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Federal Energy Regulatory Commission

Office of Hydropower Licensing

November 1993

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Final Environmental Impact Statement

Upper Androscoggin River Basin Hydroelectric Projects

New Hampshire

(FERC 2422-004, 2287-003, 2326-002, 2327-002, 2311-001, 2288-004, 2300-002)

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825 NORTH CAPITOL STREET, N.E., WASHINGTON, D.C. 20426

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FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF HYDROPOWER LICENSING

FINAL ENVIRONMENTAL IMPACT STATEMENT

RELICENSING SEVEN EXISTING PROJECTS IN THE UPPER ANDROSCOGGIN RIVER BASIN

FERC Project Nos. 2422-004, 2287-003, 2326-002, 2327-002, 2311-001, 2288-004, 2300-002

Applicants:

James River-New Hampshire Electric, Inc.
650 Main Street
Berlin, NH 03570-2489

Public Service Company of New Hampshire
1000 Elm Street, P. O. Box 330
Manchester, NH 03105

Additional copies of this Final EIS are available from:

Division of Public Information
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, DC 20426

November 1993

COVER SHEET

a. Title: Relicensing Seven Existing Projects in the Upper Androscoggin River Basin, FERC Project Nos. 2422-004, 2287-003, 2326-002, 2327-002, 2311-001, 2288-004, 2300-002.

b. Final Environmental Impact Statement

c. Lead Agency: Federal Energy Regulatory Commission

d. Abstract: James River-New Hampshire Electric, Inc. and Public Service Company of New Hampshire filed applications for new licenses (relicense) for seven projects all located within an 11-mile reach of the Upper Androscoggin River, near Berlin, New Hampshire. Two of James River's applications contain proposals for increased generating capacity. Generating capacity for the seven projects would total 55.58 MW, an increase of 15.76 MW over existing capacity.

The primary environmental resource issues are potential impacts to and effects on; (1) geologic and soils resources, (2) water quality and quantity, (3) fish, (4) terrestrial resources, (5) recreational resources, (6) aesthetic resources, (7) cultural resources, (8) air quality (9) and cumulative interactions between projects.

The staff's recommendation is to relicense the projects as proposed with additional resource enhancement and mitigation measures.

e. Contact: Mr. R. Feller
Federal Energy Regulatory Commission
Office of Hydropower Licensing (HL20.1)
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f. Transmittal: This final environmental impact statement prepared by the Commission's staff in connection with relicense applications filed by the James River-New Hampshire Electric, Inc, for the existing Sawmill Project (FERC No. 2422-004), Cross Project (FERC No. 2326-002), Cascade Project (FERC No. 2327-002), Gorham Project (FERC No. 2311-001), and Shelburne Project (FERC No. 2300-002); Public Service Company of New Hampshire for the existing J. Brodie Smith Project (FERC No. 2287-004) and Gorham Project (FERC No. 2288-3) is being made available to the public on or about November 12, 1993 as required by the NEPA of 1969 and the Commission's Regulations Implementing the National Environmental Policy Act (18 CFR Part 380).

FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)[1] and the US Department of Energy (DOE) Organization Act[2] is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary conditions:

> [T]hat the project adopted . . . shall be such as in the judgement of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e) . . . .[3]

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.[4] Compliance with such conditions during the licensing period is required. Section 385.206 (1987) of the Commissions' Rules of Practice and Procedure allows any person objecting to a licensee's compliance or noncompliance, with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.[5]

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1 16 U.S.C. §§797(a)-825(r), as amended by the Electric Consumers Protection Act of 1986, Public Law 99-495 (1986) and the Energy Policy Act of 1992, Public Law 102-486 (1992)

2 Public Law 95-91, 91 Stat. 556 (1977)

3 16 U.S.C. Sec. 803(a).

4 16 U.S.C. 803(g).

5 18 C.F.R. 385.206 (1987).

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ACRONYMS AND ABBREVIATIONS

ABF	Aquatic Base Flow
Act, the	Federal Power Act
AMC	Appalachian Mountain Club
AR	American Rivers
AWA	American White Water Affiliates
Berlin	City of Berlin, NH
BOD	biological oxygen demand
Btu/hr	British thermal unit per hour
BP	before present
Cascade	Cascade Hydroelectric Project, FERC No. 2327
Cascade Flats	Cascade Flats Neighborhood Organization
cfs	cubic feet per second
CNR	Canadian National Railroad
Commission, the	Federal Energy Regulatory Commission
Conservation Law	Conservation Law Foundation
Conservation Law, *et al.*	Conservation Law Foundation, American Whitewater Affiliation, Appalachian Mountain Club, American Rivers, and Trout Unlimited
Corps	Department of the Army, Corps of Engineers
Council, the	Advisory Council on Historic Preservation
Cross	Cross Hydroelectric Project, FERC No. 2326
DEIS	draft environmental impact statement
DO	dissolved oxygen
Dummer	Town of Dummer, NH
Environmental Services	New Hampshire Department of Environmental Services
EPA	U.S. Environmental Protection Agency
Errol	Town of Errol, NH
FERC	Federal Energy Regulatory Commission
Fish and Game	New Hampshire Fish and Game Department
fps	feet per second
FWS	U.S. Fish and Wildlife Service
Gorham, Town of	Town of Gorham, NH
GWh	gigawatthours
Historic Resources	New Hampshire Division of Historic Resources
Interior	U.S. Department of the Interior
James River	James River-New Hampshire Electric, Inc.
James River Gorham	Gorham Hydroelectric Project, FERC No. 2311
kV	kilovolt
KA	Kleinschmidt Associates
kVa	kilovolt-ampere
kW	kilowatts
kWh	kilowatthours
mgd	million gallons per day
MOA	Memorandum of Agreement
MW	megawatt
NAI	Normandeau Associates, Inc.
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NEFLOW	New England FLOW
NGVD	National Geodetic Vertical Datum
NGO	Non-governmental organization

NMFS	National Marine Fisheries Service
NPS	National Park Service
Parks and Recreation	New Hampshire Department of Parks and Recreation
Pollution Control	New Hampshire Water Supply and Pollution Control Division
ppt	parts per trillion
Public Health	New Hampshire Division of Public Health Services
Public Service	Public Service Company of New Hampshire
Public Service Gorham	Gorham Hydroelectric Project, FERC No. 2288
Sawmill	Sawmill Hydroelectric Project, FERC No. 2422
Shelburne	Shelburne Hydroelectric Project, FERC No. 2300
Shelburne, town of	Town of Shelburne, NH
SHPO	State Historic Preservation Officer, New Hampshire Division of Historic Resources
Smith	J. Brodie Smith Hydroelectric Project, FERC No. 2287
staff, the	Federal Energy Regulatory Commission's Staff
TU	Trout Unlimited
Upper Androscoggin Projects	the projects being considered in this EIS, collectively
USFS	U.S. Forest Service
USGS	U.S. Geological Survey Datum
UWPC	Union Water Power Company
WQC	Water Quality Certificate

EXECUTIVE SUMMARY

This Final EIS evaluates the potential natural resource benefits, economic costs, and the environmental impacts associated with relicensing the Sawmill, J. Brodie Smith, Cross, Cascade, James River Gorham; Public Service Gorham; and Shelburne Hydroelectric Projects in the Androscoggin River Basin near Berlin, New Hampshire.

The applicants for the projects propose:

Sawmill Project. In addition to continuing the existing run-of-river operation, James River is proposing to release a minimum flow of 12 cfs into the bypassed reach, which is about 600-feet-long. Currently, no minimum flow release is required and the bypassed reach receives a variable amount of leakage flows, generally less than 20 cfs. The project consists of a dam, about 720 feet long, a 72.5-acre reservoir, and a 3.174-MW powerhouse. No new capacity is proposed.

J. Brodie Smith Project. Public Service is not proposing any new generating capacity. However, Public Service is proposing to release a minimum flow of 10 cfs into the bypassed reach, which is about 2,600-feet-long. Currently, no minimum flow release is required and the bypassed reach receives a variable amount of leakage flows, generally less than 5 cfs. The project consists of a dam, about 500 feet long, a power canal and penstock, an 8-acre reservoir, and a 15-MW powerhouse.

Cross Power Project. James River is not proposing any changes to the existing project or its operation. The project consists of a dam, about 467 feet long, a 22-acre reservoir, and a 3.22-MW powerhouse.

Cascade Project. James River proposes to continue the existing project's run-of-river operation with a few major modifications: (1) to modify Unit 1 in the Cascade powerhouse to increase its efficiency and (2) James River is also planning to add, on the eastern shore of the river, another intake structure, a penstock with surge tank, and a 14.3-MW powerhouse, Pulsifer Rips. The existing project consists of a dam, about 583 feet long, a 28-acre reservoir, and a 7.92-MW powerhouse. Total new capacity of the project would be 22.22 MW. Further, James River proposes to release a minimum flow of 6 cfs into the reach bypassed by the Cascade powerhouse and 400 cfs into the reach bypassed by the proposed Pulsifer Rips powerhouse. Currently, no minimum flow release is required and the reach bypassed by the Cascade powerhouse receives a variable amount of leakage flows, generally less than 6 cfs.

James River Gorham Project. James River is proposing to replace two existing generator exciters with a new unit with a rated capacity of 1.3 MW and to release a minimum flow of 50 cfs into the bypassed reach, which is about 4,500-feet-long. Currently, no minimum flow release is required and the bypassed reach receives only un-quantified leakage flows. The project consists of a dam, about 775 feet long, a 45-acre reservoir, a power canal, and a 4.8-MW powerhouse. Total new capacity would be 6.1 MW.

Public Service Gorham Project. Public Service is not proposing any new generating capacity. However, Public Service is proposing to release a minimum flow of 50 cfs into the bypassed reach, which is about 800-feet-long. Currently, no minimum flow release is required and the bypassed reach receives only un-quantified leakage flows. The project consists of a dam, 417 feet long, a 32-acre reservoir, a power canal, and, a 2.15-MW powerhouse.

Shelburne Project. James River is proposing to raise the Shelburne Project reservoir level by 1.7 feet, increasing the reservoir surface area by about 40 acres. The project consists of a dam, about 700 feet long, a 210-acre reservoir, and a 3.72-MW powerhouse.

The action of relicensing these projects involves tradeoffs between energy production and enhancement of environmental quality. The staff formulated alternatives, and evaluated impacts to respond to concerns raised during the scoping process. In developing preliminary recommendations, we gave equal consideration to developmental and nondevelopmental values in accordance with the Federal Power Act.

The issues addressed in this EIS are impacts to and effects on; (1) geologic and soils resources, (2) water quality and quantity, (3) fisheries resources, (4) terrestrial resources, (5) recreational resources, (6) aesthetic resources, (7) cultural resources, (8) air quality (9) and cumulative interactions between projects.

Alternatives to the applicants' proposals considered in detail are (1) modification to proposed project operation or facilities to further protect, enhance, or mitigate adverse impacts to environmental resources and values and (2) no action.

We conclude that the projects if licensed as proposed would result in the following generation, costs[6], impacts, and enhancements:

Sawmill: Annual generation	17.78 GWh
additional cost	$8,000/yr
Adverse or beneficial effects	Beneficial effects on fish, water quality, and recreation
Enhancement	• 12-cfs minimum flow in bypassed reach (there is currently no minimum flow requirement) • recreation facilities
J. Brodie Smith: Annual generation	104.01 GWh
additional cost	$17,000/yr
Adverse or beneficial effects	Beneficial effects on fish, water quality, and recreation
Enhancement	• 10-cfs minimum flow in bypassed reach (there is currently no minimum flow requirement) • wildlife measures • lands reserved for recreation
Cross Power: Annual generation	19.20 GWh
additional cost	negligible
Adverse or beneficial effects	None
Enhancement	None
Cascade: Annual generation	93.76 GWh
additional cost	$79,000/yr
Adverse or beneficial effects	• spillage at dam reduced • flows in additional bypassed reach (Pulsifer Rips) of the river reduced • increase fish impingement and entrainment • short term turbidity increase

[6] Costs are increases above the baseline, *i.e.* projects operated under current license conditions.

Enhancement/mitigation	• erosion control measures • 400-cfs minimum flow in Pulsifer bypass • 6-cfs minimum flow in upper bypassed reach (there is currently no minimum flow requirement) • angler access facility • cultural resource measures • aesthetic measures
James River Gorham: Annual generation	33.50 GWh
additional cost	$65,000/yr
Adverse or beneficial effects	• dam spillage reduced
Enhancement/mitigation	• 50-cfs minimum flow in bypassed reach (there is currently no minimum flow requirement) • cultural resource measures
PSNH Gorham: Annual generation	13.63 GWh
additional cost	$10,000/yr
Adverse or beneficial effects	Beneficial effects on fish, water quality, and recreation, and wildlife resources
Enhancement	• 50-cfs minimum flow in bypassed reach (there is currently no minimum flow requirement)
Shelburne: Annual generation	20.00 GWh
additional cost	negligible
Adverse or beneficial effects	• 2,500-ft reach eliminated • wetlands loss • DO concentration decreased
Enhancement	None
All projects cumulatively:	
Annual generation	301.88 GWh
additional cost	$179,000/yr
Adverse or beneficial effects	• water levels stabilized • DO concentration decrease • toxic pollutants trapped in sediments • downstream fish movement impeded • increases fish impingement and entrainment
Enhancement/mitigation	• water quality monitoring and measures • downstream movement of fish improved • salmonid habitat improved

Our recommendations and modifications to the projects as proposed would result in the following generation, costs, and additional enhancements which would, in most cases, have beneficial project specific and cumulative effects:

Sawmill: Annual generation	17.78 GWh
additional cost	$8,000/yr
Adverse or beneficial effects	Additional beneficial effects on fish, recreation, and cultural resources

Enhancement	• 12 cfs minimum flow in bypass • reservation authority to prescribe fish passage facility • improve boat launch area • provisions for disabled • cultural resource measures
J. Brodie Smith: Annual generation	103.67 GWh
additional cost	$40,000/yr
Adverse or beneficial effects	Additional beneficial effects on fish, water quality, and visual resources
Enhancement	• reservation authority to prescribe fish passage facility • 20-cfs minimum flow in bypass (for more effective fish passage than applicant's 10 cfs) • aesthetic measures
Cross Power: Annual generation	19.20 GWh
additional cost	negligible
Adverse or beneficial effects	Additional beneficial effects on recreation, visual, and cultural resources
Enhancement	• reservation authority to prescribe fish passage facility • public access • aesthetic measures • cultural resource measures
Cascade: Annual generation	89.25 GWh
additional cost	$617,000/yr
Adverse or beneficial effects	Additional beneficial effects on fish, recreation, cultural, and visual resources
Enhancement/mitigation	• 100-cfs interim minimum flow in upper bypassed reach (applicant proposes 6 cfs) • assessment to determine permanent releases • downstream fish bypass and fish protection • increased public access • additional cultural resource measures • additional aesthetic measures
James River Gorham: Annual generation	30.36 GWh
additional cost	$440,000/yr
Adverse or beneficial effects	Additional beneficial effects on fish, water quality, recreation, cultural, and visual resources
Enhancement/mitigation	• 200 and 400-cfs minimum flow in bypassed reach to provide optimum habitat for rainbow and brook trout (applicant proposes 50 cfs) • downstream fish passage and fish protection • public access • cultural resource measures • aesthetic measures

PSNH Gorham: Annual generation	12.68 GWh
additional cost	$213,000/yr
Adverse or beneficial effects	Additional benefits on fish, water quality, recreation, and visual resources
Enhancement	• 200-cfs minimum flow in bypassed reach to provide optimum habitat for rainbow trout, brook trout, and fallfish (applicant proposes 50 cfs) • downstream fish bypass and fish protection • public access • aesthetic measures
Shelburne: Annual generation	20.00 GWh
additional cost	negligible
Adverse or beneficial effects	Additional beneficial effects on wildlife, recreation, visual, and cultural resources
Enhancement/mitigation	• reservation authority to prescribe fish passage facility • wetland measures • public access • aesthetic measures • cultural resource measures
All projects cumulatively: Annual generation	292.94 GWh (compared to 301.88 GWh as proposed)
additional cost	$1,318,000/yr (compared to $179,000/yr as proposed)
Adverse or beneficial effects	Additional beneficial effects on fish, water quality, recreation, visual, and cultural resources
enhancement/mitigation	• optimum trout habitat in over 2.6 miles of the Androscoggin River currently receiving either excessive flows or inadequate flows • additional minimum flow releases to protect and enhance water quality • downstream fish bypass and fish protection facilities • increased recreational facilities including two river overlook areas, an angler access facility, a trail, an upgraded boat launch site, a tailrace fishing facility, improved parking areas, reservation of land for future use, and access for the physically challenged • additional cultural resources measures • additional aesthetic measures including vegetative screening and buffer zone ares • a shoreline buffer zone to protect recreatioual, aesthetic, and other environmental values

1. PURPOSE AND NEED FOR ACTION

1.1 Purpose of action

The proposed action by the Commission is to issue new licenses (relicense) for the continued operation of seven hydroelectric projects located on the Upper Androscoggin River. All the projects are located in Coos County, New Hampshire near Berlin (Table 1-1, Figure 1-1). This Environmental Impact Statement (EIS) is prepared as required by the NEPA[1] and FERC regulations, to provide the Commission with descriptions and evaluations of the potentially significant environmental and developmental effects associated with the projects.

1.2 Need for power

1.2.1 James River

James River-New Hampshire, Inc. (James River) has applied for new licenses for five of its hydroelectric projects on the Androscoggin River in New Hampshire: (1) Sawmill; (2) Cross Power; (3) Cascade: (4) Gorham, FERC No. 2311; and (5) Shelburne.

The five projects are owned by the applicant, James River.
James River is a totally-owned subsidiary of the James River Paper Company (James River Paper), which is, in turn a subsidiary of the James River Corporation. The purpose of the applicant's electric generating resources is to supply electric power --capacity and energy-- to meet a portion of the James River Paper's requirements.

Table 1-1. Upper Androscoggin River Basin hydroelectric projects evaluated in this EIS (listed from upstream to downstream). Source: Staff.

Projects	Project Numbers	Existing Capacity (MW)	Total Proposed Capacity (MW)
Sawmill	2422	3.17	3.17
J. Brodie Smith	2287	15.00	15.00
Cross Power	2326	3.22	3.22
Cascade	2327	7.92	22.22
Gorham	2311	4.80	6.10
Gorham	2288	2.15	2.15
Shelburne	2300	3.72	3.72
Totals		39.98	55.58

The pulp and paper products industry is highly competitive and energy-intensive. James River's competitive position depends heavily on the availability of a reliable source of low-cost electric power.

James River and its predecessors have been depending on low-cost electric power from these five projects for periods of time ranging from 64 years to 91 years. These lengthy periods of supply service have given James River adequate time to recover construction costs of the projects and reduce fixed-charge expenses. Additionally, these long periods of operation have established, in adequate fashion, both the short term and long term needs for electric power equivalent to the combined outputs of the five projects listed above.

James Rrver supplies James River Paper's total electric power requirements. Approximately 54 percent of these requirements are met by James River's hydropower generation, 23 percent by cogeneration facilities and the remaining 23 percent by purchases from the Public Service Company of New Hampshire

[1] P.L. 91-90, 42 U.S.C. 4341 (January 1, 1970), as amended by P.L. 94-52 (July 3, 1975) and P.L. 94-83 (August 9, 1975).

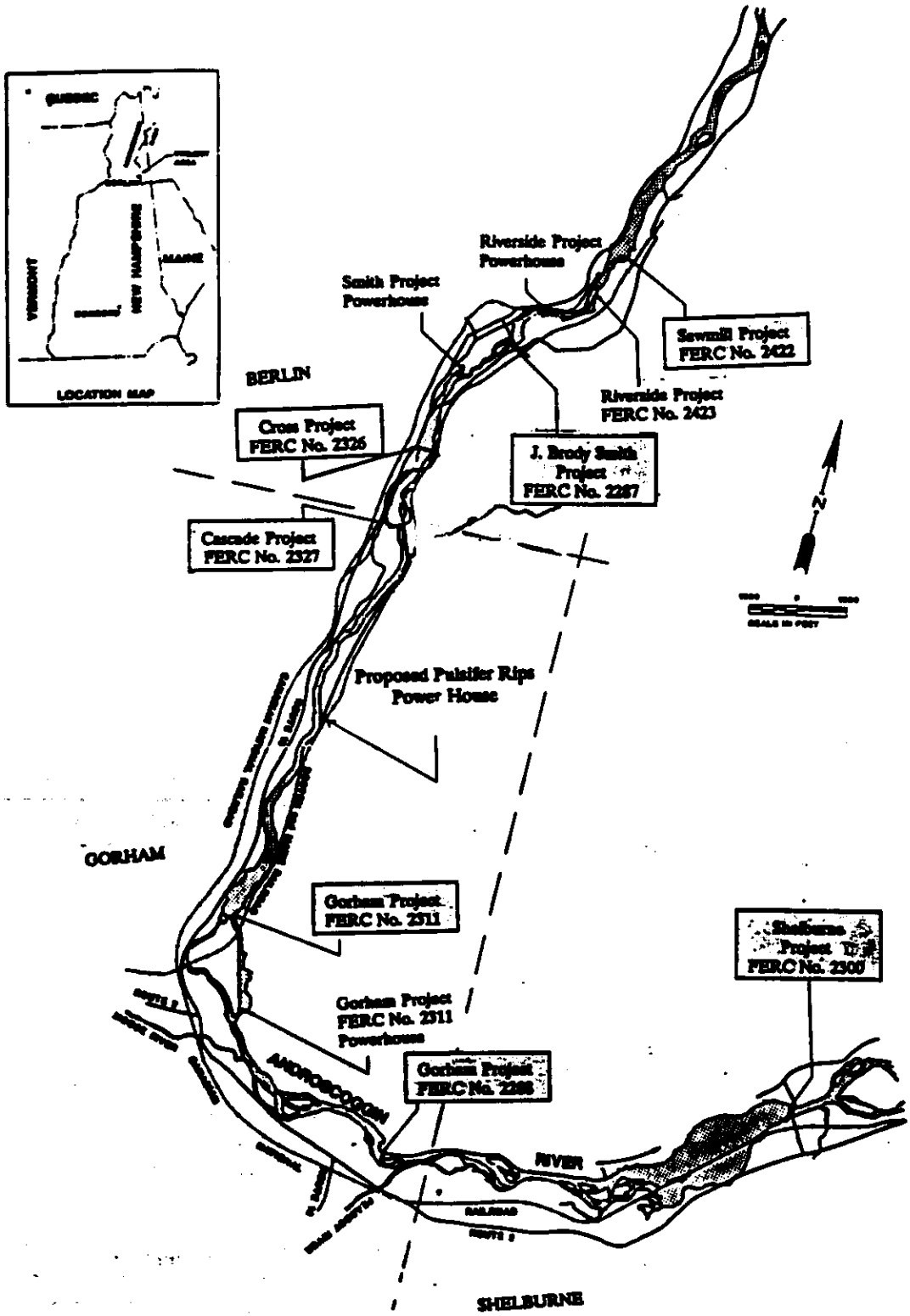

Figure 1-1. Location of existing hydroelectric projects in the Upper Androscoggin River Basin, New Hampshire. Projects in rectangles are being considered in this EIS.

(Public Service).

1.2.2 Public Service

Public Service is applying for new licenses for two of its hydroelectric projects: J. Brodie Smith and Public Service Gorham.

Two units of the Public Service Gorham Project have been supplying their output to the distribution grid of Public Service for 76 years. The other two Public Service Gorham units have been supplying their output to the grid for 70 years. The J. Brodie Smith unit has been in operation for 45 years. The electricity produced by the Public Service Gorham and J. Brodie Smith projects has been needed by the applicant for a substantial period of time. Perpetually continuing demand growth will ensure the long term need for the electricity generated by both projects.

Public Service reports to the New England Power Pool (NEPOOL), which, together with the New York Power Pool (NYPP) constitute the Northeast Power Coordinating Council (NPCC). A report entitled "The Regional Reliability Council Long Range Coordinated Bulk Power Supply Programs Report" is prepared by NPCC from data reported by NYPP and NEPOOL. The NPCC report is published in April of each year, and is referred to by the industry as the DOE form IE-411 Report --or simply as the IE-411 Report.

The IE-411 Report gives projected summer and winter peak hour demand data, capacity resources data and projected annual energy requirements data for each year of the 10-year planning period. NEPOOL and NYPP data are presented separately.

In the introduction to the NEPOOL portion of the 1992 NPCC IE-411 Report, it is reported that the annual compound growth rate for the summer peak load is forecasted to be 1.9 percent for the 1992 through 2001 planning period, und 1.6 percent for the winter peak load. The corresponding compound annual growth rate for annual energy requirements is projected to be 1.8 percent. These projections support Public Service's long term need for the electricity generated by the J. Brodie Smith and Public Service Gorham projects.

1.3 Scope of the EIS

Conservation Law *et al.* filed petitions on July 6, 1992, requesting, among other things, that a comprehensive EIS be prepared and that pending applications for all 5 James River's projects and both Public Service's projects be consolidated in single proceedings. Conservation Law *et al.* requested that a comprehensive EIS should address impacts of all Androscoggin River hydro-projects now and soon to be filed, but, at a minimum, the comprehensive EIS should cover the 5 James River and 2 Public Service projects and include a cumulative impact analysis of the entire Androscoggin River Basin.

In response to Conservation Law *et al.*'s petitions, we issued notice in October 1992, of our intent to prepare an EIS that would analyze 5 existing James River projects, 2 existing Public Service projects, and the proposed Alpine project. The notice also scheduled scoping meetings.

We reviewed public and agency comments filed with the Commission; visited the sites in November 1992; held a public scoping meeting in the City of Berlin, NH on November 18, 1992; held a scoping meeting in Concord, NH on November 19, 1992; and reviewed public aud agency comments resulting from this process.

During the scoping process, Conservation Law, *et al.* recommended that the scope of the EIS be expanded to address all the hydropower projects in the Androscoggin Basin which are unlicensed, undergoing review for licensing now, and soon to undergo review for licenses expiring in 1999, that is a "program impact statement". Specifically the EIS should include analysis of the effects of projects (1) downstream from the Berlin-Gorham reach of the Androscoggin River: Rumford Falls[2] (FERC No. 2333); Gulf Island and Deer Rips (FERC No. 2283); Riley, Jay, and Livermore (FERC No. 2375); Otis (FERC No. 8277); and (2) upstream from the Berlin-Gorham reach: Errol[3] (FERC No. 3133); Middle Dam; Upper Dam; Rangeley Dam; Aziscohos (FERC No. 4026); and Kennebago (FERC No. 4413) (see Table 1-2 and Figure 1-2). Conservation Law, *et al.* reiterated that even if the need for a "program impact statement" is rejected, the EIS must consider the cumulative effects of all federal actions on the Androscoggin River. EPA and Cascade Flats generally agree with this recommendation. (CLF, *et al.* letter dated November 23, 1992, EPA letter dated November 23, 1992, and in FERC, 1992a and 1992b).

We agree with the need for an assessment of cumulative impacts, but have chosen not to assess the 10 additional projects in this EIS for various reasons discussed below. The status of the projects identified by the Conservation Law, *et al.* is shown in Table 1-2. We are analyzing cumulative effects from all uses of the Androscoggin River especially as they relate to hydropower development in this EIS[4]. In addition, we have conducted cumulative impact analyses on the Rumford Falls Project and will analyze the Deer Rips Project in project-specific Environmental Assessments (EA) as we did for the Riverside Project (FERC Project No. 2423) (the new license was issued on May 12, 1992). For the remaining projects listed in Table 1-2, we will analyze cumulative impacts of hydropower projects, factoring in all operating projects and other activities on the river at the time the analysis is initiated. Environmental analyses for these projects will be initiated when license or relicense applications are received and accepted. We'll use the conclusions on this EIS in subsequent NEPA analyses.

Our decision to analyze only the relicense applications for the 7 projects in this EIS is based primarily o the following:

First, the detailed information gathering and studies we need for our NEPA analysis is inextricably intertwined with license processing. If the licensing process for projects is not fairly closely synchronized, enhancement measures or developmental benefits could be unreasonably delayed for projects closest to license issuance. For example, licenses for Riley, Jay, Livermore, and Otis expire in 1999. Applications for new licenses could be filed as late as December 31, 1997. The Commission's jurisdiction over headwaters reservoirs (Rangeley Dam, Upper Dam, and Middle Dam) is in the process of being determined now. If these projects are deemed jurisdictional this year, it could take 3 to 5 years before they are ready for environmental analysis. We believe that we could not justify the 3 to 5 year delay in relicensing the projects considered in this EIS and the improvements to environmental resources that would result.

Second, although a basin-wide approach is preferable, in general, any cumulative effects analysis requires us to consider the distribution of the environmental resources in the basin which may vary

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[2] Rumford Falls is the closest of these projects to the 7 projects being analyzed in this EIS, about 35 miles downstream from Shelburne.

[3] Errol is the closest of there projects to the 7 projects being analyzed in this EIS, about 30 miles upstream from Sawmill.

[4] Based on comments on the DEIS, to make our evaluation of cumulative effects on all resources clearer, we eliminated references to target resource.

considerably. The interaction of water uses and projects to cumulatively affect environmental resources diminishes with distance between them. This is particularly true in the Androscoggin Basin for water quality and resident salmonids. Cumulative effects of the projects in this EIS do not impact water quality and resident salmonids at the Rumford Falls and Deer Rips projects, about 35 and 77 miles, respectively, downstream of the Shelburne Project (see Figure 1-2), the NEPA analysis of these projects is being done in separate EA's.

We believe our approach is reasonable. Re-opener articles in licenses already issued and in any new licenses for these seven projects would allow imposition of additional unforseen measures determined to be necessary by subsequent analyses[5].

Based on the scoping process, we prepared and distributed to agencies, NGOs, the public, and interested parties a document entitled *Scoping Document II*, which identifies the issues to be addressed in the draft EIS. These issues include potential impacts to and effects on (1) geology and soils, (2) water quality and quantity, (3) fisheries resources, (4) terrestrial resources, (5) recreational resources, (6) aesthetic resources, (7) cultural resources, and (8) air quality. The draft EIS was sent out for comment on June 2, 1993. Comments were received and are addressed herein.

The Alpine Project, FERC No. 9713, a minor project on Alpine Cascade Brook, had been identified for assessment. The application for this project was dismissed on January 29, 1993, because the applicant did not file additional information we requested. Consequently there is no proposal for hydroelectric development on Alpine-Cascade Brook. The effects of an Alpine-Cascade Brook project are not analyzed in this EIS.

[5] The Commission discusses the use of re-opener articles to ameliorate unanticipated cumulative impacts in greater detail in its September 15, 1993, Notice of Proposed Policy Statement, Use of Reserved Anthority in Hydropower Licensing to Ameliorate Cumulative Impacts (Docket No. RM93-25-00).

Table 1-2. Existing hydropower projects in the Androscoggin River Basin listed in order from the mouth to the headwaters. Source: Staff.

FERC Project No.	Name	River	Capacity (MW)	License expiration	Map Key[a]
2284	Brunswick	Androscoggin	19.600	2/28/29	1
4784	Pejebscot	Androscoggin	13.880	8/31/22	2
None	East Worumbo	Androscoggin	.900	NA	3
3428	West Worumbo	Androscoggin	19.100	1/30/25	4
2808[b]	Lower Barker's Mill	Little Androscoggin	1.500	1/31/19	
3562[b]	Upper Barker's Mill	Little Androscoggin	.950	8/31/23	
6398[b]	Hackett Mill	Little Androscoggin	.485	8/31/24	
None	Marcal	Little Androscoggin	1.320	NA	
8411[c]	Biscoe Falls	Little Androscoggin	.050	NA	
2302	Lower Androscoggin	Gulley Brook	.270	8/31/26	
11006[b]	Upper Androscoggin	Lewiston Canal	.995	8/31/26	
2302	Continental Mills	Lewiston Canal	1.584	8/31/26	
2302	Bates 2	Lewiston Canal	.450	8/31/26	
2302	Hill Mill	Lewiston Canal	2.160	8/31/26	
2302	Bates Weave Shed	Lewiston Canal	3.900	8/31/26	
None	Lewiston	Lewiston Canal	.750	NA	
2302	Lewiston Falls	Androscoggin	28.440	8/31/26	5
2283	*Deer Rips*	*Androscoggin*	*6.540*	*12/31/93*	*6*
2283	*Androscoggin No. 3*	*Androscoggin*	*3.600*	*12/31/93*	*7*
2283	*Gulf Island*	*Androscoggin*	*19.200*	*12/31/93*	*8*
2375	Livermore Mill	Androscoggin	8.615	9/30/99	9
8277	Otis Falls	Androscoggin	10.350	9/30/99	10
2375	Jay	Androscoggin	3.125	9/30/99	11
2375	Riley Mill	Androscoggin	7.800	9/30/99	12
9079[c]	Upper Spears	Spears Stream	.050	NA	
8321[c]	Thurston Mill	Swift	.338	NA	
2333	*Lower Rumford Falls*	*Androscoggin*	*12.800*	*12/31/93*	*13*
2333	*Upper Rumford Falls*	*Androscoggin*	*26.550*	*12/31/93*	*14*
8505[c]	Abbots Mills	Concord	.040	NA	
9421[c]	Gardner Brook	Gardner Brook	.060	NA	
8450[c]	Stony Brook	Stony Brook	.035	NA	
7591[c]	Wight Brook	Wight Brook	.025	NA	
9384[c]	Whites Brook	Whites Brook	.040	NA	
2300	Shelburne	Androscoggin	3.720	12/31/93	15
2300	Gorham	Androscoggin	2.150	12/31/93	16
2311[d]	Gorham	Androscoggin	4.800	12/31/93	17
2327[d]	Cascade	Androscoggin	7.920	12/31/93	18
2326	Cross	Androscoggin	3.220	12/31/93	19
2287	J. Brodie Smith	Androscoggin	15.000	12/31/93	20
2423	Riverside	Androscoggin	7.400	12/31/33	21
2422	Sewmill	Androscoggin	3.174	12/31/93	22
2861	Pontook	Androscoggin	9.900	7/31/23	23
3133	Errol	Androscoggin	2.031	7/31/23	24
4026	Aziscohos	Magalloway	5.200	3/31/25	25
None	Middle Dam	Rapid	None	NA	26
None	Upper Dam	Rapid	None	NA	27
None	Rangeley Dam	Rangeley Stream	None	NA	28
4413[c]	Kennebago Falls	Kennebago	.800	NA	29
4413[c]	Mahaney	Kennebago	.100	NA	
8417[c]	Yarmouth	Royal	.270	NA	

Key:
[a] see Figure 1-2 for locations
[b] minor project
[c] exemption
[d] pending relicense application includes increased capacity

Projects in bold are specifically considered in this EIS, italics show projects to by analyzed by EA.

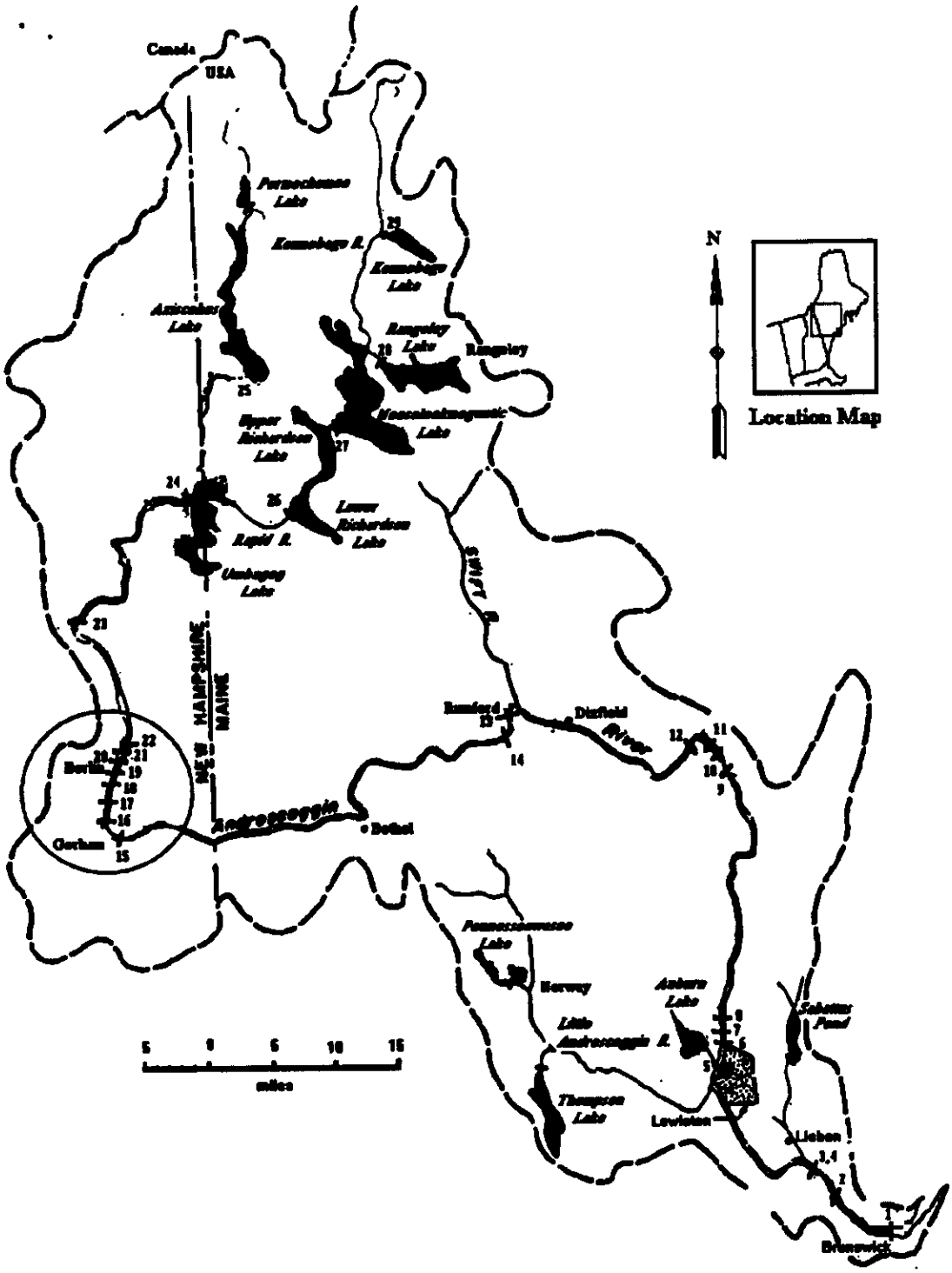

Figure 1-2. The Androscoggin River Basin showing major tributaries and existing projects on the main stem of the river and in the headwaters (see Table 1-2 for the key to projects). Projects being analyzed in this EIS are within the circled area.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 Projects as proposed

2.1.1 Project facilities

Beginning with the most upstream project, a description of each of the 7 projects follows. All projects are or would be located in Coos County, New Hampshire near the City of Berlin. They are all on the Androscoggin River. The location of each of the 7 projects is shown in Figure 1-1. The Androscoggin River drains an area of about 1,494 square miles at the Shelburne Project's dam (most downstream of the projects evaluated in this EIS). All projects would continue their present run-of-river operation.

Sawmill Project (Figure 2-1). In addition to continuing the existing run-of-river operation, James River is proposing to release a minimum flow of 12 cfs into the Sawmill bypassed reach[1], which is about 600-feet-long. This proposal would decrease the average annual generation from 17.85 GWh to 17.78 GWh.

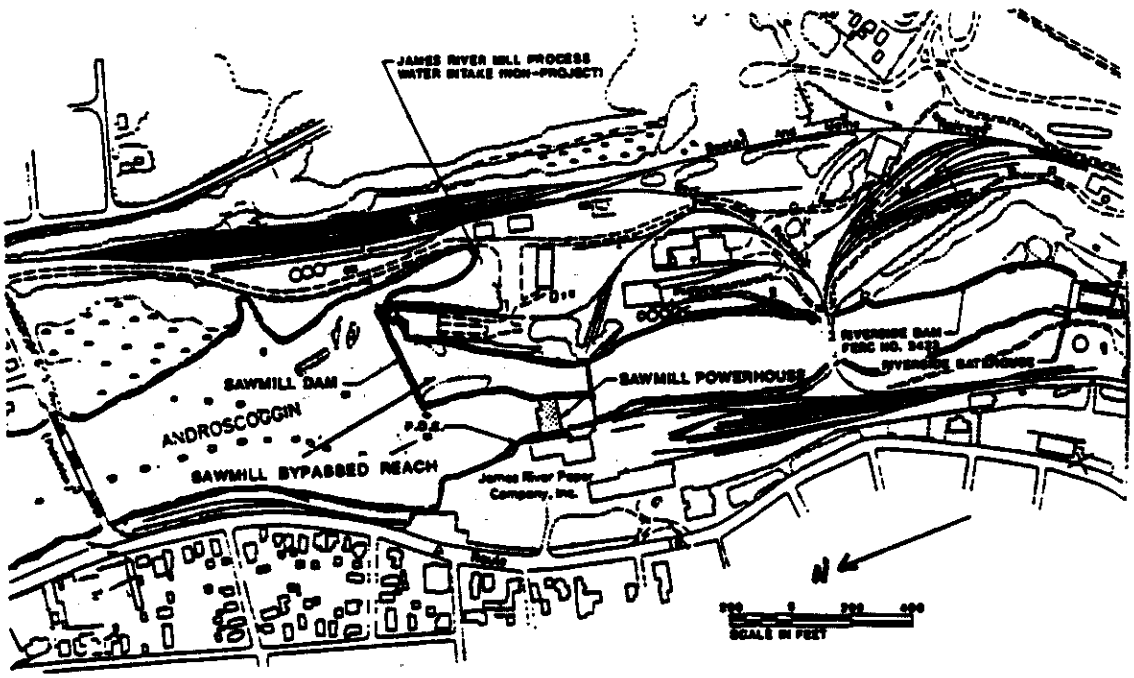

Figure 2-1. Layout diagram for the Sawmill Project FERC No. 2422. Source: Staff modified from James River (1991a).

The project consists of (1) a dam, which has a total length of about 720 feet and a maximum height of 15 feet, with (a) a spillway section, about 168 feet long by 6 to 14 feet high, with a crest elevation of 1094.1 feet (USGS), topped with 0.5-foot-high timbers, (b) a wastegate section, about 134 feet long by 22 feet

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1 A bypassed reach of the river occurs, for example, when water used for power generation is diverted from a river channel, passed through a power house, often via a penstock or a canal, and returned to the river some distance downstream.

high, with a sill elevation of 1081.5 feet (USGS), topped with five wooden gates, each measuring 18 feet wide by 13 feet high, (c) a spillway section, about 100 feet long by 2 feet high, with a crest elevation of 1094.2 feet (USGS), topped with 0.5-foot-high timbers, (d) a spillway section, 145 feet long by 11 feet high, with a crest elevation of 1093.2 feet (USGS), topped with 21-inch-high permanent flashboards, (e) a spillway section, about 36 feet long by 2 feet high, with a crest elevation of 1094.2 feet (USGS), topped with 0.5-foot-high timbers, and (f) a spillway section, about 137 feet long by 15 feet high, with a crest elevation of 1087.0 feet (USGS), topped with crescent-shaped hinged flashboards, about 7.5 feet high; (2) a concrete, brick, and steel powerhouse integral with the dam, about 65 feet wide by 115 feet long, with four hydroelectric generating units having (a) a total rated capacity of 3.174 megawatt (MW), (b) a hydraulic capacity of 2,484 cfs, and (c) an average design head of 17 feet; (3) a reservoir with a surface area of about 72.5 acres, at a water surface elevation of 1094.5 feet (USGS); (4) a 22.0-kilovolt (kV), 900-foot-long primary transmission line; and (5) appurtenant facilities.

J. Brodie Smith Project (Figure 2-2). Public Service is not proposing any new development. However, in addition to the existing leakage of 5 cfs, Public Service is proposing to release a minimum flow of 10 cfs, April through November, into the Smith bypassed reach, which is about 2,600-feet-long. This

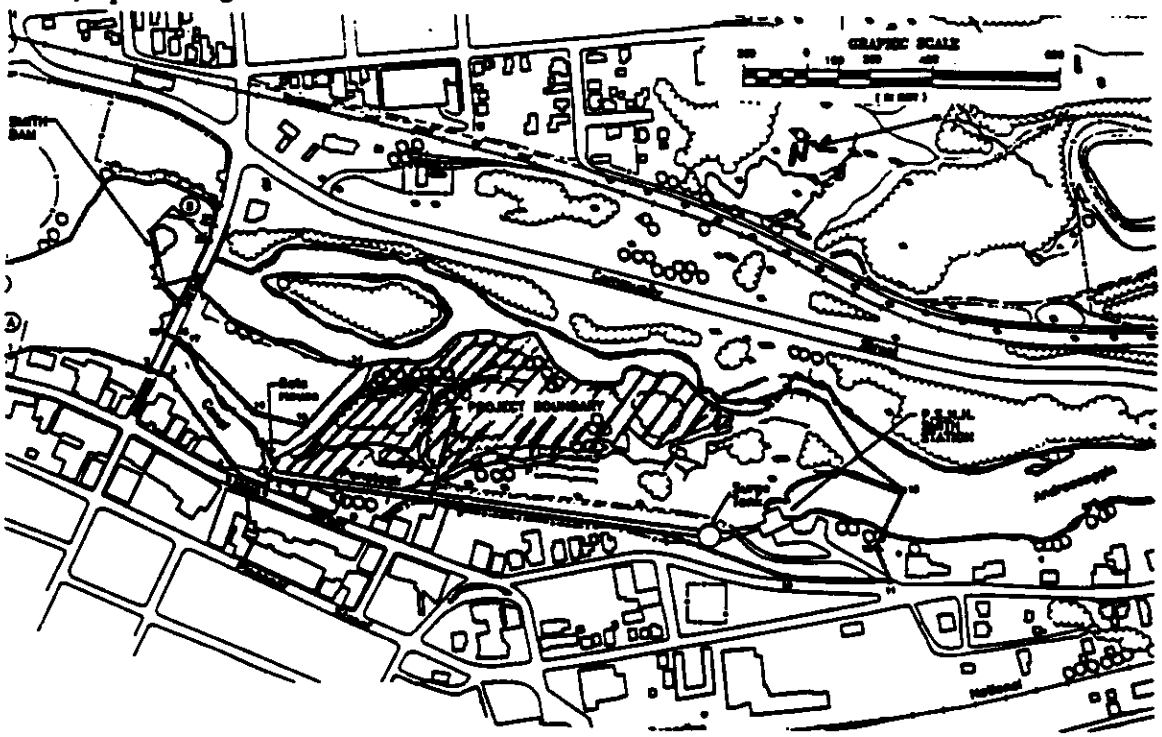

Figure 2-2. Layout diagram for the J. Brodie Smith Project FERC No. 2287. Cross hatched area to be reserved in an undeveloped state. Source: Staff modified from PSNH (1991a).

proposal would decrease the average annual generation from 104.26 GWh to 104.01 GWh.

The project consists of (1) a masonry and concrete gravity U-shaped dam, about 500 feet long with a maximum height of about 24 feet, with a (a) a spillway section, 170 feet long, with a crest elevation of 1002.96 feet (USGS), topped with hinged steel flashboards, about 6.7 feet high; separated by (b) two S. M. Smith steel roller-type sluice gates, each 17 feet high by 25 feet wide, with a sill elevation of 993.0 feet (USGS), (c) a second spillway section, 256 feet long, with a masonry crest elevation of 1006.7 feet (USGS), topped with pin-supported wooden flashboards, about 3 feet high; (2) an intake structure, consisting of (a) a 500-foot-long by 100-foot-wide power canal, (b) an 18-foot-diameter by 1,450-foot-long steel penstock, and

(c) a 1.15-million-gallonsteel surge tank, measuring 70 feet in diameter by 40 feet high; (3) a powerhouse, 65 feet long by 53 feet wide, with one hydroelectric generating unit (a) rated at 15.0 MW, (b) a hydraulic capacity of 3,000 cfs, (c) a normal operating head of 88 feet; and (4) a reservoir with a water surface area of 8 acres, at a normal headwater elevation of 1009.7 feet (USGS); (5) a 115-kV, 1,500-foot-longprimary transmission line; and (6) appurtenant facilities.

Cross Power Project (Figure 2-3). James River is not proposing any changes to the existing project or its operation. The project's average annual generation would be about 19.2 GWh.

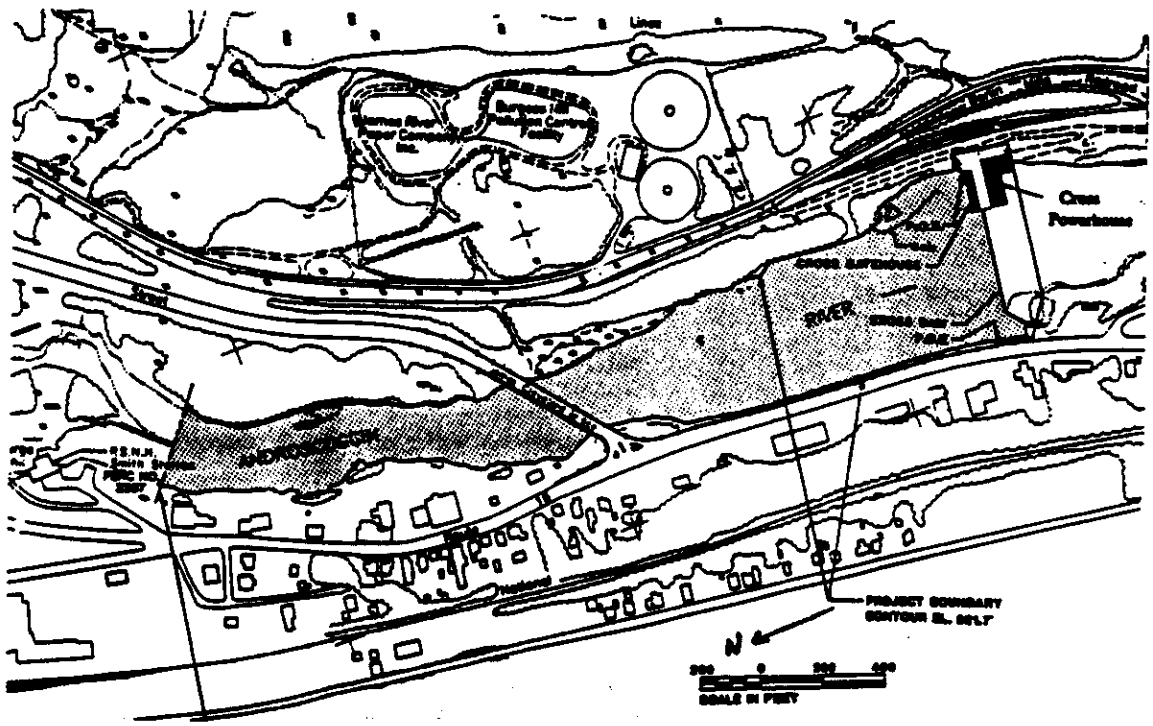

Figure 2-3. Layout diagram for the Cross Power Project FERC No. 2326. Source: Staff modified from James River (1991d).

The project consists of (1) a dam, about 467 feet long, with (a) a 103-foot-long non-overflow section, (b) a 276-foot-long by 25-foot-high spillway, with a crest elevation of 918.2 feet (USGS), topped with 3.5-foot-high flashboards, (c) a 38-foot-long wastegate structure which is no longer used comprised of two gates, about 15.5 feet wide and 9 feet wide. The wastegate structure presently functions with flashboards as an extension of the uncontrolled spillway, and (d) a retaining wall about 50.5 feet long; (2) a gatehouse, integral with the dam, about 19 feet wide by 124 feet long; (3) a concrete and brick powerhouse, about 47 feet wide by 146 feet long, with five hydroelectric generating units having (a) a total rated capacity of 3.22 MW, (b) a hydraulic capacity of 2,600 cfs, and (c) a design head of about 20 feet; (4) a reservoir with a surface area of about 22 acres, at a water surface elevation of 921.7 feet (USGS); (5) a 22-kV, 20-foot-long primary transmission line; and (6) appurtenant facilities.

Cascade Project (Figure 2-4). James River proposes to continue the existing project's run-of-river operation with a few major modifications: (1) James River is proposing to modify Unit 1 in the Cascade powerhouse to increase its efficiency and allow it to operate at a lower minimum hydraulic capacity. This modification would change the existing hydraulic capacity range of 870 - 2,690 cfs to 400 - 2,320 cfs. Unit 1 would be used for passing a minimum flow release of 400 cfs into the Pulsifer Rips bypassed reach, which is

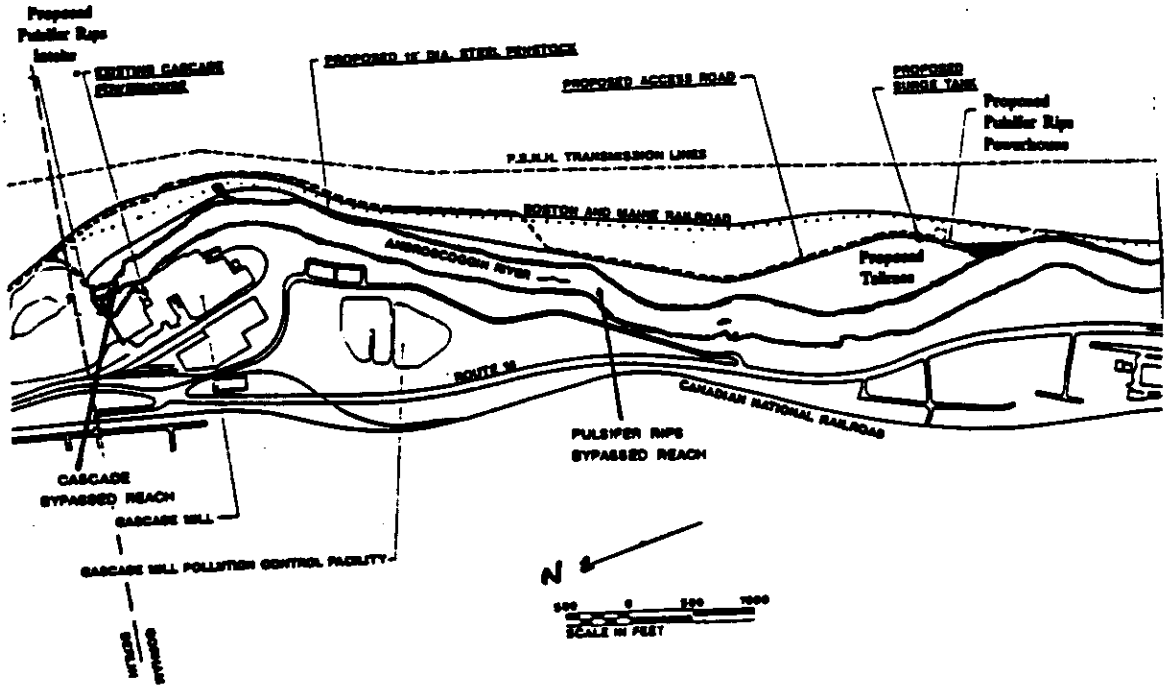

Figure 2-4. Layout diagram for the Cascade Project FERC No. 2327. Source: Staff modified from James River (1989).

about 7,750-feet-long. (2) James River is also planning to add, on the eastern shore of the river, another intake structure, a penstock with surge tank, a powerhouse (the Pulsifer powerhouse), with one generating unit, a tailrace, a short transmission line, and appurtenant facilities.

James river estimates that the proposed Pulsifer unit would generate about 87.65 GWh of energy annually, using some of the water that would otherwise be used at the Cascade powerhouse. The addition of the Pulsifer powerhouse would increase the existing project generation from 52.6 GWh to 103.3 GWh annually. The relicensed project would have a total rated capacity of 22.22 MW and a hydraulic capacity range of 400 to 4,920 cfs.

The existing project consists of (1) an existing concrete dam, with a total length of about 583 feet, with two spillway sections: (a) an ogee semi-orbicular shaped spillway section, about 313 feet long with a maximum height of about 53 feet, at a crest elevation of 898.4 feet (USGS), topped with 3-foot-high flashboards, and (b) a gated forebay spillway structure, about 168 feet long by 15 feet wide, with a sill elevation of 886.5 feet (USGS), topped with 7 operable and 7 inoperable log gates, each about 9 feet wide by 11 feet high; (2) an existing concrete/brick powerhouse, about 43 feet wide by 135 feet long, with three hydroelectric generating units having (a) a total rated capacity of 7.92 MW, (b) a proposed hydraulic capacity range of 400 to 2,320 cfs (existing 870 - 2,690 cfs), and (c) a design head of about 45 feet; (3) a reservoir with a surface area of about 28 acres, at a water surface elevation of 901.4 feet (USGS); (4) an existing 22-kV, 50-foot-long primary transmission line; and (5) appurtenant facilities. There is a bypassed reach, about 400 feet long, between the existing Cascade dam and tailrace.

The proposed Pulsifer development would consist of (1) a new intake structure; (2) an 18-foot-diameter by 7,400 foot-long penstock connected to a surge tank about 60 feet in diameter by 100 feet high; (3) a new powerhouse, 35 feet wide by 99 feet long, containing a single electric generating unit with (a) a

rated capacity of 14.3 MW, (b) a hydraulic capacity of 2,600 cfs, (c) a net head of about 71.7 feet; (4) a new 22.0-kV, 100-foot-long transmission line; and (5) appurtenant facilities.

James River Gorham Project (Figure 2-5). James River is proposing to replace two existing generator exciters with a new unit with a rated capacity of 1.3 MW, a hydraulic capacity of 600 cfs, and a design head of 29 feet. This change would increase the project's average annual energy generation from 29.1

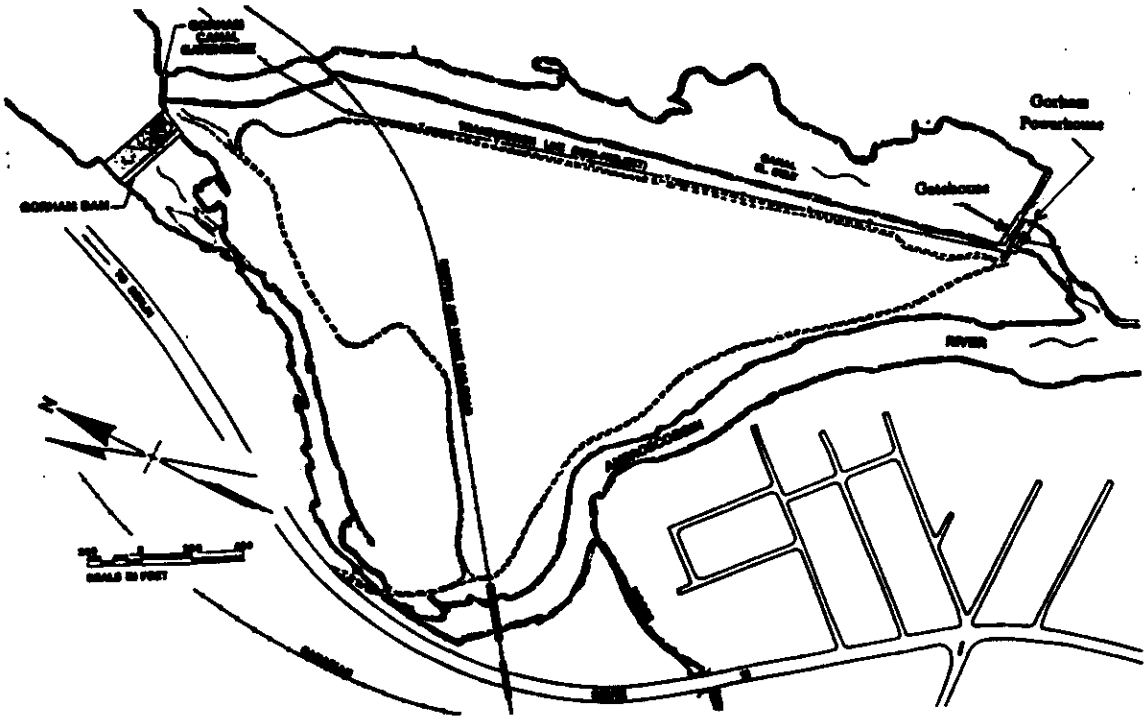

Figure 2-5. Layout diagram for the Gorham Project FERC No. 2311. Source: Staff modified from James River (1991c).

GWh to about 33.5 GWh, the total rated capacity from 4.8 MW to 6.1 and the hydraulic capacity from 2,200 cfs to 2,800 cfs.

The project consists of: (1) a dam, about 775 feet long, with (a) a west earthen dike, 133 feet long, having a concrete core wall with a crest elevation of 820.0 feet (USGS), (b) a 300-foot-long by 18-foot-high rock-filled timber-crib spillway section with a crest elevation of 807.3 feet (USGS), topped with 6-foot-high flashboards, (c) a 122-foot-long power canal headgate section with a sill elevation of 795.0 feet (USGS), having eight operable and two inoperable stoplog gates, each about 7.5 feet wide, the headgate section is topped with a gatehouse, 113 feet long by 16 feet wide, and (d) an east earthen dike, 220 feet long, having a concrete core wall with a crest elevation of 820.0 feet (USGS); (2) a power canal, about 3,350 feet long by 100 feet wide by 18 feet deep; (3) a brick and steel powerhouse about 20 feet high by 74 feet wide by 127 feet long with four existing hydroelectric generating units, each with (a) a rated capacity of 1.2 MW, (b) hydraulic capacity of 550 cfs, and (c) a design head of 29 feet; and one proposed unit with (a) a rated capacity of 1.3 MW, (b) hydraulic capacity of 600 cfs, and (c) design head of 29 feet; (4) a reservoir with a surface area of about 45 acres, at a headwater surface elevation of 813.3 feet (USGS); (5) a 22-kV, 50-foot long primary transmission line; and (6) appurtenant facilities. There is a bypassed reach, about 5,200 feet long, between the existing James River Gorham dam and tailrace.

Public Service Gorham Project (Figure 2-6). Public Service is not proposing any new development. However, Public Service is proposing to release a minimum flow of 50 cfs into the bypassed reach, which is about 800-feet-long. This proposal would decrease the existing average annual generation from 13.80 GWh

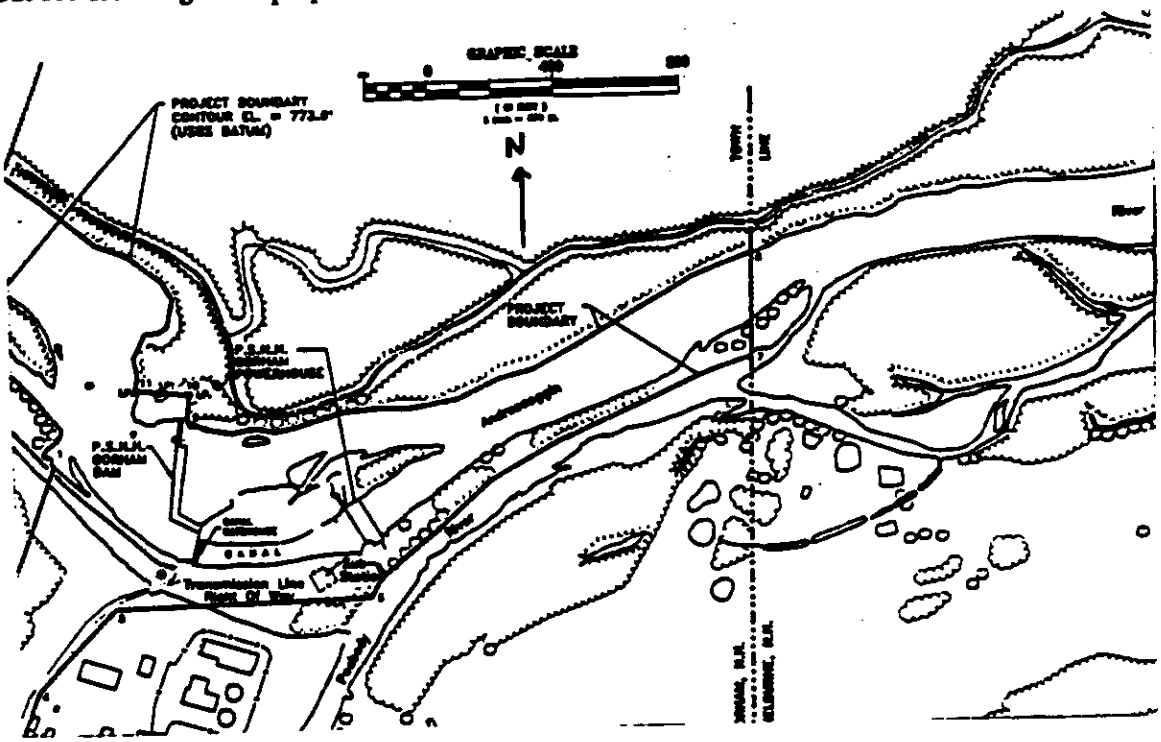

Figure 2-6. Layout diagram for the Gorham Project FERC No. 2288. Source: Staff modified from PSNH (1991b).

to 13.63 GWh.

The project consists of: (1) a timber crib, L-shaped dam, 417 feet long and about 20 feet high, with three sections (a) a 90-foot-long spillway section, with a steel sheet pile facing, having a crest elevation of 772.23 feet (USGS), topped with wooden flashboards, about 1.7 feet high, (b) a 252-foot-long spillway section, with two layers of 3-inch wooden plank facing, having a crest elevation of 768.12 feet (USGS), topped with wooden flashboards, about 5.4 feet high, and (c) a 75-foot-long reinforced-concrete sluiceway section, with a crest elevation of 768.20 feet (USGS), topped with 5.33-foot-high wooden flashboards, having one 15-foot-wide sluice gate; (2) an earthen power canal, 415 feet long by 60 feet wide by 20 feet deep; (3) a reservoir with a surface area of 32 acres, at a water surface elevation of 773.53 feet (USGS); (4) a powerhouse with four hydroelectric generating units, with (a) a total rated capacity of 2.15 MW, (b) a hydraulic capacity of 2,000 cfs, and (c) an operating head of 18 feet; (5) an existing 33-kV, 200-foot-long primary transmission line; and (6) appurtenant facilities.

Shelburne Project (Figure 2-7). James River is proposing to raise the Shelburne Project reservoir level by 1.7 feet by increasing the flashboard height on the 83-foot-long spillway section. This would increase the reservoir surface area from 210 acres to about 250 acres, and the headwater surface elevation from 733.6 feet to 735.3 feet (USGS). The average annual energy generation would increase from an existing average annual energy generation of about 18.0 GWh to about 20.0 GWh. The project has a 150-foot-long bypassed reach.

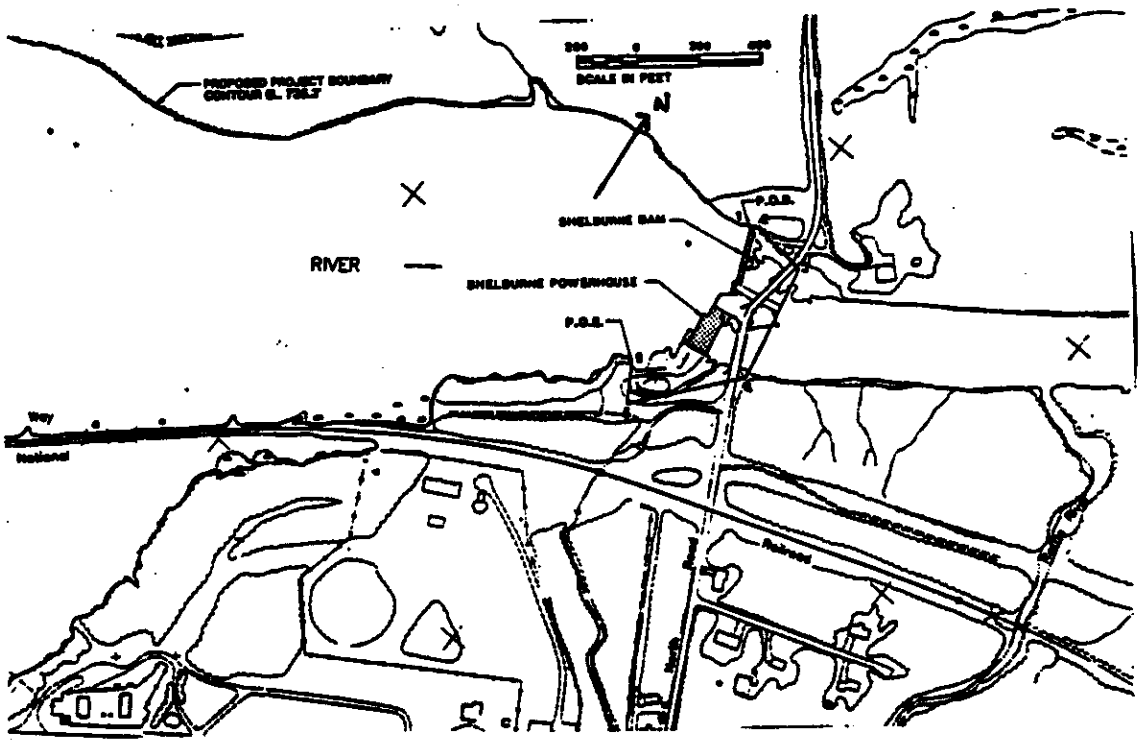

Figure 2-7. Layout diagram for the Shelburne Project FERC No. 2300. Source: Staff modified from James River (1991b).

The project consists of: (1) a concrete gravity dam, about 700 feet long by a maximum height of 17 feet, with (a) an 83-foot-long concrete spillway section, with a crest elevation of 724.5 feet (USGS), topped with pinned-flashboards of a proposed height of 10.7 feet, (b) a gate section, about 88 feet long, with a sill elevation of 725.3 feet (USGS), topped with three drop wastegates, each about 25 feet wide by 10 feet high, separated by concrete piers about 5 feet wide, (c) a sluice gate structure about 27 feet long, with a sill elevation of 722.5 feet (USGS), topped with one sluice gate, about 19 feet wide by 13.5 feet high, connected to a downstream concrete sluiceway about 143 feet long by 19 feet wide, (d) a non-overflow concrete retaining wall, about 95 feet long, with a crest elevation of 736.3 feet (USGS), topped with 2-foot-high permanent flashboards, (e) an integral powerhouse, about 150 feet long, and (f) a concrete dike, about 180 feet long, with a crest elevation of 737.8 feet (USGS); (2) an integral brick and steel powerhouse, about 68 feet wide by 150 feet long, equipped with three hydroelectric generating units, with (a) a total rated capacity of 3.72 MW, (b) a hydraulic capacity of 3,105 cfs, and (c) a design head of 17 feet; (3) a reservoir with an existing surface area of about 210 acres, at a water surface elevation of 733.6 feet (USGS); (4) an existing 22-kV, 5.5-mile-long primary transmission line; and (5) appurtenant facilities.

2.1.2 Proposed environmental measures

The applicants for the projects are proposing the following environmental enhancement and mitigation measures:

<u>Sawmill</u>

- Continue run-of-river operation and maintain the impoundment at an elevation of 1,094.5 ft (USGS).

- Plans describing the methods for releasing and maintaining required minimum flows and run-of-river operation and how these flows will be maintained in the bypassed reach and below the project when the impoundment is refilled after any maintenance and/or repairs.

- Continue passing a continuous minimum flow of 12 cfs into the bypassed reach, with 8 cfs from the flashboard section und 4 cfs from the spillway section, for both water quality protection and to provide a zone of passage flow for downstream migrating salmonids.

- Participate in Berlin's Heritage Trail by providing two viewing areas. These sites would provide both upstream and downstream views and would be accessible via tour bus, auto, and/or foot paths.

- Provide interpretive signage on the hydroelectric generation process.

- Work with the city of Berlin when preparing future FERC Form-80 recreation reports to monitor future recreation needs.

J. Brodie Smith

- Continue run-of-river operation.

- Implement the water quality program outlined in the section 401 Water Quality Certificate dated April 25, 1991.

- Release a minimum flow of 10 cfs plus leakage (estimated at 3 to 5 cfs) in the bypassed reach during the ice-free months (April to November) to enhance and eliminate potential tempereture and DO concerns, provide pool habitat, and maintain a zone-of-passage for downstream fish movements.

- Power house roof maintenance would be conducted with common night hawk (a state threatened species) in mind; i.e. check for night hawk nesting, if any, do repairs prior to or after nesting season; and to the extent possible, use materials and construction features that maintain the roof's suitability for night hawk nesting.

- Cooperate with Fish and Game if necessary to remove roosting bats from project facilities; check for small footed myotis, (a state endangered species); and relocate to appropriate habitat.

- Cooperate with the Audubon Society to identify and mark killdeer nests on project lands; use reasonable efforts to avoid disturbance to known nest sites.

- To the extent possible, avoid disturbing beaver activity in the area west of the bypassed reach.

- Reserve about 9 acres of undeveloped land between the bypassed reach and the penstock to protect its cultural, aesthetics, wildlife, and recreation potential (see Figure 2-2). Public Service would include this tract of land in the project boundary.

Cross Power

- Continue run-of-river operation.

- Monitor water quality in the impoundment, as detailed in the Androscoggin River Water Quality Monitoring Program (see discussion under Shelburne).

Cascade

- Use cofferdams to dewater the intake and tailrace construction sites.
- Implement the erosion and sediment control plan contained in its application.
- Line the excavated intake and tailrace areas with riprap.
- Continue run-of-river operation.
- Maintain a 6 cfs minimum flow in the existing 400-foot bypassed reach between the Cascade dam and tailrace (approximately existing leakage).
- Maintain a minimum flow of 400 cfs at all times via the existing Cascade powerhouse in the 1.5-mile bypassed reach formed from the existing Cascade powerhouse to the proposed Pulsifer Rips tailrace. The proposed minimum flow of 400 cfs would be used to maintain optimal habitat for existing wild rainbow trout in the reach and to establish habitat for the future management of brown trout.
- Discharge additional Androscoggin River flows between 3,000 cfs and 4,920 cfs into the Pulsifer Rips bypassed reach via the Cascade powerhouse (Pulsifer Rips hydraulic capacity is 2,600 cfs).
- Discharge all river flows greater than 4,920 cfs via the Cascade spillway.
- Conduct a water quality sampling and analysis study to verify the accuracy of predictive modeling of water quality parameters in the bypassed reach affected by the Pulsifer Rips development. This study would supplement James River's proposed Water Quality Monitoring Program (see section on Shelburne) and would be conducted with Environmental Services approval under "worst case conditions" (i.e., low flow and high temperatures).
- Develop a water quality response plan, in conjunction with Environmental Services, with specific steps for corrective actions, if operation of the project precludes attainment of the state water quality standards.
- Install a calibrated staff gauge in the Pulsifer Rips bypassed reach in order to visually verify the proposed minimum flow release of 400 cfs.
- Build (through easement or purchase) an angler access facility adjacent to Cascade Flats Road near the confluence of Tinker Brook in Gorham; including parking for 3-5 vehicles, signage, trash collection, and a footpath. The facility would cost about $2,330.
- Locate the proposed Pulsifer Rips penstock on a natural hillside bench to lessen the amount of clearing and ground disturbance.
- Leave a buffer strip between the proposed Pulsifer Rips penstock and river.
- Minimize the amount of land clearing in areas other than those needed for construction and maintenance of the proposed Pulsifer Rips structures. These areas would be replanted with conifers to help conceal the penstock.
- Minimize the amount of land needed for staging by using some storage space at their Burgess and Cascade Mills facilities.

- Paint the proposed Pulsifer Rips penstock and surge tank to make them less visually obtrusive.
- Make a lump-sum payment of $50,000 to the Town of Gorham to implement a landscape plan for Cascade Flats properties (May 27, 1992, letter).
- Systematically excavate archaeological sites which are potentially eligible for the National Register of Historic Places.
- Install a warning device to warn downstream users of emergency situations at the dam.

James-River Gorham

- Continue run-of-river operation.
- Release a 50 cfs minimum flow in the bypassed reach. If, however, subsequent increases in angling demand warrants, the flow in the bypassed reach would be increased to 200 cfs for most of the year and 400 cfs during trout spawning, in order to optimize rainbow trout and brook trout habitat in the bypassed segment.
- Monitor water quality in the impoundment, as detailed in the Androscoggin River Water Quality Monitoring Program (see discussion under Shelburne), if subsequent data collected at the downstream Shelburne impoundment suggest that there may be violations of upstream water quality standards.
- Continue to maintain a footbridge across the Androscoggin River and allow the public to use project access roads.
- Enter a memorandum of agreement with the SHPO which would stipulate: (1) Interior's *Standards for Rehabilitation* for routine maintenance, repairs, and upkeep of the facility are to be followed; (2) consultation with the SHPO and, prior to [new] construction, documenting the exciters with photos and drawings; and (3) make the exciters available to the New Hampshire Division of Historical Resources.

Public Service Gorham

- Continue run-of-river operation.
- Release a minimum flow of 50 cfs in the bypassed reach.
- Implement the water quality monitoring program outlined in the Section 401 Water Quality Certificate dated April 25, 1991.
- Cooperate with Fish and Game if necessary to remove roosting bats from project facilities; check for small footed myotis, (a state endangered species); and relocate to appropriate habitat.
- Cooperate with the Audubon Society to identify and mark killdeer nests on project lands; use reasonable efforts to avoid disturbance to known nest sites.
- Encourage and provide access for the state-wide winter bald eagle monitoring program.

- Provide waterfowl nest boxes; type and location to be determined in consultation with the Audubon Society.

- Continue to provide the current level of public access at the project and add an information sign at the project entrance.

- Develop a canoe portage when there is demand for one.

Shelburne

- Continue run-of-river operation.

- Implement the Androscoggin River Water Quality Monitoring Program (WQ Program) detailed in James River's filing of December 16, 1991, which consists of the following:

  - Bathymetric survey of the Shelburne impoundment
  - Sample DO and temperature during years 1 - 3 of the new license at:
    (1) Riffles upstream of the impoundment
    (2) Profile of deepest location in impoundment
    (3) Profile just above dam
    (4) Tailwater
    (5) Additional locations (if necessary)
  - Collect data dusing "worse case" conditions, as possible
  - Record river flow and other pertinent conditions
  - Prepare yearly report based on findings
  - Initiate additional consultation if water quality violations are encountered
  - Assess the need for future monitoring after 3 years.

- Implement a two-part monitoring program to evaluate changes in the wetlands as a result of raising the reservoir surface elevation.

- Enter into a memorandum of agreement with the SHPO which would stipulate: (1) Interior's *Standards for Rehabilitation* for routine maintenance, repairs, and upkeep of the facility are to be followed; and (2) consultation with the SHPO and, prior to any alterations of the project features that may exceed the scope of Interior's standards.

2.2 Modification to proposed project operation or facilities

The alternatives to licensing the projects as proposed are to license the projects with modifications (e.g. changes in facility design or facility operation) and resource protection, impact mitigation, and enhancement measures. These include:

- Monitor water quality in the projects' impoundments, as detailed in the Androscoggin River Water Quality Monitoring Program (see discussion under Shelburne), if data collected at the downstream Shelburne impoundment suggest that there may be violations of upstream water quality standards.

- Consult further with the agencies and develop a plan to conduct additional DO monitoring and a plan to modify project operations, if necessary, to meet the DO requirements in the project area.

- Execute a Programmatic Agreement to provide for the protection of cultural and archeological resources at the projects.

- Consult with Parks and Recreation, the NPS, and the town or city in which they are located, during the preparation of the FERC Form 80 to determine the need for more recreation facilities.

Sawmill

- Provide measures for improving site aesthetics.
- Provide plans for operating and maintaining the viewing areas with drawings and specifications for the parking areas and interpretive signs and provisions for the disabled.
- Grade, resurface, and maintain an existing boat launch in Centennial Park

J. Brodie Smith

- A year-round minimum flow release of 20 cfs into the bypassed reach for enhancement of fish passage.
- File a plan for Commission approval, to provide a protective shoreland buffer zone.
- Paint the surge tank and penstock a color that fits better with the surrounding environment and landscape to screen the view of the surge tank from Route 16.

Cross Power

- Improve the appearance of the powerhouse and gatehouse buildings and grounds.
- Provide a public access area on the east bank of the reservoir.

Cascade

- Finalize erosion and sediment control measures prior to construction of the Pulsifer Rips development in consultation with the Town of Gorham, as well as Berlin.
- Install downstream fish passage facilities.
- Release 100 cfs minimum flow in the upper bypassed reach once the Pulsifer Rips development comes on-line.
- Conduct a flow study of the 400-ft-long upper bypassed reach when the Pulsifer Rips development comes on-line.
- Provide a hiking trail to the river, a small pull-over parking area, and fishing access to the west side of the river at Pulsifer Rips.
- File a plan for Commission approval, to provide a protective shoreland buffer zone.

James River Gorham

- Install downstream fish passage facilities.

- Release a minimum flow of 400 cfs from March 1 to June 15 and 200 cfs at all other times in the bypassed reach for rainbow trout and brook trout fry, juvenile, and adults and rainbow trout spawning.
- Formalize an existing informal access area and expand it, if needed in the future, and mark the causeway entrance as a public access point.
- File a plan for Commission approval, to provide a protective shoreland buffer zone.

Public Service Gorham

- Install downstream fish passage facilities.
- Release a minimum flow of 200 cfs in the bypassed reach for the enhancement and optimization of fisheries habitat.
- Provide informational signage at the Route 2 entry point and along Hogan Road at points that are currently being used as informal access to project waters.
- File a plan for Commission approval, to provide a protective shoreland buffer zone.

Shelburne

- Eliminate, minimize, or mitigate for any loss in wetland habitat value as a result of raising the reservoir water surface elevation.
- Provide signs to formalize existing public access sites on the impoundment and downstream from the dam.
- File a plan for Commission approval, to provide a protective shoreland buffer zone.

2.3 No Action alternative

Since all seven projects already exist, the no action alternative would maintain the *status quo* and result in no change to the existing environment. The projects would continue to operate as required by the original project licenses. In the case of the Cascade project, Pulsifer Rips would not be developed. If the projects are allowed to operate as they have in the past, there would be continued energy production and no enhancement of natural resources. No one advocates continuing the *status quo*. We use this alternative to establish baseline environmental conditions for comparison to other alternatives.

2.4 Alternatives considered but eliminated from further consideration

We considered several other alternatives to the relicensing proposals but eliminated them from detailed study because they are not reasonable in the circumstances of this case. They are: (a) recommending Federal government takeover of the projects; (b) issuance of nonpower licenses upon expiration of the original licenses and (c) denial of the license applications, with surrender or termination of the licenses.

We don't consider Federal takeover to be a reasonable alternative. Federal takeover of the projects would require Congressional approval, While that fact alone wouldn't preclude further consideration of this alternative, there is no evidence indicating that a Federal takeover should be recommended to Congress. No

party has suggested Federal takeover would be appropriate and no Federal agency has expressed interest in operating the projects.

Issueing a nonpower license woudn't provide a long-term resolution of the issues presented. A nonpower license is a temporary license which the Commission would terminate whenever it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. No government agency has suggested its willingness or ability to do so. No party has sought a nonpower license and we have no basis for concluding that the projects should no longer be used to produce power. Thus, a non-power license is not a reasonable alternative to some form of new license with mitigation and enhancement measures.

Denial of the license applications leading to termination or surrender of the existing licenses would entail two alternatives which would require a departure from the *status quo*. The first alternative is surrender or termination coupled with removal of the dams. No participant has suggested that dam removal would be appropriate and we have no basis for recommending it. We don't regard that alternative as reasonable here because it would result in the loss of substantial electric power generation in exchange for possible significant environmental impacts. For example, dam removal could result in sediments accumulated behind the dams, along with any associated contaminants, to be washed downstream, lacustrine habitats would be converted to riverine habitats, wetlands could be lost.

The second alternative involving surrender or termination would be to retain the dams but require removal or disabling of the equipment used to generate power. That would require the Commission to identify another government agency willing and able to assume regulatory control and supervision of the facilities. No agency has stepped forward and no participant has advocated removal of electric generating equipment. Nor have we any basis for recommending it. Because the power supplied by the projects is needed, a source of replacement power would have to be identified. Under the circumstances, we don't consider this a reasonable alternative.

Annual licenses could be issued if the Commission does not take uction on a new license application prior to the expiration date of the existing licenses. A project would continue to operate under the terms and conditions of its existing license. This is, essentially, the same as the no action alternative.

The Conservation Law *et al.*, recommend that energy conservation be considered as, at least, a partial alternative to the projects' current generation and proposed capacity increases. They anticipate that this would allow modification of operations to provide enhanced fishery flows at little, if any, cost in terms of power loss. However, load reduction and energy conservation measures do not displace relatively low-margiual-cost generating resources such as nuclear, solar, wind, high-quality geothermal, and hydropower, except in very rare instances when those are the only resources operating. The generating resources that are dispiaced in actual practices are those with the higher marginal costs, such as oil-fueled, natural-gas fueled, and coal-fueled generating resources. For this reason, load reduction and energy conservation are not true or reasonable alternatives to the operation of generating resources with low marginal operating costs, such as in the case of relicensing existing hydroelectric projects. Load reduction and energy conservation can be considered as alternatives to only the highest marginal cost resources, or considered to the extent that they can effectively delay the date at which new generating capacity would need to be constructed to serve power demands. Further, any economic or need for power studies based on the regional/resource data in IE-411 reports[2] have fully considered all reasonable, economical alternative load-reduction and conservation alternatives.

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[2] Reports entitled "Regional Reliability Council Long Range Coordinated Bulk Power Supply Programs" are submitted to the Department of Energy each year. They are known as DOE Code IE-411.

2.5 Economic comparison of alternatives

We have studied the economics of James River's proposals for power expansion at the Cascade, James River Gorham, and Shelburne projects. In addition, we looked at the cost of various enviroumental enhancement options for all seven projects for which new license applications have been filed. The enhancement options we studied include minimum-flow, trashrack-construction (fishways), and land buffer acquisition proposals that were evaluated or proposed by James River, Public Service, the resource agencies, and our own staff.

Only James River proposes new construction for power expansion of its Cascade and Gorham hydroelectric projects. We adopted James River's estimated construction costs, and escalated them to the midpoint of construction, based on the Bureau of Reclamation's construction cost indices. The Shelburne project's incremental capital cost, associated with its power generation increase, is the cost of flowage rights along the project reservoir for the proposed increase in reservoir elevation.

Table 2-1. Economic analyses assumptions for Public Service's J. Brodie Smith Project and Gorham Project (Source: staff).

On-line date	December, 1993
Financing term	N/A[a]
Term of analysis[b]	30 years
Insurance cost	N/A
Construction cost and escalation	N/A
Operation and maintenance escalation	N/A
Maximum federal tax	N/A
State and local taxes	N/A
Interest rate	11 percent
Discount rate	11 percent
Levelized alternative power value (1994)	for 30-years levelized: 75.91 mills/kWh

[a] "NA" means that topics were not considered because there is no new construction nor power expansion at the project.

[b] The most probable term for a new FERC license, if issued.

We based our estimates of operation, maintenance, administrative, and general expenses for the hydroelectric projects on industry averages. The details of our economic assumptions for our studies of Public Service's and James River's projects are shown in Table 2-1 and Table 2-2, respectively.

In our economic analyses, we compared the levelized cost of Public Service's projects with the cost of producing equivalent power from generic fossil fuel plants in the New England Region. Details of our economic assumptions for the alternative power values for Public Service's projects are given in Table 2-3.

Since James River's only source of alternative power would be power purchased from Public Service, we compared the levelized cost of James River's projects with the cost of purchasing an equivalent amount of power from Public Service at the current contract prices, escalated according to EIA's projected electricity cost estimates. Details of our economic assumptions for James River's alternative power costs are shown in Table 2-5.

A summary of the economic analyses for the proposed power expansion at James River's Cascade, Gorham, and Shelburne projects is shown in Table 2-6. Table 2-6 shows the incremental effect of each proposal as compared to the existing project condition, also known as the baseline condition. In analyzing the projects in Table 2-6, we assumed an 11 percent discount and interest rate, or the cost of money, for non-municipal developers. The resulting net benefit is the difference between the cost of the proposed project expansion as compared to the cost of alternative power generation.

We analyzed the impacts on project generation and the project benefits of the minimum flow proposals, made by James River, Public Service, the resource agencies, NGOs, and the FERC staff. We also looked at intermediate minimum flow options to provide a more complete analysis. The change in net annual benefits we calculated reflects the value of the lost power that the project would incur for the

minimum flow spillage. The results of our analyses are shown in Figure 2-8 through Figure 2-13 and Table A-1.

We analyzed the cost impact on project economic benefits resulting from the proposal of acquiring shoreline buffer zones. We studied the land acquisition option for the following projects: Public Service's Gorham project, and James River's Cascade, Gorham, and Shelburne projects. The results of our analyses are shown in Table 2-4. The change in net annual benefits we calculated reflects the additional annual cost that projects would incur to acquire a shoreline buffer zone.

We analyzed the cost and generation impacts of the various trashracks installation proposals. We studied new trashracks installation options with 1-inch bar spacing for the following projects: Public Service's J. Brodie Smith and Gorham projects, and James River's Cascade, Gorham, and Shelburne projects. The results of our analyses are shown in Table 2-7. The change in net annual benefits we calculated reflects the annual cost the projects would incur for the trashrack replacement under the various minimum flow proposals.

Table 2-2. Economic analyses assumptions for James River's hydroelectric projects (Source: staff)

Description	Sawmill	Cross	Cascade	Gorham	Shelburne
License issuance date of 12/1993, or on-line date for project expansion	Dec. 1993	Dec. 1993	Cascade powerhouse 1996 Pulsifer powerhouse 1998	1995	Dec. 1993
Financing term	N/A[a]	N/A	20 years	20 years	N/A
Term of analysis[b]	30 years	30 years	50 years	40 years	30 years
Insurance cost	N/A	N/A	0.25 percent of investment	0.25 percent of investment	N/A
Construction cost, escalation, and construction period	N/A	N/A	Cascade powerhouse upgrade: $0.592 million (1988$), 4% escalation, 2-year const. Pulsifer powerhouse construction: $25.767 million (1988$), 4% escalation, 2-year const.	$3.0 million (1991$), 4% escalation, 1-year const.	$.05 million (1993$), 4% escalation, no construction
Operation and maintenance escalation	N/A	N/A	4 percent	4 percent	4 percent
Maximum federal tax	N/A	N/A	34 percent	34 percent	34 percent
State and local taxes	N/A	N/A	1.60 percent	0.71 percent	1.16 percent
Interest rate	11 percent	11 percent	11 percent	11 percent	11 percent
Discount rate	11 percent	11 percent	11 percent	11 percent	11 percent
Levelized alternative power value (1994$)	for 50-years: 151.18 mills/kWh	for 50-years. 151.18 mills/kWh	for 50-years: 161.90 mills/kWh	for 40-years: 157.86 mills/kWh	for 30-years: 151.18 mills/kWh

[a] "NA" means that topics were not considered because there is no new construction nor power expansion at the project.

[b] The most probable term for a new FERC license, if issued.

Table 2-3. Basic assumptions for Public Service's alternative power costs (Source: Energy Information Administration, 1992)

Assumptions	Year	Amount
Starting Value	1994	35.91 mills/kWh
Real Escalation	1990-2000	3.7 %
	2001-2010	3.1 %
	After 2010	0.0 %
Inflation	1990-2010	3.9 %
	After 2010	3.9 %
Discount Rate	–	11 %
Levelized Rate	–	11 %
Fuel Cost	1990	2.52 $/MM BTU
Heat Rate	–	10,600 BTU/kWh
Deflator	1990	1.315
RESULTS: Levelized alternative power cost (1994$)	30-yrs	75.91 mills/kWh

Table 2-4. The staff's sensitivity analyses of impacts on project economic benefits resulting from the proposal of acquiring shoreline buffer zone[a]. Source: Staff.

Project	Cost of Land Acquisition ($1000)	Change in Net Annual Benefits ($1000 / year)
Public Service's Hydroelectric Projects		
Gorham:	218.40	-37.40
James River's Hydroelectric Projects		
Cascade:	940.80	-120.30
Gorham:	341.60	-31.30
Shelburne:	157.50	-23.10

a The results in this table have been rounded to two significant digits, producing slightly different answers than listed elsewhere in this report.

Table 2-5. Basic assumptions for James River's alternative power costs (Source: James River, FAX, 1993; Energy Information Administration, 1992)

Assumptions	Year	Amount
Starting Values (Based on current power sales contract)	1994	80.00 mills/kWh
	1995	90.00 mills/kWh
	1996	100.00 mills/kWh
Escalation	1996-2000	5.35 %
	2000-2010	4.30 %
	After 2010	3.87 %
Discount Rate	–	11 %
Interest Rate	–	11 %
RESULTS: Levelized alternative power cost (1994$)	30-yrs	151.18 mills/kWh
	40-yrs	157.86 mills/kWh
	30-yrs	161.90 mills/kWh

Table 2-6. Economic summary of the James River's proposed power expansion at the Cascade, Gorham, and Shelburne hydroelectric projects[a] (Source: staff)

	Estimated project capacity (MW)	Estimated average annual energy (GWh)	Total on-line capital cost ($million)	Levelized net benefits ($1000)	Levelized net benefits (mills/kWh)	Internal rate of return (%)
Cascade:						
Historic generation:	7.92	52.60		Baseline condition		
Cascade powerhouse modification only	+0	+8.17[b]	-0.864	+795	+97.29	N/A[c]
Pulsifer powerhouse expansion only	+14.3	+41.89[d]	-40.71	+1,070	+25.56	10.94
James River Gorham:						
Historic generation:	4.8	29.10		Baseline condition		
Power expansion only	+1.3	+5.00	-3.631	+217	+43.33	13.50
Shelburne:						
Historic generation:	3.72	18.00		Baseline condition		
Reservoir expansion only	+0	+2.00	-0.052	+142	+71.19	N/A[c]

a The results in this table are rounded off to four significant digits, producing slightly different answers than listed elsewhere in the DEIS.

b Due to lowering of the hydraulic capacity range from 870 - 2,690 cfs to 400 - 2,320 cfs, we estimated the theoretical increase in generation could be as much as 8.17 GWh at Cascade powerhouse. In actuality, the Cascade powerhouse would reduce its generation from the existing levels, because it would allow the new Pulsifer powerhouse to use water that it would have used, because Pulsifer would generate more power with the same amount of water.

c The capital investment for the minor turbine improvements is so small that the internal rate of return for the improvements is indeterminate.

d We estimated the total on-line generation of both the Cascade and Pulsifer powerhouses, with no minimum flow spillage, would be about 94.49 GWh. The incremental generation of Pulsifer was derived by subtracting the Cascade proposed generation of 52.60 GWh from 94.49 GWh.

Table 2-7. The staff's sensitivity analyses of impacts on energy production and project economic benefits resulting from trashracks installation or modification proposals[a]. Source: Staff.

Scenario	Estimated average annual energy w/ existing trashracks (GWh)	Estimated average annual energy w/ new trashracks (GWh)	Change in average annual energy (GWh)[b]	Change in net annual benefits ($1000/year)
PSNH's Hydroelectric Projects				
J. Brodie Smith: Cost of trashracks $302,000[c]				
With applicant's minimum flow proposal	104.01	103.42	-.059	-85
With agencies and staff's flow proposals	103.67	103.08	-0.59	-82
PSNH Gorham: Cost of trashracks: $670,000				
With applicant's minimum flow proposal	13.63	13.25	-0.38	-168
With agencies and staff's minimum flow proposals	13.04	12.68	-0.36	-167
James River's Hydroelectric Projects				
Cascade: Cost of trashracks: $140,000[d]				
With applicant's minimum flow proposal	93.76	93.11	-0.65	-116
With agencies and staff's minimum flow proposals	89.88	89.25	-0.63	-117
James River Gorham: Cost of trashracks: $530,000				
With applicant's minimum flow proposal	33.50	32.92	-0.58	-124
With agencies and staff's minimum flow proposals	30.89	30.36	-0.53	-119
Shelburne: Cost of trashracks: $660,000				
With applicant and staff's proposals	20.00	19.41	-0.59	-167

a The results in this table have been rounded to two significant digits, producing slightly different answers than listed elsewhere in this report.

b We assumed a head loss of about 0.5 foot due to reducing the bar spacings of the trashracks; thus reducing the project's power generation

c Capital cost (1993$)

d The recommended trashrack installation is applicable to Pulsifer only; however the energy loss is taken from the total project.

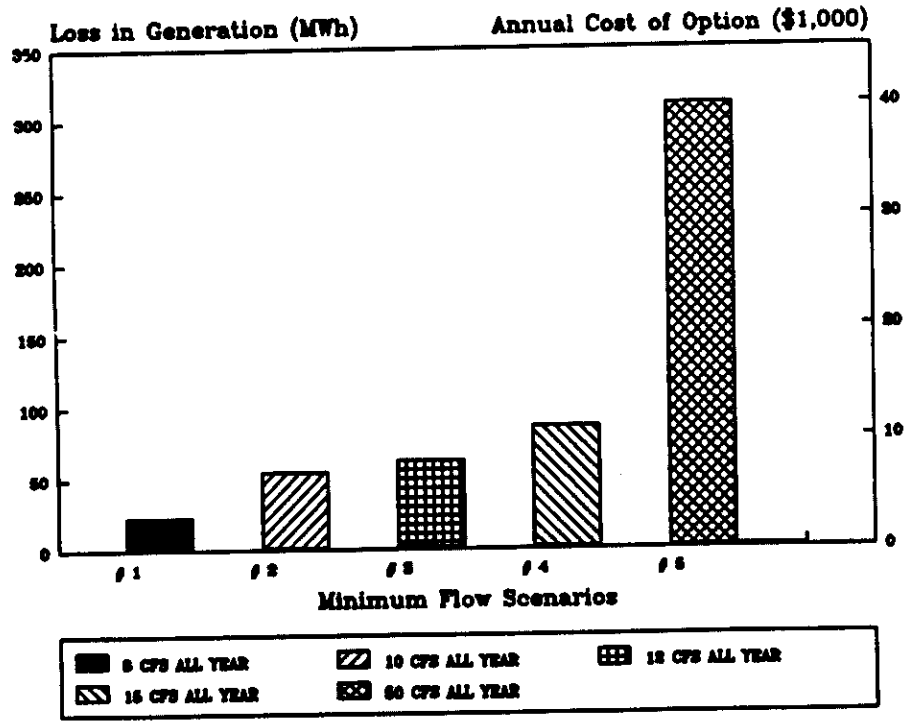

Figure 2-8. Cost and lost generation as a result of minimum flow releases at Sawmill. Costs and generation losses are above current license conditions.

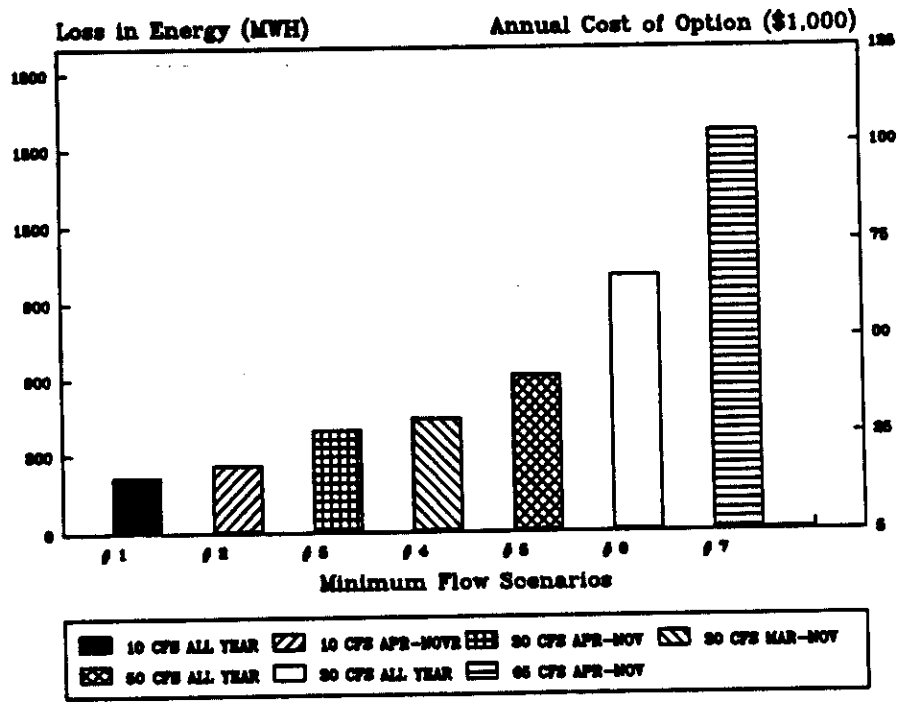

Figure 2-9. Cost and lost generation as a result of minimum flow releases at J. Brodie Smith. Costs and generation losses are above current license conditions.

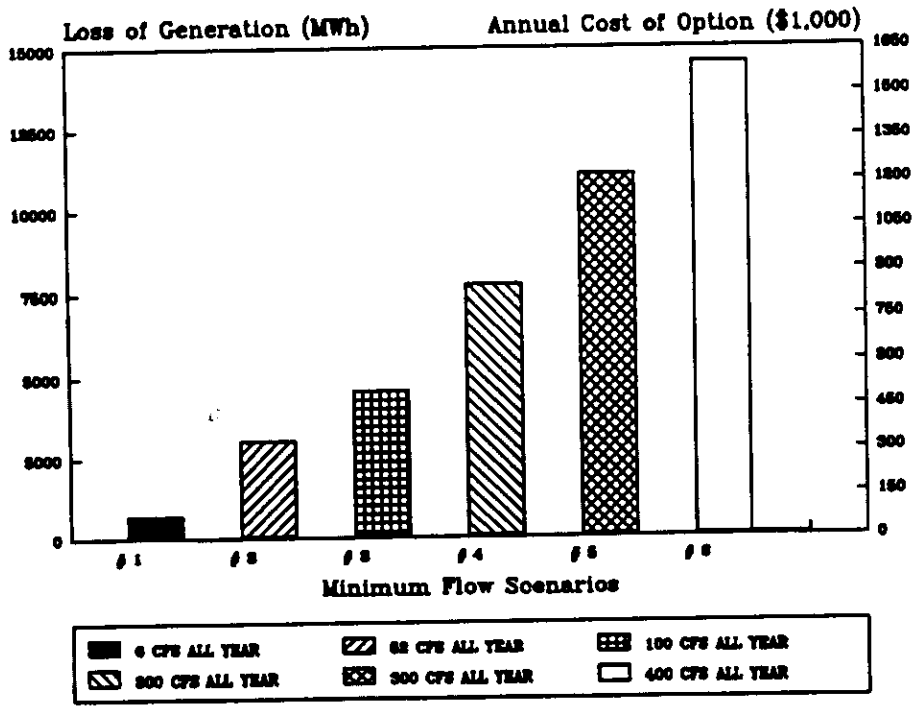

Figure 2-10. Cost and lost generation as a result of minimum flow releases at Cascade. Costs and generation losses are above proposed generation expansion.

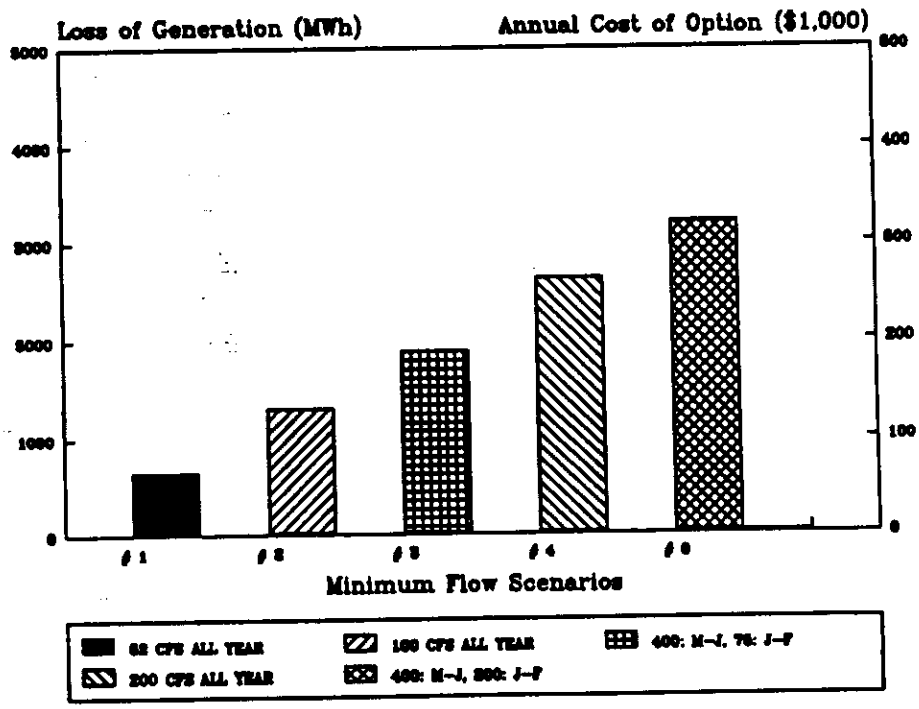

Figure 2-11. Cost and lost generation as a result of minimum flow releases at James River Gorham. Costs and generation losses are above proposed generation expansion.

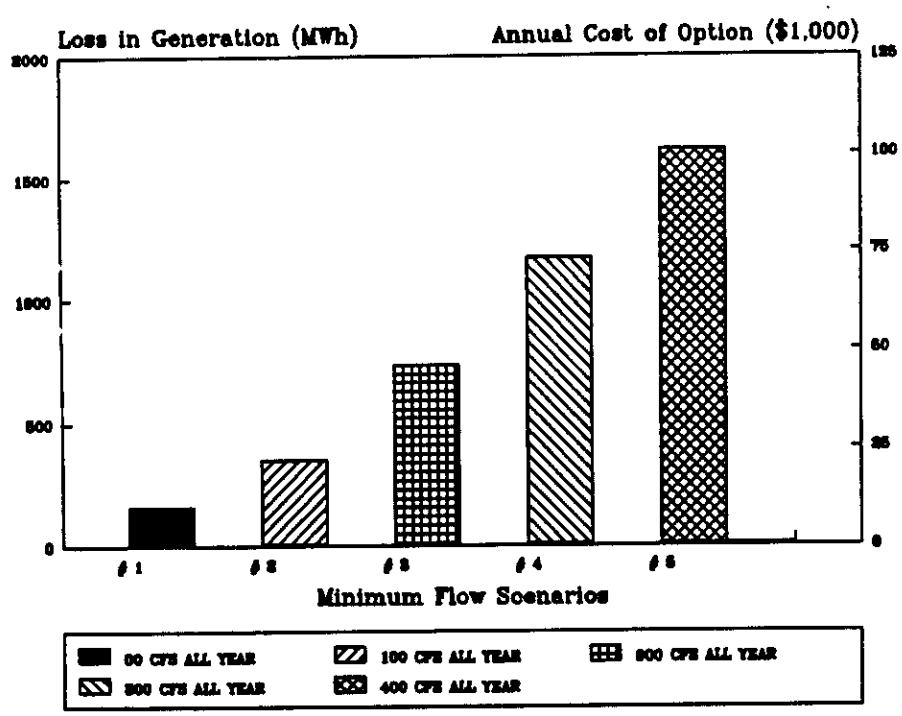

Figure 2-12. Cost and lost generation as a result of minimum flow releases at Public Service Gorham. Costs and generation losses are above current license conditions.

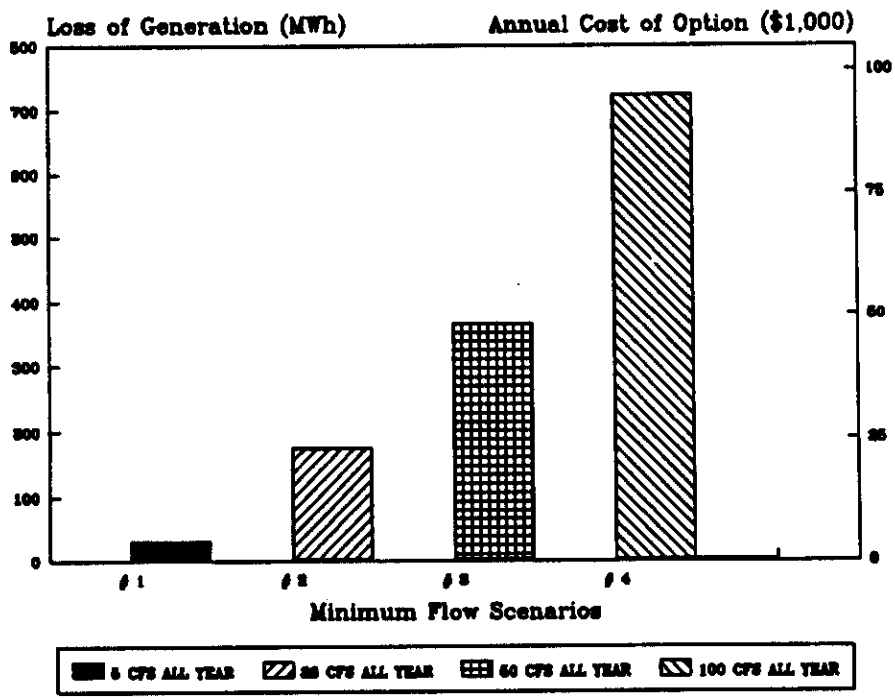

Figure 2-13. Cost and lost generation as a result of minimum flow releases at Shelburne. Costs and generation losses are above proposed generation expansion.

3. AFFECTED ENVIRONMENT

3.1 Regional resources

3.1.1 General setting

The Androscoggin River drains a total of about 3,450 square miles; 2,730 square miles in western Maine, and 720 square miles in northeastern New Hampshire. The Androscoggin River rises at the confluence of the Magalloway and Rapid Rivers at Errol Dam, the outlet of Lake Umbagog in New Hampshire. The river drains into the Atlantic Ocean 161 miles downstream at Merrymeeting Bay near Brunswick, Maine. Major tributaries of the Androscoggin include the Cupsuptic, Kennebago, Magalloway, Dead Diamond, Ellis, Swift, Webb, Dead, Nezinscott, and Little Androscoggin Rivers.

The seven projects considered in this EIS are located in a region dominated by the White Mountains. The projects are all located within an 11-mile reach of the river between Berlin and the Town of Gorham in Coos County, New Hampshire. About 45 percent of the people in Coos County live in Berlin and the Town of Gorham. Within this 11-mile reach, the river corridor has been heavily developed for paper production and related industries. Upstream, the basin is mainly forested and includes five large storage reservoirs - Rangeley, Mooselookmeguntic, Richardson, Aziscohos, and Umbagog - which have been managed to regulate river flow since the late 1800's. The Androscoggin River's flow and storage is managed by the UWPC under a 1909 agreement for power and manufacturing purposes. The headwater storage dams are used to release a minimum flow of approximately 1,550 cfs at Berlin, year round.

Table 1-2. lists all existing hydroelectric projects in the Androscoggin River Basin. Figure 1-2 shows the location of projects on the main stem of the Androscoggin River and in the head waters.

The region's climate is characterized by severe winters with mild summers. Average annual snowfall is 110 inches. Mt. Washington, the highest peak in the northeast, is about 10 miles south of the projects. Although the river corridor in the region has been heavily developed, the surrounding area is dominated by national and state forest lands, including several wilderness areas.

3.1.2 Geology and soils

The Androscoggin River valley is relatively narrow, flanked by the Mahoosuc Mountain Range on the east, the Crescent Mountain Range on the west, the foothills of the Presidential Mountain Range on the southwest, and the Carter-Moriah Mountain Range on the south. The valley floor widths in the 12-mile-long Sawmill to Shelburne Project reach varies from about .3 to .5 mile at the Sawmill Project, .3 mile in Berlin, .2 mile near the Cascade Project, and widening to .5 to .6 mile from Upper Village/Gorham to the Shelburne Project area.

The river elevations drop from around 1,095 feet at the Sawmill impoundment to 720 feet at the Shelburne tailrace. Elevations of the ridges and peaks adjacent to the reach range from around 1,700 - 2,400 feet at Berlin to about 3,000 - 4,000 feet at the Shelburne Project. Local relief in the reach ranges from about 600 - 1,600 feet in Berlin to 1,000 - 2,700 feet in the Shelburne Project area. The highest peak, Mount Washington at 6,288 feet, is only 10 miles southwest of Gorham.

Bedrock in the area includes intrusive granitic rock and metamorphic gneisses, schists, and amphibolites. Natural unconsolidated materials in the project areas consist of sand, gravel, cobbles, and boulders. These materials occur as (1) ungraded glacial till on hillsides and ridges; (2) graded, glacial-alluvial (melt water stream) deposits forming glacial (kame) outwash terraces and deltas; and (3) more recent floodplain deposits of essentially the same, reworked materials. James River reports that, although there is no mining active now, mines located in the Mahoosuc Range east of the Androscoggin River valley

were active during the late 19th century. Primarily lead (galena) and zinc (sphalerite) sulphide ores were mined. Some silver, tin, and copper/iron (chalcopyrite) sulphide, were also extracted.

Throughout the long history of industrial and urban development, a large portion of the natural materials in much of the project areas, particularly in Berlin and Cascade, have been drastically changed by excavation and fill during construction of the dams and associated hydroelectric and hydromechanical facilities, and for the various mill buildings and yards, roadways, railroad beds, bridges, and other industrial, residential, and local civil structures. The fill commonly consists of original deposits to which have been added material obtained from nearby gravel terraces and debris from demolition of previous structures, either at the site or elsewhere.

3.1.3 Water quality and quantity

The Androscoggin River upstream of Berlin flows through relatively undeveloped sections of Maine and New Hampshire. Within the Berlin-Shelburne section, both industrial and municipal use of the river begin. There are four licensed major municipal and industrial waste discharges: the James River Burgess Mill, the city of Berlin. the James River Cascade Mill, and the Town of Gorham. Each of these secondary treatment plants discharge 25, 2.6, 1.5, and 0.75 mgd, respectively. There are also eight licensed non-contact cooling water discharges, one hot water overflow discharge, and approximately 63 combined overflow discharges (within Berlin).

Pollution Control designates the Androscoggin River in the Berlin-Shelburne area as Class B, the next highest classification behind Class A. New Hampshire defines DO standards for Class B waters as not less than 75 percent of saturation. Class B waters should also be acceptable for swimming and other recreation, fish habitat, and, after adequate treatment, for use as water supplies. No disposal of sewage or wastes is allowed unless they are adequately treated. Class B waters shall contain not more than either a geometric mean based on at least 3 samples obtained over a 60-day period of 126 *Escherichia coli* per 100 milliliters, or greater than 406 *E. coli* per 100 milliliters in any one sample. The pH range shall be 6.5 to 8.0 except when due to natural causes.

Historically, water quality was severely degraded in the Berlin-Gorham area due to industrial and municipal waste discharges. The installation of wastewater treatment facilities in the mid-1970's, however, has resulted in improved water quality to a degree that the river currently supports a trout population. Modeling studies of "worst case" DO concentrations (i.e., summer low flows and high temperatures) couducted by James River indicate that the entire 19.1-mile reach of the Androscoggin River between Berlin and the Maine state line (downstream) would meet or exceed Class B standards (75 percent DO saturation) at all times (NAI, 1991b; KA, 1993).

The following summary flow data is based on information provided by both James River and Public Service.

- At Sawmill, the project watershed drains approximately 1,338 square miles.
- At Shelburne, the project watershed drains approximately 1,494 square miles.
- Sawmill is located at river mile 138.2 and Shelburne is located at RM 128.4.

- The 7Q10 flow (the estimated historical 7-day low flow with a recurrence interval of 10 years) is approximately 1,490 cfs[1].
- The mean annual river flow ranges from 2,474 cfs at Sawmill to 2,700 cfs at Shelburne.
- The maximum discharge was estimated to be about 25,000 cfs, in 1959, at Shelburne.
- The river is currently managed to provide a minimum flow of 1,550 cfs at Berlin.

One of the most important and significant indicators of a river system's water quality and a key determinant of a river's waste assimilative capacity is dissolved oxygen (DO). Concern for DO levels in the Androscoggin River is based on the combined effect of existing wastewater treatment facility discharges and the potential loss of aeration due to reservoir stratification and reduced spillage at project dams resulting from flow diversions for hydropower generation. During periods of low flow, DO levels can be especially critical for aquatic organisms despite the recently improved treatment of waste water and the resulting improved water quality conditions in the river.

In natural flowing rivers, DO primarily comes from aeration at the water surface. Surface aeration is higher when turbulence is greater and depths are shallower. In the Androscoggin River, turbulence has been decreased and depth increased by the addition of hydroelectric dams, so that the resulting amount of surface aeration is relatively low. Consequently, the aeration of water as it spills over these dams can be an important source of DO. During hydropower generation, much of the river flow that would be spilled over the dam crest or through the gates is diverted or routed through turbines and no longer becomes available for surface aeration. The result can be a net loss of oxygen input to the river since most hydropower turbines provide little aeration. This is especially true on the Androscoggin River in the 11-mile Berlin-Shelburne reach where the vast majority of free-flowing river has been inundated and impounded for hydro-generation purposes by a series of eight dams.

The importance of a dam for aeration depends not only on how well it aerates (some dams are efficient aerators, providing DO concentrations consistently near saturation, while others provide little aeration) but also on whether or not it is located where DO concentrations are typically low. For example, a dam that provides only fair aeration but is located where DO concentrations may be depressed by major wastewater discharges could still be critical for maintaining adequate DO levels.

Furthermore, differences in DO levels caused by changes in aeration rates at one dam affect not only the pool immediately downstream of that dam but also the aeration rate at the next downstream dam and, consequently, the DO concentrations in the following downstream pools. Changing the aeration at a series of dams can accumulate into changes in the DO concentrations greater than the change caused by each individual dam. Therefore, the effects of changing the aeration at one dam or a series of dams in the system clearly is both cumulative and interactive. Operation of the projects could adversely affect DO concentrations both in the project areas by changing the amount of aeration that takes place at a dam and at areas well downstream of the project through cumulative impacts.

Since all of the projects in the Berlin-Shelburne area have negligible storage capacity, operation of all projects is run-of-river. While the river is regulated at the headwater reservoirs by UWPC, the projects do not alter the overall flow rate in the river.

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[1] The Androscoggin river's 7Q10 flow would be lower if the river were not regulated. Currently, the Androscoggin River is managed, through the use of headwater storage reservoirs, to provide a minimum flow of 1,550 cfs at Berlin.

Because of the interrelationships and cumulative impacts of the projects on water quality in the Berlin-Shelburne section of the Androscoggin River, NAI (1989) conducted a water quality study on the entire 19.1-mile reach of the Androscoggin River between Berlin and the Maine state line, with subsequent modelling by Kleinschmidt Associates (KA, 1993). Conducted to assess the current water quality and any potential new water quality impacts, the study included both field data collection and the construction of a predictive water quality model using the EPA's QUAL2E model. The model was calibrated and verified with various sets of field data. Model simulations were performed to assess "worst case" conditions - i.e., 7Q10 conditions and the maximum allowable discharge from each of the pulp mills and municipalities.

Results of the study are:

- No observed violations of the Class B water quality standards during the data collection.
- The model simulations indicated that even under "worst case" conditions, the predicted water quality within the entire river section was always above Class B standards.
- Under "worst case" conditions the model predicted a DO sag point of 6.79 mg/l (79.7 percent saturation) at the Shelburne headpond.
- BOD concentrations decreased as a result of a combination of decay and settling in the upstream portion of the reach, then exhibited two rapid increases due to inputs from the Burgess and Cascade Mills.
- Nutrients, in particular, organic nitrogen and organic phosphorus levels, showed significantly higher concentrations under "worst case" conditions.
- None of the impoundments exhibited any evidence of temperature or DO stratification.

Another indicator of a system's water quality is the presence of toxic substances and contaminants. The byproduct of both man-made and natural processes, contaminants can cause significant damage to a system when toxic concentrations exceed a system's natural assimilative capacity.

One contaminant that has been the focus of much attention in Androscoggin River fish is dioxin. Dioxin, as recent studies have indicated, is presumed to be present in the industrial discharge from paper mills that use the bleached kraft process for manufacturing paper. The James River mill in Berlin is one such paper mill on the Androscoggin River that utilizes the bleached kraft process. Additional paper mills located downstream in Maine also employ this processing method.

Hydroelectric projects can cause toxic substances, such as dioxins, to be trapped behind dams and accumulate in reservoir sediments. The proposed relicensing of the projects could adversely affect toxic and contaminant concentrations in the Androscoggin River through cumulative impacts, Fluctuations of reservoir levels could resuspend toxic substances present in the impoundments' sediments. Cumulatively, the resuspended contaminants could be carried to downstream areas in greater concentrations than previously experienced. Additionally, inadequate sediment and erosion control measures could cause large quantities of toxic substances to be transported downstream and deposited in new areas previously unaffected.

3.1.4 Fisheries resources

In pre-colonial times, the Androscoggin River supported anadromous fish runs of Atlantic salmon, American shad, and alewives (U.S. Fish and Wildlife Service, 1989). While it is believed that the historic range of Atlantic salmon extended to Rumford, the Great Falls in Lewiston provided a natural barrier to the upstream migration of most all other anadromous species (see Figure 1-2) (Central Maine Power, 1991).

Currently, there are no fishery management plans to introduce anadromous fish into the Berlin-Gorham area.

Although we found a general lack of historical fisheries data on the Androscoggin River, we speculate that it was typical of most other New England rivers. Brook trout, dace, and other cold water fish species probably dominated the river until the advent of colonization and logging in the early-1800's. Dam construction, logging, log-drives, over fishing, and water pollution most likely severely reduced fish populations in the river. Log drives were stopped in 1964, see section 3.2.1.3. As discussed in section 3.1.3, the installation of wastewater treatment facilities in the mid-1970's has resulted in improved water quality to the degree that the river can currently support a salmonid population.

Currently, the Androscoggin River in the Berlin-Shelburne area supports both cold water and warmwater species. Generally, warmwater species are found in the impoundments and cold water species in the riverine reaches (Table 3-1). Dominant fish species collected from impoundments on the Androscoggin River include white sucker, fallfish, common shiner, longnose dace, blacknose dace, and various minnow species. Dominant fish collected in the riverine areas include white sucker, fallfish, common shiner, longnose dace, and various minnow species. Landlocked Atlantic salmon, brook trout, and rainbow trout are also fairly common in tha riverine reaches.

Table 3-1. Fish species found to occur in the Berlin-Shelburne reach of the Androscoggin River, New Hampshire.

Common Name	Scientific Name
fallfish	*Semotilus corporalis*
common shiner	*Notropis cornutus*
golden shiner	*Notemigonus crysoleucas*
spottail shiner	*Notropis hudsonius*
white sucker	*Catostomus commersoni*
longnose sucker	*Catostomus catostomus*
rainbow trout	*Oncorhynchus mykiss*
brown trout	*Salmo trutta*
brook trout	*Salvelinus fontinalis*
Atlantic salmon	*Salmo salar*
yellow perch	*Perca flavescens*
blacknose dace	*Rhinichthys atratulus*
longnose dace	*Rhinichthys cataractae*
northern redbelly dace	*Phoxinus eos*
lake chub	*Couesius plumbeus*
creek chub	*Semotilus atromaculatus*
slimy sculpin	*Cottus cognatus*
brown bullhead	*Ictalurus nebulosus*
pumpkinseed sunfish	*Lepomis gibbosus*
smallmouth bass	*Micropterus dolomieui*
chain pickerel	*Esox niger*
cusk	*Lota lota*

While the fishery in the Berlin-Shelburne area is not actively managed by the Fish and Game, the main stem Androscoggin upstream of Berlin supports a popular sport fishery. Stocked annually by Fish and Game with brook trout, rainbow trout, brown trout, and yearling landlocked salmon, the fishery is also supplemented by natural reproduction. Except for tributary streams, no hatchery fish are stocked in the Berlin-Shelburne reach, although evidence indicates that both wild and stocked salmonids from upstream of the projects commonly migrate down stream into the Berlin-Shelburne reach (KA, 1988; NAI, 1991a).

The Berlin-Shelburne area of the Androscoggin River currently supports no populations of anadromous fish. Numerous dams downstream of this reach (most of which do not have fish passage facilities) preclude anadromous fish from this section of the river. Furthermore, the Berlin-Shelburne area provides only very limited salmonid habitat and, at the present time, no salmonid stocking is conducted in the Androscoggin River in or downstream of Berlin (PSNH, 1991).

However, approximately 15 miles upstream of Berlin, in the Errol and Dummer area, landlocked Atlantic salmon, brook trout, brown trout, and rainbow trout are both heavily stocked by Fish and Game and naturally produced. Studies have shown that these salmonids do transiently reside in the Berlin-Shelburne area as a result of downstream fish movements (KA, 1988). Furthermore, with the improved water quality throughout the Berlin-Shelburne reach, the river downstream of Cross now supports a self sustaining

salmonid population. The population is supported by migrants from upstream and from natural production in the free flowing river reaches and tributaries between Cross and Shelburne.

The proposed operation of the 7 Androscoggin River projects has the potential to contribute to cumulative effects on the resident salmonid fishery of the Androscoggin River through impingement, entrainment, and turbine related mortality. Additioually, changes in flows below the projects' dams could cumulatively affect fish habitat and populations. Increased allocation of flows could increase habitat availability and provide cumulative benefits to the Berlin-Shelburne salmonid population.

Recently, studies conducted by James River, Environmental Services, and the New Hampshire Division of Public Health Services (Public Health) confirmed the presence of dioxin and its derivatives in samples of trout and brown bullhead taken from below the James River mill at Berlin (Smith, 1989). No detectible levels were found in fish above the mill. As a result, the Public Health recommended restrictions on consuming fish from the Androscoggin River downstream of the James River mill in Berlin. A similar health advisory was issued by Maine for the lower Androscoggin River after a 1985 study.

In Public Health's Androscoggin River study, samples of bullhead (a bottom feeder) and trout (a top feeder) were captured and filleted for analysis. No whole fish analysis was conducted. Fish were analyzed for the presence of three contaminants: 2,3,7,8-tetrachlorodibenzo-p-dioxin(2378-TCDD), 2,3,7,8-tetrachlorodibenzofuran(2378-TCDF), and the concentration of all other TCDF congeners[2]. The results are shown in Table 3-2.

Table 3-2. Mean concentration (in ppt) of TCDD and TCDF in Androscoggin River fish (Source: Smith, 1989).

Species	Location	2378-TCDD	2378-TCDF	Total TCDF
Trout	Upstream	ND[a]	ND	ND
	Downstream	1.43	24.9	26.6
Bullhead	Upstream	ND	ND	ND
	Downstream	4.82	26.0	28.4

a not detectable at detection limits of:
trout - 0.210 (TCDD) and 0.256 (TCDF)
bullhead - 0.170 (TCDD) and 0.312 (TCDF)

These results were similar to those in a 1985 Maine Department of Environmental Protection (MDEP) study conducted on the Androscoggin River from Gilead, ME to Brunswick, ME, which found 2378-TCDD concentrations of 6.6 parts per trillion (ppt) in white sucker fillets and 22.6 ppt in white sucker whole fish samples. However, in 1985, the EPA, as part of a national dioxin survey, found no detectable dioxin (2378-TCDD) levels in fish from four other locations in New Hampshire, including the Pemigiwasset River at Plymouth and the Merrimack River at Concord.

Polychlorinated dibenzo-para-dioxins (PCDDs) are present as trace impurities in some manufactured chemicals and industrial wastes (Eisler, 1986). PCDDs are resistent to biological breakdown, concentrated in fat, and not readily excreted. While there are 75 PCDD isomers, ranging from extremely toxic to relatively innocuous, one of the most toxic is 2378-TCDD. Studies using birds, mammals, and aquatic organisms have shown that exposure to 2378-TCDD can result in acute and delayed mortality as well as carcinogenic, teratogenic, mutagenic, histopathologic, immunotoxic, and reproductive effects (Eisler, 1986). Furthermore, 2378-TCDD is exceedingly stable, readily incorporated into aquatic and terrestrial ecosystems, extraordinarily persistent, and virtually impossible to destroy.

Currently, there are no New Hampshire or Federal standards for dioxin levels in fish. The Food and Drug Administration (FDA), however, has established a health advisory guideline threshold level of 25 ppt for 2378-TCDD. At levels above 25 ppt, the FDA recommends that consumption should be limited, and at levels above 50 ppt, consumption should be halted.

[2] A congener is defined as a member of the same kind, class, or group.

Public Health subsequently conducted their own risk assessment on Androscoggin River fish below the James River mill and issued their own health advisory (Smith, 1989). The current advisory states that consumption of fish taken downstream of the James River mill should be limited to 1 to 2 meals (8 ounce portions) per year and that pregnant women and nursing mothers should avoid all consumption.

As we have previously stated, dioxin levels in the projects' areas could be adversely affected by operation of the projects. Fluctuating reservoir water levels and disturbances of reservoir sediments by dredging could resuspend dioxin already present in the impoundments.

Table 3-3. Cover types, in acres[a], in the Androscoggin Projects' area (Source: James River 1989, 1991a, 1991b, 1991c, 1991d; PSNH 1991a, 1991b; and Staff)

Cover type[b]	Sawmill	Smith	Cross	Cascade	James River Gorham	PSNH Gorham	Shelburne
Developed	109.6	48	18.1	103.2	54.3	117	45.7
Open water	87.7	48	8.8	84.7	78.0	119	230.4
Unconsolidated shore	1.5	-	1.2	1.5	1.5	-	1.6
Nonpersistent emergent wetland	2.0	-	-	0.7	1.3	-	6.3
Persistent emergent wetland	1.3	-	.6	1.4	4.6	5	9.7
Scrub-shrub wetland	6.3	-	1.4	2.3	8.5	8	23.9
Forested wetland	0.3	-	-	-	-	-	25.9
Open field	27.8	8	.5	10.7	8.4	-	6.7
Scrub-shrub	32.6	-	10.7	50.3	35.4	-	27.6
Evergreen forest	1.0	-	-	-	1.1	17	12.5
Deciduous forest	9.3	39	8.8	116.9	90.3	173	174.8
Mixed forest	2.8	12	-	-	-	28	5.1

[a] Acreages are not necessarily within project lands, but are within a study area following well defined land marks, such as roads or railroad tracks and encompassing the project and immediate surroundings of the project.
[b] See section 3.1.5 for descriptions of the cover types.

3.1.5 Terrestrial resources

The project area is within the hemlock-white pine-northern hardwoods forest. This forest is generally dominated by hemlock, beech, sugar maple, yellow birch, northern red oak, American chestnut, and basswood at lower elevations. White pine occurs as a successional species. At higher elevations, above 1,800 feet, the forest is generally dominated by red spruce, balsam fir, yellow birch, and paper birch (also called white birch), sugar maple, beech, and hemlock. Logging for lumber, paper, and pulp; agriculture; and fire reduced the virgin hemlock-white pine-northern hardwoods forest in New England from 95% to 5% of the total area by the 1920's. The remaining forested areas were too small to provide habitat for all the native animals originally present. Wolf, mountain lion, and wapiti (elk), were extirpated from the region. The second growth forests or forests that become established following logging or abandonment of agricultural areas existing in the area now, bear little resemblance to the original forest. Though, many wildlife species,

such as white-tailed deer, black bear, and turkey have returned in numbers to areas that have become reforested (Braun, 1950; Shelford, 1963).

Specific cover types occurring in the area of the projects follow. Table 3-3 gives estimates of the area covered by each type (James River 1989, 1991a, 1991b, 1991c, 1991d; PSNH 1991a, 1991b):

- Developed - areas used by industrial, commercial, road, railroad, or residential development.
- Open water - area of open water, reservoir or river; may support submerged wetland species such as tape-grass or pondweed in quiet, shallow areas, generally less than 6 feet deep, with appropriate substrate.
- Unconsolidated shore - unvegetated rock or boulder shoreline.
- Nonpersistent emergent wetland[3] - dominated by pondweed, sedges, jewelweed, and spikerush, with tape-grass.
- Persistent emergent wetl - dominated by cattails with sensitive fern, royal fern, tall meadow rue, grasses, sedges, rushes, and blue flag iris.
- Scrub-shrub wetland - dominated by trembling aspen, speckled alder with green ash, red maple, silver maple, red osier dogwood, sweet gale, broadleaf meadow sweet, and willows occurring in wetter areas.
- Forested wetland - dominated by American elm, with speckled alder, choke-cherry and red-osier dogwood.
- Open field - dominated by species such as tansy, wild strawberry, grasses, aster, golden rod, orange hawkweed, and rattlesnake weed.
- Scrub-shrub - upland areas containing trees, shrubs, and herbaceous vegetation. Dominant species include paper birch, white ash, trembling aspen, bigtooth aspen, red maple, silver maple.
- Evergreen forest - upland forest dominated by white pine and hemlock, or either species alone, with a sparse under story.
- Deciduous forest - upland forest, dominants include paper birch and red maple or box elder and trembling aspen. Riparian areas are dominated by black willow and box elder.
- Mixed forest - upland forest dominated by white pine, balsam fir, spruce or paper birch, with sugar maple, paper birch, hemlock and spruce.

A total of about 110 acres of wetlands are associated with the Upper Androscoggin River Projects. Of these, most of the wetlands, about 65.8 acres, are associated with Shelburne reservoir (see Table 3-3). The Reflection Pond (separated from the main Shelburne Reservoir by a railroad causeway, but hydraulically

[3] Wetland classification follows Cowardin, *et al.*, (1979)

connected) contains an additional 15 acres suitable for establishment of aquatic bed wetlands[4]. The existing wetlands, particularly at Shelburne, provide good habitat for great blue heron, moose, and other waterfowl and wildlife.

The projects' area is within the range of about 52 mammal; 138 bird; and 23 reptile and umphibian species. Of these, about 21 mammal; 88 bird; and 7 reptile and amphibian species are fairly common and were encountered in surveys by the applicants (James River, 1989; PSNH, 1991b). About 33 bird species nest in the project area, another 35 species nest nearby and forage in the project area, and about 20 migrate through the area (PSNH, 1991b). Wildlife species associated with the river include those that live on the banks (*eg.* mink, muskrat, beaver, otter), feed in flight (*eg.* bats, swallows), feed along the shoreline (*eg.* crow, sand piper, goldfinch, raccoon, fox), feed in the water (*eg.* frogs, turtles, waterfowl, mink, otter), and live in the river's flood plain (*eg.* red-winged black birds, sand piper, water shrew, white tail deer) (PSNH, 1991b).

Bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), federally listed endangered species, occur in the area as migratory transients or visitors. The only known breeding pair of bald eagles in New Hampshire nest along Umbagog Lake about 26 miles north of Berlin. The shallow riffle areas and rapids in the free flowing river provide forage habitat for bald eagles. Large hardwoods trees on islands and along shore lines provide perching habitat. Mature pines provide night roosting habitat. Also, osprey and common nighthawk; and small-footed myotis, state listed threatened and endangered species. respectively, occur in the area. There is a small-footed myotis hibernaculum[5] about one mile from the Shelburne project, in the Town of Gorham (James River 1991b; PSNH, 1991b).

In the Shelburne area, there is a heron rookery, or heronry, located on the north side of the river just upstream from Shelburne dam in a stand of white pines. The rookery, consisting of ten to twelve nests, has been used since 1985 (James River 1991b).

3.1.6 Aesthetic resources

The river basin surrounding the projects is very scenic, and is dominated by the rugged landscape of the White Mountains. However, the project sites are industrial and commercial in nature, as are the communities where they are located. Therefore, the aesthetic significance of the projects is generally low. There are exceptions. The Shelburne project area is much less developed, and these are places at some of the projects that have aesthetic significance. Several of the projects' bypassed reaches are quite scenic. There are two impressive stands of mature white birch at the Public Service Gorham and Shelburne projects.

3.1.7 Cultural resources

Prehistoric. The earliest people to enter and occupy the region, in the Paleoindian period from 11,000 to 9,000 years ago, were probably small nomadic bands adapted to the cold environment of the end of the Pleistocene glaciation. The Androscoggin was probably a prehistoric travel route from those earliest times through the Woodland period (1,000 to 1,550 AD) [1,000 to 450 years ago].

Rhyolite, a form of fine-grained granite suitable for tool making, was mined just outside Berlin at Mount Jasper, about 1 mile up the Dead River (northwest) from the Androscoggin River. Rhyolite

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[4] Recent stabilization of the Shelburne reservoir's water surface elevation resulting from the installation of new crest gates in 1991, is expected to lead to the development of these wetlands, i.e. water level fluctuations had inhibited wetland development.

[5] A place where the animals congregate to hibernate.

workshops and quarry sites on Mount Jasper were used for about 7,000 years, through the Woodland period (until about 450 years ago).

Permanent, seasonal, and temporary prehistoric encampment and special activities, such as tool making, focused on sites that were flat and had easy or immediate access to water. Sites near or adjacent to falls, rapids, and stream confluences were especially attractive. Travel was by water or foot, and these sites were used as portages (canoe carries) and natural rest stops during water travel, as well as handy places to fish for food.

Thus, there are several land forms along the Berlin-Shelburne reach of the Androscoggin River that would be expected to have high potential for containing prehistoric resources -- terrace bluffs, outwash terraces, and first and second alluvial terraces near rapids and locations at stream confluences. Unfortunately, these are the same types of features that were attractive to Europeans settling the area, and became increasingly used as settlement increased; the flatter areas for farming and the falls and steeper rapids for building dams for harnessing water energy to power sawmills, pulp and paper mills, and hydroelectric facilities. Because the close confines of the narrow valley didn't provide much room, industrial and associated residential and commercial development destroyed many prime prehistoric resources within the project area. Gengras and Bolian (1991a) advise that any remaining intact land forms listed above should be looked on as areas with moderate to high prehistoric resource sensitivity.

Although the terraces adjacent to both shorelines of the Sawmill Project and the upstream end of the James River Gorham impoundments were very likely to have once contained prehistoric archaeological resources, most of the original land has been sufficiently altered by (non-project) development activities that whatever may have been there has long since been obliterated. In the small 'natural' shoreline areas (undisturbed by development) at the Sawmill project where minor erosion is occurring, a preliminary site reconnaissance study revealed no sign of prehistoric cultural remains (Bolian, 1987). For the other natural shoreline areas that have potential to contain such resources, Bolian reports those areas are not threatened by the project (shoreline erosion), and thus no further site studies were warranted or conducted.

Similarly, because virtually the entire Smith and Cross project areas, including all of the project shorelines, have been disturbed and altered by commercial, industrial, and transportation development, whatever prehistorical archaeological potential may have existed has long since been obliterated (Gengras and Bolian, 1991a).

Historic. Gengras and Bolian (1991a, 1991b) report that, beginning with an expedition in 1724 and 1725 led Captain John Lovewell, the earliest historical activities reported in northern New Hampshire were mostly forays by Europeans against Indians in reprisal "for real or imagined wrongdoings." It was the early 19th century before Euro-american settlement became well established in the Androscoggin Valley of New Hampshire -- Coos County was established in 1803, Shelburne was incorporated in 1820, and Berlin and Gorham were incorporated as towns in 1829 and 1836, respectively.

Although settlement during the first half of the 19th century was first oriented toward agriculture, logging soon followed. To take advantage of the 400-foot drop in the 6 miles of the Androscoggin River from Berlin to Gorham, a sawmill was built in Gorham in 1823, and there were two sawmills in Berlin when it was incorporated. The river was used for log drives to the mills and for rafting lumber to downstream markets.

The railroad reached Berlin by the 1850's, and the town grew rapidly as a sawmill town once the lumber could be shipped by rail. The first pulp manufacturing mill in Berlin began operating in 1877 and more pulp mill companies were established in the 1800's. The year 1886 marked the first paper production in Berlin as well as the first electric lights. The Berlin Mills Company which was formed after the Civil War eventually became the largest lumber, paper, and pulp manufacturing business in New England.

3.1.8 Recreation resources

According to New Hampshire (1989a), the state's major rivers, including the Androscoggin, have long been an important resource for transportation, industry, and recreation. However, not until the 1960's, with increased public environmental awareness, did attention turn from the river's primary role of transport, producing power and receiving wastes turn to the river's role of providing fish and wildlife habitat and recreation. Today, improved water quality, increased population, and increased recreation demand result in many more river use conflicts.

The region around the projects is rich in outdoor recreation opportunities. Fishing, hiking, hunting, camping, skiing, canoeing, and sightseeing are all available nearby. The area outside of Berlin and Gorham is virtually undeveloped, with the 750,000 acre White Mountain National Forest just a few miles away. The Appalachian Trail crosses near Shelburne, and several wilderness areas are within an hour's drive. The state manages Moose Brook Park in Gorham, and Lead Mine Park in Shelburne, mainly for hunting and fishing. James River, International Paper Company, and the state manage the Thirteen Mile Woods Recreation Area about 10 miles upstream of Berlin. The large amount of land owned by timber companies in the area is also available to the public for some hiking, fishing, and hunting.

3.1.9 Land use

A combination of steep sided upland areas around a narrow floodplain and valley floor has concentrated development of the area in the valley. The Berlin to Gorham area along the river is heavily developed for pulp and paper manufacturing. Service, and commercial business support the paper industry. The area also acts as a stopping-off point for tourists on their way to the White Mountain National Forest. Lands surrounding the projects are mainly forested.

3.1.10 Socioeconomics

The projects are all located in Coos County, within or near the communities of Berlin and Gorham, New Hampshire. The upper Androscoggin River Basin economy is 78 percent forest product industry based (Town of Gorham, July 28, 1992, letter). Berlin and Gorham, New Hampshire, as of 1986, had 45 percent of the county's population. Berlin is a regionally important manufacturing, commercial, and service center. Two pulp and paper mill complexes, Burgess and Cascade Mills, employ about 1,200 (personal observation, November 17, 1992, site visit). James River pays over $2 million per year in property taxes to Berlin (George Hill, James River-New Hampshire Electric, Inc. letter dated December 10, 1992). Gorham is more of a crossroads, tourism oriented community due to its location relative to two important highways, Routes 2 and 16.

3.1.11 Air Quality

Air quality in the Androscoggin River Basin ranges from quite good in the sparsely inhabited regions to problematic in industrial areas. In the Berlin area, atmospheric emissions from James River Paper's mill have the most noticeable effect on the local air quality.

New Hampshire has EPA approved air quality improvement plans for the state as a whole (*e.g.* EPA, 1992, 1991). James River Paper is meeting emission standards for criteria pollutants, such as sulfur dioxide and oxides of nitrogen (NO_x). Air quality in the Berlin area has improved considerably during the past ten years. This improvement is expected to continue (pers. com. Thomas Noel, NHDES, Air Resources Division).

Unhealthful air quality[6] as a result of ozone emissions occurs periodically in the industrialized coastal areas of New England (PR New Wire Association, Inc., 1992). NO_x contributes to smog and ground level ozone. About 24 percent of NO_x emissions come from utilities burning fossil fuels (Coal & Synfuels Technology, 1992).

3.2 Site specific resources

3.2.1 Sawmill

3.2.1.1 Geology and soils

The east shoreline of the project impoundment is bordered by high and low sand and gravel terraces occasionally crossed by streams. Only a few small sections of unaltered shoreline remain. Most of the terraces were drastically altered by filling and grading associated with road and railroad construction, bridge construction, pulp industry activities, residential and recreational (Centennial Park) development, and a cemetery. The eastern shoreline is stable, with only a few areas with minor local erosion.

The west shoreline of the impoundment consists of low terraces occasionally crossed by small streams or depressions from former river meanders. Only one small area, a hay field, has avoided drastic alteration. Most of this shoreline was also altered: developments on the west shoreline and adjacent terraces include a railroad yard, a railroad bed, mill yards, commercial buildings, parking lots, houses, institutional buildings (Berlin Vocational Technical Institute), a park (Rotary Park), Route 16, and 12th Street bridge. The western shoreline is stable, either naturally or artificially stabilized, with no areas of erosion.

3.2.1.2 Fish

The 72.5-acre Sawmill impoundment is approximately 1 mile long and dominated by fallfish, common shiner, and white sucker (KA, 1988). Other species stocked upstream by Fish and Game, such as brook trout, rainbow trout, brown trout, and landlocked salmon may also transiently reside in the reservoir.

The main river channel ranges in depth from 8 ft to over 10 ft and the substrate consists mainly of a mixture of silty sand and gravel. KA (1988) reports that the substrate and cover in the impoundment are generally not characteristic of trout habitat.

The Sawmill bypassed reach is 600 ft long with a wetted channel width of approximately 100 ft. Substrate consists largely of ledge, rock, boulder, and cobble with virtually no gravel or fines present. The lower 100 ft of the bypassed reach is standing water influenced by the downstream Riverside Project (FERC No. 2423). Currently, the reach receives leakage flows of generally less than 20 cfs.

Fish surveys conducted in 1987 showed the dominant species to be white sucker, landlocked salmon, and rainbow trout (KA, 1988). Further analysis of the salmonids indicated that most of the salmon were of hatchery origin and all of the rainbow trout were wild fish. However, no salmonid spawning habitat was observed in the bypassed reach and there was no evidence of salmonid reproduction. Salmonid habitat in the bypassed reach has been characterized as not uniformly attractive and/or suitable with most of the fish concentrated in a few areas (KA, 1988).

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[6] Air quality is considered unhealthful when it exceeds the National Ambient Air Quality Standard of .12 ppm for ozone.

3.2.1.3 Cultural

There are no properties listed in the National Register of Historic Places in the project area (within the project boundary or the immediate area which might be affected by project operation). However, there are within the project reservoir upwards of 30-or-more rock crib structures which appear within the river and impoundment channel as a row of small boulder islets or boulder piles with wooden buttresses. These served during log drives as anchors for booms (or strings) of floating logs chained together end-to-end. The booms were strung between the anchor cribs and along the shoreline to direct logs destined for downstream sawmills and pulp mills past coves and obstructions and also helped sort the logs destined for various mills. We believe the logging boom anchor cribs in the Sawmill Project impoundment may be eligible for listing on the National Register of Historic Places. Gengras and Bolian (1991b) report the last long log drive on the Androscoggin River was in 1930, and log drives of 4-foot pulp timber ceased in 1964. Gary Hume reports that the New Hampshire Division of Historical Resources (Historic Resources) assisted the Town of Berlin in erecting a plaque recognizing the historic importance of the logging boom anchor cribs (in FERC, 1992b).

3.2.1.4 Recreation

Seasonal (May-October) fishing and boating occurs on the impoundment. There are two municipal park areas on the impoundment, Rotary Park (west shore) and Centennial Park (east shore). These parks provide opportunities for picnicking, historic interpretation, outdoor sports, and boat launching. There is also a state-managed facility, the Nansen Wayside Area, about one mile upstream which has picnic, restroom, and boat launching facilities. Berlin plans to offer a tour along the river corridor in the city to highlight the area's industrial heritage. However, because of the nearby industrial development, access to the project bypassed reach and tailwaters is not permitted. These areas are gated and patrolled to discourage trespassing.

3.2.1.5 Aesthetic

The area in the immediate vicinity of the Sawmill dam and powerhouse is very industrial. There are several factory type buildings on both sides of the river, some of which are abandoned. There is also a railroad switchyard near the river on the east side. Although highways flank the river on both sides, much of this industrial area is currently screened from the public's view. Because access is not permitted to the dam and powerhouse, the only location from which to view the project facilities is Route 16.

3.2.2 J. Brodie Smith

3.2.2.1 Geology and soils

All of the project area, including the shorelines, has been disturbed and altered by urban commercial, industrial, and transportation development of roads, bridges, industrial complexes, commercial and municipal buildings. As a result, the Androscoggin River flows within a steep-sided rocky gorge flanked by near-vertical outcrop cliffs, steep rock and fill banks, concrete retaining and building foundation walls, bridge abutments, and highway fill banks. The shoreline banks are all stable, but have little or no soil. The partially flooded gorge above the dam forms the project impoundment. Between the dam and powerhouse, the river channel within the largely dewatered gorge consists of bare, sometimes jagged, bedrock outcrop ledges and boulders. The bypassed reach below the dam also includes some small, steep-sided bedrock islands. A shallow gorge containing the Dead River cuts diagonally southeastward across the terrace west of the Androscoggin River below the dam.

3.2.2.2 Fish

The 8-acre Smith impoundment is dominated by a warmwater fish assemblage of fallfish, white sucker, golden shiner, blacknose dace, longnose suckers, smallmouth bass, yellow perch, and fallfish (NAI, 1991a). Other species stocked upstream of the Berlin-Shelburne area by Fish and Game, such as brook trout, rainbow trout, brown trout, and landlocked salmon, may also transiently reside in the reservoir.

The substrate of the impoundment primarily consists of boulders interspersed with sand and silt - habitat not generally characteristic of salmonids. However, NAI (1991a) reports that the deeper sections of the reservoir may offer potential salmonid wintering habitat.

The Smith bypassed reach is approximately 2,600 ft long. Substrate consists largely of ledge and boulders. Currently, the reach receives leakage flows of generally less than 5 cfs.

Fish surveys conducted in 1991 showed the dominant species to be fallfish, blacknose dace, longnose dace, and lake chub (NAI, 1991a). Substrate and cover conditions in the bypassed reach are not conducive with general salmonid habitat requirements (NAI, 1991a).

3.2.2.3 Cultural

Gengras and Bolian (1991a) report that the project area extending from the dam south to the tailrace area on the east side of the powerhouse contains the site of old pulp and paper making facilities formerly owned by the International Paper Company. Within this site are remnants of late 19th and early 20th century industrial use of water power for pulp and paper making and is the location of the first paper manufactured in Berlin. The project area may also have been the location of earlier 19th century sawmills, predating the pulp and paper making activities.

Various features from the International Paper Company complex -- including remains of mill building foundations, mill yards, chimneys, dams, canals, retaining walls, and railroads -- are found in the project area along the banks of both the Dead and Androscoggin Rivers, on rock escarpments in the Androscoggin River, and on the terrace between the J. Brodie Smith dam and the area adjacent to the tailrace on the east side of the powerhouse.

The J. Brodie Smith project penstock, surge tank, and powerhouse occupy the west side of the International Paper Company site. The old International Paper Company main dam, canal, and spillway are currently used by the J. Brodie Smith Project. Portions of original timber crib dam, constructed in 1885, abut the new (1948) masonry and concrete gravity-type dam, and reinforced concrete was poured against the original stone masonry canal walls (PSNH, 1992b). The New Hampshire State Historic Preservation Officer (SHPO) has determined that neither the project hydroelectric facility as a whole nor any of its components are eligible for listing in the National Register of Historic Places (letter to James Kearns from Nancy C. Muller, Director and State Historic Preservation Officer, New Hampshire Division of Historical Resources, Concord, New Hampshire, September 3, 1992).

3.2.2.4 Recreation

There are no recreation facilities at the project, and there is no known recreational use of the project site. There are two park facilities in the vicinity: Public Service Park, (west side of the canal wall) and Community Field Central Park (east side of the impoundment). Public Service owns Public Service Park and Berlin owns Community Field Central Park. Berlin manages both. Public Service Park is mainly a pedestrian rest area, while Community Field Central Park is geared to outdoor sports (softball, tennis). The 2,600-foot-long bypassed reach, while difficult to access, may have potential for recreation. It contains three

cascade sections, and may offer whitewater opportunities. Berlin is interested in a small piece of undeveloped land between the bypassed reach and the penstock for future use (nature trail, picnic area, etc.).

3.2.2.5 Aesthetic

The project sits in the commercial-industrial section of Berlin. The Mason Street bridge, in downtown Berlin, crosses the bypassed reach at the dam. Looking upstream from this bridge, James River's Burgess mill dominates the viewshed. The only area of the project bypassed reach that is readily viewable by the public is the uppermost section, just downstream from the dam. Looking downstream, the impression of the bypassed reach is that it is very much dewatered, although there is currently some leakage. The lower bypassed reach has scenic value due to the presence of several cascade sections and old mill ruins. The project's penstock, surge tank, and powerhouse are prominent visual features as you drive north on Route 16. The surge tank is painted bright green, and the penstock is painted black. The powerhouse appears well maintained.

3.2.3 Cross Power

3.2.3.1 Geology and soils

The eastern shore of the river and the impoundment, and the northern half of the western impoundment shore above the bridge are bordered steep-sloped rocky banks. Portions of the shore have been altered by bulldozing, filling, dumping, and other construction activities, including highway, road, and bridge construction. The eastern shore below the powerhouse consists of a concrete retaining wall and a steep rocky bank that was altered by construction of the powerhouse access road. The southern half of the western impoundment shoreline to the dam is the steep-sloped rock fill embankment immediately adjacent to Route 16. The west abutment and shoreline downstream of the dam is exposed bedrock.

3.2.3.2 Fish

The 22-acre Cross impoundment is approximately 0.5 mile long and dominated by a warmwater fish assemblage of common shiner, white sucker, and fallfish (KA, 1988). Other species stocked upstream of the Berlin-Shelburne area by Fish and Game, such as brook trout, rainbow trout, brown trout, and landlocked salmon may also transiently reside in the reservoir.

The main river channel ranges in depth from 10 ft to over 12 ft and the substrate consists mainly of a mixture of silty sand, gravel, and rock. KA (1988) reports that the habitat in the impoundment is generally not characteristic of trout habitat and may be a limiting factor for salmonids.

Due to the backwater effects of the downstream Cascade Project, there are no riverine areas in or near Cross.

3.2.3.3 Cultural

The powerhouse was constructed in 1903 as a hydromechanical groand wood facility for grinding logs into wood pulp to be used in papermaking by the Berlin Mills Company (predecessor to James River). From 1912 to 1925 the facility was converted from a wood grinding to a hydroelectric generating facility to provide electricity to pulp and paper making facilities. As part of James River's ongoing program of energy conservation, upgrading, and modernizing their facilities, unit no. 5 was removed and replaced in 1989 by a new, modern turbine and a renovated generator (James River, 1992b).

We believe project facilities are eligible for listing on the National Register of Historic Places. Gary Hume reports that Historic Resources has identified the dam, powerhouse, gatehouse, and gatehouse

machinery as representing the earliest phase of the electric power part of the mill industry in Berlin (in FERC, 1992b).

3.2.3.4 Recreation

There are no existing recreational facilities at the project. Based on the James River survey, the project site attracts very little, if any, recreational use. Informal access to the impoundment's west shore and tailwaters is available along Route 16. James River states that the east shore is not considered accessible by the public.

3.2.3.5 Aesthetic

The project can be viewed from Route 16, which runs very close along the west side of the impoundment. The West side is commercial and residential in nature, and the project can be viewed from several nearby businesses. The east side of the project is less developed, although the James River water treatment facility is nearby, upstream of the dam. The Berlin municipal water treatment facility is also on the east of the river, downstream of the dam.

3.2.4 Cascade

3.2.4.1 Geology and soils

The dam is built on exposed gneissic bedrock. Bolian (1987) reports that before the dam was built, there was a 'major' falls at the site; the river channel was apparently deeply incised in the project area, and the original upstream land surface is now covered by impoundment. A dirt access road and railroad bed run adjacent to portions of the eastern impoundment shore. The present shore slope varies from a level, poorly drained peninsula south of railroad bridge trestle to steep slope and rock escarpment. Most of the eastern shore land has been disturbed; only the peninsula, some small wetland islands, and two small well-drained "noses" of land between the access road and the river remain undisturbed. Except for some erosion and slumping on the peninsula, most of the eastern banks are stable with no sign of erosion. Banks on the west impoundment shore are steep. All lands adjacent to the west side of the river have been disturbed by filling and dumping and by construction of housing, a railroad trestle, a railroad bed and railroad yard, and Route 16. Bolian (1987) reports no shoreline erosion was observed during the phase "0" cultural resources survey. The west shore of proposed bypassed reach is a continuation of the impoundment shoreline -- mostly steep bank that has been disturbed by industrial, residential, commercial, and highway development.

The proposed new intake, penstock, powerhouse, and tailrace would be built along the east side of the bypassed reach. The intake would be immediately adjacent to the east dam abutment on an irregular glacial kame terrace consisting of sandy gravel, cobbles, and boulders. The general area appears to have a "kame-and-kettle" topography. In addition to obvious small kame knolls (or knobs), large scale topographic mapping of the area provided by James River (1989) shows the surrounding area of the terrace also has several depressions. Some of these were undoubtedly formed during gravel excavations and filling that accompanied railroad and road construction. However, some are probably "kettles" -- depressions which once contained blocks of remnant glacial ice when the surrounding sand and gravel materials were deposited by glacial melt waters.

The intake and first 600 feet of new penstock would cross the kame deposits. The intake site and much of the rest of this section of the penstock route have been excavated and filled from construction of the dam and construction of access roads to the top and base of tha dam site. Except for the small flat graded portion at the intake site and a small area on the top of what's left of the gravel knoll, this portion of the penstock route has a very irregular, steep topography of excavated and natural slopes and some bedrock outcrop, sloping down to the more gently sloping and flatter floodplain that lies along the east bank of the

river. The narrow rocky floodplain then extends along the east river bank past the proposed powerhouse and tailrace site. The penstock route generally follows the east side of the floodplain near the base of the slope that lies below the adjacent glacial outwash terrace for about 4,600 feet then angles away from the river for about 1,450 feet across a low terrace to another dry floodplain channel at the proposed powerhouse and tailrace site.

Borrow and spoil disposal sites. James River anticipates that most of the borrow materials (sand and gravel) needed for construction would be obtained from the gravel knob located just east of the dam, and from other on-site excavations during construction of the new intake, penstock, powerhouse, and tailrace. James River has identified two existing commercial gravel pits located in Gorham from which additional borrow materials would be obtained. One is located in glacial outwash terrace gravel deposits west of the Canadian National Railroad (CNR) bed at the base of the valley slope about 1/4-mile northwest of the James River Gorham dam. The other is located in a triangular portion of an area of glacial outwash delta deposits bounded by the CNR bed to the northeast, the Boston and Maine Railroad bed to the northwest, and Moose Brook to the south.

Anticipating limited availability of on-site storage space for borrow and spoil materials, James River has identified 4 off-site locations where excavated material would be stored until being returned as common fill and grading material. One site (designated site SA-1) is located just outside the project boundary east of the Cascade impoundment in a variably sloping area of alluvial sand deposits that lies between the dirt access road to the east dam abutment and the Boston and Maine Railroad bed. Part of the site is crossed by a transmission line right-of-way. Site SA-2 is a generally flat area just north of James River's Burgess Mill pollution control facility on the upper terrace away from the Boston and Maine Railroad bed, east of the Cross Power Project powerhouse access road, and almost straight east across the valley from tha J. Brodie Smith project powerhouse. James River reports the site was used in the past for storage of materials from the Cross Station Project cofferdam and has recently been used as a staging area for work at the Burgess Mill pollution control facility. Site SA-3 is located just northeast of end on the other side of the access road and railroad bed from the Cross dam in a similar generally flat to modestly sloping area on the terrace that lies just south of the Burgess Mill pollution control facility. Site SA-4 is an existing borrow pit located adjacent to the western edge Gorham Island just west of the Gorham dam access road of the James River Gorham project bypassed reach between the access road and the river.

3.2.4.2 Fish

The 28-acre Cascade impoundment is approximately 2600 ft long and dominated by fallfish, common shiner, white sucker, and smallmouth bass (KA, 1988). A single brown trout of hatchery origin was also collected. Other species stocked upstream by Fish and Game, such as brook trout, rainbow trout, and landlocked salmon may also transiently reside in the reservoir.

The main river channel ranges in depth from 8 ft to over 15 ft and the substrate consists mainly of sand, clay, and gravel. Shoal areas consisting of silt, sand, and rooted aquatic vegetation that are less than 5 ft in depth are numerous.

The Cascade bypassed reach is approximately 400 ft long with a wetted channel width of approximately 100 ft. Substrate and bottom configuration consists largely of ledge, a short riffle, and pools up to 8 ft deep. The lower half of the reach is largely influenced by the back watering effect of the existing Cascade tailrace. Currently, the reach receives leakage flows of generally less than 6 cfs or flows in excess of the project's capacity of 2,690 cfs.

The Cascade tailrace, or Pulsifer Rips, is an approximately 2-mile-long riverine reach extending to the headwaters of the James River Gorham impoundment. Characteristics of this reach at the existing minimum flow of 1550 cfs include mean column velocities of over 3 fps, main channel depths of 4 to 5 ft, and

a width of about 250 ft. Substrate consists largely of rock and boalder, with virtually no gravel or fines present for salmonid spawning habitat.

Fish surveys conducted in 1987 showed the dominant species to be white sucker, common shiner, blacknose dace, fallfish, and lake chub (KA, 1988). Landlocked salmon and rainbow trout were also found to be present. Further analysis of the salmonids indicated that most of the salmon were of hatchery origin and most of the rainbow trout were of wild origin. However, KA (1988) found that there was very limited salmonid spawning habitat in the Sawmill to Cascade reach, or within the Pulsifer Rips section, except for small areas in the adjoining tributaries.

3.2.4.3 Cultural

Few, if any, affected potential prehistoric sites remain at Cascade mill and along the west bank of the impoundment and proposed bypassed reach, where residential, commercial, and highway construction activities have altered the floodplain and terrace banks. Bolian (1987) reports that the potential for prehistoric resources on the few remaining undisturbed portions of the eastern shore of the impoundment is only marginal. The impoundment isn't threatening these areas, so no investigation on the east side of the Androscoggin River downstream of the dam were made beyond preliminary reconnaissance. On the east side of the Androscoggin River downstream of the dam, however, except for the area near the dam site, portions of the terraces have remained less disturbed by historic activities. Phase I and II archaeological site surveys conducted in the fall of 1987, and Jnly, 1988 in the areas that would be affected by the proposed Pulsifer Rips development identified 4 sites along the east side of the river with prehistoric artifacts and other information which have not yet been destroyed by development. These sites might be adversely affected by construction of the proposed new Pulsifer development. Based on the survey results, on December 12, 1988, the New Hampshire SHPO determined that the 4 sites should be considered eligible for listing in the National Register of Historic Places. Gary Hume, the NH State Archaeologist, reports that the sites include a remnants of a prehistoric village and prehistoric stone tool workshop sites (personal communication, November 13, 1992).

We believe the Cascade dam, powerhouse, and portions of the Cascade paper mill may be eligible for listing on the National Register of Historic Places. Construction of the mill began in 1902, and the dam and powerhouse were completed in 1904. The powerhouse originally housed a hydromechanical pulp grinding facility. However, three of the original six units were converted to electric generation in 1914, 1916, and 1918.

3.2.4.4 Recreation

There are no recreation facilities at the existing project, and there is little documented recreational use of the project area. This is likely due to a general lack of access and industrial development. The project is bordered on the west by the Cascade mill complex, and a railroad switchyard which are gated and patrolled against trespassing for safety reasons. The east side of the existing project is undeveloped deciduous forest. No access is currently provided to the east side.

Some fishing has been observed in Pulsifer Rips (site of the proposed new 7,750-foot-long bypassed reach) near Tinker Brook. Fish and Game may manage this reach in the future for fishing. Because of the relatively high flow that is maintained in the Androscoggin River, this reach is currently not considered wadeable. There is no formal access to the reach, but Cascade Flats Road passes nearby on the upper end, and Route 16 parallels the lower end. The reach is canoeable and contains some Class I rapids.

3.2.4.5 Aesthetic

James River's Cascade mill dominates the viewshed on the west side of the river. The east side of the project area is fairly scenic and consists of undeveloped forest along a narrow floodplain that quickly rises to form the Mahoosuc Mountains.

The area that would be impacted during construction and operation of the expanded Cascade project (new penstock, powerhouse, tailrace, transmission line, and surge tank) includes about 7,750 linear feet of undeveloped woodland along the river's east bank. This area can be viewed from Route 16, from a local shopping center, and from the Cascade Flats neighborhood on the opposite bank. Mean annual flow in this section of the river is 2,500 cfs. The river in this reach is about 210 feet wide, and has several rapids.

The penstock route would be 15 to 450 feet from the river's edge. Constructing the penstock and surge tank would involve clearing vegetation, and placing fill and concrete supports. Constructing the new powerhouse and tailrace would involve installing a cofferdam in the river bed. An existing access road would be improved and extended from near the dam along the penstock route to the new powerhouse.

3.2.5 James River Gorham

3.2.5.1 Geology and soils

The east shoreline of the impoundment consists of moderate to steep banks with a small level terrace area near the gatehouse, and a broad, level terrace at the upper end of the impoundment. Bolian (1987) reports the bank is stable and with no noticeable erosion, and the only modern disturbance is a short stretch where the Boston and Maine Railroad bed cuts into the steep bank. The broad, level terraces along the west shoreline of the impoundment have been disturbed by highway, commercial, and residential developments. The bank itself is stable with minor erosion where construction activities have removed the vegetation.

The west shore of the canal is a long, straight graded embankment which was formed during excavation of the canal and serves to impound the canal against the eastern side of the valley floor. The east shore of the canal is a meandering moderate to gently sloping bank caused by ponding of the water against the terraces along the base of the valley wall. Although the general area was the site of an historic homestead, the east bank itself remains relatively undisturbed except for the impounding waters. Both canal banks are stable with no sign of erosion.

3.2.5.2 Fish

The 45-acre James River Gorham impoundment is approximately 0.8 mile long and dominated by a warmwater fish assemblage of white sucker, longnose dace, and fallfish (KA, 1988). Other species stocked upstream of the Berlin-Shelburne area by Fish and Game, such as brook trout, rainbow trout, brown trout, and landlocked salmon may also transiently reside in the reservoir.

The main river channel ranges in depth from 6 ft to over 10 ft and the substrate consists mainly of a mixture of silty sand and gravel. Extensive shoal areas of less than 5 ft in depth occur along both banks. While the habitat in the impoundment is generally not characteristic of trout habitat, KA (1988) reports that the reservoir may serve as a winter refuge for upstream dwelling salmonids.

The James River Gorham bypassed reach is approximately 4,500 ft long. Substrate consists largely of boulder, cobble, and sand. Currently, the reach receives only leakage flows.

Fish surveys conducted in 1987 showed the dominant species to be white sucker, blacknose dace, longnose dace, longnose sucker, lake chub, and sculpin. Brook trout and rainbow trout were also found to be present (KA, 1988). Further analysis of the salmonids indicated that all of the trout were of wild origin and ranged in age from 0 to 3 years old. KA (1988) suggests that Moose Brook, the only significant tributary discharging into the bypass, serves as a spawning and rearing area for juvenile brook trout and as adult habitat for both rainbow trout and brook trout. The study also suggests that the James River Gorham bypassed channel supports a wild salmonid fishery.

3.2.5.3 Cultural

Gary Hume reports that Historic Resources has identified the entire facility at James River's Gorham project as a district eligible for the National Register (in FERC, 1992b). The project dam, gatehouse, powerhouse, and machinery remain virtually intact from the time of construction and represent the earliest phase of the electric power part of the mill industry in Berlin. Bolian (1987) reports that the few historic resource remains in the area traversed by the canal include farmstead cellarholes, outbuilding foundations, barn remains, and stone piles from land clearing. None is threatened by canal bank erosion.

3.2.5.4 Recreation

The project area attracts some use, mainly for hiking. James River estimates that about 75 people per year use either the impoundment, bypassed reach, or tailrace (James River, June 25, 1992, letter). James River provides public access via a footbridge which they maintain. They also allow the public to use the project's access roads. The footbridge, owned by the Appalachian Mountain Club, crosses the bypassed reach and is mainly used by hikers of the Mahoosuc Trail. This trail leads to the Mahoosuc Mountains and connects with the Appalachian Trail about 3 miles downstream in Shelburne. James River estimates that about 100 hikers use the footbridge each year (James River, June 25, 1992, letter).

3.2.5.5 Aesthetic

The 4,500-foot-long bypassed reach at the James River Gorham project can be seen from Route 16, and from a few homes. Recreationists can also view the project if they use the footbridge described above. Current flow in the bypassed reach is such that it is possible to drive a vehicle across the river when the dam is not spilling. Although flow is present, the bypassed reach has a dewatered appearance. The project power canal and powerhouse are surrounded by a scenic birch and evergreen forest.

3.2.6 Public Service Gorham

3.2.6.1 Geology and soils

The Public Service Gorham area is a relatively flat area of glacial kame terraces, outwash, and delta deposits that fill the valley floor where the Moose River and Peabody Rivers empty into the Androscoggin River. The river flows near the north side of the valley floor within in a meandering braided channel containing several islands.

The impoundment shoreline consists of steep banks composed of bedrock outcrops, boulders, cobbles, and mixed sand and gravel. The south side of the impoundment is a broad, level outwash, delta, and river floodplain terrace area on which the village of Gorham is located. The entire south shoreline of the impoundment has been filled and stabilized by riprap for flood protection. The north side of the Androscoggin River in the Public Service Gorham project area alternates between narrow kame terraces and steep rocky slopes. Except for a short section of undercutting near the upper end of the impoundment, most of the north bank is stable. A town road generally parallels most of the north side of the impoundment. On some of the steep slopes where, due to lack of a terrace, the road needs to pass close to the river, portions

of the bank, although stable, have also been disturbed during bulldozing and widening of the roadway. Gengras and Bolian (1991b) report occasional bank slumping and erosion on some of the islands in the impoundment.

The river below the dam and powerhouse has steep bedrock outcrop and boulder banks, and constantly changing cobble and gravel bars and islands within the channel.

3.2.6.2 Fish

The 35-acre Public Service Gorham impoundment is dominated by a warmwater fish assemblage of lake chub, white sucker, and fallfish (NAI, 1991a). Landlocked salmon of hatchery origin were also found to be present and ranged in age from 1 to 6 years old. Other species stocked upstream of the Berlin-Shelburne area by Fish and Game, such as brook trout, rainbow trout, and brown trout, may also transiently reside in the reservoir.

NAI (1991a) reports that there appears to be considerable habitat for rainbow trout and landlocked salmon in the upper reaches of the impoundment and that the deeper sections of the reservoir may offer potential salmonid wintering habitat.

The Public Service Gorham bypassed reach is approximately 800 ft long. Currently, the reach receives only leakage flows.

Fish surveys conducted in 1990 and 1991 showed the dominant species to be fallfish, yellow perch, blacknose dace, and lake chub (NAI, 1991a). However, rainbow trout and Atlantic salmon were found to be present in the project tailrace. Further analysis of the salmonids indicated that the salmon were of hatchery origin and the rainbow trout were both of hatchery and wild origin (NAI, 1991a). However, since spawning habitat for salmonids has been identified as very limited, the salmonid fishery is probably sustained by immigrants from upstream stocked areas or from nearby tributaries (PSNH, 1991).

3.2.6.3 Cultural

Gengras and Bolian (1991b) report that, although there were a few locations with high to moderate prehistoric sensitivity in the general area, their pbase 1A archaeological survey of the Public Service Gorham Hydroelectric Project area found no evidence of prehistoric activity in the project area itself. The New Hampshire SHPO determined that there are no recorded prehistoric sites, no areas of bank erosion in the project area that threatens as-yet-undiscovered sites, and no further prehistoric field survey is required (letter to James Kearns from Nancy Muller, New Hampshire SHPO, Historic Resources, Concord, New Hampshire, August 3, 1992).

The original dam and powerhouse at the Public Service Gorham site were constructed in 1894. However, substantial reconstruction in 1909, 1917, and 1923 destroyed the historically significant physical characteristics the original powerhouse may have had (PSNH, 1992a). The dam was removed and replaced with a new timber and crib dam in 1958-59. Because of the dam rebuilding and powerhouse changes that have occurred at the Public Service Gorham Project, the SHPO states there are "No Resources Present" at the project; Historic Resources found that the project is without distinction under any National Register criteria, and none of its individual elements are sufficiently distinctive to merit eligibility on their own as engineering features (letter to James Kearns from Nancy Muller, New Hampshire SHPO, NHDHR, Concord, New Hampshire, August 3, 1992).

3.2.6.4 Recreation

Fishing is the main use of the Public Service Gorham project area. The primary fishing site is a narrow piece of land just below the powerhouse between the Peabody and Androscoggin rivers. Both vehicular and pedestrian access is provided to this site on the south bank. The area below the powerhouse is used for hunting. A logging road, also known as Hogan Road, which is open to the public, parallels the entire north side of the project. A footpath on the south bank above and below the dam provides downstream views of a stand of tall birches and distant mountains.

3.2.6.5 Aesthetic

The Public Service Gorham project sits several hundred feet back from Route 2 and is generally not viewed by passersby. The area between the project structures and Route 2 has been developed for the Town of Gorham Public Works Department end wastewater treatment plant. Limited views of the project are possible from Hogan Road on the project's north side. The project does, however, offer scenic views of both the Androscoggin and Peabody Rivers for recreationists. The area below the Lower Gorham powerhouse is also noteworthy for its birch groves and mountain views. A peninsula of land which starts near the powerhouse separates the Androscoggin and Peabody rivers until they meet about 1,600 feet downstream. This narrow piece of land is open to the public and contains a very nice stand of mature white birches. The tip of the peninsula provides a very good vantage point for viewing the surrounding mountains.

3.2.7 Shelburne

3.2.7.1 Geology and soils

The valley floor in the existing and proposed enlarged Shelburne impoundment and project area is an extension of the relatively flat glacial kame terraces, outwash, and delta deposits that fill the valley floor immediately in the Gorham area. For the first .3-mile upstream of the dam, the impoundment is relatively narrow, about 800 or 900 feet wide. The impoundment quickly widens to about 2,400 feet wide-or-so, including the reflection pond, filling most of the flat valley floor for about .8 mile. As in Gorham, the upper portion of the impoundment and river channel tends to follow the north side of the valley floor. In the upper .4-mile portion of the existing impoundment and the additional .5-mile reach above it which would be impounded with the proposed raised reservoir level, the river flows through pronounced braided channels, islands, and bars.

The first mile of the north shore of the Shelburne impoundment above the dam consists of high, steep terrace banks. The banks are stable with only minor erosion in some places. The bank slopes are also shallower where streams flow into the impoundment. Upstream, the banks are still relatively steep, but the terrace is lower, only a few feet above the water surface. The south shore of the impoundment consists of low-lying, partially inundated, sandy terraces having stable banks with little or no erosion.

3.2.7.2 Fish

The 210-acre Shelburne impoundment is approximately 1.5 mile long and dominated by a warmwater fish assemblage of white sucker and fallfish (KA, 1988). Rainbow trout were also found to be present. Other salmonid species stocked upstream of the Berlin-Shelburne area by Fish and Game, such as brook trout, brown trout, and landlocked salmon may also transiently reside in the reservoir.

The main river channel ranges in depth from 6 ft to over 14 ft and the substrate consists mainly of a mixture of silty sand and gravel. Extensive shoal areas of less than 5 ft in depth occur along both banks with a relatively extensive wetland found on the south bank of the impoundment at approximately the midpoint of the reservoir. While the habitat in the impoundment is generally not characteristic of trout habitat, KA

(1988) reports that the reservoir may serve as a winter refuge for upstream dwelling salmonids, in particular rainbow trout.

In addition, there is a 1 mile riverine reach between the tailwaters of Public Service Gorham and the headwaters of the Shelburne impoundment. KA (1988) reports that this reach appears to provide adequate rainbow trout habitat, including spawning areas. Further analysis of the rainbow trout collected in the reservoir indicated that all of the trout were of wild origin and ranged in age from 1 to 2 years old.

The Shelburne bypassed reach is approximately 150 ft long and currently receives only leakage flows. Substrate consists largely of ledge, boulder, cobble, and sand.

Fish surveys conducted in 1987 showed the dominant species to be golden shiner, yellow perch, and white sucker (KA, 1988). However, brook trout of wild origin were also found to be present and subsequent unrelated sampling in 1988 showed an abundance of brook trout in the tailrace.

3.2.7.3 Cultural

Bolian (1987) reports some existing and potential prehistoric archaeological sites on the terraces near the impoundment. None is affected by the present impoundment waters, or potentially affected by the proposed raised impoundment.

The original Shelburne dam and powerhouse were constructed in 1906 in order to supply electric power for streetcars that operated between Berlin and Gorham. The existing powerhouse was built in 1917 and reconstructed in 1929 to repair damage that occurred during a flood in 1927. Several repairs and changes have been made to the original dam, the most recent in 1990 when 83 feet of flashboards on the spillway were replaced by three hydraulically operated drop gates (James River, 1992a).

We believe only the project powerhouse is eligible for the National Register. Gary Hume reports that, although the distinctive, original symmetry of the powerhouse was lost when it was shortened in 1929, Historic Resources has identified the Shelburne powerhouse as an architecturally significant structure. It is the only portion of the entire Shelburne complex which has historical value (in FERC, 1992b).

3.2.7.4 Recreation

Because the Shelburne project area is much less developed than the other project areas, it offers more opportunity for back-country or wilderness type outdoor recreation. The project is bordered on the south by White Mountain National Forest, and on the north by Lead Mine State Forest. Fishing, camping, hiking, and canoeing are available in the immediate vicinity. The Appalachian Trail crosses near the dam and powerhouse, with several side trails nearby. There are two informal boat launches on the north shore of the impoundment on Hogan Road. Canoe launching is also possible below the bridge adjacent to the dam. The reach between Shelburne and Bethel has both flatwater and quick water sections, and views of the Presidential Mountain Range.

3.2.7.5 Aesthetics

Of all of the projects being considered, the Shelburne project has the most aesthetic significance. The Town of Shelburne is much less developed than Gorham and Berlin, and the surrounding area is very scenic. Views at the project are panoramic. The Shelburne impoundment looks like a lake, while the other project impoundments generally look like wide sections of river. The project is surrounded by undeveloped state and national forest lands. A large stand of white birches, the Shelburne Birches, grows on the impoundment's south shore, and Mount Washington can be seen from the dam and impoundment.

4. ENVIRONMENTAL CONSEQUENCES

4.1 Projects as proposed

We considered the cumulative impacts[1], as well as site specific effects, the Upper Androscoggin River projects would have on resources. The geographic area included in this cumulative analysis is the 19.1-mile stretch of the Upper Androscoggin River from the Sawmill Project to the Maine State line (see Table 1-2 and Figure 1-2, for projects located in this reach as well as the rest of the Androscoggin River Basin).

4.1.1 Geology and soils

Continued operation of the Sawmill, Smith, Cross, Cascade, James River Gorham, and Public Service Gorham projects would not cause any new erosion or instability of the impoundment shorelines or downstream river channels; some localized minor impoundment bank erosion would continue. Proposed minimum flow releases at Sawmill, Smith, James River Gorham, and Public Service Gorham would be negligible compared to normal high flows that flow through the bypassed reaches each year without effect under the projects' current operation, and thus would not cause erosion or instability of bypassed reach channels and banks.

Cascade. Coostruction activities associated with modification of unit 1 and operation of the existing powerhouse would all be within the existing powerhouse, and would not affect geology or soils resources.

The erosion and sediment control plan filed with the application (James River, 1989a) and amplified by additional information filed Jnly 10, 1989, is conceptual and covers all phases of construction in connection with the Pulsifer Rips development. The plan generally shows where various types of control wonid be used, and includes some of the specifications that would be followed for some of the control measures and for site restoration. Sequenced use of earth berms and cofferdams to dewater the construction sites at the intake and tailrace would be used along with such measures as silt fences, temporary and permanent slope designs with surface erosion control, sediment traps, lined diversion ditches, interceptor dikes, sediment basins with riprap outlet aprons, suspended silt barriers, and straw or hay bale dikes. These would be used at all construction sites, including access roads, construction staging and laydown areas, temporary and permanent stockpile and disposal sites. With implementation of the control plan und the types of measures it proposes, along with the construction sequencing described in exhibit C of the application (James River, 1989a) only minor, short-term erosion and sediment runoff would occur during the construction of the Pulsifer Rips development. Minor erosion and sediment runoff would occur during construction of the new angler access area and during use of the site (no control measures have been proposed).

Operation of the new Pulsifer Rips development would reduce the flows in the bypassed reach of the river (downstream of the existing dam and powerhouse to the Pulsifer Rips tailrace). Project operation isn't causing any channel or bank erosion or instability now, and the proposed new operation would not cause any new such impacts. No erosion would occur at the new intake or tailrace during project operation; both areas would be lined with riprap.

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[1] The Council on Environmental Quality defines cumulative impacts as impacts on the environment that result from the impacts of an action which when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or entity undertakes such actions. The Council says cumulative impacts can result from minor but collectively significant actions taking place over a period of time (40 C.F.R. 1508.7).

Shelburne. There would be no disturbance of geological or soils resources during installation of the new flashboards. Localized minor bank erosion on the impoundment shoreline would continue during operation with the reservoir raised 1.7 feet, and a few new areas of minor erosion may develop. However, there would be no new erosion or instability of the downstream river channel and banks.

4.1.2 Water quality

4.1.2.1 Run-of-river operation

James River's and Public Service's continued operation of the 7 Androscoggin River hydroelectric projects in run-of-river modes with minor variations in the impoundment levels would allow daily and seasonal flow volumes and reservoir water surface elevations to remain unchanged. Fluctuating water levels have been found to impact fishery resources and aquatic habitat (see section 4.1.3). Operating the projects as run-of-river would not disrupt the availability of water for other uses in the Berlin-Gorham area. For example, hydropower projects and industrial water facilities located immediately upstream and downstream of the projects would not be affected by operation of the projects. Fish and Game and Interior support James River's and Public Service's proposal for run-of-river operation.

Operation of the projects as run-of-river would also reduce the potential for resuspension of contaminated bottom sediments by minimizing the fluctuations of the impoundments' water surface elevations. Fluctuating water levels can resuspend particulate matter. With run-of-river operation, contaminated bottom sediments would remain in their present locations and continue to be "locked-up" in the impoundment's sediments (see further discussion in section 4.1.3).

4.1.2.2 Dissolved oxygen

James River conducted a water quality study and subsequently developed a water quality model of the 19.1-mile reach of the Androscoggin River between Berlin and the Maine state line (see section 3.1.3). As part of the study, monitoring stations were located: (1) in the Sawmill headpond and tailrace; (2) near the upstream limit of the Cross impoundment and immediately downstream of the Cross tailrace; (3) in the Cascade impoundment, the Cascade tailrace, and the proposed Pulsifer Rips bypassed reach; (4) in the James River Gorham impoundment, bypassed reach, and immediately downstream of the tailrace; (5) the Public Service Gorham headpond and tailrace; and (6) at the upstream limit of the Shelburne impoundment, immediately upstream of the dam, and just below the tailrace, the Shelburne Bridge (2.5 miles downstream from Shelburne) and the Gilead Bridge (8.5 miles downstream form Shelburne)

The result:

- at Sawmill, DO concentrations averaged 7.95 mg/l in the headpond and 8.15 mg/l in the tailrace.
- at Cross, all measured DO saturation values were greater than 87.[illegible] percent.
- at Cascade, no stratification of oxygen or temperature was detected in the impoundment and all measured DO saturation values were well above Class B standards (NAI, 1989; 1991j).
- at James River Gorham, all measured DO saturation values were greater than 87.8 percent.
- at Shelburne, monitoring stations located at the upstream limit of the impoundment, immediately upstream of the dam, and just below the tailrace showed DO saturation percentages of approximately 86 to 93 percent during "worst case" conditions.

Additionally, at Cascade, to determine the effects of diverting flow from the proposed Pulsifer Rips bypassed reach, the QUAL2E model was used to simulate water quality within the bypassed reach under worst case conditions. The model was run with effluent discharge from the Cascade Mill released into the Pulsifer Rips bypassed stream channel and with discharge from the mill released into the proposed Pulsifer Rips penstock.

Under the mill discharge into the penstock scenario, the model predicted little change over the existing conditions. The DO concentration would be lowered under water quality critical conditions to 6.38 mg/l or 78 percent saturation from 6.41 mg/l or 78.36 percent saturation and the DO sag point for the entire 19.1-mile modeled reach would be moved 0.1 mile farther downstream. The major contributing factor to the DO regime change was the loss of re-aeration through the natural river channel attributable to the reduction in flow (NAI, 1989; 1991j).

Under the proposed mill discharge into the bypassed river channel scenario, the water quality impacts are somewhat more pronounced. As in the previous scenario, the impacts on the DO concentrations were not predicted to be substantial. The DO concentration would be lowered under water quality critical conditions to 6.36 mg/l or 77.75 percent saturation from 6.41 mg/l or 78.36 percent saturation and the DO sag point for the entire modeled reach would be moved 0.1 miles farther downstream. However, Carbonaceous Biochemical Oxygen Demand[2] (CBOD) and nutrient concentrations increased dramatically in response to the Cascade Mill discharge.

NAI (1989; 1991j) reports that elevated nutrient levels could enhance algal growth in the bypassed reach. This would likely increase diurnal variations in the DO concentrations in the bypassed reach (for further discussion on diurnal variations, see section 4.2.2.1 - Shelburne). However, both CBOD and nutrient levels are predicted to return to pre-diversion levels after the diverted Pulsifer Rips water rejoins the main stem of the river (NAI, 1989; 1991j).

To verify the accuracy of predictive modeling of water quality parameters in the bypassed reach affected by the Pulsifer Rips development, James River proposes to conduct a water quality sampling and analysis study (James River, 1992c). The study will supplement James River's proposed WQ Program (see section 2.1.2) and would be conducted with Environmental Services approval under "worst case conditions" (i.e., low flow and high temperatures). If subsequent analysis of the above studies indicate that operation of the project precludes attainment of the state water quality standards, James River proposes to develop a response plan, in conjunction with Environmental Services, with specific steps for corrective actions.

At James River Gorham, additional water quality monitoring stations were located in the 4,500-ft-long bypassed reach which receives only leakage flows. Leakage flows were estimated to be about 6 cfs. However, before James River repaired the dam in 1990, leakage flows were estimated to be between 50 and 75 cfs. Temperature and DO data collected during an extended high temperature, low flow period in July, 1991, showed a temperature range of 15 to 25 degrees Celsius and DO levels from 5.0 to 10.2 mg/l. Furthermore, water quality modeling of worst case conditions predicted that, within the bypassed reach, the minimum DO concentration would be 7.44 mg/l or 90.95 percent of saturation at a leakage flow of only 5 cfs (NAI, 1991j).

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[2] Biological Oxygen Demand (BOD) is a measure of the amount of oxygen consumed by bacteria in the metabolism of biodegradable organic matter. For most material, the oxidation process is normally completed in about 20 days, although for some pulp and paper waste the process may take in excess of 90 days. In general though, most of the oxidation takes place in the first 5 days and is usually the carbonaceous fraction as opposed to the nitrogenous fraction. Therefore, the 5-day BOD is commonly referred to as the CBOD.

At Shelburne, DO concentrations taken immediately above the project dam were shown to be the lowest DO levels in the study reach. However, James River's water quality study indicated that because the Shelburne impoundment is relatively shallow (average depth approximately 8 ft) and the upstream Androscoggin River projects are operated as run-of-river, no stratification would be expected to occur during a typical critical summer period (NAI, 1991b). Increasing the impoundment depth by 1.7 ft would eliminate a free-flowing reach of the river that could be important for aeration and waste assimilation. KA (1991) describes the reach as an area of lower gradient, non-turbulent flow with uniform cobble substrate. Typical depths range from 2 to 3 ft. A 2,500 ft reach consisting of relatively turbulent, well-washed boulder/rock rapids immediately upstream of the impacted area would not be affected (KA, 1991). NAI (1991b) further estimated that, under worst case conditions, DO levels would decrease by 0.16 mg/l with the increased reservoir elevation. The DO percent saturation, however, would remain above the 75 percent level.

All DO concentrations measured exceed the Class B state water quality standards. The study concluded that no violations of New Hampshire Class B water quality standards would be expected to result from the continued operation of the projects or the proposed developments (NAI, 1989, 1991b; KA, 1993). Environmental Services concurred with the modeling results of the study (letter from Richard A. Flanders, Supervisor, Water Quality Investigations and Monitoring, NHDES, Concord, NH, February 8, 1989). Thus, James River made no proposal specifically for the maintenance or enhancement of water quality at the projects. However, James River's proposal to implement the WQ Program (detailed in section 2.1.2) would assist in identifying and assessing any unforseen water quality problems and verifying the results of the model. As a result, Environmental Services made the proposed WQ monitoring program conditions in the Section 401 Water Quality Certificate for Shelburne (letter from Edward J. Schmidt, P.E., Ph.D., Director, Water Supply and Pollution Control Division, NHDES, Concord, NH, December 13, 1991).

Public Service conducted water quality studies in its project areas under low flow, high temperature conditions in August of 1990. The studies conclude that the Smith project would have no adverse impacts on water quality and that no violations of New Hampshire Class B water quality standards would be expected to result from the continued operation of the project (NAI, 1991c; 1991d; 1991e). Furthermore, study results, conducted in the bypassed reach, indicated that DO levels were above the Class B standard of 75 percent saturation and that temperatures did not rise more than 2.0 degrees Celsius above ambient with Public Service's proposed minimum flow (NAI, 1991e). At Public Service Gorham, the study found DO levels ranged from 6.2 to 7.3 mg/l with percent saturation values from 74.3 to 89.6 percent. Two short-term violations of the Class B standard of 75 percent DO saturation occurred during the early morning hours before sunrise and appeared to be attributable to diurnal variations caused by primary producers (NAI, 1991f). However, the 24-hour variability of DO concentrations was consistently 0.5 to 0.6 mg/l and NAI (1991f) suggests that primary production is not a major overall influence on the total DO budget. The study concludes that the Public Service Gorham project would have no adverse impacts on water quality from the continued operation of the project (NAI, 1991f). Environmental Services issued Section 401 Water Quality Certificates for Public Service Gorham and Smith with conditions requiring water quality monitoring programs (letters from Richard A. Flanders, Jr., Supervisor, Water Quality Section, Water Supply and Pollution Control Division, NHDES, Concord, NH, April 25 and December 13, 1991). Public Service concurred with the monitoring programs and proposes to implement them as outlined in the Section 401 certificate.

4.1.2.3 Water quantity

Sawmill. The bypassed reach receives variable leakage flows of generally less than 20 cfs and periodic spillage when river flows exceed the project's hydraulic capacity of 2,484 cfs (annually, approximately 24 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1982). Leakage takes place through the dam gates and spillway flashboards. Under James River's operational proposal, spillage at the dam would not change. James River's proposal to release a continuous minimum flow of 12 cfs into the bypassed reach, with 8 cfs from the flashboard section and 4 cfs from the spillway section, would mandate

and prescribe the existing leakage flow. While the proposed minimum flow is primarily for the benefit of fisheries resources (see further discussion on fisheries resources impacts in section 4.1.3.3), water quality in the bypassed reach of the river would probably be enhanced, although the actual quantitative improvements might be negligible. Fish and Game and Interior agree with James River's minimum flow proposal (letter from Donald A. Normandeau, Ph.D., Executive Director, NHFGD, Concord, NH, August 12, 1992; letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., August 12, 1992 letter).

J. Brodie Smith. The 2,600-ft-long bypassed reach receives variable leakage flows of generally 3 to 5 cfs and periodic spillage when river flows exceed the project's hydraulic capacity of approximately 3,000 cfs (annually, approximately 16 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1983). Leakage at the dam takes place through the flashboards and dam gates. Additional inflow to the bypassed reach occurs from the overflow canal and the Dead River. The overflow canal, which enters the bypassed reach approximately 775 ft downstream of the dam, is a relatively minor contributor to the overall flow with flows generally ranging less than 1 cfs. The Dead River, which enters the bypassed reach approximately 1,875 ft downstream of the dam, is not regulated and estimated inflow ranged from 8 to 20 cfs during a 1991 study (NAI 1991d).

Under Public Service's operational proposal, spillage at the dam would not change. Public Service's proposal to release a minimum flow of 10 cfs into the bypassed reach would supplement the existing leakage flow and contribute to eliminating any potential temperature or DO problems during water quality critical times (low flow, high temperature months). While the proposed minimum flow is primarily for the benefit of fisheries resources (see further discussion on fisheries resources impacts in section 4.1.3.3 - Smith), water quality in the bypassed reach of the river would be enhanced.

Cross Power. Under James River's operational proposal, spillage at the dam would not change. Currently, the Cross station has periodic spillage when river flows exceed the project's hydraulic capacity of 2,600 cfs (annually, approximately 21 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1982). Since the project discharges directly into the headpond of the Cascade Project and no bypassed reach exists, no bypass flows are necessary. Fish and Game and Interior agree with James River's operational proposal for Cross (letter from Donald A. Normandeau, Ph.D., Executive Director, NHFGD, Concord, NH, June 5, 1992; letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., July 13, 1992 letter).

Cascade. James River's proposal would increase the project's hydraulic capacity by 2,230 cfs. Currently, the Cascade station has periodic spillage when river flows exceed the project's hydraulic capacity of 2,690 cfs (annually, approximately 20 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1982). Under the new proposal, spill in excess of project capacity would occur approximately 6 percent of the time (for further discussion see section 4.2.3.2).

James River Gorham. James River's proposal to add a hydroelectric turbine at the powerhouse would increase the project's hydraulic capacity by 500 cfs. Currently, the James River Gorham station has periodic spillage when river flows exceed the project's hydraulic capacity of 2,300 cfs (annually, approximately 32 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1982). Under the new proposal, spill in excess of project capacity would occur approximately 18 percent of the time.

To enhance water quality and to maintain the newly classified Class B water quality standards in the bypassed reach, James River proposes to release a 50 cfs minimum flow into the bypassed reach. The 50 cfs minimum flow, James River states, would protect the aquatic resources that developed in the bypassed reach prior to the 1990 repair of the dam.

It is likely that the 50 cfs minimum flow would improve the existing water quality. The additional modeling efforts seem to indicate that the 50 cfs flow would be adequate to maintain Class B standards. Further indications are th justification of increased flows in the bypassed reach for water quality purposes are not warranted (NAI, 1991b).

Public Service Gorham. The Public Service Gorham 800-ft-long bypassed reach currently receives variable leakage flows of generally less than 50 cfs and periodic spillage when river flows exceed the project's hydraulic capacity of approximately 2,000 cfs (annually, approximately 62 percent of the time based on USGS Gorham Gage No. 01054000 records from 1914-1983). Additionally, the headwater elevation is generally kept between 5 and 6 ft above the dam crest with about 3 inches spilling over the flashboards. The top of the flashboards is at 5 ft 5 inches.

Under Public Service's operational proposal, spillage at the dam would not change. Public Service's proposal to release a minimum flow of 50 cfs into the bypassed reach would contribute to eliminating potential water quality problems at critical times (low flow, high temperature months). While the proposed minimum flow is primarily for the benefit of fisheries resources (see further discussion on fisheries resources impacts in section 4.1.3.3), water quality in the bypassed reach of the river would be enhanced.

Shelburne. Although James River proposes to increase the impoundment depth by 1.7 ft, the amount and duration of excess flows spilled at the dam would not change under the proposed plan. The Shelburne bypassed reach currently receives variable leakage flows and periodic spillage when river flows exceed the project's hydraulic capacity of 3,105 cfs (annually, approximately 17 percent of the time based on James River constructed gage records from 1965-1982). Fish and Game, stating that the short bypassed reach consists of bedrock and ledge and thus is not valuable as fish habitat, concurs with James River's proposal (letter from Donald A. Normandeau, Ph.D., Executive Director, NHFGD, Concord, NH, January 5, 1993). Interior also agrees with James River's proposal for maintaining leakage flows in the bypassed reach, as long as flow is quantified and a means provided for its continued release (letter from William Patterson, Regional Environmental Officer, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Boston, MA, January 11, 1993).

4.1.2.4 Turbidity at Cascade

Pulsifer Rips construction activities would also have some short-term localized impacts. Construction of the new intake, powerhouse, tailrace, and access road would require excavation and grading of the impoundment bottom and river bed, the adjoining shoreline area, and portions of the floodplain adjacent to the river. Thus, a small portion of the reservoir and river would be dewatered during construction and some brief, minor episodes of turbidity would be expected to occur. Additionally, construction of the new penstock and surge tank would require the clearing of vegetation along the route (generally 15 to 450 ft from the river's edge) and the construction of the penstock supports.

To protect water quality during construction of the new penstock, powerhouse, and tailrace for the Pulsifer Rips development, James River proposes to use cofferdams and other sediment and erosion control measures (see section 4.1.1 for details).

4.1.2.5 Ice

Cascade Flats is concerned that reduced flow in the reach of the river bypassed by the proposed Pulsifer Rips would potentially result in anchor ice formation on vegetation in the channel. This anchor ice could obstruct water flow and result in flooding (Cascade Flats petition filed June 26, 1991). James River concludes that the potential for flooding in this reach of the river would be reduced as a result of reduced flows, the steep gradient of the reach, and the minimum flow releases (letter filed Jnly 26, 1991). We agree that reducing the flow of water in the reach is very unlikely to increase the potential for flooding.

4.1.2.6 Toxic pollutants

Dioxin has been identified as a contaminant in fish captured within the projects' area. As we discussed in section 3.1.4, dioxin levels could potentially be adversely affected by operation of the projects.

We considered in our analysis the continued operation of the hydroelectric projects and their effect, impact, or exacerbation of the existing dioxin levels found to already exist in the fish downstream of the pulp mills in Berlin and presumed to be contained/trapped in the reservoir sediments. We also considered any reasonably foreseeable future actions which may occur. We did not consider it within our scope whether or not James River's paper mills currently produce detectable levels of dioxin. We consider this issue irrelevant to the hydroelectric licensing proceedings, and is a matter for Environmental Services and the EPA. We note, however, that Public Health and Environmental Services have already addressed this issne through the issuance of the current health advisory and the section 401 water quality certificates for the projects. Furthermore, EPA has recently issued a new NPDES permit for the Burgess and Cascade Mills (NPDES No. NH0000655) and water quality models have been run with these new regulatory conditions. Given the mandates and the expertise of these agencies on these matters, we believe that this issue, as far as it pertains to the continued operation of the hydroelectric facilities, has been resolved to their satisfaction.

At Cascade, construction activities associated with the Pulsifer Rips intake could cause some short-term sediment disturbances. In addition, increased flows from the James River Gorham facility could potentially increase sediment transport from above the project intakes. Both of these disturbances could cause short-term increases in sediment erosion and turbidity levels until a re-stabilization took place. Cosequently, we predict that any dioxin and other sediment-bound pollutant levels would likely increase downstream of these disturbances.

James River and Public Service propose to minimize the fluctuation of reservoir water levels and operate in a run-of-river mode. Further, any disturbances of reservoir sediments by dredging or new construction would be done in accordance with an agency approved sediment and erosion control plan. Intermittent flooding, which could possibly resuspend contaminated river sediments, would continue and is not within the control of the Licensee. However, the high degree of river-regulation, through the use of upstream storage reservoirs, has enabled the flows in the river to remain stable and more reliable, and aided in flood prevention.

Continued existence of the dams (even in the absence of hydropower operation) would continue to trap sediments and potentially concentrate toxic pollutants. Cumulative impacts would result in conjunction with continued inputs of dioxin from the paper plants, in that for the present and foreseeable future the dams would continue to trap sediments. Given the existing contamination levels in the river (and without knowledge of what the system would be like if the sediment-bound dioxin was allowed to move freely downriver), we conclude that continued operation of the hydroelectric facilities is the best available option. That is, given the existing contamination of the forebay sediments, continued sequestering of dioxin in these sediments is advantageous to flushing them downriver.

We further conclude that the operation of the projects in a run-of-river mode with minimal headwater fluctuations would minimize the resuspension of any existing contaminants likely trapped in the sediments and would therefore have little impact on an existing condition.

Dioxin, or any other contaminants, currently trapped or contained in the reservoir sediments would essentially remain minimally affected with or without the operation of the hydroelectric projects. Further, consultation and cooperation with the agencies on an effective sediment and erosion control plan would minimize impacts due to any construction activities. Therefore, dioxin, and any other toxicant, levels in fish would not be likely to increase under the proposed operation of the projects and any impacts to the fishery resources would be negligible and short-term.

4.1.2.7 Project interaction and cumulative effects

Water quality, in particular DO leve. in the Androscoggin River could be cumulatively affected by several proposals. Decreasing the spillage a cade and James River Gorham has the potential to adversely impact water quality in the Andro gin River, especially during DO limiting times (i.e., low flow, high temperatures). In most instances, the spillage of excess flows over dams can serve to effectively entrain air and become an important source of aeration in a system. This may be especially true in highly developed areas, such as the Berlin to Shelburne reach, that have few remaining free-flowing riverine areas.

Development of Pulsifer Rips would decrease the amount of flows in the 7,400-ft-long bypassed reach and divert flows currently used for the dilution of wastewater discharged below the Cascade mill. The proposed lower flows could potentially affect water quality parameters related to the treated wastewater effluent (eg. DO, BOD).

Additionally, the proposed inundation of a 2,500-ft-long riverine reach due to the increased headwater elevation at Shelburne would result in the loss of a free-flowing Androscoggin River reach. Currently, due to the highly developed nature of the Berlin - Shelburne area, free-flowing areas of the Androscoggin River are severely limited and isolated. Inundation of this reach would further decrease this amount.

Proposals by James River and Public Service to: (1) operate all 7 Androscoggin River projects in run-of-river modes, (2) implement James River's Androscoggin River Water Quality Monitoring Program, (3) monitor DO at the Smith Project, the Pulsifer Rips bypass, the Public Service Gorham Project, and the Shelburne impoundment, (4) maintain existing minimum flow releases in the Sawmill and Shelburne bypassed reaches, and (5) increase minimum flow releases in the Smith, James River Gorham, and Public Service Gorham bypassed reaches would contribute to protecting, enhancing, and mitigating for any adverse cumulative impacts that might occur to the Androscoggin River basin's water quality, particularly DO levels.

Furthermore, James River and Public Service have already conducted extensive water quality studies and modeling indicating that the proposed operations of the projects would not adversely affect the water quality wi n the Berlin - Shelburne reach (see section 4.1.2.2). Turbidity impacts would be short-term. Impacts to DO levels within the reach would be minimized.

Continued existence of the dam (even in the absence of hydropower operation) would continue to trap sedi nts and potentially concentrate toxic pollutants. Cumulative impacts would result in conjunction with con ed inputs of dioxin from the paper plants, in that for the present and foreseeable future the dams w d continue to trap sediments. The proposed operation of all 7 projects as run-of-river with minimal impoundment level fluctuations would serve to keep dioxin or any other toxic contaminants, contained in the sediments trapped behind the existing project dams, in their present locations. Proposed measures would not affect the existing dioxin levels found in fish below the project area. Requirements for developing adequate sediment and erosion plans prior to any disturbances would further protect water quality and fisheries. Any resuspension of sediments due to project operations would be minimized as much as possible. Thus, we conclude that continued operation of the hydroelectric facilities is the best available option.

Head waters reservoirs

The Conservation Law *et al.* say that managing the headwater reservoirs (Kennebago, Rangeley, Mooselookmegantic, Richardson, Aziscohos, and Umbagog Lakes, see Table 1-2 and Figure 1-2) to maintain a uniform flow in the Androscoggin River causes drastic water surface elevation changes in these reservoirs. They claim that these water level elevation changes adversely effect reservoir fisheries, shoreline habitat,

wetlands, and recreational uses. The uniform flow in the Androscoggin River also allows for increased discharges of municipal and industrial waste. For these reasons, the Conservation Law, *et al.* recommends that the Commission determine how the proposed operation of James River's and Public Service's projects constrain decisions regarding management of both upstream and downstream projects (letters dated July 6, 1992).

Managing the headwater reservoirs to provide a uniform flow in the Androscoggin River over the past 80 years affects a number of environmental and developmental resources, including hydropower. Berlin, Dummer, Errol and the Town of Gorham, cite benefits which include flood control, waste assimilation, and the local economy (*e.g.* Mitchell Berkowitz, Berlin City Manager letter December 1, 1992; Board of Selectmen, Town of Dummer letter August 17, 1992; Kelly Goddard, Town Manager, Town of Gorham letter December 1, 1992; Board of Selectmen, Town of Errol letter September 1, 1992; and FERC, 1992a). The upper Androscoggin River projects, considered in this EIS, would all operate in run-of-river mode. If flows change in the Androscoggin River, for whatever reason, the projects would still operate in a run-of-river mode. Any licenses issued for the seven projects considered in this EIS would include re-opener articles to provide for necessary changes to project operation needed to mitigate for environmental impacts identified during subsequent analyses of other projects. The economic viability of the projects considered in this EIS could change as a result of reduced flows in the river. Reduced flow in the river could affect developmental resources besides hydropower at the seven upper Androscoggin projects and environmental resources, *e.g.* hydropower at other projects constructed and operating (see table Table 1-2), flood control, waste water assimilation, water quality, riverine wetland habitats, and river oriented recreation (see sections 4.1.2, 4.1.4.1, and 4.1.7). Any decision to modify the operating regimes in the headwaters reservoirs would need to balance the benefits to headwater reservoir resources with downstream impacts whether changes are considered now or in the future. Therefore, we don't believe that any action taken now with respect to the Upper Androscoggin projects would constrain decisions that may be made in the future at the headwaters projects.

4.1.3 Fisheries

4.1.3.1 Run-of-river operation

Operation of the 7 Androscoggin River hydroelectric projects in a run-of-river mode with minor variations in the impoundment level would protect aquatic habitat and fisheries both upstream and downstream of the projects by minimizing fluctuations in water levels. Fluctuating water levels have been found to impact aquatic resources by reducing fish spawning success, causing stranding of fish and invertebrates, and subjecting fish to desiccation and predation from terrestrial predators (Cushman, 1985). As discussed in section 4.1.2.1, Fish and Game and Interior support James River's and Public Service's continued run-of-river operation.

4.1.3.2 Fish entrainment, impingement, and mortality

The proposed projects have the potential to entrain, impinge, injure, and/or kill some of the resident fish in the Androscoggin River. Mortality or injury could occur as a result of fish being struck by turbine blades, pressure changes, sheer forces in turbulent flows, and water velocity accelerations (Knapp et al., 1982). Entrainment and impingement of resident fish would be expected to continue at the existing levels under proposed operations. However, with the additional hydraulic capacity proposed at Cascade and James River Gorham, entrainment, impingement, and turbine related mortality would likely increase. At this time, James River and Public Service do not propose any additional fish entrainment enhancement measures at the existing projects or the proposed developments because these have been no indications of significant entrainment events resulting in fish mortality occurring at the projects.

Trashracks have been used at hydropower plants to deter fish from entering project intakes. Designed to physically block the passage of larger fish while permitting smaller fish to pass through, trashracks can be influenced in their effectiveness by intake velocities and the size of bar spacings (Bell, 1991). Bar spacing's influence on fish entrainment is related to the size of the fish. For a given size fish, the greater the spacing between trashrack bars, the greater the probability of the fish passing through the trashrack. While closely-spaced (1 inch) racks designed to block the passage of fish at hydroelectric facilities have not been extensively studied, bar racks with 1 to 3 inch spacing have been found to prevent the passage of larger fish at steam electric stations (Stone and Webster Engineering Corporation, 1986). The projects are equipped, or proposed to be equipped with trashracks as follows:

- Sawmill, Smith, Cross, James River Gorham and Shelburne are equipped with trashracks with clear spacing of 3 inches between the bars.
- Cascade currently is equipped with trashracks with a clear spacing of 2½ inches between the bars. Trashracks for the new Pulsifer Rips intake are proposed to have 2½ inches of clear spacing between the bars.
- Public Service Gorham is equipped with trashracks with clear spacing of 2 inch spacing (units 1 and 2) and 3½ inch (units 3 and 4) between bars.

These bar spacings would prevent the entrainment of only the very largest fish that would have the greatest risk of turbine injury or mortality. Project-related fish mortality, particularly for smaller fish, would be expected to continue.

The velocity of water in the intake can influence potential impingement on the trashrack in much the same manner as the trashrack bar spacing can influence fish entrainment. Since there is a positive relationship between fish size and swimming ability, the greater the intake velocity the larger the fish must be to escape possible impingement. However, it is difficult to establish one optimal intake velocity applicable to a mixed array of fish species and sizes (Hansen and Li, 1978).

Intake velocities at the projects are generally low enough for adult salmonids in the intake area to escape entrainment (Bell, 1991):

- At Smith, mean cross sectional velocities in the intake canal are approximately 2.0 to 2.7 feet per second (fps) at full generation. Average approach velocities were estimated at 3.5 fps at the trashracks.
- At Cascade, existing average intake velocities are approximately 1.1 fps or less at full generation flows of 2,690 cfs. New velocities are estimated to be 2.5 fps or less during full generation flows of 2,600 cfs at Pulsifer Rips and 1.0 fps or less at the existing Cascade intake.
- At James River Gorham, existing average intake velocities are approximately 1.0 fps or less at full generation flows of 2,300 cfs. New velocities were calculated to be 1.24 fps during full generation flows of 2,800 cfs.
- At Public Service Gorham, mean cross sectional velocities in the intake canal are approximately 2.0 fps or less at full generation. Average approach velocities were estimated at 2.3 fps at Units 1 and 2, and 1.4 fps at Units 3 and 4 during full generation.
- At Shelburne, average intake velocities were estimated at 1.5 fps at the trashracks.

In the case of Sawmill, Smith, Cross, and Shelburne, Fish and Game and Interior, agree with James River and Public Service on the lack of need for fish screening and fish bypass facilities at this time,

4.1.3.3 Minimum flows

Sawmill. Fishery resources and habitat in the bypassed reach were evaluated via a fish survey and a minimum flow study. As discussed above in sections 3.2.1.2 and 4.1.2, the studies evaluated the effect of alternative flows on fishery habitat. The conclusions were:

- Salmonids do transiently reside in the bypassed reach as a result of downstream movement from upstream areas.
- No salmonid spawning habitat was observed.
- Salmonid habitat in the bypassed reach was not uniformly attractive/suitable.
- Optimum salmonid habitat occurs at flows between 125 and 440 cfs.

James River proposes a minimum flow release of 12 cfs into the Sawmill bypassed reach to provide a zone of passage flow for downstream moving salmonids. Episodic spillage at the dam from high flow events (probably the main contributor to downstream fish movements (KA, 1989)) would not change under James River's proposal. The release of a continuous minimum flow of 12 cfs into the bypassed reach would be provided by 8 cfs from the flashboard section and 4 cfs from the spillway section via a removed timber. The study results further indicate that while 12 cfs does not maximize either juvenile or adult salmonid habitat, it does provide sufficient habitat for a strictly transient fish population, i.e., a zone-of-passage.

Fish and Game and Interior agree that public access to the bypassed reach is not feasible because of safety and liability reasons (see section 4.1.7). Thus, the bypassed reach provides practically no angling opportunities - a key compouent of Fish and Game's *Fishing for the Future* management plan. Further, both Interior and Fish and Game state that due to the highly impounded nature of the Berlin to Shelburne reach, the only potential salmonid habitat in the 11-mile river reach is contained below the Cascade dam. Given these additional factors and the overall lack of salmonid habitat in the immediate project area, Fish and Game, in their August 12, 1992 letter, and Interior, in their August 12, 1992 letter, agree with James River's proposed minimum flow of 12 cfs.

J. Brodie Smith. As discussed in section 4.1.2.3, the Smith bypassed reach currently receives only variable leakage flows and periodic spillage. Under Public Service's operational proposal, a minimum flow of 10 cfs into the bypassed reach would supplement the existing leakage flow providing additional pool habitat and maintaining a zone-of-passage for downstream transient salmonid movements. Additionally, aquatic macroinvertebrates in the bypassed reach would be protected from potential dewatering.

Fishery resources and habitat in the bypassed reach were evaluated via a fish survey and a minimum flow study (NAI, 1991d; 1991e). General conclusions were:

- Salmonids do transiently reside in the bypassed reach as a result of downstream movement from upstream areas.
- Sand, gravel, and cobble substrate was very limited.
- Salmonid habitat in the bypassed reach was at best marginal and limited at all four study flows (leakage, 10, 20, and 65 cfs).

- A small waterfall and the remnants of a former mill building's foundation effectively block the upstream movement of fish from the project's tailwaters.

- At a discharge of 10 cfs, there appeared to be adequate resting (pool) habitat for transient salmonids and suitable depth and velocities for the downstream movement of salmonids.

Public Service based their proposed minimum flow release of 10 cfs, plus leakage, on the results of these studies. While the actual habitat area would only slightly increase (pool habitat would slightly increase), the increased water velocities would be expected to benefit macroinvertebrate filter and suspension feeders (NAI, 1991d; 1991e).

Impacts from annual outages for station inspection and maintenance and unanticipated outages, resulting in reduced water levels in the impoundment and rapidly changing high flows in the bypassed reach, would be expected to continue. Annually, for 1 to 2 weeks in July, impoundment water levels are dropped about 12 ft and flows are diverted to the bypassed reach for station inspection and maintenance. Generally, the drawdown is done gradually, and fish and mobile invertebrates are able to seek velocity shelters on the channel margins although some organisms in high velocity areas would be displaced to downstream areas. Additionally, littoral dwelling organisms in the impoundment could become stranded and be subject to desiccation from the reservoir drawdown. Greater impacts, however, could result from an unanticipated station outage. Rapid (total river flow within 10 minutes) flow changes in the bypassed reach would result in the displacement of both fish and invertebrates from scouring.

Cascade. With the proposed construction of the Pulsifer Rips development and the resulting new 1.5-mile bypassed reach, flows downstream from the existing Cascade development would be altered and fishery habitat impacted (see section 4.1.2.3 for a description of flows). James River's proposed minimum flow of 400 cfs from the existing Cascade powerhouse to the new Pulsifer Rips tailrace would be used to maintain optimum habitat for existing wild rainbow trout in the reach and to establish habitat for the future management of brown trout.

Fishery resources and habitat down stream from the project dam were evaluated in a fish survey and a minimum flow study utilizing the FWS's Instream Flow Incremental Methodology (IFIM) (KA, 1988; NAI, 1991k). The studies concluded that:

- Some wild rainbow trout and an occasional hatchery origin landlocked salmon (all less than 12 inches) were found in the bypassed reach, primarily the result of immigration from upstream areas.

- Fish and Game stocking of large (8 - 15 inches) rainbows upstream do not seem to be contributing significantly to the fish population in the reach.

- Rainbow trout spawning habitat was virtually nonexistent and brown trout spawning habitat was very limited (less than 400 total square feet for the Pulsifer Rips reach) at all modeled flows due to the lack of suitable spawning gravel.

- IFIM results suggest the optimal discharge for brown trout and rainbow trout life stages to be approximately 400 cfs.

- Juvenile brown trout habitat was the least abundant life stage habitat.

Based on the IFIM results and analysis, a year-round discharge of 400 cfs into the new bypassed reach was the recommended flow for optimization of fisheries habitat for the selected life stages of the studied trout species (NAI, 1991k). A discharge of 400 cfs would provide 82 percent of the maximum WUA for rainbow trout fry, 99 percent for juvenile rainbow trout, 92 percent for adult rainbow trout, 87 percent for

brown trout fry, 100 percent for juvenile brown trout (Figure 4-1), and 99 percent for adult brown trout (Figure 4-2) (NAI, 1991h).

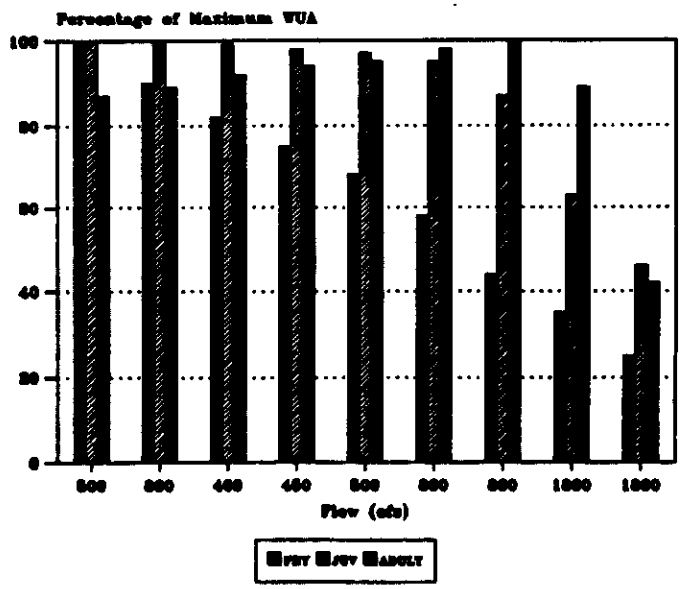

Figure 4-1. Percentage of maximum WUA at selected stream flows for fry, juvenile (JUV), and adult life stages of rainbow trout in the Cascade-Pulsifer Rips bypassed reach. Source: NAI (1988).

Fish and Game, Interior, EPA, and Conservation Law, *et al.* concur with the IFIM study results and James River's proposal for a minimum flow release of 400 cfs into the 1.5-mile-long bypassed reach (letter from Donald A. Normandeau, Ph.D., Executive Director, NHFGD, Concord, NH, August 18, 1992; letter from John H. Farrell, Acting Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., July 19, 1989; letters from Jonathan P. Deason, Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., October 7, 1992 and October 13, 1992; letter from Ronald G. Manfredonia, Chief, Water Quality Branch, EPA, Boston, MA, September 16, 1992; comments and recommendations from Mark A. Sinclair, Conservation Law, Montpelier, VT, September 14, 1992). Interior, Fish and Game, and Conservation Law, *et al.* agree that trout habitat appeared to be optimized at 400 cfs. Juvenile brown trout (the least abundant salmonid habitat and almost identical to unmodeled brook trout habitat) and juvenile rainbow trout habitat are maximized at flows less than 450 cfs. Fry habitat is maximized at the lowest modeled flows, and adult habitat is maximized at slightly higher flows than the proposed 400 cfs.

When compared to 1,600 cfs (roughly the existing minimum flow for the reach), 400 cfs provides 116 percent more adult rainbow trout habitat (1,815,000 square feet versus 839,000 square feet) and 120 percent more adult brown trout habitat (1,474,000 square feet versus 670,000 square feet). A 400 cfs flow would also provide 117 percent more juvenile rainbow trout habitat (1,672,000 square feet versus 770,000 square feet) and 161 percent more juvenile brown trout habitat (1,465,000 square feet versus 562,000 square feet).

The resulting habitat differences are even greater when the fry stage is considered. A 400 cfs flow would provide 278 percent more brown trout fry habitat (982,000 square feet versus 260,000 square feet) and 221 percent more rainbow trout fry habitat (412,000 square feet versus 128,000 square feet). Although rainbow adult trout habitat is maximized at 800 cfs, this flow would result in a 40 percent loss of brown trout fry habitat and a 46 percent loss of rainbow trout fry habitat when compared to the proposed 400 cfs flow.

These resulting increases in WUA from decreases in the existing flow are primarily attributable to decreases in the associated velocities within the reach (see Table 4-1) (NAI, 1988). Brown trout are generally only able to tolerate velocities of up to about 2.0 fps, and prefer velocities of around 0.5 fps (Raleigh et al., 1986). While rainbow trout do prefer higher velocities than brown trout (2.0 fps is within their preferred range), velocities above about 2.5 fps are generally deemed unsuitable (Raleigh et al., 1984).

As shown in Table 4-1, at Site #1 with the existing minimum flow of around 1,600 cfs, 72 percent of the area had velocities above 2.0 fps. By lowering the flow to 400 cfs, velocities were more evenly distributed and there were no velocities above 2.0 fps.

The absence of suitable spawning habitat in the reach also has several important considerations. Given this absence, it is unclear as to the actual overall importance of fry habitat to the system. However, given the potential spawning habitat in adjacent tributaries and the already identified recruitment from upstream sources, it is likely that the fry and juvenile habitat would be readily utilized.

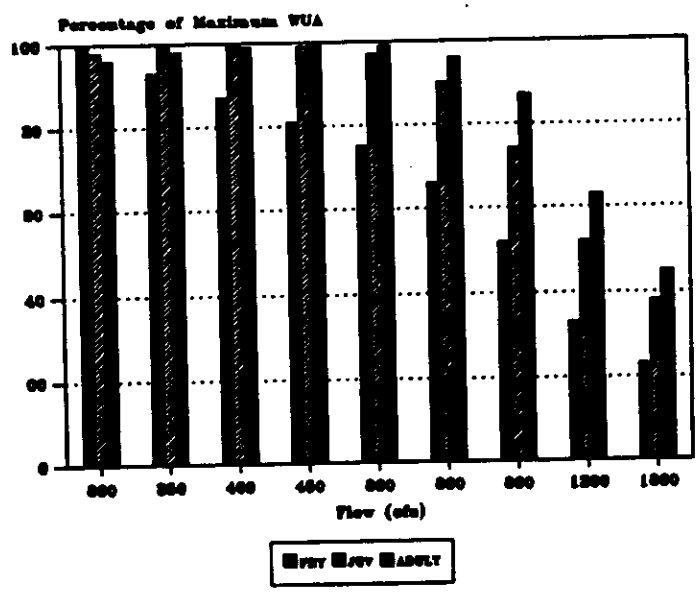

Figure 4-2. Percentage of maximum WUA at selected stream flows for fry, juvenile (JUV), and adult life stages of brown trout in the Cascade-Pulsifer Rips bypassed reach. Source: NAI (1988).

For comparative purposes, application of the FWS's Aquatic Base Flow (ABF) policy would result in an ABF recommendation of approximately 680 cfs for the Pulsifer Rips bypassed reach, the estimated unregulated median August flow (U.S. Fish and Wildlife Service, 1981). James River's proposed minimum flow of 400 cfs is approximately 59 percent of the ABF flow.

Table 4-1. Distribution of mean column velocities (fps) in the Pulsifer Rips IFIM at two study sites. Data under velocity ranges are percentages of the total wetted area having the associated velocity ranges. Source: NAI (1988).

SITE	FLOW (cfs)	0.0 to 1.0	1.0 to 2.0	ABOVE 2.0
1	400	51	49	0
	1600	10	18	72
2	400	82	17	1
	1600	23	31	46

Fish and Game has decided to manage this reach for self-sustaining populations of trout. Fish and Game's *Fishing for the Future* management plan places a high value on waters close to human population centers that provide self-sustaining trout populations. The Pulsifer Rips bypassed reach runs roughly adjacent to Route 16, a major thoroughfare in the Berlin - Gorham area. Although there is substantial documentation of limited existing angling use (see section 3.2.4.4), this would be expected to change given the establishment of adequate flows and a trout fishery. Additionally, the proposed reduced flow and associated reduced velocities in the bypassed reach would likely make the reach more wadeable and, thus, more accessible to anglers. Restoration of the Pulsifer Rips reach through decreased flow would be consistent with Fish and Game's plan.

We agree that providing a minimum flow of 400 cfs in the proposed Pulsifer Rips bypassed reach would protect and enhance aquatic habitat and fishery resources in the project area. This flow would increase the availability of salmonid habitat and make the reach accessible for angling.

The existing 400-ft-long bypassed channel from the base of Cascade dam to the existing Cascade powerhouse would continue to receive leakage flows of approximately 6 cfs. However, with the proposed additional hydraulic capacity of 2,230 cfs, the project's capacity would be exceeded only about 6 percent of the time, compared to the existing 20 percent of the time. Additionally, the lower half of the existing bypassed reach that is now permanently back-watered by the Cascade tailrace would be affected by the proposed decreased flows into the Pulsifer Rips bypassed reach. Water levels and wetted area in the reach would be reduced due to smaller flows and associated back watering effects from the Cascade powerhouse.

James River conducted a habitat-flow study of the existing bypassed reach in September of 1987. The habitat was characterized as: two parallel pools separated by a ledge outcrop at the base of the dam, and a short riffle connecting the upstream pools to the downstream back watered pool. Flows of leakage (6 cfs) and 100 cfs were studied on two transects representing the riffle habitat and the back watered pool habitat.

The results of the study indicated that some suitable salmonid habitat exists in the riffle area at leakage. This habitat slightly increases with 100 cfs, but velocities start to become higher than desirable. The back watered pool offers suitable depths for salmonids at both leakage and 100 cfs, however, at 100 cfs increased velocities within the pool become more desirable.

Fish and Game, in its August 18, 1992 letter, concurs with the proposed 6 cfs minimum flow as long as a permanent discharge is designed to pass the 6 cfs flow. James River, while stating that they have no intention of reducing or eliminating the existing leakage at the dam, has proposed to install a gate or pipe in the flashboard section of the dam to pass the equivalent leakage flow should conditions at the project change.

James River Gorham. As previously discussed in section 4.1.2.3, the James River Gorham bypassed reach currently receives only variable leakage flows of about 6 cfs and periodic spillage (approximately 32 percent of the time). Under James River's operational proposal, spillage would be reduced to approximately 18 percent of the time and a minimum flow of 50 cfs would be released into the bypassed reach to protect fisheries habitat. If, however, subsequent increases in angling demand warrants, James River proposes to increase the minimum flow in the bypassed reach to 200 cfs for most of the year and 400 cfs during the trout spawning period, in order to optimize rainbow trout and brook trout habitat in the segment.

Fishery resources and habitat in the bypassed reach were evalnated via a fish survey and a minimum flow study utilizing the FWS's Instream Flow Incremental Methodology (IFIM) (KA, 1988; NAI, 1991k). The study conclusions were:

- Wild brook trout and rainbow trout were found in the bypassed reach.
- Moose Brook, a tributary emptying into the bypassed reach, likely serves as a salmonid spawning and fry rearing area, and the James River Gorham bypassed reach supports a wild salmonid fishery.
- The optimal discharge for brown trout and rainbow trout was estimated at 200 cfs, with a 400 cfs spawning flow from March 1 to June 15 for rainbow trout.
- Adult brown trout habitat was the least abundant salmonid habitat.
- A discharge of 75 cfs (lowest modeled flow, James River's proposed flow of 50 cfs was not modeled) would provide 100 percent of the maximum WUA for rainbow trout fry, 97 percent for juvenile rainbow trout, 74 percent for adult rainbow trout, 4 percent for rainbow trout spawning, 90 percent for brown trout fry, 89 percent for juvenile brown trout, 70 percent for adult brown trout, and 25 percent for brown trout spawning.

James River based their proposed minimum flow release of 50 cfs on water quality and economic considerations. James River states that a flow of 50 cfs would wet the thalweg[3], provide circulation through the pools, and provide suitable salmonid habitat. A 50 cfs minimum flow wonid somewhat enhance the existing salmonid habitat conditions and some fry and forage production could be expected.

Furthermore, James River bases their proposal on angling demand. Stating that there are abundant alternative opportunities for sport fishing in close proximity to the project area, James River proposes to monitor angler demand at Cascade's Pulsifer Rips site and increase Gorham's minimum flow only if angling demand exceeds opportunities and if economically feasible. We disagree with this approach. Any increases in minimum flow should be based on environmental conditions, both existing and future, and the existing economic conditions (see further discussion in section 4.1.7).

Public Service Gorham. As previously discussed in section 4.1.2.3, the Public Service Gorham bypassed reach currently receives only variable leakage flows of less than 50 cfs and periodic spillage (approximately 62 percent of the time). Under Public Service's operational proposal, a minimum flow of 50 cfs, plus leakage, would be released into the bypassed reach to provide additional habitat and maintain a zone-of-passage for downstream transient salmonid movements.

Fishery resources and habitat in the bypassed reach were evaluated via a fish survey and a minimum flow study utilizing the FWS's Instream Flow Incremental Methodology (IFIM) (NAI, 1991a; 1991g; 1991h; 1991i). The study conclusions were:

- No salmonids were found in the bypassed reach, but salmonids likely are transients through the bypassed reach as a result of downstream movement from upstream areas.
- There was a general lack of suitable salmonid spawning and fry habitat.
- The optimal discharge was estimated at between 200 and 250 cfs, with fallfish included, and between 300 and 350 cfs, if only brook trout and rainbow trout were considered.
- Fallfish habitat was very limited at all study flows and habitat was considered marginal at best.
- Juvenile brook trout habitat was the least abundant salmonid habitat.
- A discharge of 200 to 250 cfs was recommended based on fallfish habitat optimization and juvenile brook trout habitat within 5 percent of its maximum. Other salmonid life stages would range from 86 to 88 percent of their maximum weighted usable area (WUA).
- WUA values generally indicate that the bypassed reach contains good physical habitat for salmonids.
- A discharge of 50 cfs would provide 59 percent of the maximum WUA for juvenile rainbow trout, 67 percent for adult rainbow trout, 76 percent for juvenile brook trout, 49 percent for adult brook trout, and 65 percent for juvenile fallfish, and suitable depth and velocities for the downstream movement of salmonids.

Public Service based their proposed minimum flow release of 50 cfs, plus leakage, on the results and analysis of these studies. Public Service states that the type of habitat in the 800-ft-long bypassed reach is not unique in the area downstream of the project. Furthermore, Public Service claims that the reach has limited value as a sport fishing area (see further discussion in section 4.1.7) and that the reach is likely to

[3] a line following the lowest points of a valley.

become temperature limited for salmonids in the summer. A 50 cfs minimum flow would result in an annual generation loss of 160 MWH based on Public Service estimates.

Impacts from outages for station inspection and maintenance and unanticipated outages, resulting in reduced water levels in the impoundment and rapidly changing high flows in the bypassed reach, would be expected to continue. Typically, during the late summer or fall, impoundment water levels are dropped and flows are diverted to the bypassed reach for station inspection and maintenance. Generally, the drawdown is done gradually, and fish and mobile invertebrates are able to seek velocity shelters on the channel margins although some organisms in high velocity areas would be displaced to downstream areas. Littoral dwelling organisms in the impoundment could become stranded and be subject to desiccation from the reservoir drawdown. Impacts would be unavoidable, but because such drawdowns are infrequent (on the order on once every 5 years), the resulting impacts should not be long term. Greater impacts, however, could result from an unanticipated station outage. Rapid (total river flow within 15 minutes) flow changes in the bypassed reach would result in the displacement of both fish and invertebrates from scouring.

4.1.3.4 Other impacts

Construction. Proposed erosion control measures would protect fish resources during construction of the new penstock, powerhouse, and tailrace for the Pulsifer rips development (see section 4.1.1).

Shelburne impoundment level. James River's proposal to increase the Shelburne impoundment depth by 1.7 ft would partially inundate approximately 2,200 ft of the Androscoggin River above the existing Shelburne impoundment (KA, 1991). The reach (described in section 4.1.2.3) has uniform cobble substrate, little object cover other than depth and overhanging vegetation, velocities generally greater than 2 fps, and few velocity refuges (KA, 1991). Although the reach would become back watered and no longer totally free-flowing, the study estimates that the inundation would result in a slight net increase in habitat suitability for salmonids based on increased depths and lowered velocities in the reach. Fish and Game, in their August 8, 1991 letter, concurs with the study's findings.

4.1.3.5 Project interaction and cumulative effects

Proposals by James River and Public Service to: (1) operate all 7 Androscoggin River projects in run-of-river modes, (2) maintain existing zone-of-passage minimum flow releases in the Sawmill and Shelburne bypassed reaches, (3) increase minimum flow releases for salmonids in the Smith (zone-of-passage), James River Gorham, and Public Service Gorham bypassed reaches, and (4) provide an optimum salmonid habitat flow of 400 cfs in the 7,400 ft-long Pulsifer Rips bypassed reach would contribute to protecting, enhancing, and mitigating for any adverse cumulative impacts that might occur to the Androscoggin River basin's resident salmonid population from the continued operation of the projects.

Transient salmonids moving from upstream areas to areas within and downstream of the projects would have enhanced bypassed reach flows at the uppermost projects, Sawmill and Smith, enabling improved zone-of-passage. Salmonids residing or moving into the Pulsifer Rips bypassed reach would have significantly enhanced habitat for all life stages. Further downstream at James River Gorham and Public Service Gorham, salmonids would again have enhanced instream flows although not at optimum levels. Together, aquatic habitat in the three bypassed reaches at Cascade and both Gorhams, comprising over 2.6 miles of the remaining free-flowing Androscoggin River reaches in the 11-mile Berlin-Shelburne reach, would be enhanced. In the upstream Sawmill and Smith bypassed reaches, however, which comprise approximately 0.6 miles or about 18 percent of the total available unimpounded reaches, aquatic habitat would not be significantly enhanced, although the proposed flows would provide better zone-of-passage in these areas.

Interior has stated in their comment letters that with adequate flow releases, this 2.6 miles would be valuable for trout and "encompass the only potential salmonid habitat in the highly impounded and bypassed

river reach from Berlin to Shelburne. While we agree that the proposed flows would be of definite benefit, we are not convinced that they would be adequate for the enhancement and re-establishment of resident salmonids, nor that they would necessarily outweigh the cumulative environmental impacts of the seven projects. Currently, there is little ideal, free-flowing riverine salmonid habitat in the entire 11 mile reach.

Further, no specific proposals relating to fish impingement and entrainment through the projects' turbines were made by either James River or Public Service. Increased capacity proposed at James River Gorham and Cascade could add to cumulative impacts already occurring to transient salmonids moving downstream by reducing spillage at the projects and increasing the likelihood that fish would encounter mortalities from impingement and/or turbine entrainment. Surveys have shown that a significant amount of downstream movement of salmonids from above Berlin is presently occurring and would be expected to continue. Thus, any cumulative entrainment impacts now occurring to the fishery would be expected to continue and could be greater.

4.1.4 Terrestrial resources

4.1.4.1 Wildlife habitat

Continued operation of the projects and improvements as proposed would not affect terrestrial resources at the Sawmill, Cross, and James River Gorham Projects. Common night hawk, small footed myotis, killdeer, and some waterfowl species at the J. Brody Smith and Public Service Gorham Projects may benefit modestly from nesting and roosting habitat protection and enhancement measures proposed by Public Service.

Table 4-2 Land requirements for the Pulsifer Rips development (James River, 1989).

Feature	Acres
Intake	1.3
Penstock, surge tank	13.6
Access road	3.1
Powerhouse, tailrace	< 1
Construction laydown areas	8
Total	27

Cascade. The proposed construction of the Pulsifer Rips development at the Cascade Project would require land areas as shown in Table 4-2. Table 4-3 shows the vegetation cover affected by the proposed construction. Associated wildlife habitat would also be lost. James River proposes to reseed and replant with woody species, trees and shrubs, 8 acres cleared and used as laydown areas during construction. The remaining vegetation would be permanently displaced. The 18-foot-diameter, 7,400 foot-long penstock would be a barrier, for much of its length, between the forest on the east bank of the Androscoggin River and the river for larges wildlife species (eg. moose, deer). Smaller species would still be able to get to the river by passing under the penstock. When the Pulsifer Rips powerplant operates, much less water would flow down the bypassed reach. James River (1989) estimates that persistent emergent and scrub shrub wetland could develop in 10 to 15 foot wide strips along the river banks in the bypassed reach. This could result in the development of 3.5 acres of new wetlands.

Shelburne. As noted above, in Section 2, the proposed 1.7-foot increase in reservoir water surface elevation would increase the Shelburne reservoir surface area from 210 to 240 acres,

Based on James River's study in 1991, the rise in water level would change the water depth in existing wetlands and inundate upland areas, forming wetlands, generally changing the vegetation zones around the reservoir. Overall, there would be a net loss of about 4.3 acres of wetland habitat associated with the reservoir (Table 4-4). Most of this net loss would be incurred in the relatively lower habitat value scrub-shrub wetlands in the main channel area of the reservoir, while the relatively higher habitat value wetlands in Reflection Pond area of the reservoir would accrue a net gain in wetland area (James River, 1991b).

In 1990, James River installed crest gates. Before that time, flashboard failure would lower the reservoir water surface elevation 5 to 9 feet three to five times a year. This fluctuation likely kept aquatic bed wetlands from forming in otherwise suitable areas in the Reflecting Pond area. James River's 1991 study concludes that conditions suitable for aquatic bed wetland formation exist in about 15 acres in the Reflecting Pond. James River proposes to monitor the wetland development in the Reflection Pond area in 1993 to verify this projection. James River would conduct a final assessment of the wetlands 3 years after the impoundment water level is raised.

Table 4-3 Vegetation cover removed for the Pulsifer Rips construction (James River, 1989).

Cover type	acres
Persistent emergent wetland	0.1
Scrub-shrub	4.5
Deciduous forest	17.97

The Conservation Law, *et al.* say that the expansion of the reservoir would destroy substantial acres of wetlands and that upland soils (in newly inundated areas) may not support new wetlands (Mark Sinclair, Staff Attorney, letter dated January 14, 1993). Interior notes that the higher water level elevations could result in more or less wetlands at the project than James River predicts. Consequently, Interior agrees with James River's resurvey proposal (William Patterson, Regional Environmental Officer, letter dated January 11, 1993).

Based on James River's study (James River, 1191b), we conclude that raising the reservoir surface elevation would likely result in the net loss of less than 5 acres of wetlands associated with the Shelburne reservoir.

Table 4-4. Wetlands affected by a 1.7-foot rise in Shelburne Reservoir water surface elevation (James River, 1991b).

Cover type	Existing (acres)	Change (acres)
Aquatic bed wetland (potential)	15.0[a]	+3.0
Nonpersistent emergent wetland	6.3	-1.3
Persistent emergent wetland	9.7	+2.2
Scrub-shrub wetland	23.9	-10.4
Forested wetland	25.9	+2.1
Total/net change	80.8	-4.3

[a] wetlands expected to have established as a result of reservoir surface elevation stabilization in 1990.

4.1.4.2 Endangered and threatened species

The Conservation Law, *et al.* and the Cascade Flats Neighborhood Organization (Cascade Flats) say that the Upper Androscoggin projects adversely affect bald eagles (and osprey, a state listed threatened species) because: (1) the reservoirs still the water making it freeze more readily during the winter and keep bald eagles from fish; (2) reduced flow in the reach bypassed by the proposed Pulsifer development would make contaminated fish more readily accessible to wildlife; and (3) the project's dams trap sediments containing contaminants such as mercury and dioxin which can enter the food chain and may result in serious impacts on bald eagles (Conservation Law *et al.* letters Jnly 6, 1992; August 5, 1992; and January 14, 1993, Cascade Flats letter filed July 1, 1991).

Interior says that except for occasioual transient individuals, no federally listed or threatened species are known to exist in the projects' impact areas. Therefore no biological assessment or further Section 7 consultation under the Endangered Species Act[4] is required (letters from J. P. Deason, Director, Office of

[4] 87 Stat. 884, as ameuded; 16 U.S.C. 1531 *et seq.*

Environmental Affairs dated March 2, 1993; October 7, August 11, and July 13, 1992, and W. Patterson, Regional Environmental Officer dated January 11, 1993).

Bald eagles feed primarily on fish. Dams can adversely affect wintering bald eagles because they impound reservoirs which may freeze over more readily than a free flowing river thereby preventing bald eagles from foraging for fish. Hydroelectric plants expose prey and keep the water open, and thus may be beneficial to bald eagles (Dunstan, 1981). In the case of the Upper Androscoggin River, exposed prey and open water in winter may not be completely beneficial to bald eagles because the prey may be contaminated.

The fish in the Upper Androscoggin River downstream from Berlin contain toxic substances (see Section 4.1.3, Fisheries, above). Any occasional transient bald eagles that feed on contaminated fish could suffer from illness, loss of reproduction, or mortality from contaminant poisoning. Toxic effects of environmental contaminants is one of the reasons for bald eagles' overall population decline (Grier, *et al.*, 1983).

However, the only effect to bald eagles that could be attributed to hydropower operation, if any, would be associated with open water in the tailrace areas during winter, that might otherwise freeze, and expose prey that is contaminated. The projects' contribution to exposure of occasional transient bald eagles to contaminated fish during winter, would be insignificant in relation to the rest of the year. Downstream riffles and rapids in the Androscoggin River would make contaminated fish available most of the year. Furthermore, occasional transient bald eagles are more likely during fall and spring migration times than during the winter. We conclude that neither continued operation of the projects nor the proposed generation expansion is likely to adversely affect bald eagles.

4.1.4.3 Cumulative effects

Less than 5 acres of wetlands would likely be lost by raising the Shelburne reservoir 1.7 feet. Nationally, wetland losses are estimated at 300,000 to 450,000 acres annually. They are lost bit by bit (EPA, 1989). Coos County wetlands are estimated to cover 25,114 acres. Inland freshwater wetland losses in New Hampshire are estimated at roughly 24 acres per year (New Hampshire Office of State Planning, 1989b). Any wetland loss at Shelburne would contribute to the cumulative loss of wetlands in the state.

4.1.5 Aesthetics

Sawmill. James River has made no proposals for enhancing aesthetics at the project, and no comments or recommendations have been received regarding aesthetics. The proposed 12 cfs minimum bypass flow would not be an enhancement, since this approximates current leakage.

J. Brodie Smith. Public Service filed a videotape of the upper bypassed section at a range of flows from leakage to 30 cfs. This section is relatively flat and wide, with large boulders, and is divided by an island just downstream of the Mason Street Bridge, At 30 cfs and under, most flow follows a relatively narrow channel on the river left and diverts to the left side of the island where it passes from view. Based on the videotape, and our November 17, 1992, site visit, stream morphology is such that it would take much more than 30 cfs to get any significant flow over to the right side of the channel where it could be viewed. Therefore, Public Service's proposed 10 cfs plus leakage minimum flow would not be a significant enhancement for aesthetics.

Cross Power. James River has made no proposals that would affect aestheties at this project, and no comments or recommendations have been received regarding aesthetics.

Cascade. The Town of Gorham, in a September 25, 1990, letter, is concerned about visual impacts of the proposed Pulsifer Rips development. However, in a later, June 25, 1992, letter, it states that James River's current proposal (see section 2.1.2) addresses its concerns and ask that these measures be made part of any license issued. Cascade Flats, in their July 1, 1991, intervention, states that the Pulsifer Rips development would add to the aesthetic problems already experienced by Cascade Flats residents since the proposed new penstock and surge tank would be in direct view of their homes.

It is currently not possible to release a flow of 400 cfs into the Pulsifer Rips reach because of the impoundment's limited storage capacity. Without the opportunity to observe the reach at James River's proposed 400 cfs minimum bypass flow, we can't evaluate its actual affect on aesthetics. Although James River expects that this flow would expose more boulders and create more whitewater, the flow would reduce the wetted perimeter by 10 to 15 percent. James River estimates that this would create a extra 10 to 15 foot wide strip of shoreline. Although this area would eventually revegetate naturally, there would likely be moderate short-term, and minor long-term adverse impacts on aesthetics.

There would also be short and long-term adverse impacts on aesthetics from constructing and operating the structures for the proposed Pulsifer Rips development. The impact area currently provides a pleasing view to residents of Cascade Flats and motorists traveling Route 16. The aesthetics of the east side of the river are important in countering the industrial/commercial development of the west side.

Short term, unavoidable impacts from increased dust, noise, heavy equipment traffic, and increased water turbidity would occur. The new penstock and powerhouse would be a moderate long-term visual intrusion on a view that currently has a fairly natural look. Long term impacts could be mitigated by implementing the measures proposed by James River. These include revegetating disturbed areas, locating the penstock on a natural hillside bench to lessen the amount of clearing needed, leaving a buffer between the penstock and the river, using conifers in replantings and buffer strips, and painting the penstock and surge tank a natural color. It would also be appropriate to landscape around the new powerhouse to screen it from the river's west bank. However, plantings designed to screen large structures such as the penstock and powerhouse from view would take several years to be effective.

James River Gorham. Since the 4,500-foot-long bypassed reach currently receives only leakage, James River's proposed 50 cfs minimum flow would enhance the reach's aesthetics. Based on a video of the reach at various flows, and on our November 17, 1992, site visit, we think this enhancement would be minor.

Public Service Gorham. As with the Upper Gorham project, the 800-foot Lower Gorham bypassed reach currently receives leakage. Therefore, Public Service's proposed 50 cfs minimum flow release would be an aesthetics enhancement. Based on a video of the reach at a variety of flows, and on our November 18, 1992, site visit, we think this enhancement would be minor.

Shelburne. James River's proposal to raise the impoundment by 1.7 feet would not have any significant impact on aesthetics. As noted above in Section 4.1.4.1 there would only be a total net loss of about 4.3 acres of wetland habitat. Continuing to release leakage into the 150-foot-long bypassed reach would maintain the short reach's limited aesthetics value.

Cumulative effects Aesthetic effects at individual projects, with proposed mitigation, would largely be nentral, consequently there would be no cumulative effect to aesthetic resources.

4.1.6 Cultural resource

Continued Sawmill, Smith, Cross, Cascade, James River Gorham, Public Service Gorham and Shelburne project operatious aren't threatening any historic or archaeological resources.

Sawmill. James River's hasn't proposed any measures concerning the 30-or-more logging boom anchor cribs in the Sawmill Project impoundment which we believe may be eligible for listing on the National Register of Historic Places. The SHPO hasn't made any formal statement, either, on the eligibility of the anchor cribs for inclusion in the National Register of Historic Places, determination on project effects on the cribs, or recommendations on measures to reduce project consequences on the cribs.

However, we believe that project operation isn't adversely affecting the anchor cribs. Instead, project operation may have a beneficial effect on the cribs by helping their preservation; the impoundment waters may actually serve to provide protection to submerged crib timbers. They were put in place when the impoundment was at or near the current level, and were probably designed and built for the current impoundment level in the first place.

Cross Power. Project operation has a minor, beneficial effect on the historic characteristics of the project dam, powerhouse, gatehouse, and gatehouse machinery by allowing them to continue to be a working representation of the earliest phase of the electric power part of the mill industry in Berlin.

Under James River's proposed MOA, routine maintenance, repairs, and upkeep of the facility would follow Interior's *Standards for Rehabilitation*, and James River would consult the SHPO before any alteration of the project features which might exceed the scope of Interior's standards. These stipulations would result in long-term, moderate effects on the historic characteristics of the project dam, powerhouse, gatehouse, and gatehouse machinery by assuring their preservation during continued project operation and maintenance.

Cascade. We believe that James River's proposed modification of unit 1 would adversely affect critical characteristics of the unit or the powerhouse which may make the powerhouse eligible for listing on the National Register of Historic Places. Gary Hume reported that Historic Resources hasn't yet determined whether any existing portions of the overall Cascade [hydroelectric] facility have sufficient integrity to be considered historic [eligible] structures (in FERC, 1992b). He also reported that if the paper mill is "historic", operation of the hydroelectric facility wouldn't appear to have any effect on the paper mill itself.

Three National Register-eligible archaeological sites identified during the phase I and II archaeological site surveys -- remnants of a prehistoric village and 2 prehistoric stone tool workshop sites -- would be destroyed by construction of the Pulsifer Rips intake and penstock. James River's proposal for a Data Recovery Program (systematic excavation of the sites) would be prepared for approval by the Advisory Council after consulting the SHPO. We believe this would constitute a major beneficial effect for each of the sites. The thorough, controlled recovery of data would guarantee preservation of their Register-critical characteristics.

Operation of the Pulsifer Rips development wouldn't affect any prehistoric or historic resources.

James River Gorham. Project operation has a minor, beneficial effect on the characteristics of the project that make it eligible for the National Register as an historic district. The dam, gatehouse, and machinery continue to be a working representation of the earliest phase of the electric power part of the mill industry in Berlin.

James River's proposed replacement of the two existing water-driven exciters with a new unit would adversely affect the integrity of the entire facility as an historic district that, as Gary Hume has pointed out (in FERC, 1992b), has been virtually intact from the time of construction. James River reports that the SHPO indicates that, although the exciters are an integral component of the historic facility, their removal is an adverse effect that can be mitigated. Thus, James River proposes to enter into an MOA with the SHPO for the proposed equipment modifications and for routine maintenance, repairs, upkeep, and future alterations of the project features at the Gorham Project, following Interior's *Standards for Rehabilitation*.

Before beginning the proposed modifications in the powerhouse, James River would consult with the SHPO and document the exciters and powerhouse design, and would make the exciters available to Historic Resources or another institution Historic Resources might recommend historical preservation. James River would consult the SHPO before any future alteration of the project features which might exceed the scope of Interior's standards.

Under the proposed MOA, removal and replacement of the exciters would be reduced to a minor, long-term adverse effect; the proposed documentation and preservation of the exciters would minimize the adverse effect of their removal from the historic facility. The MOA would have a long-term, moderate beneficial effect on the historic district by assuring preservation of the historic characteristics of the project dam, powerhouse, gatehouse, and gatehouse machinery during continued project operation and maintenance.

Shelburne. Normal upkeep during project operation has a minor, beneficial effect on the historical value of the powerhouse. With James River's proposed measures, routine maintenance, repairs, and upkeep of the powerhouse would follow Interior's *Standards for Rehabilitation*, and James River would consult the SHPO before any alteration which might exceed the scope of Interior's standards. This would result in long-term, moderate effects on the historic characteristics of the powerhouse assuring preservation of its architectural significance during continued project operation and maintenance.

Cumulative effects. Effects on historical and cultural resources at individual projects, with proposed measures, would range from moderately beneficial to no effect, consequently there would be no cumulative adverse effects to on the resources.

4.1.7 Recreation

Sawmill. In a March 18, 1992, letter, Berlin supports James River's plan to cooperate in a proposed Heritage Trail by providing viewing areas and interpretive signs. In a March 9, 1992, letter, Fish and Game states that James River's recreation plan, which was filed April 1, 1992 is nearly complete, except that facilities for the disabled need to be discussed further.

Providing the two viewing areas at the Sawmill project would enhance public access to the Androscoggin River for sightseeing. Providing interpretive signs at these viewing areas would increase the public's understanding of the relationship between James River's developments and the river.

J. Brodie Smith. Incorporating the piece of land between the penstock and the bypassed reach into the project boundary for future wildlife habitat management or recreation would be a long-term enhancement since this would ensure that the parcel is not developed for other uses over the term of a new license.

Cross Power. Since there are no recreation measures proposed, there would be no change in recreation opportunities at the project.

Cascade. In a July 19, 1989, letter, Interior states that James River's recreation plan is adequate. Interior recommends that the recreation facilities be constructed within two years after a new license is issued. Interior also notes that Fish and Game believes that James River's proposed minimum bypassed reach flow of 400 cfs would improve angler access. In an August 18, 1992, letter, Fish and Game recommends that a fishing access area with parking and a footpath be developed on the western bank of the bypassed reach.

James River's proposed angler access facility would enhance public access to the Androscoggin River at Pulsifer Rips. This area is open to the public now, but there are currently no facilities or signs indicating

this access. This measure, therefore, would increase public awareness that this section of the river is accessible. The proposed facility would also enhance safety since a pull-off parking area would be provided.

As discussed above in section 4.1.3, James River's proposed 400 cfs minimum flow for the Pulsifer Rips reach is expected to improve trout habitat. Also, since the reach is currently not considered to be wadeable at the present minimum flow of 1,550 cfs, James River's proposed minimum flow would improve fishing opportunity by making wading feasible. For wading, depths from 0.0 to 2.5 feet, and velocities from 0.0 to 2.0 feet per second (fps) are considered optimal (Nestler *et al.*, 1986). James River's IFIM model predicts that velocities throughout most of the reach would be less than 2.0 fps at a flow of 400 cfs, and depths would generally be 2.0 to 3.0 feet or less (NAI, 1988). NAI (1988) also believe that it is likely that anglers could cross some areas of Pulsifer Rips at a flow of 400 cfs. As opportunity for fishing in this reach increases, so could demand. James River's proposed fishing access area would help meet this demand.

Although no information has been presented showing that Pulsifer Rips is used for canoeing, the available data suggest that at a flow of 400 cfs, the reach would still be canoeable. Optimally, to determine whether this flow is canoeable, an on-site test would need to be conducted, but it is currently not possible to provide such a low flow to this reach. However, the IFIM study report shows that the reach consists of a fairly deep, fast main channel, and that the majority of the reach (about 85 percent) would be more than 1 foot deep at a flow of 400 cfs (NAI, 1988).

After starting Pulsifer Rips operation, there would be a greater than current likelihood of unscheduled, rapid releases of water into the bypassed reach. This would be a potential hazard to downstream users. However, James River proposes to install safety devises such as sirens to warn the public of any such releases. This is a fairly standard practice at hydroelectric projects, but the final design of these safety devises should be coordinated with the Commission's New York Regional Office if a new license is issued.

Public access to the east side of the river would not change under James River's proposal for Pulsifer Rips. Since the new access road would be gated near the penstock intake, this area would remain closed to the public.

James River Gorham. As proposed, there would be no change in recreation opportunity at the project. The footbridge over the bypassed and existing parking area would remain open to the public.

Public Service Gorham. Fish and Game, in its January 19, 1993, letter, requests that Public Service's recreation plan, as described in its application, be required in a new license. They also request sufficient signage "for the convenience of the public".

Since the only change proposed for recreation at the project is to add an information sign, the only enhancement would be to increase the public's awareness of the availability of access. Public Service's proposal to add a canoe portage when there is demand for one would not be an enhancement since there would be no guarantee that such a facility would ever be built.

Shelburne. Fish and Game, in its January 5, 1993, letter, states that the final application adequately describes public access to the project.

Since no formal recreation facilities exist and none are proposed, access opportunities would not change. Raising the reservoir elevation 1.7 feet would have little effect on existing informal access areas.

Cumulative effects. Recreational resources at individual projects, would either remain unaffected or be enhanced, consequently there would be minor cumulative beneficial effect to recreational resources.

4.1.8 Land use

The proposed Pulsifer Rips development would permanently change about 15.5 acres from undeveloped woodland to industrial use. A wooded buffer would still exist between the new penstock and the river along most of its route. This is a relatively small amount of land in total, but because of the parcel's linear nature, over a mile of woodlands would be permanently impacted.

4.1.9 Socioeconomics

Constructing the proposed Pulsifer Rips development would take 21 to 24 months. About $26,000,000 would be spent on labor, materials, taxes, and construction-related services. Total payroll would be about $8,136,000.

A maximum of 90 persons would be employed at the project site at any one time. Most workers are expected to work at the project for only short periods. Only specialized workers, working on the penstock and powerhouse, would be at the site for any extended period (7 to 8 months). Since the area is a tourism center, commercial lodging is readily available for those specialized workers who would temporarily relocate. Most workers, however, are expected to commute to the project.

During construction, there would be an increase in local traffic from workers commuting to the site, and from transportation of equipment and material. However, because the project would be located near major East/West and North/South highways, this impact would be minor.

James River expects to hire no additioual permanent workers to operate the new development. The facility would be totally automated. Therefore, there would be no long-term impact on social services. Local government tax revenues would, however, increase by about $170,000 per year.

Reciprocal benefits to the City of Berlin. Berlin recommended that in return for use of the Androscoggin River for hydroelectric generation, the licensees provide free electric power for Berlin's city buildings (filing dated November 18, 1992). James River disagrees, noting that James River already pays over $2 million annually directly to the city in property taxes (letter dated December 10, 1992). The Act, sections 10(c), 10(e), 10(f), and 11(c), provides that licensees compensate for property used and benefits received. Section 11(c) provides that projects constructed on navigable waters furnish power free of cost, to the United States to operate navigation facilities, such as locks and dams. We found no basis for providing the compensation recommended by Berlin. We would not recommend that licensees be required to provide no cost power for non-navigation facilities.

4.1.10 Air quality

If--as a result of proposed increases in water releases from project storage dams--the annual project energy production is reduced, the resulting loss of hydropower energy would make it necessary to replace the loss with energy available from alternative sources.

For the Upper Androscoggin River projects, it is highly probable that the replacement energy would be generated by coal-fired, steam-electric facilities. This would result in increased consumption of fossil fuel; and the combustion of this increment of fossil fuel would result in increased production of atmospheric pollutants.

The replacement of one gigawatt-hour of hydropower generation energy with one gigawatt-bour of coal-fired, steam-electric generation would require the combustion of approximately 420 tons of pulverized bituminous coal. The quantity of oxides of sulfur produced by combustion is directly proportional to the

percentage of sulfur in the coal. For computational advantage, we shall assume that the coal contains one percent sulfur.

Accepting the above assumptions, we shall tabulate the quantities of atmospheric pollutants that would be produced by replacing the loss of one gigawatt-hour of hydroelectric generation with a gigawatt-hour of coal-fired generation, Table 4-5.

State-of-the-art pollution control technology is capable of removing approximately 95 percent of the oxides of sulfur and approximately 60 percent of the oxides of nitrogen from the above quantities of pollutants in uncontrolled flue gases before the gases are released to the atmosphere.

If the coal contains more or less than 1.0 percent sulfur, the correct quantity of the oxides of sulfur is calculated by multiplying the above 8.18 tons by the correct percentage of sulfur.

Continued operation of the projects and approval of proposed increases in capacity would keep additional pollutants from being released into the air. Table 4-6 shows the pollutants that would be released to the air annually if the projects' estimated 301.88 GWh electric power were generated by a fossil fuel plant. These pollutants would adversely affect air quality in New England, not necessarily in the immediate project area.

Table 4-5. Atmospheric pollutants that would be produced by replacing the loss of one GWh of hydroelectric generation with a GWh of coal-fired generation (Source: Joynar, 1985).

Oxides of sulfur	Approximately	8.18 tons
Oxides of nitrogen	"	3.78 tons
Carbon monoxide	"	0.19 ton
Carbon dioxide	"	965.00 tons

Table 4-6. Estimated air pollutants resulting annually from generating 301.88 GWh of electric power using about 126,790 tons of pulverized, one-percent sulfur, bituminous coal (Source: Staff).

Pollutant	Amount produced (tons)
Oxides of sulfur	2,469
Oxides of nitrogen	1,141
Carbon monoxide	57
Carbon dioxide	291,314
Particulates (fly ash)	7,568

4.2 Modification to proposed project operation or facilities

4.2.1 Erosion control measures at Cascade

We believe that the erosion and sediment control measures should be finalized before James River begins construction activities for the Pulsifer Rips development. To be most effective, the final measures would need to reflect the final borrow and spoil needs and site locations and the final project design. Thus they should be based on the final project drawings and specifications as well as the final construction plans and construction schedule. James River should base the final measures on the conceptual erosion and sediment control plan, and should prepare them in consultation with appropriate resource agencies. We believe the Town of Gorham shonid also be included in this consultation process since the Town of Gorham is concerned about erosion and sediment control at the Cascade Project (Kelly Goddard, Town of Gorham, Town Manager, in FERC, 1992a).

4.2.2 Water quality

4.2.2.1 Water Quality Certificate conditions

Environmental Services issued a Section 401 Water Quality Certificate for the Upper Androscoggin projects as shown in Table 4-7.

Sawmill, Smith, and Cross. The 401 water quality certificates require that a water quality monitoring program be implemented at Sawmill and Cross, if it is determined through James River's WQ Program that Class B DO standards are being violated at Shelburne (letters from Edward J. Schmidt, P.E., Ph.D., Director, Water Supply and Pollution Control Division, NHDES, Concord, NH, December 13 and 18, 1991). The program would include the following items:

- DO and water temperature monitored at three locations:
  - (1) upstream of the impoundment,
  - (2) at three depths in impoundment (surface, bottom, and mid-depth), and
  - (3) downstream of the dam.

Table 4-7. Upper Androscoggin River Basin hydroelectric project water quality certification by the New Hampshire Department of Environmental Services. Source: Staff.

Projects	Project Numbers	Date granted
Sawmill	2422	12/18/91
J. Brodie Smith	2287	4/25/91
Cross Power	2326	12/13/91
Cascade	2327	7/6/89
Gorham	2311	12/23/92[a]
Gorham	2288	4/25/91
Shelburne	2300	12/13/91

[a] Water quality certificated requested. It had been requested on 12/20/91. The application was withdrawn on 12/22/92 and resubmitted.

- Equipment calibration and quality control measures must be followed to assure accurate reporting.
- Monitoring between 6 am - 8 am.
- Monitoring events conducted under as close to worst case conditions (warm water > 20° Celsius, low flow < 2,000 cfs) as possible.
- Prepare an annual summary of the findings and results for yearly submission to Environmental Services.

The 401 water quality certificate for Smith requires that a water quality monitoring program be implemented at Smith no later than 1994 and continue for 3 years (letter from Richard A. Flanders, Jr. Supervisor, Water Quality Section, Water Supply and Pollution Control Division, NHDES, Concord, NH, April 25, 1991). Following the third year of monitoring, Environmental Services would determine whether continued monitoring would be necessary. The program should include the following items:

- DO and water temperature monitored at two locations:
  - (1) upstream of the impoundment, and
  - (2) downstream of the dam.
- Equipment calibration and quality control measures must be followed to assure accurate reporting.
- Continuous monitoring once each month for 72 hours during the following periods: late June - early July, late July - early August, late August - early September,
- Monitoring events conducted under as close to worst case conditions (warm water > 20° Celsius, low flow < 2,100 cfs) as possible

- Prepare an annual summary of the findings and results for yearly submission to Environmental Services.

The 401 certificate would also reserve the right of Environmental Services to gain access to the project sites at any time to check monitoring equipment and records to assure compliance with New Hampshire's Class B water quality standards. Additionally, the 401 certificate would require that all existing river uses would be maintained and protected, and that at no time would Class B water quality standards be violated.

Inclusion of these additional proposals to protect water quality in the project area would further verify James River's modeling study results. Because the model was constructed for an extensive end complex river system and DO data from an extended period of record is not available to confirm that the data used in the model is representative of typical water quality conditions, we believe that it would be prudent to perform short-term water quality monitoring. Furthermore, these additional measures would ensure that the continued operation of the projects would have no adverse impacts on water quality in the Berlin - Gorham reach of the Androscoggin River.

Therefore, we agree with Environmental Services and recommend that their water quality monitoring plan be included in any license issued for the projects. In addition, if subsequent DO violations are found to occur, James River and Public Service should be required to further consult with the agencies and develop a plan to conduct additional DO monitoring and a plan to modify project operations, if necessary, to meet the DO requirements in the project area. Furthermore, with the implementation of these recommendations, we believe that the project's contributions to any adverse cumulative impacts on DO in the river basin would be negligible.

Cascade. The WQC for Cascade was issued with the conditions that the final erosion control plans would be submitted prior to project construction (letter from Richard A. Flanders, Jr., Supervisor, Water Quality Section, Water Supply and Pollution Control Division, NHDES, Concord, NH, July 6, 1989). Fish and Game, in their August 18, 1992 letter, Interior, in their letters of July 19, 1989, October 7, 1992 and October 13, 1992, and Conservation Law, *et al.*, in their September 14, 1992 letter, also recommend that a sediment erosion plan for construction be developed and incorporated into any new license for the Cascade project.

Conservation Law, *et al.* recommend that the project should be operated to comply with all water quality criteria and designated uses in the state standards. Conservation Law, *et al.* further recommend that the licensee should prepare a comprehensive monitoring, enforcement, and contingency plan to ensure project compliance with state water quality standards.

Based on the previous water quality modeling efforts by James River, Environmental Services has already prescribed in the Section 401 water quality certificate for Shelburne, a substantial and comprehensive water quality monitoring plan for the Androscoggin River basin. Additionally, James River has proposed to implement all aspects of its WQ Program. We agree that the proposed WQ Program would adequately protect water quality in the project area. The WQ Program consists of a 3-year water quality data collection and subsequent sampling of the upstream impoundments should any violations or stratification of the Shelburne impoundment occur. Additionally, Environmental Services 401 certificates require annual reports and Environmental Services access to the project.

Inclusion of James River's WQ Program would further verify James River's modeling study results. Because of the new development and new bypassed reach and because the model was constructed for an extensive and complex river system and DO data from an extended period of record is not available to confirm that the data used in the model is representative of typical water quality conditions, we believe that it

would be prudent to perform short-term water quality monitoring. Furthermore, these additional measures would ensure that the operation of the Cascade Project and the new Pulsifer Rips development would have no adverse impacts on water quality in the Berlin - Gorham reach of the Androscoggin River.

Therefore, we recommend that the water quality monitoring plan, as proposed by James River and described in their March 11, 1992 letter (James River, 1992) be included in any license issued for the Cascade Project. In addition, if the data does not support the model results, James River should be required to further consult with the agencies and develop a plan to conduct additional monitoring and a plan to modify project operations, if necessary, to meet the water quality requirements in the project area. Furthermore, with the implementation of these recommendations, we believe that Cascade's contributions to any adverse cumulative impacts on water quality in the river basin would be negligible.

James River Gorham and Public Service Gorham. Conservation Law, *et al.* recommend that the projects should be operated to comply with all water quality criteria and designated uses in the state standards (comments and recommendations from Mark A. Sinclair, Conservation Law, Montpelier, VT, January 14, 1993). Conservation Law, *et al.* further recommend that the licensees should prepare a comprehensive monitoring, enforcement, and contingency plan to ensure project compliance with state water quality standards. Conservation Law *et al.* recommend that James River assess how the proposed James River Gorham's operation would effect the concentration and bio-availability of metals and dioxin at the project, and that James River take all necessary steps to eliminate the problem. Furthermore, Conservation Law, *et al.* recommend that a final erosion and sedimentation control plan be submitted for James River Gorham.

Based on the previous water quality modeling efforts by James River and Public Service, Environmental Services has already prescribed in the Shelburne section 401 water quality certificate, a substantial and comprehensive water quality monitoring plan for the Androscoggin River basin. Furthermore, Environmental Services has already prescribed in the Section 401 water quality certificate for Public Service Gorham, a substantial and comprehensive water quality monitoring plan. James River and Public Service propose to implement all aspects of their programs. We agree that the proposed programs would protect water quality in the projects' area. The programs consists of 3-year water quality data collection and subsequent sampling of the upstream impoundments should any violations or stratification of the Shelburne impoundment occur. Additionally, the plans requires annual reports and Environmental Services access to the project.

Inclusion of these additional proposals to protect water quality in the projects' area would further verify modeling study results. Because the model was constructed for an extensive and complex river system and DO data from an extended period of record is not available to confirm that the data used in the model is representative of typical water quality conditions, we believe that it would be prudent to perform short-term water quality monitoring. Furthermore, these additional measures would ensure that the continued operation of the projects would have no adverse impacts on water quality in the Berlin - Gorham reach of the Androscoggin River.

Therefore, we concur with Environmental Services and recommend that James River's WQ Program and Public Service's program be included in any licenses issued for the projects. In addition, if the DO data do not support the model results, James River and Public Service should be required to further consult with the agencies and develop a plan to conduct additional DO monitoring and a plan to modify project operations, if necessary, to meet the DO requirements in the project area. Furthermore, with the implementation of these recommendations, we believe that James River Gorham and Public Service Gorham's contributions to any adverse cumulative impacts on DO in the river basin would be negligible.

Shelburne. The EPA recommends that the proposed 1.7 ft increase in the impoundment elevation be denied based on water quality concerns (letter from Ronald G. Manfredonia, Chief, Water Quality Branch, EPA, Boston, MA, January 15, 1993). EPA, citing James River's water quality study and model estimates (NAI, 1989; 1991b), points out that macrophyte and/or periphyton respiration appear to have not been accounted for in the calculation of the minimum DO concentration due to the increased impoundment level. If the model estimated DO decrease of 0.16 mg/l were to be subtracted from the worst case DO projections of 5.8 to 6.0 mg/l (adjusted for macrophyte and /or periphyton respiration by increasing sediment oxygen demand), EPA states that the resulting increase in the reservoir's elevation would clearly violate New Hampshire's Class B water quality standards.

EPA further states that the projects would not meet the State of Maine water quality criteria for Class B waters. The DO criteria for Class B waters in Maine are an instantaneous minimum of 7.0 mg/l or 75 percent saturation, whichever is higher, and a 7-day average of 9.5 mg/l with a oue day minimum of 8.0 mg/l from October 1 to May 14 to ensure fish spawning.

The Maine state line is approximately 5.5 miles downstream of Shelburne. Until as recently as October 1990, the Androscoggin River at the Maine state line was classified as Class C by the MDEP. As such, Maine's Class B water quality criteria are now more restrictive than New Hampshire's Class B DO criteria. However, we believe that, regardless of the project's location, Maine's water quality standards should not be ignored. Operation of the project(s) should be conducted in such a way as to minimize any cumulative effects on DO levels. It is not clear, given the model results, that Maine DO standards could be violated.

Daily variations in DO concentrations were observed in the Androscoggin River during the collection of water quality data. These daily ranges were from 0.4 to 0.9 mg/l. NAI (1989) states that these variations were more pronounced in the lower portions of the study area (i.e., the downstream reaches) and appeared to be due to primary production. However, concentrations of chlorophyll a showed no distinguishable pattern and were representative of oligotrophic or unproductive aquatic systems, as reported by Wetzel (1975). Therefore, NAI (1989) assumed that relative to other factors, primary production was not a major contributor to the overall oxygen budget of the river. Subsequent use of the observed chlorophyll a concentrations in the model showed no effect on the predicted DO regime of the study reach and their use was dropped from the model. NAI (1989) then further speculated that the observed DO diurnal variability was attributable to macrophyte and/or periphyton productivity.

The selected version of the EPA supported QUAL2E model used for the Androscoggin River has limitations involving dynamic conditions. such as macrophyte and/or periphyton photosynthesis and respiration inputs to the DO budget. In an attempt to model a scenario involving diurnal variations in DO levels and worst case conditions, the model was re-calibrated to the lowest observed DO values and the sediment oxygen demand input was increased (NAI, 1989). Thus, when a scenario of low river flow was combined with maximum mill discharges, the result was estimated DO concentrations of 5.8 to 6.0 mg/l - values below the 75 percent saturation threshold. However, NAI (1989) further estimated the probability of this instance actually occurring would be about once every 8 years. and then only during the few pre-dawn hours.

James River conducted subsequent water quality modeling following EPA and Environmental Services changes to James River's wastewater discharge permit for the Burgess and Cascade facilities (NH0000655), reductions in the river flow available for critical water quality modeling, and paper making process changes (KA, 1993). EPA's newly modified permit reduced the allowable effluent discharge from James River's Burgess pulp making facility and Cascade paper making facility from 27,000 pounds per day to 25,600 pounds per day of BOD from July 1 to September 30 of each year. Environmental Services reduced the river flow used for critical conditions in water quality modeling to 90 percent of the 7Q10 flow. This change resulted in a reduction of usable flow for water quality purposes from 1,450 cfs to 1,305 cfs. And

lastly, changes made by James River in its paper making process resulted in significantly lower BOD loadings.

At 90 percent of the 7Q10, new modeling results predicted a minimum DO concentration of 6.79 mg/l (79.7 percent saturation) in the Shelburne impoundment and a DO concentration at the Maine border of 7.27 mg/l (85.3 percent saturation). At the 7Q10, new modeling results predicted a minimum DO concentration of 6.93 mg/l (81.3 percent saturation) in the Shelburne impoundment and a DO concentration at the Maine border of 7.31 mg/l (85.8 percent saturation) (KA, 1993).

Conservation Law, *et al.* recommend that the project should be operated to comply with all water quality criteria and designated uses in the state standards (comments and recommendations from Mark A. Sinclair, Conservation Law, Montpelier, VT, January 14, 1993). Conservation Law, *et al.* further recommend that the licensee should prepare a comprehensive monitoring, enforcement, and contingency plan to ensure project compliance with state water quality standards.

James River has already proposed, and Environmental Services prescribed in the 401 water quality certificate for Shelburne, a substantial and comprehensive water quality monitoring plan for Shelburne. The plan also consists of subsequent water quality data collection at all of the other James River Androscoggin River projects if monitoring results at Shelburne indicate that Class B violations are occurring. Additionally, the plan requires immediate consultation with Environmental Services to discuss appropriate modifications should any stratification of the impoundment or water quality violations be encountered.

However, we also recognize that these measures may not adequately protect DO levels downstream of the project. As we previously stated, EPA has raised some concern over possible violations of Maine's water quality standards for DO concentrations. We agree. Continued operation of the projects along with proposed new developments could cumulatively affect DO levels downstream of the projects.

Conservatively, we believe that James River should monitor DO levels downstream of the project at the Maine state line. If subsequent data indicate violations of Maine's Class B water quality standards are occurring, James River should be required to modify project operations. To maintain a DO concentration of not less than 7.0 mg/l or 75 percent saturation, whichever is higher, the Shelburne Project may need to shut down during critical water quality periods for as long as necessary to maintain this level downstream of the project.

Inclusion of James River's WQ Program would further verify James River's modeling study results. Because of the new development and because the model was constructed for an extensive and complex river system and DO data from an extended period of record is not available to confirm that the data used in the model is representative of typical water quality conditions, we believe that it would be prudent to perform water quality monitoring. Furthermore, these additional measures would ensure that the operation of the Shelburne Project and the other James River developments would have no adverse impacts on water quality in the Berlin - Gorham reach of the Androscoggin River.

Therefore, we recommend that the water quality monitoring plan, as proposed by James River, with our modifications, be included in any license issued for the Shelburne Project. In addition, if the data does not support the model results or if violations of Maine DO standards are shown to occur, James River should be required to further consult with the agencies and develop a plan to conduct additional monitoring and a plan to modify project operations, if necessary, to meet our water quality requirements in the project area. Furthermore, with the implementation of these recommendations, we believe that Shelburne's contributions to any adverse cumulative impacts on water quality in the river basin would be negligible.

4.2.2.2 Operation and flow release plans

Fish and Game and Interior recommend that the licensees prepare plans for Smith, Cascade, James River Gorham, and Public Service Gorham describing the methods for releasing and maintaining the required minimum flows and run-of-river operation. The plans should describe how flows would be maintained in the bypassed reaches and downstream from the projects when the impoundments are refilled following any necessary maintenance and/or repairs (*e.g.*, comments and recommendations from Jeffrey R. Howard, Attorney General, the State of New Hampshire, Concord, NH, January 18, 1993; letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., January 11, 1993). The recommended plans should include descriptions of all mechanisms and structures to be used, the level of manned and/or automatic facility operation, the methods for recording and maintaining data on project operations and providing them to the Commission and resource agencies for inspection. Fish and Game and Interior further recommend that the method for releasing the minimum flows into the bypassed reaches be determined and agreed upon before any new licenses are issued.

We agree. Plans describing the methods for releasing and maintaining required minimum flows, if any, and run-of-river operation and how these flows would be maintained in the bypassed reach and below the project when the impoundment is refilled after any maintenance and/or repairs should be included in any license issued for these projects and Sawmill, Cross, and Shelburne as well. The plans should include descriptions of all mechanisms and structures to be used, the level of manned and/or automatic facility operation, the methods for recording and maintaining data on project operations and providing it to the Commission and resource agencies for inspection. The plans should be required before any new construction or changes in project operations take place.

4.2.2.3 Toxic pollutants

Construction. Reservoir sediment turbidity increases in the Cascade impoundment during construction of the Pulsifer Rips development would take place primarily during placement and removal of the cofferdams. The bulk of the disturbance (excavation) of reservoir sediments would take place inside the cofferdam-dewatered area. To minimize the potential of resuspending dioxin-contaminated sediments or other toxic substances that may be present, we believe that, in addition to the erosion and sediment control measures James River has proposed, James River should also consult with the EPA and other appropriate agencies in preparing a plan (i) for testing the reservoir sediments prior to their disturbance or removal, and, (ii) if dioxin or other toxic materials are present, for the proper removal, handling, and disposal of those materials.

Flows in the James River Gorham project forebay would increase from 2,300 cfs to 2,800 cfs due to the proposed replacement of the existing exciter units with a fifth generating unit. The 500-cfs flow increase would focus on the western (right-hand) portion of the forebay channel immediately upstream of the intake that currently provides 50 cfs for the exciter turbine(s). Although no particular abundance of sediment is expected to have accumulated in that area, whatever sediments are there would be subject to possible resuspension during modifications of the intake or when the higher-capacity turbine is first started up. In the event that such sediments might contain dioxins or other toxic materials, to guard against inadvertent suspension and downstream passage of those materials, James River should consult with the EPA and other appropriate agencies in preparing a plan (i) for testing the forebay sediments prior to modifying the intake and starting up the new turbine, and, (ii) if dioxin or other toxic materials are present, for the proper removal, handling, and disposal of those materials.

Operation. As discussed in sections 4.1.2.6 and 3.1.4, dioxin has been identified as a contaminant in fish captured within the projects' area. However, as we indicated, our purpose is to determine whether the

continued operation of the hydroelectric projects would affect, impact, or exacerbate the existing dioxin levels found to already exist in the fish downstream of the pulp mills in Berlin and presumed to be contained/trapped in the reservoir sediments. Our purpose is not to determine whether or not James River's paper mills currently produce detectable levels of dioxin (see section 4.1.2.6 for further discussion). Accordingly, the potential impacts of the proposed projects on the accumulation and resuspension of any toxicants is addressed in section 4.1.2.6. Potential cumulative impacts of these pollutants are addressed in sections 4.1.2.7 and 4.2.2.4.

Conservation Law, *et al.* and Cascade Flats recommend that James River and Public Service assess how the proposed Cascade and Public Service Gorham project operation would affect the concentration and bio-availability of metals and dioxin at the projects and that all necessary steps to eliminate the problem be taken. We have addressed these issues in section 4.1.2.6.

Cascade Flats also raises concerns about possible toxicant levels in the proposed Pulsifer Rips bypassed reach and toxicant movement. Our analysis of flows and wetted area in the proposed Pulsifer Rips bypassed reach indicate that only about 10 percent of the wetted area would be lost if flows were reduced from the current 1600 cfs to the proposed 400 cfs. Given the overall lack of sediments in the proposed bypassed reach, due in large part to the existing high velocities caused by excessive flows (see section 4.1.3.3), we conclude that the potential for any contaminants located along the river bed margin to become desiccated is minimal.

The EPA further recommends that we consider any potential project impacts at Cascade and James River Gorham on the accumulation of any pollutants that may limit designated uses in the area (letter from Ronald G. Manfredonia, Chief, Water Quality Branch, EPA, Boston, MA, January 15, 1993).

We foresee no indications that existing designated uses would be limited. Our conclusions in section 4.1.2.6 were that the continued operation of the projects was the best available option. Further, operation of the projects in a run-of-river mode with minimal headwater fluctuations would minimize the resuspension of any existing contaminants likely trapped in the sediments and would therefore have minimal impact on an existing condition. Resuspension of dioxin, or any other contaminants, currently trapped or contained in the reservoir sediments would essentially be minimized as much as possible with or without the operation of the hydroelectric projects. In addition, consultation and cooperation with the agencies on an effective sediment and erosion control plan would minimize impacts due to any construction activities. Therefore, dioxin, and any other toxicant levels in fish would not be likely to increase under the proposed operation of the projects and any impacts to the fishery resources would be minimal and short-term.

4.2.2.4 Project interaction and cumulative effects

As we have previously noted in section 4.1.2.6, water quality, in particular DO levels, in the Androscoggin River could be cumulatively affected by several proposals. However, we conclude that with our proposed recommendations, water quality both within and downstream of the Berlin to Shelburne reach would not be cumulatively impacted.

The licensees proposals and our recommendations to: (1) operate all seven Androscoggin River projects in run-of-river modes, (2) implement James River's Androscoggin River Water Quality Monitoring Program, (3) monitor DO at the Smith Project, the Pulsifer Rips bypass, the Public Service Gorham Project, and the Shelburne impoundment, (4) maintain existing minimum flow releases in the Sawmill and Shelburne bypassed reaches, (5) develop appropriate sediment and erosion control plans in consultation and cooperation with the agencies, and (6) significantly increase minimum flow releases in the Smith, James River Gorham, and Public Service Gorham bypassed reaches (see section 4.2.3.1) would contribute to

protecting, enhancing, and mitigating for any cumulative impacts that might occur to the Androscoggin River Basin's water quality, particularly DO levels.

Furthermore, the proposed operation of all seven projects as run-of-river with minimal impoundment level fluctuations would serve to keep dioxin or any other toxic contaminants, presumably contained in the sediments trapped behind the existing project dams, in their present locations. We foresee no indications that existing designated uses would be limited. Our conclusions in section 4.1.2.6 were that the proposed operation of the projects would minimize the resuspension of any existing contaminants likely trapped in the sediments and would therefore have minimal impact on an existing condition. Resuspension of dioxin, or any other contaminants, currently trapped or contained in the reservoir sediments would essentially be minimized as much as possible with or without the operation of the hydroelectric projects. Thus, any resuspension of toxic sediments due to project operations would be minimal and dioxin, and any other toxicant levels in fish would not be likely to increase under the proposed operation of the projects. Any impacts to the fishery resources would be minimal and short-term.

In addition, our recommendations to provide operational plans describing the methods for releasing and maintaining our recommended minimum flows and run-of-river operations at the projects would contribute to protecting water quality. We also recommend that licensees develop a plan to modify project operations, if necessary, to meet the water quality requirements in the project area. With the implementation of these recommendations, we believe that the projects' contributions to any cumulative impacts on the water quality in the river basin would be beneficial.

4.2.3 Fisheries

4.2.3.1 Minimum flows

J. Brodie Smith. We evaluated several flow scenarios in the bypassed reach. Based on Fish and Game's and Interior's comments that public access to the bypassed reach is not considered feasible or advisable (see section 4.2.7) and that site conditions in the bypassed reach effectively block any upstream movement of fish from the project's tailwaters, we believe, as in the case at Sawmill, that it is appropriate to base our evaluation solely on the ability of the designated flow to provide an adequate zone-of-passage for salmonids to more suitable habitat located in downstream areas. Thus, in addition to Public Service's proposed 10 cfs plus leakage from April through November, year-round flows of leakage (3 to 5 cfs), 10 cfs, 20 cfs, and 65 cfs were evaluated for their effects on the fishery resources in the bypassed reach.

As discussed earlier, studies have shown that salmonid habitat in the bypassed reach was at best marginal and limited at all four study flows (NAI, 1991d; 1991e). Other studies, however, showed that salmonids do migrate downstream through the Smith Project (KA, 1988).

Interior recommends a continuous minimum flow of 20 cfs be released from the project dam into the bypassed reach from April through November. Additionally, Interior recommends that Public Service provide the same 20 cfs minimum flow release for March or establish a ramping procedure for bypass flow reductions following spillage events in March. The plan should be prepared in consultation with the FWS (letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Office of the Secretary, U.S. Department of the Interior, Washington, D.C., March 2, 1993).

Fish and Game also recommends a minimum flow release of 20 cfs from the dam into the bypassed reach (letter from Donald A. Normandeau, Ph.D., Executive Director, NHFGD, Concord, NH, March 5, 1993). Fish and Game, however, recommends the release to be a continuous year round release (personal communication, William Ingham, Jr., NHFGD, April 5, 1993).

Conservation Law *et al.* recommends a continuous minimum flow release of 65 cfs from the dam into the bypassed reach stating that this flow would ensure an adequate zone-of-passage for fish, prevent high summer temperatures, and protect water quality. Furthermore, Conservation Law *et al.* recommends that this flow be discharged across the full length of the spillway (letter from Mark A. Sinclair, CLF, Montpelier, VT, March 15, 1993).

Flows of 20 cfs provided sufficient depths and velocities to allow downstream movements of fish. At leakage flows, several areas were deemed unsultable due to shallow depths and low velocities. Data collected on Public Services's proposed 10 cfs minimum flow release also indicate a questionable zone-of-passage for salmonids. Depths as low as 0.3 feet (3.6 inches) occurred at 10 cfs. Conservation Law *et al.*, however, states that fish trapped in small, isolated pools at 10 cfs and 20 cfs would be subject to heavy predation by terrestrial sources. Thus, Conservation Law *et al.* argue that 65 cfs would provide the most efficient and effective zone-of-passage flow by reducing in-pool predation and providing higher velocities for quicker fish passage ont of the bypassed reach.

While we agree that 65 cfs would provide the highest velocities within the bypassed reach, we question whether there is any discernable difference in the overall zone-of-passage effectiveness of providing 65 cfs or 20 cfs. The bypass substrate is almost exclusively boulders and the gradient is qulte steep. Zone-of-passage channels adequate for fish passage at 20 cfs were not shown to change significantly at 65 cfs, other than providing higher velocities. Further, given the overall lack of salmonid habitat in the reach, we question whether transient fish would actually be present in the bypassed reach for other than very brief transitory periods. Additionally, 20 cfs was shown to adequately protect DO levels and water temperatures within the reach.

We agree with Interior that Androscoggin River flows from December to February generally exceed the station capacity less than 10 percent of the time. However, we remain concerned that the lack of a year-round minimum flow may not adequately protect the aquatic habitat in the bypassed reach.

Therefore, we recommend that a requirement for a year-round minimum flow release of 20 cfs be included in any license issued for the Smith Project. We find that providing this flow would enhance and protect aquatic habitat and fishery resources in the bypassed reach and provide an adequate zone-of-passage for moving salmonids. Furthermore, we note that 20 cfs is only 1.3 percent of the Androscoggin River's regulated minimum flow of 1,550 cfs and 0.7 percent of the J. Brodie Smith station's capacity. Thus, our recommeuded minimum flow of 20 cfs would only be an increase of about 5 cfs over Public Service's proposal of 10 cfs, plus leakage.

Cascade. For the 400-ft-long Cascade bypassed reach, Interior recommends the following:

- Prior to the start-up of the Pulsifer Rips powerhouse, an interim minimum flow of 6 cfs be released from the dam spillway.
- Following start-up of the Pulsifer Rips development, an interim minimum flow of 100 cfs be released.
- After initiation of operation at the Pulsifer Rips development, an upper bypassed reach minimum flow study should be conducted with the agencies and the results implemented based on the final flow recommendations.

EPA, in a September 15, 1992 letter, agrees with Interior's recommendation that fish habitat in the upper bypassed reach be evaluated following implementation of the new flow regime in the lower bypass.

EPA further recommends that the upper bypassed reach minimum flow study be conducted with the FWS and Fish and Game.

Conservation Law, *et al.* also agree with Interior's recommendation for conducting minimum flow release studies in the upper bypass. However, Conservation Law, *et al.* recommend that these studies, along with a plan for releasing the required minimum flows, be conducted prior to licensing.

Interior states that under the proposed flow of 400 cfs from the Cascade powerhouse, the backwater effect into the upper bypassed reach would be significantly lessened or non-existent. Interior further states that due to the upper bypass' position contiguous with the new trout habitat and fishing area provided by the Pulsifer Rips bypass. the upper bypassed reach could provide valuable additional fish habitat. However, without additional fish habitat data on flows in the upper bypassed reach coupled with the backwater effect from the new 400 cfs Cascade flow, determining an appropriate flow for habitat protection in the upper bypassed reach cannot be done.

James River states that it is not possible under existing river flows and project limitations to conduct such an assessment prior to development and start-up of the Pulsifer Rips powerhouse. Inflows consistently exceed the project's ability to limit flows. Thus, we believe that Interior and EPA's recommendation that a study be conducted once Pulsifer Rips becomes on line is justified. Furthermore, in the absence of the condition-specificstudy, we agree that an interim upper bypass flow of 100 cfs would adequately protect the aquatic resources in the upper bypassed reach. Therefore, we will recommend that, after start-up of the Pulsifer Rips development, an interim minimum flow of 100 cfs be released from the project dam into the upper bypassed reach. Establishment of a 100 cfs minimum flow would adequately protect water quality and aquatic resources in the bypassed reach that could be affected by the reduced flows in the Pulsifer Rips reach. Within one year after the establishment of the 100 cfs flow, James River should develop a plan for conducting an instream flow assessment in the upper bypassed reach to determine the final flow. The study should take into account the new back watering effects of the Cascade tailrace and the suitability and availability of habitat present. Based on the results of the study and the significantly enhanced habitat in the adjacent Pulsifer Rips reach, we believe the 100 cfs minimum flow would most likely be lowered to the fish passage facility flow of 52 cfs. Given the overall aquatic habitat in the reach, we do not recommend that the minimum flow be any greater. The plan should be developed after consultation with Fish and Game and the FWS. The plan should be filed with the Commission for approval.

James River Gorham. Fish and Game, in their January 18, 1993 comments, Interior, in their January 11, 1993 letter, EPA, in their January 15, 1993 letter, and Conservation Law, *et al.*, in their January 15, 1993 comments, disagree with James River's proposal for a minimum flow release of 50 cfs into the approximately 5,000-ft-long bypassed reach with the subsequent phased-in flow increases of up to 200 cfs tied to angling use in the project vicinity. Fish and Game, Interior, EPA, and Conservation Law, *et al.* recommend that the licensee release a minimum flow of 400 cfs from March 1 to June 15 and 200 cfs at all other times in the bypassed reach. The 200 cfs, the agencies state, would provide good overall habitat conditions for rainbow trout and brook trout fry, juvenile, and adults. The 400 cfs in the spring would provide optimum spawning and rearing habitat for rainbow trout.

To model fisheries habitat, James River conducted an instream flow study utilizing the FWS's IFIM procedures. In the absence of baseline fisheries data, brown trout and rainbow trout were selected as evaluation species during the initial study scoping (NAI, 1991k). While brook trout habitat was not modeled, brown trout habitat criteria utilized was very similar. Earlier studies found brook trout in the both the bypassed reach and Moose Brook, a small tributary.

Based on the IFIM results and analysis, a year-round discharge of 200 cfs and a 400 cfs flow from March 1 to June 15, during spawning, were the recommended flows for optimization of fisheries habitat for

all life stages of the modeled species (NAI, 1991k). Salmonid life stages would range from 68 to 100 percent of their maximum WUA. Salmonid spawning habitat would range from 92 to 100 percent of the maximum WUA (NAI, 1991k) (see Figure 4-3 und Figure 4-4).

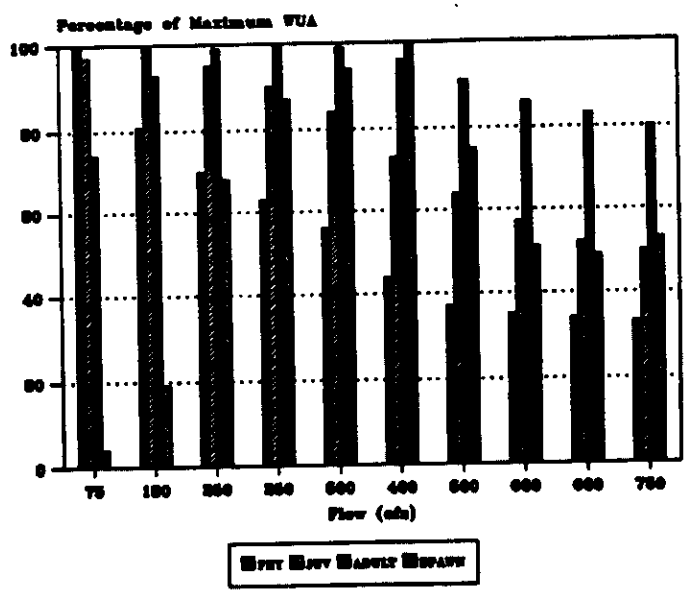

Figure 4-3. Percentage of maximum WUA at selected stream flows for fry, juvenile (JUV), adult, and spawning life stages of rainbow trout in the James River Gorham bypassed reach. Source: NAI (1991k).

Interior, Fish and Game, EPA, and Conservation Law, *et al.* concur with the study results. Adult rainbow trout habitat is maximized at 400 cfs. Brown trout habitat (the least abundant salmonid habitat) is maximized at lower flows of approximately 250 cfs. While the maximum WUA's for both brown trout and rainbow trout juveniles is similar at 75 cfs and 200 cfs, significant increases occur in adult salmonid habitat. When compared to 75 cfs (the lowest modeled flow, although James River's proposal is 50 cfs), 200 cfs provides 40 percent more adult brown trout habitat (263,000 square feet versus 188,000 square feet) and 33 percent more adult rainbow trout habitat (467,000 square feet versus 350,000 square feet). A 400 cfs spring spawning and incubation flow would provide 5,100 additional square feet of rainbow trout habitat (200 square feet at 75 cfs). A 200 cfs winter flow would provide 4,500 additional square feet of brown trout spawning and incubation habitat (1,600 square feet at 75 cfs). These differences would likely be greater at James River's proposed 50 cfs.

We also evaluated a year-round minimum flow release of 200 cfs into the bypassed reach and its effect on spawning habitat. While a 200 cfs flow would provide over 3,600 additional habitat units of rainbow trout spawning over the lowest modeled flow of 75 cfs, it would provide only 68 percent of the maximum spawning habitat available at 400 cfs. A 300 cfs springtime flow, however, would provide 94 percent of the maximum rainbow trout spawning habitat available.

Interior states that the bypassed reach with adequate flows would be a valuable reach for trout. The reach lies downstream of a 2-mile reach below the Cascade Project and flows directly into a 0.75-mile riverine reach before entering the Public Service Gorham impoundment. Given the relative scarcity of free-flowing riverine reaches and the heavily industrialized Berlin area, Interior claims that these reaches, along with the Public Service Gorham to Shelburne stretch, would encompass the only significant salmonid habitat in the highly impounded Berlin-Shelburne area.

Application of the FWS's Aquatic Base Flow (ABF) policy would result in an ABF recommendation of 680 cfs, the estimated unregulated median August flow (U.S. Fish and Wildlife Service, 1981). James River's proposed minimum flow of 50 cfs is approximately 7 percent of the ABF flow. Interior, Fish and Game, EPA, and Conservation Law, *et al.*'s recommended flow of 200 cfs is about 29 percent of the ABF. The springtime release of 400 cfs would approximate 59 percent of the ABF.

Fish and Game has decided to manage this reach for self-sustaining populations of trout. Fish and Game's *Fishing for the Future* management plan places a high value on waters close to human population

centers that provide self-sustaining trout populations. The Gorham bypassed reach runs adjacent to Route 16, a major thoroughfare. Although there is substantial documentation of limited existing angling use (see section 4.1.7), this would be expected to change given the establishment of adequate flows and a trout fishery. Interior states that the project location holds the potential for substantial public use and benefit. Restoration of the bypassed reach through increased flow allotments would be consistent with this plan.

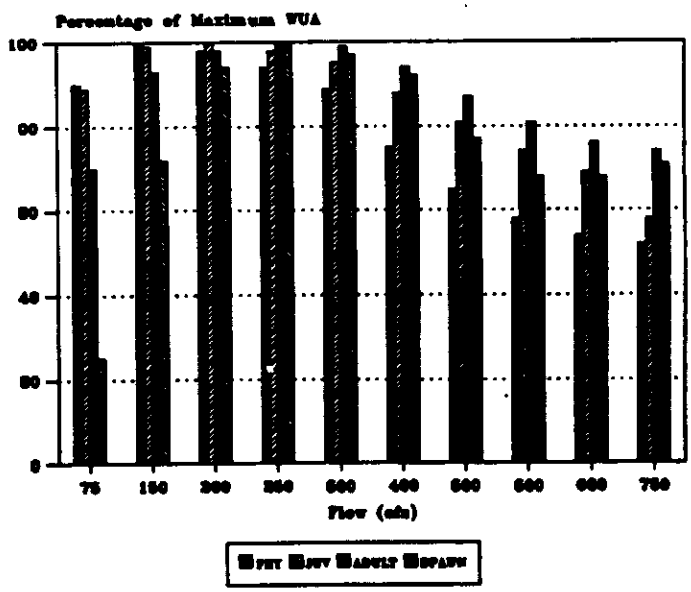

Figure 4-4. Percentage of maximum WUA at selected stream flows for fry, juvenile (JUV), adult, and spawning life stages of brown trout in the James River Gorham bypassed reach. Source: NAI (1991k).

We agree that Interior and Fish and Game's recommended minimum flow release scenario of 200 cfs and 400 cfs would optimize the available salmonid habitat in the James River Gorham bypassed reach for the various life stages modeled. A minimum flow of 200 cfs from June 16 to February 28 would provide significant increases in the available habitat for rainbow trout and brook trout fry, juveniles, and adults. A minimum flow of 400 cfs from March 1 to June 15 would provide optimum spawning a rearing habitat for rainbow trout. While James River states that their proposed 50 cfs minimum flow would wet the thalweg, provide circulation through the pools, and somewhat enhance the existing salmonid habitat, we find that 50 cfs is inadequate for fishery purposes. Specifically, James River's proposed 50 cfs would not provide appreciable or significant amounts of salmonid adult or spawning habitat. Therefore, we recommend that a minimum flow of 200 cfs from June 16 to February 28, and a minimum flow of 400 cfs from March 1 to June 15, be released to enhance salmonid fisheries habitat.

Public Service Gorham. Fish and Game, in its January 18, 1993 comments, and Interior, in its January 11, 1993 letter, disagree with Public Service's proposal for a minimum flow release of 50 cfs, plus leakage, into the 800-ft-long bypassed reach. Fish and Game and Interior recommend that the licensee provide a minimum flow release of 200 cfs in the bypassed reach for the enhancement of fisheries. Conservation Law, *et al.*, in their January 14, 1993 comments, recommend that a minimum flow release of 300 to 400 cfs should be discharged into the bypassed reach across the full length of the spillway.

Based on the IFIM results and analysis, a discharge of 200 to 250 cfs was the recommended flow for optimization of fisheries habitat for all life stages of the studied species. Fallfish juvenile habitat would be maximized and juvenile brook trout habitat would be within 5 percent of its maximum WUA. Other salmonid life stages would range from 86 to 88 percent of their maximum WUA (NAI, 1991h). A discharge of 200 cfs, as recommended by Fish and Game and Interior, would provide 88 percent of the maximum WUA for juvenile rainbow trout, 87 percent for adult rainbow trout, 96 percent for juvenile brook trout, 86 percent for adult brook trout, and 100 percent for juvenile fallfish (see Figure 4-5).

A flow of 300 cfs would further increase the availability of salmonid habitat, but decrease fallfish habitat. However, fallfish habitat was considered marginal at best and was limited at all of the studied flows. Additionally, juvenile brook trout habitat, the least abundant salmonid habitat, would be maximized.

Interior states that the bypassed reach with adequate flows would be a valuable reach for trout. The reach lies downstream of a 1.75 mile reach below the James River Gorham Project and flows directly into a 1 mile riverine reach before entering the Shelburne impoundment. Given the relative scarcity of free-flowing riverine reaches and the heavily industrialized Berlin area, Interior claims that these reaches, along with the Pulsifer Rips stretch, would encompass the only significant salmonid habitat in the highly impounded Berlin-Shelburne area.

Fish and Game has decided to manage this reach for self-sustaining populations of trout. Fish and Game's *Fishing for the Future* management plan places a high value on waters close to human population centers that provide self-sustaining trout populations. Restoration of the bypassed reach through increased flow allotments would be consistent with this plan.

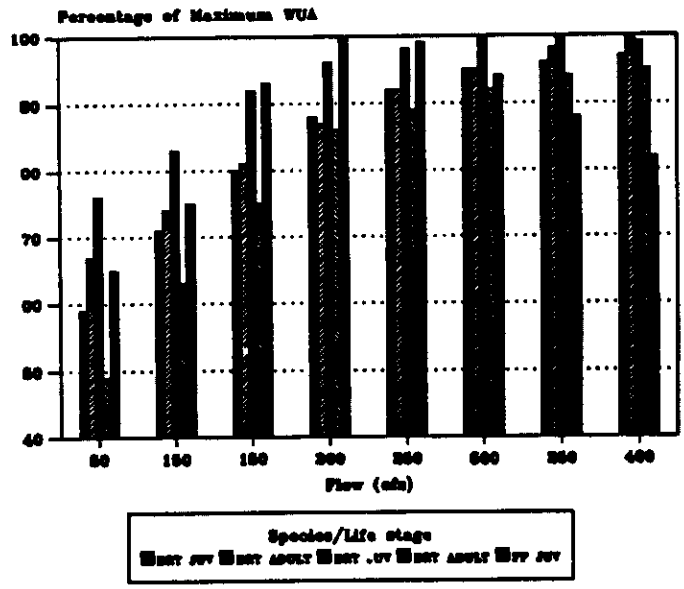

Figure 4-5. Percentage of maximum WUA at selected stream flows for juvenile (JUV) and adult life stages of selected fish species in the PSNH Gorham bypassed reach (RBT = rainbow trout; BRT = brown trout; FF = fall fish). Source: NAI (1991h).

For comparison purposes, application of the FWS's Aquatic Base Flow (ABF) policy would result in an ABF recommendation of 715 cfs, the estimated unregulated median August flow (U.S. Fish and Wildlife Service, 1981). Public Service's proposed minimum flow of 50 cfs is approximately 7 percent of the ABF flow. Interior and Fish and Game's recommended flow of 200 cfs is about 28 percent of the ABF. Conservation Law, *et al.*'s recommendation for a flow from 300 to 400 cfs would roughly approximate 50 percent of the ABF.

NAI (1991i) estimates that, based on Fish and Game stocking guidelines and a review of other New England trout streams, the Public Service Gorham bypassed reach could under optimal conditions support approximately 400 to 1000 catchable trout. NAI (1991i) further states, however, that due to likely unsuitably high water temperatures and the lack of suitable spawning habitat, the bypassed reach would probably have to be continnally stocked. Public Service estimates that a 200 cfs minimum flow would result in an annual generation loss of 740 MWH or an increased loss of 580 MWH compared to their proposal of 50 cfs.

We concur with Interior and Fish and Game's recommended minimum flow release of 200 cfs. We agree that providing this flow would enhance fisheries habitat for all life stages of the studied species.

Shelburne. Fish and Game, in their January 5, 1993 letter, recommends that the flow in the bypassed reach be quantified and a means provided for its continued release. Quantification of the leakage flow would enable the flow to be protected from future decreases in allocation. James River estimates the current leakage at less than 1 cfs. However, due to the small volume of water and the wide area over which it is dispersed, James River states that the flow cannot be accurately quantified.

We agree with Fish and Game. Quantification of the leakage flow, to the extent possible, would allow the flow to be protected against any future decreases in the amount and provide adequate protection to the aquatic resources in the bypassed reach.

4.2.3.2 Fish passage

For the further protection of fishery resources, Fish and Game recommends that, when deemed necessary by Fish and Game, licensees for Sawmill, Smith, Cross, James River Gorham, Public Service Gorham, and Shelburne should install, operate, and maintain downstream fish passage facilities. Interior requests that the Secretary of the Interior's authority to prescribe the construction, operation, and maintenance of upstream and downstream fishways under Section 18 of the Act be reserved. Section 18 of the Act provides the Secretary of Interior the authority to prescribe fishways.[5] Conservation Law, *et al.* recommend that any license issued for Smith, Public Service Gorham, James River Gorham, and Shelburne be conditioned with an article reserving the right to require upstream fish passage facilities at the request of the FWS or Fish and Game, or, for good cause shown, at the request of any interested party.

Currently, the Androscoggin River in New Hampshire does not support runs of anadromous fish. As such, Fish and Game and Interior have not requested fish screening or downstream fish bypass facilities at Sawmill, Smith, Cross, or Shelburne at this time. However, resident salmonids do move downstream through the projects (KA, 1988; NAI, 1991a). Therefore, it is possible that fishery management objectives could change or significant fish entrainment or impingement events could occur that might require additional fish screening or downstream bypass facilities in the future. We recognize that future fish passage needs and management objectives cannot always be predicted at the time of license issuance. Under these circumstances, and upon receiving a specific request from Interior, it is appropriate for the Commission to reserve Interior's authority to prescribe fishways.[6]

Conservation Law, *et al.*, in their September 14, 1992, and other, comments, recommend that the licensees construct project intakes that minimize fish entrainment. Conservation Law, *et al.* further recommend that these facilities be part of an overall plan for the development, operation, und maintenance of downstream fish passage facilities at James River's and Public Service's projects because the fishery is dependent on downstream fish movement.

As discussed in section 4.1.3.2 and below, we do not believe that providing downstream passage at this time is justified at Sawmill, Smith, Cross, or Shelburne. Passage of fish is not currently a management objective of either Fish and Game or Interior, as in the current case of fish passage at Cascade, James River Gorham, and Public Service Gorham. It is possible, however, that fishery management objectives could change that could require downstream bypass facilities in the future. Interior indicates that it is reserving authority, under §18 of the Act, to prescribe fishways should downstream bypass facilities become necessary in the future. We agree with Interior's reservation of authority to prescribe fishways. Further, we address the issue of an overall fish passage plan at the 7 projects as part of our project interaction and cumulative effects analysis in section 4.2.3.3. The following provides further project specific discussion.

Smith. As noted above, Conservation Law *et al.* recommend that Public Service design and construct a project intake to minimize turbine entrainment of fish.

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[5] Section 18 of the Federal Power Act provides: "The Commission shall require construction, maintenance, and operation by a licensee at its own expense ... such fishways as may be prescribed by the Secretary of Commerce or the Secretary of Interior as appropriate."

[6] Lynchburg Hydro Associates, 39 FERC ¶ 61,079 (1987).

Smith has trashracks with 3-inch clear spacing between the bars. Based on these spacings and on Lawler et al. (1991), we estimate that all but the very largest trout would be susceptible to entrainment through the project. We further estimate that, by decreasing the bar spacing to 1 inch, trout generally greater than about 9 inches would likely be protected from entrainment.

The only means downstream transitory salmonids currently have for moving through the project is the dam spillway, when flows are sufficient, and turbine passage at the powerhouse. We have recommended (see section 4.2.3.1), however, an enhanced zone-of-passage flow in the bypassed reach which will likely result in more effective downstream fish passage and increased numbers of salmonids below the project.

All fish species except for smallmouth bass (1 fish), white sucker, and longnose sucker, collected from the project impoundment had mean fish lengths less than 9 inches. No salmonids were collected from the impoundment. Additionally, as we have previously noted, the canal and intake velocities commonly occurring at Smith are within tha range of salmonid escape velocities and would also be a factor in any potential fish entrainment. Further, substrate studies in the bypassed reach indicate largely a ledge and boulder composition not conducive with general salmonid habitat requirements (NAI, 1991a). Therefore, we do not believe that providing downstream passage at this time is justified.

Cascade. Interior, in its letters of October 7, 1992 and October 13, 1992, prescribed the construction, operation, and maintenance of downstream fishways for Cascade. Interior states that the recommended downstream fish passage facilities for the proposed Pulsifer Rips development should be constructed and operational concurrent with tha construction and operation of the new powerhouse and should consist of the following:

- a fish guidance screen with clear spacing of 1 inch or less between screen bars, angled from the river current towards a bypass sluice;
- a bypass sluice designed to pass a flow of at least 52 cfs;
- discharge from the sluice to a plunge pool located at the base of the dam;
- facilities should be developed in consultation with, and meet the approval of, the FWS; and
- a plan for the operation and maintenance of the facilities.

Interior states that because of the proposed increase in the project's capacity and the associated reduction in spillage flows, entrainment of fish into the turbines would likely increase. After construction of the Pulsifer Rips development, the existing powerhouse would be operated at lower flowage levels and the new intake will pass the majority of normal river flows. Additionally, Interior states that since a significant amount of downstream movement of salmonids from upstream of Berlin has been identified by fish surveys, reducing the probability of entrainment would improve salmonid survival rates and, thus, provide a greater contribution to the salmonid fishery below the Cascade dam.

The only means downstream moving salmonids currently have for moving through the project is the dam spillway, when flows are sufficient, and turbine passage at the powerhouse. Increasing flows to the powerhouses (by increasing the proposed hydraulic capacity by 2,300 cfs) and decreasing the occurrence of periodic spillage (down from 20 percent to 6 percent) would likely result in increased fish entrainment rates as downstream moving fish would have less available options for bypassing the project turbines. We concur with Interior that providing safe and effective downstream fish passage would likely result in increased numbers of salmonids below the project.

Cascade is equipped with trashracks with a clear spacing of 2½ inches between the bars. The proposed trashrack clear spacing for the new Pulsifer Rips intake is also proposed to be 2½ inches. Based on these spacings and on Lawler et al. (1991), we estimate that all but the very largest trout would be susceptible to entrainment through the project. We further estimate that, by decreasing the bar spacing to Interior's recommended 1 inch, trout generally greater than about 9 inches would likely be protected from entrainment. Decreasing the bar spacing to 1.5 inches would only protect trout greater than about 14 inches. As we have previously noted in section 4.1.3.2, the estimated intake velocities commonly occurring and proposed at both intakes are within the range of salmonid escape velocities and would also be a factor in determining the likelihood of potential fish entrainment.

We agree that Interior's recommended trashrack and downstream fish bypass facility would provide increased protection to resident and transient salmonid resources in the project area and would contribute to minimizing entrainment and impingement related mortality and injury of Androscoggin River fish. We further estimate that installing Interior's recommended trashrack and fish bypass facilities at the new Pulsifer Rips intake would cost approximately $140,000. Because the Pulsifer Rips development consists of new construction, the incremental cost of providing Interior's recommended facilities is significantly less than it would be if the facilities had to be retrofitted (i.e., installed at an existing development or sometime in the future).

We have reviewed the fisheries surveys conducted above Cascade and agree with James River that, currently, fish entrainment and mortality is probably not significant. However, given the recent overall increase in the Androscoggin River's water quality, our recommendations for enhanced fish passage flows at Sawmill and Smith, the proposed increased flows to the powerhouses and the decreased occurrence of periodic spillage, and that the downstream movement of salmonids from upstream of Berlin has been identified by fish surveys, we believe that fish entrainment and mortality would likely increase in the future. Therefore, we conclude that, given this current low incremental cost, and the fact that fish populations are likely to increase in the future, it would be prudent to install Interior's recommended facilities at this time rather than at a later date.

We further recommend that James River be required to provide a sufficient plunge pool immediately downstream of the dam in the area where water is released over the spillway, and eliminate all potential abrasion points that could interfere with the safe and successful passage of fish downstream. James River should include Interior's recommended trashrack, downstream fish bypass facilities, and our recommended plunge pool in their downstream fish passage plan. The plan should be developed after consultation with Fish and Game and the FWS, and should include functional design drawings for the angled trashrack and fish bypass structure, a schedule for constructing, operating, and maintaining the angled trashrack and fish bypass structure, and designs and schedules for implementing any needed stream bed modifications immediately below the Cascade dam to ensure safe downstream fish passage. The plan should be filed with the Commission for approval.

<u>James River Gorham and Public Service Gorham</u>. At James River Gorham, Interior recommends that the licensee install and operate downstream fish passage facilities that include the following:

- a fish guidance screen with clear spacing of 1 inch or less between screen bars, angled towards;
- a bypass sluice designed to pass a flow of at least 56 cfs; and
- discharge from the sluice to a plunge pool located at the base of the dam.

At Public Service Gorham, Interior recommends that the licensee install and operate downstream fish passage facilities at this time. In both cases, Interior further recommends that the above facilities be

developed in consultation with the FWS and that a plan for the operation and maintenance of the facilities be developed.

The only means downstream moving salmonids currently have for moving through the projects are the dam spillways, when flows are sufficient, and turbine passage at the powerhouses. At James River Gorham, increasing the flows to the powerhouse (by increasing the proposed hydraulic capacity by 500 cfs) and decreasing the occurrence of periodic spillage (down from 32 percent to 18 percent) would likely result in increased fish entrainment rates as fish would have less available options for bypassing the project turbines. Given the significantly enhanced salmonid habitat in the Pulsifer Rips reach and our recommended minimum flows in the James River Gorham bypassed reach and the Public Service bypassed reach, we concur with Interior that providing safe and effective downstream fish passage would likely result in increased numbers of salmonids below the projects.

James River Gorham currently is equipped with trashracks with a clear spacing of 3 inches between the bars. Public Service Gorham has trashracks with 2-inch and 3½-inch clear spacing between the bars. Based on these spacings and on Lawler et al. (1991), we estimate that all but the very largest trout would be susceptible to entrainment through the project. We further estimate that, by decreasing the bar spacing to 1 inch, trout generally greater than about 9 inches would likely be protected from entrainment. Decreasing the bar spacing to 1.5 inches would protect trout greater than about 14 inches.

James River Gorham currently utilizes four horizontal Francis turbines with a net head of 29 feet. James River proposes to add one tube-type turbine. Public Service Gorham also utilizes four turbines: two vertical Francis and two vertical propeller. Average head is about 18 feet. Reviews of turbine mortality studies have shown that although tha mortality of salmonids passing through Francis turbines can be quite variable, it is frequently greater than that observed at most other turbine types (Stone and Webster Engineering Corporation, 1992). One recent study on rainbow trout at four projects in Michigan found mortality to averaged 26 percent for adults and 11 percent for juveniles (Lawler et al., 1991b).

As we have previously noted in section 4.1.3.2, the canal and intake velocities commonly occurring at both projects are within the range of salmonid escape velocities and would be a factor in potential fish entrainment. At James River Gorham, the current bar spacings and the proposed increase in the project's hydraulic capacity would probably influence the majority of salmonids desiring to move downstream to use the turbines for passage. We do not believe that intake velocities would be a significant factor. At Public Service Gorham, river flows exceed the project's hydraulic capacity about 62 percent of the time. Thus, depending on the time of year, downstream moving salmonids could have the opportunity for an alternative form of passage.

We agree that Interior's recommended trashrack and downstream fish bypass facilities would provide significantly increased protection to resident and transient salmonid resources in the project areas and would minimize entrainment and impingement related mortality and injury. Therefore, we recommend that the licensees should be required to develop, install, operate, and maintain the fish bypass facilities (see section 4.2.3.3).

We also recognize that fish entrainment has not been demonstrated to be a significant problem at either project. We believe, however, that our and Interior's, recommended fish passage facilities are warranted given several considerations. First, with the general increase in the area's water quality, it is recognized that the Androscoggin River in the Berlin-Shelburne area can now support a trout population. Second, salmonids do move downstream through the projects and with an increase in the hydraulic capacity of the James River Gorham project would be more susceptible to turbine passage. And third, with our recommended minimum flows for salmonid habitat in the remaining free-flowing sections of the river (both directly above and below both projects), trout populations would be likely to increase. Furthermore,

Interior's recommended fish bypass flows, 56 cfs in the case of James River Gorham, would be considered as a portion of any minimum flow that we may require below the project dams (see section 4.2.3.1).

We further recommend that the licensees be required to provide a sufficient plunge pool immediately downstream of the dam in the area where water is released over the spillway, and eliminate all potential abrasion points that could interfere with the safe and successful passage of fish downstream. James River should include Interior's recommended trashrack, downstream fish bypass facility, and our recommended plunge pool in their downstream fish passage plan. The plan should be developed after consultation with Fish and Game and the FWS, and should include functional design drawings for the angled trashrack and fish bypass structure, a schedule for constructing, operating, and maintaining the angled trashrack and fish bypass structure, and designs and schedules for implementing any needed stream bed modifications immediately below the James River Gorham dam to ensure additional safe downstream fish passage. The plan should be filed with the Commission for approval.

Public Service should include trashracks, downstream fish bypass facilities, and a plunge pool in their downstream fish passage plan. The plan should be developed after consultation with Fish and Game and the FWS, and should include functional design drawings for the angled trashrack and fish bypass structure, a schedule for constructing, operating, and maintaining the angled trashrack and fish bypass structure, and designs and schedules for implementing any needed stream bed modifications immediately below the Public Service Gorham dam to ensure additional safe downstream fish passage. The plan should be filed with the Commission for approval.

Shelburne. Conservation Law, *et al.* recommend that James River design and construct a project intake, with a trashrack spacing of 1 inch or less, to minimize turbine entrainment of fish. Interior and Fish and Game do not request downstream fish passage at this time. Currently, the only means downstream moving salmonids have for moving through the project is the dam spillway, when flows are sufficient, and turbine passage at the powerhouse.

Shelburne has trashracks with 3-inch clear spacing between the bars. Based on these spacings and on Lawler et al. (1991), we estimate that all but the very largest trout would be susceptible to entrainment through the project. We estimate that, by decreasing the bar spacing to 1 inch, trout generally greater than about 9 inches would likely be protected from entrainment.

As we have previously noted in section 4.1.3.2, the canal and intake velocities commonly occurring at Shelburne are within the range of salmonid escape velocities and would be a factor in potential fish entrainment. Further, we have estimated that to install 1-inch trashracks at the project would cost approximately $660,000. Given the significant fishery enhancements recommended upstream, the lack of a demonstrated need, and the agencies satisfaction with the existing situation, we are reluctant to recommend costly facilities at this time. Interior wishes to reserve its authority to prescribe fish passage facilities at a later date. Therefore, as noted above, we do not believe that providing downstream fish passage is justified at this time.

4.2.3.3 Project interaction and cumulative effects

Our recommendation to provide downstream fish passage at Pulsifer Rips, James River Gorham, and Public Service Gorham, would afford protection to all fishery resources within the contiguous Cascade - Shelburne area. While fisheries do not currently exist within certain portions of this reach, we believe that given our recommendations for significantly enhanced minimum fishery flows, fisheries will likely develop. We further believe that fish within this area should be protected from possible entrainment and turbine-induced mortality.

Resident salmonids, whether they are transients from above Berlin or fish newly established in the enhanced reaches, could be cumulatively affected by operation of the projects. Fish entrainment has not been demonstrated to be a significant problem at the projects. Entrainment studies, however, were not conducted, and we do not, at this time, recommend that they be conducted. We believe that the current low entrainment rates believed to be occurring at the projects are more indicative of the overall lack of adequate quality fishery habitat, and fish, than the low entrainment potential of the projects due to their individual project configuration. Thus, given few fish, entrainment rates would be expected to be low. If, however, fish moving downstream through the projects had to pass each project powerhouse, the cumulative impact on total fish mortality, and total numbers, could be significant. Entrainment and mortality could be increased given the proposed increase in capacity for Cascade and James River Gorham.

We do concur that downstream fish passage facilities at Pulsifer Rips will enhance fish protection and passage at the Cascade project. Starting with the Pulsifer Rips reach, we have recommended enhanced minimum flows and downstream fish bypasses to provide a contiguous reach for the protection and establishment of a resident salmonid population. Purposely, we have not recommended downstream fish passage facilities or significant enhancements at Sawmill, Smith, Cross, or Shelburne. We believe that our recommendations are consistent with Interior's recommendations and Fish and Game's *Fishing for the Future* management plan which places a high value on waters close to human population centers that provide self-sustaining trout populations. Restoration of the bypassed reach through increased flow allotments would be consistent with this plan. Additionally, with our recommended downstream fish passage, we estimate that entrainment and mortality impacts within this reach would be minimized to the extent possible.

We further conclude that our recommended measures would not affect the existing dioxin levels found in fish below the project area. Run-of-river operation and constant headpond levels would minimize any fluctuation of water levels. Requirements for developing adequate sediment and erosion plans prior to any disturbances would further protect water quality and fisheries. Thus, any resuspension of sediments due to project operations would be minimized as much as possible.

Overall, our recommendations to protect and enhance the resident salmonid populations in the Androscoggin River include: (1) operation of all seven Androscoggin River projects in run-of-river modes, (2) maintenance of zone-of-passage minimum flow releases in the Sawmill and Shelburne bypassed reaches, (3) increasing the minimum flow release for an enhanced salmonid year-round zone-of-passage in the Smith bypassed reach, (4) establishment of an interim minimum flow release for salmonid habitat in the Cascade upper bypassed reach, (5) establishing an optimum salmonid habitat flow of 400 cfs in the 7,400 ft-long Pulsifer Rips bypassed reach, (6) providing optimum salmonid habitat flows of 200 cfs and 400 cfs in the 4,500 ft-long James River Gorham bypassed reach for rainbow trout and brook trout fry, juvenile, and adults, (7) providing a minimum flow of 200 cfs in the 800 ft-long Public Service Gorham bypassed reach for significantly enhanced juvenile brook trout and rainbow trout habitat, and (8) providing downstream fish bypass facilities at Cascade, James River Gorham, and Public Service Gorham. All of our recommended measures would contribute to protecting, significantly enhancing, and mitigating for any cumulative adverse impacts that might occur to the Androscoggin River basin's resident salmonid population from the continued operation of the projects. In fact, any cumulative impacts would be significantly beneficial.

As previously discussed, the Berlin - Gorham area is a highly industrialized area. As such, fishery resources have been historically neglected and degraded due to inadequate flows, wastewater discharges, and loss of historical habitat. Most of the riverine habitat within the reach has long been replaced by impoundments. Thus, at Sawmill, Smith, Riverside, and Cross, we agree with Interior (e.g., see Interior's letter of August 12, 1992) that there exists limited opportunities for fishery enhancements. However, we note that Environmental Services has recently upgraded the water quality classification for this reach from Class C to Class B. Our recommendations to operate the projects as run-of-river and stabilize headpond operational

levels would contribute to protecting and enhancing the basin's resident salmonids. Any adverse cumulative effects from these projects would be minimized and overall new cumulative impacts would be beneficial.

Interior states that the reach encompassing Cascade, James River Gorham, Public Service Gorham, and Shelburne offer significant riverine resource values in the way of trout. Given the lack of these resources and opportunities in the upper Berlin - Gorham reach, Interior states that these remaining enhancement opportunities are even more valuable. And as such, greater values and consideration should be assessed to the downstream areas in our recommendations of enhancement and mitigation measures.

We agree. Our above recommended measures do consider and influence the values we placed on the downstream projects. Establishment and maintenance of adequate zone-of-passage flows at Sawmill and Smith, the provision for fish passage and optimum salmonid flows at Cascade, James River Gorham, and Public Service Gorham would provide considerable and significant enhancements within the downstream reach. All existing and remaining riverine reaches within the downstream area would be significantly enhanced. Therefore, we believe that any cumulative effects on resident salmonids would be beneficial.

4.2.4 Wetlands at Shelburne

Less than 5 acres of wetlands would likely be lost by raising the Shelburne reservoir 1.7 feet. We agree with Interior's recommendation that James River undertake measures to eliminate or minimize adverse impacts or mitigate unavoidable losses to wetlands (letter dated January 14, 1993). As noted above in section 4.1.4.1, higher water level elevations could result in more or less wetlands at the project than we predict. James River's proposed monitoring would verify the effect of higher water levels. At the same time, James River provides a monitoring plan they should provide a plan to eliminate, minimize, or mitigate for any loss in wetland habitat value. Implementation of this recommendation would eliminate any contribution by the projects to cumulative wetland losses.

4.2.5 Aesthetics

Sawmill. Because the project site downstream of the dam is very industrial, we see no reason to require any flow for aesthetics. However, during our November 17, site visit, we noted a significant amount of trash and debris in areas near the dam. This could be visually intrusive to the public depending on the exact location of the proposed viewing areas. Therefore, James River should consult with Berlin, Fish and Game, and the NPS to identify specific areas that the public would see once the proposed viewing sites are in place. Measures for improving site aesthetics should be included in the final plan for the two Heritage Trail viewing areas.

J. Brodie Smith. Because of the hazards associated with access to the bypassed reach discussed above, we do not recommend any specific aesthetics flow releases. Public Service's proposed 10 cfs minimum bypass flow would be an enhancement, but for aesthetics, it would not be significant. Interior's recommended 20 cfs bypass flow for fisheries resources would also enhance aesthetics, but again, because of access constraints, and channel morphology (see section 4.1.5), this enhancement would not be significant.

We do recommend that the next time Public Service paints the surge tank and penstock, Public Service should choose a color that blends with the surrounding environment. Public Service should also, as a long term measure, landscape to screen the view of the surge tank from Route 16. If granted a new license, Public Service should, after consulting with Berlin, Parks and Recreation, and the NPS file a plan for implementing these aesthetics enhancements.

Cross Power. Based on our November 17, 1992, site visit, we recommend that James River file a plan for improving the appearance of the powerhouse and gatehouse buildings and grounds. Although they

may be perfectly operational, these facilities currently have the appearance of being in disrepair and in need of maintenance.

Cascade. If granted a license for the Pulsifer Rips development, James River should, after consulting with the Town of Gorham, Parks and Recreation, and the NPS, file a landscaping and revegetation plan that includes the measures described in Section 4.1.5. We don't agree that James River should be required to provide landscaping for individual properties in the Cascade Flats neighborhood. The measures discussed in Section 4.1.5 are meant to screen the view of the new facilities from the Cascade Flats side of the river. Landscaping at Cascade Flats for the same purpose would be redundant.

James River Gorham. The minimum flow of 200/400 cfs recommended for fish (see section 4.2.3.1, above) would be a significant aesthetics enhancement over the existing leakage condition. Of the flows that we have observed on videotape, a flow of 400 cfs would be optimal. This flow most closely approximates a bank-full appearance. At 400 cfs, water completely covers the existing causeway. A 200 cfs flow would also be a significant aesthetic enhancement. At 200 cfs, more boulders are exposed, but the causeway is nearly completely covered. No flow, however, would be justified for the bypassed reach strictly on aesthetics. There are no unique cascade or falls features within this reach, and no recommendations specific to aesthetics flows have been made. Further, there is no evidence that this reach would be a destination that would attract any significant public use based on aesthetics alone.

As with the Cross project, based on our November 17, 1992, site visit, we recommend that James River file a plan for improving the appearance of the powerhouse and gatehouse buildings and grounds at its Gorham project. Although they may be perfectly operational, these facilities currently have the appearance of being in disrepair and in need of maintenance.

Public Service Gorham. We have seen videotapes of the bypassed reach at flows of leakage, 50 cfs, 100 cfs, 150 cfs, and 200 cfs. The agency-recommended flow of 200 cfs would be a significant aesthetic enhancement over the current leakage condition. The Conservation Law, *et al.*'s recommended 300 to 400 cfs flow would also be a significant enhancement over the current condition. However, flow releases strictly for aesthetics would not be justified at this project. There are no unusual cascade or waterfall features in the bypassed reach, and no evidence has been provided that the bypassed reach would attract any significant public use, strictly on its aesthetic merit.

Cumulative effects. Aesthetic resources at individual projects, would be enhanced. Consequently, cumulative beneficial effects would result.

4.2.6 Cultural resource protection

Section 106 of the National Historic Preservation Act requires that the Commission and the National Council on Historic Preservation (the Council) be party to preservation of eligible project properties as well as mitigation of project effects to properties listed and eligible for listing on the National Register of Historic Places.

According to James River's proposed MOAs for the Cross Power, Gorham, and Shelburne Projects, neither the Commission nor the Council would be a parties to the MOAs. The Commission and the Council would need to enact any such agreements with the SHPO to fulfill the Commission's §106 responsibilities and to ensure enforcement of the terms of the agreements in any project licenses.

We also believe that the Commission and the Council should be parties with the SHPO and James River in preparing and enacting similar agreements for (1) the archaeological recovery at the Cascade Project; (2) unit 1 and the existing historic project and non-project properties at Cascade; and

(3) preservation of the log boom anchor cribs at the Sawmill Project. The Register eligibility characteristics of the log boom anchor cribs in the Sawmill impoundment need to be preserved. In addition, at Cascade, the effects of modifying unit 1 need to be mitigated, and existing historic project and non-project properties (dam, powerhouse, mill buildings, etc.) should be protected or preserved. However, James River hasn't proposed any measures concerning the anchor cribs at Sawmill or for the historic (*i.e.* non-archaeological) properties at Cascade. In addition, under James River's proposal, the Council would approve the archaeological Data Recovery Program, but the Commission wouldn't be a party to the program's preparation or enactment.

Implementation of our recommendations would result in moderate, long-term beneficial effects on the historic aspects of the anchor cribs at Sawmill and the existing historic project and non-project properties (dam, powerhouse, mill buildings, etc.), and would reduce the potential adverse effect of modifying Cascade's unit 1 to minor, long-term.

The SHPO notes that although project relicensing won't affect the ruins on the International Paper Company site, the ruins may be considered significant in representing part of the commercial-industrial development that has defined Berlin's character for over a century (letter to James Kearns from Nancy C. Muller, Director and State Historic Preservation Officer, New Hampshire Division of Historical Resources, Concord, New Hampshire, September 3, 1992). Therefore, the SHPO recommends Public Service be required to consult with the SHPO under the regulations of the Council whenever Public Service initiates any plans that might alter these ruins. We agree. Although James River's and Public Service's proposals and our recommendation, so far, account for all anticipated effects the proposed relicensing actions would have on known archaeological and historic resources, there remain two project-related possibilities that could affect significant archaeological and historical resources. First, there could be undiscovered properties in the project areas that could be adversely affected by unforeseen ground disturbing activities or by project operation. Second, future project actions could affect known resources that weren't threatened by the proposed relicensing actions. Therefore, before engaging in any ground disturbance that we have not considered before licensing, or if properties are found during project operation, the licensee of the particular project, James River or Public Service, should take the following actions: (1) consult with the SHPO; (2) based on consultations with the SHPO, prepare a plan describing the appropriate course of action and a schedule for carrying it out; (3) file the plan for Commission approval; and (4) take the necessary steps to protect the properties until notified by the Commission that all of these requirements have been satisfied.

Cumulative effects. Cultural resources at individnal projects, would be enhanced. Consequently, cumulative beneficial effects would result.

4.2.7 Recreation

Sawmill. Berlin states, in a February 13, 1992, letter, that there is good potential for expanding recreational access to the 8,500 feet of impoundment area north of the project, They expect increased use of the boat launch at Centennial Park due to anticipated increased interest in the river between there and the Milan town line. Berlin, however, makes no specific recommendation for enhancing public access.

We agree that James River should cooperate with Berlin in implementing its Heritage Trail plan. James River's hydroelectric projects and paper mills are a significant part of Berlin's history. James River should consult with Berlin, Parks and Recreation, and the NPS, and file a final plan for the viewing areas that includes drawings and specifications for the parking areas and interpretive signs, and a discussion of who would operate and maintain the areas. To comply with the Americans With Disabilities Act (ADA), the plan should also include provisions for the disabled.

We also agree that current access facilities at the impoundment are adequate due to the presence of Centennial Park and Rotary Park. However, based on our site visit on November 17, 1992, Centennial Park could be improved. The existing boat launch needs grading and resurfacing with gravel or some other appropriate surface. At a minimum, James River should consult with Berlin and file a plan for improving and maintaining the existing boat launch at Centennial Park.

J. Brodie Smith. The AWA, in a December 3, 1992, letter, states that because of water quality conditions, access impairments, and debris, the bypassed reach is not a desirable, cost-justifiable, whitewater resource. The NPS also has this view and in its November 2, 1992, letter, adds that it is unlikely that a significant number of people would use the bypassed reach due to the access problems, and that it would be dangerous to encourage access.

We viewed the bypassed reach first-hand on November 18, 1992. While the reach contains some impressive cascade areas, it would not be in the public's interest to encourage its use. We agree with the NPS and the AWA assessments. The presence of unstable mill ruins in the river channel and on the banks, some of which are underground, would make accessing the bypassed reach hazardous, both for whitewater boating and for sightseeing. Because of the reach's morphology, the presence of exposed re-bar and edgy concrete ruins, it would likely take a significant amount of flow to make whitewater boating feasible. It is unlikely that the reach, because of its short length, would attract enough use to justify the cost of releasing such flows.

Regarding the undeveloped area between the penstock and the bypassed channel. We agree that the area has potential for recreation. We recommend that this land be incorporated within the project boundary as proposed by Public Service, and reserved for future public use if and when Berlin develops a specific proposal for the site. We do not recommend the development of any formal facilities there at this time. Unless properly planned, unsupervised recreational activity in this area could easily result in people uring the adjacent area where hazardous mill ruins exist.

Cross Power. In its June 5, 1992, letter, Fish and Game requests that James River permit reasonable public access to the impoundment and tailwaters.

Based on James River's survey, the industrial/commercial nature of the site, and the lack of public interest in recreation at the project, there appears to be little current demand for recreation enhancements. It would be reasonable, however, to at least allow the public to access project waters on the east side of the river. If a license is issued, James River should, after consulting with Parks and Recreation, and the NPS, file a plan for installing signs showing where public access is permitted. We agree that no formal recreational facilities are needed.

Cascade. The Conservation Law, *et al.*, in their September 14, 1992, intervention, state that the proposed Pulsifer Rips development would further reduce the potential of the river for recreation by reducing flow in about a mile of Class I whitewater from over 1,500 cfs to 400 cfs. The Conservation Law, *et al.*, recommend that James River prepare a comprehensive recreation plan for the Androscoggin River Basin, identifying potential areas for recreation enhancements to meet current and future demand in tha region. The Conservation Law, *et al.*, request new recreational facilities and enhancements as "off-site mitigation to fully compensate the public for loss of recreational opportunities" within the boundaries of James River's six projects.

While we agree with James River that some project structures should be fenced or gated for safety reasons, it would be reasonable to permit the public to access the area around the Pulsifer Rips development, including the tailrace area. James River notes in their application that the wooded area along Pulsifer Rips is regularly used by large mammals such as white-tailed deer, black bear and moose. Thus, this

area would be attractive for viewing wildlife and hiking. With access, fishing would be possible from the east bank, and in the tailrace area which is often the most popular angling spot at a hydroelectric project. Therefore, if James River receives a license for the Pulsifer Rips development, they should, after consulting with the Town of Gorham, Parks and Recreation, and the NPS, file a plan for providing public access to the west side of the river between the new penstock intake and the tailrace. The plan should include, at a minimum, a hiking trail from the access road to the river, a small pull-over parking area, and an area at the tailrace for fishing.

As discussed above and in Sections 2.1.2 and 4.1.7, there are opportunities for on-site recreation mitigation and enhancement at the Cascade project. Therefore, requiring off-site enhancement measures as requested by the Conservation Law, *et al.* would not be necessary. Requiring off-site mitigation for loss of recreational opportunities within the boundaries of James River's six projects is also not necessary. We interpret the Conservation Law, *et al.*'s request as referring to the loss of recreation opportunities that occurred when these projects were originally built. We, however, consider the existing conditions as the baseline for a project relicense.

James River Gorham. Interior, in its January 11, 1993, letter, recommends a minimum bypass flow for fisheries of 200 cfs from June 1 through February and 400 cfs from March 1 to June 15. Interior notes that the bypassed reach is very accessible to the public as it runs adjacent to Route 16. They expect that with the above flow, the reach would support trout and would provide an easily accessible public fishing opportunity. Interior believes there is potential for substantial public use of this resource. Interior states that since the existing parking area is designed for hikers, increased fishing use may create a need for additional access measures.

Fish and Game, in its January 19, 1993, letter, makes a similar minimum bypass flow and access recommendation. Fish and Game also recommends that James River be required to install signs at the existing public parking lot to inform the public of the availability of access and other resources.

The Conservation Law, *et al.* recommend the same bypass flows as Interior and Fish and Game in their January 15, 1993, letter, and request that James River be required to allow the public free access to project waters and adjacent project lands for navigation and outdoor recreation. Further, they recommend that James River be required to provide formal public access and parking for recreational use of the project. They also recommend that James River prepare a comprehensive recreation plan to identify potential areas and various public recreation enhancements in the basin designed to meet present and future demand for river recreation in the region. If James River declines to provide enhanced recreation opportunities at the Gorham project, Conservation Law, *et al.* want the Commission to require James River to provide recreational enhancements elsewhere in the basin.

Increased bypass flows to support a trout fishery, if successful, would likely result in increased demand for access to this reach. We agree with Interior that the current parking area may not be large enough to meet this expected future demand. Posting public access signs at this site now, as recommended by Fish and Game, would also likely increase public use. Local residents may be aware that this area is open, but tourists using the adjacent highway probably drive by without noticing the site. Those driving by also probably don't notice that it is possible to pull off of Route 16 and access the bypassed reach just upstream of the existing parking area. This pull-off leads to what is known as the causeway; a cobble river crossing point. At the recommended 200 cfs summertime flow, it appears, based on a videotape supplied by James River and its IFIM study, that canoeing would be possible downstream of the causeway. At the 200 cfs flow, about 76 percent of the bypassed reach would be 1 to 4 feet deep (NAI, 1988). From this point, it would be possible to canoe down to the lower Gorham impoundment, and, if Public Service provided a canoe portage there, one could float down to the Shelburne impoundment where informal access points already exist.

James River should monitor the existing access area and expand it if use begins to exceed capacity. If a new license is issued, James River should, after consulting with Fish and Game, the NPS, and the Appalachian Mountain Club, prepare a recreation plan that formally designates this site as open to the public. They should also mark the causeway entrance as a public access point.

There is no evidence that the public, at present, desires any more recreational development at this project. There is open access to project waters and adjacent lands via the existing parking area, footbridge, and causeway. Additional facilities could be developed on-site if future demand warrants. Therefore, off-site enhancements and a basin-wide recreation plan as suggested by Conservation Law, *et al.* would not be necessary.

Public Service Gorham. Interior, in its January 11, 1993, letter, and Fish and Game, in its January 19, 1993, letter recommend a minimum bypass flow of 200 cfs year round. Interior expects that with this flow, the reach would support trout and would provide an easily accessible fishing opportunity since it is close to the Berlin/Gorham population center.

The Conservation Law, *et al.*, in their January 15, 1993, letter, request a minimum bypass flow of 300 to 400 cfs, and recommend that Public Service be required to allow the public free access to project waters und adjacent project lands for navigation and outdoor recreation. They recommend that Public Service prepare a comprehensive recreation plan to identify potential areas and various public recreation enhancements in the basin designed to meet present and future demand for river recreation in the region. At the Gorham project site, Conservation Law, *et al.* request that Public Service be required to provide formal access and parking for recreational use of the project on both the north and south sides of the river, plus a canoe portage around the dam on the southern shore. Conservation Law, *et al.* also feel that Public Service should provide new recreation facilities and enhancements elsewhere in the basin as off-site mitigation to fully compensate the public for loss of recreational opportunities within the boundaries of its two projects.

Increasing minimum flows to enhance fisheries in the Gorham bypass, if successful, would enhance angling opportunities. Access to project waters, although informal at present, is quite good. The entire north side of the project is open to the public via the Hogan Road. The popular fishing area below the powerhouse on the south side of the river is also accessible. Placing signs at entrance points and existing parking areas would enhance public awareness of these areas. Therefore, Public Service should prepare a plan, in consultation with Fish and Game, the NPS, and any applicable current landowners, for adding informational signage not only at the existing parking area as planned, but also at the Route 2 entry point and along Hogan Road at points that are currently being used to informally access project waters. Public Service's proposed future canoe portage should be included in the above plan. This facility would provide additional public access to the south side of the impoundment and would provide good public access for those wishing to float down to the Shelburne impoundment. Since there are opportunities for on-site enhancements, requiring off-site measures or a basin-wide recreation plan as requested by the Conservation Law, *et al.* would not be necessary.

Shelburne. Fish and Game, in its January 5, 1993, letter, requests that James River maintain the existing access ways to the river below the dam and to the impoundment (including Hogan Road) and install public use signage.

The Conservation Law, *et al.*, in their January 15, 1993, letter, state that James River should compensate for the impacts of its upper projects by providing additional recreation enhancements at the Shelburne project. They recommend that James River prepare a comprehensive recreation plan to identify potential areas and various public recreation enhancements in the basin designed to meet present and future demand for river recreation in the region. At the Shelburne project site, Conservation Law, *et al.* request

that James River be required to provide formal public access and parking for recreational use of the Shelburne reservoir. Conservation Law, *et al.* also feel that James River should provide new recreation facilities and enhancements elsewhere in the basin as off-site mitigation to fully compensate the public for loss of recreational opportunities within the boundaries of its projects.

Installing signs to formalize existing public access sites on the impoundment and below the dam would enhance public awareness of these opportunities. The chief beneficiaries would be tourists visiting the area or traveling through to other destinations. James River should, after consulting with Fish and Game, the NPS, and the Town of Gorham, prepare a plan for installing signs at these areas. The plan should include means for directing the public from Route 2 to project recreation access sites.

Requiring off-site mitigation, or a basin-wide recreation plan as requested by the Conservation Law, *et al* would not be necessary. As discussed in section 3.2.7.4, the Shelburne project offers a more back country type of recreational experience relative to the other projects and public access is presently adequate. The state park that adjoins the Shelburne reservoir, satisfies a substantial portion of public recreational needs at the project. If additional future needs develop, there are opportunities for providing additional formal facilities on-site. Conservation Law, *et al.*'s request for a basin-wide plan to compensate for loss of recreational opportunities at James River's project implies a baseline of pre-project recreation opportunities. The Commission's definition of the baseline for project relicenses is the existing environment.

Shoreland protection buffer zone.

By letter dated September 14, 1992, the Conservation Law, *et al.* recommend that James River establish a shoreland buffer at Cascade that would include all lands within 4,000 feet of the east shoreline and all lands currently undeveloped between Route 16 and the west shoreline between the Cross and James River Gorham projects. The Conservation Law, *et al.* state that this buffer zone should be retained as open space in perpetuity. The purpose of the buffer zone would be to prevent degradation of the scenic value of the shoreland, protect water quality, and guarantee future public access. The Conservation Law, *et al.* further state that no subdivision or development of the buffer zone should be allowed unless it is specifically related to the provision of public access and recreation pursuant to a formal recreation plan approved by the Commission.

To further support their recommendation, the Conservation Law, *et al.* cite the Commission's regulations at 18 CFR §2.7[7]. The Conservation Law, *et al.* further state that the Commission "has clearly determined that there is a need for licensees to acquire permanent shoreline buffer zones", citing 12 FERC ¶ 61,060[8].

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[7] Section 2.7 states, in part, that the Commission "expects licensees to acquire in fee and include within the project boundary enough land to assure optimum development of the recreational resources afforded by the project. To the extent consistent with the other objectives of the project, such lands to be acquired in fee for recreational purposes shall include the lands adjacent to the exterior margin of any project reservoir plus all other project lands specified in an approved recreational use plan for the project".

[8] In 1980, the Commission affirmed a previous decision to deny an Alabama Power Company (APC) application for an amendment to a license which included an article that required them to purchase a 50 foot buffer around the unconstricted R.L. Harris Project. APC had requested that the article be amended to only require the buffer to include land that they already owned. APC had also requested that they not be required to acquire or place within the project boundary any shore lands that would be subject to adequate local zoning rules and regulations. The Commission denied APC's requests (specifically rejecting the alternative of local zoning), but did permit the alternative of a properly conditioned easement.

The Conservation Law, *et al.*, by letter dated January 15, 1993, recommend that the applicants be required to purchase and place within the project boundaries the following land for the purpose of shoreland protection: .

(1) At James River Gorham, a buffer that would include the island bounded by the existing power canal and bypassed reach, and all lands "on the eastern shore extending to the crest of the adjacent lands, extending from the boundaries of the Cascade Project (FERC No. 2327) to the Public Service Gorham Project (FERC No. 2288)". Conservation Law, *et al.* want to protect the scenic value of the eastern shoreline from development and subdivision, protect water quality, ensure public access to project waters, and protect forest habitat.

(2) At Public Service Gorham, a buffer that would include: (a) the islands; (b) all lands on the northern shore extending to the crest of the adjacent lands, and (c) shore lands on the southern boundary between the river and the public golf course. The shoreland protection zone would extend from the boundaries of the upper Gorham project to the boundaries of the Shelburne project.

(3) At Shelburne, a buffer would include all lands north of the shore extending to the Lead Mine State Forest and all lands between Route 2 and the south shore. The buffer would extend from the boundaries of the lower Gorham project to the downstream limits of the Shelburne project.

The Conservation Law et al., by letter dated March 15, 1993, recommend that for the purposes of shoreland protection at the J. Brodie Smith, the applicant should include all undeveloped land between the bypassed reach and the project penstock.

James River, in their October 30, 1992, letter, estimates that 1,344 acres of land would have to be acquired for a Cascade shoreline protective buffer zone. For the two Gorham projects, it is difficult to determine exactly the amount of land that would be involved; however, we estimate that the top of the ridge (or crest) that parallels the river is about 2,000 feet from the east bank. This means that the buffer zone for James River Gorham would include about 488 acres, and Public Service Gorham about 312 acres. At Shelburne and J. Brodie Smith Projects, the buffer zone would include about 225 acres, and less than 50 acres, respectively.

In determining the appropriate amount of land necessary for project operations, we must also weigh the factors that make land purchase unneeded or uneconomical for a particular project (Federal Register, Vol. 46, No. 219, November 13, 1981, Page 55930). We have considered these factors and have concluded that a buffer zone is needed, but on a smaller scale.

Providing the Conservation Law, *et al.*'s recommended buffer zones at these projects would help ensure that areas around the projects would remain undeveloped over the term of a new license. Not developing this land would protect the aesthetics of project shore lands particularly the eastern shore lands where the lack of development tends to offset the highly developed western side. The Conservation Law, *et al.* buffer zones would also ensure that a large area on the eastern side of the river is accessible to the public over the term of a new license.

To protect these resources, however, we believe that the buffer zone would not need to be as sizable as that recommended by the Conservation Law, *et al.* The most practical and cost-effective way to establish buffer zone protection is to develop criteria for selecting shoreland that is needed for protection, not to indiscriminately purchase large parcels of land adjacent to the project. The amount and location of land for a protective buffer zone should be determined on a site-specific basis using specific criteria and objectives. For this reason, no standard size for a buffer zone has been established by the Commission, however, 200

feet has been used as a rule-of-thumb[9]. Project boundaries for major projects, particularly on the east coast, typically do not extend beyond 200 feet from the impoundment's normal maximum surface elevation (see 18 CFR, §4.51(g)(2)(B)).

Further, no information has been presented that indicates that the project shorelines, especially on the eastern and northern sides, are currently targets for either commercial or private development. We recognize that this could, however, change over the term of new licenses since shore lands are typically attractive home sites. Therefore, we recommend that James River and Public Service, if granted new licenses, consult with the Towns of Gorham and Shelburne, Parks and Recreation, and the NPS, and file a plan for Commission approval to protect the aesthetics and public access of the shore lands within 200 feet of the Cascade, Gorham, and Shelburne impoundments' and bypassed reaches' normal maximum surface elevations, and, at the J. Brodie Smith Project. to protect the aesthetics and public access of all undeveloped land between the bypassed reach and the project penstock. The plan should include maps delineating the shoreland protective buffer zone area, the cost and method of acquiring (fee or less-than-fee) or other wise protecting the various land parcels that comprise the buffer, and the criteria used for selecting the buffer zone widths. Also the plan should include, but not be limited to, provisions for: (1) maintaining prescribed minimum-width, no tree-cutting, buffer zones around the project impoundments, public roads, and private property; (2) carefully planning any timber clearing activities adjacent to the buffer zones, including giving special consideration to the scale and pattern of any areas where cutting is performed; (3) minimizing openings in shoreline vegetation where future recreational facility development requires construction closer to the shoreline than the prescribed minimum-width buffer zone; (4) maintening the project transmission line in a way that minimizes adverse aesthetic effects caused by the clearing of vegetation; (5) storage buildings, parking areas, and other adverse visual features that are visible from the shoreline, impoundment, or other adjacent critical viewpoints to be screened or softened by supplemental landscape plantings. This screening work should be implemented on a as-needed basis. Further, the licensees should conduct a periodic inspection of project lands to identify any features in need of screening or general clean-up, and subsequently take remedial action.

The cost of providing the Conservation Law, et al. recommended buffer zone would be very expensive. We made conservative estimates for the cost of acquiring such land; however, due to the unknown variables involved in estimating the cost of fee and less-than-fee land acquisition (i.e., easements), these estimates are speculative at best.

The value of woodlands in this region can range anywhere from about $300.00 per acre to $1,000.00 per acre, depending on proximity to the river, how long ago the timber was cut, the value of the tree species, and the accessibility of the land for tree removal (personal communication, Robert L. Stickney, Energy Manager, Boise Cascade Corporation, Rumford, Maine, February 12, 1992). Because the lands involved in the Conservation Law, *et al.* buffer zone's are predominantly mature birch, some of which are very close to the river and have good access, we estimate a $700 per acre value. Assuming a cost of $700 per acre, the Conservation Law, *et al.* buffer zone's would cost: at Cascade, $940,800; at James River Gorham, $341,600; at Public Service Gorham, $218,400; and at Shelburne, $157,500. The cost for the five projects would total $1,658,300.

The cost of providing the staff recommended buffer zone would likely be inconsequential. First, significantly less land would need to included in the boundaries than that recommended by Conservation Law

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9 The idea of a 200 foot buffer zone protection was established by Commission Order 313, pursuant to the Commission's responsibilities under section 10(a) of the Federal Power Act and the policy on outdoor recreation found in the Outdoor Recreation Programs Act of 1963 (Federal Register, Vol. 46, No. 219, November 13, 1981, Page 55930).

et al. Second, all of the land would not need to be purchased outright; instead, easements and rights-of-way agreements could be executed. Third, we are aware that the James River Paper Company, an affiliate of James River applicant, may own a substantial portion of the shoreline abutting James River projects. We anticipate, therefore, that a land management agreement could be developed between the affiliated companies in lieu of land acquisition. Fourth, some portions of the shoreline are already protected by existing zoning regulations, such as the regulations enforced by the Town of Shelburne.

We also have recommended recreational enhancement measures at each project in Section 4.2.7. These measures are meant to assure the ultimate development of the recreational resources afforded by the projects as required by §2.7. In addition, §8.11 of the Commission's regulations requires licensees to periodically prepare a Form 80. Form 80 reports public use of recreational facilities and gives an indication of when additional recreation facilities are needed. To further ensure that recreation opportunities are sufficient to meet public demand at these projects over the term of new licenses, we recommend that the licensees, prior to filing any Form 80, consult with Parks and Recreation, the NPS, and the Town or City in which they are located, to identify any cases where additional recreation facilities are needed. Copies of response comments should be included in the applicants' Form 80 filings.

Cumulative effects. Recreational resources at individual projects, would be enhanced. Implementing measures proposed for these projects would cumulatively improve public access to the Androscoggin River.

4.2.8 Human health

As discussed in sections 3.1.3, 3.1.4, 4.1.2, and 4.2.2, hydroelectric projects can contribute to accumulation of toxic substances, such as dioxins, in fish. Eating contaminated fish can cause human health problems. Continued operation of the projects as proposed and with our recommended measures, would not likely contribute to increase dioxin and any other toxicant levels in fish. In any case, any human health concern from contaminated fish have been addressed by Public Health's advisory (see section 3.1.4) and can be completely eliminated by not eating any fish caught in the Androscoggin River downstream of James River's mill.

Cascade Flats is concerned, also, that human health in the Cascade Flats area is adversely affected by (1) potential contaminants released to the air, soil, and water environment by the Cascade Flats Waste Water Treatment Facility (see Figure 2-4) and (2) potential chemical waste and toxic waste in the abandon Gorham town dump (located near the west bank of the Androscoggin River about 1.5 miles downstream from Cascade dam). Consequently, Cascade Flats wants (1) potential toxic pollutants from the pollution control facility and the abandoned town dump site characterized; and (2) a human health study of all Cascade Flats residents to determine the effect of any exposure to pollutants on their health; and (3) compensation to the residents of Cascade Flats for the decrease in property values as a result of the degraded environment, estimated to be $5 million.

Impacts that may have resulted or would result from the Cascade Mill Pollution Control Facility or the abandoned Gorham town dump site cannot be attributed to the existing or proposed hydroelectric project construction or operation. Hydroelectric project operation does not generate or release toxic pollutants. Nor does hydroelectric project operation contribute to cumulative effects of pollutants in soil and air. Consequently, analysis beyond that in sections 4.1.2 and 4.2.2 is outside the scope of this EIS and the studies requested by Cascade Flats are not warranted.

4.3 No action alternative

The no action alternative would result in no change to the existing environment (described in section 3.). The projects would continue to operate under the terms and conditions of the existing licenses. The

projects would have the same effect on the environment as they do now, and the applicants wouldn't have to provide any enhancement measures.

4.4 Relationship of license process to laws and policies.

The National Environmental Policy Act (NEPA)[10] mandates the preparation of an EIS for all federal actions significantly affecting the quality of the human environment. We have determined that issuance of new licenses for the Upper Androscoggin River projects are actions that fall within this NEPA mandate.

Section 10(a) of the Act[11] requires that each licensed project be best adapted to a comprehensive plan for improving or developing a waterway for, among others, beneficial public uses including recreational purposes. The Commission, therefore, requires that each license applicant consult with the concerned federal, state, and local recreation agencies to determine the an appropriate level of development to help meet the recreational needs of the area.

Before issuing new licenses to James River and Public Service for their projects, the Commission, the SHPO, and the Advisory Council on Historic Preservation would execute a Programmatic Agreement for protecting historic properties that will satisfy all of the Commission's obligations under §106 of the Natioual Historic Preservation Act.

Per the Fish and Wildlife Coordination Act[12], the Commission must consult with the FWS and Fish and Game on preventing loss or damage to fish and wildlife resources and on developing and improving water resources.

Consistent with the requirements of the Endangered Species Act[13] the Commission requires applicants for license to submit a list of federally listed or proposed threatened or endangered species and critical habitats occurring in the vicinity of projects. Interior says that except for occasional transient individuals, no federally listed or proposed endangered or threatened species are known to exist in the projects' impact area. Therefore, no biological assessment or further consultation under the Endangered Species Act is required (letters from J. P. Deason, Director, Office of Environmental Affairs dated March 2, 1993; October 7, August 11, and July 13, 1992; and letters from W. Patterson, Regional Environmental Officer dated January 11, 1993).

Prior to beginning construction of the Pulsifer Rips development, James River would be required to obtain from the Corps, per §404 of the Clean Water Act, a permit that would regulate the placing of dredge or fill materials in waters of the United States.

Commission regulations require applicants to obtain, per §401 of the Clean Water Act[14], either (a) state certification that any discharge from the project would comply with applicable provisions of the Clean

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[10] 42 U.S.C. §§4332 *et seq.*

[11] 16 U.S.C. §803(a)

[12] 16 U.S.C. §§661 *et seq.*

[13] 16 U.S.C. §1531, as amended

[14] 33 U.S.C. §1341

Water Act or (b) a waiver of certification by the appropriate state agency. The Commission requires that applicants apply for such certification or waiver before they file their application with the Commission. Table 4-7 shows the status of water certification for the Upper Audroscoggin projects.

New Hampshire has regulations to maintain water quality standards in the Androscoggin River. In addition, the Clean Water Act has anti-degradation policies, which are to prevent degradation of waters that meet or exceed the standards. The mechanism by which the state enforces and the anti-degradation policy for hydropower projects is water quality certification in which the state specifies requirements for project operation that it feels are sufficient to maintain water quality adequately. Table 4-7 summarizes the water quality certification of each project.

4.5 Unavoidable adverse impacts

The Pulsifer Rips intake, penstock, access road, and powerhouse would permanently displace 21 acres of vegetation and associated wildlife habitat.

Short term, unavoidable impacts from increased dust, noise, heavy equipment traffic, and increased water turbidity would occur during the construction of the Pulsifer Rips development at the Cascade Project.

4.6 Irreversible and irretrievable commitment of resources

Continued operation of the existing projects would continue the commitment of lands and waters previously developed for energy production. Lands occupied by proposed project facilities at the Pulsifer Rips development would also be irretrievably lost to their current use and committed to energy production. Habitat lost or changed during construction would be reversed in time with proper reclamation techniques.

4.7 Relationship between short-term uses and long-term productivity

The projects are expected to provide an average of 292 GWh of energy each year to James River Paper and to Public Service's service area. This long-term prodactivity would extend at least as long as the duration of the licenses (30 to 50 years). The recommended alternative is designed to avoid long-term decreases in biological productivity of the system.

If the projects were to operate solely to maximize hydroelectric generation, there would be a loss of long-term productivity of the river fisheries due to decreases in river aeration and habitat loss. With the alternative recommended and appropriate mitigation at each site, there should be little if any long-term loss in productivity of aquatic life.

5. STAFF'S CONCLUSIONS

5.1 Significant environmental effects

5.1.1 Projects as proposed

Measures proposed by James River and the Public Service, described in section 2.1 and analyzed in section 4.1, would result in the following environmental effects:

Sawmill

- Continual release of 12 cfs into the bypassed reach would enhance water quality and provide a zone-of-passage for downstream moving salmonids.
- Construction of two river viewing areas, interpretive signs, would enhance recreation use at the project.

J. Brodie Smith

- Release of 10 cfs, plus leakage, into the bypassed reach from April to November would enhance water quality, provide a zone-of-passage for downstream moving salmonids, and protect aquatic macroinvertebrates in the bypassed reach from potential dewatering.
- Modest protection and enhancement of common night hawk, small footed myotis, killdeer, and waterfowl habitat.
- Reserved lands would provide for future recreational needs.

Cross Power

- None.

Cascade

- Spillage at the project dam would be reduced from 20 percent to 6 percent of the time.
- A minimum flow of 6 cfs from the existing Cascade dam to the reach bypassed by the Cascade powerhouse would provide aquatic habitat.
- A minimum flow of 400 cfs from the existing Cascade powerhouse to the new Pulsifer Rips tailrace would maintain optimal habitat for existing wild rainbow trout in the reach and establish habitat for the future management of brown trout.
- Entrainment and impingement of resident fish would likely increase under the proposed increased capacity of the project and the new development.
- Construction of an angler access facility would enhance recreational access at the project.
- Pulsifer Rips penstock and surge tank impact on area aesthetics would be minimized by judicious siting, a buffer strip between the penstock and the river, plantings, paint, and $50,000 payment to the Town of Gorham to implement a landscape plan for the Cascade Flat Properties.

James River Gorham

- Spillage at the project dam would be reduced from 32 percent to 18 percent of the time.
- A minimum flow of 50 cfs released into the bypassed reach would protect fisheries habitat.

Public Service Gorham

- A minimum flow of 50 cfs, plus leakage, released into the bypassed reach would provide additional habitat and maintain a zone-of-passage for downstream transient salmonid movements.
- Modest protection and enhancement of common night hawk, small footed myotis, killdeer, and waterfowl habitat.

Shelburne

- Impoundment depth increase of 1.7 ft wonid eliminate a 2,500-ft-long riverine reach that could be important for aeration and waste assimilation.
- Under worst case conditions, predicted DO levels would decrease by 0.16 mg/l with the increased reservoir elevation.

Cumulative effects

Water quality

- Operation of all seven Androscoggin River projects in run-of-river modes would eliminate streamflow fluctuations down stream of the projects.
- Under worst case conditions, predicted DO levels within the reach would decrease by 0.16 mg/l at the DO sag point located near the Shelburne dam.
- James River's Androscoggin River Water Quality Monitoring Program would lead to timely corrective action in the event of water quality degradation below state standards.
- Monitoring DO at the Smith Project, the Pulsifer Rips bypass. the Public Service Gorham Project, and the Shelburne impoundment would identify any cumulative effects and lead to corrective action.
- Increased minimum flow releases in the Smith, James River Gorham, and Public Service Gorham bypassed reaches would contribute to protecting and enhancing water quality for any adverse cumulative impacts that might occur to the Androscoggin River basin's water quality, particularly DO levels.
- Operation of all projects as run-of-river with minimal impoundment level fluctuations would help keep dioxin or any other toxic contaminants, contained in the sediments trapped behind the existing project dams, in their present locations and not allow them to be re-suspended or transported to other downstream areas.

Resident Salmonids

- The maintenance of existing and the establishment of new zone-of-passage minimum flow releases would aid and enhance the downstream movements of transient salmonids.

- increased minimum flows in the James River Gorham and Public Service Gorham bypassed reaches would provide increased salmonid habitat and enhance existing riverine reaches.

- An optimum salmonid habitat flow of 400 cfs in the 7,400 ft-long Pulsifer Rips bypassed reach would significantly enhance the existing salmonid fishery.

- Fish impingement and entrainment through the projects' turbines would continue and would probably be increased due to new developments in the reach.

- Salmonids moving downstream could be adversely impacted by reduced spillage at the projects.

5.1.2 Modification to proposed project operation or facilities

Our modification to proposed project operation or facilities, described in section 2.2 and analyzed in section 4.2, would result in the following effects:

J. Brodie Smith

- 20 cfs, year round, in the bypassed reach to provide enhanced zone-of-passage for salmonids and to protect water quality.

- A shoreland buffer zone would protect project recreational, aesthetic and other environmental values.

Cascade

- Safe downstream fish passage would increase and fish entrainment would decrease with the installation of screens and fish passage facilities.

- An interim minimum flow of 100 cfs would be released into the upper bypassed reach to protect fish habitat.

- The protective buffer zone on the east side of the reservoir to protect the aesthetic view from Route 16 would reduce the adverse effects of constructing the new intake structure, powerhouse, penstock. and surge tank.

- A shoreland buffer zone would protect project recreational, aesthetic, and other environmental values.

James River Gorham

- Safe downstream fish passage would increase and fish entrainment would decrease with the installation of screens and fish passage facilities.

- A minimum flow of 400 cfs from March 1 to June 15 and 200 cfs at all other times would be released into the bypassed reach to protect and enhance habitat for rainbow trout and brook trout fry, juvenile, and adults and rainbow trout spawning.

- A shoreland buffer zone would protect project recreational, aesthetic and other environmental values.

Public Service Gorham

- Safe downstream fish passage would increase and fish entrainment would decrease with the installation of screens and fish passage facilities.
- A minimum flow of 200 cfs would be released into the bypassed reach to protect and enhance habitat for rainbow trout and brook trout.
- A shoreland buffer zone would protect project recreational, aesthetic and other environmental values.

Shelburne

- A shoreland buffer zone would protect project recreational, aesthetic and other environmental values.

Cumulative effects

Water Quality

- Project operations would be modified, if necessary, to meet DO requirements in the project areas.
- The Androscoggin River's water quality, particularly DO levels would be enhanced and protected by increased minimum flows.

Resident Salmonids

- Safe downstream fish passage would likely increase and fish entrainment would likely decrease with the installation of fish passage facilities at Cascade, James River Gorham, and Public Service Gorham,
- All existing riverine reaches from Cascade to Shelburne would be significantly enhanced from the release of higher minimum flows for fish habitat.

Cultural Resources

- Implementation of a programmatic agreement encompassing all seven projects would protect historic and archeological resources.

Aesthetics

- Except for the Shelburne Project, the aesthetic character of each project would be enhanced with staff-modifications to the proposed projects. Individual project enhancements are minor, but collectively may improve the scenery for motorists travelling through the Androscoggin River Valley, especially on Route 16. The enhancements range from painting project structures to blend into the surrounding environment to providing vegetative screening and buffer zone areas to conceal unsightly views.

Recreation

- The improved recreational signage at the projects would significantly enhance public awareness of recreational opportunities on the Androscoggin River. There modifications would also enhance

public access to the river and provide more recreational facilities and improvements than the proposed projects. Overall enhancements would include two river overlook areas, an angler access facility, a trail, an upgraded boat launch site, a tailrace fishing facility, improved parking areas, land reserved for future recreational development and access for the disabled. Enhancements would be made at all seven projects.

5.1.3 No action alternative

The no action alternative would result in no change to the existing environment. The projects would continue to operate under the terms and conditions of the existing licenses. The projects would have the same effect on the environment as they do now, and the applicants wouldn't have to provide any enhancement measures.

5.2 Economic evaluation of proposed action and alternatives

We used the assumptions as defined in section 2.5 to conduct the economic analyses for each of the proposed hydroelectric projects, with and without staff-recommended mitigation. Each alternative is characterized by a distinct combination of average annual generation, total on-line capital cost, levelized annual cost, levelized net annual benefits, and internal rate of return (Table A-2). The resulting levelized benefit is the difference between cost of the proposed projects as compared to the cost of alternative power generation.

Sawmill. The 12-cfs minimum enhancement flow recommended by the applicant, resource agencies, NGOs, and staff would reduce the project's energy generation by about 0.070 GWh annually, and the project's economic benefits by about $8,000 annually from current conditions (Table A-2). However, even with the enhancement proposal, the project would provide about 17.780 GWh of clean and renewable energy annually, at a cost significantly below the cost of equivalent alternative power.

J. Brodie Smith. We conclude that the staff's year-round, 20-cfs, minimum flow enhancement proposal would reduce the project's energy generation by about .590 GWh annually and the economic benefits of the project by about $40,000 annually from current conditions (Table A-2). However, even with our enhancement flow recommendation, the project would provide about 103.670 GWh of clean and renewable energy annually, at a cost significantly below tha cost of equivalent alternative power.

We are not recommending that the applicant replace the project's existing trashracks.

Cross Power. Applicant, agencies, NGOs, and staff identified no alternative environmental enhancement flows for analysis. The Cross Project would continue operating as it has in the past; providing annually, about 19.200 GWh of clean, renewable, and economical energy to the region's ratepayers (Table A-2).

Cascade. The staff found that the applicant's proposed modification of the existing Cascade powerhouse would be economically beneficial and potentially financially feasible. The modification would provide about 52.600 GWh net energy and additional levelized net economic benefits of about $795,000 annually (Table A-2).

The applicant's and staff's 6-cfs interim flow recommendations would reduce the Cascade powerhouse's existing energy generation by about 0.110 GWh annually, and the total modified project's economic benefits by about $11,000 annually (Table A-2).

The staff found that the applicant's proposed expansion of the new Pulsifer powerhouse would be economically beneficial and potentially financially feasible. The proposed expansion, by itself, would provide about 41.890 GWh of additional energy and additional levelized net economic benefits of about $1,070,000 annnally (Table A-2).

The staff's interim 100-cfs enhancement flow recommendation, without trashracks replacement, would reduce the project's total energy generation (both the Cascade and Pulsifer Rips expansions, 94.49 GWh), by about 4.610 GWh annually, and overall economic benefits by about $500,000 annually (Table A-2).

Replacing the trashracks would further reduce the total expanded project's generation by about 0.630 GWh annually, and the levelized net annnal benefits by about $117,000 annually (Table A-2). However, even with the staff's enhancement flow recommendation and the trashrack replacement, the total expanded project would provide about 89.250 GWh of clean and renewable energy at a cost significantly below the cost of equivalent alternative power.

James River Gorham. The staff foand that the applicant's proposed expansion of the Gorham powerhouse would be economically beneficial and potentially financially feasible. The proposed expansion, by itself, would provide about 5.000 GWh net additional energy and additional levelized net economic benefits of about $217,000 annnally (Table A-2).

The staff's enhancement flow recommendation (400 cfs from March 1 to June 15, and 200 cfs from June 16 to February 28), without trashracks replacement, would reduce the total expanded project's energy generation, by about 3.27 GWh annnally, and the overall economic benefits by about $321,000 annually (Table A-2).

Replacing the trashracks would further reduce the total expanded project's generation by about 0.530 GWh annually, and the overall levelized net annual benefits by about $119,000 annually (Table A-2). However, even with the staff's enhancement flow recommendation and the trashrack replacement, the total expanded project would provide about 30.36 GWh of clean and renewable energy at a cost significantly below the cost of equivalent alternative power.

Public Service Gorham The staff's 200-cfs enhancement flow recommendation, without trashracks replacement, would reduce the project's energy generation by about 0.760 GWh annnally, and the project's economic benefits by about $46,000 annnally from current conditions (Table A-2).

Replacing the trashracks would further reduce the project generation by about 0.360 GWh annnally and the levelized net annual benefits by about $167,000 annnally (Table A-2). Even with the staff's enhancement flow recommendation and the trashrack replacement, the project wonid provide about 12.680 GWh of clean and renewable energy annually, at a cost significantly below the cost of equivalent alternative power.

Shelburne. The staff found that the applicant's proposed expansion of the Shelburne project would be economically beneficial and potentially financially feasible. The reservoir expansion would provide about 2.000 GWh of additional energy and additional levelized net economic benefits of about $142,000 annually (Table A-2). The total expanded project would provide about 20.000 GWh of clean and renewable energy at a cost significantly below the cost of equivalent alternative power.

James River, agencies, NGOs, and staff identified no alternative environmental enhancement flows for analysis. We are not recommending that James River replace the trashracks.

5.3 Comparison of proposed action and alternatives

Table 5-1. provides a summary comparison of the impacts, mitigation and enhancement measures, and costs associated with the projects as proposed, projects as proposed with modifications, and no action. The projects as proposed provide the greatest amount of power generation. The no action alternative results in no additional power generation, no impacts to environmental resources, and provides no enhancement. The projects as proposed with our modifications alternative provide the greatest amount of enhancement and provide a substantial increase in electric power generation.

5.4 Comprehensive development

Sections 4(e) and 10(a)(1) of the Act require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a proposed project, the recreational, fish and wildlife resources, and other nondevelopmental values of the involved waterway are considered equally with power and other developmental values. In determining whether, and under what conditions, a hydropower license should be issued, the Commission must weigh the various economic and environmental tradeoffs involved in the decision.

5.4.1 Recommended alternative

Based on our independent review and evaluation of the existing projects, proposed development, agency and NGOs' recommendations, and the no-action alternative as documented herein, we have selected the proposed projects with additional staff-recommended mitigation and enhancement measures, as the preferred option. We recommend this option because: (1) Our recommended measures would protect and enhance the water quality, fishery resources, recreation resources, cultural resources, and aesthetics; and (2) the electricity generated from a renewable resource would be beneficial because it would reduce the use of fossil-fueled, steam-electric generating plants, thereby, conserving nonrenewable energy resources and reducing atmospheric pollution.

This EIS analyzes the effects of the existing projects and proposed development and recommends a number of measures to protect and enhance the environmental resources. These measures are detailed in section 2.2.

5.4.2 Consistency with comprehensive and other resource plans

Section 10(a)(2) of the Act requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. Other resource plans are also examined under §10(a). There are 12 comprehensive plans for New Hampshire, 8 are applicable to the Upper Audroscoggin River Basin:

- Wild and scenic rivers for New Hampshire (New Hampshire Office of State Planning, 1977)
- New Hampshire outdoors, 1988 - 1993: State comprehensive outdoor recreation plan (New Hampshire Office of State Planning, 1989b)
- New Hampshire wetlands priority conservation plan (New Hampshire Office of State Planning, 1989b)
- Public access plan for New Hampshire's lakes, ponds, and rivers (New Hampshire Office of State Planning, 1991)
- New Hampshire rivers management and protection plan (State of New Hampshire, 1991)

- North American Waterfowl Management Plan (U.S. Fish and Wildlife Service and Canadian Wildlife Service, 1986)
- The nation-wide rivers inventory (NPS, 1982)
- Fisheries USA: The recreational fisheries Policy of the U.S. Fish and Wildlife Service (FWS, undated)

We conclude that the projects, as proposed and with our recommended additional measures, are consistent with these plans.

5.4.3 Fish and wildlife agency recommendations

In the course of consulting with the resource agencies and license application processing, Fish and Game and Interior have provided recommendations on the applicants' proposals pursuant to the Fish and Wildlife Coordination Act. The Commission, under 10(j) of the Federal Power Act (Act), is required to include in each license issued, conditions for the protection, mitigation, and enhancement of fish and wildlife based on recommendations from the resource agencies, unless it believes that the recommendations are inconsistent with Part I of the Act or other applicable law. In those instances where the Commission believes an inconsistency exists, the agencies and the Commission will try to resolve the inconsistency.

Table 5-2 shows fish and wildlife agency recommendations we've identified. The applicants' proposals as supplemented with our recommended mitigation and enhancement, generally satisfy the fish and wildlife recommendations.

Table 5-1. Comparison of effects of proposed projects and alternatives on power generation, impacts, mitigation, enhancement measures.

Project	Projects as proposed	Projects as proposed plus modifications	No Action
Sawmill:			
Annual generation (GWh)	17.78	17.78	17.85
Additional cost ($/yr)	8,000	8,000	0
Impacts	None	No change from proposed	None
Enhancement	• 12 cfs minimum flow • recreation facilities	• res. of auth. to prescribe fish pass. fac. • improve boat launch area • provisions for disabled • cultural resource measures	None
J. Brodie Smith			
Annual generation (GWh)	104.01	103.67	104.26
Additional cost ($/yr)	17,000	40,000	0
Impacts	None	No change from proposed	None
Enhancement	• 10 cfs minimum flow in bypass • wildlife measures • lands reserved for recreation	• 20 cfs minimum flow in bypass • res. of auth. to prescribe fish pass. fac. • aesthetic measures	None
Cross Power			
Annual generation (GWh)	19.20	19.20	19.20
Additional cost ($/yr)	0	0	0
Impacts	None	No change from proposed	None
Enhancement	None	• res. of auth. to prescribe fish pass. fac. • public access • aesthetic measures • cultural resource measures	None
Cascade			
Annual generation (GWh)	93.76	89.25	52.60
Additional cost ($/yr)	79,000	617,000	0
Impacts	• spillage at dam reduced • flows in river reduced • increase fish imping. and entrain. • short term turbidity increase	No change from proposed	None
Enhancement/mitigation	• erosion control measures • 400 cfs minimum flow in Puisifer bypass • 6 cfs minimum flow in upper bypass • angler access facility • cultural resource measures • aesthetic measures	• 100 cfs interim min. in upper bypass • assessment to determine perm. releases • downstream fish pass and fish prot. • increased public access • additional cultural resource measures • additional aesthetic measures	None
James River Gorham			
Annual generation (GWh)	33.50	30.36	29.10
Additional cost ($/yr)	65,000	440,000	0
Impacts	• dam spillage reduced	No change from proposed	None
Enhancement/mitigation	• 50 cfs minimum flow • cultural resource measures	• 200 and 400 cfs minimum flow in bypass • downstream fish passage and fish prot. • public access • cultural resource measures • aesthetic measures	None

Table 5-1. (continued)

Project	Projects as proposed	Projects as proposed plus modifications	No Action
PSNH Gorham			
Annual generation (GWh)	13.63	12.68	13.80
Additional cost ($/yr)	10,000	213,000	0
Impacts	None	No change from proposed	None
Enhancement	• 50 cfs minimum flow in bypass • wildlife measures	• 200 cfs minimum flow in bypass • downstream fish by pass and fish prot. • public access • aesthetic measures	None
Shelburne			
Annual generation (GWh)	20.00	20.00	18.00
Additional cost ($/yr)	0	0	0
Impacts	• 2,500-ft reach eliminated • potential wetlands loss • DO concentration decreased	• potential wetland enhancement	None
Enhancement	None	• res. of auth. to prescribe fish pass. fac. • public access • aesthetic measures • cultural resource measures	None
All projects cumulatively			
Annual generation (GWh)	301.88	292.94	254.81
Additional cost ($/yr)	179,000	1,318,000	0
Impacts	• water levels stabilized • DO concentration decrease • toxic pollutants trapped in sediments • downstream fish movement impeded • fish impingement and entrainment	No change from proposed	None
Enhancement/mitigation	• water quality monitor. and action • downstream movement of fish improved • salmonid habitat improved	• downstream fish by pass and fish prot. • fish habitat enhancement	None

Table 5-2. Resource agency recommendations subject to Section 10(j) of the Act.

Project	Recommendation[a]
All	Run of river operation[b]
	Prepare a ROR and minimum flow release plans[d]
Sawmill	Release 8 cfs minimum flow at the flashboard section of the spillway[b]
	Release 4 cfs minimum flow into the bypassed reach[b]
	Install and operate fish protection devices when deemed necessary by Fish and Game[c]
J. Brodie Smith	Release 20 cfs minimum flow into the bypassed reach[b].
	Install and operate fish protection devices when deemed necessary[b]
Cross Power	Install and operate fish protection devices when deemed necessary by the NHFGD[c]
Cascade	Release 6 cfs minimum flow for upper bypassed reach, after Pulsifer Rips operates, 100 cfs[b].
	Minimum flow of 400 cfs between existing tailrace and Pulsifer Rips power house[b].
	Provide final erosion control plan prior to construction start[b].
James River Gorham	Release 200 cfs, 6/16 to 2/28; 400 cfs, 3/1 to 6/15, minimum flow of into bypassed reach[b].
	Install and operate downstream fish passage - 1 inch fish guidance screen; bypass sluice with at least 56 cfs; discharge from sluice into a plunge pool.
PSNH Gorham	Release 200 cfs minimum flow into bypassed reach[b].
	Install and operate downstream fish passage facility.
Shelburne	Monitor and mitigate any adverse impacts to wetlands resulting from raising reservoir level .
	Quantify leakage flows[a,d].

[a] Recommended by Interior, unless otherwise noted
[b] Also recommended by the NHFGD
[c] Recommended by the NHFGD
[d] Not an appropriate 10(j) recommendation

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Appendix A. ECONOMIC ANALYSES

Table A-1. The staff's sensitivity analyses of impacts on energy production and project economic benefits resulting from various minimum flow proposals and options[a].

Scenario	Estimated Energy Generation (GWh)	Change in Energy Generation (GWh)	Change in Net Annual Benefits (1000$/year)
	Public Service's Projects		
J. Brodie Smith:			
Historic Generation: With existing leakage flow = 5 cfs	104.26	Baseline Condition[b]	
Min. Flow = 10 cfs Year round[c] Staff's option	104.06	-0.20	-14
Min. Flow = 10 cfs April - November[c] Applicant proposal	104.01	-0.25	-17
Min. Flow = 20 cfs April - November[c] Interior's proposal (a)	103.88	-0.38	-26
Min. Flow = 20 cfs March - November[c] Interior's proposal (b)	103.83	-0.43	-29
Min. Flow = 20 cfs Year round[c] Fish and Game's proposal, staffs proposal	103.67	-0.59	-40
Min. Flow = 30 cfs Year round[c] Staff's option	103.28	-0.98	-66
Min. Flow = 65 cfs April - November[c] Conservation Law's option	102.73	-1.53	-103
PSNH Gorham:			
Historic Generation	13.80	Baseline Condition	
Min. Flow = 50 cfs Year round Applicant's proposal	13.63	-0.17	-10
Min. Flow = 100 cfs Year round Staff's option	13.44	-0.36	-22
Min. Flow = 200 cfs Year round NHFGD, Interior, and staff's proposals	13.04	-0.76	-46
Min. Flow = 300 cfs Year round CLF's proposal	12.60	-1.20	-73
Min. Flow = 400 cfs Year round CLF's proposal	12.14	-1.66	-101

a The results in this table have been rounded to two significant digits, producing slightly different answers than listed elsewhere in this report.

b Existing condition is considered to be baseline condition for projects that do not have any proposed power expansion.

c Including leakage

Table A-1 (Continued).

Scenario	Estimated Energy Generation (GWh)	Change in Energy Generation (GWh)	Change in Net Annual Benefits (1000$/year)
James River-New Hampshire Electric, Inc.'s Hydroelectric Projects			
Sawmill:			
Historic Generation	17.85	Baseline Condition	
Min. Flow = 5 cfs Year round Staff's option	17.82	-0.03	-3
Min. Flow = 10 cfs Year round Staff's option	17.79	-0.06	-7
Min. Flow = 12 cfs Year round Applicant, agencies, and staff's proposals	17.78	-0.07	-8
Min. Flow = 15 cfs Year round Staff's option	17.76	-0.09	-11
Min. Flow = 50 cfs Year round Staff's option	17.54	-0.31	-40
Cross Power:			
Historic Generation	19.20	Applicant, agencies, NGOs, and staff identified no alternative environmental enhancement flows for analysis.	
Cascade:			
Historic Generation	52.60	Baseline Condition	
Min. Flow = 6 cfs Year round Applicant and staff's[c] proposal with turbine modification at Cascade only	52.49	-0.11	-11
Min. Flow = 0 cfs Year round With proposed total power expansion of both Cascade and Pulsifer powerhouses	94.49	Baseline Condition[d]	
Min. Flow = 6 cfs Year round Applicant's proposal with power expansion	93.76	-0.73	-79
Min. Flow = 52 cfs Year round Agencies' proposal for fish bypass facility with power expansion	91.43	-3.06	-331

c Staff's proposal is for the interim period between the time the Cascade powerhouse comes on line and the Pulsifer powerhouse comes on line.

d Where power expansion is proposed, the applicant's proposal is considered to be baseline condition for the comparison of mitigation enhancements.

Table A-1 (Continued).

Scenario	Estimated Energy Generation (GWh)	Change in Energy Generation (GWh)	Change in Net Annual Benefits (1000$/year)
Cascade (continued):			
Min. Flow = 100 cfs Year round Agencies and staff's proposals with power expansion	89.88	-4.61	-500
Min. Flow = 200 cfs Year round Staff's option with power expansion	86.64	-7.85	-850
Min. Flow = 300 cfs Year round Staff's option with power expansion	83.25	-11.24	-1,218
Min. Flow = 400 cfs Year round Agencies and staff's option with power expansion	79.75	-14.74	-1,597
James River Gorham:			
Historic Generation	29.10		
Min. Flow = 0 cfs Year round Proposed power expansion	34.16[a]	Baseline Condition	
Min. Flow = 50 cfs Year round Applicant's proposal with power expansion	33.50	-0.66	-65
Min. Flow = 100 cfs Year round Staff's option with power expansion	32.83	-1.33	-131
Min. Flow = 400 cfs 3/1 - 6/15 Min. Flow = 75 cfs 6/16 - 2/28 per applicants 8/10/93 letter	32.24	-1.92	-189
Min. Flow = 200 cfs Year round Staff's option with power expansion	31.48	-2.68	-263
Min. Flow = 400 cfs, 3/1 - 6/15; Min. Flow = 200 cfs; 6/16 - 2/28; Agencies and staff's proposals with power expansion	30.89	-3.27	-321

[a] Our derivation

Table A-1 (Continued).

Scenario	Estimated Energy Generation (GWh)	Change In Energy Generation (GWh)	Change in Net Annual Benefits (1000$/year)
Shelburne:			
Historic Generation	18.00		
Min. Flow = 0 cfs Year round Applicant, agencies, and staff's proposals of raising reservoir capacity	20.00	Baseline Condition	
Min. Flow = 5 cfs Year round Staff's option with power expansion	19.97	-0.03	-4
Min. Flow = 25 cfs Year round Staff's option with power expansion	19.82	-0.18	-23
Min. Flow = 50 cfs Year round Staff's option with power expansion	19.63	-0.37	-48
Min. Flow = 100 cfs Year round Staff's option with expansion	19.26	-0.74	-95

Table A-2. Economic benefits and financial feasibility comparison of principal alternatives (Source: the staff)[a].

Project	Estimated average annual energy (GWh)	Incremental change in average annual energy from baseline (GWh)	Total on-line capital cost (million$)[b]	Incremental change in levelized annual net benefits from baseline (Thous$)
Sawmill: Historic generation	17.85	Baseline	0	Baseline
Applicant and staff's proposals: Min. Flow = 12 cfs Year round	17.78	-0.07	0	-8
J. Brodie Smith: Historic Generation[c]	104.26	Baseline	0[d]	Baseline
Applicant proposal: Min. Flow = 10 cfs April - November	104.01	-0.25	0	-17
Staff's proposal: Min. Flow = 20 cfs All year Without screen mod.	103.67	-0.59	0	-40
Cross Power: Historic Generation[e]	19.20	Baseline	0	Baseline
Cascade: Historic Generation[f]	52.60	N/A	0	N/A
Applicant's Cascade turbine modification proposal only: Min. Flow = 0 cfs Year round	52.60[g]	Baseline	0.864[h]	Baseline
Applicant and staff's[i] Cascade turbine modification and enhancement proposals: Min. Flow = 6 cfs Year round	52.49	-0.11	0.864	-11

a The results in this table have been rounded to two significant digits, producing slightly different answers than listed elsewhere in this report.
b Total on-line cost includes interest during construction.
c Existing condition is considered to be baseline condition for projects that do not have any proposed power expansion.
d There is no power expansion at this project that would require any capital cost.
e There are no enhancement proposal to consider for analyses at this project.
f For projects that have power expansion, the applicant's proposal is considered to be baseline condition for the comparison of mitigation.
g Due to lowering of the hydraulic capacity range from 870 - 2,690 cfs to 400 - 2,320 cfs, we estimated the theoretical increase in generation could be as much as 8.17 GWh at Cascade powerhouse. In actuality, the Cascade powerhouse would reduce its generation from the existing levels, because it would allow the new Pulsifer powerhouse to use water that it would have used, because Pulsifer would generate more power with the same amount of water.
h This cost consists of only the Cascade powerhouse expansion capital cost in 1988 dollars, with an escalation of 4 percent for two construction years.
i Staff's proposal is for the interim period between the time the Cascade powerhouse comes on line and the Pulsifer powerhouse comes on line.

Table A-2 (Continued).

Project	Estimated average annual energy (GWh)	Incremental change in average annual energy from baseline (GWh)	Total on-line capital cost (million$)	Incremental change in levelized annual net benefits from baseline (Thous $)
Cascade (cont.)	94.49	Baseline	65.685[j]	Baseline
Applicant's total Cascade and Pulsifer power expansion proposal: Min. Flow = 0 cfs Year round				
Applicant's total Cascade and Pulsifer power expansion and mitigation proposals: Min. Flow = 6 cfs Year round	93.76[k]	-0.73	65.685	-79
Staff's total Cascade and Pulsifer power expansion and mitigation proposals: Min. Flow = 100 cfs Year round Without screen mod.	89.88	-4.61	65.685	-500
With screen mod.	89.25	-5.24	65.906[l]	-617
James River Gorham: Historic generation:	29.10	N/A	0	N/A
Applicant's power expansion proposal: Min. Flow = 0 cfs	34.16[m]	Baseline	0	Baseline
Applicant's power expansion and mitigation proposals: Min. Flow = 50 cfs Year round	33.50	-0.66	3.631	-65
Staff's power expansion and mitigation proposals: Min. Flow = 400 cfs 3/1 - 6/15 Min. Flow = 200 cfs 6/16 - 2/28	30.89	-3.27	3.631	-321
Without screen mod.				
With screen mod.	30.36	-3.80	4.686	-440
PSNH Gorham: Historic generation	13.80	Baseline	0	Baseline
Applicant's proposal: Min. Flow = 50 cfs Year round	13.63	-0.17	0	-10

j This cost includes the capital costs for both the Cascade and Pulsifer powerhouse expansions in 1988 dollars, with an escalation of 4 percent for two construction years.

k The staff estimates the total on-line generation of both the Cascade and Pulsifer powerhouses, with no minimum flow spillage, would be about 94.49 GWh. We estimated the generation loss due to the proposed minimum flow spillage of 6 cfs would be about 730 MWh.

l This cost includes the capital costs for both the Cascade and Pulsifer powerhouse expansions in 1988 dollars, with an escalation of 4 percent for two construction years, and the enhancement cost of the Pulsifer powerhouse trashracks of about $140,000 in 1993 dollars,

m We estimated the on-line generation at James River Gorham, with no minimum flow spillage, would be about 34.16 GWh annually.

Table A-2 (Continued).

Project	Estimated average annual energy (GWh)	Incremental change in average annual energy from baseline (GWh)	Total on-line capital cost (million$)	Incremental change in levelized annual net benefits from baseline (Thous $)
PSNH Gorham (cont.)	13.04	-0.76	0	-46
Staff's proposal:				
Min. Flow = 200 cfs Year round				
Without screen mod.				
With screen mod.	12.68	-1.12	0.721	-213
Shelburne:				N/A
Historic Generation	18.00	N/A	0	
Applicant and staff's power expansion proposals:	20.00	Baseline	0.052	Baseline
Min. Flow = 0 cfs				
Without screen mod.				

Appendix B. LETTERS OF COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND STAFF RESPONSES

The Notice of Availability of the draft environmental impact statement (DEIS) was published in the *Federal Register* on June 11, 1993 (corrected July 9, 1993). The DEIS was mailed to federal, state, local, and non-governmental agencies and individuals on June 2, 1993. Section 8 contains a list of those agencies and individuals that were sent a copy of both the DEIS and the FEIS.

All timely letters of comment that address specific analyses in the DEIS were reviewed by the FERC staff. Suggestions for correcting data or text and requests for further discussion of a subject have been considered. Those editorial changes and suggestions which were practicable, reasonable, and which improved the quality of the FEIS were incorporated.

Constructive criticism presenting a major environmental point of view or one in opposition to staff, when persuasively supported, is treated by making revisions in the appropriate part of the EIS. When the major point of view is not persuasive, reasons are given why the staff did not change its point of view.

The sections or pages of the EIS that have been modified as a result of comments received are identified in the staff responses to the right of the letters of comments. Other staff responses are self explanatory.

A "no response required" response is given to comments that are statements that raised no questions concerning treatment of subject matter in the DEIS. A "your opinion has been noted" or "comment noted" response is given to comments considered to be statements of opinion.

A vertical line drawn to the right of the comment letter text indicates to which comments our response applies. Where possible, our responses start next to the start of the comment, which may extend for several pages. Our responses are numbered sequentially. Where necessary to avoid confusion, the comments are numbered as well.

The respondents and the page on which they occur are as follows:

New Hampshire Department of Environmental Services	B-2
City of Berlin	B-4
Conservation Law Foundation, *et al.*	B-18
U.S. Department of the Interior (August 6, 1993)	B-74
New Hampshire Department of Justice (New Hampshire Fish and Game Department)	B-77
Town of Gorham	B-84
Town of Shelburne	B-99
Cascade Flats Neighborhood Organization	B-105
Multiple Use Association	B-149
Public Service of New Hampshire	B-155
James River-New Hampshire Electric, Inc.	B-160
U.S. Environmental Protection Agency	B-174
U.S. Department of the Interior (August 13, 1993)	B-182

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State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
603-271-3503 FAX 603-271-2867
TDD Access: Relay NH 1-800-735-2964

July 13, 1993

Mr. R. Peller
Federal Energy Regulatory Commission
Office of Hydropower Licensing (HL20.1)
825 North Capitol Street, N.E.
Washington, D.C. 20426

Re: Draft EIS-Upper Androscoggin Projects

Dear Mr. Peller:

The following comments are on the Draft Environmental Impact Statement-Upper Androscoggin River Basin Hydroelectric Projects document dated May 1993.

Page 3-2. The second paragraph in section 3.1.3 Water quality and quantity should be changed as follows:
Pollution Control designates the Androscoggin River in the Berlin-Shelburne area as Class B, the next highest classification behind Class A. New Hampshire defines DO standards for class B waters as not less than 75 percent of saturation. Class B waters should be also acceptable for swimming and other recreation, fish habitat, and, after adequate treatment, for use as water supplies. No disposal of sewage or wastes is allowed unless they are adequately treated. Class B waters shall contain not more than either a geometric mean based on at least 3 samples obtained over a 60-day period of 126 Escherichia coli per 100 milliliters, or greater than 406 Escherichia Coli per 100 milliliters in any one sample. The pH range shall be 6.5 to 8.0 except when due to natural causes. (Attached is a copy of RSA 485-A:8)

1. We agree, see revised section 3.1.3.

Page 4-26. This office is in agreement with the recommendation that a water quality monitoring plan be included in any license issued for the Cascade Project. In fact, it would be a condition in the amended Section 401 water quality certificate.

2. No response required.

AIR RESOURCES DIV.
WASTE MANAGEMENT DIV.
WATER RESOURCES DIV.
WATER SUPPLY & POLLUTION CONTROL DIV.

Staff of the Commission has recommended a minimum bypass flow of 200 cfs except during spawning season when a higher flow of 400 cfs is recommended. Our review of the applicant's IFIM analysis for other than spawning habitat revealed that habitat areas are either greater or only minimally reduced if a flow of 75 cfs is employed. The basis for selecting 200 cfs instead of 75 cfs should be explained more fully.

3. We agree, see revised section 4.2.3.1.

Thank you for the opportunity of commenting on the draft EIS for the Upper Androscoggin River Basin Hydroelectric Projects. If you have any questions regarding these comments, feel free to call Robert Baczynski at 803-271-2471.

Sincerely,

Edward J. Schmidt, P.E., Ph.D.
Director

cc: Robert Baczynski
Katherine Ueland

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City Hall - Main Street

City of Berlin

Office of the City Manager

93 JUL -9 AM 10:45

July 20, 1993

Ms. Lois Cashell, Secretary
Federal Energy Regulatory Commission
825 No. Capitol Street
Washington, D.C. 20426

RE: Sawmill, FERC Project No. 2422-004,
J.Brodie Smith, FERC Project No. 2287-003
Cross, FERC Project No. 2326-002 AND
FERC Projects Nos. 2327-002;2288-00[illegible]2311-001;
2300-002

Dear Ms. Cashell,

Enclosed please find 14 copies and the original for filing with the Commission regarding the Draft Environmental Impact Statement as it relates to the above referenced projects. The City of Berlin files these comments as an intervenor on behalf of our taxpayers and in cooperation with the Town of Gorham. We call your attention to several points that are expounded by the Draft EIS that appear to be consistent with the Municipalities original filing of the motion to intervene.

The City sees the process that the FERC has undertaken as very positive and one that serves to address the concerns of all parties. The DEIS indicates that the FERC has considered all reasonable alternatives to the proposed actions.

Copies of this document have been sent to all parties listed on the attached certificate of service list. The City also requests that any response to our comments herein be forwarded to the Office of the City Manager, 168 Main Street, Berlin, N.H. 03570.

Cordially,

Mitchell A. Berkowitz,
City Manager

Berlin, New Hampshire 03570-2494
(603) 752-7532 FAX (603) 752-5230

4. No response required.

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In re: Draft Environmental Impact Statement for the)
following FERC Projects Nos. 24222-004; 22627-003; 2326-002)
2327-002; 2311-001; 2288-004; 2300-002)

COMMENTS BY THE CITY OF BERLIN, NEW HAMPSHIRE, AS INTERVENORS REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND RELATED ISSUES THROUGH THE RELICENSING OF THE ABOVE PROJECTS PER THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 AND THE COMMISSION'S REGULATIONS IMPLEMENTING THE NEPA (18 CFR PART 380)

MUNICIPALITIES INITIAL FILING OF MOTION TO INTERVENE:

On July 28, 1992, the City of Berlin, in conjunction with the Town of Gorham, New Hampshire, filed their motions to intervene in the above referenced projects. Those filings state several key issues and concerns that the municipalities wished to sensitize the FERC to as the FERC continued the relicensing process. Listed below you will find a quick review of the issues and concerns as they previously appeared which creates the framework of our response today.

THE INTERDEPENDENCE AND BALANCE BETWEEN PEOPLE AND NATURE.

THE VALUE AND MANAGEMENT RECORD OF THE RIVER.

THE POTENTIAL IMPACTS TO CITIZENS IN LIGHT OF CHANGES TO MINIMUM FLOW LEVELS OF THE ANDROSCOGGIN RIVER INCLUDING THE NPDES PERMITS.

5. No response required.

THE MITIGATION OF FLOODING ALONG THE RIVER IN LIGHT OF ANY CHANGES TO THE RIVER FLOW MANAGEMENT AS WELL AS THE COSTS INCURRED FOR ANY NEW FLOOD PREVENTION MEASURES.

THE IMPACTS TO THE MUNICIPALITIES THAT RESULT FROM CHANGES TO THE FLOW MANAGEMENT REGIME AND THE RESULTANT LEVELS OF POWER GENERATION.

THE PUBLIC'S ACCESS TO THE RIVER CORRIDOR AND THE SAFETY ASPECTS OF ANY ACCESS TO THE RIVER CORRIDOR.

THE DRAFT ENVIRONMENTAL IMPACT STATEMENT:

The Municipalities' review of the DEIS indicates the emphasis of several target points by the FERC. These include:

THE DECISION OF THE FERC TO ANALYZE THE RELICENSE APPLICATIONS FOR THE 7 PROJECTS LOCATED ON THE 11 MILE SECTION OF THE ANDROSCOGGIN RIVER SUB BASIN RATHER THAN A PROGRAM IMPACT STATEMENT WHICH WOULD HAVE INCLUDED AN ADDITIONAL 10 PROJECTS LOCATED BOTH UPSTREAM AND DOWNSTREAM FROM THE BERLIN-GORHAM REACH.

THE SENSITIVITY OF THE FERC NOT TO UNREASONABLY DELAY THE RELICENSING OF THE PROJECTS CONSIDERED IN THE DEIS.

THE HEADWATER RESERVOIRS IF DETERMINED JURISDICTIONAL SHALL BE A PART OF A FUTURE LICENSING VENT

THAT ANY DECISION TO MODIFY THE OPERATING REGIME IN THE HEADWATERS RESERVOIRS WOULD NEED TO BALANCE THE BENEFITS WITH DOWNSTREAM IMPACTS.

THE PUBLIC'S ACCESS FOR RECREATIONAL PURPOSES AS BEING PROJECT SPECIFIC.

THERE ARE OPPORTUNITIES FOR ON-SITE ENHANCEMENTS, THEREFORE OFF-SITE MEASURES OR A BASIN WIDE RECREATION PLAN ARE NOT NECESSARY.

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ENERGY CONSERVATION AND HYDROPOWER GENERATION ARE NOT MUTUALLY EXCLUSIVE AND ARE NOT TO BE CONSIDERED AS ALTERNATIVES TO ONE ANOTHER.

NOTHING IN THE APPLICATIONS OR IN THE PROJECTS' RECORDS JUSTIFIES THE NEED TO STUDY DAM REMOVAL.

These are not the full extent of the DEIS comments. We view them as significant and directly related to the Municipalities' concerns as raised in our initial filings and summarized above. The City however is in the process of reviewing its initial request for the provision of electricity as a condition of the relicense and requests that this remain as part of the relicensing process.

We feel that the FERC has taken the Municipalities issues and concerns seriously and has addressed the majority of them in the DEIS. We believe that the FERC has also attempted to comply with its mission as taken from the DEIS;

> "That the project adopted...shall be such as in the judgement of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational (emphasis added) and other purposes referred to in section 4(e)....

The Municipalities understand that there is a wider range of acceptable responses to each of the issues that were raised. The relicensing process is one of complexities and is highly technical in nature based upon the filings of the applicants and the Intervenors thus far. We reiterate that our issues and concerns have generally been addressed by the DEIS and we encourage the FERC to continue its relicensing process expeditiously.

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FUTURE COMMENTS AND ISSUES:

The FERC has made some difficult decisions that will provide the basis for our continued comments. We concur with the vast majority of these decisions and while we do not want to unreasonably cause a delay in the timely processing and issuing of any hydroelectric relicense, there are a few issues that will be raised in a general manner as concerns now, but because of the technical nature of these issues and the need to further study the alternatives proposed, we are advising you of our full intent to file follow-up comments with the FERC in these general areas.

BYPASS FLOW 6.
Further review should be undertaken to determine if, through innovative river bed modifications, the applicant's proposed bypass reach flow levels can be maintained. Achieving more consistent flows in the narrower channels and still addressing the issues of fish migration, spawning, habitat, and associated angling opportunities.

SHORELAND BUFFERS 7.
Given that the amount and location of land for a protective buffer zone should be determined on a site specific basis using specific criteria and objectives, we would encourage the FERC not to utilize the rule-of-thumb of a 200 foot buffer zone but to seek the appropriate criteria with the consultation of the applicants on a site specific basis.

FLOW REGIME 8.
Since the flow regime has been one of the major issues raised by many parties in the relicensing process, we restate the Municipalities' concern for any flow regime changes that may have impacts on existing sedimentary pockets within the sub-basin region or Impact Agency permits under which the Municipalities operate.

9.
For informational purposes, enclosed you will find several articles that have appeared in either the AMC's Outdoors publication, AMC's Appalachia Bulletin and an AMC Fund Raising Letter. The subject matters presented deal directly with the Relicensing of the above referenced projects. It also must be noted that Appalachia Bulletin, 12 November, 1992 represents the following statement "In September, Kimball met with residents of the two towns along the 11-mile stretch of river affected by the hydroelectric project to

6. We disagree with this approach. River bed modifications are usually employed in cases where only one or two minor modifications to the existing river bed are necessary in order to achieve a specific fishery objective, such as fish passage. In the case of Cascade, James River Gorham, and Public Service . Gorham, the overall objective of increased instream flows is the enhancement of instream salmonid habitat. Providing a narrower, more flume-like channel would not serve this purpose, or provide any associated angling opportunities.

7. As stated in section 4.2.7, a shoreline protection buffer zone plan should be developed by the licensees. The plan shall be designed to protect the aesthetics and public access of the shore lands within 200 feet of the Cascade, Gorham, and Shelburne impoundments' and bypassed reaches' normal maximum surface elevations and; at the J. Brodie Smith Project, all undeveloped land between the bypassed reach and the project penstock.

It is stipulated in section 4.51(i)(B) of the Commissions's regulations that a typical project boundary for an existing major project should not be more than 200 feet (horizontal measurement) from the exterior margin of the reservoir, defined by the normal maximum surface elevation. Additional land may be included if needed for shoreline control, recreational access ,or other environmental reasons. Therefore, the width of the buffer zone may not be limited to 200 feet, if it is determined and justified (based on the criteria established for delineating an appropriate boundary) that more than 200 feet of protection is needed in certain areas.

8. Comment is noted

9. No response is required.

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research local concerns. "The attitude seems to be that this place is already all messed up so why fix it?" asks Kimball. "But we shouldn't approach relicensing from that perspective," he said. (Kimball)

Both Berlin and Gorham, referenced above, have no record of Mr. Kimball meeting in any public forum with the residents of either community for the purpose of researching local concerns. Rather, I as the Berlin City Manager and the Gorham Town Manager have invited and facilitated a few meetings with the key parties namely Mr. Kimball, Mr. Sinclair and representatives of James River-NH Electric and Public Service Company of New Hampshire.

It has always been the posture of Berlin and Gorham that the Androscoggin River Basin in this 11 mile stretch is not a virgin water course but a completely altered resource which has long served the needs of the Communities. To this end, while some may feel the river is "all messed up", great strides have been made. Financial resources have been allocated and continue to be expended by the taxpayers and industry to improve the water quality of the river and enhance the overall economic, social and civic uses of this resource.

Berlin and Gorham hope that the FERC recognizes that the current status of what we all agree to be an altered environment in the Androscoggin River Basin which is still an important resource and we are proud of our environmental accomplishments to date. We look upon this relicensing effort not as a means to trade acreage in a remote sector of the state, but to continue to address the dynamic needs of the 11 miles of river and surrounding land that is directly under our care and custody.

We would also like to indicate the City and the Town strongly feel the FERC relicensing of the above referenced projects is an inappropriate venue for intervenors to negotiate land rights for dam relicensing.

SUMMARY AND CONCLUSION:

The City of Berlin and the Town of Gorham affirm several of the findings and recommendations of the Draft Environmental Impact Statement for the above referenced projects. We believe that the FERC has been sensitive to the concerns and issues raised by the Municipalities and that the relicensing process should continue to move forward in a timely manner. The municipalities have raised several general concerns which will be addressed in future correspondence to the FERC but emphasize that these should not be considered justification to slow the relicensing process.

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The net results of the DEIS is that this sub-basin and its combined hydro-electric facilities should be relicensed in a timely manner so that the economic and regional benefits may continue to accrue to all parties in the process and the balanced relationship between people and the environment may continue into the future on a steady and predictable course.

Cordially,

Mitchell A. Belkowitz
City Manager
Berlin

ENC: 7

The following pages contain attachments to the comment letter. No comments are required.

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Opportunity and necessity.

These are the two items we will finance with your contribution of $50, $100, $250 or more.

We need help with our traditional year-end expenses. And we need your further support for one of the most worthy adventures in AMC history.

Please read on.

Dear Former AMC Member,

At each year-end we write to our members asking you to help close our books in the black. It's an essential part of our financial housekeeping. And this year is no exception.

We must raise $140,000 before the end of the year to close our books in the black. And we're counting on you to renew your membership to help meet our goals.

But this year our needs are greater than ever before.

We have a crisis of opportunity at AMC. And without your immediate help, the greatest environmental opportunity in 50 years may slip through our fingers.

Let me explain.

In 1986, Congress passed an Amendment to the Federal Power Act that set the legal parameters for the relicensing of existing hydroelectric dams. There are 92 such dams on the rivers of the Northern Forest. In their Amendment, Congress mandated that the relicensing authority, now the Federal Energy Regulatory Commission (FERC), give "equal consideration" to the public's interest in the rivers when considering the relicensing of an existing dam.

This means that our values -- yours and mine -- are now equal in law to the

Over, please

values of the hydroelectric interests. And that means that the fish and wildlife, rivers and shorelands, energy conservation, and public enjoyment — both aesthetic and recreational — must all be considered before the dams can be relicensed.

That's great news. But our values must be spoken to be heard; our new rights must be exercised to be valued. And exercising those rights will be costly.

The dams have their own well-financed constituencies in the power and forest products companies that use the generated power. And while you are part of an even greater constituency to protect the environment, there is no well-heeled advocate to make your case to the FERC and the Courts. That's where our challenge lies.

AMC has taken a leadership position in the fight to exercise these newly granted rights. We have already intervened in the first of the relicensing cases before the FERC. But each step is costly.

We are not anxious to line the pockets of a fleet of trial lawyers through costly litigation. But we are interested in some good old Yankee horse trading — where the rights to the recreational use of some of the vast land holdings of these companies can be traded for the safe and sane use of our rivers.

We want to ensure the protection of and public access to millions of acres of the Northern Forest that are owned by the same companies that want to relicense these dams. And we want to do it to the advantage of the people whose present and future livelihoods depend on a healthy forest.

We must continue to recognize the importance of maintaining our historic reputation as an organization that brings adversaries together and is sensitive to all sides of an issue. This is particularly important now as we work on such sensitive issues as the hydro relicensing cases.

Never has AMC's reputation for common sense and fairness been as important to us as it is today.

Every hiker, fisherman, bird watcher, canoeist, camper, hunter, and nature lover will benefit directly through this opportunity. Continued public access to millions of acres of Northern Forest will keep lands available for future generations to explore.

Make no mistake about it. This is the greatest opportunity for outdoor recreational enthusiasts since the creation of the White Mountain National Forest. And these opportunities are only extensions of our recent accomplishments.

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Consider just a few of our many successes during the past year.

- AMC and the National Park Service formed a successful partnership to revitalize the trails at Acadia National Park.
- Congress increased funding of the Sterling Forest Project to $3 million while the Northern Forest Council received $1.2 million — enough to carry it through 1993.
- More than 30 bog bridges were built with the help of Connecticut and New Hampshire volunteers and AMC Professional Trail Crew.
- Air quality research conducted by AMC and Harvard School of Public Health has provided dramatic information on adverse changes in both pollution and ozone levels in the White Mountains.
- Our advocacy efforts have provided great support to worthy projects including the Sterling Forest Project, the Forest Legacy Program, and the addition of 900 acres to the White Mountain National Forest.
- Our housekeeping at the huts posted an over 90% drop in solid waste. Composting, recycling, and decreased packaging lowered our solid waste from 628 to 28 tons per year.
- Chapter activities in all 11 regions reached a record high and our outdoor educational opportunities continued to grow setting new marks for opportunities, attendance, and quality of program.
- A record 31,000 visitors to our backcountry huts witnessed our model backcountry management techniques of solar energy, composting, waste management, and peaceful coexistence with our natural surroundings.
- Our overnight school program provided 2,500 overnights; 680 children became AMC Junior Naturalists; 50 new youth program leaders were trained who, in turn, led 1,160 inner city kids on wilderness trips.

AMC's continued leadership of the Northern Forest Alliance has had great bearing on the accomplishments of the past year. Twenty-eight organizations now make up the alliance.

Your support of the AMC Year-End Appeal is critical to our continued success.

We will not be able to implement our relicensing strategies without your help.

No one at AMC wants to erase the advantage of hydro-generated power as a positive, clean source of energy for our region. Far from it. But we do want to share the windfall of this great free natural resource with the environment that provides it.

That's just plain sensible sharing of our natural resources.

AMC is not simply a fee-for-service organization offering trails to hike and shelter for weary travelers.

Our trailside services are all part of our larger goals:

To protect the mountains, rivers and trails of the Northeast while encouraging ecologically and economically sustainable use; to provide access to and enjoyment of these special places; to encourage stewardship of these areas; to create conservation awareness and appreciation of the natural world through research and education.

Please do what you can to support this phase of the Northern Forest Project and the Year-End campaign to meet our general obligations.

Your membership dollars must be used for facilities, workshops, training, all the activities of AMC. Nothing can be allowed to divert funds from that most basic part of our mission. But additional contributions are needed to ensure the success of our environmental efforts.

We absolutely cannot do this without your help.

You can give strength to our collective voice by renewing your membership right now. The basic membership rate remains only $40. Family membership is just $65. Whichever you choose, please renew today.

You are the source of our hopes for the future.

Sincerely yours,

Andrew J. Falender
Executive Director

P.S. Your renewal contribution is tax-deductible. You may pay directly or with a credit card. Use the reply form enclosed to indicate your wishes.

Printed on recycled paper

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AMC AT WORK

An Update on AMC Conservation Programs

LAND CONSERVATION

Greylock Glen Advisory Committee reviews plan

The Greylock Glen Advisory Committee, a state-appointed committee assigned the task of creating a plan for the future of Greylock Glen, is seeking public comment on a proposal to build a golf course and an environmental education center on the 1,000-acre woodland nestled next to Mt. Greylock Reservation in western Massachusetts.

In addition to the golf course and education center, the plan may include a range of overnight facilities, from a hotel to education-center-type dormitories. Consultants for the Advisory Committee finished reviewing the proposed plan in September, and indicated that it may be the best solution for the site, once slated for a 850-home condominium development.

"Consultants indicate it's workable," said Dennis Regan, AMC Regional Programs director and advisory committee member. "We are trying to please a wider spectrum. It's not geared to one specific audience. It will give people who come to visit the opportunity to participate in something they might not have experienced before." The committee and the state began reviewing the consultants' findings in late September. AMC members are urged to comment on the proposed design. Regan will forward all comments to the state. For information or to comment, write Dennis Regan, AMC, 399 Main St., Union Block, Dalton, Mass. 01226.

AMC members help shape Cape Cod Seashore's future

This summer, the AMC Southeast Massachusetts Chapter Conservation Committee commented on the National Park Service's (NPS) management plan for the Cape Cod National Seashore. The park, known for its rare species of flowers and its delicate ecosystem of dunes and uplands, runs 40-miles along the ocean and sees over 5 million visitors annually.

"We wanted to comment, working with AMC staff, because we are very familiar with the park," said Pam Carter, AMC Southeast Massachusetts Chapter Conservation committee co-chair. "AMC members down here use it a lot. And it's a park for people from all over the world," she said.

In the process of revising its management philosophy for the next 10 to 20 years, the NPS sought public input. "It's a tough job for the Park Service, trying to balance all of the different interests," said Carter. Suggestions the AMC offered included increasing educational programs at the visitor center, improving boardwalks to keep people off the dunes, reviewing off-road vehicle use, and improving hiking and biking trails.

WATER QUALITY

AMC takes a closer look in Androscoggin relicensing

The AMC has met with representatives from the James River Corp. and residents of Berlin and Gorham, N.H., to discuss concerns about the relicensing application of eight dams along the Androscoggin River. In September, the AMC filed for intervenor status with the Federal Energy Regulatory Commission (FERC) to officially participate in the relicensing process.

According to AMC Research Director Dr. Kenneth Kimball, the eight dams — six operated by James River, and two by Public Service of New Hampshire — cumulatively affect the flow and water quality of the river, an important wildlife habitat, fishery, and recreation destination.

In September, Kimball met with residents of the two towns along the 11-mile stretch of river affected by the hydroelectric project to research local concerns. "The attitude seems to be that this place is already all messed up to why fix it?" asked Kimball. "But we shouldn't approach relicensing from that perspective," he said.

"Our objective is not to shut down the dams. Instead, we're seeking to balance public benefit with the negative effects of the dams," said Kimball.

Farther north, in the meantime, Steve Tuchermon, AMC Maine Chapter member and city planner for Old Town, Maine, invited Kimball to participate in a panel discussion, hosted by the American Planners Association, about hydroelectric dam relicensing.

N.H. DES and AMC team up to create river-flow policy

This fall, the AMC and The New Hampshire Department of Environmental Services (DES) teamed up to review the state's rivers flows and uses. The study, conducted by the AMC, will collect and analyze data available from river-gauging stations for rivers recognized under the N.H. Rivers Management and Protection Program.

"Individual watersheds vary greatly in their actual water flow. We need to start to question the numbers in front of us," said Kathy Fallon, AMC Research staff scientist and Switzer Foundation fellow. "We will be able to look at water issues more concretely instead of purely from philosophical points of view." Fallon will compare water flows at all times of the year, and will study major water users such as ski areas, industry, and the public. The AMC Research team will evaluate river flow needs for recreation and aquatic life.

Our Rivers

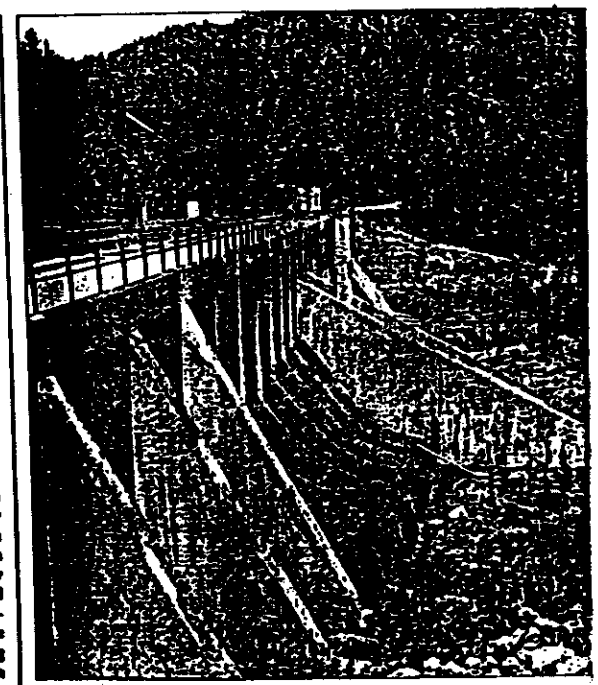
River Interests Pull Together for New England's Dammed Waters

MORE THAN A DOZEN disparate groups representing anglers, boaters, birdwatchers, scientists, lawyers, and conservationists teamed up this fall to make sure hydroelectric developers act to protect the environment and enhance recreational opportunities in exchange for the privilege of harnessing New England's rivers for financial gain.

Conceived in August and officially born in October, the New England FERC Relicensing Coalition will allow members to share resources and expertise, and draw public attention to the concerns of those who use rivers for something other than electric power generation. Its members include the AMC, Conservation Law Foundation (CLF), Trout Unlimited, American Rivers, New England FLOW, Maine Audubon Society, American Whitewater Affiliation, and the Vermont Natural Resources Council.

In theory, the alliance will form a team of public-interest wranglers ready to make sure their voices are heard in every one of the 48 New England dam relicensing cases the Federal Energy Regulatory Commission (FERC) will consider during the next year. In practice, the coalition will probably also be a vehicle for compromise among groups that share concern for the health of New England's rivers, but sometimes differ in their opinions of how power generators can best accommodate the public. A likely credo for the group would be "united we stand, divided we fall."

The coalition is made up of several "teams" working specifically on individual rivers — a strategy designed to ensure that not a single FERC relicensing case slips through the cracks without addressing recreational and environmental issues important to coalition members.



The hydropower dam at Ripogenus Gorge on West Branch of the Penobscot is one of 48 New England dam relicensing cases the Federal Energy Regulatory Commission (FERC) will consider during the next year. Photo by Paul Mitzell.

"There may be competing interests on how water should be released [from dams]," said AMC Research Director Dr. Kenneth Kimball, referring to conflicts between whitewater boaters may want large releases during weekends and other peak times and anglers who want more consistent flows to support fisheries. "What the coa offers is the opportunity for the b the fisheries people and the wh

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people to sit down and work out issues themselves rather than letting FERC and the applicant be the judge.

"We can't make Trout Unlimited the winner on every river and we can't make American Whitewater Affiliation the winner on every river. But we can sit down and try to get equity," Kimball said.

AMC Conservation Programs Director Stephen D. Blackmer acknowledged that "some individual differences" exist among the coalition's members, but he said discussions at initial meetings demonstrated "the remarkable degree to which there were not different visions. There was a very strong consensus on the direction for these rivers. I was really struck by the commonality of the coalition."

Perhaps that shared vision stems from the coalition members' realization that the current wave of FERC relicensings offers New England outdoorspeople an enormous opportunity. Applications are pending on such fabled rivers as the West Branch of the Penobscot and the Kennebec in Maine, and the Androscoggin in Maine and New Hampshire. Several of the rivers and the watersheds they support represent a chunk of the 26-million-acre Northern Forest, this region's last undeveloped wilderness. Since new licenses granted by FERC in 1993 will last 30 to 50 years, coalition members see the relicensing proceedings as a once-in-a-lifetime chance to make sure that the public's interest in clean water, whitewater rapids, pristine shorelands, and sustainable ecosystems isn't sacrificed for the financial gain of a few.

"From the AMC's perspective," said AMC Executive Director Andrew J. Falender, "these issues are paramount, but we also understand the importance of economic sustainability for the regions surrounding the dams, and of reducing the nation's reliance on fossil fuels."

The 1986 Amendment to the Federal Power Act mandated that FERC give "equal consideration" to the public's interests in rivers used for hydroelectric power. It is this legislation that allows the AMC and other interested parties to legally intervene in relicensing cases and ask FERC to require dam owners to do things like alter water flow schedules to satisfy the needs of recreational boaters and fisheries, improve access for hikers and paddlers, and protect endangered wildlife. Such actions are known as "mitigation measures," and the AMC is already pursuing such trade-offs in relicensing cases involving the Androscoggin, Kennebec, and Penobscot.

But the AMC — or any organization — alone can't spread itself thin enough to cover all of the dams up for relicensing next year.

"Really, we just think there are so many rivers involved in relicensing right now and there is so much work to be done that no one group could do all the work, no matter how big it was," said Matthew Huntington, hydropower program director for American Rivers, a Washington D.C.-based organization devoted to preserving and restoring the country's riparian systems. "The best thing the coalition could do would be to benefit from many groups working on the same issue...and for people to see it as a regional issue, rather than a project-by-project issue or river-by-river issue."

Blackmer echoed Huntington's words: "We're hoping to develop mitigation strategies as consistent as we can make them, given the differences between the rivers themselves. Regionwide, we're looking at the coalition to make sure that what goes on on one river can take advantage of the knowledge that's being gained by what's going on on another river."

"I think the coalition means we can do a more comprehensive job of intervening," said Norm Sims, a director of the whitewater boaters' group New England FLOW. "The way to avoid putting all your eggs in the FERC basket is to negotiate directly with the power companies. The coalition gives the power company the opportunity to negotiate with all the key players at the same time at the same table."

"Understanding the concerns of all parties is how we'll gain the most," said Falender, "and that includes the hydro operators. The AMC's strategy has been to work directly with the dam owners whenever possible. It's difficult to process, but it can provide better short-term results and better long-term relationships."

> We can't make Trout Unlimited the winner on every river and we can't make American Whitewater Affiliation the winner on every river. But we can sit down and try to get equity.
>
> *— Dr. Kenneth Kimball, AMC Research Director*

According to AMC Director of Conservation Jennifer Melville, the coalition will not incorporate as a separate non-profit organization, so intervention in FERC cases will continue to be done by member groups or teams of groups. The coalition will focus on sharing information and strategy, coordinating technical and legal assistance among members, and developing and implementing education, outreach and media efforts. The hope is that the united effort will come closer to matching the legal, technical and environmental staffs — and budgets — of the power companies and forest products industries that operate the dams.

Blackmer said one of the coalition's biggest challenges will be making sure it has enough money to follow through on the "massive effort" of having a say in relicensing cases throughout New England. Raising that money from charitable foundations should be easier for a diverse coalition than for lots of individual special-interest groups, he said.

"It shows we're organized. We are together and not splintered, and foundations are more likely to back a winning enterprise," Blackmer said.

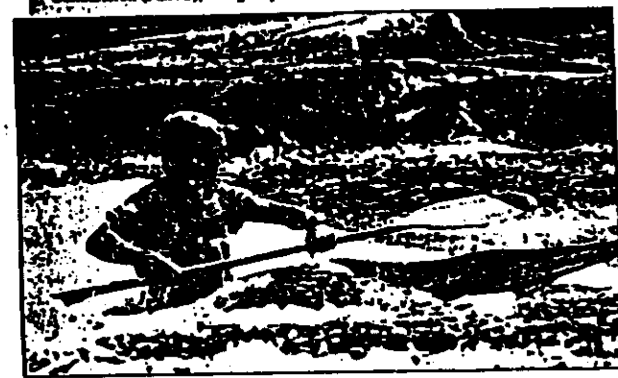
On the eve of the October meeting that solidified the coalition, the AMC, CLF, and American Rivers got word

(continued on page 19)

FERC: A river (of red tape) runs through it

The two-year process to renew dam licenses is as meandering and tricky as the whitewater runs it controls, and as demanding as the strokes a kayaker pulls against the current.

At the center of the action is the Federal Energy Regulatory Commission (FERC), an agency that primarily oversees oil and gas pipelines. For the most part, regulating water-powered electric generating plants represents a small part of FERC's mandate, but there are 231 dams nationwide up for relicensing at the end of 1993. Ninety-two of them are in the Northeast; 48 in New England.



A kayaker runs the West Branch of the Penobscot. Photo by Paul Mozell.

Thomas Russo, the Hydro Power Licensing Office's East Branch project review chief, and his staff will be responsible for conducting complex engineering and environmental studies, sifting through scores of arguments submitted by third parties like the AMC, and, in the end, determining whether hydro developers have made their case to continue using New England rivers, such as the Deerfield, Androscoggin, and Penobscot, to generate electricity.

For licenses that expire in 1993, the relicensing process began at the end of 1991, the deadline for dam owners to file relicensure applications with FERC. Thanks to the 1986 amendment to the Federal Power Act, interested groups or individuals have 45 days after that to ask FERC to require the applicant to conduct additional studies.

Within the 45-day window, FERC and relicensure applicants receive additional study letters and applicants then have 45 more days to file a response. Meanwhile, Russo's office reviews the original application to determine if it meets minimum standards. FERC also scrutinizes the additional study requests and, within 90 days, decides whether an application is adequate. The agency sends letters to dam owners telling them whether more information is needed, and to others that requested additional studies, informing them whether it is requiring the applicant to conduct those studies and, if not, why not.

Once an application is accepted, groups such as the AMC have 45 days to file a motion to intervene in the relicensure proceeding. Russo said that intervenor status, which gives outside groups legal standing in the process, is usually routinely granted.

FERC's review continues, applicants perform more studies if required, and, approximately six months after intervenors file, FERC notifies them and public environmental agencies that the license application is ready for environmental analysis. Intervenors get 60 days to file recommendations on environmental issues and hydropower developers have 45 days after that to respond to their comments. Russo said most environmental and engineering analyses are completed in four to five months and result in a document called an Environmental Assessment (EA).

Sometimes requirements of the National Environmental Policy Act may trigger preparation of a much more involved Environmental Impact Statement. Russo pointed to the Edwards Dam on the Kennebec River in Maine as one that is likely to require an EIS because opponents are calling for outright removal of the dam.

If intervenors don't oppose a license but recommend mitigating measures, as the AMC is doing, Russo said the director of hydropower licensing could grant a new license about a month after issuing the EA. If intervenors do oppose a new license, the case must go to the full FERC board — five FERC commissioners, all presidential appointees — and the granting or denying of a license could still be six months to a year off. Cases presented to the full commission are subject to public hearings, which are carried on CSPAN, Russo said.

"In the end, those involved have 30 to 50 years until the next round, when the hydroelectric dam licenses expire again."

— L.C.

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AMC AT WORK

An Update on AMC Conservation Programs

LAND CONSERVATION

Franconia Parkway divided

Responding to a recommendation from the N.H. Department of Transportation, environmental groups recently signed an agreement to allow construction of a median barrier along the two-lane Franconia Notch Parkway.

"We are deeply saddened by the tragic accidents that have occurred on the Parkway, and have recognized for some time that some form of a divider may be necessary on certain sections of the Parkway," wrote Paul O. Boffinger, president of the Society for the Protection of New Hampshire Forests (SPNHF) and Stephen D. Blackmer, AMC Conservation Programs director, in a joint public statement. The two groups joined the N.H. Department of Transportation, N.H. State Parks, and N.H. Governor Stephen Merrill in signing the agreement.

It was in the early 1980s that the AMC, SPNHF, and state and federal transportation officials — after more than 25 years of negotiation — agreed on a parkway design for the scenic Franconia Notch State Park. Instead of running the four-lane Interstate 93 through the scenic notch, the group designed a two-lane parkway with a speed limit of 45 mph. Franconia Notch, with its lakes, escarpments, and the famous Old Man of the Mountains, is one of the state's most scenic parks.

Property rights hit the Hill

The U.S. Congress and several state legislatures are currently reviewing "takings" legislation. According to environmental advocates, these bills could require taxpayers to reimburse polluters who argue that compliance with public-health laws constitutes a "taking" of property.

"It's a trend. We are seeing this legislation introduced across the country. These bills are not aimed at protecting legitimate property rights; instead they are a veiled attempt to undermine our basic environmental protection laws," said Jennifer Melville, AMC Conservation director.

"The AMC strongly opposes [Senate Bill 177, the Private Property Rights Act, introduced by Sen. Robert Dole]," wrote AMC Executive Director Andrew J. Falender in a recent letter to Senator George J. Mitchell. "S.B. 177 is a serious threat to important regulations that promote the public interest in health, safety, and the environment." According to Falender, the legislation would require federal agencies to conduct elaborate reviews of proposed regulations, ostensibly to avoid any actions that might result in a taking of private property under the Fifth Amendment.

In April the AMC wrote a letter in opposition to S.B.177, testified against a similar bill introduced in Massachusetts, and prepared testimony to defeat another in New Hampshire. Holly Van Houten, the AMC's Grassroots coordinator, said she expected a similar bill would be introduced in Vermont.

For a complete report on "takings" legislation, see the upcoming July/August *AMC Outdoors*. For more information, contact Holly Van Houten, AMC , 5 Joy St., Boston, Mass. 02108; 617-523-0655 ext. 358.

Sterling Forest under review

New York officials say a deal "for under $50 million may soon be struck to make most of the Sterling Forest part of the Palisades Interstate Park System," reported the April 27 *New York Times*.

The AMC recently commented on a draft Environmental Impact Statement (EIS) for Sterling Forest Corp.'s development of the 19,000-acre Sterling Forest in New York. The proposal would bring more than 35,000 new residents to the forest, which lies an hour's drive from New York City.

The AMC, in concert with the National Park Service, Sterling Forest Coalition members, and the Palisades Interstate Park System criticized the plan for fragmenting wildlife habitat, degrading water quality, and affecting the Appalachian Trail, which passes through the forest.

"Sterling Forest's waters provide over 2 million residents of northern New Jersey with drinking water," said Jennifer Melville, AMC Conservation director. "Under the proposed development scenario, roughly 3 million gallons of untreated sewage will flow into these drinking-water sources every day."

The AMC New York-North Jersey Chapter is urging members to write to the state, hosting a Sterling Forest Day at Greenwood Lake in cooperation with Sterling Forest Coalition member organizations, and planning a series of short nature hikes for local residents. For information about Sterling Forest events, consult the New York-North Jersey Chapter Activities listings, or call the AMC's New York office at 212-986-1430.

AMC goes to Washington for Northern Forest funds

The AMC testified in March before a House Interior Appropriations subcommittee in favor of $14 million for the purchase of three Northern Forest "jewels" — Follensby Pond in New York's Adirondack Park, northern Maine's Katahdin Iron Works, and Big Jay in Vermont's Northeast Kingdom. The AMC also asked key federal legislators for $25 million for the Forest Legacy Program, which allows purchase of conservation easements from willing sellers. The AMC hopes these funds would be used to ensure that the land maintains its traditional uses, such as recreation and forestry.

For more on the AMC's 1993 Northern Forest Project and a list of "jewels," see the April *AMC Outdoors*.

It Could Be Better on the West Branch

AMC Calls for More Information on Penobscot Dam Relicensing

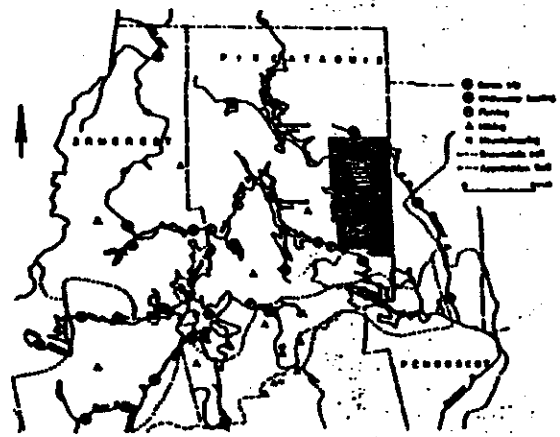
THE WATERS, SHORES, AND forests surrounding the West Branch of the Penobscot River in Maine are natural and recreational resources of national significance. The only way to protect these resources for future generations is to look at each of the area's many pieces — land, water, wildlife, and industry — as well as the long-term sustainability of the big picture.

That's the bottom line of a Statement of Deficiency filed in early spring with the Federal Energy Regulatory Commission (FERC) by the Appalachian Mountain Club, American Rivers, Inc., the Conservation Law Foundation, and Maine Audubon.

FERC is currently considering Bowater, Inc.'s applications to relicense six of 18 hydroelectric dams on the Penobscot — a river, located in the heart of the Northern Forest, known to boaters for its racing whitewater, to loggers for its mills, and to conservationists for its varied ecosystems and wildlife. Bowater, which purchased 2.1 million acres of land, 18 hydroelectric dams, two pulp and paper mills and a sawmill from Georgia-Pacific last fall, applied to FERC last December to renew the 50-year permits required on the dams.

"The West Branch of the Penobscot is clearly one of the most important relicensings in the country because of the size of the watershed and the river and the land involved in that," said Matthew Huntington, director of hydropower programs for Washington-based American Rivers, Inc. "The West Branch is clearly in the very, very top tier of environmental importance and opportunity," he said.

The deficiency statement, which FERC was to rule on by May 1, calls on Bowater to supplement its applications with data from several additional studies addressing the impact of the hydro dams on recreation, fisheries, wildlife, wetlands, and water quality. The AMC is prepared to file for official intervenor status in Bowater's case by July 1 should FERC rule against supplemental studies. If FERC agrees that Bowater should have included information cited in the deficiency letter in its original application, the company will have until Sept. 1 to file a new application with FERC correcting cited deficiencies.



The West Branch region offers a truly unique environmental setting, and includes the northern tip of the Appalachian Mountains, exceptionally large and numerous lakes, and a long tradition of sporting camps.

"Bowater's success in Maine is critically important to the Northern Forest, and especially to communities like Millinocket," said AMC Executive Director Andrew J. Falender, noting the long history of the timber industry in the communities surrounding the West Branch. "The key here is to balance the needs of the company, the recreationists, the townspeople, and the natural resources. I strongly hope Bowater will see that their objectives overlap with ours. Each of us has more to gain in the long run by working with, rather than against, each other. In the end, we're looking for a win-win situation."

According to Huntington, the West Branch system is the largest hydroelectric development used solely by a private company — Bowater uses all of the electricity to power its mills and sells none to the public.

Meanwhile, the Electric Consumers Protection Act of 1986 requires companies that use public water resources for private gain to compensate the public by mitigating any environmental damage and/or enhancing the resources for the public's benefit. Herein lies the backbone of the conservationists' appeal.

AMC Conservation Programs Director Stephen Blackmer said getting

FERC to pay attention to conservation-ists' concerns about the West Branch projects may be difficult because of the overwhelming number of cases the agency must consider during the next year; some 160 hydroelectric dams across the country are up for relicensing.

"We are framing the debate via the deficiency letter," said AMC Research Director Dr. Kenneth Kimball. "We are not disagreeing with the project. We are disagreeing with the amount of mitigation and enhancement involved. In the current [Bowater] application, the mitigation and enhancement is just not there."

According to the Statement of Deficiency, the West Branch watershed spans approximately 100 miles from west to east and about 40 miles north to south, draining an area of more than 2,100 square miles. Historically, the hydropower system, although owned by one entity and controlled through one central location, is governed by four separate FERC licenses. In addition, eight unlicensed impoundments are due for their original FERC licensure.

Kimball refers to the West Branch as a "highly integrated" river system and argued that "the whole watershed should be put under one license."

The letter from the four conservation groups states, "If the recreation and ecological potential of the region is not assessed on a comprehensive basin-wide basis, it will only be performed on artificially segmented sections of the integrated watershed as the Commission undertakes review of each separate license application. The result would be both the potential loss of substantial recreational and ecological opportunities, and the failure to recognize and address adequately the potential adverse impacts of individual license flow regimes on the basin as a whole. We urge the Commission to require a basinwide analysis not only for power purposes but also for fish, recreation, wildlife and water quality values to avoid these two detrimental results."

"FERC ought to recognize that you can't look at this on a site-by-site basis, but you have to consider the entire watershed," Blackmer said.

The letter goes on to point to specific aspects of the watershed that Bowater neglected to consider adequately when it filed for relicensure. Kimball classified the additional studies asked for in the deficiency letter within three categories. First, the AMC and its co-filers want Bowater to take a closer look at when and how much water gets released from the dams, an issue that relates to both wildlife habitat and whitewater boating opportunities. Some stretches of river are currently dry.

> "The West Branch is unique in New England," said Steve Tuckerman, an avid whitewater paddler and canoe trip leader for the AMC's Maine Chapter. "Just about anybody can enjoy it."

The second category of studies would look at better protecting backcountry resources for wildlife and for flatwater canoeists. Kimball said the Chesuncook Reservoir "offers one of the best multi-day backcountry canoe trips in the East," but there are currently no protective easements on the Chesuncook's shores, leaving it vulnerable to development. Bowater should explore the feasibility of placing easements on that and other unprotected land, Kimball said.

"We look at it [the Statement of Deficiency] as complementing what we are doing in the Northern Forest Lands effort," said Mike Cline, director of the Northern Forest Program for the Maine Audubon Society.

"The West Branch is unique in New England," said Steve Tuckerman, an avid whitewater paddler and canoe trip leader for the AMC's Maine Chapter. "Just about anybody can enjoy it," he said, explaining that the river offers everything from Class 5 whitewater to flatwater canoeing and fishing. "The scenery is incredible, with Mount Katahdin staring at you all the time. It's good the AMC is getting together with others to preserve the near-wilderness experience," said Tuckerman, who's been tracking Bowater's activities on the river.

Category three, according to Kimball, includes studies on wildlife protection in general. One method would be to collect data on the impact dammed rivers have on finding habitat for the bald eagle. "The way the project is run is probably causing some serious problems for the bald eagle, which is an endangered species, and probably has substantial impact on wetlands which provide better habitat for moose and ducks and beaver," Kimball said. He said the level of the Chesuncook Reservoir can be "drawn down," or lowered, as much as 44 feet per year, destroying the habitat of many of the fish that bald eagles feed on.

The AMC's FERC filing also asks Bowater to study the potential for energy conservation at its mill facilities, and to substantiate its paper production and employment forecasts. CLF Staff Attorney Don Sosland said Bowater has pledged to invest $600 million in its West Branch facilities, but data show that both production and employment have been falling steadily over the past decade. In 1981, the mills employed 4,171 workers, according to the deficiency letter. That number fell to 2,400 in 1991, Sosland said, and Bowater's relicense application predicts employment will stabilize at 2,000 "for the indefinite future commencing in 1994."

"There's no indication that, given the paper industry, more jobs will be created in the mills," said Sosland, noting that the deficiency letter also calls for studies of possible economic benefits to mill towns from recreation and tourism industries.

— Lisa Capone, an Appalachia Bulletin Advisory Committee member, is author of the AMC's Conservationworks Book.

OBITUARIES

AMC has nothing to gain by delaying relicensing of dams

To the editor:

The AMC has been involved in the Northern Forest issue since the mid-1980's, not to realize any financial gain, but to prevent the type of situation we all witnessed when Diamond International first sold the Nash Stream tract to a developer.

As we stated in a June 10, information paper, the Appalachian Mountain Club believes that the dams on the Androscoggin should continue to operate through compliance with the Federal Power Act. The AMC has nothing to gain from delaying the process, but the public has much to lose if the people's interests remain unrepresented. For too long the dam owners have used the people's river primarily for private gain without sufficient public benefit.

We are involved in the issue because we believe that the environmental and economic future of the North Country—including jobs in timber, tourism and recreation industries—will be enhanced in the long run by a clean, enjoyable river. We are seeking reasonable options that will not impair the fiber base or economic viability of James River's hydropower operations, which are critical to the local economy.

The claim made recently in your paper that the AMC is in this for financial gain is false. When river flows and adjacent lands are made accessible to sportsmen and recreationalists as compensation for the dam relicensing, it is the public that will benefit directly. While the Appalachian Mountain Club is part of the recreation industry, it is first and foremost a non-profit organization that encourages the protection, wise use and enjoyment of the mountains, forests, open spaces and rivers of the Northeast.

We share other's concerns about the toxic contaminants discharged into the river, but the Federal Power Act does not supply us the opportunity to change the paper-making process. However, it does allow the public to raise legitimate concerns about how hydro facilities and their related dams may exacerbate water-quality problems. AMC and the EPA have raised water-quality concerns related to relicensing on the Androscoggin because they may interfere downstream with legitimate designated uses, including boating, swimming and fishing.

The waters of the Androscoggin are publicly owned and it is for this reason a privately owned hydro facility must periodically obtain federal licenses for the privilege of using this public resource. The dams and diversions on the Androscoggin effectively eliminate much of the public's ability to use its own resource, a loss which is typically considered in the licensing process.

We believe that protecting and restoring recreational opportunities, fish and wildlife habitat, energy efficiency, and clean water along the Androscoggin River will be in the best long-term economic and environmental interest of the people of Coos County and New Hampshire. The Federal Energy Commission relicensing process, including the Environmental Impact Study, can go smoothly if the dam owners, agencies and interveners work cooperatively to address these critical issues.

Sincerely

Andrew J. Falender, executive director

Appalachian Mountain Club

Letters Policy

We welcome your comments and opinions on all subjects. Please try to limit your comments to 300 words or less and be sure to include an adress and phone number where you may be reached for verification.

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AMC PEOPLE

Ken Kimball: Researching the possibilities

By Lucille Daniel

THIS MONTH KEN Kimball will once again run the Mt. Washington Road Race, something he's done more times than he can count. "You know the old joke about that race, don't you?" he asks. "They say it's the easiest road race in the world — it's only got one hill."

Making his way almost eight winding miles up the auto road to the highest summit in the Northeast, Kimball will literally run into an old habit of his: combining play with work. Once he reaches an elevation of about 3,000 feet, he'll meet an environmental problem he's been working on since he became the AMC's Research Director in 1983.

AMC Research Director Ken Kimball, pictured above with his son, Eric, has made great strides in water, air, and land protection, and in the Mt. Washington Road Race.

"High-level air pollution is really becoming a health problem for the hiker," he explains. "The base of Mt. Washington can show very clean air quality on a given day, but as you climb up to the bottom of the cloud cover, the air can fall out of compliance with the natural ambient air-quality standards."

This pollution, says Kimball, begins in the Ohio Valley and increases as air moves through a series of urban centers on its way to the White Mountains.

A conversation with Kimball quickly develops into a fascinating mix of adventure and science. Typical of his approach to life was a decision, after receiving a master's in biology from the University of Massachusetts at Amherst, to join the Peace Corps with his wife, Sarah, also a biologist. "We wanted to stop the book learning and do something that was for real," he says.

They landed in Iran in 1972 for a two-year stint with the Smithsonian Institute's Peace Corps Environmental Program. Living on the coast of the Caspian Sea, they worked in the Iranian Fisheries Institute and later helped set up a research lab on water quality.

"We also did a lot of hiking in Iran," says Kimball. "Much of the country is mountainous, and we'd climb Mt. Damavand, which is 19,000 feet up, or go backpacking in the desert. Biology is as much a hobby as it is work. We'd end up going out with other biologist friends just to count gazelles or wild sheep."

During a vacation from Iran, Kimball and his wife spent six weeks hiking in Nepal. "We hit it just before the really big tourist boom," he says. "We just hiked alone from one small village to another, asking the natives if we could stay with them. We made it to the base camp of Everest and then climbed some lesser peaks."

Rather than head straight back to the United States at the end of their Peace Corps work in 1974, the Kimballs "took the slow boat home," by way of Kenya and Tanzania. "You build up a real network in the Peace Corps, and we'd visit research stations wherever we went and ask a lot of questions. Americans have a tendency to look at all big problems, including environmental ones, from a strictly American perspective. It was important to us to understand how other people were attacking the same problems. If you really want to see what overpopulation is like, there's nothing like traveling to Asia and Africa. It's a sobering experience."

The Kimballs took advantage of their time in Tanzania to climb Mt. Kilimanjaro. "It's really just a long hike," he says. "You get up to about 8,000 or 9,000 feet the first day and then climb to the base of the final cone at 15,000 feet the second day. Because the cone is made of volcanic scree, you do best to climb it during the night, when the footing is firm. So we started to the top after midnight under a full moon and then watched the sun rise over the African plain."

Even after these experiences of what Kimball calls "majestic" mountains, he's never lost his respect or affection for the White Mountains of his native New Hampshire. "Sure, they don't have that kind of majesty," he says, "but they're more intimate. They bring you into a closer relationship with the forest."

AFTER RETURNING TO THE U.S. late in 1974, Kimball went on to receive a doctorate in limnology (fresh-water biology) from the University of New Hampshire. He was working at Cornell on an Environmental Protection Agency grant conducting ecosystems research when he heard about the opening for a research director at the AMC.

"I was really attracted to the AMC," he says, "because it has always had strong scientific underpinnings. If we really expect to change policy, we can't afford to be technically inept. The science generally practiced in the environmental world is very biased. A client hires a scientist to prove whatever point the client wants to prove. That's not classic science at all. We need to make sure we keep our science honest, and the AMC happens to be in a good position to do that."

One of Kimball's pet projects has been his involvement in the relicensing of the "Class of '93", the 69 New England dams that come up for licensing by the Federal Energy Regulatory Commission (FERC) this year. "I really felt this was an opportunity for the AMC to make a difference," says Kimball.

His idea was to ask power companies to offer conservation easements on land bordering rivers in exchange for what they are taking from the public by reducing water flow. "Rivers belong to the people," says Kimball, "and these companies are making huge profits by restricting public access to them. We don't want to bankrupt the companies or [illegible] but we want to prevent them from selling prime waterfront land to housing developers."

Kimball's concept has been adopted by a coalition of water-use groups, including the AMC, which is currently negotiating with some of the power companies seeking new licenses for their dams. "A number of them are talking serious mitigation with us now," he says optimistically.

> "If we really expect to change policy, we can't afford to be technically inept."

Kimball also speaks with cautious optimism about finding the time soon to take a break from the work of science. "Every year we try to choose a different place to explore," he says. "Of course, our 9-year-old son, Eric, has a vote now, too." Recent family adventures have included canoe trips on the Penobscot in Maine and the Green and Colorado rivers out West. The threesome also went off on a work-play trip to Costa Rica, where they climbed the 13,000-foot Cerro Chirpo, explored parts of the rain forest, and studied cloud-water pollutants. The next trek, says Kimball, will probably be to Alaska.

But for now, the man who rides his bike 11 miles to work "to get the poison out of the blood" is thinking about that Mt. Washington run. "It's not a long buster," he says. "It just does a job on your legs."

Knowing how much he enjoys combining science and recreation makes me wonder which Kimball will win this race: the biologist who might be watching for "visibility degradation," another effect of air pollution in the Whites; or the outdoorsman who relishes running and hiking in the mountains?

— Lucille Daniel, a Boston Chapter member, is editor of the Chelmsford Independent *in Chelmsford, Mass.*

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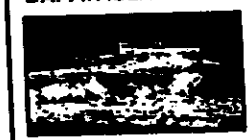

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CLF Conservation Law Foundation

August 8, 1993

By Airborne Express

Lois Cashell, Secretary
Federal Energy Regulatory Commission
625 North Capitol Street NE
Washington, DC 20426

Re: Upper Androscoggin River Draft Environmental Impact Statement

James River-New Hampshire Electric, Inc.
Project Nos. 2422, 2326, 2227, 2311, 2300
Sawmill, Cross Power, Cascade, Gorham, and Shelburne Projects

Public Service Company of New Hampshire
Project Nos. 2287, 2288

Dear Ms. Cashell:

Enclosed for filing with the Commission in the above-captioned proceedings are the original and 9 copies of (1) COMMENTS OF AMERICAN RIVERS, INC.; AMERICAN WHITEWATER AFFILIATION; APPALACHIAN MOUNTAIN CLUB; CONSERVATION LAW FOUNDATION, INC.; AND TROUT UNLIMITED ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE UPPER ANDROSCOGGIN RIVER BASIN HYDROELECTRIC PROJECTS, and (2) MOTION FOR A PUBLIC HEARING.

Please date stamp one copy of the document and return it to our office in the enclosed, stamped, self-addressed envelope. Thank you.

Sincerely,

Mark A. Sinclair

Mark A. Sinclair
Staff Attorney

MAS:plm
Enclosures
cc: Service List

10. No response required.

Vermont Office: 21 East State Street, Montpelier, Vermont 05602-2192 • (802) 223-5992 • Fax (802) 223-5999
Headquarters: 62 Summer Street, Boston, Massachusetts 02110-1008 • (617) 350-4030 • Fax (617) 350-4030
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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In re Applications of James River-New Hampshire Electric, Inc., for Licensing of Sewall, Cross Power, Cascade, Gorham, and Shelburne Hydropower Projects	Project Nos. 2422, 2326, 2327, 2311, 2300
In re Applications of Public Service Company of New Hampshire for Licensing of Gorham and J. Brodie Smith Projects	Project Nos. 2288, 2267

MOTION OF AMERICAN RIVERS, INC; AMERICAN WHITEWATER AFFILIATION; APPALACHIAN MOUNTAIN CLUB; CONSERVATION LAW FOUNDATION, INC; AND TROUT UNLIMITED FOR A HEARING TO CONSIDER PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE UPPER ANDROSCOGGIN RIVER BASIN HYDROELECTRIC PROJECTS

American Rivers, Inc.; American Whitewater Affiliation; Appalachian Mountain Club; Conservation Law Foundation, Inc.; and Trout Unlimited (CLF et al.) hereby request that the Commission hold a public hearing in the Berlin/Gorham, New Hampshire area to receive public comments on the Upper Androscoggin River Basin Hydroelectric Draft Environmental Impact Statement (DEIS). This request should be granted for the following reasons:

1. The preparation of an environmental impact statement (EIS) is designed to ensure that detailed information on significant environmental impacts from a proposed federal action is made widely available to the public. An EIS is to "provide a springboard for public comment..." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989).

2. Regulations implementing the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., require agencies to "[m]ake diligent efforts to involve the public in preparing and

11. Comments are noted.

implementing NEPA procedures. 40 CFR § 1506.6(a). Agencies are required to hold public hearings whenever appropriate and certainly when there is substantial environmental controversy over the proposed action or substantial interest in holding a hearing. Id. at § 1506.6(c).

3. As set forth in CLF et al.'s written comments on the DEIS filed on August 5, 1993, the DEIS is wholly inadequate, does not provide detailed information on the cumulative impacts of the proposed licensing of the seven projects, and requires major revision if it is to meet the requirements of NEPA and the Federal Power Act. The DEIS lacks much of the analysis and information requested during the scoping process by CLF et al., the Environmental Protection Agency, and the United States Fish & Wildlife Service. As a result, there exists significant controversy over the adequacy of the DEIS, its geographic coverage, its treatment of target resources and cumulative impacts, and its analysis of alternatives and mitigation.

4. The licensing of the seven projects will affect the future management of the Androscoggin River and of public resources for the next 30 years. Therefore, the public should have full opportunity to test, assess, and evaluate the information and conclusions offered by the Commission's staff in the DEIS. A public hearing will ensure that information in the DEIS will be developed in a public forum and in a public process based on analysis and assumptions fully disclosed to the public. Reliance solely on written comments is inadequate because there is no opportunity for the public to question the Commission staff's on the DEIS. A public hearing also will ensure fuller participation in the NEPA process.

5. There is substantial interest in holding a public hearing. CLF et al. alone is a coalition of five public interest organizations with a combined membership of hundreds of thousands of citizens. Our organizations believe that a public hearing would allow the Commission to more effectively solicit information from the public on the merits of relicensing these projects and would result in an improved NEPA process.

For these reasons, CLF et al. requests that the Commission immediately hold a public hearing to solicit additional comments on the DEIS.

Dated this 8th day of August, 1993, at Montpelier, Vermont.

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In re Applications of James River-New Hampshire Electric, Inc., for Licensing of Sawmill, Cross Power, Cascade, Gorham, and Shelburne Hydropower Projects	Project Nos. 2422, 2326, 2327, 2311, 2300
In re Applications of Public Service Company of New Hampshire for Licensing of Gorham and J. Brodie Smith Projects	Project Nos. 2288, 2287

COMMENTS OF AMERICAN RIVERS, INC; AMERICAN WHITEWATER AFFILIATION; APPALACHIAN MOUNTAIN CLUB; CONSERVATION LAW FOUNDATION, INC; AND TROUT UNLIMITED ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE UPPER ANDROSCOGGIN RIVER BASIN HYDROELECTRIC PROJECTS

PRELIMINARY STATEMENT

American Rivers, Inc.; American Whitewater Affiliation;[1] Appalachian Mountain Club; Conservation Law Foundation, Inc.; and Trout Unlimited (CLF et al.) file the following comments on the draft environmental impact statement for the Upper Androscoggin River Basin Hydroelectric Projects (DEIS). Unfortunately, CLF et al. believes that the DEIS does not meet the requirements of the National Environmental Policy Act (NEPA) or of the Federal Power Act (FPA).

First, the scope of the EIS is fundamentally flawed. The DEIS should be expanded to evaluate the impacts of all hydropower projects in the Androscoggin River Basin which are unlicensed or which are currently licensed but have relicensing reviews pending or soon to be pending. Such a "program" EIS would ensure a

[1]American Whitewater Affiliation (AWA) intervened in these proceedings independently of the four other public interest groups. However, AWA joins in and supports these comments on the deficiencies of the DEIS.

12. Comments are noted.

basinwide, cumulative impact analysis; allow for the preparation of a comprehensive river plan to guide future licensing decisions; and prevent the segmentation of the Commission's review for projects which are hydrologically connected through a single river flow regulation system.

Second, even if the Commission continues to reject the merits of preparing a program EIS, the DEIS must examine the cumulative and indirect impacts of the seven projects operated by James River-New Hampshire Electric, Inc. and Public Service Company of New Hampshire (JR/PSNH projects). The current DEIS limits the geographic scope of its analysis too narrowly by looking only at the waters of these seven projects. The DEIS fails to examine the operation of these projects, in combination with others, on the resources of the entire watershed. Inexplicably, the DEIS refuses to address the relationship between the operation of the seven projects and the management of the headwater storage reservoirs and associated resource damage in the upper basin.

Third, the DEIS fails to consider the full range of reasonable alternatives to relicensing of the seven projects. Most notably, the DEIS omits any discussion of cost-effective energy efficiency and distribution measures which could provide greater flexibility in flow regime management or act to lower costs of changes to current water management. Moreover, the DEIS does not explore all feasible alternative management schemes to the seven projects' current operation and to the overall river flow management regime - alternatives which could mitigate for the environmental impacts of the hydropower system on fisheries, wetlands, wildlife, and water quality throughout the upper basin.

Fourth, the DEIS only looks at two target resources: dissolved oxygen levels and trout fisheries. It does not assess cumulative impacts on other important basin resources, including recreation, wetlands, and wildlife. As for water quality, the DEIS fails to demonstrate that the projects will comply with state water quality standards, including the antidegradation standards of the Clean Water Act. There is no discussion of whether the projects allow for achievement of the designated uses of the waters. The DEIS fails to accurately and adequately describe the projects' impacts on water quality, deferring instead to post-licensing studies and monitoring to determine whether the projects will adversely affect only one criterion of water quality: dissolved oxygen (DO).

Fifth, the DEIS grossly underestimates the impacts of relicensing the facilities by defining the baseline for analysis as existing environmental conditions under the current hydropower

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operations. As a result, the DEIS wrongly concludes that the Commission does not need to explore mitigation for resource impacts since, according to the Commission, relicensing is only a continuation of the status quo.[2]

Sixth, the DEIS contains no detailed or quantitative analysis by the Commission of resource impacts. The data presented is insufficient, conclusory, not supported by analysis or documentation, and too qualitative. The Commission fails to undertake any independent analysis of the resource issues. Instead, the DEIS only presents the incomplete information provided in the applicants' relicensing applications.

While CLF et al. is pleased that the Commission agreed to prepare an EIS, the document must be more than an exercise in procedure. The NEPA process must be a meaningful information gathering process in order to result in a comprehensive EIS that contains sound, accurate and supportable scientific conclusions. Unless the EIS meets this standard, it cannot be relied on to support issuance of new licenses. The Commission must go back to the drawing board to prepare a new draft EIS.

A. THE DEIS IS DEFICIENT BECAUSE IT IS NOT A PROGRAM IMPACT STATEMENT

The scope of the DEIS should be expanded to address licensing of all unlicensed projects and projects with license reviews pending or soon-to-be-pending in the basin in a program impact statement. The Commission states that it has decided to analyze only the relicense applications for the 7 JR/PSNH projects. DEIS at 1-4. In deciding not to prepare a program EIS for ten additional projects [3], the Commission has rejected the advice of EPA, an agency with recognized expertise in the NEPA process, and the CEQ regulations. In its scoping comments, the EPA wrote:

> EPA believes that in the case of the Androscoggin River the benefits to be gained from such a programmatic EIS, including a

[2] The Commission's position has been soundly rejected by the courts. See Confederated Tribes v. FERC, 746 F.2d 466, 476 (9th Cir. 1984).

[3] The ten additional projects are Rumford Falls (FERC 2333); Gulf Island and Deer Rips (2283); Riley, Jay, and Livermore (2375); Otis (5277); Errol (3133); Middle Dam; Upper Dam; Rangeley Dam; Aziscohos (4026); and Kennebago (4413).

13. Comment is noted. See our discussion in section 1.3.

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basinwide cumulative impacts analysis, the opportunity to evaluate facility operations to minimize adverse environmental impacts, and avoiding the potential segmentation of the environmental review process, argue strongly for the preparation of such a programmatic EIS. Indeed, the CEQ regulations encourage that impacts from broad federal actions such as the Androscoggin River hydro projects, where located in the same geographic area and on the same body of water, be evaluated in a single EIS. The programmatic EIS would also facilitate the analysis of the flow regime for the Androscoggin.

Letter from Elizabeth Higgins Cougran, EPA to R. Feller, FERC, 11/23/92 (EPA Scoping Letter).

The Commission also has ignored CEQ regulations that recommend that federal agencies prepare program impact statements on a group of actions that are related geographically (same region or body of water) or generically (common impacts, alternatives, and subject matter). 40 CFR §§ 1508.18(b)(3), 1502.4(c).

The ten additional projects excluded from the DEIS certainly are both geographically and generically related. The projects are hydrologically connected and benefit from (or serve) a headwater flow agreement that has environmental impacts on the upper basin - impacts which the DEIS refuses to analyze. The operation of these related projects can only be adapted to a comprehensive plan for improving the waterway, as required by the FPA, if considered as an integrated system.

The Commission itself admits that a basin-wide approach is preferable, but insists that there would be an unacceptable delay of several years to prepare such a program EIS. However, the Commission could immediately accelerate the licensing process for these projects not currently under review. And even if a program impact statement would result in some delay in licensing the JR/PSNH projects, this delay cannot justify failing to perform an analysis required by law. Because these licensing decisions will determine the management of the Androscoggin River for the next generation, a delay of even several years is not unreasonable, especially since the Commission can allow the continued operation of the JR/PSNH projects through issuance of annual licenses. Moreover, a comprehensive EIS will save the public and the Commission time and money in the long-run, by avoiding

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duplicative and piecemeal reexamination of relicensing issues through a series of individual environmental assessments. Most importantly, a program EIS will provide a comprehensive analysis to ensure that individual licensing decisions are based on a better understanding of river basin resources and on a coordinated approach to basin management of all resources.

B. THE DEIS IS DEFICIENT BECAUSE IT FAILS TO EXAMINE CUMULATIVE IMPACTS

The DEIS contains no meaningful evaluation of the direct, cumulative, and indirect impacts of (and alternatives to) proposed licensing of the seven JR/PSNH projects. The DEIS is not a comprehensive study of the impacts of these projects on the resources of the entire basin. Instead, the Commission has continued its piecemeal, geographically-limited review of individual hydroelectric projects. The DEIS has misdefined (1) the appropriate geographic area for reviewing the impacts of these projects and (2) the target resources affected.

The DEIS has improperly limited its cumulative impact assessment to the impacts of only the seven JR/PSNH projects. The DEIS fails to examine the impacts of these seven projects "when added to other past, present, and reasonably foreseeable future actions", as required by NEPA. 40 CFR § 1508.7. The DEIS does not assess the resource impacts of the other 26 hydroelectric projects on the river because the Commission states these projects will be examined in individual, segmented environmental assessments. The DEIS states:

> For the remaining projects listed in Table 1-2, we will analyze cumulative impacts of hydropower projects, factoring in all operating projects and other activities on the river at the time the analysis is initiated. Environmental analyses for these projects will be initiated when license or relicense applications are received and accepted.

DEIS at 1-4 (emphasis added).

The DEIS does not conduct the basin-wide impact analysis required by FPA and NEPA. The EIS cumulative impact analysis geographically must cover the entire river basin. The EIS must analyze the cumulative impacts of all hydropower projects, both jurisdictional and nonjurisdictional. And the EIS must consider the cumulative effects of the 26 projects on all environmental resources - not just salmonids and dissolved oxygen.

The Commission offers two reasons for limiting its review to

14. See section 1.3 for our discussion. The EIS analyzes cumulative effects on all affected resources. To make this clearer: under "Affected environment" we eliminated section "3.2 Resources that may be cumulatively affected", moving the discussions on water quality and fish to sections 3.1.3 and 3.1.4. We revised the "Environmental consequences" section, to better emphasize the cumulative effects of the alternatives. See also the "Executive summary" and section 5.1.1 and 5.1.2 which summarize site specific and cumulative effects of the proposed action and the staff's alternative.

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the project specific impacts of the seven JR/PSNH facilities. Despite acknowledging that "a basin-wide approach is preferable," the Commission states that 1) it would require a 3 to 5 year delay in relicensing to gather additional information and would result in a corresponding delay in improving environmental resources at the seven projects, and 2) the target resources of water quality and salmonids are not impacted downstream of Shelburne dam due to distance. DEIS at 1-4. Neither of these reasons has merit. And the DEIS offers no rationale for limiting the target resources analyzed to salmonids and dissolved oxygen.

1. Delay Does Not Justify Failure to Perform a Cumulative Impact Analysis

While performing a proper EIS may delay the relicensing of the seven JR/PSNH projects, the delay is a small price to pay for the increased understanding and the increased resource benefits that will result. A comprehensive EIS will better identify mitigation conditions basin-wide. It also will better coordinate the enhancement measures between all projects. And it will provide a basis for making future licensing decisions instead of the Commission's current reactive approach. A basin-wide approach will produce better licensing decisions by eliminating the Commission's practice of licensing individually small projects in the absence of adequate information showing that cumulatively these small projects cause significant resource degradation.

A cumulative impacts analysis will actually save the Commission time and money in the long run. The data compiled will eliminate the need for duplicative review during the future environmental analyses of the ten other projects.

Moreover, since new licenses for the seven JR/PSNH projects will determine how the unlicensed headwater reservoirs (Rangeley Dam, Upper Dam, and Middle Dam) are operated for the next thirty years, it is critical that the pending applications are not acted upon until these relationships are fully understood. Otherwise, the licensing of the seven Berlin/Gorham projects will cause the incremental loss of basin resources without regard for rest of the basin picture. And if the Commission truly is concerned about improving current operations at the seven projects without delay, it can issue annual licenses with interim enhancements until a cumulative impacts analysis is complete.

2. The DEIS Wrongly Concludes Without Any Analysis That the Projects Cause No Cumulative Impacts

The DEIS is simply wrong to conclude that the seven DEIS

15. Comment is noted. See our discussion in section 1.3 and our response to comment 14. This issue is considered further in the Commission's Notice of Proposed Policy Statement, Use of Reserved Authority in Hydropower Licensing to Ameliorate Cumulative Impacts issued September 15, 1993,

projects have no cumulative impacts on the basin outside of the project boundaries. The DEIS only looked at cumulative impacts downstream on DO and salmonid fish in a 19.1 mile stretch of river from the Sawmill Project to the Maine State line. DEIS at 3-10. The DEIS fails to explain why it did not look at cumulative impacts beyond this arbitrary and geographically limited area. The DEIS merely concludes, without site specific analysis or quantitative data, that the projects cause no downstream impacts on fisheries and water quality because "the interaction of water uses and projects to cumulatively affect target resources diminishes with the distance between them." DEIS at 1-4. This is not real analysis of cumulative impacts, but merely a bald assertion without data or documentation.

NEPA requires a "detailed statement." 42 U.S.C. §4332(2)(C). An "EIS cannot be composed of statements 'too vague, too general and too conclusory.'" Silva v. Lynn, 482 F.2d 1262, 1284 (1st Cir. 1973).

Furthermore, this conclusory statement is contradicted by evidence before the Commission in another recent proceeding that the fishery resource in Maine is contaminated by dioxin from the waters of the JR/PSNH projects. The Commission itself recently acknowledged in the Environmental Assessment for the Rumford Falls Project (FERC 2333-005) (March 25, 1993) that fishery management objectives are limited at this downstream project and that the State of Maine has discontinued stocking of trout from just below Bethel to Livermore Falls, Maine because of high levels of dioxin contamination, "making fish consumption questionable from a health perspective." Id. at 14. It is inexplicable that the DEIS fails to examine the impacts on the salmonid fishery below the Shelburne project when the fishery resource is so negatively impacted by dioxin concentrated behind the JR/PSNH dams that Maine has discontinued managing its fishery. Because of dioxin originating from the waters of these seven projects, both New Hampshire and Maine are unable to achieve a designated use of the Androscoggin: providing fishable waters. The DEIS must examine this downstream cumulative impact, among others.

3. The DEIS Must Analyze the Impacts of the Seven Projects on the Headwater Reservoirs and the Resources of the Upper Basin

The DEIS cumulative impact assessment omits any discussion of the impacts of the JR/PSNH projects on the management of the headwater storage lakes and on upper basin resources. Specifically, the DEIS states:

16. See our response to comment 14. Cumulative effects are the result of an accumulation of site specific effects. Our analysis concludes that substantial environmental enhancement would result from our modifications to proposed project operation and facilities (see sections 4 and 5 of the draft EIS). This analysis is based on
16. site specific studies.

17. We disagree. The seven hydroelectric projects examined in the this EIS do not produce, originate, or discharge dioxin into the Androscoggin River. Dioxin and other contaminants presumably originate from the operation of the pulp and paper mills located on the river. The Commission does not regulate pulp and paper mills or their discharges. These responsibilities belong to the EPA and Environmental Services. Our analysis responsibility lies in the potential of the hydroelectric facilities to affect, impact, or exacerbate the existing dioxin levels found to already exist in the fish downstream of the pulp mills in Berlin and presumed to be
17. contained/trapped in the reservoir sediments. We agree that continued existence of the dam (even in the absence of hydropower operation) would continue to trap sediments and potentially concentrate toxic pollutants. Our recommended action would result in a cumulative impact in conjunction with continued inputs of dioxin from the paper plants, in that for the present and foreseeable future the dams would continue to trap sediments. Given the existing contamination levels in the river (and without knowledge of what the system would be like if the sediment-bound dioxin was allowed to move freely downriver), we concluded that continued operation of the hydroelectric facilities was the best available option. That is, given the existing contamination of the forebay sediments, continued sequestering of dioxin in these sediments is advantageous to flushing them downriver. We do not disagree that fish downstream in Maine may be impacted by the operation or discharges of the Berlin pulp and paper mill.
18. However, based on the information available concerning dioxin transport, we concluded that the operation of the projects in a run-of-river mode with minimal headwater fluctuations would not appreciably resuspend any existing contaminants likely trapped in

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Any decision to modify the operating regime in the headwaters reservoirs would need to balance the benefits of downstream impacts. [However,] no action taken with respect to the Upper Androscoggin projects being considered in this EIS would affect the headwaters reservoirs. Nor do we believe that any action taken now with respect to the Upper Androscoggin projects would constrain decisions that may be made in the future at the headwater projects.

DEIS at 4-22.

The DEIS's failure to look at the cumulative impacts of the operation of the seven projects on the upper basin is a major flaw. The projects cause adverse impacts on upper basin resources because the water levels of the headwater reservoirs are managed to provide a constant, regulated river flow to serve hydropower generation downstream.

The Commission does not deny that these impacts exist. It only refuses to examine them in the DEIS because the Commission is resistant to conditioning new downriver licenses on better management of the headwater reservoirs. While the Commission understands that modification of the management of the headwater reservoirs must balance the corresponding impacts on downstream resources, inexplicably the Commission refuses to undertake this balancing now in the DEIS. Under the Commission's approach, comprehensive basin-wide balancing will never occur. Once new downriver 30-year licenses are issued for the seven projects based on the existing river flow regime, it will be even more difficult to alter headwater management. As just one example, James River will have invested in a new hydropower facility at Pulsifier Ripe based on the Commission's de facto endorsement of the current river flow regime.

The Commission's approach to basin management leads to a situation where the status quo is perpetuated and there is never a comprehensive analysis of how best to operate the entire hydropower system to give equal consideration to all resources. The Commission is illegally segmenting its review of the river's hydropower management even though the upper reservoirs and downriver generating facilities are hydrologically interdependent.

Despite the Commission's statement to the contrary, issuance of seven new licenses <u>will</u> constrain the Commission's alteration of the existing headwater management scheme. The licensing of the seven projects as proposed is based on the assumption that base flows at Berlin will remain at not less than 1550 cfs as a

the sediments and would therefore have little impact, or cumulative impacts, on an existing condition. We also note that Environmental Services, the agency responsible for determining attainment of water quality standards in New Hampshire through the issuance of section 401 water quality certificates deems that the hydroelectric projects would comply with all applicable law and designated uses, including the Clean Water Act.

18. As noted in the comment, we've addressed this issue in sections 1.3 and 4.1.2.7. The Upper Androscoggin Projects would all operate in run-of-river mode. If flows change, for whatever reason, the projects would still operate in a run-of-river mode. Any licenses issued for the upper Androscoggin River projects would include re-opener articles to provide for necessary changes to project operation needed to mitigate for environmental concerns identified during subsequent analyses of upstream projects. The economic viability of the Upper Androscoggin Projects could change as result of reduced flows in the river. As discussed in section 4.1.2.7, reduced flow in the river could also affect other developmental (bedsides hydropower) and environmental resources such as: flood control, waste water assimilation, local economies, water quality, riverine wetland habitats, and river oriented recreation (see section 4.1.2, 4.1.4.1, and 4.1.7). Any decision to modify the operating regime in the headwaters reservoirs would need to balance the benefits with downstream impacts.

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result of the headwater reservoir management agreement among the downriver hydropower owners. For example, James River and PSNH have based their assessment that their project operations will comply with water quality standards on the continued provision of flows of 1550 cfs.[4] The DEIS fails to analyze whether water quality standards would be met with the presence of the dams operated under reduced river flows. It is likely that lowering of the minimum river flow at Berlin to accommodate better management of the headwater lakes would cause violations of water quality standards (DO) at Berlin and require the provision of enhanced flows below each dam. This relationship should be explored now in a comprehensive EIS. Otherwise, down the line (if the Commission defers examining the headwater lakes management to a later time) the risk of water quality violations at the lower projects will prevent alteration of upper basin management to serve the best interests of the public overall.

Furthermore, James River and PSNH have based their economic analysis on the current river flow regime. The existing headwater management results in increased generation capacity at each downriver project. The economic viability of these projects would change substantially if the headwater management scheme were changed and, as a result, lower flows were provided at Berlin. The DEIS also should explore the financial and ownership connection between each downriver project and the headwater benefits agreement (entered by the Union Water Power Company and the Androscoggin Reservoir Company) and the current upper basin management plan.

Other federal agencies certainly recognize the integrated nature of the operation of the downriver projects and the headwater reservoirs. Both the USFWS and EPA have stated that the Commission should examine overall management throughout the upper basin in <u>this</u> DEIS. For example, the USFWS stated:

> [The Commission has] previously postponed a final decision on permanent minimum flows at Aziscohos pending consideration of minimum flow needs at the yet to be licensed Middle Dam Project ... This recognized that the integrated nature of projects in the upper Androscoggin River Basin requires a

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4 James River's water quality model is based on a "worst case" scenario of 7Q10 flows. DEIS at 3-3. At the Shelburne Project, for example, the modeling was based on provision of 90% of the 7Q10 flow or 1350 cfs to determine whether DO standards would be met. <u>Id</u>. at 4-29.

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> comprehensive analysis before permanent operational requirements are imposed at any one development. Furthermore, the FERC staff is presently conducting an Environmental Impact Statement (EIS) on the proposed relicensing of several hydrologically-connected projects located downstream on the Androscoggin River. We recommend that you forego any final determination [as to altered water level management] at the Aziscohos Project until the EIS for the downstream projects is complete, and until decisions are made on how fish and wildlife values will receive equal consideration at all of the projects in the upper watershed.

Letter to Mark Robinson, FERC, from Gordon Beckett, USFWS, June 11, 1993 (attached as Exhibit A).

However, the DEIS fails to address how the management of the seven downriver projects may constrain the determination of the final release schedule for the Aziscohos reservoir, which provides 1/3 of the headwater storage capacity serving these projects. The DEIS does not even acknowledge that permanent minimum flows in the 1985 Aziscohos license were left undecided - flows which could alter the amount of minimum flow received at Berlin. This is just one example of the relationship between management of the upper storage and lower hydropower projects, a relationship which the DEIS fails to evaluate. Certainly, the USFWS believed the DEIS should examine this relationship.

As did the EPA. In its scoping comments, EPA stressed that "the EIS [should] be expanded to include the upstream storage reservoirs and the downstream hydro facilities which may be affected by modifications in upstream flow management." EPA Scoping Letter, 11/23/92.

Without adequate explanation, the DEIS ignores the recommendations of its sister agencies by not examining the cumulative impacts of its proposed licensing decisions outside of the arbitrary geographic boundaries of the seven projects.

The DEIS must contain a complete study of the consequences and potential adverse impacts of the seven projects for areas upstream. The Commission has not required the applicants to employ a basin-wide simulation model to determine the relationship between headwater reservoir storage, downriver project operation, fishery habitat, flood control, wetlands, water quality, and other resources throughout the basin. Without

such an analysis, the EIS cannot address several essential questions: How will the proposed operation of the JR/PSNH projects constrain decisions regarding the management of the headwater reservoirs? What basin-wide losses in fisheries, wildlife habitat, endangered species, recreational opportunities and water quality will result from the proposed operation of the seven downriver projects?

Given the reliance of JR/PSNH's projects on waters from the headwater reservoirs and the relationship of these projects to the management of these reservoirs, it is critical that the DEIS discuss the basin-wide impacts of and mitigation for the current water management regime.

Basin-wide Impacts Ignored by the DEIS

The basin-wide impacts are indisputable, although not quantified in any comprehensive analysis. Run-of-river operations at the seven projects cause substantial fluctuations and drawdowns in the upstream reservoirs (including Aziscohos, Upper and Lower Richardson, Umbagog, Rangeley, Kennebago, and Mooselookmeguntic Lakes).[8] The DEIS acknowledges that "fluctuating water levels have been found to impact aquatic resources by reducing fish spawning success, causing stranding of fish and invertebrates, and subjecting fish to desiccation and predation from terrestrial predators." DEIS at 4-1, -5. However, the DEIS then fails to review these very impacts in the upper reservoirs - impacts which constitute the cumulative and secondary impacts of the JR/PSNH projects.

Among the critical or "target" resources affected by the operation of the seven projects are the littoral zone and wetlands of the headwater lakes. Littoral zones and wetlands provide critical environments for fish and wildlife, and feeding habitat for species such as the bald eagle. The littoral zones and wetlands of the headwater lakes are severely degraded by the extensive drawdowns needed to provide enhanced flows for downriver hydropower.

For example, drawdowns have a negative effect on wetlands, reducing the diversity of wetland communities and preventing the

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8 The headwater reservoirs incur substantial annual drawdowns to maintain enhanced flows to the downriver hydroprojects: Aziscohos - 45 feet, Mooselookmeguntic - 12 feet, Umbagog - 8 feet, Richardson - 17.5 feet, Rangeley - 4 feet, Kennebago - 4 feet. Androscoggin River Basin Overview, New England River Basins Commission, September 1981, p. 23.

19. Comment is noted. See our response to comment 18. With respect to the comment regarding off-site mitigation: Mitigation is appropriate for project specific impacts that cannot be avoided. Off-site mitigation is appropriate if unavoidable project related impacts cannot be mitigated on-site. Any impacts resulting from the operation of the headwaters reservoirs would need to be mitigated by the licensees for those projects.

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establishment of shoreline wetlands. In turn, the loss of wetland habitat reduces the presence of waterfowl and furbearers.

Drawdowns also destroy fisheries. Lowering of water levels adversely effects lake trout fisheries when lowering occurs after fish have spawned, exposing eggs.

Lake drawdowns have caused a virtual absence of productive littoral zone in the headwater lakes at Aziscohos, Mooselookmeguntic, and Richardson Lakes. Fisheries that rely heavily on littoral zones have been harmed. The lack of a littoral zone also harms the endangered bald eagle. Major drawdowns increase the mobility and bioaccumulation of toxics, including mercury, and cause the loss of key food sources to the bald eagle, an aerial feeder of fish dwelling in littoral zones. The DEIS never examined the impact of lost and damaged littoral zones on the ability of the bald eagle to re-colonize the upper basin with nesting pairs.

The DEIS should quantify these impacts in the upper lakes. The DEIS also should explore the extent to which headwater reservoir fluctuations can be moderated to minimize these impacts.

Recommendation

The DEIS must examine the full impacts of the River's water management regime. The DEIS also must explore the extent to which lake fluctuations can be moderated to minimize impacts to wetlands, the littoral zone, recreational areas, and wildlife. To the extent overall basin water flow management cannot be modified to moderate lake fluctuations or the Commission determines that downriver hydropower generation needs justify these fluctuations, the DEIS must investigate off-site mitigation options that the downriver hydropower beneficiaries can provide to compensate for these impacts. The DEIS should explore the ability of the applicants to offer off-site mitigation by protecting wetlands, littoral zones, fisheries, recreational opportunities and bald eagle habitat elsewhere on lands owned in the watershed.

Both James River and PSNH have the ability to offer off-site mitigation by protecting shorelands, wetlands, wildlife habitat, and littoral zones on lands and waterbodies owned in the Androscoggin watershed. This option could provide the most significant form of environmental mitigation at lower cost than other options. The DEIS should identify lands that the applicants own or control elsewhere in the watershed which have resource values that could be placed under conservation easements to compensate for resource losses caused by the cumulative

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impacts of operating the seven projects. Such conservation easements would allow for continued sustainable forestry activities to ensure long-term viability of James River's timber products operation.

For example, James River has the ability to protect lands on both sides of the Androscoggin River located in the towns of Milan, Cambridge, and Errol, New Hampshire, while PSNH owns two major watershed parcels on Wheeler Bay in Dummer, New Hampshire. These properties are located between the headwater reservoirs and the seven hydropower projects and are heavily used by recreational boaters and fishermen, as the fishery in the upper river is not contaminated by dioxin and river water quality is good. The DEIS should describe these and other lands controlled by the applicants and assess the feasibility and mitigation value of protecting them as a condition of licensing.

4. The DEIS Must Identify and Examine All Resources Affected Cumulatively

The DEIS fails to assess the cumulative impact of the projects on all resources effected. Without explanation, the DEIS limits it cumulative impact analysis to two target resources: dissolved oxygen and resident salmonids. DEIS at 4-40, -49. The DEIS does not explain the rationale used in so narrowly and arbitrarily defining the target resources. The DEIS should examine the projects' cumulative impacts on other regionally important resources, such as wetlands and littoral vegetation, wildlife habitat, endangered species, shorelands, recreational use, and on all aspects of water quality including designated uses and toxics standards.

Certainly, both CLF et al. and the resource agencies identified other important public resources that are affected cumulatively by the projects. Specifically, EPA and the USFWS asked that the DEIS examine cumulative impacts on fish habitat, shoreland protection, recreation, endangered species, and the designated uses of the waters. See USFWS and EPA Scoping Comments.

The DEIS must expand its definition and examination of target resources to include all the resources that the FPA requires the Commission to give equal consideration to.

C. THE DEIS DID NOT EXAMINE ALL REASONABLE ALTERNATIVES TO THE STATUS QUO OPERATION OF THE PROJECTS

NEPA clearly requires federal agencies to consider all reasonable alternatives to their proposed actions. 42 U.S.C. §

20. See our response to comment 14.

21. Comment is noted. See section 2.3 for our discussion of the dam removal and energy conservation alternatives. See also our responses to comments 18 and 22 for addressing alternate flow regimes and energy conservation as an alternative.

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4332(2)(C). Section 102(2)(E) states that "[a]ll agencies of the Federal government shall ... study, develop, and describe appropriate alternatives to a recommended course of action in any proposal which involves unresolved conflict concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). NEPA's requirement that an EIS address alternatives "has been aptly characterized as 'the linchpin of the entire impact statement.'" Alaska V. Andrus, 580 F.2d 465, 474 (D.C.Cir.1978), vacated in part sub nom.

Council of Environmental Quality regulations refer to the alternatives discussion as the "heart" of the environmental impact statement. 40 C.F.R. § 1502.14. CEQ regulations require an agency to "[r]igorously explore and objectively evaluate all reasonable alternatives ..." , to "[i]nclude reasonable alternatives not within the jurisdiction of the land agency", and to "[i]nclude the no-action alternative." id.

In its scoping comments, EPA stressed that the Commission should explore the full range of reasonable alternatives "not limited to those that are desirable from the standpoint of the applicant."

> To fulfill this requirement ... EPA recommends that FERC expand the scope of alternatives to be evaluated fully in the EIS to include: (1) dam removals; (2) alternative energy sources and energy conservation; and (3) relicensing with a range of alternative flow regime on a basin wide basis.

EPA Scoping Letter, 11/23/93 (emphasis added).

Ignoring both the requirements of NEPA and the EPA's recommendations, the DEIS fails to explore all feasible alternatives. The DEIS only assesses minor modifications to each project's current minimum flow releases. The DEIS does not consider dam removal as a reasonable alternative. The DEIS does not examine energy conservation as an alternative. DEIS at 2-13. The DEIS does not consider system-wide changes to the river flow regime and water use plan to better balance overall resource protection in the watershed. There is no examination of alternatives to current headwater lake management which might lessen impacts from lake fluctuations. Finally, the DEIS misdefines the "no action" alternative as licensing the projects with no change in the original licenses. As a result of this definition, the DEIS minimizes the environmental impacts of relicensing and insists that there is no need for significant mitigation in the relicensing process. DEIS at 2-13, 4-41, -43.

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1. The DEIS Should Examine the Key Contribution Energy Demand Reductions Could Make In Providing Additional Environmental and Resource Benefits

NEPA requires federal agencies to consider energy conservation as an alternative to proposed actions. NRDC v. Morton, 458 F.2d 827 (D.C. Cir. 1972) ; NRDC v. Hodel, 865 F.2d 288 (D.C.Cir. 1988) (agency must consider energy conservation as a partial alternative to outer continental shelf leasing program even if alternatives would not reduce need for leasing); Mason County Medical Association v. Knebel, 563 F.2d 256 (6th Cir. 1977) (EIS for proposed coal-fired generating unit was adequate as it considered the alternatives of alternative generation and energy conservation); Swinomish Tribal Community v. FERC, 627 F.2d 499 (D.C.Cir.1980); Libby Rod & Gun Club v. Poteat, 457 F.Supp. 1177 (1978) (agency violated NEPA by failing to adequately consider conservation as an alternative to a hydropower dam in meeting the Northwest's energy needs); see also National Wildlife Federation v. FERC, 912 F.2d 1471 (D.C.Cir. 1990) (FERC properly considered water conservation as alternative to dam which was designed primarily for water supply).

The Federal Power Act also requires consideration of alternatives to proposed licensing of a hydropower project in sufficient detail to determine that the project is in the public interest. Swinomish Tribal Community v. FERC, 627 F.2d 499, 512 (D.C.Cir. 1980). The Electric Consumers Protection Act (ECPA) specifically requires the Commission to give "equal consideration" to energy conservation as well as to hydropower production. 16 U.S.C. § 797(e).

> Amended Section 4(e) requires the Commission, in deciding whether to issue ... a new license for an existing project, to [sic] give "equal consideration" to the purposes of energy conservation and environmental values ... in deciding whether to issue the license for power and developmental purposes. Such consideration is important because it is intended that the Commission give these nondevelopmental values the same level of reflection as it does to power and developmental objectives. In other words, it requires thorough evaluation of these values before the Commission makes its licensing decision. Consequently, equal consideration must be viewed as a standard, both procedural and substantive, ... Protection, mitigation, and enhancement of fish and wildlife, energy

22. See revised section 2.4. In reality, load reduction and energy conservation measures do not displace relatively low-marginal-cost generating resources such as nuclear, solar, wind, high-quality geothermal, and hydropower, except in very rare instances when those are the only resources operating. The generating resources that are displaced in actual practices are those with the higher marginal costs, such as oil-fueled, natural-gas fueled, and coal-fueled generating resources. For this reason, load reduction and energy conservation are not true or reasonable alternatives to the operation of generating resources with low marginal operating costs, such as in the case of relicensing existing hydroelectric projects. Load reduction and energy conservation can be considered as alternatives to only the highest marginal cost resources, or considered to the extent that they can effectively delay the date at which new generating capacity would need to be constructed to serve power demands.

The various Regional Electric Reliability Councils (ERC's) of the country prepare and submit reports, titled "Regional Reliability Council Long Range Coordinated Bulk Power Supply Programs," to the U.S. Department of Energy (DOE) each year. These reports, known as DOE Code IE-411, contain, among other data, the forecast of annual energy requirements and the compound growth rate of the peak load for the next 10-year planning period. In the IE-411 reports, the utilities' load estimates are reduced by the projected amounts of energy conservation and load reduction that can be economically achieved by specific dates. Therefore, any economic or need-for-power studies based on the regional load/resource data in the IE-411 reports have fully considered all the reasonable, economical alternative load-reduction and conservation measures.

The results of studies using the IE-411 data show the benefits of and need for projects to serve load that cannot be reasonably be eliminated or reduced by load-reduction or energy conservation measures. Therefore, when economic studies are done based on the need for capacity and energy shown in the IE-411 or equivalent

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> conservation, and the protection of recreational opportunities are the potential cost of doing business for hydropower projects ... Projects licensed years earlier must undergo the scrutiny of today's values as provided in this law and other environmental laws applicable to such projects.

H.R. Conf. Rep. No. 99-934, 99th Cong., 2nd Sess., at 21-22 (1986) (emphasis added).

Despite the requirements of NEPA and ECPA, the DEIS failed to discuss energy conservation as an alternative to relicensing of seven projects. Instead, the DEIS states that:

> We believe that energy conservation and utilization of environmentally sound hydropower, a renewable resource, need to be developed to the maximum extent possible as an alternative to energy generated from fossil fuels. Consequently energy conservation and hydropower generation are not mutually exclusive and we don't consider them to be alternatives to each other.

DEIS at 2-13.

The DEIS ignores the fact that while energy conservation may not eliminate the applicants' need for the hydropower projects altogether, it could serve as a partial alternative to the projects' current hydropower operation. As a partial alternative, energy conservation programs could allow the applicants to modify existing operations to provide enhanced fishery flows at little if any cost in terms of power loss.

Courts require that agencies "consider such alternatives to the proposed action as may partially or completely meet the proposal's goals." NRDC v. Callaway, 524 F.2d 79, 93 (2nd Cir. 1975) (emphasis added). An alternative is still reasonable and must be considered even if it does not offer a complete solution to the problem. NRDC v. Morton, 458 F.2d 827, 836 (D.C. Cir. 1972). The Commission must still consider energy conservation alternatives even if such alternatives do not reduce an applicant's need for the hydropower project. NRDC v. Hodel, 865 F.2d 288, 295-6 (D.C.Cir. 1988). Agencies must consider alternatives which would allow a hydropower project to be carried out differently, such as a project modification to enhance fishery flows. Mandelker, NEPA Law and Litigation, 10-60.

The DEIS does not examine the energy conservation plans of

reports, no additional studies are needed to demonstrate that theproposed generating resources being evaluated would not displace more cost-efficient conservation or load-reduction measures.

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James River and PSNH, fails to consider the role conservation investments could play in providing more flexibility in project operations, and fails to require the applicants to provide information showing that they are maximizing energy production from the existing hydropower facilities. The DEIS fails to give any consideration, notwithstanding "equal consideration", to the positive role energy conservation can play in increasing the flexibility to enhance non-power values. The DEIS must investigate the lowest-cost energy alternative available in weighing the balance between power and non-power values that will be reflected in final licensing decisions.

James River and PSNH have not provided detailed information in their applications as to their conservation and demand side management activities. For example, James River has not produced any studies or analyses of the technical potential for electricity conservation in its mills. The DEIS must develop this information.

Specifically, the DEIS must examine the following additional sources of power that could be sufficient to replace some or all of the hydropower losses associated with project or river flow modifications:

a. Opportunities to improve the electrical efficiency of James River's mill facilities

Cost-effective energy investment programs in energy efficiency technologies have proven to be a least-cost supply alternative to traditional supply options. The major utilities in New England are spending approximately $250 million in 1992 on programs designed to capture "megawatts" lost through waste and inefficiencies. These expenditures are capturing hundreds of megawatts of power at costs of 2-6 cents per kilowatt hour, or 20-60% of the cost of traditional supply alternatives. These programs are targeted to residential, commercial and industrial users, including large, energy intensive manufacturing companies such as James River. Results of industrial customer treatments conducted during the early stages of these programs are beginning to emerge. These results show that measured, program-induced electrical savings of 15% to 30% are not uncommon.

Several recent studies addressing both general industrial electricity conservation potential and more specifically addressing electricity conservation potential in the pulp and paper industry find a large technical and economic potential for electrical efficiency savings. Emerging results from New England utility efficiency programs for industrial customers are demonstrating that much of the technical potential to save

23. James River currently generates about 77% of the annual energy requirements at the Cascade and Burgess Mills, 54% by hydroelectric, 23% by cogeneration, and purchases the remaining 23% from Public Service. Load management is not considered a significant resource by James River. Although the company continuously searches for new energy conservation measures, James River has only limited opportunities for load management because most of the manufacturing processes are uninterruptible.

23. James River Corporation assigns a high priority to conservation of energy, and has a team of conservation specialists who travel to the manufacturing divisions to evaluate and improve conservation measures. Because of measures implemented after the team's most recent recommendations, James River has been able to reduce their energy consumption (measured in kWh per ton of finished product), during the period from 1984 through 1988, by 10.75% at the pulp mill and by 10.34% at the paper mill, although total consumption has increased by an average of 2% per year due to production increases. James River also has a policy of updating retired motors and other equipment with more energy efficient equipment as the need arises. However, as the numbers indicated above, additional savings through conservation and efficiency improvements are not enough to eliminate the alternative of purchased power and to keep up with the continuing increase in production.

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electricity in New England can be captured.

Complete analysis of energy efficiency investments at James River's facilities is important for two major reasons.

First, supply acquisition through conservation investments may be made at a cost less than that of the alternatives to project hydropower assessed as "lowest cost" by the applicant: purchases from PSNH.

Second, efficiency investments could be helpful in reducing energy demand and therefore in making James River's operations more efficient.

A recent study of industrial electrical conservation technical potential conducted for BC Hydro contains the most systematic examination of technical potential to conserve electricity to date in pulp and paper mills.[6] This study finds a technical potential to save over 50% of the electricity necessary in paper making (compared with 1988 base conditions in British Columbia pulp and paper mills) by 2010 and to save over 30% of the electricity necessary to produce mechanical pulp. This study also projects wide adoption of several mechanical pulping process improvements that could also reduce electricity consumption.

Another recent study of electrical conservation and energy management potential in Maine pulp and paper mills conducted by the MIT Energy Lab,[7] found the following in summary:

> The potential for cost-effective[8] savings of both electrical (20-25%) and thermal (35-40%) energy today is greater than the savings achieved over the past 20 years. Furthermore, the technology exists to cut the

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6 M. K. Jaccard and Associates, 1991-1994 Electricity Conservation Potential Review: the British Columbia Industrial Sector, prepared for BC Hydro, February 1992.

7 Howard J. Herzog, Zheng Chang, and Jefferson W. Tester; Energy Management in Central Maine Power Company's Industrial Sector with Specific Emphasis on the Pulp and Paper Industry; prepared for the Central Maine Power Company by the Energy Laboratory, Massachusetts Institute of Technology, March 1992, MIT-EL 92-001.

8 Cost-effective was defined in this study as calculated from a utility viewpoint (MIT-EL at page 27).

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overall energy intensity of pulp and paper manufacture in half (emphasis added).[9]/

James River's licensing applications do not provide information on the potential at its mills for cost-effective conservation investments. Therefore, the Commission must obtain through the NEPA process additional information on the technical potential for cost-effective conservation investments in the mill facilities. The DEIS should identify all efficiency improvements that would be less expensive than the least expensive alternative power sources. The DEIS should provide the following information:

- a full description of the financial criteria used by James River in making efficiency investments
- a full description of the financial criteria to be used to identify all cost-effective conservation investments
- a comprehensive analysis identifying all additional conservation investment opportunities costing up to the least next expensive energy alternative

b. Opportunities for PSNH to provide additional investments in a utility efficiency program and to improve the efficiency of customer electricity use

The DEIS should identify the opportunities for PSNH to increase its investments in utility efficiency programs to the extent such investments cost less than the New England region's long-range marginal cost of utility power production. The DEIS also should assess all practically achievable efficiency improvement opportunities in PSNH's power facilities, transmission and distribution system, and other electricity-using facilities that cost less than New England's long-range marginal cost of utility power production.

c. Opportunities to expand power production at existing hydroelectric facilities

The DEIS must provide an adequate analysis of the cost-effective potential to enhance power production from the existing dams. As more fully set forth below, there are specific areas where efforts to optimize power production may be available. The

9 MIT-EL at 57.

24. Public Service is actively maintaining many Demand-Side Management (DSM) programs that improve efficiency of the use of electricity and which, therefore, reduce electric load and system generation requirements. However, alternatives that are available to customers that would substitute other supplies (e.g., self-generation) or technologies that use fuels other than electricity are not encompassed in this definition of DSM programs. Many of Public Service's energy efficiency programs are primarily informational in nature, which communicate the latest efficiency information on appliances, lighting, motors, processes, and other electrical applications. Detailed information of these various efficiency programs can be found in the license application, Exhibit H, Attachment A, Section III, titled, "Integrated Least Cost Resource Plan, 1991 Edition, Assessment of Demand-Side Options".

25. Both James River and Public Service have studied extensively the many opportunities to expand capacities at their existing projects, and their current proposals are the most feasible at this time. The Androscoggin River in the areas of the seven hydroelectric projects has been and is fully developed and regulated to capture any additional capacities, such that your request to list such opportunities is unwarranted at this time.

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DEIS should clearly detail all such power optimization opportunities that are economic to New England.[10]

Opportunities may exist to cost-effectively improve the efficiency of James River and PGNN's hydropower system. A lengthy list of such opportunities were identified in the 1986 Northwest Conservation and Electric Power Plan:[11]

- Turbine improvements (estimated for all pre-1960 units);
- Turbine governor improvements;
- Generator windage loss reduction (estimated for all pre-1980 units);
- Solid state exciters (considered promising for all units without such equipment);
- High efficiency transformers (considered promising for all pre-1975 projects not to have post-1975 transformer replacement);
- Improved water use[12];
- Increased operating head; and
- reduction in station service loads (considered promising at all pre-1980 units);

2. <u>The DEIS Fails to Examine Modifications in Overall Basin Flow Management</u>

The DEIS does not include an analysis of alternatives to the overall basin-wide river flow/reservoir management regime that could result in moderation of fluctuations in the headwater reservoirs and less damage to nonpower resources in the basin.

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10 All power optimization opportunities that cost up to the New England region's long-range marginal cost for incremental electrical power should be identified.

11 NCEPP, Volume Two, at pages 6-5 to 6-7.

12 Examples presented of such measures included improved spillway gate seals, spillway gate position indicators, and bypass water energy recovery facilities.

26. See our responses to comments 18 and 17.

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The DEIS must examine alternative water use plans for the upper river basin which could lessen destruction to wetlands, wildlife, recreational and fishery values throughout the system.

In other relicensing proceedings involving major watersheds, sophisticated models, such as the U.S. Army Corps of Engineer's HEC-5 model, have been employed to evaluate alternative water use options throughout an entire hydropower system. See e.g., FERC Additional Information Request, Project 2323 (Deerfield River) (requiring use of the HEC-5 model or some other modeling approach to develop a project operations model "for the Deerfield River Basin, including current and proposed operating characteristics of projects within the basin, but not part of the current application ..."). In the JR/PSNH proceedings, however, the Commission has not required this information, despite the fact that the seven projects are operated under a basin-wide water use plan. Moreover, both PSNH and James River are parties to the headwater benefits agreement and therefore control the management of the headwater storage reservoirs. There is no legal or factual basis for the inconsistent treatment of the watersheds.

The DEIS must examine alternatives to the current basin water use plan by using a sophisticated operations model. The DEIS must examine alternative basin management regimes that could result in less destruction to wetlands and trout populations, that could provide additional habitat for wildlife and bald eagle, that would reduce littoral zone losses, and that would enhance recreational benefits, while maintaining necessary flood control and water quality benefits the basin.

3. The DEIS Misdefines the No Action Alternative

The DEIS misdefines the "no action" alternative as relicensing the projects under the terms of the original licenses. DEIS at 2-13. Instead, the DEIS should define the no action alternative as not relicensing the projects (dam removal, federal takeover, or issuance of a nonpower license). The proper definition of "no action" is critical because the no action alternative "provides the benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action and alternatives." Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18026 (March 1981).

CEQ regulations provide two definitions of "no action." The first definition involves situations where ongoing programs, such as land management plans, will continue under existing legislation. Only in these cases does "no action" mean "no change" from the status quo. Id. Relicensing hydroelectric projects is not such a situation - involving an ongoing program -

27. The "no action" alternative is the action, which if selected, results in no change to the existing environment. The Commission defined the existing environment at relicensed projects to be as it is today not up to 50 years ago (Commission Order 513, issued May 17, 1989). This is reasonable because there is no practical way to get data about the environment as it existed pre-hydroelectric development. The same goes for obtaining data about the river as it existed in a free flowing unregulated state. The Upper Androscoggin River was probably first regulated in 1820's when sawmills were first established at Gorham and Berlin (see section 3.1.7). This does not mean that the effects of the projects on the river are ignored. Section 3 provides extensive discussion of the existing environment which includes project effects on environmental resources associated with the Androscoggin River, both positive and negative.

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as the courts have made clear. Relicensing "is more akin to a irreversible and irretrievable commitment of a public resource than a mere continuation of the status quo." Confederated Tribes v. FERC, 746 F.2d 466, 476 (9th Cir. 1984), cert. denied, 471 U.S. 1116 (1985).

The existing JR/PSNH licenses expire at the end of 1993; the applicants have applied for new licenses, not an extension to the existing licenses. Therefore, hydroelectric project relicensing involves the second situation discussed by CEQ regulation:

> The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward... This [no action] analysis provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives... Inclusion of such an analysis in the EIS is necessary to inform the Congress, the public, and the President as intended by NEPA.

46 Fed. Reg. 19626 (emphasis added).

As required by the FPA and by NEPA, the DEIS must define the no action alternative as not issuing new power licenses for the seven projects. In fact, denial of a new license is required by law if any of the projects fail to comply with the Federal Power Act.

By misdefining the no action alternative as continued operation of the hydropower projects, the DEIS then claims that the proper baseline to measure the magnitude of impacts associated with relicensing is existing project conditions. See e.g. DEIS at 4-43. Instead, the DEIS should acknowledge that the proper baseline for analysis of impacts is pre-dam conditions. Through its mischaracterization of the baseline, the DEIS minimizes the true impacts of relicensing and concludes that there is no need to identify significant mitigation on or off-

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sites.[13]

The DEIS establishment of a false baseline for its impact analysis renders the document a big lie. The Commission again has ignored the recommendations of EPA, an agency with particular expertise on NEPA compliance. The EPA wrote:

> EPA recommends that the EIS evaluate the total impacts from the hydro projects, not merely the impacts from the proposed modifications or operation changes. For purposes of measuring the impacts, the baseline for the environmental analysis should be the <u>conditions that existed pre-project, before the construction of the hydro facilities</u>. This baseline of pre-project conditions should also be used as the basis of the no action alternative analysis.

EPA Scoping Comments, 11/23/92 (emphasis added).

The definition of the baseline as the existing environment under current hydropower operations, instead of conditions under an unregulated flow regime, causes a gross trivialization of the impacts of new licensing of these facilities. It also violates NEPA's requirement that the EIS evaluate the <u>full</u> environmental impacts of the proposed action.

The DEIS must analyze river conditions under the proper baseline - an unregulated flow regime; compare river conditions under new licenses with the unregulated scenario; and identify measures (both on and off-site) to mitigate for the <u>full</u> impacts of new licenses on river resources as compared to conditions if the river was managed solely for nonpower values.

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13 For example, the DEIS states that:

> Requiring off-site mitigation for loss of recreational opportunities within the boundaries of James River's six projects is also not necessary. We interpret the Conservation Law, <u>et al.</u>'s request as referring to the loss of recreation opportunities that occurred when these projects were originally built. We, however, consider the existing conditions as the baseline for a project relicense.

4-40, -41.

4. The DEIS Fails to Examine All Potential Mitigation Alternatives

NEPA requires a thorough discussion of mitigation measures. 40 C.F.R. §§ 1502.14(f), 1502.16(h), 1508.20. Mitigation includes measures that would compensate for unavoidable hydropower impacts by providing substitute resources. The DEIS must discuss off-site measures when on-site mitigation is not feasible.

The USFWS specifically requested that the DEIS consider off-site mitigation since the presence of the seven projects has limited the opportunities for on-site mitigation. In its Scoping Comments, the USFWS wrote:

> A broad range of mitigation and enhancement alternatives should also be assessed. The Berlin-to-Gorham reach of the Androscoggin has been severely impacted by the hydropower and industrial development. As such, opportunities for on-site, in-kind mitigation are somewhat limited, especially in the areas of riverine fisheries habitat, riparian habitat and recreation. We encourage the Commission to explore other opportunities where on-site, in-kind mitigation or enhancement are not possible or feasible.

USFWS Scoping Letter, 11/23/92 (emphasis added).

However, the DEIS fails to consider any off-site mitigation alternatives to compensate for the projects' on-site and basin-wide cumulative impacts on fisheries, wildlife, recreation, public access, and water quality. A revised DEIS should examine several types of off-site mitigation.

First, the DEIS should discuss the need for and mechanics of establishing a recreational and natural resource damage restitution fund based on a percentage of the net present value of the hydropower generated from the issuance of new licenses. The establishment of such a fund is gaining acceptance in other relicensing proceedings. See Deerfield River Enhancement Fund Agreement, proposed by the Massachusetts Department of Environmental Management in FERC Project 2323. Such a fund would be used to enhance environmental and recreational resources of the watershed, including those within or outside the boundaries of the seven projects, especially for mitigation not contemplated at the present time. The fund could be used to protect riparian lands and waters for recreation, conservation, and natural

28. The use of on-site enhancement measures was determined to be the best alternative to off-site mitigation measures. As stated in section 4.2.7, off-site enhancements are not necessary because on-site enhancements are feasible and are staff-recommended license requirements for each project. Refer to section 5.1.2 for a summary of these enhancements.

With regard to your suggestion that a damage restitution fund be established to cover recreational mitigation not yet contemplated, we rely on other mechanisms to monitor and require future recreational enhancements. Some ways that future recreational needs are identified at our licensed projects are: (1) a licensee may notify us of their intent to make improvements on their own volition; (2) licensee and Commission monitoring efforts for recreational use (such as Form 80) may indicate a need for a particular improvement; (3) the Commission's regional office staff may identify such a need while conducting their periodic environmental and public use inspections and; (4) future letters of concern by resource agencies or other interested parties may alert the licensee and Commission. It is common for the Commission to receive requests from the licensees to make improvements due to changing or unforseen circumstances during the term of the license and for the Commission to require future improvements.

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resource protection.

Second, as discussed above at pp.12-13, the DEIS should identify off-site lands in the watershed that the applicants have the ability to affirmatively protect. As a condition of new licenses, these land would be managed for the traditional uses of the watershed (forestry) and for wildlife habitat, recreational use, wetlands, and quality fisheries.

D. THE DEIS FAILS TO ADEQUATELY ASSESS WATER QUALITY IMPACTS AND NEEDED MITIGATION

It is well-recognized that the seven projects have contributed to the degradation of water quality in the river and prevented attainment of New Hampshire's Class B designated uses. The dams have reduced natural aeration, dramatically lowered flows in bypass reaches, and reduced water quality overall. The dams also have acted to trap sediments and caused the concentration of toxic pollutants, such as dioxins, which in turn have contaminated fish and prevented attainment of a sport fishery (where the fish caught can be safely consumed). The DEIS fails to quantify these dam-induced water quality problems. The DEIS should assess the impacts of the projects on such water quality parameters as color, phosphorus, bacteria, lead, toxics, odor, turbidity, and suitability for the designated uses of swimming and fishing.

As the EPA stressed:

> the EIS should demonstrate that the proposed projects can comply with water quality standards including the antidegradation provisions pursuant to the Clean Water Act. While demonstrating project compliance with these standards, the EIS should also evaluate impacts on waste assimilation, dissolved oxygen levels, and dioxin and phosphorus contamination of the waters of the Androscoggin River. The EIS should also provide a detailed discussion of environmental effects of the bypass flows, impacts on designated uses of the waters, including fisheries and recreation, and impacts on endangered species (e.g. bald eagle).

EPA Scoping Comments, 11/23/93. The DEIS ignores EPA's recommendations.

29. We consider other parameters of water quality at the projects, as they related to water quality and criteria of designated use. However, we limit the detailed analysis in the EIS to the parameters deemed pertinent to the proposed action (see sections 3.1.3, 4.1.2, and, 4.2.2).

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Rather than a detailed analysis of water quality, the DEIS relies wholly on the water quality assessment and modelling performed by James River, despite the fact that this modelling is flawed, demonstrates the potential for future violations of the DO standard, and fails to examine any other parameters of water quality other than DO.

30. We agree that the QUAL2E model was imprecise, but not that it was flawed as EPA states. We examined the study results, conclusions, and comments pertaining to the water quality issue. We then relied on our independent analysis to reach the conclusion. We consider other parameters of water quality at the projects, but limit the detailed analysis to the parameters deemed pertinent to the proposed action.

The DEIS seeks to downplay the fact that the field data collected by James River indicated that DO levels were dangerously close to the Class B standard. The DEIS conveniently discounts PSNH's conflicting data which actually detected violations of the DO standard in project waters. Without any independent analysis by the Commission, the DEIS simply accepts James River's conclusion that these violations "appeared to be attributable to diurnal variations caused by primary producers" and that "primary production is not a major overall influence on the total DO budget." DEIS at 4-3. These statements are pure conjecture. The DEIS must conduct an independent, objective examination of the potential for DO violations through new studies conducted by the Commission prior to licensing.

31. The Commission does not conduct new studies on its own, but can require an applicant to conduct new or more detailed studies or analysis if it is deemed necessary by staff in their independent analysis. Staff determined that, though imprecise, the QUAL2E model was the best available information at predicting changes that could potentially occur due to operational and structural changes in the project area. Post-licensing monitoring of the water quality would ensure that the predicted minor changes did not violate state water quality standards.

For example, the DEIS should analyze the impact of waste assimilation and phosphorus loads on the increased production of primary producers before concluding that the project waters will not experience violations of DO. The modelling performed by James River simply does not account for the effect of nutrient levels on macrophyte and periphyton photosynthesis and respiration inputs to the DO budget and on diurnal variations in DO. Without this analysis, the DEIS cannot conclude that the projects will conform with DO standards.

32. The QUAL2E model runs attempted to quantify the major factors responsible for determining water quality (specifically DO) in the project area. Calibration and verification of the model with the available data showed that the model results approximated the conditions found. James River commented in their filing that they considered the effects of these other parameters to be minor, and that the system, and thus the model, were largely driven by other more significant factors.

As discussed at pages 8-9, James River's water quality model should be rejected because it is based on an incorrect worst case scenario 7Q10 flow. James River's prediction that the projects will comply with DO standards assumes the continued availability of artificially high flows to the Berlin projects from a private headwater management agreement. However, 7Q10 flows should be based on a more natural river flow pattern. Because the headwater management agreement is not a FERC-approved water use plan and is subject to change by private parties, the real worst case 7Q10 value may be much lower than the 1350 cfs used by James River to show compliance with DO standards. See DEIS at 4-28. There is no guarantee that a minimum flow of 1550 cfs (or 1350 cfs) will be provided to the seven projects during the duration of new licenses. In fact, it appears that the Commission has required minimum flow releases of only 522 cfs from Lake Umbagog, which immediately controls flows to the seven projects. See Article 28, License Order, Errol Project No. 3133-001 (August 1983). Therefore, flows much lower than 1550 cfs may be provided

33. The seven projects analyzed are all run-of-river projects. We have no jurisdiction or authority over the continued availability of flows from the upstream storage reservoirs. As such, James River based their water quality model and analysis on the current 7Q10 flow for the area. Further, we agree that there is no guarantee that a minimum flow of 1550 cfs will be provided during the duration of the new licenses. However, we have based our analysis on the best available information, and we assume that any future decision on the flows from the upstream sources will be made in cooperation with, and with approval from, Environmental Services

to the seven projects at any time. The DEIS does not discuss whether the Berlin area is receiving flows lower than 1550 cfs and how often. If the Berlin area regularly receives flows less than the 7Q10 flows used in the James River modelling exercise, obviously the model's conclusions are useless. The DEIS must address this issue.

Furthermore, the Commission has authority to review the overall river flow regime and require needed changes as it reviews the merits of licensing the headwater reservoirs and the seven downriver projects (as mentioned earlier, the final release schedule for Aziscohos Lake is currently unresolved and may affect how much water actually reaches Berlin). This issue again illustrates the need for the Commission to conduct a comprehensive basin-wide analysis. The DEIS must review reasonable alternative river flow regimes that would allow better management of the upper reservoirs. The water quality analysis for the 7 JR/PSNH projects correspondingly should evaluate how various modifications to the headwater flow plan would affect water quality parameters in the Berlin area. And once a comprehensive EIS identifies the most beneficial reservoir and river management water use plan, the needed modifications in flow releases at the Berlin projects to comply with water quality standards can be determined based on resulting 7Q10 flows.

At one point, the DEIS fully acknowledges that James River's modelling study is flawed since there is insufficient data to ensure that it is representative of typical water quality conditions. DEIS at 4-25. The DEIS also admits that "[d]ecreasing spillage at Cascade and James River Gorham has the potential to adversely impact water quality in the Androscoggin River, especially during DO limiting times (i.e., low flow, high temperature)", while increasing the height of Shelburne reservoir will further reduce freeflowing river conditions. DEIS at 4-22. However, the DEIS does not quantify the cumulative effect of these hydropower changes when combined with current river conditions. Despite finding James River's analysis incomplete and inadequate, the Commission has not conducted any additional studies to correct the water quality information deficiencies. The DEIS also fails to identify mitigation measures, such as enhanced bypass flows, to ensure adequate margins of safety to prevent projected DO violations.

Instead of requiring new studies to assess the significant impact of nutrient levels on DO levels, instead of requiring changes to existing project operations to enhance DO levels, and instead of recommending denial of project modifications that will further reduce DO levels, the DEIS only proposes implementation of a <u>post-licensing</u> water quality monitoring program to detect

cooperation with, and with approval from, Environmental Services and EPA.

34. See our responses to comments 18, 32, 51, 33, 87.

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future DO violations. This program allows for data collection that should be performed before licensing decisions are reached. The Commission also intends to require the post-licensing development of a plan to modify operations as necessary to meet water quality standards. DEIS at 4-48,-49.

The reliance on post-licensing studies and post-EIS assessment of project modifications to mitigate for predicted future DO violations violates both NEPA and the FPA. Confederated Tribes and Bands of the Yakima Indian Nation v. FERC, 746 F.2d 466 (9th Cir. 1984) (the Federal Power Act requires FERC to examine all resource issues before issuing new licenses), Sierra Club v. Marsh, 976 F.2d 763, 770 (1st Cir. 1992); Appalachian Mountain Club v. Brinegar, 394 F.Supp. 105, 121-22 (D.N.H. 1975) (a deficient EIS cannot be corrected by supplemental post-EIS information because it denies the public "the opportunity to test, assess and evaluate the data and make an informed judgment as to the validity of the conclusion to be drawn therefrom".) The Commission should evaluate the potential for water quality violations and necessary project modifications to avoid future violations in the DEIS prior to licensing.

The DEIS also concludes, without documentation or analysis, that enhanced bypassed flows at the Smith, PSNH Gorham, and JR Gorham Projects will protect against DO violations. However, the DEIS does not quantify the effect of these flows on DO levels. There also is no exploration of whether greater bypassed flows at the projects would better safeguard against predicted DO violations.

The DEIS also fails to explain whether increasing the elevation of Shelburne Reservoir and constructing the Pulsifier Ripe facility with a corresponding lowering of DO levels complies with the antidegradation policy of the Clean Water Act. The DEIS does not independently assess and clearly explain the potential for DO violations as a result of the proposed Pulsifier Ripe development.

The DEIS also does not assess the impact of construction of the proposed Pulsifier Ripe project on stream sediment disturbance. The DEIS must identify the presence of any contaminated sediments at this river location based on comprehensive testing and discuss measures to avoid disturbance of toxic sediments in the project impact area. See Manual of Standard Special Articles, Paper No. DPR-4 (April 1992), p.35. This is extremely important for the Pulsifier Ripe project since the DEIS acknowledges that toxics such as dioxin reside in the study area.

35. See sections 4.1.2 and 4.2.2. We conclude that with proposed and our recommended measures, the projects would not violate state standards.

36. See revised section 4.2.2.3.

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E. THE DEIS FAILS TO OBJECTIVELY EXAMINE THE NEED FOR AND COST OF ENLARGED SHORELAND BUFFER ZONES

The Commission clearly has determined the need for applicants to acquire and protect sizeable buffer zones to protect hydropower project lands. Alabama Power Co., Project 2628, 3 FERC 63,036 at 65,246 (1978), aff'd, 12 FERC 61,059 (1980). Buffer zones ensure scenic protection, provide recreational access, and protect wildlife habitat and water quality. While the DEIS concludes that a buffer zone is justified around several of the seven projects, the Commission arbitrarily establishes shoreland protection zones that are insufficient in size to achieve adequate resource protection. The Commission also provides for the development of a post-licensing shoreland protection plan, again violating the requirement of NEPA and the FPA that resource impacts and mitigation plans be developed in a public process conducted prior to licensing.

The DEIS rejects CLF et al.'s recommendation that all project buffer zones be extended significantly to the height of adjacent land on the eastern and northern shores. Our recommendation is based on available information as to surrounding land uses, existing development pressures, existence of adjacent undeveloped lands owned or controlled by the applicants, and the resource values of the lands. The DEIS agrees that buffer zone size should be determined on a site-specific basis using specific criteria and objectives. DEIS at 4-47. But then the DEIS fails to identify these criteria or objectives. Instead, the DEIS sets the size of the recommended buffers at an arbitrary and limited 200 feet around the Cascade, Gorham, and Shelburne impoundments, without any explanation other th[illegible] that this width is a standard size buffer established in an old 1965 order. The DEIS does not explain that the buffer zone established on the eastern shore of the Cascade/Pulsifier Ripo Project would be virtually nonexistent since the proposed new penstock will occupy the narrow buffer and prevent public access to the river.

The DEIS states that no information has been presented that indicates that the project shorelines are the target of commercial or private development. However, the very purpose of the NEPA process is for the Commission to assess these development pressures and the adequacy of the current level of protection during the future 30-year term of new licenses. To determine the necessary buffer zones, the DEIS should analyze the current zoning regulations and the recent rate of development and subdivision along the undeveloped lands adjacent to the river. The DEIS should calculate how much and what kind of development

37. The Commission commonly considers the need for project shoreline buffer zones. Section 4.41(f)(7)(iii) and 4.51(i)(B) of the Commission's regulations emphasize the need to consider establishing a buffer zone of sufficient width to allow public access to project lands and waters and to protect the scenic, public recreational, cultural, and other environmental values of the reservoir shoreline. Although we reference a 200-foot width as a rule-of-thumb for a buffer zone, it is stipulated in section 4.51(i)(B) that a project boundary for existing major projects should not be more than 200 feet (horizontal measurement) from the exterior margin of the reservoir, defined by the normal maximum surface elevation. Additional land may be included if needed for shoreline control, recreational access ,or other environmental reasons. Because we do not agree that the licensees should be expected to purchase and control use of vast amounts of land within the basin, as suggested by CLF and Interior, we have reference the 200 foot rule-of-thumb. The environmental effects associated with these projects do not warrant such extensive enhancement.

With regard to CLF's statement that we have not stipulated criterion for selecting the width of the buffer zone. We believe that this criterion should be developed by the licensee and the consulted resource agencies. This would ensure that site-specific and local matters are properly considered in the development of a buffer zone such as private land ownership, terrain, and local zoning regulations.

Regarding CLF's request that we analyze the zoning regulations, rate of development along the river, and investigate all options for conserving lands adjacent the Androscoggin River, we believe the environmental impacts associated with these projects do not warrant such extensive mitigation.

could potentially occur along the shoralands under current zoning in Berlin, Gorham, and Shelburne.

The only factor the DEIS examines in establishing recommended buffer zones is the cost to the applicants. The DEIS calculates the cost of providing the buffer zones recommended by CLF et al. based on the market value of timber lands. The DEIS does acknowledge "that James River Paper Company, an affiliate of the James River applicant, may own a substantial portion of the shoreline abutting James River projects." DEIS at 4-48. However, inexplicably, the DEIS fails to explore whether any of these lands are already owned by the applicants, a factor which would substantially reduce the cost of buffer zone acquisition. The DEIS should identify which lands adjacent to the projects are owned or controlled by the applicants. This information could dramatically change the cost/benefit ratio of providing truly adequate buffers as recommended by CLF et al.

The DEIS must investigate all options for conserving lands adjacent to the Androscoggin River in the general vicinity of the projects, and not just limit shoreland protection to an arbitrary narrow band of shoreland. The DEIS contains no comprehensive study of the need to preserve and protect land owned or controlled by the applicants in the project area or elsewhere in the watershed. The applicants should take a pro-active role in preserving the quality of their land holdings. Recreational, wildlife, and traditional uses of the area should be protected over the course of new licenses by preventing inappropriate development of watershed lands controlled by the applicants.

In other relicensing cases around the country, applicants provide significant buffer zones around all the lands they own in the basin surrounding a hydropower facility (i.e. Deerfield River project in Vermont; Salmon River project in New York). However, the JR/PSNH project boundaries were drawn decades ago to exclude virtually all adjacent shoreland. The Commission's present responsibility is to ensure public access and to protect the quality of the public waters while allowing hydropower generation to occur. The Commission must not just accept arbitrarily drawn project boundaries that prevent adequate watershed protection. The Commission is authorized to look beyond existing boundaries and should do so.

F. THE DEIS FAILS TO EXAMINE THE CUMULATIVE IMPACTS OF THE PROJECTS ON RECREATION OR TO IDENTIFY OPPORTUNITIES FOR RECREATIONAL ENHANCEMENT IN THE BASIN AS PROJECT MITIGATION.

The DEIS acknowledges that the hydropower projects have limited public access to the river and that opportunities for on-

38. In the event that on-site mitigation or enhancement were not possible we would consider off-site opportunities. This was not the case with the projects analyzed in this EIS. On-site enhancement

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site recreation are limited. DEIS at 4-39. However, the DEIS fails to assess the full significance of the loss of recreational resources along this 11-mile stretch of public river because the Commission insists that these losses occurred when the projects were originally built and are not relevant to relicensing. As a result, the DEIS concludes that the loss of recreational use from relicensing is insignificant, major recreational enhancements on-site are unneeded, and "requiring off-site enhancement measures as requested by Conservation Law, et al. would not be necessary." DEIS at 4-40. The DEIS flatly refuses to examine opportunities for off-site recreational enhancements even though the Scoping Document stated such opportunities <u>would be examined</u>. Scoping Document II at p. 13.

The DEIS should describe how the projects have severely degraded fishing, boating, and swimming opportunities along a major stretch of the Androscoggin River. The river basically is unusable for recreation between the Sawmill dam and the proposed Cascade diversion dam to hydropower development, reduced water quality and minimal bypass flows. The river is not swimmable in the waters of any of the projects. Any fish caught cannot be safely eaten due to dioxin advisories. Boating has been almost eliminated due to the gauntlet of eight dams. The DEIS does not describe these impacts. Nor is there an assessment of the effect of reduced flows from the proposed Pulsifier Ripe project on canoeing. The DEIS ignores the fact that the USFWS has stated that the seven projects have caused a significant, cumulative loss of public resources and recreational opportunities. Memorandum from Gordon Becket, USFWS, 9/2/92. Instead, the DEIS pretends that there are no cumulative impacts to recreational resources in the Berlin/Gorham from the projects' operations.

As recommended by the USFWS and NPS, the DEIS should examine the potential for the applicants to provide off-site recreational opportunities elsewhere in the watershed to compensate for the loss of public use of the river in the Berlin to Gorham stretch. There is unmet and expanding demands for recreation areas in the upper watershed. The DEIS will likely identify many existing and new recreational opportunities which could be enhanced in the broader region surrounding the projects, including but not linited to fishing and public access to the river and watershed lakes, snowmobile and x-c skiing trails, and backcountry camping facilities, all designed to be consistent with the traditional uses and character of the area. Enhancement of recreational opportunities could provide significant economic benefits to this region.

is the best alternative.

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G. THE DEIS FAILS TO PROVIDE A COHERENT EXPLANATION TO SUPPORT ITS FISHERY RECOMMENDATIONS

The Commission's analysis of the impacts of relicensing on the fishery is strangely inconsistent with its view of recreational impacts. While the DEIS insists that relicensing has no impacts on recreational resources because the projects are already existing, the Commission does admit that relicensing does have continuing cumulative impacts on fisheries. In fact, the DEIS accepts the recommendations of the USFWS, over the applicants' objections, to increase minimum flows in the various bypassed reaches to enhance the fishery.

However, the DEIS fails to examine several important fishery issues, such as the impacts of the projects on the presence of dangerous levels of dioxin in fish and on the reduction of aquatic macroinvertebrate communities. Furthermore, the DEIS fails to provide a coherent rationale for its differing recommendations at the various projects. For example, it is unclear why the DEIS recommends downstream fish passage at the Gorhams and Cascade Projects, but not at Sawmill, Smith, Cross, and Shelburne if the goal is to provide a self-sustaining fishery throughout this stretch of river.

The DEIS does not identify the full cumulative impact of the seven projects on the fishery. Several statements in the DEIS confirm that the projects do cumulatively prevent achievement of the designated use of providing a healthy, edible, and sustainable fishery as required by state water quality standards and the Clean Water Act. For example, the DEIS states that there is no need for fish screens and bypass facilities at the Sawmill, Smith, Cross, and Shelburne Projects because passage of fish is currently not a management objective. DEIS at 4-30. The DEIS also states that "[t]he proposed relicensing of the projects could adversely affect toxic and contaminant concentrations in the Androscoggin River through cumulative impacts." DEIS at 3-3. The DEIS further notes that recent studies have confirmed the presence of dioxin in samples of trout and brown bullhead taken from below James River's Berlin mill, resulting in restrictions on consuming fish. DEIS at 3-4. However, the DEIS fails to fully explore or quantify these cumulative impacts or to suggest mitigation or compensation for the fishery degradation.

In essence, while the DEIS recommends several fishery enhancements at PSNH Gorham and at James River Gorham and Cascade, the improvements are only incremental and do not adequately compensate for the full impact of the seven dams on the fishery and on the public's enjoyment of it. The DEIS fails to acknowledge the full impacts of the battery of dams on the

39. We disagree. For a discussion on dioxin see sections 3.1.4 and 4.1.2.6, and our responses to comments 17, 33, 87 and 122. As to the aquatic macroinvertebrate communities, we have recommended flow changes which would result in significant aquatic habitat enhancements in over 2.6 miles of the remaining free-flowing, Androscoggin River reaches in the 11-mile Berlin-Shelburne reach. For reasons discussed in sections 4.1.3.3 and 4.2.3.1, we have not recommended optimum aquatic habitat flows in the Sawmill or J. Brodie Smith bypassed reaches which comprise approximately 0.6 miles or about 18 percent of the total available un-impounded reaches. We have, however, recommended increased zone-of-passage flows in these areas.

40. See revised section 4.2.3.2.

41. We disagree. We have based our recommendations on an analysis of all seven projects, both independently and cumulatively. Our fishery recommendations would result in significant beneficial effects on the fishery resources in the area. See response to comment 26a. and section 4.2.3.2.

42. Comments are noted.

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fishery or to identify enhancements that the applicants could provide elsewhere in the basin to compensate for the unavoidable impacts of the facilities.

The DEIS discussion of dioxin contamination of the fishery is inadequate. While acknowledging the presence of dangerous levels of dioxin in fish, the DEIS concludes, without scientific analysis or documentation, that dioxin and other toxicant levels in fish would not be likely to increase under the proposed operation of the projects. DEIS at 4-13. The DEIS does not explain how it determined that minor fluctuations in reservoir levels and the periodic substantial drawdowns that occur will not cause the release of dioxin and increase fish contamination. Moreover, regardless of future increased contamination, the DEIS fails to identify mitigation or compensation for the current contamination built up behind the dams that has destroyed the public's enjoyment of the fishery and created a public health hazard.

The DEIS treatment of the need for fish passage facilities is also inadequate. The DEIS fails to assess whether the downstream fish passage facilities recommended at the Gorham and Cascade Projects will provide sufficient restocking rates of fish to sustain the isolated pockets of habitat being protected.

The proposed flow enhancements at the individual projects also are insufficient when viewed in light of the state's management objective that the Berlin to Shelburne stretch of the river should be managed as a self-sustaining wild trout fishery. See DEIS at 4-10.

At Sawmill, despite the findings of a fish survey and minimum flow study that a bypassed reach minimum flow of between 125 and 440 cfs would provide optimum salmonid habitat, the DEIS recommends a 12 cfs flow because of the lack of angling access at the project. DEIS at 4-7. The DEIS fails to identify any mitigation off-site for this loss of fish habitat and fishing opportunity. There is no explanation of why James River should be allowed to destroy fishery habitat just because the project now prevents public access to its waters. Also, there is no explanation of why providing sustainable fishery habitat at the Sawmill Project with proper downstream fish passage would not benefit the fishery downstream at the other projects where public access is still possible. The DEIS must address these issues.

At the Smith Project, the Commission lacks sufficient information to determine whether the bypassed reach can provide quality trout habitat. PSNH never performed an analysis of the full range of flows that could improve overall fish habitat

43. 43. See responses to comments 17, 33, 87 and 122.

44. 44. See revised section 4.2.3.2.

45. 45. We disagree. Our recommended bypass flows at Cascade, James River Gorham, and Public Service Gorham would provide over 2.6 miles of optimum trout habitat in the 11-mile Berlin-Shelburne stretch. Thus, over 80 percent of the available free-flowing riverine habitat in this stretch would be significantly enhanced. Interior states in their comment letters that with adequate flow releases, this 2.6 miles would be valuable for trout and "encompass the only potential salmonid habitat in the highly impounded and bypassed river reach from Berlin to Shelburne. Further, Fish and Game states that these recommended flows, "will restore the fisheries in the bypassed reach and maintain consistency with the Fishing for the Future management plan."

46. 46. See revised sections 4.1.3.3 and 4.2.3.2.

47. 47. See revised sections 4.2.3.1 and 4.2.3.2.

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characteristics. Despite this lack of information, the DEIS determines that the only management goal is to provide a zone of passage for fish. DEIS at 4-34. The DEIS should analyze whether this reach can be managed to provide suitable trout habitat pursuant to state fishery management objectives. Again, the Commission's argument that protecting fishery habitat at this project is not justified because public access is limited is inconsistent with the Commission's mandate to give equal consideration to fishery resources.

Even assuming the only goal at the Smith Project is to provide a zone of passage, the DEIS recommends a bypass flow of only 20 cfs instead of 65 cfs, although CLF et al. provided evidence that the latter flow will provide a more effective passage. The DEIS fails to meaningfully answer our position that the 65 cfs flow will reduce the threat of in-pool predation from great blue heron, mink, raccoon, and kingfishers; that the higher velocities will provide better and quicker passage; and that the 65 cfs flow will exhibit the least amount of temperature and DO variation and accompanying stress to transient fish. The DEIS also fails to assess whether the 65 cfs flow would improve the aesthetics of the project waters as recommended by the NPS. See Comments and Recommendations of CLF et al. on Smith Project, March 15, 1993, pp. 10-12. 48.

At the Cascade Project, the DEIS recommends a bypassed reach minimum flow of 400 cfs based on the recommendations of USFWS that this flow is best for juvenile trout habitat. Based on the available information, however, CLF et al. now believes that an 800 cfs flow is more suitable. The DEIS fails to assess the benefits of this higher flow. James River's studies indicate that a 800 cfs flow is best for adult rainbow trout habitat. This river segment should be managed for stocked adult trout since the current downstream passage of fish is very limited, as acknowledged in the DEIS. ("Fish and Game stocking of large ... rainbows upstream do not seem to be contributing significantly to the fish populations in the reach" - 4-8). It makes less sense to manage the project waters for juvenile trout (with a 400 cfs flow) because this stretch of river lacks any effective spawning habitat to give rise to juveniles. DEIS at 3-17, 4-8. While the DEIS argues that potential spawning habitat in adjacent tributaries and recruitment from upstream makes it "likely that the fry and juvenile habitat would be readily utilized", there is no evidence that this is true, especially since the tributaries do not appear to be providing fish now. DEIS at 4-8. An 800 cfs flow would also provide better attractive flows for the successful use of fish bypass sluices at the Cascade Project. The DEIS should address the benefits of this 800 cfs higher flow. 49.

48. Section 4.2.5 concludes that because of the hazards associated with access to the bypassed reach we do not recommend any specific flow releases. The width of the bypassed reach and the large boulders located throughout the reach would make it necessary to release much greater than 20 to 65 cfs flows to make a difference aesthetically. If such flows were released, very few people, if any, would see it.

49. We disagree. An instream flow of 800 cfs was analyzed in the context of the IFIM study. We agree with the study results indicating that rainbow adult trout habitat is maximized at 800 cfs. The objectives and basis of the IFIM study, however, were not to solely model rainbow trout adult habitat. The consulted agencies, including both Interior and Fish and Game, agreed that all life stages of both rainbow and brown trout would be modeled. Results from the study would be used to select a flow which optimized all life stages, not merely adult rainbow trout. To selectively choose study objectives and goals after the fact, we believe seems contrary to the point of study scoping. The IFIM results suggest the optimal discharge for all brown trout and rainbow trout life stages to be approximately 400 cfs. Thus, if in fact, the management objective for this reach is to provide a self-sustaining fishery, we find that a flow of 400 cfs would provide the best probability.

As we pointed out in section 4.1.3.3, a 800 cfs flow would result in a 40 percent loss of brown trout fry habitat and a 46 percent loss of rainbow trout fry habitat when compared to the recommended 400 cfs flow. A discharge of 400 cfs would provide 82 percent of the maximum WUA for rainbow trout fry, 99 percent for juvenile rainbow trout, 92 percent for adult rainbow trout, 87 percent for brown trout fry, 100 percent for juvenile brown trout (Figure 4-1), and 99 percent for adult brown trout (Figure 4-2).

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H. THE DEIS FAILS TO ANALYZE THE IMPACT OF PROJECT OPERATIONS ON ENDANGERED SPECIES

The DEIS fails to demonstrate that, under Section 7(a) of the Endangered Species Act, 16 USC § 1536(a) (ESA), licensing of the projects will not jeopardize the continued existence of the bald eagle - a federally listed endangered species. The DEIS must examine whether the licensing actions would reasonably be expected, directly or indirectly, to reduce the likelihood of either the survival or recovery of a listed species by reducing the reproduction, numbers, or distribution of that species. 50 CFR § 402.02.

The DEIS does admit in a series of statements that bald eagle could be harmed directly by the presence of toxins and contaminants in the waters of the seven JR/PSNH projects:

"Dams can adversely affect wintering bald eagles ... In the case of the Upper Androscoggin River, exposed prey and open water in winter may not be completely beneficial to bald eagles because the prey may be contaminated." DEIS at 4-17;

"The proposed relicensing of the projects could adversely affect toxic and contaminant concentrations in the Androscoggin through cumulative impacts", DEIS at 3-3;

"dioxin levels could be adversely affected by operation of the projects", DEIS at 3-5;

"Toxic effects of environmental contaminants is one of the reasons for bald eagles' overall population decline", DEIS at 4-18.

However, inexplicably, the DEIS then concludes without documentation or sufficient explanation that "[w]e conclude that continued operation of the projects nor the proposed generation expansion is not likely to adversely affect bald eagles." DEIS at 4-18.

An EIS is inadequate if it does "not describe the likely environmental harms well enough to allow the [agency] to make an informed decision." Commonwealth of Massachusetts v. Watt, 716 F.2d 946, 948 (1st Cir. 1983).

> A conclusory statement 'unsupported by empirical or experimental data, scientific authorities, or explanatory information of any kind' not only fails to crystallize issues, but 'affords no basis for a comparison of the problems with the proposed project

50. As noted by the FWS and in section 3.1.5 bald eagles may be occasional transients in the Berlin-Gorham area. We conclude in section 4.1.4.2 that bald eagles are not likely to be adversely affected by continued operation of the projects. See, also, the responses to comments 16 and 17.

and the difficulties involved in the alternatives.'

Silva v. Lynn, 482 F.2d 1282, 1284 (1st Cir. 1973).

Because the DEIS does acknowledge that bald eagles are present at the projects and could be affected by contaminants trapped behind the dams, under the ESA, the DEIS must fully analyze in detail the effects of the projects on the species and its habitat, including indirect and cumulative effects; identify measures to minimize or avoid the impacts; identify opportunities for enhancing the species either on or off-site, and analyze alternatives that would reduce impacts. The DEIS also must document the consistency of relicensing with the USFWS Northern States Bald Eagle Recovery Plan. The DEIS performs none of this analysis in any meaningful and well-documented way.

The DEIS does not use the best scientific data available to quantify or model estimated dioxin contamination in bald eagles using these projects as required by ESA. There are techniques available to estimate the impact of dioxin in bald eagles feeding in the JR/PSNH project waters.[14] The DEIS should employ these techniques before concluding that the projects do not adversely affect bald eagles.

The DEIS also fails to discuss the indirect impacts of the seven projects on bald eagles. For example, as discussed previously, the headwater reservoir management plan has resulted in the virtual absence of a productive littoral zone in several of the upper lakes because of major drawdowns (Aziscohos, Mooselookmeguntic, Richardson). Eagle reproductive rates are lowered by the lack of viable littoral zones and littoral fisheries. Drawdowns also increase the problems of mobility and bioaccumulation of toxics, affecting eagle survival and recovery. The DEIS should assess these impacts and explore alternative water management plans that would reduce drawdowns and protect eagle feeding habitat. To the extent the water use plan cannot be altered, the DEIS should identify off-site mitigation in the form of protection by the applicants of future nesting and feeding habitat in the watershed not influenced by the effects of reservoir drawdowns. The DEIS should explore sites that would provide suitable nesting, isolation from human disturbance, and

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14 For example, the EPA has developed a document entitled the "Great Lakes Water Quality Initiative - Technical Support Document - Procedure for Deriving Criteria for Protection of Wildlife." The document presents a protocol for estimating toxic bioaccumulation factors and the sensitivity of a species to the toxicant.

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nearby food sources.

I. THE DEIS FAILS TO MEANINGFULLY ASSESS THE CONSISTENCY OF RELICENSING WITH STATE COMPREHENSIVE PLANS

NEPA requires an EIS to assess how a proposed action will comply with other environmental permitting laws such as the Federal Power Act. 40 CFR § 1502.2(d). In turn, the FPA requires the Commission to determine whether licensing decisions are consistent with all applicable state comprehensive plans. Without any analysis or explanation, the DEIS baldly concludes that the projects are consistent with 8 listed comprehensive plans. DEIS at S-7.

The DEIS must do more than make a blanket statement that the projects conform with state watershed management goals and objectives. The DEIS should specifically list the relevant provisions of the 8 plans and explain how the proposed action would conform with and achieve state objectives for the Androscoggin River during the duration of new licenses.

As just one example of the failure of the DEIS to examine the consistency of the projects with applicable comprehensive plans, the DEIS ignores the objectives of the State Comprehensive Outdoor Recreation Plan (SCORP) - New Hampshire Outdoors, 1988-1993. This plan clearly documents the growth in use and demand for water-related recreational activities, the need for additional public access to state waters, and the need for shoreland protection. SCORP at 42-46. The Plan also discusses the importance of outdoor swimming and fishing to the public. The DEIS must examine how licensing of the seven hydropower projects, as proposed, is consistent with the state recreational plan when the projects' waters are not swimmable and difficult to access, and when the fishery is unsafe to consume. The DEIS must also explain how its rejection of the need for a basin-wide recreation plan to compensate for the lack of on-site recreational opportunities is consistent with state recreational objectives as expressed in the SCORP.

CONCLUSION

For the reasons stated above, the DEIS is legally deficient. The Commission must revise the scope of the EIS, prepare a new DEIS which addresses in detail the deficiencies noted above, and release the revised DEIS for public review and comment.

Dated this 5th day of August, 1993, at Montpelier, Vermont.

51. We believe that the comprehensive plans were adequately assessed. We do not agree that we need to "specifically list the relevant provisions of the 8 plans and explain how the proposed action would conform with and achieve state objectives for the Androscoggin River. Had we discovered a discrepancy with any plan, we would have addressed the issue in detail, however because no discrepancy or non-conforming action was found, we felt it would be best to be brief and concise.

With regard to your concern that we have not considered the New Hampshire State Comprehensive Outdoor Recreation Plan (SCORP), the proposed and staff-recommended recreational enhancements at these projects would help satisfy some of the needs identified in the SCORP. It should be noted that the latest SCORP indicates that numerous public recreation areas in New Hampshire have been developed in conjunction with hydroelectric generating facilities licensed by the FERC (refer to page 91 of the 1988-1993 SCORP). The SCORP also indicates that there is statewide need to facilitate fishing access and hiking (trails) as well as a need for additional open and natural areas (page 21). The SCORP also indicates that it is the state policy to "provide access to any water body in the state which has recreational potential... and that public access is acquired to any body of water." We believe that the cumulative recreational enhancements at these projects would provide some of the public benefit that the SCORP is identifying.

52. Comment is noted.

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Respectfully submitted,

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The following pages contain attachments to the comment letter. No comments are required.

EXHIBIT A

United States Department of the Interior

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Concord, New Hampshire 03301-4901

JUN 1 8 993

REF: FERC #4026

June 11, 1993

Mr. J. Mark Robinson, Director
Division of Project Compliance and Administration
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. Robinson:

We have reviewed the filing by the Androscoggin Reservoir Company and the Aziscohos Hydro Company, Inc. containing the results of a five-year common loon monitoring program at the Aziscohos Hydroelectric Project in Maine. Mitigation for loons nesting in the wetland areas affected by project reservoir operation is a requirement of Article 33 of the license that was issued for Aziscohos on April 17, 1985.

The monitoring report concludes that the use of artificial nesting islands (rafts) in Aziscohos Reservoir resulted in satisfactory production of loons over the five-year period. However, as discussed in our previous comments on the Article 33 studies (letter, dated December 30, 1986, to Richard Hunt of the Office of Hydropower Licensing), other fish and wildlife resources that are impacted by the extensive water level fluctuations at the project receive no benefits from the loon mitigation measures that were evaluated at Aziscohos.

In addition the long-term utility of the artificial nesting islands should be questioned in light of the fact that they often must be repositioned as water levels fluctuate. Although an expert loon biologist was actively involved in this study, and could supervise placement and adjustment of the rafts, it is unclear whether such expertise would continue to be available throughout the remainder of the license term.

Furthermore, the report notes that the rafts attract attention, not only from predators, but from recreationists using the lake. The licensees suggest that recreation should be limited to prevent disturbance of loons using the rafts, while we believe that a more balanced strategy should involve protection of the typically well-hidden, natural nest sites. This can best be accomplished by water level management in the lake.

As pointed out in our December 30, 1986 letter, a wildlife management strategy similar to that used on the nearby Errol Dam Project (FERC No. 3133) should be applied at the Aziscohos Project. At Errol Dam (Lake Umbagog) water level fluctuations are limited during the spring and early summer. This protects loons without resorting to rafts, and accommodates the other fish and wildlife resources inhabiting shallow wetlands.

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The licensees contend that a water level regime at Aziscohos that involved stabilizing water levels from ice-out until July 15 (the strategy at Errol Dam), would result in negative impacts throughout the remainder of the upper Androscoggin reservoir system. We do not necessarily agree. For example, the licensees state that flows in the Rapid River would have to be increased to over 1000 cfs to maintain stable water levels downstream in Umbagog Lake, if lake level fluctuations in Aziscohos were also minimized. This assumes that the discharge from Aziscohos Lake would only be 107 cfs. During the majority of the wildlife nesting period inflows to Aziscohos Lake would exceed 107 cfs (an estimate of base flow conditions in August), thereby reducing the need to augment discharge elsewhere to maintain water levels in Umbagog.

More importantly, the licensees need to augment discharges from other components of the reservoir system if Aziscohos were managed differently is related to the requirement for a non-FERC related minimum flow of 1,550 cfs in the Androscoggin River downstream in Berlin. This discharge has nothing to do with wildlife in Umbagog, but with power generation and pollution assimilation in the Androscoggin River.

You have previously postponed a final decision on permanent minimum flows at Aziscohos pending consideration of minimum flow needs at the yet to be licensed Middle Dam Project (see Order Granting Extension of Time With Modification, dated May 7, 1992). This recognized that the integrated nature of projects in the upper Androscoggin River Basin requires a comprehensive analysis before permanent operational requirements are imposed at any one development. Furthermore, the FERC staff is presently conducting an Environmental Impact Statement (EIS) on the proposed relicensing of several hydrologically-connected projects located downstream on the Androscoggin River.

We recommend that you forego any final determination on the acceptability of artificial nesting islands (as a substitute for altered water level management) at the Aziscohos Project until the EIS for the downstream projects is complete, and until decisions are made on how fish and wildlife values will receive equal consideration at all of the projects in the upper watershed. Until then, any acceptance of artificial nesting islands at Aziscohos should be provisional, and subject to modification by the FERC.

We appreciate the opportunity to comment on the results of the loon monitoring study. We regret the delay in providing these comments, however, your order requiring the study did not call for consultation between us the licensees after the report was completed. It was only after your staff telephoned and stated that our lack of communication was assumed to mean "No Comment", that a response was proposed. We suggest that your future post-licensing actions provide clearer obligations for final consultation between agencies and licensees.

If you have any questions, please contact Gordon Russell at (207) 827-5938.

Sincerely yours,

Gordon E. Beckett

Gordon E. Beckett
Supervisor
New England Field Offices

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In re Applications of James River-New Hampshire Electric, Inc., for Licensing of Sawmill, Cross Power, Cascade, Gorham, and Shelburne Projects	Project Nos. 2422, 2326, 2327, 2311, 2300
In re Applications of Public Service Company of New Hampshire for Licensing of Gorham and J. Brodie Smith Projects	Project Nos. 2288, 2287

MOTION OF AMERICAN RIVERS, INC.; APPALACHIAN MOUNTAIN CLUB; CONSERVATION LAW FOUNDATION, INC.; AND TROUT UNLIMITED TO AMEND SCOPING DOCUMENT II, UPPER ANDROSCOGGIN RIVER ENVIRONMENTAL IMPACT STATEMENT

American Rivers, Inc.; Appalachian Mountain Club; Conservation Law Foundation, Inc.; and Trout Unlimited ("CLF et al.") hereby move to amend Scoping Document II, Upper Androscoggin River Environmental Impact Statement, issued December 1992. Specifically, we object that, according to the Scoping Document, the Environmental Impact Statement for the above-captioned projects ("EIS") will not consider the full range of alternatives to relicensing of the projects. The Scoping Document also misdefines the no action alternative as continued operation of the projects and indicates that the EIS will not analyze resource impacts in comparison to the baseline as it existed before the projects were constructed. Finally, the Scoping Document fails to require the preparation of a comprehensive EIS which considers the cumulative impacts of all the hydropower projects on the Androscoggin River. If not corrected, the Scoping Document will result in an EIS which violates the National Environmental Policy Act, 42 U.S.C. § 4321 et seq. ("NEPA") and the Federal Power Act, 16 U.S.C. 791a et seq. CLF et al. therefore requests that the Scoping Document be revised as follows:

53. Comment is noted.

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1) Energy conservation should be considered as an alternative to continued status quo operation of the hydroelectric projects;

2) Project modifications that maximize wildlife and fishery values should be considered as an alternative to current operations;

3) Alternative river flow regimes should be considered;

4) The no-action alternative should be redefined as not relicensing the project(s);

5) The EIS should analyze the impacts of relicensing compared with the impacts of not relicensing the projects by defining the baseline for comparison as river conditions on a non-regulated river.

6) The EIS should review the cumulative impacts of all hydroelectric and storage projects on the river.

7) The Commission should prepare a program impact statement to examine the impacts of licensing the unlicensed dams located in the headwaters of the Androscoggin River and the dams located downriver in Maine whose licenses expire in 1993.

In support of this motion, CLF et al. submits the following memorandum.

MEMORANDUM IN SUPPORT OF MOTION TO AMEND SCOPING DOCUMENT

A. The Scoping Document Must Examine All Reasonable Alternatives to the Status Quo Operation of the Projects

NEPA clearly requires federal agencies to consider all reasonable alternatives to proposed actions. 42 U.S.C. § 4332(2)(C). Section 102(2)(E) states that "[a]ll agencies of the Federal Government shall ... study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). NEPA's requirement that an EIS address alternatives "has been aptly characterized as 'the linchpin of the entire impact statement.'" Alaska v. Andrus, 580 F.2d 465, 474 (D.C.Cir.1978), vacated in part sub nom.

The performance of this duty requires substantive, good-faith consideration of alternatives to the fullest extent possible', a very high standard.

Libby Rod & Gun Club v. Poteat, 457 F.Supp. 1177 (1978), quoting

54. See our response to comment 13.

Calvert Cliffs' Coordinating Committee, Inc. v. U.S. Atomic Energy Commission, 449 F.2d 1109, 1114 (1971) (emphasis added).

Council of Environmental Quality (CEQ) regulations refer to the alternatives discussion as the "heart" of the environmental impact statement. 40 C.F.R. § 1502.14. CEQ regulations requires an agency to "[r]igorously explore and objectively evaluate all reasonable alternatives ..." ; to "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency"; and to "[i]nclude the alternative of no action." Id.

1. Energy Conservation is a Reasonable Alternative Which The EIS Must Evaluate

Courts consistently have determined that NEPA requires agencies to consider energy conservation as an alternative to proposed actions. NRDC v. Morton, 458 F.2d 827 (D.C. Cir. 1972) (Department of Interior required to consider conservation measures - quotas on oil imports - as an alternative to outer continental leasing for oil and gas exploration); NRDC v. Hodel, 865 F.2d 288 (D.C.Cir. 1988) (agency must consider energy conservation as a partial alternative to outer continental shelf leasing program, even if alternative would not reduce need for leasing); Mason County Medical Association v. Knebel, 563 F.2d 356 (6th Cir. 1977) (EIS for proposed coal-fired generating unit adequate as it considered the alternatives of energy conservation); Swinomish Tribal Community v. FERC, 627 F.2d 499 (D.C.Cir.1980); Libby Rod & Gun Club v. Rotset, supra (agency violated NEPA by failing to adequately consider conservation as an alternative to a hydropower dam in meeting the Northwest's energy needs); see also National Wildlife Federation v. FERC, 912 F.2d 1471 (D.C.Cir. 1990) (FERC properly considered water conservation as alternative to dam which was designed primarily for water supply).

The Federal Power Act also requires consideration of alternatives to a hydropower project in sufficient detail to determine that the project is in the public interest. Swinomish Tribal Community v. FERC, 627 F.2d 499, 512 (D.C.Cir. 1980). The Electric Consumers Protection Act ("ECPA") specifically requires FERC to give equal consideration to energy conservation as well as to hydropower production. 16 U.S.C. § 797(e).

> Amended Section 4(e) requires FERC, in deciding whether to issue ... a new license for an existing project, to give "equal consideration" to the purposes of energy conservation and environmental values, including fish and wildlife and recreation, in deciding whether to issue the license for power and developmental purposes. Such consideration is important because it is

55. See or response to comment 22.

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> intended that FERC give these nondevelopmental values the same level of reflection as it does to power and developmental objectives. In other words, it requires thorough evaluation of these values before FERC makes its licensing decision. Consequently, equal consideration must be viewed as a standard, both procedural and substantive ... Protection, mitigation, and enhancement of fish and wildlife, energy conservation, and the protection of recreational opportunities are a potential cost of doing business for hydropower projects ... Projects licensed years earlier must undergo the scrutiny of today's values as provided in this law and other environmental laws applicable to such projects. If nonpower values cannot be adequately protected, FERC should exercise its authority to restrict or ... even deny a license on a waterway.

H.R. Conf. Rep. No. 99-934, 99th Cong., 2nd Sess., at 21-22 (1986) (emphasis added).

Despite the requirements of NEPA and the ECPA, the Commission's EIS Scoping Document for the seven Androscoggin River hydroelectric projects proposed by James River-New Hampshire Electric, Inc. ("James River") and Public Service Company of New Hampshire ("PSNH") dams not include energy conservation as an alternative to relicensing.

On October 19, 1992, the Commission decided to prepare an EIS for these projects. On November 23, 1992, CLF et al. filed comments with the Commission on the appropriate scope of the EIS, requesting, among other things, that FERC examine energy conservation as an alternative. In its Scoping Document II, FERC refused this request. Commission staff wrote,

> We believe that energy conservation and utilization of hydropower, a renewable resource, need to be developed to the maximum extent possible as an alternative to energy generated by fossil fuels. Consequently energy conservation and hydropower generation are not mutually exclusive and aren't considered as alternatives to each other.

Id. at 4.

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Commission staff appear to have missed our point. CLF et al. noted that:

> [e]ven if conservation investments may not eliminate the need for a project altogether, such investments may be less costly than purchase of replacement power by the companies and allow them to provide enhanced fishery flows at a cost below that projected in the applications, making habitat mitigation cost effective and reasonable.

CLF et al. Scoping Comments, 11/23, p. 5.

In other words, while energy conservation may not eliminate an applicant's need for a hydropower project altogether, it could serve as a partial alternative to a project's current operation, allowing the applicant to modify the existing operation to provide enhanced fishery flows while reducing an applicant's overall energy needs. Courts have insisted that agencies must "consider such alternatives to the proposed action as may partially or completely meet the proposal's goals." NRDC v. Callaway, 524 F.2d 79, 93 (2nd Cir. 1975) (emphasis added). An alternative is still reasonable and must be considered even if it does not offer a complete solution to the problem. NRDC v. Morton, 458 F.2d 827, 836 (D.C. Cir. 1972). The Commission must still consider energy conservation alternatives even if such alternatives do not eliminate or reduce an applicant's need for the hydropower project. NRDC v. Nodal, 865 F.2d 288, 295-6 (D.C.Cir. 1988). Agencies must consider alternatives to hydropower which would allow a hydropower project to be carried out differently, such as a project modification to enhance fishery flows. See Mandelker, NEPA Law and Litigation, 10-60.

The Commission has a legal responsibility both under NEPA and under the ECPA to examine whether the utilization of energy more efficiently by an applicant would allow the operation of a project to be modified to increase the non-power benefits the public receives from the river's use. James River and PSNH have failed to provide detailed information as to their conservation and demand side management activities. For example, James River has not produced any studies or analyses of the technical potential for electricity conservation in its mills. And PSNH has not assessed (or implemented) all practically achievable efficiency improvement opportunities in its power facilities that cost less than the New England Region's long-range marginal cost of utility power production. The EIS must develop this information to objectively evaluate whether energy conservation is a partial alternative to the present hydropower operations and would allow the companies to modify their hydropower operations to enhance and give equal consideration to non-power benefits without unreasonable loss of power capacity.

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2. The EIS Must Define the No Action Alternative as Not Relicensing the Projects

The Androscoggin Scoping Document also misdefines the "no action alternative" as relicensing the projects, when no action really involves denying new licenses.

CEQ regulations require the NEPA alternatives analysis to "include the alternative of no action." 40 C.F.R. § 1502.14(d). An EIS is to consider the impacts of a proposed action in comparison to not carrying out the proposed action. The proper definition of "no action" is critical because the no-action alternative "provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives." Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18026 (March, 1981).

CEQ regulations provide two definitions of "no action." The first definition involves situations where ongoing programs, such as land management plans, will continue under existing legislation. Only in these cases does "no action" mean "no change" from the states quo. Id. Relicensing hydroelectric projects is not such a situation - involving an ongoing program - as the courts have made clear. Relicensing "is more akin to an irreversible and irretrievable commitment of a public resource than a mere continuation of the status quo", requiring "the same inquiry as original licensing..." Confederated Tribes v. FERC, 746 F.2d 466, 476 (9th Cir. 1984), cert. denied, 471 U.S. 1116 (1985).

Existing licenses expire at the end of 1993; new licenses, not as extension of the existing licenses, have been requested by the James River and PSNH. Therefore, hydroelectric project relicensing involves the second situation discussed by CEQ regulation:

> The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity could not take place, and the resulting action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward... This [no action] analysis provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives... Inclusion of such an analysis in the EIS is necessary to inform the Congress, the public, and the President as intended by NEPA.

56. The no action alternative is the one that results in no change to the existing environment. Denying a license may or may not result in changes to the existing environment.

46 Fed. Reg. 15620 (emphasis added).

CLF et al. specifically requestud the Commission to define the no action alternative as not relicensing the projects, to define the baseline for analysis of impacts as pre-project conditions, and to analyze impacts by comparing existing resources at the projects to conditions on non-regulated rivers. Scoping Comments, 11/93 at p. 6. However, Commission staff rejected these requests. The Scoping Document defines the no action alternative as relicensing the projects to "continue to operate as required by the original project license." Id. at 9. The Scoping Document does not include an alternative where the Commission does not issue new licenses, although such a course of action is legally required if the proposed action fails to comply with the Federal Power Act.

The Scoping Document also mischaracterizes the relevant baseline for EIS analysis as the status quo. Such a baseline is improper, underestimates the impact of the proposed action - new licensing of the project, and violates NEPA's requirement that an EIS evaluate the full environmental impacts of a proposed action in comparison to conditions if the action is not taken. The Commission must describe the impacts of denying the license applications - a reasonable alternative to new licensing which the Commission is required to evaluate under the Federal Power Act. This requires assessment of river conditions in a nonregulated condition - the pre-dam baseline.

Clearly, the Commission has authority to deny new licenses. 16 U.S.C. §§ 797(a), 808. The Commission can terminate a license or accept surrender of a license. The legislative history of the ECPA specifically states:

> if nonpower values cannot be adequately protected, FERC should exercise its authority to restrict or ... even deny a license on a waterway."

H.R. Conf. Rep. No. 99-934, 99th Cong., 2nd Sess. 22 (1986). The legislative history indicates that the Commission should deny an application for a new license for an existing project on environmental grounds if the resource impacts cannot be mitigated.

> It is intended that the Commission give significant attention to, and demonstrate a high level of concern for all environmental aspects of hydropower development, even, if necessary, to the point of denying an application on environmental grounds. Moreover, the Commission is to apply ... this concern and scrutiny to all projects, whether

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> licensed or ... original ...

House Report, H.R. Rep. No. 99-507, 99th Cong., 2nd Sess. 22, 32 (1986) (emphasis added).

NEPA also requires agencies to consider not going forward with proposed actions.

> [NEPA] seeks to ensure that such agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance. Only in that fashion is it likely that the intelligent, optimally beneficial decision will ultimately be made.

Calvert Cliffs Coordinating Comm. v. U.S. Atomic Energy Comm'n, 449 F.2d 1109, 1114 (D.C.Cir. 1971) (emphasis added).

> The requirements of NEPA impose a continuing obligation upon agencies to re-evaluate the necessity for projects in light of changed circumstances.

Libby Rod & Gun Club v. Potest, 457 F.Supp. 1177, 1188 (D. Mont. 1978).

Unless the environmental conditions resulting from not issuing new licenses are compared to the impacts of new licenses, the Commission will be unable to determine the full environmental impacts of relicensing the projects. The use of the status quo as the baseline, as currently proposed by the Scoping Document, would prevent the EIS from "serv[ing] as the means of assessing the environmental impact of proposed agency actions, rather [it would] justify ... decisions already made." 40 C.F.R. § 1502.2(g).

The Scoping Document should be amended to require an examination of the environmental impacts of relicensing the projects in comparison to the no action alternative of not licensing the projects with river conditions restored to conditions without the dams.

3. The EIS Must Examine Alternatives Which Enhance and Maximize Non-Power Values

The Scoping Document indicates that staff will review various reasonable modification alternatives "described in the project license applications or proposed by staff and others to the extent that such information is available." Id. at 10. CLF

57. See section 4.2 for an examination of alternatives to enhance nonpower alternatives. See also our response to comment 18.

et al. is concerned that the EIS will not contain a rigorous analysis of alternative water use plans at the projects since the applicants have only analyzed one proposed operation in their applications. Because of the applicants' failure to prepare complete applications, information on other alternatives is not available without additional analysis by FERC.

The Scoping Document should clarify that it will examine a wildlife/fishery maximization alternative that enhances wildlife benefits by providing the target flows recommended by the United States Fish & Wildlife Service.

Furthermore, FERC should examine alternative water use plans for the upper river basin which enhance or maximize wetland, wildlife, recreational and water quality values throughout the basin. While the seven EIS projects are all run-of-river projects, the river's entire flow regime is artificially managed to provide enhanced flows to these projects to enhance energy production at the expense of other river values. Alternatives to existing river flow regulation should be examined to analyze their respective impacts on the each project's existing operations, on upper storage lake conditions, and on basin-wide resources. CLF et al. has requested such an analysis in prior filings with the Commission in these proceedings.

However, the Scoping Document fails to identify specific alternatives that will be examined to ensure that a meaningful cumulative impact assessment is performed, examining the relative merits and impacts of all reasonable water flow regime alternatives on a comprehensive basis. The Commission has required just such a <u>systemwide</u> analysis of reasonable alternative operation scenarios on key resources (including power generation, fisheries, boating, flood control, and wetlands) in New England Power Company's Deerfield River relicensing proceeding (Project No. 2323). The Upper Androscoggin River EIS should conduct a similar alternatives analysis.

B. <u>The Scoping Document Must Require Preparation of a Comprehensive Environmental Impact Statement Addressing the Impacts of All the Androscoggin River Hydropower Projects</u>

CLF et al. recommended that the Commission prepare a comprehensive EIS that not only considers the impacts of the seven James River and PSNH dams, but also examines the cumulative impacts of the other hydropower facilities on the river, including licensing both those other projects with licenses expiring in 1993 and unlicensed facilities (the "other" projects are listed on page 4 of the Scoping Document). While the staff agreed with the need for an assessment of cumulative impacts, the Scoping Document then indicates that the EIS will only look at the cumulative impacts of the James River and PSNH dams. The

58. See our discussion in section 1.3.

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Scoping Document suggests that analysis of the cumulative impacts of the other hydropower projects will be analyzed in separate environmental analyses conducted at the time applications are received and accepted. Scoping Document at 4. This approach violates NEPA and the Federal Power Act.

The Androscoggin EIS (1) must assess the cumulative impacts of all operating hydropower and storage facilities on the Androscoggin River and (2) should evaluate the merits of licensing the unlicensed projects (Rangeley Dam, Upper Dam, Lower Dam) and the other projects with license applications now pending (Rumford Falls, Gulf Island, Deer Rips). Only then will the Commission fulfill the mandate of the Federal Power Act to accurately assess the cumulative impacts of hydropower projects through coordinated study and comprehensive planning.

> Congress' commitment to coordinated study and comprehensive planning along an entire river system before hydroelectric projects are authorized is a central feature of the Federal Power Act... As the [Commission] has recognized, 'the concept of considering a particular watershed as a whole is the backbone' of the Federal Power Act.

National Wildlife Federation v. FERC, 801 F.2d 1505, 1507 (9th Cir. 1986) (FERC EIS inadequate for failure to perform comprehensive analysis of cumulative impacts of all hydropower projects, pending and otherwise, on the American River Basin).

NEPA also requires an evaluation of the cumulative effects of any proposed action so that the combined environmental effects of related actions will be discussed and evaluated. CEQ regulations require the scope of an EIS to include "[c]umulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement." 40 C.F.R. § 1508.25(a)(2). The regulations also require an EIS to discuss "[s]imilar actions, which when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography." Id. at (a)(3). Moreover, CEQ regulations require an EIS to discuss cumulative impacts, id. at (c), which are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7; see also Manygoats v. Kleppe, 558 F.2d 556 (10th Cir. 1980) (impact statement for mining project adequate because it discussed the cumulative impact of related projects); North Slope Borough v. Andrus, 642 F.2d 589 (D.C.Cir. 1980)

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(impact statement for offshore lease sale adequate because it discussed the cumulative impact of related energy projects in area); Akers v. Resor, 443 F. Supp. 1355 (W.D. Tenn. 1978) (impact statement for water tributaries project must discuss cumulative impact of other projects).

The Androscoggin hydro projects, including the unlicensed storage projects and the projects with license applications now pending, are closely related projects with cumulative impacts on the river basin. The projects are interdependent and operated pursuant to a single basin-wide water use plan devised by the owners of the projects. For example, the Commission is unable to determine the full impacts of relicensing the James River and PSNH projects without considering the impact of their operation on the management of the headwater storage facilities. The EIS must examine the adverse effects of fluctuating water levels in the headwater lakes on fish habitat, wetlands, water quality, and recreational use caused by the river water use plan. The EIS must contain a comprehensive analysis of the cumulative impacts of all projects on the river if the projects are to be "best adapted to a comprehensive plan for improving ... a waterway..." 16 U.S.C. § 803(a). If the Commission does not consider the impact of all past, present, and reasonably foreseeable future hydro projects on the basin's resources, the Commission will be unable to conclude that the James River and PSNH projects have no adverse cumulative impacts on the environment.

CLF et al. also requests that the Commission prepare what is called a "program impact statement" which would address specifically the action of licensing Rangeley, Upper, and Lower dams (unlicensed) and Rumford Falls (FERC No. 2333), Gulf Island, and Deer Rips (FERC No. 2283) projects in addition to the James River/PSNH projects. It is difficult if not impossible to examine the cumulative impacts of individual but related proposed actions when they are not all reviewed at the same time. A program impact statement would assist the Commission by considering the implications of licensing the many pending and unlicensed projects on the Androscoggin River together in one comprehensive EIS. Such an EIS is particularly suited to the several Androscoggin hydropower projects unlicensed or with licenses pending because they involve related projects with "cumulative or synergistic environmental impact on a region [and] are pending concurrently before an agency." Kleppe v. Sierra Club, 427 U.S. 390, 410 (1976). A program EIS would reduce the time and costs associated with studying the environmental impacts of these projects in separate, individual environmental analyses. However, even if the Commission decides not to prepare such a program EIS, as discussed above, the James River/PSNH EIS must still consider the cumulative effects of all the Androscoggin hydro facilities on the river's resources.

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CONCLUSION

For the reasons set forth, the Scoping Document II should be amended as requested herein.

59. Comment is noted.

Dated this 26th day of May, 1993, at Montpelier, Vermont.

Respectfully submitted,

Mark A. Sinclair

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cc: service list

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United States Department of the Interior [redacted]

OFFICE OF THE SECRETARY
Washington, D.C. 20240

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REGULATORY COMMISSION AUG 6 1993 OR

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Honorable Lois D. Cashell
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, W.E.
Washington, D.C. 20426

Dear Ms. Cashell:

The Department of the Interior has completed its review of the draft environmental impact Statement (DEIS) for the Upper Androscoggin River Basin Hydroelectric Projects, FERC Nos. 2422-004, 2287-003, 2327-002, 2327-002, 2311-001, 2288-004, 2300-002, Coos County, New Hampshire. We have the following comments and recommendations on the DEIS. We have reviewed the DEIS for its handling of our site specific Section 10(j) recommendations and Section 18 prescriptions. We have also provided comments on the scope of the DEIS and the handling of other resource issues.

Recommendations and Prescriptions

In the DEIS, the Commission Staff's recommended alternative incorporates all the 10(j) and section 18 recommendations and prescriptions made in comments to FERC in response to previous project specific public notices.

Of special note, the recommended alternative incorporates all the Department's minimum bypass flow recommendations for the Cascade Project's upper and lower bypass reaches and the bypass reaches of the James River-Gorham and PMMM-Gorham projects. These reaches offer opportunities for significant enhancement of trout habitat. The alternative recommended by staff in the DEIS should be retained in the final EIS for the projects.

Headwaters Projects

In the DEIS, the Commission staff assessed the seven projects in the Berlin to Shelburne reach of the Androscoggin, but did not review the storage reservoirs upstream from Berlin. The DEIS dismisses the concept of including these projects in its analysis based on a number of factors. Staff concluded that the extended expiration dates on the licenses for most of the projects and the uncertain nature of FERC jurisdiction of the other sites meant that inclusion of any of these would result in extended delays in the licensing of the seven projects with expiring licenses and the subsequent delay in any of staff's recommended mitigation measures.

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60. No response is required.

61. See our response to comment 18.

The DEIS also stated on page 4-22 that staff does not believe "that any action taken now with respect to the Upper Androscoggin projects would constrain decisions that may be made in the future at the headwaters projects". There is a possibility, however, that the increase in capacity at the Cascade and Jones River-Gorham projects would increase the total basin-wide costs of implementing any changes at the upstream storage reservoirs in the future since the proposed expansion is based on the expected long-term reliability of the existing constant 1,550 cfs flow. The final EIS should more fully explain how the headwaters projects could be assessed completely independently from the projects in the Berlin reach and how capacity changes wouldn't affect future actions upstream.

Wetlands Protection

In its comments dated September 14, 1992, the Conservation Law Foundation, et al. (CLF), had recommended the protection of undeveloped wetlands land within 4,000 feet of the east shore of the river for protection of scenic values, public recreational access, and water quality. In subsequent correspondence, CLF recommended other specific areas warranting protection. The staff rejected these recommendations in favor of establishing a 200 foot wide buffer of pro .tted land.

We believe that protection of undeveloped wetlands property would offer benefits to fish and wildlife resources due to protection of both terrestrial habitat and water quality. The staff's alternative will protect a riparian corridor along the Androscoggin but not offer the same water quality or habitat protection.

The economic assessment of the cost of wetlands protection was based on the cost of outright purchase of the estimated 2,300 acres within CLF's recommend protected areas. Alternatives such as easements were not explored except in relation to staff's 300 foot buffer recommendation. Also, other options besides the 4,000 foot limit and the 200 foot limit adopted by staff were not assessed, nor were options such as targeting key tracts or targeting tributary stream riparian corridors in the area. The land ownership patterns in these areas were also not assessed. The Commission should explore a variety of alternatives that could be implemented before settling on its recommendation.

Contaminants

The DEIS discusses the issue of dioxin and how its presence could influence and be influenced by the proposed operation and construction at the projects. The DEIS suggests that since dioxin is primarily in sediments and since no major changes in operation or construction are proposed or recommended by staff at cost sites, the sediments will not be disturbed and there will be no adverse impacts. Any potential impacts relative to disturbing these sediments during construction of Falsifer Rips were passed off to a post license soil erosion and sedimentation control plan. Impacts of altering flow releases due to expansion of the Jones River-Gorham station were not addressed.

62. See response comment 37.

63. We agree, see revised sections 4.1.2.6 and 4.2.2.3. However, we do not agree that the collection of background data is necessary. We agree that dioxin is probably contained in the reservoir sediments and that some potential short-term disturbances could occur. We do not believe that the results obtained from any pre- or post-licensing studies could be directly related to the increased flows from the Gorham facility. An increased flow from 2,300 cfs to 2,800 cfs would not be the sole possible cause for any possible

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These activities could result in the disturbance of dioxin laden sediments. The effect of such disturbances could be evidenced in elevated dioxin levels in fish or other aquatic organisms downstream from these sites, and in fish-eating wildlife. The dioxin level in the sediments in these areas is not known and the available background data may not provide an adequate baseline upon which to measure changes in fish or other organisms. If not, background data may be needed.

The potential implications to fish and wildlife in the food chain should be assessed prior to license issuance. If after this review, alterations of the projects are approved, post-alteration assessments would verify that in fact no adverse impacts to fish and wildlife occurred.

This section of the DEIS should be revised and new data, discussion and analysis undertaken to adequately address this issue.

Fish Habitat

On page 4-62, it states that the uniform flow of 1,500 cfs benefits fish habitat in the Androscoggin River. Non-bypassed reaches were not assessed except the Pejepscot . Rips reach, in which lower flows were found to enhance fish habitat. Although a stable base flow regime generally would minimize impacts of flow fluctuations, no site specific data is available to support the statement that the existing 1,500 flow is more beneficial that other potential flow release regimes.

We hope these comments will be of assistance to you.

Sincerely,

Jonathan P. Deason
Director
Office of Environmental Affairs

increase in downstream fish dioxin levels. Given periodic high flows and the possibility that increased numbers of downstream fish could actually be from upstream sources (due to your and our recommended new downstream fish bypass facilities), we do not believe the results would be of any substantive value.

64. We agree, see revised section 4.1.2.7

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DEPARTMENT OF JUSTICE
STATE OF NEW HAMPSHIRE

25 CAPITOL STREET
CONCORD, NEW HAMPSHIRE 03301-6397

JEFFREY R. HOWARD
ATTORNEY GENERAL

GEORGE DANA BISBEE
DEPUTY ATTORNEY GENERAL

August 6, 1993

Ms. Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, DC 20426

Re: Upper Androscoggin River Basin
Projects No. 2287-003, 2288-004, 2300-002, 2311-001,
2326-002, 2327-002, 2422-004

Dear Ms. Cashell:

Enclosed please find an original and fourteen copies of the State of New Hampshire Fish & Game Department's Comments on Draft Environmental Impact Statement in the above-referenced projects.

65. No response is required.

Sincerely,

Jennifer J. Patterson
Attorney
Environmental Protection Bureau
(603) 271-3679

JJP:pmc
Enclosures
cc: George W. Hill, James River Co.-New Hampshire Electric, Inc.
Gordon E. Beckett, Supervisor, U. S. Fish & Wildlife Service
Dean L. Shumway, Director, FERC Division of Project Review
William C. Ingham, Jr., New Hampshire Fish & Game Department
Steven Weber, New Hampshire Fish & Game Department
Ray Feller, FERC Division of Project Review
William J. Maddan, Esquire,
James J. Kearns, Public Service Company of New Hampshire
Robert A. Barsak, Northeast Utilities
John H. Slagle, Kleinschmidt Associates
Anton J. Sidoti, FERC
Patricia Aspland, National Park Service
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Delbert F. Downing, DES/WRD
David Turin, EPA
Kevin Mendik, National Park Service
Mitchell Berkowitz, City of Berlin
Coos County Planning Office
Kelly Goddard, Town of Gorham
Board of Selectmen, Town of Shelburne

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

UPPER ANDROSCOGGIN RIVER BASIN Hydroelectric Projects	)	Projects No. 2287-003 2288-004, 2300-002 2311-001, 2326-002 2327-002, 2422-004

NEW HAMPSHIRE FISH AND GAME DEPARTMENT'S COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

NOW COMES the State of New Hampshire Fish and Game Department ("Department"), by and through its attorney, the Office of the Attorney General, and submits its Comments on the Draft Environmental Impact Statement ("DEIS") issued in May, 1993 by the Federal Energy Regulatory Commission ("FERC") regarding the above-captioned projects, known collectively as the "Upper Androscoggin River Basin Hydroelectric Projects" ("the Projects"). The Department's comments are as follows:

1. In general, the Department concurs with FERC's conclusions in the DEIS. For those projects in which the Department has not sought intervenor status, the Department agrees with the project operation, flow level, mitigation and access provisions adopted by FERC in the DEIS. These projects are as follows: Sawmill (FERC # 2422), Brodie-Smith (FERC # 2287), Cross (FERC # 2326), Cascade (FERC # 2327), and Shelbourne (FERC # 2300).

2. The Department is an intervenor in two of the Projects, James River Gorham (FERC #2311) and Public Service Company of New Hampshire ("PSNH") Gorham (FERC #2288).

66. No response is required.

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3. In its comments on the James River Gorham (FERC #2311) application, the Department requested that the applicant be required to:

a. operate the project in a run-of-river mode;

b. release a minimum flow in the bypass reach of 200 CFS between June 16 and February 28, and 400 CFS between March 1 and June 15;

c. install signage at the parking lot which provides public access;

d. prepare a plan explaining how flows will be maintained when the impoundment is being refilled after maintenance or repair; and

e. install, operate and maintain downstream fish passage when the Department deems necessary.

4. In its comments on the PSNH Gorham (FERC #2288) application, the Department requested that the applicant be required to:

a. operate the project in a run-of-river mode;

b. release a minimum flow in the bypass reach of 200 CFS, and prepare a plan indicating how this flow level would be achieved and maintained;

c. develop and maintain a recreational access plan, including the installation of signage; and

d. install, operate and maintain downstream fish passage when the Department deems necessary.

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5. The Department's review of the DEIS indicates that FERC has adopted conditions which meet or exceed the Department's recommendations regarding the two Gorham Projects, and the Department is therefore satisfied with FERC's conclusions in the DEIS. The Department's additional comments relate to specific technical details of the DEIS.

6. On page 3-2, the DEIS indicates that the 7Q10 for the Upper Androscoggin is approximately 1490 CFS. The Department requests that this passage be rephrased to indicate that this is the 7Q10 for the river in a highly regulated state. The river has been highly regulated for many years by headwater reservoirs controlled by the Union Water Power Company. The 7Q10 figure for the Androscoggin in its natural state would be substantially less than 1490 CFS.

67. We agree, see revised section 3.1.3.

7. Table 3-2 on page 3-5 lists the mean concentration in parts per trillion of TCDD and TCDF (dioxin) in Androscoggin River fish in 1999. The table indicates that detectable amounts of dioxin were found for both trout and bullheads upstream of Berlin, while no dioxin was detected in those fish downstream of the Berlin. Based on the text accompanying this table, it appears that the table contains a typographic error reversing the locations in which dioxin was found. As the text indicates, there are no treated wastewater discharges upstream of Berlin which would contain dioxin.

68. We agree, see revised Table 3-2.

8. In setting conditions for the James River Gorham facility, the DEIS is not consistent regarding whether the 400 CFS flow in the bypass reach must be maintained until June 15, or only until June 1. At times the DEIS uses the June 1 figure (see pp. 2-12, 4-36, 4-41, 5-4, A-3 and A-6), while at other times it uses the June 15 figure (see pp. 4-11, 4-37, 5-11). The Department's comments have also been inconsistant in this regard; the original comments submitted on January 18 used the June 1 figure, due to an error. The Department corrected its error in a letter dated May 12, 1993, indicating its preference that the higher flow be maintained through June 15. The DEIS should use a consistent date, preferably June 15.

69. We agree, see revised sections 2.2, 4.2.3, 5.1.2, and Tables A-1 and A-2.

9. On page 5-7, the DEIS states that FERC'S recommendations are consistent with the comprehensive plans for the Upper Andrescoggin region. The DEIS should explain more specifically how the Projects as recommended are consistent with the objectives of the eight plans.

70. See response to comment 32, 51.

10. The Department was not listed in the distribution list at pages 8-1 to 8-3 of the DEIS, and received a copy of the document only after requesting one from FERC. As an intervenor in two of the applications, the Department should be included on the distribution list for future correspondence relating to the DEIS.

71. This oversight has been corrected, see revised section 8.

WHEREFORE, the Department respectfully requests that FERC:

A. Incorporate the Department's comments into the final Environmental Impact Statement; and

72. No response is required.

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B. Grant such other relief as may be just.

Respectfully submitted,

THE STATE OF NEW HAMPSHIRE

JEFFREY R. HOWARD
ATTORNEY GENERAL

Dated: 8/6, 1993

By: Jennifer J. Patterson

Jennifer J. Patterson
Attorney
Environmental Protection Bureau
Office of the Attorney General
25 Capitol Street
Concord, New Hampshire 03301
Tel. (603) 271-3679

CERTIFICATE OF SERVICE

I hereby certify that a copy of the within New Hampshire Fish and Game Department's Comments on Draft Environmental Impact Statement has this 6th day of August, 1993, been mailed to all persons on the official service list.

Jennifer J. Patterson

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

Town of Gorham, New Hampshire
Inc. 1836

Town of Gorham
20 Park Street
Gorham, New Hampshire 03581
Tel. (603) 466-3322

August 6, 1993

FEDERAL EXPRESS

Ms. Lois Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D.C. 20426

RE: Sawmill, FERC Project No. 2422-004; J. Brodie Smith, FERC Project No. 2287-003; Cross, FERC Project No. 2326-002; Cascade, FERC Project No. 2327-002; Gorham, FERC Project No. 2288-003; Gorham , FERC Project No. 2311-001; and Shelburne, FERC Project No. 2300-002, projects in the Androscoggin River Basin.

Dear Ms. Cashell,

Enclosed please find 14 copies and the original for filing with the Commission regarding the Draft Environmental Impact Statement as it relates to the above referenced projects. The Town of Gorham files these comments as an intervenor on behalf of our taxpayers and in cooperation with the City of Berlin. We call your attention to several points that are expounded upon by the Draft EIS that appear to be consistent with the Municipalities original filing of the motion to intervene.

The Town sees the process that the FERC has undertaken as a very positive one and one that serves to address the concerns of all parties. The DEIS indicates that the FERC has considered all reasonable alternatives to the proposed actions.

Copies of this document have been sent to all parties listed on the attached certificate of service list. The Town also requests that any response to our comments herein be forwarded to the Office of the Town Manager, 20 Park Street, Gorham, N.H. 03581.

Cordially,

Kelly A. Goddard
Town Manager

Enclosures.
CC: Service List

73. No response is required.

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In: Draft Environmental Impact Statement for the following FERC Projects Nos. 2422-004;2287-003;2326-002;2327-002;2311-001;2286-003;2300-002

COMMENTS BY THE TOWN OF GORHAM, NEW HAMPSHIRE AS INTERVENORS REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND RELATED ISSUES THROUGH THE RELICENSING OF THE ABOVE REFERENCED PROJECTS PER THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 AND THE COMMISSION'S REGULATIONS IMPLEMENTING THE NEPA (18 CFR PART 380)

MUNICIPALITIES INITIAL FILING OF MOTION TO INTERVENE:

On July 28, 1992, the Town of Gorham, in conjunction with the City of Berlin, New Hampshire, filed their motions to intervene in the above referenced projects. Those filings state several key issues and concerns that the municipalities wished to sensitize the FERC to as the FERC continued the relicensing process. Listed below you will find a quick review of those issues and concerns as they previously appeared which creates the framework of our response today:

THE INTERDEPENDENCE AND BALANCE BETWEEN PEOPLE AND NATURE.

THE VALUE AND MANAGEMENT RECORD OF THE RIVER.

THE POTENTIAL IMPACTS TO CITIZENS IN LIGHT OF CHANGES TO MINIMUM FLOW LEVELS OF THE ANDROSCOGGIN RIVER INCLUDING THE NPDES PERMITS.

THE MITIGATION OF FLOODING ALONG THE RIVER IN LIGHT OF ANY CHANGES TO THE RIVER FLOW MANAGEMENT AS WELL AS THE COSTS INCURRED FOR ANY NEW FLOOD PREVENTION MEASURES.

THE IMPACTS TO THE MUNICIPALITIES THAT RESULT FROM CHANGES TO THE FLOW MANAGEMENT REGIME AS IT PERTAINS TO LEVELS OF POWER GENERATION.

THE PUBLIC'S ACCESS TO THE RIVER CORRIDOR AND THE SAFETY ASPECTS OF ACCESS TO THE RIVER CORRIDOR.

IN ADDITION TO THE ABOVE REFERENCED ISSUES SEVERAL KEY FACTORS WERE RAISED BY THE TOWN OF GORHAM ON THE CASCADE PROJECT, FERC NO. 2327. THEY WERE AS FOLLOWS:

MAINTENANCE OF WATER QUALITY STANDARDS IN THE BYPASS SEGMENT OF THE RIVER.

74. No response is required.

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AESTHETIC CONSIDERATIONS.

SEDIMENT AND EROSION CONTROL PLANS.
FLOOD HAZARD MONITORING OF CONSTRUCTION ACTIVITIES.

LOCAL ZONING REGULATIONS.

THE DRAFT ENVIRONMENTAL IMPACT STATEMENT:

The Municipalities' review of the DEIS indicates the emphasis of several target points by the FERC. The Municipalities wish to hereby indicate their support for all of the following points :

THE DECISION OF THE FERC TO ANALYZE THE RELICENSING APPLICATIONS FOR THE 7 PROJECTS LOCATED ON THE 11 MILE SECTION OF THE ANDROSCOGGIN RIVER SUB-BASIN AS OPPOSED TO A PROGRAM IMPACT STATEMENT WHICH WOULD HAVE INCLUDED AN ADDITIONAL 10 PROJECTS LOCATED BOTH UPSTREAM AND DOWNSTREAM FROM THE BERLIN-GORHAM REACH.

THE SENSITIVITY OF THE FERC NOT TO UNREASONABLY DELAY THE RELICENSING OF THE PROJECTS CONSIDERED IN THE DEIS.

THE HEADWATER RESERVOIRS ARE NOT A PART OF THIS LICENSING VENUE.

ANY DECISION TO MODIFY THE OPERATING REGIME IN THE HEADWATERS RESERVOIRS WOULD NEED TO BALANCE THE BENEFITS WITH DOWNSTREAM IMPACTS.

THE PUBLIC'S ACCESS FOR RECREATIONAL PURPOSES AS BEING PROJECT SPECIFIC.

THERE ARE OPPORTUNITIES FOR ON-SITE ENHANCEMENTS; THEREFORE OFF-SITE MEASURES OR A BASIN WIDE RECREATION PLAN ARE NOT NECESSARY.

ENERGY CONSERVATION AND HYDROPOWER GENERATION ARE NOT MUTUALLY EXCLUSIVE AND ARE NOT TO BE CONSIDERED AS ALTERNATIVES TO ONE ANOTHER.

NOTHING IN THE APPLICATIONS OR IN THE PROJECTS' RECORDS, JUSTIFIES THE NEED TO STUDY DAM REMOVAL.

Although, these are not the full extent of the DEIS comments, we view them as significant and directly related to the Municipalities' concerns as raised in our initial filings and summarized above. We feel that the FERC has taken the Municipal issues and concerns seriously, and has addressed the majority of them in the DEIS. We believe that the FERC has also attempted to comply with its mission as taken from the DEIS;

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"That the project adopted...shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational (emphasis added) and other purposes referred to in section 4(a)....

The Municipalities understand that there is a wider range of acceptable responses to each of the issues that were raised. The relicensing process is one of highly complex and technical in nature based upon the filings of the applicants and the intervenors thus far. We reiterate that our issues and concerns have generally been addressed by the DEIS, and we encourage the FERC to continue its relicensing process, expeditiously.

FUTURE COMMENTS AND ISSUES:

The FERC has made some difficult decisions which will provide the basis for our continued comments. We concur with the vast majority of these decisions and while we do not want to cause a delay in the timely processing and issuing of any hydroelectric relicense, there are a few issues which will be raised in a general manner now. However, because of the technical nature of these issues and the need to further study the alternatives proposed, we are advising you of our intent to file follow-up comments with the FERC in these areas:

BYPASS FLOW
Further review should be undertaken to determine if, through innovative river bed modifications, the applicant's proposed bypass reach flow levels can be maintained. Achieving more consistent flows in narrower channels, and still addressing the issues of fish migration, spawning, habitat, and associated angling opportunities.

75. See response to comment 6.

SHORELAND BUFFERS
Given that the amount and location of land for a protective buffer zone should be determined on a site specific basis using specific criteria and objectives, we would encourage the FERC not to utilize the rule-of-thumb of a 200 foot buffer zone but rather to seek appropriate criteria with the consultation of the applicants on a site specific basis. This could include additional buffer in some areas with less in other more remote reaches of the river.

76. See response to comment 37.

FLOW REGIME
Since the flow regime has been one of the major issues raised by many parties in the relicensing process, we re-state the Municipalities' concern for any flow regime changes which may have impact on existing sedimentary pockets within the sub-basin region, or impact Agency permits under which the Municipalities operate.

77. Comment is noted.

MITIGATION MEASURES
Attached you will find a petition from the people of the Cascade Flats Neighborhood in Gorham New Hampshire. The petition contains signatures from 97% of the residents in this area. Should the FERC recognize mitigation measures

78. Comment is noted.

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to be deemed appropriate, those measures should inure to the most adversely impacted public, which we believe to be all the people who reside along the 11 mile stretch of the Androscoggin River Basin inclusive of the people of the Cascade Flats Neighborhood.

For informational purposes, enclosed you will find several articles which have appeared in either the AMC's Outdoors publication, AMC's Appalachia Bulletin or a AMC Fund Raising Letter. The subject matters presented deal directly with the Relicensing of the above referenced projects.

Also please note that Appalachia Bulletin, 12 November, 1992 erroneously makes the following statement:...." " In September , Kimball met with residents of the two towns along the 11-mile stretch of river affected by the hydroelectric project to research local concerns.... " The attitude seems to be that this place is already all messed up so why fix it?" asked Kimball... "But we shouldn't approach relicensing from that perspective, " he said (Kimball).""

Both Gorham and Berlin, referenced above have no record of Mr. Kimball meeting in any public forum with the residents of either community for the purpose of researching local concerns. Rather, I as the Gorham Town Manager and the Berlin City Manager have invited and facilitated a few meetings with the key parties namely, Mr. Kimball, Mr. Sinclair and representatives of James River-NH Electric and Public Service Company of New Hampshire.

It has always been the posture of both Gorham and Berlin that the Androscoggin River Basin in this 11 mile stretch is not a virgin water course, but a completely altered resource which has long served the needs of the Communities. To this end, while some may feel the river is " all messed up", great strides have been made and financial resources have been allocated and continue to be expended by the taxpayers and industry to improve the water quality of the river and enhance the overall economic, social and civic uses of this resource.

Gorham and Berlin hope that the FERC recognize that the current status of what we all agree to be an altered environment in the Androscoggin River Basin is still an important resource for which we are proud of our environmental accomplishments to date and look upon this relicensing effort not as a means to trade acreage in a remote sector of the state, but to continue to address the dynamic needs of the 11 miles of river and surrounding land that is directly under our care and custody.

We would also like to indicate that the Town and the City strongly feels the FERC relicensing of the above referenced projects is an inappropriate venue for intervenors to negotiate land rights for dam relicensing.

SUMMARY AND CONCLUSION:

The Town of Gorham and the City of Berlin affirm several of the findings and recommendations of the Draft Environmental Impact Statement for the above referenced projects. We believe that the FERC has been sensitive to the concerns and issues raised by the Municipalities and that the relicensing process should continue to move forward in a timely manner.The municipalities have raised several

79. No response required.

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general concerns which will be addressed in future correspondence to the FERC but emphasize that these should not be considered justification to slow the relicensing process.

The net results of the DEIS is that this sub-basin and its combined hydro-electric facilities should be relicensed in a timely manner so that the economic and regional benefits may continue to accrue to all parties in the process and the balanced relationship between people and the environment may continue into the future on a steady and predictable course.

Cordially,

Kelly A. Goddard, Town Manager
On behalf of the Gorham Board of Selectmen

The following pages contain attachments to the comment letter.
No comments are required.

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Opportunity and necessity.

These are the two items we will finance with your contribution of $50, $100, $250 or more.

We need help with our traditional year-end expenses. And we need your further support for one of the most worthy adventures in AMC history.

Please read on.

Dear Former AMC Member,

At each year-end we write to our members asking you to help close our books in the black. It's an essential part of our financial housekeeping. And this year is no exception.

We must raise $140,000 before the end of the year to close our books in the black. And we're counting on you to renew your membership to help meet our goals.

But this year our needs are greater than ever before.

We have a crisis of opportunity at AMC. And without your immediate help, the greatest environmental opportunity in 50 years may slip through our fingers.

Let me explain.

In 1986, Congress passed an Amendment to the Federal Power Act that set the legal parameters for the relicensing of existing hydroelectric dams. There are 92 such dams on the rivers of the Northern Forest. In their Amendment, Congress mandated that the relicensing authority, now the Federal Energy Regulatory Commission (FERC), give "equal consideration" to the public's interest in the rivers when considering the relicensing of an existing dam.

This means that our values -- yours and mine -- are now equal in law to the

Over, please

APPALACHIAN MOUNTAIN CLUB

values of the hydroelectric interests. And that means that the fish and wildlife, rivers and shorelands, energy conservation, and public enjoyment — both aesthetic and recreational — must all be considered before the dams can be relicensed.

That's great news. But our values must be spoken to be heard; our new rights must be exercised to be valued. And exercising those rights will be costly.

The dams have their own well-financed constituencies in the power and forest products companies that use the generated power. And while you are part of an even greater constituency to protect the environment, there is no well-heeled advocate to make your case to the FERC and the Courts. That's where our challenge lies.

AMC has taken a leadership position in the fight to exercise these newly granted rights. We have already intervened in the first of the relicensing cases before the FERC. But each step is costly.

We are not anxious to line the pockets of a fleet of trial lawyers through costly litigation. But we are interested in some good old Yankee horse trading — where the rights to the recreational use of some of the vast land holdings of these companies can be traded for the safe and sane use of our rivers.

We want to ensure the protection of and public access to millions of acres of the Northern Forest that are owned by the same companies that want to relicense these dams. And we want to do it to the advantage of the people whose present and future livelihoods depend on a healthy forest.

We must continue to recognize the importance of maintaining our historic reputation as an organization that brings adversaries together and is sensitive to all sides of an issue. This is particularly important now as we work on such sensitive issues as the hydro relicensing cases.

Never has AMC's reputation for common sense and fairness been as important to us as it is today.

Every hiker, fisherman, bird watcher, canoeist, camper, hunter, and nature lover will benefit directly through this opportunity. Continued public access to millions of acres of Northern Forest will keep lands available for future generations to explore.

Make no mistake about it. This is the greatest opportunity for outdoor recreational enthusiasts since the creation of the White Mountain National Forest. And these opportunities are only extensions of our recent accomplishments.

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Consider just a few of our many successes during the past year.

- AMC and the National Park Service formed a successful partnership to revitalize the trails at Acadia National Park.
- Congress increased funding of the Sterling Forest Project to $3 million while the Northern Forest Council received $1.2 million — enough to carry it through 1993.
- More than 30 bog bridges were built with the help of Connecticut and New Hampshire volunteers and AMC Professional Trail Crew.
- Air quality research conducted by AMC and Harvard School of Public Health has provided dramatic information on adverse changes in both pollution and ozone levels in the White Mountains.
- Our advocacy efforts have provided great support to worthy projects including the Sterling Forest Project, the Forest Legacy Program, and the addition of 900 acres to the White Mountain National Forest.
- Our housekeeping at the huts posted an over 90% drop in solid waste. Composting, recycling, and decreased packaging lowered our solid waste from 628 to 28 tons per year.
- Chapter activities in all 11 regions reached a record high and our outdoor educational opportunities continued to grow setting new marks for opportunities, attendance, and quality of program.
- A record 31,000 visitors to our backcountry huts witnessed our model backcountry management techniques of solar energy, composting, waste management, and peaceful coexistence with our natural surroundings.
- Our overnight school program provided 2,500 overnights; 680 children became AMC Junior Naturalists; 50 new youth program leaders were trained who, in turn, led 1,160 inner city kids on wilderness trips.

AMC's continued leadership of the Northern Forest Alliance has had great bearing on the accomplishments of the past year. Twenty-eight organizations now make up the alliance.

Your support of the AMC Year-End Appeal is critical to our continued success.

We will not be able to implement our relicensing strategies without your help.

No one at AMC wants to erase the advantage of hydro-generated power as a positive, clean source of energy for our region. Far from it. But we do want to share the windfall of this great free natural resource with the environment that provides it.

That's just plain sensible sharing of our natural resources.

AMC is not simply a fee-for-service organization offering trails to hike and shelter for weary travelers.

Our trailside services are all part of our larger goals:

To protect the mountains, rivers and trails of the Northeast while encouraging ecologically and economically sustainable use; to provide access to and enjoyment of these special places; to encourage stewardship of these areas; to create conservation awareness and appreciation of the natural world through research and education.

Please do what you can to support this phase of the Northern Forest Project and the Year-End campaign to meet our general obligations.

Your membership dollars must be used for facilities, workshops, training, all the activities of AMC. Nothing can be allowed to divert funds from that most basic part of our mission. But additional contributions are needed to ensure the success of our environmental efforts.

We absolutely cannot do this without your help.

You can give strength to our collective voice by renewing your membership right now. The basic membership rate remains only $40. Family membership is just $55. Whichever you choose, please renew today.

You are the source of our hopes for the future.

Sincerely yours,

Andrew J. Falender
Executive Director

P.S. Your renewal contribution is tax-deductible. You may pay directly or with a credit card. Use the reply form enclosed to indicate your wishes.

Printed on recycled paper

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AMC AT WORK

An Update on AMC Conservation Programs

LAND CONSERVATION

Greylock Glen Advisory Committee reviews plan

The Greylock Glen Advisory Committee, a state-appointed committee assigned the task of creating a plan for the future of Greylock Glen, is seeking public comment on a proposal to build a golf course and an environmental education center on the 1,000-acre woodland nestled next to Mt. Greylock Reservation in western Massachusetts.

In addition to the golf course and education center, the plan may include a range of overnight facilities, from a hotel to education-center-type dormitories. Consultants for the Advisory Committee finished reviewing the proposed plan in September, and indicated that it may be the best solution for the site, once slated for a 850-home condominium development.

"Consultants indicate it's workable," said Dennis Regan, AMC Regional Programs director and advisory committee member. "We are trying to please a wider spectrum. It's not geared to one specific audience. It will give people who come to visit the opportunity to participate in something they might not have experienced before." The committee and the state began reviewing the consultants' findings in late September. AMC members are urged to comment on the proposed design. Regan will forward all comments to the state. For information or to comment, write Dennis Regan, AMC, 399 Main St., Union Block, Dalton, Mass. 01226.

AMC members help shape Cape Cod Seashore's future

This summer, the AMC Southeast Massachusetts Chapter Conservation Committee commented on the National Park Service's (NPS) management plan for the Cape Cod National Seashore. The park, known for its rare species of flowers and its delicate ecosystem of dunes and uplands, runs 40-miles along the ocean and sees over 5 million visitors annually.

"We wanted to comment, working with AMC staff, because we are very familiar with the park," said Pam Carter, AMC Southeast Massachusetts Chapter Conservation committee co-chair. "AMC members down here use it a lot. And it's a park for people from all over the world," she said.

In the process of revising its management philosophy for the next 10 to 20 years, the NPS sought public input. "It's a tough job for the Park Service, trying to balance all of the different interests," said Carter. Suggestions the AMC offered included increasing educational programs at the visitor center, improving boardwalks to keep people off the dunes, reviewing off-road vehicle use, and improving hiking and biking trails.

WATER QUALITY

AMC takes a closer look in Androscoggin relicensing

The AMC has met with representatives from the James River Corp. and residents of Berlin and Gorham, N.H., to discuss concerns about the relicensing application of eight dams along the Androscoggin River. In September, the AMC filed for intervenor status with the Federal Energy Regulatory Commission (FERC) to officially participate in the relicensing process.

According to AMC Research Director Dr. Kenneth Kimball, the eight dams — six operated by James River, and two by Public Service of New Hampshire — cumulatively affect the flow and water quality of the river, an important wildlife habitat, fishery, and recreation destination.

In September, Kimball met with residents of the two towns along the 11-mile stretch of river affected by the hydroelectric project to research local concerns. "The attitude seems to be that this place is already all messed up so why fix it?" asked Kimball. "But we shouldn't approach relicensing from that perspective," he said.

"Our objective is not to shut down the dams, instead, we're seeking to balance public benefit with the negative effects of the dams," said Kimball.

Farther north, in the meantime, Steve Tuckerman, AMC Maine Chapter member and city planner for Old Town, Maine, invited Kimball to participate in a panel discussion, hosted by the American Planners Association, about hydroelectric dam relicensing.

N.H. DES and AMC team up to create river-flow policy

This fall, the AMC and The New Hampshire Department of Environmental Services (DES) teamed up to review the state's rivers flows and uses. The study, conducted by the AMC, will collect and analyze data available from river-gauging stations for rivers recognized under the N.H. Rivers Management and Protection Program.

"Individual watersheds vary greatly in their actual water flow. We need to start to question the numbers in front of us," said Kathy Fallon, AMC Research staff scientist and Switzer Foundation fellow. "We will be able to look at water issues more concretely instead of purely from philosophical points of view." Fallon will compare water flows at all times of the year, and will study major water users such as ski areas, industry, and the public. The AMC Research team will evaluate river flow needs for recreation and aquatic life.

Our Rivers

River Interests Pull Together for New England's Dammed Waters

MORE THAN A DOZEN disparate groups representing anglers, boaters, birdwatchers, scientists, lawyers, and conservationists teamed up this fall to make sure hydroelectric developers act to protect the environment and enhance recreational opportunities in exchange for the privilege of harnessing New England's rivers for financial gain.

Conceived in August and officially born in October, the New England FERC Relicensing Coalition will allow members to share resources and expertise, and draw public attention to the concerns of those who use rivers for something other than electric power generation. Its members include the AMC, Conservation Law Foundation (CLF), Trout Unlimited, American Rivers, New England FLOW, Maine Audubon Society, American Whitewater Affiliation, and the Vermont Natural Resources Council.

In theory, the alliance will form a team of public-interest wranglers ready to make sure their voices are heard in every one of the 48 New England dam relicensing cases the Federal Energy Regulatory Commission (FERC) will consider during the next year. In practice, the coalition will probably also be a vehicle for compromise among groups that share concern for the health of New England's rivers, but sometimes differ in their opinions of how power generators can best accommodate the public. A likely credo for the group would be "united we stand, divided we fall."

The coalition is made up of several "teams" working specifically on individual rivers — a strategy designed to ensure that not a single FERC relicensing case slips through the cracks without addressing recreational and environmental issues important to coalition members.

The hydropower dam at Ripogenus Gorge on West Branch of the Penobscot is one of 48 New England dam relicensing cases the Federal Energy Regulatory Commission (FERC) will consider during the next year. Photo by Paul Mccall.

"There may be competing interests on how water should be released [from dams]," said AMC Research Director Dr. Kenneth Kimball, referring to conflicts between whitewater boaters may want large releases during weekends and other peak times and who want more consistent flows to support fisheries. "What the coa offers is the opportunity for the b the fisheries people and the wi

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people to sit down and work out issues themselves rather than letting FERC and the applicant be the judge.

"We can't make Trout Unlimited the winner on every river and we can't make American Whitewater Affiliation the winner on every river. But we can sit down and try to get equity," Kimball said.

AMC Conservation Programs Director Stephen D. Bleckmer acknowledged that "some individual differences" exist among the coalition's members, but he said discussions at initial meetings demonstrated "the remarkable degree to which them were not different visions. There was a very strong consensus on the direction for these rivers. I was really struck by the commonality of the coalition."

Perhaps that shared vision stems from the coalition members' realization that the current wave of FERC relicensings offers New England conservationists an enormous opportunity. Applications are pending on such fabled rivers as the West Branch of the Penobscot and the Kennebec in Maine, and the Androscoggin in Maine and New Hampshire. Several of the rivers and the watersheds they support represent a chunk of the 26-million-acre Northern Forest, this region's last undeveloped wilderness. Since new licenses granted by FERC in 1993 will last 30 to 50 years, coalition members see the relicensing proceedings as a once-in-a-lifetime chance to make sure that the public's interest in clean water, whitewater rapids, pristine shorelands, and sustainable ecosystems isn't sacrificed for the financial gain of a few.

"From the AMC's perspective," said AMC Executive Director Andrew J. Falender, "these issues are paramount, but we also understand the importance of economic sustainability for the regions surrounding the dams, and of reducing the nation's reliance on fossil fuels."

The 1986 Amendment to the Federal Power Act mandated that FERC give "equal consideration" to the public's interests in rivers used for hydroelectric power. It is this legislation that allows the AMC and other interested parties to legally intervene in relicensing cases and ask FERC to require dam owners to do things like alter water flow schedules to satisfy the needs of recreational boaters and fisheries, improve access for hikers and paddlers, and protect endangered wildlife. Such actions are known as "mitigation measures," and the AMC is already pursuing such trade-offs in relicensing cases involving the Androscoggin, Kennebec, and Penobscot.

But the AMC — or any organization — alone can't spread itself thin enough to cover all of the dams up for relicensing next year.

"Really, we just think there are so many rivers involved in relicensing right now and there is so much work to be done that no one group could do all the work, no matter how big it was," said Matthew Huntington, hydropower program director for American Rivers, a Washington D.C.-based organization devoted to preserving and restoring the country's riparian systems. "The best thing the coalition could do would be to benefit from many groups working on the same issue...and for people to see it as a regional issue, rather than a project-by-project issue or river-by-river issue."

> We can't make Trout Unlimited the winner on every river and we can't make American Whitewater Affiliation the winner on every river. But we can sit down and try to get equity.
>
> — *Dr. Kenneth Kimball, AMC Research Director*

Bleckmer echoed Huntington's words: "We're hoping to develop mitigation strategies as consistent as we can make them, given the differences between the rivers themselves. Regionwide, we're looking at the coalition to make sure that what goes on on one river can take advantage of the knowledge that's being gained by what's going on on another river."

"I think the coalition means we can do a more comprehensive job of intervening," said Norm Sims, a director of the whitewater boaters' group New England FLOW. "The way to avoid putting all your eggs in the FERC basket is to negotiate directly with the power companies. The coalition gives the power company the opportunity to negotiate with all the key players at the same time at the same table."

"Understanding the concerns of all parties is how we'll gain the most," said Falender, "and that includes the hydro operators. The AMC's strategy has been to work directly with the dam owners whenever possible. It's difficult to process, but it can provide better short-term results and better long-term relationships."

According to AMC Director of Conservation Jennifer Melville, the coalition will not incorporate as a separate non-profit organization, so intervention in FERC cases will continue to be done by member groups or teams of groups. The coalition will focus on sharing information and strategy, coordinating technical and legal assistance among members, and developing and implementing education, outreach and media efforts. The hope is that the united effort will come closer to matching the legal, technical and environmental staffs — and budgets — of the power companies and forest products industries that operate the dams.

Bleckmer said one of the coalition's biggest challenges will be making sure it has enough money to follow through on the "massive effort" of having a say in relicensing cases throughout New England. Raising that money from charitable foundations should be easier for a diverse coalition than for lots of individual special-interest groups, he said.

"It shows we're organized. We are together and not splintered, and foundations are more likely to back a winning enterprise," Bleckmer said.

On the eve of the October meeting that solidified the coalition, the AMC, CLF, and American Rivers got word

(continued on page 19)

FERC: A river (of red tape) runs through it

The two-year process to renew dam licenses is as meandering and tricky as the whitewater runs it controls, and as demanding as the strokes a kayaker pulls against the current.

At the center of the action is the Federal Energy Regulatory Commission (FERC), an agency that primarily oversees oil and gas pipelines. For the most part, regulating water-powered electric generating plants represents a small part of FERC's mandate, but there are 231 dams nationwide up for relicensing at the end of 1993. Ninety-two of them are in the Northeast; 40 in New England.

A kayaker runs the West Branch of the Penobscot. Photo by Paul Macell.

Thomas Russo, the Hydro Power Licensing Office's East Branch project review chief, and his staff will be responsible for conducting countless engineering and environmental studies, sifting through scores of arguments submitted by third parties like the AMC, and, in the end, determining whether hydro developers have made their case to continue using New England rivers, such as the Deerfield, Androscoggin, and Penobscot, to generate electricity.

For licenses that expire in 1993, the relicensing process began at the end of 1991, the deadline for dam owners to file relicensure applications with FERC. Thanks to the 1986 amendment to the Federal Power Act, interested groups or individuals have 45 days after that to ask FERC to require the applicant to conduct additional studies.

Within the 45-day window, FERC and relicensure applicants receive additional study letters and applicants then have 45 more days to file a response. Meanwhile, Russo's office reviews the original application to determine if it meets minimum standards. FERC also scrutinizes the additional study requests and, within 90 days, decides whether an application is adequate. The agency sends letters to dam owners telling them whether more information is needed, and to others that requested additional studies, informing them whether it is requiring the applicant to conduct those studies and, if not, why not.

Once an application is accepted, groups such as the AMC have 45 days to file a motion to intervene in the relicensure proceeding. Russo said that intervenor status, which gives outside groups legal standing in the process, is usually routinely granted.

FERC's review continues, applicants perform more studies if required, and, approximately six months after intervenors file, FERC notifies them and public environmental agencies that the license application is ready for environmental analysis. Intervenors get 60 days to file recommendations on environmental issues and hydropower developers have 45 days after that to respond to their comments. Russo said most environmental and engineering analyses are completed in four to five months and result in a document called an Environmental Assessment (EA).

Sometimes requirements of the National Environmental Policy Act may trigger preparation of a much more involved Environmental Impact Statement. Russo pointed to the Edwards Dam on the Kennebec River in Maine as one that is likely to require an EIS because opponents are calling for outright removal of the dam.

If intervenors don't oppose a license but recommend mitigating measures, as the AMC is doing, Russo said the director of hydropower licensing could grant a new license about a month after issuing the EA. If intervenors do oppose a new license, the case must go to the full FERC board — five FERC commissioners, all presidential appointees — and the granting or denying of a license could still be six months to a year off. Cases presented to the full commission are subject to public hearings, which are carried on C-SPAN, Russo said.

"In the end, those involved have 30 to 50 years until the next round, when the hydroelectric dam licenses expire again."

— *L.C.*

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AMC AT WORK

An Update on AMC Conservation Programs

LAND CONSERVATION

Franconia Parkway divided

Responding to a recommendation from the N.H. Department of Transportation, environmental groups recently signed an agreement to allow construction of a median barrier along the two-lane Franconia Notch Parkway.

"We are deeply saddened by the tragic accidents that have occurred on the Parkway, and have recognized for some time that some form of a divider may be necessary on certain sections of the Parkway," wrote Paul O. Bofinger, president of the Society for the Protection of New Hampshire Forests (SPNHF) and Stephen D. Blackmer, AMC Conservation Programs director, in a joint public statement. The two groups joined the N.H. Department of Transportation, N.H. State Parks, and N.H. Governor Stephen Merrill in signing the agreement.

It was in the early 1980s that the AMC, SPNHF, and state and federal transportation officials — after more than 25 years of negotiation — agreed on a parkway design for the scenic Franconia Notch State Park. Instead of running the four-lane Interstate 93 through the scenic notch, the group designed a two-lane parkway with a speed limit of 45 mph. Franconia Notch, with its lakes, escarpments, and the famous Old Man of the Mountains, is one of the state's most scenic parks.

Property rights hit the Hill

The U.S. Congress and several state legislatures are currently reviewing "takings" legislation. According to environmental advocates, these bills could require taxpayers to reimburse polluters who argue that compliance with public-health laws constitutes a "taking" of property.

"It's a trend. We are seeing this legislation introduced across the country. These bills are not aimed at protecting legitimate property rights; instead they are a veiled attempt to undermine our basic environmental protection laws," said Jennifer Melville, AMC Conservation director.

"The AMC strongly opposes Senate Bill 177, the Private Property Rights Act, introduced by Sen. Robert Dole," wrote AMC Executive Director Andrew J. Falender in a recent letter to Senator George J. Mitchell. "S.B. 177 is a serious threat to important regulations that promote the public interest in health, safety, and the environment." According to Falender, the legislation would require federal agencies to conduct elaborate reviews of proposed regulations, ostensibly to avoid any actions that might result in a taking of private property under the Fifth Amendment.

In April the AMC wrote a letter in opposition to S.B.177, testified against a similar bill introduced in Massachusetts, and prepared testimony to defeat another in New Hampshire. Holly Van Houten, the AMC's Grassroots coordinator, said she expected a similar bill would be introduced in Vermont.

For a complete report on "takings" legislation, see the upcoming July/August *AMC Outdoors*. For more information, contact Holly Van Houten, AMC , 5 Joy St., Boston, Mass. 02108; 617-523-0655 ext. 358.

Sterling Forest under review

New York officials say a deal "for under $50 million may soon be struck to make most of the Sterling Forest part of the Palisades Interstate Park System," reported the April 27 *New York Times*.

The AMC recently commented on a draft Environmental Impact Statement (EIS) for Sterling Forest Corp.'s development of the 19,000-acre Sterling Forest in New York. The proposal would bring more than 35,000 new residents to the forest, which lies an hour's drive from New York City.

The AMC, in concert with the National Park Service, Sterling Forest Coalition members, and the Palisades Interstate Park System criticized the plan for fragmenting wildlife habitat, degrading water quality, and affecting the Appalachian Trail, which passes through the forest.

"Sterling Forest's waters provide over 2 million residents of northern New Jersey with drinking water," said Jennifer Melville, AMC Conservation director. "Under the proposed development scenario, roughly 3 million gallons of treated sewage will flow into these drinking-water sources every day."

The AMC New York-North Jersey Chapter is urging members to write to the state, hosting a Sterling Forest Day at Greenwood Lake in cooperation with Sterling Forest Coalition member organizations, and planning a series of short nature hikes for local residents. For information about Sterling Forest events, consult the New York-North Jersey Chapter Activities listings, or call the AMC's New York office at 212-986-1430.

AMC goes to Washington for Northern Forest funds

The AMC testified in March before a House Interior Appropriations subcommittee in favor of $14 million for the purchase of three Northern Forest "jewels" — Follensby Pond in New York's Adirondack Park, northern Maine's Katahdin Iron Works, and Big Jay in Vermont's Northeast Kingdom. The AMC also asked key federal legislators for $25 million for the Forest Legacy Program, which allows purchase of conservation easements from willing sellers. The AMC hopes these funds would be used to ensure that the land maintains its traditional uses, such as recreation and forestry.

For more on the AMC's 1993 Northern Forest Project and a list of "jewels," see the April *AMC Outdoors*.

It Could Be Better on the West Branch

AMC Calls for More Information on Penobscot Dam Relicensing

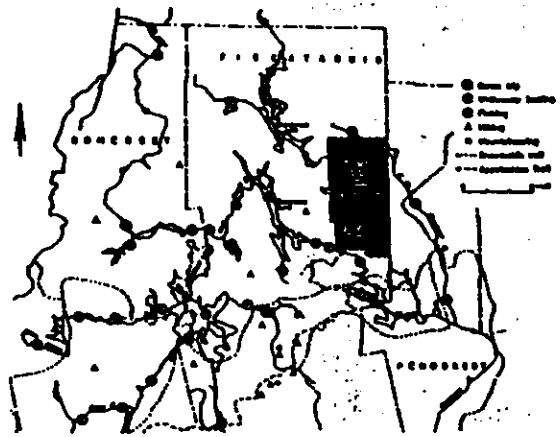
THE WATERS, SHORES, AND forests surrounding the West Branch of the Penobscot River in Maine are natural and recreational resources of national significance. The only way to protect these resources for future generations is to look at each of the area's many pieces — land, water, wildlife, and industry — as VEIS to the long-term sustainability of the big picture.

That's the bottom line of a Statement of Deficiency filed in early spring with the Federal Energy Regulatory Commission (FERC) by the Appalachian Mountain Club, American Rivers, Inc., the Conservation Law Foundation, and Maine Audubon.

FERC is currently considering Bowater, Inc.'s applications to relicense six of 18 hydroelectric dams on the Penobscot — a river, located in the heart of the Northern Forest, known to boaters for its racing whitewater, to loggers for its mills, and to conservationists for its varied ecosystems and wildlife. Bowater, which purchased 2.1 million acres of land, 18 hydroelectric dams, two pulp and paper mills and a sawmill from Georgia-Pacific last fall, applied to FERC last December to renew the 50-year permits required on the dams.

"The West Branch of the Penobscot is clearly one of the most important relicensings in the country because of the size of the watershed and the river and the land involved in that," said Matthew Huntington, director of hydropower programs for Washington-based Americans Rivers, Inc. "The West Branch is clearly in the very, very top tier of environmental importance and opportunity," he said.

The deficiency statement, which FERC was to rule on by May 1, calls on Bowater to supplement its applications with data from several additional studies addressing the impact of the hydro dams on recreation, fisheries, wildlife, wetlands, and water quality. The AMC is prepared to file for official intervenor status in Bowater's case by July 1 should FERC rule against supplemental studies. If FERC agrees that Bowater should have included information cited in the deficiency letter in its original application, the company will have until Sept. 1 to file a new application with FERC correcting cited deficiencies.



The West Branch region offers a truly unique environmental setting, and includes the northern tip of the Appalachian Mountains, exceptionally large and numerous lakes, and a long tradition of sporting camps.

"Bowater's success in Maine is critically important to the Northern Forest, and especially to communities like Millinocket," said AMC Executive Director Andrew J. Falender, noting the long history of the timber industry in the communities surrounding the West Branch. "The key here is to balance the needs of the company, the recreationists, the townspeople, and the natural resources. I strongly hope Bowater will see that their objectives overlap with ours. Each of us has more to gain in the long run by working with, rather than against, each other. In the end, we're looking for a win-win situation."

According to Huntington, the West Branch system is the largest hydroelectric development used solely by a private company — Bowater uses all of the electricity to power its mills and sells none to the public.

Meanwhile, the Electric Consumers Protection Act of 1986 requires companies that use public water resources for private gain to compensate the public by mitigating any environmental damage and/or enhancing the resources for the public's benefit. Herein lies the backbone of the conservationists' appeal.

AMC Conservation Programs Director Stephen Blackmer said getting

FERC to pay attention to conservationists' concerns about the West Branch projects may be difficult because of the overwhelming number of cases the agency must consider during the next year; some 160 hydroelectric dams across the country are up for relicensing.

"We are framing the debate via the deficiency letter," said AMC Research Director Dr. Kenneth Kimball. "We are not disagreeing with the project. We are disagreeing with the amount of mitigation and enhancement involved. In the current (Bowater) application, the mitigation and enhancement is just not there."

According to the Statement of Deficiency, the West Branch watershed spans approximately 100 miles from west to east and about 40 miles north to south, draining an area of more than 2,100 square miles. Historically, the hydropower system, although owned by one entity and controlled through one central location, is governed by four separate FERC licenses. In addition, eight unlicensed impoundments are due for their original FERC licensure.

Kimball refers to the West Branch as a "highly integrated" river system and argued that "the whole watershed should be put under one license."

The letter from the four conservation groups states, "If the recreation and ecological potential of the region is not assessed on a comprehensive basin-wide basis, it will only be performed on artificially segmented sections of the integrated watershed as the Commission undertakes review of each separate license application. The result would be both the potential loss of substantial recreational and ecological opportunities, and the failure to recognize and address adequately the potential adverse impacts of individual license flow regimes on the basin as a whole. We urge the Commission to require a basinwide analysis not only for power purposes but also for fish, recreation, wildlife and water quality values to avoid these two detrimental results."

"FERC ought to recognize that you can't look at this on a site-by-site basis, but you have to consider the entire watershed," Blackmer said.

The letter goes on to point to specific aspects of the watershed that Bowater neglected to consider adequately when it filed for relicensure. Kimball classified the additional studies asked for in the deficiency letter within three categories. First, the AMC and its co-filers want Bowater to take a closer look at when and how much water gets released from the dams, an issue that relates to both wildlife habitat and whitewater boating opportunities. Some stretches of river are currently dry.

> "The West Branch is unique in New England," said Steve Tuckerman, an avid whitewater paddler and canoe trip leader for the AMC's Maine Chapter. "Just about anybody can enjoy it."

The second category of studies would look at better protecting backcountry resources for wildlife and for flatwater canoeists. Kimball said the Chesuncook Reservoir "offers one of the best multi-day backcountry canoe trips in the East," but there are currently no protective easements on the Chesuncook's shores, leaving it vulnerable to development. Bowater should explore the feasibility of placing easements on that and other unprotected land, Kimball said.

"We look at it (the Statement of Deficiency) as complementing what we are doing in the Northern Forest Lands effort," said Mike Cline, director of the Northern Forest Program for the Maine Audubon Society.

"The West Branch is unique in New England," said Steve Tuckerman, an avid whitewater paddler and canoe trip leader for the AMC's Maine Chapter. "Just about anybody can enjoy it," he said, explaining that the river offers everything from Class 5 whitewater to flatwater canoeing and fishing. "The scenery is incredible, with Mount Katahdin staring at you all the time. It's good the AMC is getting together with others to preserve the near-wilderness experience," said Tuckerman, who's been tracking Bowater's activities on the river.

Category three, according to Kimball, includes studies on wildlife protection in general. One method would be to collect data on the impact dammed rivers have on feeding habitat for the bald eagle. "The way the project is run is probably causing some serious problems for the bald eagle, which is an endangered species, and probably has substantial impact on wetlands which provide better habitat for moose and ducks and beaver," Kimball said. He said the level of the Chesuncook Reservoir can be "drawn down," or lowered, as much as 44 feet per year, destroying the habitat of many of the fish that bald eagles feed on.

The AMC's FERC filing also asks Bowater to study the potential for energy conservation at its mill facilities, and to substantiate its paper production and employment forecasts. CLF Staff Attorney Don Sosland said Bowater has pledged to invest $600 million in its West Branch facilities, but data show that both production and employment have been falling steadily over the past decade. In 1981, the mills employed 4,171 workers, according to the deficiency letter. That number fell to 2,400 in 1991, Sosland said, and Bowater's relicense application predicts employment will stabilize at 2,000 "for the indefinite future commencing in 1994."

"There's no indication that, given the paper industry, more jobs will be created in the mills," said Sosland, noting that the deficiency letter also calls for studies of possible economic benefits to mill towns from recreation and tourism industries.

—Lisa Capone, an Appalachia Bulletin Advisory Committee member, is author of the AMC's Conservationworks Book.

OBITUARIES

AMC has nothing to gain by delaying relicensing of dams

To the editor:

The AMC has been involved in the Northern Forest issue since the mid-1980's, not to realize any financial gain, but to prevent the type of situation we all witnessed when Diamond International first sold the Nash Stream tract to a developer.

As we stated in a June 10, information paper, the Appalachian Mountain Club believes that the dams on the Androscoggin should continue to operate through compliance with the Federal Power Act. The AMC has nothing to gain from delaying the process, but the public has much to lose if the people's interests remain unrepresented. For too long the dam owners have used the people's river primarily for private gain without sufficient public benefit.

We are involved in the issue because we believe that the environmental and economic future of the North Country—including jobs in timber, tourism and recreation industries—will be enhanced in the long run by a clean, enjoyable river. We are seeking reasonable options that will not impair the fiber base or economic viability of James River's hydropower operations, which are critical to the local economy.

The claim made recently in your paper that the AMC is in this for financial gain is false. When river flows and adjacent lands are made accessible to sportsmen and recreationalists as compensation for the dam relicensing, it is the public that will benefit directly. While the Appalachian Mountain Club is part of the recreation industry, it is first and foremost a non-profit organization that encourages the protection, wise use and enjoyment of the mountains, forests, open spaces and rivers of the Northeast.

We share other's concerns about the toxic contaminants discharged into the River, but the Federal Power Act does not supply us the opportunity to change the paper-making process. However, it does allow the public to raise legitimate concerns about how hydro facilities and their related dams may exacerbate water-quality problems. AMC and the EPA have raised water-quality concerns related to relicensing on the Androscoggin because they may interfere downstream with legitimate designated uses, including boating, swimming and fishing.

The waters of the Androscoggin are publicly owned and it is for this reason a privately owned hydro facility must periodically obtain federal licenses for the privilege of using this public resource. The dams and diversions on the Androscoggin effectively eliminate much of the public's ability to use its own resource, a loss which is typically considered in the licensing process.

We believe that protecting and restoring recreational opportunities, fish and wildlife habitat, energy efficiency, and clean water along the Androscoggin River will be in the best long-term economic and environmental interest of the people of Coos County and New Hampshire. The Federal Energy Commission relicensing process, including the Environmental Impact Study, can go smoothly if the dam owners, agencies and interveners work cooperatively to address these critical issues.

Sincerely

Andrew J. Falender, executive director

Appalachian Mountain Club

Letters Policy

We welcome your comments and opinions on all subjects. Please try to limit your comments to 300 words or less and be sure to include an adress and phone number where you may be reached for verification.

OBITUARIES

SHADES
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AMC PEOPLE

Ken Kimball: Researching the possibilities

By Lucille Daniel

THIS MONTH KEN Kimball will once again run the Mt. Washington Road Race, something he's done more times than he can count. "You know the old joke about that race, don't you?" he asks. "They say it's the easiest road race in the world — it's only got one hill."

Making his way almost eight winding miles up the auto road to the highest summit in the Northeast, Kimball will literally run into an old habit of his: combining play with work. Once he reaches an elevation of about 3,000 feet, he'll meet an environmental problem he's been working on since he became the AMC's Research Director in 1983.

"High-level air pollution is really becoming a health problem for the hiker," he explains. "The base of Mt. Washington can show very clean air quality on a given day, but as you climb up to the bottom of the cloud cover, the air can fall out of compliance with the natural ambient air-quality standards."

This pollution, says Kimball, begins in the Ohio Valley and increases as air moves through a series of urban centers on its way to the White Mountains.

A conversation with Kimball quickly develops into a fascinating mix of adventure and science. Typical of his approach to life was a decision, after receiving a master's in biology from the University of Massachusetts at Amherst, to join the Peace Corps with his wife, Sarah, also a biologist. "We wanted to stop the book learning and do something that was for real," he says.

They landed in Iran in 1972 for a two-year stint with the Smithsonian Institute's Peace Corps Environmental Program. Living on the coast of the Caspian Sea, they worked in the Iranian Fisheries Institute and later helped set up a research lab on water quality.

AMC Research Director Ken Kimball, pictured above with his son, Eric, has made great strides in water, air, and land protection, and in the Mt. Washington Road Race.

"We also did a lot of hiking in Iran," says Kimball. "Much of the country is mountainous, and we'd climb Mt. Damavand, which is 19,000 feet up, or go backpacking in the desert. Biology is as much a hobby as it is work. We'd end up going out with other biologist friends just to count gazelles or wild sheep."

During a vacation from Iran, Kimball and his wife spent six weeks hiking in Nepal. "We hit it just before the really big tourist boom," he says. "We just hiked alone from one small village to another, asking the natives if we could stay with them. We made it to the base camp of Everest and then climbed some lesser peaks."

Rather than head straight back to the United States at the end of their Peace Corps work in 1974, the Kimballs "took the slow boat home," by way of Kenya and Tanzania. "You build up a real network in the Peace Corps, and we'd visit research stations wherever we went and ask a lot of questions. Americans have a tendency to look at all big problems, including environmental ones, from a strictly American perspective. It was important to us to understand how other people were attacking the same problems. If you really want to see what overpopulation is like, there's nothing like traveling to Asia and Africa. It's a sobering experience."

The Kimballs took advantage of their time in Tanzania to climb Mt. Kilimanjaro. "It's really just a long hike," he says. "You get up to about 8,000 or 9,000 feet the first day and then climb to the base of the final cone at 15,000 feet the second day. Because the cone is made of volcanic scree, you do best to climb it during the night, when the footing is firm. So we started to the top after midnight under a full moon and then watched the sun rise over the African plain."

Even after these experiences of what Kimball calls "majestic" mountains, he's never lost his respect or affection for the White Mountains of his native New Hampshire. "Sure, they don't have that kind of majesty," he says, "but they're more intimate. They bring you into a closer relationship with the forest."

AFTER RETURNING TO THE U.S. late in 1974, Kimball went on to receive a doctorate in limnology (fresh-water biology) from the University of New Hampshire. He was working at Cornell on an Environmental Protection Agency grant conducting ecosystems research when he heard about the opening for a research director at the AMC.

"I was really attracted to the AMC," he says, "because it has always had strong scientific underpinnings. If we really expect to change policy, we can't afford to be technically inept. The science generally practiced in the environmental world is very biased. A client hires a scientist to prove whatever point the client wants to prove. That's not classic science at all. We need to make sure we have our science honest, and the AMC happens to be in a good position to do this."

One of Kimball's pet projects has been his involvement in the relicensing of the "Class of '93", the 69 New England dams that come up for licensing by the Federal Energy Regulatory Commission (FERC) this year. "I really felt this was an opportunity for the AMC to make a difference," says Kimball.

His idea was to ask power companies to offer conservation easements on land bordering rivers in exchange for what they are taking from the public by reducing water flow. "Rivers belong to the people," says Kimball, "and these companies are making huge profits by restricting public access to them. We don't want to bankrupt the companies or [illegible] want to prevent them from selling off riverfront land to housing developers.

"Kimball's concept has been adopted by a coalition of water-use groups, including the AMC, which is currently negotiating with some of the power companies seeking new licenses for their dams. A number of them are talking serious mitigation with us now," he says optimistically.

> "If we really expect to change policy, we can't afford to be technically inept."

Kimball also speaks with cautious optimism about finding the time soon to take a break from the work of science. "Every year we try to choose a different place to explore," he says. "Of course, our 9-year-old son, Eric, has a vote now, too." Recent family adventures have included canoe trips on the Penobscot in Maine and the Green and Colorado rivers out West. The threesome also went off on a work-play trip to Costa Rica, where they climbed the 13,000-foot Cerro Chirpo, explored parts of the rain forest, and studied cloud-water pollutants. The next trek, says Kimball, will probably be to Alaska.

But for now, the man who rides his bike 11 miles to work "to get the poison out of the blood" is thinking about that Mt. Washington run. "It's not a long buster," he says. "It just does a job on your legs."

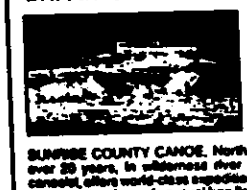
Knowing how much he enjoys combining science and recreation makes me wonder which Kimball will win this race: the biologist who might be watching for "visibility degradation," another effect of air pollution in the Whites; or the outdoorsman who relishes running and hiking in the mountains?

— Lucille Daniel, a Boston Chapter member, is editor of the Chelmsford Independent *in Chelmsford, Mass.*

EASTERN ARCTIC

Wild Rivers

BAFFIN ISLAND ★ UNGAVA PENINSULA



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WILDERNESS MEDICAL ASSOCIATE
RFD 2 Box 890 Bryant Pond, ME 04219

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C F N O

CASCADE FLATS NEIGHBORHOOD ORGANIZATION

July 24, 1993
34 Main - Cascade
Gorham, NH 03581

Town Manager and Selectmen
Town Office
20 Park Street
Gorham, NH 03581

We the people of the Cascade Flats neighborhood respectfully submit the enclosed petition concerning the pending licensing by the Federal Regulatory Commission (FERC) of hydropower facilities in our area. Attached are signatures from 97% of the residents of Gorham's Cascade Flats and support signatures from other Gorham residents.

We want the Town of Gorham to represent our interest in this matter by commenting to FERC by 10 August on the pending EIS Document dated June, 1993 indicating the following:

The Town of Gorham supports the Cascade Flats Neighborhood Organization's position that the Human Health, Environmental, Aesthetic and Socioeconomic impact on the residents of Gorham's Cascade Flats will be significant from the relicensing of Smith 2287-003 Gorham 2288-004 Shelburn 2300-002 Gorham 2311-001 Cross 2326-002 Sawmill 2422-004 and Cascade 2327-002. Therefore, top priority should be given to mitigate their concerns in all areas.

OR

The Town of Gorham objects to the proposed Pulsifer Rips Power Generator Facility (FERC # 2327) due to the Human Health, Environmental, Aesthetic and Socioeconomic impact to the residents of Gorham's Cascade Flats Neighborhood. The only acceptable condition under which to allow the construction of this facility is the purchase of the homes in the neighborhood at replacement cost.

Your prompt attention to this matter is greatly appreciated.

Elsie Marcou
Armand Addario
Cascade Flats Neighborhood Organization
John Dalphonse V.P.

cc: Congressman Dick Swett
NH Senater Carole Limarande

Page of

PETITION

Date:

We the undersigned citizens of the Town of Gorham NH, petition the elected officials to send correspondence to the Federal Energy Regulatory Commission objecting to the construction of the new Pulsifer Rips Power Generation Facility (Project #2327). We object to the Human Health, Environmental, Aesthetic and Socioeconomic impact on the residents of the Cascade Flats neighborhood. The only acceptable condition under which to allow the construction of this facility is the purchase of the homes in the neighborhood at replacement cost.

Richard M Semen
Theresa Vallee
Rosario G Vallee
Carol Robichaud
Richard Robichaud
Craig B. Washburn
Linda Ross
Mr & Mrs Joseph Addario
Brad Rud
Kathy Baillargeon
Helen McCarthy
John McCarthy
Alice Armand
Sue Marcou
Tim Marcou
Bill Hannigan
June Addario
Richard Addario
Alfred Bolduc
Juliette Bolduc
Armand Addario
Oliver Benibe
Jeannette Benibe
Judy Rheaume
Normand Rheaume
[illegible]
Sylvia Fecteau
Rita Fecteau
Marlene Martin
Scott Martin
Paul Laflamme
Cecile Laflamme
Richard W. Ross
Margaret J. Ross

Number of Signatures
37

Robert J Ford
Lucille Addario

Cascade Flats

PETITION

Date:

We the undersigned citizens of the Town of Gorham NH, petition the elected officials to send correspondence to the Federal Energy Regulatory Commission objecting to the construction of the new Pulsifer Rips Power Generation Facility (Project #2327). We object to the Human Health, Environmental, Aesthetic and Socioeconomic impact on the residents of the Cascade Flats neighborhood. The only acceptable condition under which to allow the construction of this facility is the purchase of the homes in the neighborhood at [redacted] replacement cost.

Dan C Poré
Mr & Mrs Pat Marcou
Mrs Nicholas Tirelphouse
Maria L. Shore
Pat Lefebvre
Andy Lefebvre
Wilfred Fernette
Marcia Donato
Maggie Fernette
John Donato
Anna DiPaolo
John Tirelphouse
Edward Knapp
Cecile Dalphonse
Ray G Wheeler
Helen W Smith
John Gerrior
Barbara Gerrior
Frank Sherrien
Mavis Sherrien

Number of Signatures
22

Cascade Flats

PETITION

Date:

We the undersigned citizens of the Town of Gorham NH, petition the elected officials to send correspondence to the Federal Energy Regulatory Commission objecting to the construction of the new Pulsifer Rips Power Generation Facility (Project #2327). We object to the Human Health, Environmental, Aesthetic and Socioeconomic impact on the residents of the Cascade Flats neighborhood. The only acceptable condition under which to allow the construction of this facility is the purchase of the homes in the neighborhood at replacement cost.

Cecilia Gleason	4 Western Ave. Cascade	752-4227
Flor Hebie		
Rita Lapnow	8 Wetherbee Ave.	752-4887
Rene Lapnow	" " "	"
Donna LaCombe		
[redacted]	2 First St	752-7559
Kathy + Rich Nickerson	194 Wight St.	
Paul + Pauline Gonsalvagni	18 Western Ave - Gorham N.H.	752-4787
Louis Dalphonse	Anne Dalphonse Gorham N.H.	752-4263
John Addario	Gorham N.H.	
Florence Addario	Gorham N.H.	Norman & Michael
Rita Pinard	Patricia Pike	Mary Eames
Jean Paul Pinard	8 Lafayette Street Ave	Gary Eames
Mary Bedard	Lisa Veazey	
Arline Cellupica	Dan Veazey	
Dominic Cellupica	Rick White	
Roland A. Fortier	Emilda White	
Lena Parent	Maurice Nadeau	
Wilfred Bailey	Janet Nadeau	
Germaine Landry		
Clarence Pike		

Number of Signatures
34

Cascade Hill

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Town of Shelburne
Shelburne, N. H. 03581

OFFICE OF THE SECRETARY
FILED
93 AUG 12 PM 1:00
FEDERAL ENERGY
REGULATORY COMMISSION

August 9, 1993

Lois Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street NE
Washington, Dc 20426

Re: Upper Androscoggin River Draft Environmental Impact Statement

James River-New Hampshire Electric, Inc.
Project No. 2300-002

Dear Ms. Cashell:

Enclosed please find 14 copies and the original for filing with the Commission regarding the Draft Environmental Impact Statement as it relates to the above referenced project. The Town of Shelburne files these comments as an intervenor on behalf of our taxpayers.

Copies of this document have been sent to all parties listed on the attached certificate of service list. The Town requests that any response to our comments be forwarded to the Shelburne Town Office, 74 Village Road Shelburne, NH 03581.

Sincerely,

Warren Hayes
Warren Hayes
Selectman

Lynn Newell
Lynn Newell
Selectman

80. No response is required.

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

Town of Shelburne

Shelburne, N. H. 03581

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

In re: Draft Environmental Impact Statement
for the following FERC Project No. 2300-002

COMMENTS BY THE TOWN OF SHELBURNE NEW HAMPSHIRE REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Town of Shelburne, New Hampshire would like to have its opinion taken into consideration on the Upper Androscoggin River Basin Draft Environmental Impact Statement (DEIS) prepared by the Federal Energy Regulatory Commission (FERC).

The Town feels that the DEIS is a well written piece of documentation and much time and labor have been expended to clearly define and clarify both positions to the licensing of all hydros on the Androscoggin River.

We agree with the FERC staff conclusion section # 5 with a few exceptions noted below.

1. There is no objection to raising the river level at the Shelburne Project 2300-002 by 1.7 feet, with the estimated loss of shoreline of approximately 2500 feet and increase of surface area of about 40 acres.

2. The proposed Shoreline Protection Buffer zone need not be applied in the Shelburne Relicensing Application. Shelburne all ready has shoreline zone in the town. (See attached copy)

3. Recreation - In section 4.23 it is suggested that more signs be erected to show the location of recreation facilities and the proposed boat launch. The Town feels this should not be required in the Shelburne Project. The additional signs along our highways would only degrade the scenic beauty and quaintness that we try to maintain. As for the boat launch, we do not under any circumstance want this in Shelburne. If the FERC requires this boat launch, then the FERC or some other governmental agency must fund its construction and related costs - upkeep, safety and management.

81.

81. No response required.

82. See response to comment 88. Note that the Shelburne zoning ordinances that you have presented to us is one example of why our recommendation to the Licensee is to work with you and other entities in selecting the appropriate width of the project buffer zone. We are recommending that the licensee, in consultation with you and the National Park Service, develop criteria for selecting the appropriate width of the buffer zone (see section 4.2.7 last paragraph). Further, we indicate that the buffer zone land need not be purchased in fee, less than fee methods, and other protective measures would suffice.

83. We are not recommending the development of a boat launch in or near Shelburne.

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Town of Shelburne
Shelburne, N. H. 03581

Page 2

In conclusion, the Town of Shelburne, New hampshire supports James River Corporation in their Relicensing Application of Shelburne Project 2300-002 and agree with the staff conclusions in Section # 5 of the DEIS with the few exceptions minor exceptions as listed.

Sincerely,

Warren Hayes
Selectman

Lynn Nesell
Selectman

84. No response required.

The following pages contain attachments to the comment letter. No comments are required.

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

ZONING ORDINANCES

Town of Shelburne, New Hampshire
REVISED MARCH, 1987

An ordinance to promote the health, safety, morals and general welfare of the community by regulating the use of land in the Town of Shelburne.

PREAMBLE: In pursuance of authority conferred by Chapter 31, sections 60-69, New Hampshire Revised Statutes annotated 1955, and for the purpose of promoting the health, safety, morals, and general welfare of the inhabitants of the incorporated Town of Shelburne, New Hampshire, and to insure the preservation of the rural charm attached to our town, through the promotion of an orderly process of its development, by providing adequate areas between buildings and various rights of way, by preventing overcrowding of land, avoiding undue concentration of population, ensuring safety from fire and other hazards, facilitating adequate provision for water, sewerage and other public requirements, and by other means, now therefore the following ordinance is hereby enacted by the voters of the Town of Shelburne, New Hampshire, in official annual town running convened.

SECTION 1
DISTRICTS

In conformance with our Master Plan, with the purposes expressed in the preamble and with special concern for preservation of our unique environmental assets, it seems desirable to divide the township of Shelburne into two zones. Zone 1 to consist of all land with the exception of land lying 200 ft. proximate on the river side of US Rt. 2 and a line 400 ft. proximate of the North Road and its extension Hogan Road on the North side both extending to Gorham on the West and Maine on the East. This excepted area shall be known as Zone 2.

SECTION 2
DEFINITIONS

For the purpose of this ordinance, certain terms of words used herein are defined as follows:

1. **ACCESSORY BUILDING:** A building subsidiary to the main building on the lot and used for purposes customarily incidental to those of the main building, and not for dwelling purposes.
2. **CAMP OR COTTAGE:** A building of such nature that it may only be used for recreational and dwelling purposes during seasonal parts of the year (six months or less in a twelve-month period).
3. **CAMPGROUND:** An area with a state-approved sewage disposal system that is set aside for rental of sites and tourists who provide their own tents or trailers.
4. **DWELLING:** Any permanent building designated and used as a residence, containing one or more dwelling units. The term shall not be deemed to include hotel, motel, rooming house, travel or camping trailer, or mobile home.
5. **DWELLING UNIT:** A building or portion of a building which contains a single set of living quarters (accommodations) designed for permanent occupancy.
6. **FRONTAGE:** The distance that a front yard borders on the public right of way.
7. **FRONT YARD:** An open unoccupied space extending for the full width of a lot between the extreme front line of the building thereon and the nearest existing edge of the public right of way.
8. **HOME PRODUCE AND PRODUCTS:** Anything of an agricultural nature grown, produced, conditioned or otherwise carried on the property of a resident, also such articles as are manufactured or shared by members of the household of a resident.
9. **JUNK:** Any old metal, bottles, paper, plastic, cotton or woolen wastes, two or more unregistered motor vehicles which are unfit for use on the highways, used parts and materials of any kind the accumulation of which is detrimental, injurious, or unsightly to the neighborhood, excluding farm trucks, tractors and machinery.
10. **MOBILE HOME:** Any vehicle used or intended to be used for occupancy as a dwelling or sleeping place for one or more persons, which is or may be equipped with wheels or similar devices for purposes of transporting the unit, whether by motive or other means, and is provided with running water, toilet, bathtub or shower. The term shall apply to such vehicles regardless to the removal of wheels, the placing of the vehicle on a foundation or the construction of accessory buildings.
11. **MOBILE HOME PARK:** An area set aside for permanent occupancy by mobile homes.
12. **NON-CONFORMING LOT:** A lot which does not conform to the frontage or area requirements of the district in which it is located.
12. **NON-CONFORMING USE:** The use of any building, structure, or land which does not conform to the use permitted in the district in which it is located.
14. **PUBLIC RIGHT OF WAY:** Any town, state, or federal highway or road and the land on either side of the same as covered by statutes to determine the width of right of ways.
15. **SIGN:** A structure, building wall, or other outdoor mechanism used to bring to the attention of the public the name, product, or service of any person, business or industry.
16. **TOURIST LODGING:** A building or buildings including, but not limited to, motel, tourist home, overnight cabin and inn, to be offered as sleeping accommodations for transient guests for compensation, and where a general kitchen and dining room may be provided within the central building or in an accessory building.
17. **TRAILER:** A house trailer or mobile home which does not have toilet, bathtub and/or a shower, which is not connected to a septic system.
18. **TWO-FAMILY OR TWO-DWELLING UNIT:** A building which contains two separate sets of living quarters designed for permanent and separate occupancy.

SECTION 3
ZONING REGULATIONS
A. RESIDENCES PERMITTED IN ZONES 1 AND 2

1. Farms, residences, and accessory buildings shall be permitted.
2. For all new residences' construction or removal of an old house to a new lot, building lots shall have a frontage of at least 200 feet on a public or private right of way. Each lot shall be a minimum of one acre and there shall be only one dwelling unit on each a lot, except as permitted in paragraph 4. The dwelling unit and accessory buildings may occupy no more than 20 percent of the lot on which they are located.
3. On all new construction or relocated buildings front yard shall have a minimum depth of 25 feet from the nearest existing edge of the public or private right of way and shall set back 15 feet from the side and rear lot lines, buildings on corner lots shall have a minimum depth of 25 feet from the nearest existing edge of all

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public or private right of ways. The only exception shall be that roadside stands erected for the purpose of selling or exposing for sale home produce may be located a minimum of 15 feet from the nearest existing edge of the public or private right of way.

4. Two dwelling units may be allowed on a lot according to the following provisions:

Lots larger than two acres can have no more than two dwelling units.

a. The conversion of a single dwelling unit into two dwelling units is permitted if the following requirements are met:
   (1) the dwelling unit exists on the date of adoption of this provision (3/8/83);
   (2) there must be adequate off-street parking for both units;
   (3) a septic system construction approval from WSPCC is submitted as part of the building permit application to insure that the existing system is adequate or to require additional capacity;
   (4) if the existing building is on a lot at least two acres in size and the second dwelling unit is created, future subdivision of the lot shall maintain at least a two-acre lot on which the two dwelling units are located. This is, the ratio of one dwelling unit per acre is the maximum density allowed in future subdivisions.

b. New construction (after 3/8/83) of a single dwelling containing two dwelling units may be allowed if the following requirements are met:
   (1) the lot is at least two acres with the frontage and set-back requirements as set down in paragraphs 2 and 3;
   (2) there must be adequate off-street parking for both units;
   (3) a septic system construction approval from WSPCC is submitted as part of the building permit application.

5. Cottages and camps designed and built for company during a portion of the year are permitted subject to the same restrictions as those applying to permanent residences. Camps and cottages are also allowed in licensed camping areas, but the permit for these shall specify that the structure is temporary in nature and shall not be turned into a permanent residence. These latter camps and cottages must be located more than 600 feet from any public highway.

6. Mobile home parks to be used for resident purposes shall not be established within the township. An individual mobile home may be used by a homeowner as his place of residence subject to all the restrictions of this ordinance that pertain to dwelling units.

7. Trailers or mobile homes shall not be used as permanent residences on leased land. Trailers or mobile homes are allowed at licensed campgrounds, but if the length of stay is such as to indicate year-round residence, they come under the prohibition pertaining to mobile home parks.(Year-round is greater than six months in a 12-month period.)

8. Limitations of the number of mobile homes: There shall be not more than one mobile home to every six (6) dwellings.

B. PERMITTED USES IN ZONE I

1. Residences may be used by owners or tenants as offices for doctors, engineers, architects, lawyers, real estate, insurance, hairdressers and barbers, or other recognized professions.

2. Home produce and products may be bought and sold and exposed for sale.

3. Tourist accommodations in the form of hotels, tourist homes, motels, motor courts and campgrounds may be maintained and operated. Such accommodations shall be subject to the same restrictions as to lot size, frontage, percentage of lot occupied by buildings, distances from public right of way and from side and rear lot lines as are established for business and industry, paragraphs 11 and 12 of this section 3, B.

4. Schools, hospitals, licensed running homes and sanitoriums may be operated.

5. Places for the conduct of winter sports such as ski slopes may be established and operated.

6. Facilities for summer recreation may be established and operated with the following exceptions: There shall not be constructed and operated within the town auto race tracks, motorcycle nearest cross, go-kart tracks, demolition derbies and other forms of motorized contests or other sports centers of this nature which tend to draw crowds of people to the town for a few hours, rather than being designed to serve the needs of the citizens of the town or the summer residents and tourists who are using the town facilities.

7. The following types of business and industries will be permitted.

(a) Stores for the retail sale of groceries, hardware, dry goods, drugs, etc., including all merchandise that may be legally dispensed in such establishments.

(b) Service establishments, including but not limited to barber and beauty shops, custom tailors, shoe repair, banks and restaurants.

(c) Public garages and gasoline service stations, including repair facilities.

(d) Operations relating to the production of lumber or its processing.

(e) Industries of varied types subject to the restrictions of the other articles in this ordinance pertaining to industry.

(f) No business or industry shall be operated which produces noise outside of lot lines exceeding in intensity that of average week-day traffic on the surrounding streets or so as to be objectionable due to intermittence, beat frequency, or shrillness. Nor shall any objectionable, obnoxious or dangerous concentrations or quantities of odor, dust, fly ash, gases or fumes be emitted. No excessive vibration shall be caused.

9. Junk yards may be operated when used in conjunction with a conforming industry, provided the yard is fenced or screened so as to be completely hidden from view from the public right of way and from adjacent lands and set back a minimum of 25 feet from the nearest existing edge of the public right of way.

10. The opening and operation of a gravel pit shall be conducted in accordance with the Town of Shelburne Gravel Pit Regulations.

11. Building lots for business and industry shall have a frontage of at least 200 feet and shall be at least one acre in area. Buildings for the business or industry may occupy no more than 30 percent of the lot on which they are located.

12. Buildings for business and industry shall have a front yard with a minimum depth of 25 feet. Such buildings shall be set back at least 25 from side and rear lot lines. Adequate off-street parking facilities shall be made available for workers and patrons of the business, with drives or roadways with clear visibility and non-hazardous motor to the public right-of-way.

C. PERMITTED USES ZONE II

1. Residential uses as per Section 3-A.
2. Accessory buildings as defined in section 3-A.
3. Recreational uses consistent with the rural nature of the Zone are permitted.
4. Public facilities.
5. Forestry and agricultural activities including roadside stands for the sale of agricultural products as in Section 3 B 2.
6. Home business as defined in Section B-1.

D. GENERAL

1. No owner or occupant in the town shall permit fire or other ruins to be left, but shall remove the same to ground level or rebuild the structure within one year.

2. No cesspool, septic tank, or sewerage disposal area shall be constructed or maintained in such a way as to affect a public body of water, a spring, a well or a dwelling from the point of view of health or as an offensive nuisance. No waste water or sewage shall be permitted to run free into a public body of water or be discharged in any way that may be offensive or detrimental to health.

3. No sewage disposal plant shall be constructed in the town to serve the needs of any other township or municipality.

4. Advertising signs shall be permitted but shall refer only to a business establishment or industry operated in the Town of Shelburne. Each business establishment or industry shall be restricted to four signs. A building permit shall be obtained for each sign erected.

All signs shall be properly maintained to the satisfaction of the building inspector. Any sign which is damaged in excess of 25 percent of its value must be repaired or removed within 90 days or it shall be removed at the owner's expense.

Non-conforming signs may be removed for painting or repairing. The repaired sign must be no larger than the original sign and must be replaced in the previous location.

Signs may be illuminated only with a steady burning light.

5. All utility service entrance lines shall be installed underground from the road to the structure. This ordinance may be waived, by appeal to the Board of Adjustment, in situations where this requirement is prohibitive in cost.

6. The following uses are specifically prohibited in the township of Shelburne

Acetylene gas manufacture
Ammonia, bleaching powder, chlorine manufacture
Animal fertilizer manufacture
Asphalt manufacture refining
Auto wrecking yard operation
Blast furnace operation
Brick, terra cotta, or tile manufacture
Candle manufacture
Celluloid treatment, storage or manufacture
Cement, lime, or plaster of Paris manufacture
Coke manufacture
Dye stuff manufacture
Gunpowder, fireworks or explosive manufacture
Emery cloth or sandpaper manufacture
Enamel, Japan lacquer, oil, paint, shellac, turpentine or varnish manufacture
Junk yard operation, except as above
Leather japanning, or tanning or curing of raw hide or skins
Ore smelting
Shoe or stove blackening, cleaning or polish manufacture
Slaughterhouse operation
Soap manufacture
Soda and soda compounds manufacture
Stockyard operation
Tar distillation or manufacture
Yeast manufacture

SECTION 4
NON-CONFORMING USES

1. If, at the time of the adoption of the ordinance, any land, building or structure is being used in a lawful manner, except that such use is not in conformity with the provisions of this ordinance, such non-conforming use of said land, building or structure may be continued. No interruption of such non-conforming use shall prevent its continuance except as hereinafter provided in paragraph 2 of this section 4.

2. Whenever a non-conforming use has been discontinued for more than one year for any reason, or damaged exceeding 75 percent of its value, such non-conforming use shall not thereafter be re-established, and the future use of the property shall be in conformity with the provisions of this ordinance.

3. A non-conforming use may not be extended or enlarged or changed to another non-conforming use.

4. A lot with less frontage and depth than required by this ordinance, which is recorded and taxed as a lot of record at the time of the passage of this ordinance, may be used for building a residence conforming to frontage and depth requirements as closely as may be.

5. A non-conforming temporary building may be permitted by the Board of Adjustment for use incidental to construction and building operations for an initial period of not more than two years, upon application accompanied by a bond and bill of sale to the town, effective in case such building is not removed at the expiration of the permit. A permit may be renewed by the Board of Adjustment for a period of one year, provided that hardship or other good cause can be shown.

SECTION 5
ENFORCEMENT AND ADMINISTRATION

1. It shall be the duty of the Board of Selectmen, and the Board is hereby given power and authority, to enforce the provisions of this ordinance.

2. There shall be a Building Inspector and the administration of this ordinance is hereby confirmed upon him. He shall be paid such salary as is authorized within the Town Budget.

3. A building permit shall be required before any of the following activities occurs:

(a) the erection, construction, change in ground plan, or structural additions, or reconstruction of a building, or change in the number of dwelling units (as allowed in section 3, part A, paragraph 4) or
(b) a change in use between categories A and B in section 3, or
(c) conversion of seasonal dwelling to year round dwellings

A building permit application shall be filed with the Building Inspector. The application must have a plot plan showing the outline of the building and its position on the lot and all applicable WSPCC permits

and other necessary state and local permits shall be attached. The permit shall be issued within 15 days of receipt, provided such proposed use is in conformity with the provisions of this ordinance, the subdivision regulations, and any other local regulation.

4. A record of all building permits and of plot plans shall be kept on file in the office of the building inspector and a copy shall be furnished on request to any person having proprietary or tenancy interest in the building or land affected.

5. If work under the building permit lapses for a period of 12 months, the building permit shall be void and a new one applied for before work is recommenced.

6. A fee based on a schedule set up by the Selectmen shall be charged for issuing a building permit, and this shall be collected by the Building Inspector at the time the permit is issued. All such fees shall be transmitted to the Town Treasury.

7. Upon any violation of this ordinance, the Selectmen shall, on their own initiative, take immediate steps to enforce the provisions of this ordinance by seeking an injunction in the Superior Court or by any other proper legal action.

SECTION 5
BOARD OF ADJUSTMENT

Within thirty days after the adoption of this ordinance the Board of Selectmen shall make appointment to a Board of Adjustment of five members conforming in duties to the provisions of Chapter 31 of the New Hampshire Revised Statutes Annotated 1955. Thereafter as terms expire or vacancies occur, the Board of Selectmen shall be responsible for filling vacancies and maintaining full membership on the Board of Adjustment. The Board of Adjustment here provided shall conform in membership and term of office to the provisions of Section 67, Chapter 31, N. H. Revised Statutes Annotated 1955.

SECTION 7
AMENDMENTS

This ordinance may be amended by a majority vote of any legal town meeting when such amendment is published in the warrant calling for the meeting and when such amendment has received two public hearings at least fifteen days apart, as specified in Chapter 31:63a of the community Zoning Enabling Act.

SECTION 8
PENALTY

Any person, firm or corporation violating any of the provisions of this ordinance shall be fined not more than the maximum penalty permitted by the state law upon conviction, for each day such violation may exist.

SECTION 9
SEPARABILITY CLAUSE

The invalidity of any provisions of this ordinance shall not affect the validity of any other provision.

SECTION 10
WHEN EFFECTIVE

This ordinance shall take effect upon its passage. (Passed at Town Meeting March 10, 1964).

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C F N O
CASCADE FLATS NEIGHBORHOOD ORGANIZATION

August 9, 1993
34 Main - Cascade
Berham, NH 03581

By Federal Express

Lois Cashell
Secretary
Federal Energy Regulatory Commission
825 N. Capitol Street, N.E.
Washington, DC 20426

Reference :

J. Brodie Smith	P-2287-003	Cross	P-2326-002
Berham	P-2288-004	Cascade	P-2327-002
Shelburne	P-2300-002	Sawmill	P-2422-004
Berham	P-2311-001		

Subject : Review of Draft Environmental Impact Statement:

Dear Ms. Cashell:

Enclosed for filing with the Commission on the above projects are the original and 9 copies of the motions and comments on the Draft Environmental Impact Statement from the Cascade Flats Neighborhood Organization.

Please date stamp one copy of the document and return it to us in the enclosed, stamped, self-addressed envelope.

Sincerely,

Dennis J McCarthy
Chairperson

85. No response is required.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Reference :

J. Bredie Smith	P-2287-003	Cross	P-2326-002
Berham	P-2288-004	Cascade	P-2327-002
Shelburne	P-2300-002	Sawmill	P-2422-004
Berham	P-2311-001		

COMMENTS, RECOMMENDATIONS, AND MOTIONS
OF THE CASCADE FLATS NEIGHBORHOOD ORGANIZATION
ON THE DRAFT ENVIRONMENTAL IMPACT STUDY (DEIS) OF
THE REFERENCE PROJECTS

The Draft Environmental Impact Statement does not represent the Environmental Impact to the Andrescoggin River Basin of Berlin and Gorham, New Hampshire. The notion of simply accepting the licensees' biased data and adopting it to the Federal Energy Regulatory Commission's DEIS document without serious consideration of valid intervener requests, comments and motions is contrary to Commission's policy. This policy encourages the public to bring issues and problems to the Commission's attention which will have substantial impact upon those regulated by the Commission or others affected by the Commission's activities.

CFNO filed documents on February 23, 1993 and April 27,1993 citing specific hazards associated with the referenced projects. The DEIS contains none of the valid issues nor does it address any of the motions made in those documents. The DEIS does not include any studies or information requested by CFNO for the scoping document.

86. Comments are noted.

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The draft environmental impact statement (DEIS) does a superb analysis on the impact on the river's fish and aquatic life, but fails to assess the affect on human health, environmental impact, socioeconomic impact and the quality of life of the people living in the Cascade Flats neighborhood of Gorham, New Hampshire in the Androscoggin River basin.

The deadline for the final Environmental Impact Statement must be extended so the DEIS can be edited to include updated and accurate data. The only logical conclusion is to not grant the licensees' request at this time.

1. The DEIS fails to evaluate the affect on Human Health resulting from the issuance of licenses for the referenced projects to the already environmentally stressed Cascade Flats neighborhood. The Commission
indicated that it would include a discussion on the Human Health impact.

> ...include a section on Human Health Impacts, citing the presence and buildup of chemical by-products used in paper production.
>
> ...[FERC] We'll discuss this issue in the section on Water Quality and Quantity for these projects.
>
> (Scoping Document II December 1992, page 11)

There is no discussion on Human Health in the DEIS. The Commission is obligated to address this issue.

87. See new section 4.2.8. We have addressed the fact that dioxin and other possible contaminants are present, and could be affected by the operation of the projects. Further, we have cited the fact that the New Hampshire Division of Public Health Services (Public Health) has confirmed the presence of dioxin and its derivatives in samples of fish taken below James River's mill in Berlin, and that Public Health has issued a health advisory on fish consumption (see sections 3.1.3 and 3.1.4). After analysis of the data, our conclusions were that the continued operation of the hydroelectric facilities in a run-of-river mode with minimal headwater fluctuations would not appreciably resuspend any existing contaminants presumed trapped in the sediments and would therefore have little impact on an existing condition which is not directly related to the hydroelectric operation of the project. Dioxin, or any other contaminants, currently trapped or contained in the reservoir sediments would essentially remain unaffected with or without the operation of the hydroelectric projects. Additionally, we find that Public Health and Environmental Services have already addressed this issue to our satisfaction through the issuance of the health advisory and the section 401 water quality certificates for the projects. Furthermore, EPA has recently issued a new NPDES permit for the Burgess and Cascade Mills (NPDES No. NH0000655) and water quality models have been run with these new regulatory conditions (James River has subsequently appealed these new permits, however, modeling runs showed no predicted violations). Given the mandates and the expertise of these agencies on these matters, we believe that this issue, as far as it pertains to the continued operation of the hydroelectric facilities, has been resolved to both their and our satisfaction.

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Attachments 1 through 4 show the vulnerable location of the Cascade neighborhood adjacent to the Androscoggin River and to all other mentioned contamination sources. The relicensing issue has significant impact on the neighborhood with or without changes to the target resource. Human Health should be elevated to highest consideration under all Environmental Issues, Section 3 of the DEIS document.

FERC has acknowledged the existence of Dioxin associated with the referenced projects. However, FERC has refused to address the hazards of Dioxin and other toxic chemicals on Human Health and Environment resulting from the operation of these projects.

2. The DEIS fails to evaluate the socioeconomic impact to the Cascade Flats neighborhood. CFNO requested a factual analysis be performed to provide a measurable basis for financial impact on the neighborhood. Any action taken with respect to the referenced projects will have a negative effect on the combination of social and economic factors of the neighborhood.

As required by the Commission of its licensees:

> The applicant must provide a report which identifies and quantifies the impacts...within the towns and counties in the vicinity of the proposed project.
> (i) A description of the socio-economic area;...
>
> (18 CRF Chpt. 1 para. 4.41 (5)

The DEIS contains no discussion of the socioeconomic impact on the Cascade Flats neighborhood. The map used in the DEIS is inaccurate.

88. We do not agree that James River should be required to "buy out the residents of Cascade Flats community" due to the "degraded environment" that you indicate has resulted in decreasing property values. As indicated in the Cultural resource section (section 3.1.7), the paper and pulp mills and other industries of Berlin continue to play an important role in the town's economy. In fact, many of the facilities associated with these industries predate the Cascade Flat community. The hydropower facilities along the river have also played an important role in the Town's history. If the property values have decreased, it is not likely because of the hydropower facilities. Implementation of the proposed and staff-recommended mitigation measures would likely result in a minuscule socioeconomic impact on the Cascade Flat Community. We assess the aesthetic impacts of constructing and operating the new penstock and powerhouse on the Cascade Flats Community in section 4.2.5. We conclude that long-term impacts would be mitigated by re-vegetating the disturbed areas, locating the penstock on a natural hillside bench to lessen the amount of tree clearing, planting conifers to screen unsightly areas, and painting the surge tank and powerhouse a natural color.

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3. The DEIS fails to do a complete Environmental Impact evaluation on the Cascade Flats neighborhood. Refer again to Attachments 1 through 4 showing the proximity of the neighborhood to the contaminated target resource: Androscoggin River; contaminated air: fugitive emissions from the Cascade Waste Water Treatment Facility (CWWTF), Androscoggin River and James River stack emissions; contaminated soil: leachate from the CWWTF, contaminated riverbanks and contaminated riverbed. FERC has not required any testing of the obvious pollution point sources, including the abandoned Gorham Town dump situated in the proposed Cascade reach on the riverbank of the target resource.

The USEPA charter requires that:

> Despite its complexity, for pollution control purposes the environment must be perceived as a single interrelated system.
>
> (title 42 para. 4321 EPA)

89. As discussed in section 4.1.9, hydroelectric generation affects air quality only in that it generates electricity which would otherwise likely be generated by fossil fueled plants. Any pollutants released by the James River Paper's mill, the Cascade Mill Pollution Control Facility, or the abandon Gorham town dump are not related to the operation of hydroelectric projects. These discharges are regulated by Environmental Services and the EPA under the Clean Water and Clean Air Acts. See also our response to comment 33, 87.

4. The DEIS fails to acknowledge the Aesthetic Impact on the neighborhood. Attachments 3 and 4 show the neighborhood inside the project area. Impact of the Pulsifer Rips development will be an 18 foot high by 7,400 foot long penstock, 100 feet high surge tank, 35 feet by 99 foot powerhouse, access road, power lines; at best, an eye sore. The proposed mitigation of painting the penstock a "native" color and a buffer zone where there is no room for a buffer zone is ludicrous, unacceptable and shows no evaluation of the site problems associated with the licensing the referenced project.

90. We assessed the aesthetic impacts of constructing and operating the new penstock and powerhouse on the Cascade Flats Community in section 4.2.5.

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The Congressional Declaration of National Environmental Policy states:

> ...it is the responsibility of the Federal Government to use all practical means...to the end that the Nation may ...
>
> (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
>
> (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
>
> (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities;
>
> (c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.
>
> (title 42 The Public Health and Welfare para. 4331)

The DEIS does not meet the objectives of this law. It is unconscionable that the Commission entrusts public resources to private companies that historically have caused such damage to and have such lack of concern for the environment and it's future.

91. Comments are noted.

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THE CASCADE FLATS NEIGHBORHOOD ORGANIZATION (CFNO) MOVES THAT THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) DIRECT ITS STAFF TO EVALUATE AND AMEND THE EIS DOCUMENT TO INCLUDE AS A MINIMUM ALL ITEMS SET FORTH IN PRIOR INTERVENOR DOCUMENTS dated February 23, 1993 and April 27, 1993 INCLUDING BUT NOT LIMITED TO THE FOLLOWING MOTIONS AND ENHANCEMENTS.

CFNO MOVES THAT A HUMAN HEALTH STUDY BE CONDUCTED ON ALL PRESENT AND PAST RESIDENTS OF THE CASCADE FLATS NEIGHBORHOOD AND REACH AREA TO IDENTIFY THE EFFECTS OF PAST AND PRESENT EXPOSURE TO POLLUTANTS IN THE ANDROSCOGGIN RIVER BASIN OF BOWMAN.

CFNO MOVES THAT THE FEDERAL ENERGY REGULATORY COMMISSION ADOPT THE NO ACTION ALTERNATIVE WITH A PLAN TO REDUCE THE PRESENT PROJECTS' OPERATION AND REVERSE THE ENVIRONMENTAL IMPACT CAUSED BY PAST LICENSING OF THE REFERENCED HYDROPOWER OPERATIONS.

CFNO MOVES THAT FERC REQUIRE THE LICENSEES TO MITIGATE AN ACCEPTABLE FINANCIAL COMPENSATION FOR THE CASCADE RESIDENTS FOR PAST, PRESENT AND FUTURE IMPACT ON THEIR HEALTH, ENVIRONMENT, AESTHETIC AND SOCIOECONOMIC STATUS CAUSED BY THE LICENSING OF THE HYDROPOWER FACILITIES.

In support of the above options, the CFNO hereby submits comments on the primary resource issues included in the DEIS.

I. GEOLOGIC AND SOILS RESOURCES:

CFNO requests that FERC require the licensee to conduct a complete soil analysis for chemical content in and around all areas effecting and affected by the referenced projects.

The soil in which our children play is laced with toxic chemical compounds and heavy metals that effect human health from nervous system damage to birth defects.

92. As noted in our response to comment 33, 87, hydroelectric projects do not generate or release toxic pollutants. With respect to potential dioxin contaminated sediments in construction areas, see revised section 4.2.2.3. In addition to the erosion and sediment control measures James River has proposed, James River should also consult with the EPA and other appropriate agencies in preparing a plan (i) for testing the reservoir sediments prior to their disturbance or removal, and, (ii) if dioxin or other toxic materials are present, for the proper removal, handling, and disposal of those materials.

Soil samples were collected at and near the Cascade Flats playground by the NHDPHS in 1989 indicating the presence of many heavy metals including chromium, copper, lead and mercury with levels measuring up to three times higher than a background sample also collected from a probable contaminated site. TCDD was reportedly not detected at this time however low level detection was difficult in 1989. TCDF detected was reported as 0.35ppt and 0.90ppt (nine (9) times the background sample). Studies indicate that dioxins concentrate in sediment and bind to particles.

The James River Paper Company holds a permit to leach from the Cascade Water Treatment Facility located on the playground itself and within one hundred feet of the homes of the Cascade residents. This facility is situated approximately two hundred fifty feet from the Androscoggin River at an elevation of approximately forty feet above the water level. The facility has historically leached into the peoples' homes and into the river. This is substantiated by testimonial from CFNO members that:

> "Black liquor leached from the lagoons into our basements. It was so bad that the Company had to construct drainage around the basement and into the river."

We now know that the liquor was highly toxic and contained Dioxins.

The Brown Paper Company (now the James River Company) has monitored the leachate from the CWTF through a series of wells surrounding the facility and have refused to make this information available to the CFNO.

The area cited for the proposed construction of the Pulsifer Rips and access road is located in the river's floodplain; therefore must be tested for dioxins.

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The decrease in flow created by the proposed Pulsifer Rips project will expose contaminated sediment to the residents, their pets, wildlife and recreationers. Effects on human beings, not only the fish, must be studied.

The now abandoned Gorham town dump is located within the Cascade area on the bank of the Andrescoggin River. The site was used as a refuse facility by both the town and the Brown Paper Company. Test bores should be performed and evaluated for chemical contaminants and toxic waste.

A complete report on geological and soil resources is required by FERC of its licensees:

> (iii) A description showing the location of existing and potential geological and soil hazard and problems, including earthquakes, faults, seepage,....
>
> (v) A description of any proposed measures of facilities for the mitigation of impacts on soils.
>
> (18 CFR Chpt. 1, 4.41 (6))

The Federal Energy Regulatory Commission Office of Hydropower Licensing Paper No.DPR-4 (April 1992), Manual of Standard Special Articles, page 35.

> "....has recently required applicants to test sediments and to file a plan before issuing a license."

Based on this relatively new data, the information contained in the DEIS under Geology and Soils is insufficient evidence upon which to issue license.

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II. WATER QUALITY AND QUANTITY

The CFWD contends that the Androscoggin River does not meet the present standards of a Class B waterway set forth by the "State of NH Surface Water Quality Regulations" August 1, 1990 with respect to toxic compounds and heavy metals and is unsafe for its intended recreational use. It is the recipient of one hundred years of effluent from the paper industry. A boating accident could be fatal even if the victim survives the drowning.

The water quality model is inadequate. It takes into consideration only the dissolved oxygen content (DO) and addresses no contaminants. The WQ Model does not study effects from sewage systems of Berlin that bypass the City's sewage treatment facility. Based on new developments with respect to water quality standards since the above mentioned WQ Model was done, FERC should request a new study be performed before any license is issued.

NOTE:

The licensee, James River Paper Co., is required to apply for and receive a "Mixing Zone" permit from the State of NH Division of Water Quality, Department of Environmental Services. This has not been done under present flow conditions nor under the proposed reduced flow conditions. Therefore, the licensee stands in violation of present Class B water quality standards.

93. We disagree. Both the initial water quality model and subsequent updated versions were conducted by James River in consultation with Environmental Services. Further, James River's updated model runs were conducted with the new, more restrictive EPA NPDES permit and Environmental Service's conditions (see section 4.2.3.1). Environmental Services concurred with the modeling results of the study and has issued valid section 401 water quality certificates for all of the projects with the exception of James River Gorham. We fail to see the need for a new water quality study.

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III.FISHERIES RESOURCES:

Prompted by the knowledge that the Androscoggin River contains 2378-TCDD, the NH Division of Health Services and the NH Department of Environmental Services requested the James River Paper Company participate in a survey to measure dioxins in fish above and below the mill. Data showed dioxins detected only in the fish sampled below the mill. In its conclusion, the NHDPHS in assessing the cancer risks associated with consuming trout and hornpout downstream from the James River Paper Company, using the USEPA standard of 1 x 10 to the -6 power, states the fish are not fit for consumption; therefore, the NHDPHS opted to lower the acceptable risk by changing their standard to 1 x 10 to the -5 power thereby "allowing" the angler to consume one meal of dioxin laden fish per year as an "acceptable risk".

Pregnant women and nursing mothers should not eat any of these fish. Nursing infants are exposed to ten to twenty times the daily concentration of the general population for a short period of time, due to the mobilization of dioxin related compounds into mother's milk during lactation.

CFNO requests, in addition to dioxin studies, the fish are studied for all toxic chemicals, especially mercury.

"The Commission, under 10(j) of the Federal Power Act...is required to include in each license issued, conditions for the protection, mitigation and enhancement of fish...". (DEIS 5-7).

94. We disagree. We see no basis for an additional mercury study on fish that are already under a health advisory for dioxin contamination.

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IV. TERRESTRIAL RESOURCES:

The CFNO contends the pollution of and use of the Androcoggin River by the licensees infringe on the riparian rights of the property owners along the Androcoggin River in the Cascade Flats neighborhood.

> At common law, a riperian owner is entitled to beneficial use of water of river or stream passing through or adjacent to his land, and without responsibility for the consequences to others of such use, he may use the bed of stream adjacent to his land for a purpose which is not unlawful and which, in view of his own interest and that of all persons affected by it, is a reasonable use.
>
> (NH Law 42. N.H. 1954)

We do not consider using the river as a toxic waste dump a reasonable use of our property.

> Riparian proprietors have an equal right to the use of the water, and the right of each qualifies that of all the others; the question as between them is whether the use made of the water by one is reasonable and consistent with a correspondent use by the rest.
>
> (NH Law 42. N.H. 1873)

Mitigation for referenced project impact to riparian habitat, in this case the Cascade Flats Neighborhood, is required by FERC "Manual of Standard Special Articles" section 5., Articles included in licenses for the protection and Enhancement of Environmental Resources.

95. See our responses to comments 33, 87 and 89.

V. RECREATIONAL RESOURCES:

The USFWS has all but condemned the section of river between Berlin and Gorham with "no chance of mitigation".

> The Berlin-to-Gorham reach of the Androscoggin has been severely impacted by the hydropower and industrial development. As such, opportunities for on-site...mitigation are somewhat limited, especially in the areas of...riparian habitat and recreation.
>
> (USFWS LETTER November 23, 1992)

Improving the accessibility to the river for children and recreationers and attempting to increase the fish population without first identifying and mitigating all hazards of the area is unacceptable.

96. The recreational enhancements recommended by staff do not encourage water-contact recreation. Further, the State of New Hampshire has classified the water quality in this segment of the Androscoggin River as acceptable for water-contact recreation (see section 3.1.3). With regard to increasing access for fishing and the consumption of those fish, as with anywhere else in the country, fisherman must comply with local warnings on fish consumption.

VI. AESTHETIC RESOURCES:

An accurate map and description of the Cascade Flats neighborhood are essential for the Commission's staff who have not viewed the project area to conclude what is proper mitigation for aesthetic impact. Figure 2-4 of the DEIS is not of a quality to do this. It does not include the homes of the Cascade Flats neighborhood nor the size and location of the CWWTF.

As required by FERC from its licensees:

> The map must show the location of the project as a whole with reference to the affected stream or a nearby town...
> (18 CFR chpt. 1 para. 4.41 (h)(1))

97. Staff has visited the site and has many drawings and photographs in the record from which base its conclusions. We are confident with our conclusions and recommended mitigation measures (see sections 4.2.5 and 5.1.2).

We disagree that there is no room for a buffer strip between the penstock and the river. Design drawings indicate that there would be between 200 and 600 feet of tree covered land depending on where the measurement is taken along the bypassed reach.

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The location of the Cascade Flats neighborhood makes it a part of the cascade project(02327).

The CFNO requests that FERC require the licensees as a mitigation measure to purchase all property abutting the west bank of the Androscoggin River in the Cascade Flats and the remaining neighborhood at replacement cost. This would provide a buffer zone between the affected resource, the Ardrescoggin River, and the public road.

Note Attachment 4. There is not enough area for a buffer zone between the proposed Pulsifer Rips penstock and the river on the east bank.

> A provision for a shore buffer zone that must be within project boundary, above the no maximum surface elevation of project reservoir, and of sufficient width to allow public access to project lands and waters and to protect scenic, public recreational, cultural and other environmental values of reservoir shoreline.
> (18 CRF Chpt.I (7)(iii))

VIII. AIR QUALITY

CFNO requests that the Commission refer to comments and motions made in the CFNO document dated April 27, 1993.

98. See responses to following letter.

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IX. CUMULATIVE INTERACTIONS AMONG PROJECTS:

TOXIC POLLUTANTS

The DEIS does not address the effect of toxic pollutants such as mercury and Dioxin on human health and wildlife nor has the Commission required testing to determine the extent of the pollution associated with each of the referenced projects. There is information on the hazards of mercury, its ability to vaporize into the air and its toxic effects when ingested by consumption of contaminated aquatic life, yet the DEIS has overlooked these facts. Dioxin hazards and effects are being studied in every aspect of human health and disease.

CHEMICAL AIDS is the simplest way to describe the effect dioxin has on humans. It attacks the immune system, increasing the susceptibility to all diseases. New information indicates:

> "Dioxins concentrate in sediment and bind to particles. The majority of environmental distribution is due to atmospheric transport on particles."
> (Linda S. Birnbaum, EPA Health Effects Research Laboratory April 1993. Attachment 5)

This combined with the acknowledged contaminated riverbed and fluctuating water levels pose a significant Human Health risk to the Cascade residents and those who use the river for recreation.

99. We disagree, see responses to comments 33, 87, 108, and 122.

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"No Safe Level of Dioxin"; "No Non Effect Minimum Dosage"; "The Most Toxic Chemical Known to Man"; are but a few of the descriptors used by experts to describe only one of the many chemicals exposed to the men, women, children and the unborn of the Cascade Flats neighborhood that are directly traceable to the licensee, James River Corporation. "Modification" activity of the referenced projects will result in an increase to the now chronic exposure of dioxin and other toxic chemicals. It is unacceptable to financially better one industry at the expense of people living in the Cascade neighborhood. Hydropower generation has been an industrial development in the project area. It has provided financial success to the Pulp and Paper Industry, jobs to workers and an environmental nightmare for the people living adjacent to the mills and dams.

The target resource (Androscoggin River) is dangerous to the Cascade Flats neighborhood in is present condition. The concept of removing 80% of the water for the Pulsifer Rips project thus exposing the toxic riverbanks and riverbed containing 100 years of effluent is unacceptable. Any resuspension of Dioxin must be evaluated. The seasonal fluctuation of the river would provide a condition to increase Dioxin exposure to the residents of the Cascade neighborhood.

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The Commission, through the US Public Health Service and the USEPA, should conduct an in depth Public Health Assessment on the Cascade Flats neighborhood and its past and present residents as part of the environmental impact study. The cumulative interaction between the referenced hydroelectric projects have adversely impacted the environment and quality of life of the people of the neighborhood.

Support for a complete Human Health Study is validated by the knowledge that:

Volumes of new data are available from the USEPA Dioxin Reassessment Activity, USEPA Human Health Effects Research Laboratory and private sources such as Dr. Richard Peterson of the the University of Wisconsin Dioxin studies;

Dioxins are present in the Cascade Waste Water Treatment Facility, leaching through the soil from the CWWTF, contained in the water of the Androscoggin River, contained in the sediment of the river banks and riverbed, and contained in the air from the volatilization of the chemicals from the CWWTF and from the river, and contained in the topsoil;

Dioxins concentrate in sediment and bind to particles and that the majority of environmental distribution is by to atmospheric transport on particles;

Low level dosage affects endocrine functions associated with reproductive functions in humans;

Actual risk from Dioxin is due to the sum total of the chemicals which are closely related in structure to dioxin and have the same effect;

Body burden levels at or near current background levels affect humans;

Five human health disorders (soft tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, chloracne, porphyria cutanea tarda) are linked to Dioxin by the National Academy of Sciences Institute of Medicine report released July 27,1993;

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During 1989, the NHDPHS conducted a superficial health risk assessment of the Cascade neighborhood. Based upon data provided to them from James River Corporation, the DPHS did not consider the levels of 2,3,7,8-TCDF detected and reported no detection of 2,3,7,8-TCDD in the three soil samples analyzed. New information indicates: Dioxin 2,3,7,8-TCDD detection at the level used would have been difficult. (Attachment 6)

Assumption that vegetation was a protection media and not a potential source was an error. We now know Dioxin attaches to vegetation in the environment. No consideration was given to air-borne Dioxin laden dust particles from nearby point sources. We now know this is the primary distribution method in the environment.

Assessment was conducted solely on a carcinogen model. We now know that there is no minimum dose effect. In fact, effects range from biochemical changes, birth defects, immunotoxicity, cancer and death based on total body burden of the entire family of Dioxins.

The NHDPHS did acknowledge our observation of excess cancer in the area and cited three Division of Public Health Studies to support it. (Attachment 7)

The above new information supports a new combined environmental health study of the neighborhood.

Any degradation to the quality of life through toxic exposure for any person must result in not granting the licenses or provide adequate mitigation for that impact.

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Any degradation to the quality of life for any person must result in not granting the licenses or adequate mitigation for that impact. The only acceptable mitigation for any licensing action of the referenced projects is financial restitution for past, present and proposed environmental impact to this already environmentally hazardous area.

MITIGATION

CFND and the people of the Cascade neighborhood are those most impacted by the licensing actions and must be given top priority for mitigation action.

The cumulative interaction between the hydro projects has strained the environment of the Cascade Flats Neighborhood to the point that it is unaccaptable. Mitigation for the referenced projects must include the acquisition of all properties in the Cascade neighborhood. Failure to do this leaves the " No Action Alternative" a plan to reverse existing hydro projects and reduce the affect they have imposed on the neighborhood and its people as the only viable solution.

CFND attemptdd to mitigate their concerns with the James River Corporation at a meeting on May 15, 1993. Attachment 8 is the statement read by CFND at the meeting. Attachment 9 is the minutes of the meeting as taken by CFND. Attachment 10 is the response to the meeting by Jame River Corporation. In their response, James River clearly relinquishes all mitigation in the matter to FERC.

100. See response to comment 88.

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" Many of the issues raised in your statement and in our discussions are not new. The CFNO has raised these issues in its interventions to FERC. Since FERC has the responsibility to address these issues, and James River the responsibility to respond to the issues as raised by FERC, I think it would be inappropriate for me to enter into discussions with CFNO to address many of the concerns you raised."
(Mr. David A. Nelson, Vice President, Resident Manager)

The Commission should require the licensees to do multiple cost impact analyses across all referenced projects showing various ways to acquire the Cascade Flats neighborhood in mitigation for: Environmental Impact, Socioeconomic Impact, and Riparian Rights Infringement.

CONCLUSION

The DEIS does not meet the Commission's requirements and objectives for an Environmental Impact Statement. It must be rewritten to include current and accurate data and issued as a second draft document for comments before the final document can be released.

101. Comment is noted.

The following pages contain attachments to the comment letter. No comments are required.

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ATTACHMENT 1.1

These photographs have been taken since the licensing process has begun and are representative of the conditions of the Cascade Flats neighborhood.

Fig. 1

CASCADE WASTE WATER TREATMENT FACILITY (CWWTF)
Note its proximity to the homes of Cascade Flats. EPA data measures 38,000 pounds of fugitive emissions including chloroform and methanol from this facility each year.

Fig. 2

CWWTF in operation showing foam which was blown onto the playgroud and onto the residents' porches and gardens.

Fig. 3

The Androscoggin River abutting Cascade Flats neighborhood. Note the dioxin laden effluent stream dumping into the residential side of the river. In the background is one of many stacks of the James River Paper Co., responsible for spewing 1.7 million pounds of toxic chemicals into the Androscoggin Valley yearly. (EPA 1992).Theproposed penstock, access road and power lines will destroy the scenic hillside on the east bank while construction of the project will put tons of dioxin laced soil particles into the air.

Fig. 4

"UNIDENTIFIED" RED SLIME on the bottom of the Androscoggin river-bottom near the effluent outfall of the lagoon (CWWTF) located on the residential side of the river.

Fig. 5

"PURE" foaming effluent being discharged from the CWWTF on its way to the River. This is located in the Cascade Flats neighborhood on private property with an "easement" to James River Paper Co.

Figure 1

Figure 2

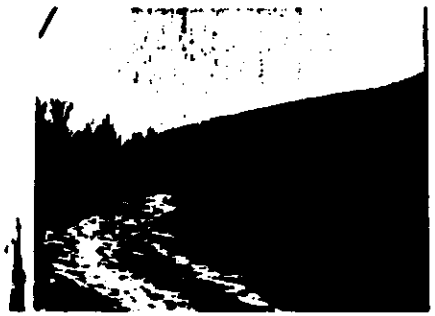

Figure 3

Figure 4

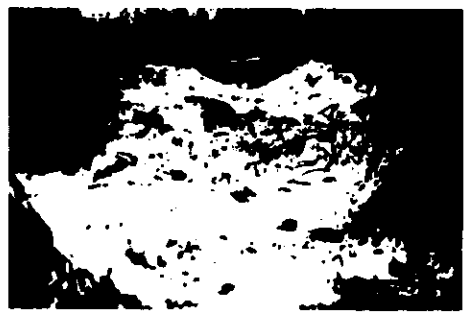

Figure 5

Attachment *1*

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ATTACHMENT 2.1

Fig. 1

Cascade Flats neighborhood childrens' park. The cleared area is the skating rink in the winter. Note the elevation and the proximity of the open fencing of the CWWTF. In the midright side of the photo is the tennis court abutting the fence.
OF NOTE: the James River Co. holds a leaching license for this facility.

Fig. 2 and 3

Views children in the play area, a picnic table, the nearby homes and "smoke" stacks in the background.

Figure 1

Figure 2

Figure 3

Attachment 2

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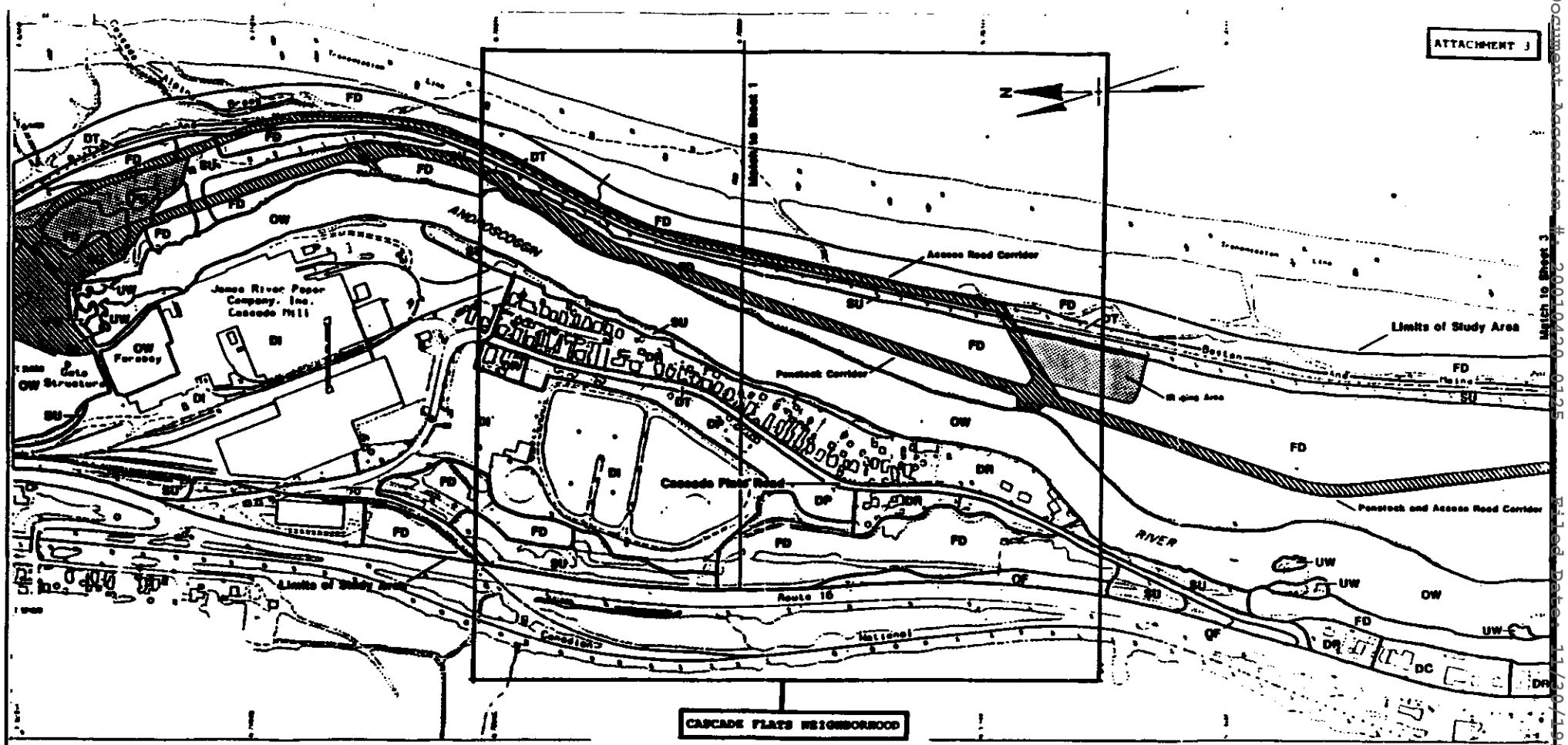


PROPOSED
DISTURBANCE AREAS
- Permanent Disturbance
- Temporary Disturbance

DEVELOPED
- DI - Industrial
- DC - Commercial
- DT - Transportiou
- DP - Public
- DR - Residential

UPLAND OPEN
- OF - Open Field
- SU - Scrub-shrub Upland

UPLAND FOREST
- FD - Deciduous Forest

OPEN WATER/WETLANDS
- OW - Open Water
- UW - Unconsolidated Shore
- EWn - Nonpersistent Emergent Wetland
- EWp - Persistent Emergent Wetland
- SW - Scrub-shrub Wetland

FIGURE E3.3 - 2 SHEET 2 OF 3

CASCADE PROJECT

VEGETATION COVER MAP

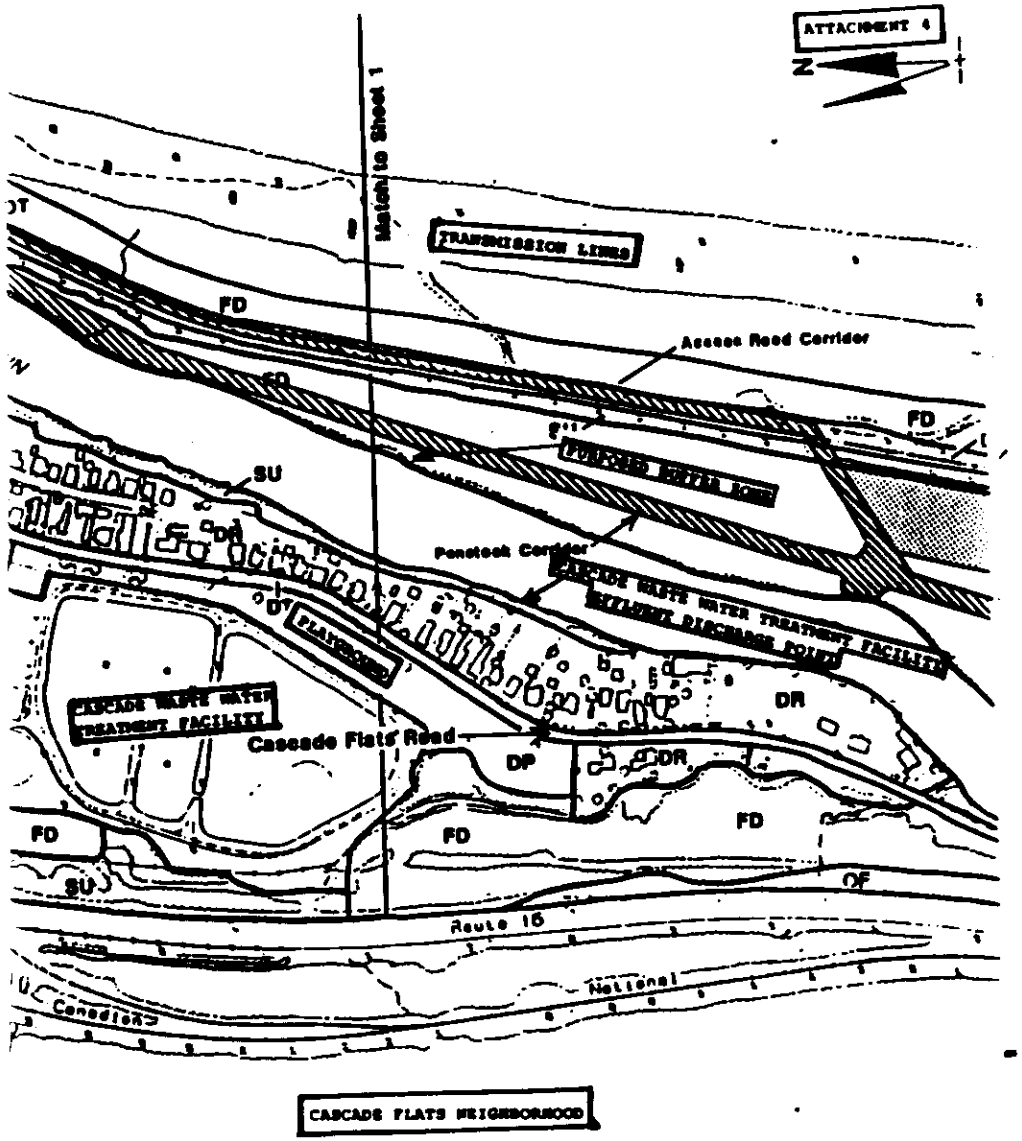
JAMES RIVER-NEW HAMPSHIRE ELECTRIC, INC.
BERLIN, NEW HAMPSHIRE

BASE PLAN PREPARED FROM AERIAL PHOTOGRAPHS DATED 11-1-90 BY JAMES W. SEWALL COMPANY, OLD TOWN, MAINE.

RESOURCE MAPPING BY TERRESTRIAL ENVIRONMENTAL SPECIALISTS, INC., PHOENIX, NEW YORK.

Kleinschmidt Associates
Consulting Engineers
Pittsfield, Maine

SHEET NO. OF



CASCADE FLATS NEIGHBORHOOD

ATTACHMENT 5

HEALTH EFFECTS OF DIOXIN: NEW UNDERSTANDING

Linda S. Birnbaum
Health Effects Research Laboratory
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

ABSTRACT

Dioxin is a highly toxic environmental contaminant which is found world-wide. Highly resistant to degradation, it bioaccumulates and concentrates in the food chain, resulting in blood levels of approximately 7ppt, on a lipid adjusted basis. The effects of dioxin range from biochemical changes to birth defects, immunotoxicity, cancer, and death. Its actions appear to mimic that of a hormone, leading to alterations in growth and differentiation. The effects of dioxin are mediated via a cellular protein called the Ah receptor which is necessary but not sufficient for all of the actions of dioxin. People respond in a similar way to dioxin as do experimental animals and wildlife. The actual risk from dioxin, however, is due to the sum total of the chemicals which are closely related in structure to dioxin and have the same effects. Attempts have been made to estimate the hazard from such complex mixtures using the toxic equivalency approach. Recent studies have indicated that levels of environmental exposure to dioxin and its relatives have resulted in body burdens in the general population which are at or near those where health effects might be expected to occur.

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INTRODUCTION

There has been grave public concern for over twenty years about the health effects resulting from exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD; dioxin). This is due to its description as the most toxic man-made chemical based on the ability of minute amounts to cause death in laboratory animals. For many years, the only response unequivocally demonstrated in people was that of chloracne, a severe skin disorder. Recent studies, both in the laboratory and in the field, have provided new insights into the mechanisms underlying the responses to dioxin, and have led to the realization that subtle effects may be occurring in at least some segments of the human population at current exposure levels of dioxin and related chemicals[1].

SOURCES AND OCCURRENCE

There is no known industrial or commercial use for dioxin. It is produced as an unwanted byproduct of high temperature combustion processes involving chlorinated phenolic products[2]. It can also be produced whenever the appropriate conditions are present and chlorine containing compounds are present with organic molecules. While dioxin can be thermally degraded, very high temperatures are required[3]. One of the major sources of the industrial production of dioxin as a contaminant was in the use of chlorinated phenols in the production of chlorophenoxy acid herbicides. Another source of concern has been in the chlorine bleaching of pulp and paper products[4]. The pattern of dioxins produced varies in the high temperature processes as compared with the bleaching pathways. Combustion results primarily in the production of highly chlorinated dioxins, while bleaching leads mainly to lower chlorinated species. The polychlorinated dibenzofurans (PCDFs) are also produced as contaminants in similar processes and in the manufacture and use of polychlorinated biphenyls (PCBs)[5].

Dioxins and the related chemicals, PCDFs and PCBs, are omnipresent in the environment. Because of their high lipophilicity, limited solubility, and high vapor pressure, their free concentration in water and air is very low. Dioxins concentrate in sediment and bind to particles. The majority of environmental distribution is due to atmospheric transport on particles[6]. The highly chlorinated dioxins, furans, and PCBs persist in the environment because of their resistance to chemical, physical, and biological degradation. This persistence results in their bioaccumulation in the food chain. Most human exposure results from ingestion of meat, fish, and dairy products which contain these chemicals[7]. Daily exposure to TCDD in the industrialized world is estimated to be between 0.1-0.3 pg/kg/day[8], resulting in body burdens of 5-7 ppt in the blood on a lipid adjusted basis. When the relative potency of all the dioxin-related compounds is taken into account, it can be estimated that general environmental exposure leads to body burdens of approximately 2 ng of dioxin toxic equivalents per kg body weight.

HEALTH EFFECTS OF DIOXIN IN ANIMALS

In all species examined, dioxin causes death if the dose is high enough. While there is a great deal of interspecies variability in the lethal dose, i.e., <2mg/kg kills guinea pigs while 5000mg/kg kills hamsters, the LD50 dose in most laboratory species is approximately 100mg/kg[1]. Death is delayed, being preceded by a severe wasting syndrome in which animals lose as much as half of their body weight. Sublethal, but still highly toxic, doses result in atrophy of lymphoid

tissues and of the testes. The liver is a target organ for dioxin toxicity in many, but not all, species, as is the stomach, urinary tract, and sebacous glands. Dioxin causes birth defects, skin lesions, immunotoxicity, and cancer in multiple species, both in the laboratory and in the wild. For example, the inability of lake trout to reproduce in Lake Ontario has been attributed to dioxin contamination[9].

Other effects of dioxin are biochemical in nature[1]. It is often difficult to say whether these are adverse or not. For example, one of the most studied responses to dioxin exposure is the induction of enzymes involved in the metabolism of drugs and xenobiotics, as well as endogenous compounds. The induction of cytochrome P4501A1 is a very sensitive and rapid response. Other enzymes which are induced in response to dioxin are involved in cell proliferation and differentiation, and result in changes in the basic metabolism of an organism. Dioxin also effects many hormone systems within the body, leading to alterations in homeostatic controls. For example, dioxin modulates the levels of sex and stress hormones, of insulin, melatonin, and thyroxin. Recent studies have demonstrated that dioxin alters the levels of various growth factors and their receptors, such as those for retinoic acid (the active form of vitamin A), epidermal growth factor, transforming growth factors α and β, and certain cytokines. In addition, dioxin appears to activate specific cellular oncogenes. Taken together, this supports the role of dioxin as a growth dysregulator, leading to altered growth and development.

MECHANISM OF DIOXIN ACTION

Although all of the steps leading to the multiple actions of dioxin are not understood, the first step involves binding of the dioxin molecule to a high affinity cellular protein known as the Ah receptor[10-12]. This step is necessary, but not sufficient. Binding to this receptor is controlled by interaction with other cellular proteins, and is followed by activation steps leading to interaction of the dioxin-receptor complex with specific recognition sequences on DNA, ultimately resulting in alterations in gene expression. Many of these steps have been well characterized for the induction of cytochrome P4501A1, and involve multiple protein/protein interactions, transport into the nucleus, and addition/deletion of phosphate groups. Little is known about the steps subsequent to binding of dioxin to its receptor for any other response. However, it is clear that the Ah receptor is involved as a first step in all effects which have been carefully examined[13].

While it is now evident that the activated dioxin-Ah receptor complex functions by modifying gene expression, it is possible that it has additional roles. Recent studies have demonstrated that dioxin causes phosphorylation of tyrosine residues on specific cellular proteins[14-16]. This response is very sensitive and rapid. Some of the proteins phosphorylated are involved in control of the cell cycle[16a]. It is tempting to speculate that this response, which may occur directly in the cytoplasm of the cell and does not involve a direct interaction with DNA, may play a role in the enhanced cell division which often occurs as a consequence of dioxin exposure. This hypothesis is compatible with current understanding of the combinatorial complexity exhibited by many hormones and growth factors and would explain, at least in part, the wide variety of cellular and tissue responses caused by dioxin and related chemicals.

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ARE PEOPLE A SENSITIVE SPECIES TO DIOXIN?

Until recently, the only response that had been documented in people as a result of exposure to dioxin was chloracne. It is now clear that this is a response to very high levels of dioxin and there is a great deal of interindividual variability in sensitivity[1]. While the presence of chloracne is absolute evidence that exposure to dioxin or a related chemical has occurred, absence of chloracne in no way proves that there has not been exposure. Examination of more sensitive effects has revealed that humans display similar sensitivity to the effects of dioxin as do experimental animals. The lack of dioxin-induced lethality among people is a reflection that exposure has luckily not reached a high enough level. However, there have been stillbirths, severe toxicity, and developmental abnormalities in people exposed to complex mixtures of PCBs and PCDFs in Japan and Taiwan[16,17]. Investigations of occupationally exposed workers and of the Ranch Hand veterans have demonstrated decreased levels of circulating testosterone and decreased glucose tolerance in the highly exposed men[18-22]. Decreases in testosterone have been reported in experimentally exposed animals as well[23]. The chloracnogenic response also occurs in monkeys, hairless mice, and on the ears of rabbits. The body burden associated with this response in animals is similar to that observed in people[24]. In vitro studies have demonstrated that the sensitivity of human embryonic tissue to dioxin-induced cleft palate is similar to that of rats[25], and that the suppression of the primary antibody response, a marker for immunotoxicity, is similar between mice, monkeys, and man[26,27]. Biochemical effects such as enzyme induction and modulation of growth factors and hormones also occur at similar concentrations in people and experimental animals[1].

Dioxin is a carcinogen in all species examined. There have been 17 studies in both sexes of rats, mice, and hamsters - all positive[28]. Tumors have been observed at multiple sites following low levels of exposure. In addition, dioxin has been shown to cause multiple tumors with short latency and high potency in fish[29]. For many years, the epidemiological studies were inconclusive in providing a link between dioxin and cancer. However, in the past few years several studies involving occupational cohorts, both in the United States and in Europe, have provided strong support for an association between exposure to dioxin and cancer. In the three studies involving chlorophenol workers, the increase in the standardized mortality ratio was approximately 1.5 for all cancers[30-32]. Soft tissue sarcomas and respiratory tumors appeared to exhibit an additional increased risk. Thyroid tumors were reported in the fourth cohort involved phenoxyacid herbicide workers[33]. Both respiratory tumors and thyroid tumors have been noted in the experimental animal studies.

HOW RISKY IS DIOXIN?

There is now general agreement among dioxin researchers that there is a common mechanism, the Ah receptor, underlying all the effects of dioxin; that people respond similarly to animals; and that dioxin is but one member of a family of related chemicals which have similar structures, act via the Ah receptor, and cause the same spectrum of biological responses[34]. This last point is the basis for the toxic equivalency factor approach to estimating the toxicity of complex mixtures. This approach is really a relative potency scheme in which TCDD is assigned a value of one, and the potency of all other chemicals is expressed relative to that of dioxin[35]. While quite successful, there are issues of pharmacokinetic and species differences which need to be considered when utilizing this technique.

There are two basic approaches to estimating the risk associated with exposure to dioxin and related compounds. The first involves a process of extrapolation based on observed data in animals, and in people, at high concentrations. Such extrapolations involve certain assumptions and the development of dose/response models. The inclusion of mechanistic information into these models has demonstrated that there is not an a priori reason to assume that responses to dioxin have a threshold. In fact, recent studies have demonstrated that the dose/response curves for some relatively simple effects of dioxin, such as binding to the Ah receptor and induction of drug metabolizing enzymes, do not demonstrate nonlinearities in the low-dose region[36]. This, however, does not imply that more complex responses such as developmental toxicity or cancer have linear dose-response relationships over their entire dose range.

A second approach involves direct comparison of the body burdens in people and in animals with their associated responses. Such a comparison demonstrates that there are great similarities across species in their dose/response relationships[24,37]. What appears to be cause for concern is the observation that current body burdens in the general population are at or near the level where responses have been observed in animals, and within an order of magnitude of where adverse effects have been reported in occupational cohorts. Added concern centers on populations which may have elevated exposure, such as subsistence fishermen. Nursing infants would also be exposed to ten to twenty times the daily concentration of the general population for a short period of time due to the mobilization of dioxin and related compounds into mother's milk during lactation[38]. Experimental studies have suggested that the developing embryo/fetus and infant may have heightened sensitivity to dioxin as compared to the adult.

CONCLUSIONS

While it is clear that most human exposure comes from ingestion of foods containing low levels of dioxin and related chemicals, the source of these chemicals in the food supply is not clear. Not all of the sources of dioxin in the environment can be accounted for[39-41]. Where is the remainder coming from? It is unlikely that point sources are responsible for the unknown contributions. Regardless, given the knowledge that current environmental levels are associated with human body burdens that are at or near the level where health effects may occur, at least in some of the population, It is clear that all exposures should be reduced. Identifying additional sources and controlling those already known are clear priorities for both research and regulatory action.

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH SERVICES

ATTACHMENT 6

M. Mary Mongan
Commissioner

William T. Wallace Jr., M.D., M.P.H.
Director
Division of Public Health Services

Health & Welfare Bldg
6 Hazen Drive
Concord, NH 03301-8527
Tel. 603-271

FILE Town
PENDAFLEX Gorham
MANILA

September 13, 1989

Mr. John Walsh
Town Manager
Town of Gorham
Gorham, NH 03581

Dear Mr. Walsh:

The New Hampshire Division of Public Health Services recently received the remaining results of the soil samples that were coll[illegible]ed on June 2, 1989, in the Cascade Flats area of the Town of Gorham. As we [illegible]ntioned to you in our letter of August 28, 1989, the DPHS would be forwar[illegible] to you an evaluation of these sample results, once they became available [illegible]s.

Soil analyses for 2,3,7,8-tetrachlorodibenzo-p-d[illegible]in (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDD) was performed on three surficial soil samples. Other forms of chlorinated [illegible]xins or chlorinated dibenzofurans were not analyzed. One soil sample was collected from the Cascade Flats neighborhood park (a grassy strip which separates the Cascade mill lagoons from the residences), behind the playgro[illegible]nd equipment. A second soil sample was collected near an ice rink and an out[illegible]ll, south of the first sample. A background soil sample was collected appro[illegible]imately one-half mile south of Cascade Flats, off Gill Street. Results are as follows:

Concentrations of 2,3,7,8-TCDD and 2,3,7,8-T[illegible]DF in Soil (ppt)

Compound	Cascade Flats Playground	Cascade Flats Near Outfall	Background Off Gill St.
2,3,7,8-TCDD	ND (0.18)	ND (0.2)	ND (0.24)
2,3,7,8-TCDF	0.35	0.9	0.16

Key: ND ( ); Not detected at this limit of detection.
ppt; parts per trillion.

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Health Risk Evaluation:

2,3,7,8-TCDD is one of 75 chlorinated dibenzo-p-dioxins (CDDs). Low doses of this compound have elicited a wide range of toxic responses in many animal studies. The U.S. Environmental Protection Agency's (U.S.EPA) Carcinogen Assessment Group has determined that based on demonstrated effects in animals, there is sufficient evidence to regard 2,3,7,8-TCDD as a probable human carcinogen. Limited data also suggests that some of the other CDDs may have other toxic effects similar to those of 2,3,7,8-TCDD, again at very low doses. Moreover, these toxicity concerns are not restricted to CDDs. Limited experimental data of chlorinated dibenzofurans (CDFs) indicate that some of these compounds exhibit "2,3,7,8-TCDD-like" toxicity.

As part of its efforts to address the risks posed by CDDs and CDFs in the environment, the U.S.EPA (as well as the DPHS) has adopted a procedure based upon "toxicity equivalence" factors (TEF) for estimating potential health effects. Using this approach, 2,3,7,8-TCDD is assigned a TEF of 1 and 2,3,7,8-TCDF assigned a TEF of 0.1, as it has been shown to be is 1 to 2 orders of magnitude less potent than 2,3,7,8-TCDD in laboratory studies. Since the maximum level of 2,3,7,8-TCDF detected in soil was 0.9 ppt, the DPHS calculated a TEF for 2,3,7,8-TCDF of 0.09 ppt (0.9 ppt x 0.1), which was utilized in our risk characterization.

As discussed in our August 28 letter to you, there are several pathways to consider when assessing exposure to soil. These include dermal absorption, ingestion, and inhalation of soil particulates. Exposure to metals via direct contact with the soils could occur on a frequent basis, as the park area does include a playground. Exposure to metals through the ingestion of soil could result from the inadvertant consumption of soil adhering to the hands, food items, or objects that are placed in the mouth. Due to the grassy cover over the soil, inhalation of soil particulates was considered a minor exposure pathway, and was not considered further.

The DPHS developed exposure scenarios to estimate potential health risks associated with chronic (repeated) exposure to the 2,3,7,8-TCDD equivalent concentration (0.09 ppt) in the soil. The DPHS assumed that children (ages 2-6 and 7-16) contacted the soil an average of 247 days per year (days without snow cover), for a period of 5 years (ages 2-6) and 10 years (ages 7-16). Children were assumed to play in the soil with their hands, arms and part of their legs available for soil contact.

It is generally accepted that any exposure to a carcinogen carries with it an increased risk of developing cancer. As individual susceptibility varies, it is impossible to determine how much of a substance a person must be exposed to before that individual develops cancer. Therefore, risk levels for exposure to carcinogens or suspect carcinogens have been developed. The EPA uses ranges of incremental risk of 10^{-5} (one excess cancer per one hundred thousand people exposed) to 10^{-7} (one excess cancer per ten million people exposed), as goals for remediation at hazardous waste sites. The DPHS typically considers unnecessary cancer risks above 10^{-6} (one excess cancer per one million people exposed) as unacceptable, and therefore, uses this risk level as a health goal.

Using the exposure assumptions outlined above (worst-case), the DPHS calculated an incremental cancer risk of 5.6×10^{-9} for children ages 2 to 6, and 3.1×10^{-9} for ages 7 to 16. A combined incremental cancer risk for ages 2 to 16 is 8.7×10^{-9} (9 excess cancers out of one billion people exposed).

Conclusions:

Based upon the data provided to us and the conservative calculations performed, the DPHS does not consider that the levels of 2,3,7,8-TCDF detected in the Cascade Flats soil samples analyzed present any significant risk to human health. Should you have any questions on this assessment, please do not hesitate to contact me. Please continue to direct any concerns on health issues to the DPHS.

Sincerely,

Colleen D. Schwalbe
Environmentalist III
Bureau of Health Risk Assessment
NH Division of Public Health Services

CS/3077s
cc: Raymond Danforth, James River Corp., Berlin
Jack Stantos, Assistant Director, DPHS
Robert Varney, Commissioner, DES
John McCarthy, Cascade Flats Neighborhood Organization, Gorham
Raymond Chandler, Health Officer, Gorham
Ray Cushman, House Minority Office, State House, Concord

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH SERVICES

ATTACHMENT 7

M. Mary Mongan
Commissioner

William T. Wallace, Jr., M.D., M.P.H.
Director
Division of Public Health Services

Health & Welfare Bldg.
6 Hazen Drive
Concord, NH 03301-6527
Tel. (603) 271-4477

May 17, 1989

John F. McCarthy
34 Cascade Flats
Gorham, N.H. 03581

Dear Mr. McCarthy:

I am writing in regard to your concern about cancer in the Berlin area. As I mentioned in our phone conversation earlier today, your observance of excess cancer is correct, and is supported by three Division of Public Health studies. I have enclosed a copy of the New Hampshire State Cancer Registry annual report for 1987, which shows that during 1987 Coos County had the second highest cancer incidence rate of all New Hampshire counties. Also enclosed is our study of New Hampshire death rates by occupation. In this study, pulp and paper workers were shown to suffer an excess number of deaths due to many types of cancer.

The enclosed Division of Public Health Services study of cancer mortality in New Hampshire also supports your observation. This study shows significantly high cancer death rates in Coos County during the period 1970-1979 due to laryngeal cancer in females, lung cancer in males, esophageal cancer in males, stomach cancer in females, rectal cancer in females, and bladder cancer in males.

As a result of the studies showing excess cancer mortality in New Hampshire, the New Hampshire State Cancer Registry was established in mid-1986. The registry will allow us to maintain close surveillance of cancer incidence in New Hampshire. It will also serve as a basis for research into the reasons for excess cancer in certain parts of New Hampshire.

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I hope this information will be of some use to you, and I wish you the best of luck in your endeavors.

Sincerely yours,

Priscilla A. West, M.P.H.
Chief, Chronic Disease
Epidemiology Program
Bureau of Disease Control

Enclosures

cc: Colleen Schwalbe
Risk Assessment Unit

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ATTACHMENT 8

C F N O

CASCADE FLATS NEIGHBORHOOD ORGANIZATION

May 15, 1993

The Cascade Flats Neighborhood Organization maintains its opposition to the James River Company's request for licenses to construct the Alpine P-9713-001 and the Cascade P-2327-002, now under consideration by the Federal Energy Regulatory Commission. This new construction is unacceptable to the people of Cascade Flats for Human Health, Environmental, Socioeconomic and Aesthetic reasons.

This neighborhood is presently under attack 24 hours a day because of its proximity to the James River Papermills. These mills have surely caused the deterioration of the neighborhood by toxic stack emissions, waste water emissions and the taking of playgrounds, ballfields and community garden plots to construct the mill's waste water trmatment facility. Instead of all of the effluent going into the river, most of it is now dumped in our front yard, concentrated, and aerated.

The addition of poles, powerlines, a 7,750 foot long by 18 foot diameter pipe, a surge tank, and a power generating facility along the east bank of the Androscoggin River in the Cascade Flats area will present a most unpleasant sight for the people of the neighborhood, interrupt the aesthetics of the area and further decrease our property value.

Diverting the water through the pipe will expose people living on the west bank to 100 years of effluent that has settled in the river. Seasonal increases and decreases in the flow of the river will deposit additional contaminants from upriver sources.
The long term effect of the proposed new projects is yet to be determined; however, we do have a yardstick as to what to expect from "new projects by The Company". A 1974 letter from the Brown Company to the residents of Cascade Flats regarding the construction of the waste water facility states:

> The Brown Company will use the "latest technological advances" when building the Cascade Waste Water facility.

As we now know, this latest technology was not adequate to handle the increased demands for waste treatment. Changes were made in the use of the facility without consideration of the peoples' right to know what is affecting their environment. We never know what chemical cocktail is being brewed for us just a few hundred feet away.

> ...no odor is expected from the lagoons.

The odor problems have been well documented. The stench is unacceptable.

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> No offensive side effects such as noise or vapor spray are anticipated...

The din of motors and the aeration of the waste water laced with chemicals spewing fugitive emissions into the environment presents both noise and chemical pollutants.

> ... a safe and attractive ADDITION to the Cascade area.

NOTHING safe nor attractive has been added to the Cascade neighborhood. Playgrounds, ballfields, and garden plots have been taken away and this facility is aesthetically unacceptable.

We do not want to wait 30 to 50 years for the next relicensing to correct the yet to be determined problems of the proposed new hydro-power construction. There are already too many known problems. Therefore we are not in favor of the projects.

People in the neighborhood live in constant fear of the long term effects the combination and concentration of pollutants in the environment will have on them, their families and unborn children. The air they breathe is polluted with the stack emissions consisting of 1.7 million pounds of toxic chemicals as per 1992 EPA release numbers for 1990. They are exposed to cancer causing chemicals from "fugitive emissions".

We believe that the James River water quality model for the proposed new construction is flawed and incomplete. It deals only with the oxygen level in the water. It does not take into account the toxic materials known to exist, the water color, petroleum content, sludge deposits nor does it take into account the health, safety and recreation of the people. It is not clear to us that studies on the changes of the diurnal oxygen levels caused by the diversion of the water through the 1.5 mile pipe has been considered. It is not clear James River Co. intends to dump the effluent of the Cascade Waste Water Facility into the penstock pipe as recommended by VMDES and not into the reduced water flow of the bypass reach.

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RECAP OF JAMES RIVER PUBLIC MEETING ON HYDRO PROJECT HELD OCTOBER, 1989

Nothing has changed from the October 1989 meeting to date.

John Shank's (JR General Manager in 1989) comment that "the lagoons are in line with federal standards" was unacceptable then and it is unacceptable now. We believe that you have an obligation to the people of Cascade beyond the federal minimum standards to provide a healthy, safe, chemical free environment.

Testing to date has been minimal and superficial. Anyone's environment containing dioxins, chlorine, methanol, acetone, catechol, chloroform, ammonia, sulfuric acid, mercury and so on in any quantity is unacceptable. The health of everyone in this area is at risk. The risk will increase with additional exposure resulting from the proposed project's reduced water flow exposing the contaminated riverbed.

We disagreed with Mr. Sanford's comment that he didn't think contamination was illegal, since the substances in the lagoons are a "low level contaminate". We submit that no level of contamination is acceptable. Small children, adults and animals exposed to any level contaminates 24 hours a day 7 days a week does constitute contamination, chemical exposure and a definite health risk.

The people have complained of paint peeling off their homes and automobiles and of eye problems related to the air quality. There has been no attempt by the Company to mitigate this problem.

We agree with Mr. Shank's comment when questioned as to whether he would like to live in the Cascade Flats beside lagoons and the proposed hydro and penstock projects when he replied he "would move". We also want out of this neighborhood. We believe that the impact of the project will result in the total demise of the neighborhood and result in total financial loss of real property value to the owners.

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ATTACHMENT 2

WHAT DOES THE CASCADE FLATS NEIGHBORHOOD WANT ?

A public meeting was held with the residents of the neighborhood to formulate a uniform response to the town of Gorham's survey. The results of the meeting was overwhelmingly in favor of the following:

We want an independent Health Study conducted on the present and past residents of the Cascade Flats.

We want a buyout of the Cascade Flats property, at a fair replacement value. This would afford the residents the option to take Mr. Shanks advice and move from the hazards surrounding the neighborhood.

The meeting indicated a majority opinion that the people are not in favor of the new projects. The people want the project stopped unless fair financial compensation is realized for their properties.

C F N O

CASCADE FLATS NEIGHBORHOOD ORGANIZATION

May 17, 1993
34 Main - Cascade
Gorham, NH 03581
(603)885-0711

Mr. David Nelson
Jeees River Corporation
650 Main Street
Berlin, NH 03570-2489

Dear Dave:

I would like to take this opportunity to thank you and your staff for taking time out on May 15,1993 to meet with the members of the Cascade Flats Neighborhood Organization.

The issues discussed at the meeting are serious concerns to the people of the neighborhood and I know of great concern to the James River Corporation. We are looking forward to a timely mitigation of these issues so James River Corporation can receive the licenses requested from with the Federal Energy Regulatory Commission.

I have enclosed a copy of the statement we read at the meeting plus highlights of the meeting. If you disagree with any of the highlights, please contact me so we can clarify our understandings. I will gladly reissue the highlights. If I do not hear from you by close of business May 21, 1993, I will assume you concur with the abbreviated highlights.

Sincerely,

Dennis J. McCarthy
Chairperson
Cascade Flats Organization

MEETING HIGHLIGHTS
BETWEEN
JAMES RIVER CORPORATION AND THE CASCADE FLATS ORGANIZATION
May 15, 1993

Attendees

James River	CFNO
Mr. David Nelson	Mr. Dennis McCarthy
Mr. Bill Lockard	Ms. Jacqueline McCarthy
Mr. Ron Salliargeon	Ms. Elsie Marcou
	Mr. John Dalphonse
	Mr. Armand Addario

CFNO read position on the licensing process. JR indicated they would like time to read and respond to the lengthy statement and would try to clarify some of the statements at this meeting.

JR asked CFNO whether CFNO was in objection to the other licenses for dams under consideration. CFNO indicated that they were keeping there options open on these facilities. When asked on what ground CFNO would object, CFNO indicated past and present pollution issues including toxic build up behind these dams to mention one. JR indicated that any objection would have to be directly tied to the licensing issues.

Jr indicated that they were not in contention for the Alpine project and that the project application was withdrawn by the Turner Group. They also indicated that they too were in opposition to the project.

Discussion on the license application for (2327)

JR indicated the primary reason they applied for the pulisifer rips facility was to cover the FERC requirement to maximize the use of this section of the river. They indicated that if granted they would probably not build the facility due to the 10 year return on investment. JR requires that the return be 2 years unless they have outside investors. They also indicated that if they did not apply for this use, another company could challenge their maximizing of this section of the river and loose their dam at Cascade in the process. JR also indicated that they already had licenses in place where they could better utilize the monies to increase power generation.

When asked if they would withdraw the application for the pulsifer Rips facility, JR indicated they would not.

One of JRs original plans called for a power dam not a Pulisifier Rips facility when asked why wsn't that applied for. JR indicated a dam would be more expensive and do more damage to the river plus increase potential flooding in
the Cascade Neighborhood.

Discussion on revenues generated from the new facility

JR indicated that the revenue from the new facility would be $3 million based on their present contract value for electricity not the $ 6 million indicated by Mr. John Shank at the October 1989 meeting.

Discussion on the Cascade Waste Water facility

CFNO reiterated their concerns for pollution, noise and stench generated from the facility both past and present.

CFNO asked why the lagoons were not dredged on a yearly basic as originally promised. JR indicated they had no plans to dredge the facility on a yearly basis due to the expense. They would be dredged only when necessary and full.
Jr asked what is the problem if the sludge was covered. Question was answered by JR indicating that a few years ago the polishing lagoon turned septic.

CFNO asked why the water was green. JR indicated they could make the water any color CFNO wanted;" green, blue, any color".

JR agreed to check into providing CFNO with latest test data from the 3 or 4 test bores along one section of the Waste Water facility.

JR agreed to check into providing CFNO access to the test bores for their own testing.

JR questioned why the facility was still in use and indicated it was for the final polishing lagoon and the ability to add additional oxygen to the Waste Water.

JR asked if the rerouting of trucks had satisfied a previous complaint. CNFO indicated trucks not going through the neighborhood was better however they are still dropping sludge in the highway when exiting the area.

CFNO registered strong complaints on wide spread eye irritation problem in the neighborhood. Complaint was backed up by member's physician who indicated " as long as you live in the Cascade neighborhood and they (JR) continue to dump chemicals into the lagoon, you will have this problem". The physician has volunteered to speak to JR at their request on the subject.

CFNO shared one interview with a former resident who lived in the neighborhood for 20 years. 15 of which she was treated for thyroid condition. Within 2 years of moving from the neighborhood, she was totally taken off the thyroid medication. This is a medical anomaly. No response from JR was received.

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CFNO registered complaints of strong odors from the facility in the summer months. So strong that residents would call JR to complain. So strong were the odors that it was impossible to have a cook out in their yard.

CFNO told JR that in one case when an interested buyer showed up to view his property he immediately lost interest when he viewed the Waste Water facility indicating he knew that that it was toxic and dangerous.

Discussion on the new construction

JR indicated that reducing the river from 1500cfs to 400cfs would leave 85% of the river wetted. Both JR and CFNO wondered how the river could maintain 85% coverage while taking 75%-80% of the water. JR indicated that the riverbed would have to be flat to allow this and also indicated rocks and boulders would be exposed. CFNO indicated the river has been below that point many time in the past during summer months. JR indicated that if that happened it was not their problem they had "run of the river operation" which means that the water runs over the dam or through the turbines but is never held back in reserve. Control of the river is done at other locations. JR indicated once or twice a few year ago a problem may have existed that was out of their control which may have lowered the river below that point.

JR stated that the Cascade Waste Water effluent would be dumped into the reduced water flow of the Cascade reach, not into the penstock pipe as requested by NHDES. A bridge and pumping station would be required increasing cost of the project. JR position is that they will meet water quality at all time in the Cascade reach under reduced water flow conditions.

CFNO reiterated their concerns for children safety if the river velocity were reduced to 400cfs. Children would want to play in that area thus producing an additional hazard. Now, children learn at a young age to stay away from the river.

CFNO unanimously rejected the discussion of the $50K originally offered to the town of Gorham for partial use in Cascade as an "insult and totally inadequate".

JR indicated that they would investigate the concerns for health problem to their satisfaction but "probably not to CFNOs" to convince themselves that the pollution problem CFNO are concerned about was not theirs.

CFNO indicated that the town officials had been invited and expressed regret that the Town Manager and Selectmen could not find time to attend this important meeting. JR defended the Gorham Town Manager indicating that she had originally suggested the meeting between JR and CFNO. CFNO concurs.

JR indicated they would be available for future meetings.

ATTACHMENT 10

JAMES RIVER CORPORATION
COMMUNICATION PAPERS/N.E. GROUP
650 Main St Berlin NH 03570-2400 (603) 752-4000

7 June 1993

Mr. Dennis J. McCarthy
Cascade Flats Neighborhood Organization
34 Main - Cascade
Gorham, NH 03581

Dear Dennis,

Thank you for your correspondence of May 17. I have sent copies along to Bill Lockard and Ron Baillargeon for their review. Even though they have not yet completed their review of the statement read by Ms. McCarthy, I wanted to drop you this note to let you know we received your package.

Many of the issues raised in your statement and in our discussions are not new. The CFNO has raised these issues in its interventions to FERC. Since FERC has the responsibility to address these issues, and James River the responsibility to respond to the issues as raised by FERC, I think it would be inappropriate for me to enter into discussions with CFNO to address many of the concerns you raised.

I do have some early responses to two of the questions raised in our meeting:

1. James River will not grant access to our test wells near the Cascade Treatment Facility. However, all of the tests that have been conducted over the years were filed with the State of New Hampshire. The data should be a matter of public record and available on request.

2. Ron Baillargeon has been able to confirm that we did perform a 600 cfs test several years ago. We are currently searching our files for the data and will share it with you when we find it.

I'm afraid I cannot confirm the accuracy of the notes you typed up as these were notes you took for your own purposes. We will, however, continue to work on issues you raised regarding the potential impact of the Cascade Operations on the neighborhood, and will let you know about our findings and any actions we take. In the mean time, if you have additional questions or concerns, please contact Ron Baillargeon or Bill Lockard directly.

Sincerely,

David A. Nelson
Vice President, Resident Manager
Berlin-Gorham Operations
James River Corporation
650 Main Street
Berlin, NH 03570

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

C F N O

CASCADE FLATS NEIGHBORHOOD ORGANIZATION

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FEDERAL ENERGY
REGULATORY
COMMISSION

April 27, 1992
34 Main - Cascade
Berham, NH 03581

COPY

Lois Cashell
Secretary
Federal Energy Regulatory Commission
825 N. Capitol Street, N.E.
Washington, DC 20426

Reference :

J. Bredie Smith	P-2287-003	Cross	P-2326-002
Gorham	P-2288-004	Cascade	P-2327-002
Shelburne	P-2300-002	Sawmill	P-2422-004
Berham	P-2311-001	Alpine	P-9713-001

Subject :
Comments on Air Quality in the Berlin NH Area

Dear Ms. Cashell:

Enclosed for filing with the Commission in the above projects are the original and 14 copies of the COMMENTS AND RECOMMENDATION OF THE CASCADE FLATS ORGANIZATION IN RESPONES TO TELEPHONE CONVERSATION RECORD FROM: R. FELLER TO: THOMAS NOEL DATED: FEBRUARY 2, 1993 CONCERNING AIR QUALITY IN BERLIN, NH AREA

Copies of this document have been served on all parties listed on the attached certificate of service list.

Respectfully,

Dennis J. McCarthy
Chairperson

Enclosures
cc: service list

102. No reponse required.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

James River	)	
New Hampshire Electric, Inc.	)	Docket No. P-2327-002
	)	Docket No. P-9713-001

CASCADE FLATS NEIGHBORHOOD ORGANIZATION hereby files comments and recommendations concerning the TELEPHONE CONVERSATION RECORD From: R.Foller To: Thomas Noel Dated: February 2, 1993 concerning AIR QUALITY in the Berlin, NH area.

PRELIMINARY STATEMENT

CFNO requests that the Federal Energy Regulatory Commission take action on CFNO's previous motions for a complete Human Health Study of the people living in the Cascade Flats neighborhood and expand the Environmental Impact Study section 3.B Air Quality to include evaluation of the combined effect of present air quality in the Cascade neighborhood from emissions from the James River smoke stacks and from the Cascade Waste Water Treatment Facility located within 300 feet of homes and immediately adjacent to childrens' playground. Also, conduct an evaluation of the air quality impact resulting from the development of the proposed 7,750-foot-long penstock and Pulsifer Rips powerhouse and contaminants in the proposed riverbed and contaminants from the river when the upstream contaminants dry along the riverbed and are carried by the winds in the valley.

As stated in the telephone record:

1. Air Quality in the Berlin area has improved considerably during the past ten years. This improvement is expected to continue.

This has not been the case for the Cascade Flats neighborhood. (Attachment 1) is an article from the Coos County Democrat dated May 9,1990, indicating the Environmental Protection Agency reports that James River Corporation (Berlin facility) emitted over 1.5 MILLION POUNDS of toxic chemicals during 1988 including, described by the E.P.A., chloroform a probable human carcinogen. The article reports chrenic exposure to chloroform has caused thyroid, liver and kidney cancer in laboratory animals. As stated in the letter from Mr. and Mrs. McCarthy of the Cascade Flats neighborhood to the Federal Energy Regulatory Commission dated November 23, 1992, they and others in the neighborhood are being treated for thyroid conditions.

103. See our responses to comments 33, 87 and 92.

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Dr. Dwight Peavey, the Toxic Release Program coordinator for the Boston office of the E.P.A. reports that 48,000 pounds of the chemical went out the company's smoke stacks and 34,000 pounds was released into the working environment as "fugitive emission". Mr. Ray Danforth, James River Environmental Director states in the same article: "fugitive chloroform evaporates out of waste water treatment lagoons in exceedingly small amounts". He also indicates these numbers are down from 1985 when the company reportedly cut its chloroform emissions by 90%. Many of the people living in the neighborhood have been residents for more than the 30 year history of the lagoon systems.

1990 Environmental Protection Agency figures show James River Berlin now emits 1.7 MILLION POUNDS of toxic chemicals into the environment. Included in the chemicals released were: chlorine, chlorine dioxide, methanol, acetone, catechol, chloroform, ammonia and sulfuric acid. Attachment 2 is an article from the Berlin Daily Sun dated May 29,1992. This article identifies James River Corporation as the number one polluter in the State of New Hampshire based on figures released by the E.P.A. showing the amounts of toxic chemicals including cancer-causing substances, released into the environment in 1990.

(Attachment 3) is a paper mill document dated June 17, 1974 distributed to the residents of Cascade Flats prior to the construction of the waste water treatment facility. This document assures the neighborhood that:

1. No oder is expected from the lagoon.
2. No offensive side effects such as noise or vapor spray are anticipated.
3. It would be a safe and attractive addition to the Cascade area.

Each of these items is now a major issue between the Cascade Flats neighborhood and the James River Corporation.
During the summer of 1989, the stench from the waste water treatment facility was such that James River had to take extreme measures in the form of dumping large amounts of hydrogen peroxide to neutralize the hydrogen sulfide gases to reduce the odor and had to dredge the lagoon. Again in the summer 1992, the people of the neighborhood complained that an unusually large build up of "floating material" in the lagoon, believed to be paper fibers mixed with chemicals, was generating more stench than usual.

The people of the neighborhood believe that the noise pollution caused by large trucks during the dredging operations and the noise from the aeration devices coupled with chemical exposure has resulted in offensive side effects and does not provide a safe and attractive addition to the Cascade neighborhood.

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This facility has been a constant source of concern to residents because of the odors generated, unknown chemical contents and quantity, and the close proximity to peoples' homes (attachment 4). This facility aerates the chemical effluent (including Dioxins) from the paper process and it is not known what effect on AIR QUALITY this process has on the long term exposure to people living so close to this facility. This plus the exposure to riverbed contaminates with reduced river flow in the Cascade reach and exposure during the construction process warrants a complete Human Health and AIR QUALITY impact study.

2. James River is meeting emission standards for criteria pollutants, such as sulfur dioxide and oxides of nitrogen.

As the E.P.A. moves to tighten emission standards, so James River must move to comply with the law. However, as noted in attachment 5 Berlin Reporter article dated July 5, 1989, James River released chlorine dioxide sufficient to cause breathing difficulties and nausea of people living near the mill. This happened after residents complained for a couple of weeks of a strong odor of chlorine, contained in chlorine dioxide gas.

104. Comment is noted.

3. The major source of odor are the recovery boilers - which will be changed soon.

The major source of odor in the Cascade neighborhood is the waste water treatment lagoon. There is no known plan to eliminate this facility from the neighborhood. Therefore it appears that the odor problem will continue in the Cascade Flats neighborhood.

105. Comment is noted.

4. James River has a variance from the Total Reduced Sulfur Emissions regulations. James River will close the most polluting boilers.

This indicates they are not yet in compliance. Thus, how can the AIR QUALITY for the Cascade Flats Neighborhood be improving?

106. We defer to the expertise of Environmental Services, with respect to the assessment of air quality of the Berlin area.

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

RECOMMENDATIONS

I. Federal Energy Regulatory Commission should take action on the Cascade Flats Neighborhood Organization February 23,1993 motion to expand the EIS study to include a complete HUMAN HEALTH STUDY be conducted on all people living in the Cascade reach area to identify the effects the exposure to the existing pollutants has had on their health and to detereine the effects of additional exposure resulting from the reduced water flow of the Cascade project (2327). 107.

II. Federal Energy Regulatory Commission should take action on the Cascade Flats Neighborhood Organization February 23, 1993 motion to examine the effect on air quality in the Cascade reach area resulting from the intermittent flooding and receding of the water level (400cfs-2320cfs) of the river when the upstream contaminants dry along the riverbed and are carried by the winds in the valley. It should also contain the combined effect of the Cascade waste water facility, and the James River smoke stacks emissions. 108.

III. Federal Energy Regulatory Commission should require that the James River buy out the residents of the Cascade Flats Neighborhood at a fair replacement value as a condition to issuing a license for the Cascade (2327) and/or Alpine (9713) projects. The socioeconomic effects on the neighborhood from the degraded environment has resulted in property values decreasing far below the replacement value of equivalent homes. Any further impact to the neighborhoods environment will completely destroy any possible socioeconomic recovery of the real property and the neighborhood. The estimate to acquire the homes in the neighborhood is $5 million. This is a small price to pay for the right to generate revenue for 30 to 50 years from these facility. The people of the Cascade neighborhood abut the Androscoggin River along the west bank of the proposed Cascade reach area and therefore have equal rights to the hydraulic head as does the east bank land owner, the James River Corporation. 109.

Dated this 27 day of April, at Gorham, New Hampshire.

Respectfully submitted,

Dennis J. McCarthy

Dennis J. McCarthy
Chairperson
Cascade Flats Neighborhood Organization
Gorham, NH 03581
(603)752-6376

107. As noted above, in our response to comment 17, hydroelectric project operation does not generate toxic pollutants. To the extend that hydroelectric projects affect toxic pollutants in the environment is discussed in sections 3.1.3, 4.1.2.6, and 4.2.2.3.

108. Intermittent flooding is not case specific to the Androscoggin River and is not within the control of the Licensee. Conversely, the high degree of upstream river-regulation, through the use of storage reservoirs, has enabled the flows in the river to remain stable and more reliable, and aided in flood prevention. Furthermore, our analysis of flows and wetted area in the proposed Pulsifer Rips bypassed reach indicate that only about 10 percent of the wetted area would be lost if flows were reduced from the current 1600 cfs to the proposed 400 cfs. Given the overall lack of sediments in the proposed bypassed reach, due in large part to the existing high velocities caused by excessive flows (see section 4.1.3.3), we don't see a concern about the possible drying-up of the contaminants along the river bed and their subsequent movement through the air.

109. See response to comment 88.

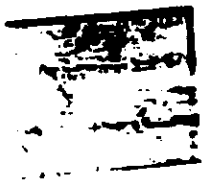
The following pages contain attachments to the comment letter. No comments are required.

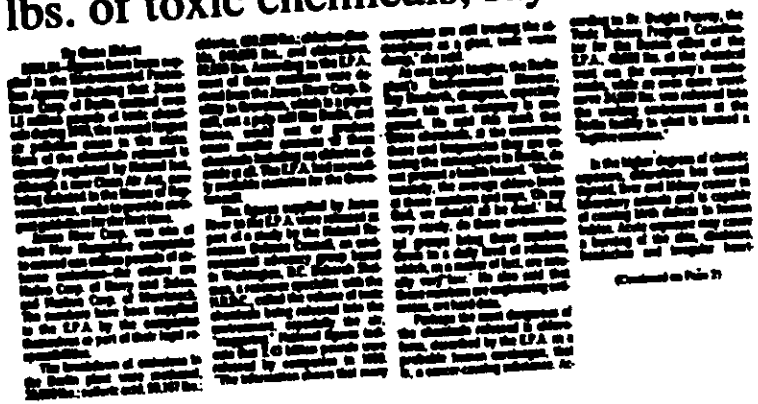
Document Accession #: 20010420-0125 Filed Date: 11/30/1993

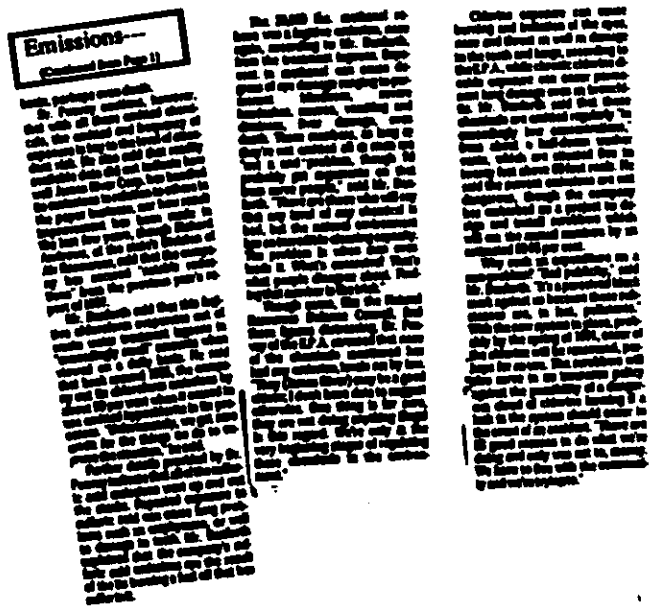
ATTACHMENT 1

COOS COUNTY DEMOCRAT—LANCASTER, NEW HAMPSHIRE—WEDNESDAY, MAY 8, 1996

James River emitted 1.5 million lbs. of toxic chemicals, says EPA







Emissions—

JR top polluter in state

Berlin Daily Sun MAY 29, 1992

Photo: Paulsbo recently completed about this material in James River's settling ponds.

By Pekka Paavonpera
THE BERLIN DAILY SUN

The James River Corporation was the number one polluter in the State of New Hampshire according to figures released this week by the Department of Environmental Protection (EPA).

The figures, the latest compiled by the EPA, showed the amounts of toxic chemicals, including cancer-causing substances, released into the environment in 1990.

They showed James River released 1.7 million pounds of toxic chemicals into the environment. This means that of all toxins pumped out by industry in the whole state, nearly 20 percent was deposited on Berlin and its surrounds.

Although according to the EPA, New Hampshire industry cut back by about a third the amount of toxins released the previous year, James River actually showed an increase in the amount of toxins it discharged. In 1989 it released 1.527 million pounds.

Included in the chemicals released were: chlorine, chlorine dioxide, methanol, acetone, catechol, chloroform, ammonia and sulfuric acid.

According to EPA spokesperson Allison Casman, the figures released this week were compiled from information released by the state's indus-

see POLLUTION page 8

James River state's top polluter

POLLUTION from page one

tries. This is a legal requirement.

She said although there were penalties that could be applied to industries which did not reveal full information on chemicals released, or which doctored their figures, the EPA had no way of policing this.

James River in Berlin and the company's national public affairs department in California declined to comment on the EPA figures.

The Berlin Daily Sun was told there was no one in Berlin available to comment on the matter.

Environmental activist group The Wilderness Outlook Legal Foundation however said the figures were no surprise.

Spokesperson Jeffrey Elliott said the chemical release figures of the James River Corporation were typical of a company that used toxic chemicals and an outdated manufacturing process that had been outlawed in most other countries producing paper products.

He said he would not be surprised if the figures released actually favored James River. He claimed many companies released total monthly or other time frame period figures rather than daily discharge figures.

"They could release deadly amounts of toxic chemicals over a three or four day period but on other days just minimal amounts. When these were averaged out over a month, the end figure wouldn't appear to be so damaging," he said.

Local resident Mr Alphonse Bean, who has been very vocal on the James River pollution issue for some time, also said it came as no surprise to him that James River was the worst polluter in the State.

James River declined to comment on the EPA figures.

"You don't need figures to show that. You can see all the pollutants on your windows and walls and this stuff is exactly the same as what we are breathing in each day," he said.

He said not many residents would speak out about the James River's pollution problem because they were afraid.

"The company pays most of the people around here so it's either a case of speaking out which might close the place down and then starving to death because you have no job, or keep on living here and working and dying later on through cancer or some other disease you get from the pollution," said Bean.

"If the economy was better and there were jobs elsewhere, I'm sure people would say 'the hell with Berlin and James River' and move somewhere else."

Document Number: Date: 11/30/1993

ATTACHMENT 3

FROM: COMPANY'S CASCADE WASTE WATER TREATMENT

The Brown Company has begun construction on its waste water treatment plants for the Berlin-Gorham Division. Two separate plants are being built with one site being on the east side of the river near the Burgess Mill, and the other in the Cascade Flats area. The latest technological advances are utilized in our plans for both of these plants.

The Cascade Plant will service only the Cascade papermaking operation and treat the "white water" now being dumped directly to the river.

The treatment process that will be used at Cascade is a simple system consisting of a settling tank to remove the solids and two lagoons following to provide secondary treatment.

Secondary treatment consists of adding air to the waste using mixers and settling out any remaining solids. The process being used does not promote bacterial action so no odor is expected from the lagoons.

No offensive side effects such as noise or vapor spray are anticipated and with the new landscaping and clean-up the area should provide a pleasing improvement.

The sanitary waste from the Cascade Mill will not be treated in the new plant, but will be separated and discharged into the town sewer system.

Construction of the new sewer lines and the lagoons will begin this summer and will continue with building erection and equipment installation the next two summers. Plans call for the plant to be started up in the fall of 1976.

The Company has engaged the services of AMRE, Inc., of Nashville, Tennessee, and C. T. Main, Inc., of Boston to design and engineer this treatment plant. All of the latest engineering and construction improvements will be used to make this a safe and attractive addition to the Cascade area.

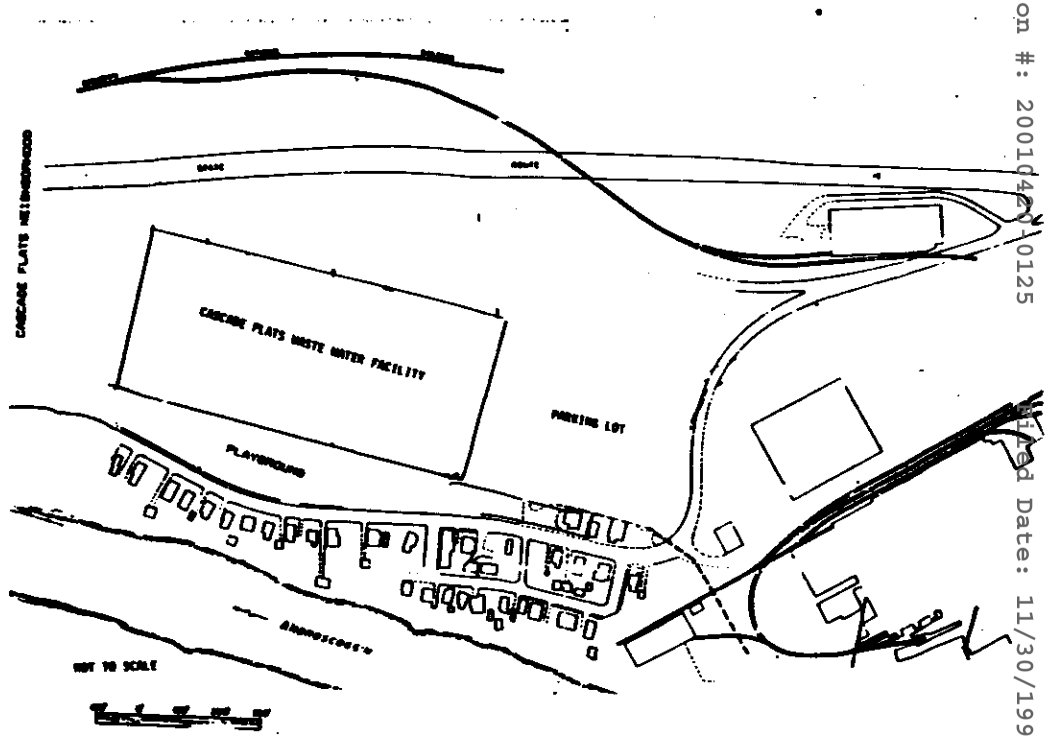
The plant is being designed in compliance with Federal and State regulations and will be monitored around the clock by trained Brown Company personnel.

If any further details are desired, please feel free to contact Fred Stubbert or Earl Hanson at Brown Company, 752-4600.

6/17/74

ATTACHMENT 4

CASCADE FLATS NEIGHBORHOOD



Document Accession #: 20010420-0125 Filed Date: 11/30/1993

Chemical causes nausea

BERLIN REPORTER 7/5/89

Chlorine dioxide leak

by Ross Dodge

BERLIN—A chlorine dioxide leak at the James River Burgess Mill Sunday evening caused several East Side residents quite a bit of discomfort and led to the closing down of the company's D2 bleachery tower.

A complaint to police about breathing difficulties and nausea by one family living near the mill led to the shut-down, said Capt. Roger Villeneuve of the Berlin Fire Department. A police officer responded to the call at 7:05 p.m. and upon arrival, called in the fire department. The odor in the area was very strong and a fire department officer saw yellow smoke intermittently spurting from the bleachery tower.

James River officials said it was determined that chlorine dioxide was escaping into the atmosphere due to a gasket failure. The company reduced operating capacity at the tower in an effort to contain the leak but the action did not work, said Capt. Villeneuve. Berlin Fire Chief Paul Fortier and Assistant Chief Bob Goudreau also responded to the area and the tower was ordered shut down. The officials also ordered James River to repair the leak and that if they didn't, they would evacuate that section of the East Side as a precautionary measure, he said.

According to Capt. Villeneuve, James River told fire department officials Sunday that the company was unaware of a leak and that it had just happened that day. Residents living in the area, however, have been complaining of the strong odor of chlorine, contained in chlorine dioxide gas, for a couple of weeks and said they have often seen yellow smoke coming from the tower.

Ray Danforth, environmental director for James River, who just returned from vacation, said Monday the bleachery tower had been shut down and temporarily fixed. The repair is holding and the tower will be completely repaired at the next bleachery shut-down scheduled for next week. He admitted, however, after looking into the incident Monday, that he found out there had been a gasket problem on the tower since the mill started up again after its Memorial Day week shutdown. Officials at the Burgess

Continued on page 2

Chlorine dioxide leak at Burgess Mill

Continued from page 1

"I knew there was a leak but we're unable to pinpoint it, he said. Since the tower didn't leak all the time, the workers were having a hard time finding it.

Chlorine dioxide is a strong, oxidizing agent which dissipates in the air. In low doses, it causes eye, nose, throat irritations and nausea, said Mr. Danforth. In high doses it is toxic. He stressed that the emissions Sunday evening, though admittedly unpleasant, were at a low level. He stressed also that the matter was being addressed and that "In the future, the company will be monitoring the gasket seals much more closely to prevent a recurrence."

He explained that in the normal process of the bleachery Chlorine dioxide and steam are added to pillow tubes. If the stock is hot enough, and there is a small leak in a gasket, you'll get steam coming out of the tower that appears to be a gas leak, he said. What the company did Sunday was to increase the steam and decrease the chlorine dioxide to try and eliminate the problem. However, he said, residents will see more steam coming out of the tower and what in fact is an improved situation, will appear worse.

Mr. Danforth further explained that the spillow tubes were installed 12 years ago and are in good shape. What the problem has been, he said, is that the glue that seals the gaskets don't hold very long. The company installed retainer bands and that has worked well, but not well enough, he said. He stated that James River will be consulting with engineers of the Simons Eastern Company, a designer of paper mills and bleacheries, working with them to try to determine what kind of a permanent mechanical solution they can come up with.

The problem will be permanently fixed next week, Mr. Danforth repeated.

"Although what was coming out of the tower Sunday evening was in no where near a life threatening or hazardous situation, the company recognizes that it must and will respond to any and all emission problems," he concluded.

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

Document Accession #: 20010420-0125 Filed Date: 11/30/1993

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REGULATORY COMMISSION

Comments of the Multiple Use Association
332 North Road
Shelburne, New Hampshire 03581
(207) 836-2624

Federal Environmental Impact Statement

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Relicensing Seven Existing Dam Projects
Numbers 2422-004,2287-003,2326-002,2327-002,2311-001,2288-004,2300-002
In the Upper Androscoggin River Basin

for

James River - New Hampshire Electric, Inc. (JR)
Public Service Company of New Hampshire (PSNH)

Submitted to:

Ms. Lois D. Cashell
Secretary, Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, DC 20426

August 9, 1993

110.

The Multiple Use Association is a member supported organization that promotes open land policies on both public and private lands and which takes a particular interest in the health of our nation's forest environment. Members of the Association include individuals and companies from the wood products industry, landowners, recreationists and those concerned about the adverse economic and environmental effects that result from pressure by environmental groups. We favor a balanced approach to government management and regulations and we have an interest in maintaining a healthy environment through reasonable actions. MUA networks with many other responsible pro land use associations from across the country which have faced the same restrictive pressures from special interest groups that we now face.

I am a licensed professional engineer (Maine & New Hampshire) who worked as a Project Engineer for Brown Company, James River's local predecessor, from 1973 to 1978. I was involved in a number of the projects mentioned in the Draft Report that helped improve the local environment. I now manage a primary and secondary wood products manufacturing firm that employs 80 people. As an engineer, I am interested in science, particularly when it can improve the environment or reduce the need for outside energy sources such as fossil fuels. As you know, northern New England is highly dependent on imported oil and dearly needs all the alternative energy sources it can get.

110. No response required.

111.

General Comments on the Draft Report

We reviewed the Draft Report and we are very concerned about the document and its potential negative effect on James River (Berlin-Gorham) and the local economy. The added expense to PSNH will increase this area's already too high electric rates. The DEIS comes across with an "industry is bad, so it must pay attitude." It calls for costly increased recreational opportunities for the public in an area that has no shortage of recreational opportunities. It calls for operational changes to improve fisheries that don't warrant the high cost to implement. It fails to consider that these subject properties are industrial, which are by nature, hazardous. It appears no contact has been made with Occupational Safety and Health Administration (OSHA) to discuss the safety aspects of encouraging public recreation at hazardous dam sites.

We are distressed to see that much of what is being proposed is driven by environmental lobbies who have a history of harming local economies in all parts of the country, usually without significantly improving the environment. When they use bad science, they frequently harm the environment. The Commission points out in several places the absurdity of the Conservation Law Foundation et al.'s positions, but it doesn't go far enough as it accepts some of their other equally absurd positions. The commission also fails to point out some of the excessive desires of the Fish & Wildlife Service and that of other regulators.

111. The recreational enhancements recommended by staff in addition to what the licensees have proposed at these projects would require minor expenditure by the licensee. Most of our recommended enhancements are in the form of improved signing. The only project where notable recreational enhancements would occur is at the Cascade Project (see section 4.2.7) where the licensee's generation revenues would increase after project modification. The cost of recreational development at this project would be minor compared to the increased generation revenue. Therefore, the effects of recreational development costs on the financial stability of the licensee would not be a factor.

With regard to your concern for public safety, we consider public safety a high priority in our dealings with licensing and post-licensing activities. A standard license article for all projects states that project lands and waters shall be available for full utilization by the public for recreational purposes, <u>except where the licensee has reserved areas for the protection of life, health, and property.</u> Parts 12 and 2.7 of the Commission's regulations discuss, in part, what the Commission will expect of each licensee in the area of public safety. In sum, these regulations say that the licensee must comply with federal, state, and local regulations for health, sanitation, and safety. Further, the licensee must operate recreation facilities in a safe manner and maintain facilities (including natural areas such as trails) in a safe condition.

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Required reading for the Commissioners should be two recently released books on environmental issues. The first is Environmental Overkill: Whatever Happened to Common Sense by scientist Dr. Dixy Lee Ray. The title says it all. The second is Trashing the Economy by Ron Arnold and Alan Gotlieb, which demonstrates that today's environmental groups aren't always what they appear to be.

We are disturbed by the economic assumptions made in the DEIS. It seems to say that it feels spending an extra $1,600,000 annually for amenities is no big thing because the projects are to make money for the subject firms. Any business manager knows that you can't continually lose money and stay in business. JR has experienced experienced difficult economic times in recent years and because of this, they have had several major employee layoffs. At $30,000 per employee, the extra money the Commissioners would have JR and PSNH spend, translate to 53 employees. Not having to spend the extra money might save existing employees from future layoffs and could even help bring some laid off workers back. Having to spend the money may well insure future layoffs.

Because of the DEIS's industry is bad attitude, we are enclosing a copy of the American Forest & Paper Association's Environmental, Health, and Safety Principles that most paper companies are now using as operating guidelines. The James River Corporation has signed onto this impressive program and it actively uses these principles in all its activities.

112. Comment is noted.

Specific Comments Relative to the Draft Report

Forward: This section sets up the Draft Environmental Impact Statement (DEIS) for what it is, mainly about amenities rather that the original purpose of the dams, to generate electricity for JR and the community. We feel this is wrong.

113. Comment is noted.

Executive Summary

Sawmill Project. We are upset that this dam is being called Sawmill instead of by its correct name, the "Philip E. Johnson" dam. In 1980, this dam was dedicated to a brilliant professional engineer named Philip E. Johnson who worked with the Androscoggin river [for JR and Brown Co.] actively for three decades and as a consultant after retirement. For twelve years before his local employment, he worked with the Corp of Engineers as a flood control expert. His use of good science and common sense helped make the Androscoggin one of the best water flow regulated rivers in the country, and at a reasonable cost. We would like to see the documentation changed to include this dam's correct name so that the deceased Mr. Johnson receives the honor he so rightly deserves.

114. We believe that changing references to the dam at this point would be unnecessarily confusing. Note also that "Sawmill" refers to the entire project, not just the project's dam.

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JR & PSNH amenity proposals. We believe those proposals are generous, given the fact that neither firm is in the recreation business. The extra costs incurred could well be used for other needed improvements that may help their employees, the environment and the local community more.

FERC additional proposals. We feel these extra proposals are too costly and don't appreciably help the environment or local recreation. They will cause financial harm to JR, PSNH and the local community.

115. Comment is noted.

116. Comment is noted.

1.3 Scope of EIS. We are greatly concerned about the Conservation Law Foundation et al. imposing its wishes on affairs that so negatively affect the local economy. We believe that their actions are based more on fundraising reasons rather than a desire to help the environment or the public. In Trashing the Economy, the authors point out environmental groups frequently use the Equal Access to Justice Act to get the federal government to reimburse them for legal fees in lawsuits brought against the government. A current example is the Sierra Club Legal Defense Fund's expected award of almost a million dollars for the role the Fund played in closing down the rural forest communities of the Pacific Northwest.

In addition, a call to "save the rivers" (even if the groups do nothing to save or improve it) is always a sure method to bring in funds from new and existing members and from the Environmental Grantmakers Association (EGA). EGA currently distributes a billion dollars a year to environmental groups. We believe those fundraising actions are being used on this dam relicensing issue. A local newspaper reported that two foundations gave $300,000 to a regional environmental group to get involved in the dam relicensing. It is unfortunate that one party [the environmental groups] has to harm another party [the subject firms and community] so much in the effort to raise funds for itself.

We feel strongly that the Commission should not increase the scope of the DEIS to include the other 50 dams as requested by Conservation Law et al. as that would even more negatively affect the economies of the communities in the River Basin. Holding more dams than the current 7 dams hostage by environmental groups will further increase local community outrage.

2.2 Modifications to proposed project operation or facilities. We are strongly opposed to the involvement of the National Park Service (NPS) in these affairs. This government agency has shown itself in actions all across the country to be heavy handed with and only too willing to harm local communities for little public or environmental benefit.

117. Comment is noted.

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We are strongly against JR and PSNH needing to file a plan for protective shoreland buffer zones. This has nothing to do with the operation of the dams. We have learned from other pro land use associations in other parts of the country that this is frequently used as a first step for government to take over or to excessively control private land. The recent defeat of the Pemmigiwasset Wild & Scenic River designation shows that local people are strongly against excessive control of private land by government or appointed commissions. Our association will be very active in opposing a buffer zone land grab, if the final EIS should recommend it.

118. See response to comment 37.

2.3 Alternatives considered but eliminated from further consideration. The Conservation Law et al. claiming that "energy conservation" is an alternative to relicensing of the dams is absurd. All firms practice energy conservation wherever they can. Energy costs money and all businesses need to contain costs in today's very competitive climate. Having the cash to invest in energy equipment is frequently a problem, however. Government and environmental groups forcing companies to spend money unnecessarily on issues that don't appreciably help the environment or conservation as they are doing on the subject issue, flies in the face of energy conservation.

119. Comment is noted.

We are very pleased to see the Commission make a strong statement that it feels hydropower is "environmentally sound." This is knowledge that many of today's environmental leaders have not been able to grasp. We feel that this is because most are driven more by a "no use of nature" ideology, than by good science.

2.4 No Action alternative. While we believe the proposals to increase energy production are worthwhile, we feel JR and PSNH should consider this alternative because of the excessive demands by the Commission and others. History has shown that giving in to unreasonable demands only whets the appetite of environmental groups for more. Satisfaction can never be achieved.

120. Comment is noted.

2.5 Economic comparison of alternatives. The DEIS is incomplete because it does not list the quantity of fossil fuel that will need to be consumed and its negative effect on air quality, to displace the reduction of dam created energy that will be lost because of the larger amount of water flow that the commission wants to by pass the dams.

121. The comparison and the basis for the calculation of the impacts on air quality resulting from the energy generation of the seven EIS projects versus from the energy generation of a fossil fuel plant are addressed in section 4.1.9. An explanation of the effect of the energy displaced by the various minimum flow regimes that we analyzed on the quantity of fossil fuel that would be consumed and the air quality are addressed in section 4.1.10.

3.1.3 Water quality and quantity. The approach taken on dioxin in this section makes us question whether the Commission is using good science and our best information in its work. In Environmental Overkill..., Dr. Ray writes about dioxin in pages 142 to 144. She shows that the chemical isn't the harmful substance it was once thought to be. Even though, JR, like all pulp and paper companies, have spent substantial funds to greatly reduce its production to levels that were undetectable a few years ago. All the pulp and paper companies in the country together now produce less than 4 ounces of dioxin annually. "Natural" sources, however, such as forest fires produce much more dioxin.

122. Comment is noted. However, our concerns about dioxin levels in the Androscoggin River are not relative to whether or not James River's paper mills currently produce detectable levels of dioxin. Our concerns are whether the continued operation of the

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3.1.6 Aesthetic resources. This section mentions "two impressive stand of mature white birch" in Gorham and Shelburne. It needs to be understood, that a mature stand of white birch can't be maintained by setting it aside. This species dies at a relatively young age and the land is then taken over by other species. A good example of white birch decline is the famous "Shelburne Birches" that received vegetation managment too late to keep the area as attractive as it once was. In addition, letting trees die naturally on river banks causes sever erosion because the root structure pulls out the soil. On the other hand, cutting and dropping a few river edge trees in the river improves fish habitat and to a small extent, it also raises the Dissolved Oxygen (DO) level. This issue is a good example that what is considered good aesthetics is frequently divergent with what is good science.

Summary

The Federal Energy Regulatory Commission is in a position to help increase or to help reduce conflicts between citizens. Virtually all of rural America is very upset with today's environmental movement [that seems to have lost its way] and the hardships they create through forced government and legal actions. Nobody who lives or works in the country wants to harm the environment. Local people aren't ignorant. Indeed, because of their living and working proximity, they understand the environment best. The Commission will help to increase conflict between people if it caves in to the desires of outside environmental groups. If, on the other hand, the Commission uses and stands up for good science, if it uses common sense, and if it does not harm the local community unnecessarily, conflicts will be reduced and the Commission's actions will help people regain confidence in their government agencies. We fully understand the laws and regulations give you the ability to go beyond these parameters, but we can't see that they force you to do so.

Signed: Date: 8/8/93

N. Leon Payreau
President
Multiple Use Association

123. hydroelectric projects would effect, impact, or exacerbate the existing dioxin levels found to already exist in the fish downstream of the pulp mills in Berlin and presumed to be contained/trapped in the reservoir sediments. Based on the information available concerning dioxin transportation, we concluded that the operation of the projects in a run-of-river mode with minimal headwater fluctuations would not appreciably resuspend any existing contaminants likely trapped in the sediments and would therefore have little impact on an existing condition. Dioxin, or any other contaminants, currently trapped or contained in the reservoir sediments would essentially remain unaffected with or without the operation of the projects. We agree that continued existence of the dam (even in the absence of hydropower operation) would continue to trap sediments and potentially concentrate toxic

124. pollutants. Our recommended action would result in a cumulative impact in conjunction with continued inputs of dioxin from the paper plants, in that for the present and foreseeable future the dams would continue to trap sediments. Given the existing contamination levels in the river (and without knowledge of what the system would be like if the sediment-bound dioxin was allowed to move freely downriver), we further concluded that continued operation of the hydroelectric facilities was the best available option. That is, given the existing contamination of the forebay sediments, continued sequestering of dioxin in these sediments is advantageous to flushing them downriver.

123. Comment is noted.

124. Comment is noted.

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PSNH

Public Service of New Hampshire

August 9, 1993

J. Brodie Smith Project (L.P. No. 2287-NH) 003
Gorham Project (L.P. No. 2288-NH) 004

D06752

Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

Dear Ms. Cashell:

Draft Environmental Impact Statement

Attached please find Public Service Company of New Hampshire's (PSNH) comments on the Commission's Draft Environment Impact Statement (DEIS) for the Upper Androscoggin River Basin Hydroelectric Projects. The attached comments focus on the two existing PSNH hydroelectric projects referenced above.

Please note that copies of this filing have been served on all parties listed on the attached service list. Should you have any questions concerning this filing, please contact Mr. James J. Kearns at (203) 665-5936.

125. No response required.

Very truly yours,

PUBLIC SERVICE COMPANY OF
NEW HAMPSHIRE

FOR: R. G. Chevalier
Vice President

BY: C. F. Sears
Vice President

1000 Elm St., P.O. Box 330, Manchester, NH 03105 • Telephone (603) 669-4000 • TWX 7102207595

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J. BRODIE SMITH PROJECT
L.P. No. 2287-NH

PSNH offers the following comments on the Draft Environmental Impact Statement (DEIS) for the Upper Androscoggin River Basin Hydroelectric Projects, as it relates to PSNH's J. Brodie Smith Project:

(1) The environmental measures proposed by PSNH at its Smith and Gorham projects include the implementation of the water quality monitoring program outlined in their Section 401 Water Quality Certificates dated April 25, 1991. While mention is made of this proposed measure for PSNH's Gorham Project on page 2-10 of the DEIS, no similar notation is made for PSNH's Smith Project on page 2-8 of the DEIS.

126. We agree, see revised sections 2.1.2 and 4.1.2.2.

(2) On page 4-35 of the DEIS, Commission staff recommends "that a requirement for a year-round minimum flow release of 20 cfs be included in any license issued for the Smith Project." However, on page 5-5 of the DEIS, the Commission concludes "that the staff's March-November, 20 cfs, minimum flow enhancement proposal would reduce the project's energy generation by about .560 GWh annually and the economic benefits of the project by about $37,000 annually from current conditions." It is not clear whether the Commission is recommending a year-round minimum flow release or releases only during the ice-free months (ie., March-November).

It is important to note that the Department of Interior's March 2, 1993 letter to the Commission addresses this issue. Interior states that "a lack of any minimum flow during this period would result in no zone-of-passage flow following spill events that occur when either the river flow exceeds station capacity or in the event of station outages." Interior goes on to state "Flows in the river from December through February exceed station capacity less than 10% of the time. This, coupled with the relative inactivity of fish during this period, reduce our concerns during these months." Interior's Section 10(j) recommendation on this matter reads as follows:

> "The licensee shall release a continuous instantaneous minimum flow of 20 cubic feet per second (cfs), from April through November. The licensee shall either be required to apply the 20 cfs bypass flow to the month of March, or establish a procedure for slowly ramping bypass flow reductions following spillage conditions during March. If a ramping plan is implemented, a plan for the ramping should be submitted to the Commission by the licensee after consultation with the Fish and Wildlife Service on the plan."

127. We agree that the DEIS was inconsistent on this issue. Our recommended minimum flow in section 4.2.3.1 was a year-round release of 20 cfs into the J. B-rodie Smith bypassed reach. Our rationale for a 20 cfs minimum flow was: 1) 20 cfs would provide a more suitable zone-of-passage flow for any migrating salmonids, 2) 20 cfs would adequately protect and enhance the existing aquatic habitat, and 3) 20 cfs would only be an increase of about 5 cfs over Public Service's proposed 10 cfs plus leakage (approximately 3 - 5 cfs). While we agree with Interior that Androscoggin River flows from December to February generally exceed the station capacity less than 10 percent of the time, we remain concerned that the lack of a year-round minimum flow may not adequately protect the aquatic habitat in the bypassed reach. Establishment of a ramping plan would not address this issue. We also note that 20 cfs is only 1.3 percent of the Androscoggin River's regulated minimum flow of 1,550 cfs and 0.7 percent of the J. Brodie Smith station's capacity. Thus, we have recommended a 20 cfs year-round minimum flow (for further explanation, see section 4.2.3.1).

If, in fact, it is the Commission staff's intent to recommend a year-round minimum flow release, the final EIS should thoroughly document staff's reasons and explain why Interior's minimum flow recommendation is inadequate.

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GORHAM PROJECT
L.P. No. 2288-NH

PSNH offers the following comments on the Draft Environmental Impact Statement (DEIS) for the Upper Androscoggin River Basin Hydroelectric Projects, as it relates to PSNH's Gorham Project:

(1) PSNH disagrees with the DEIS recommendation that trashrack replacement is warranted at this time. As noted on page 4-6 of the DEIS, PSNH is not proposing any additional fish entrainment enhancement measures at its Gorham Project because there have been no indications of significant entrainment events resulting in fish mortality. Surveys have shown that a significant amount of downstream movement of salmonids from above Berlin is presently occurring and the only means downstream migrating salmonids currently have for moving through the project is the dam spillway, when river flows exceed the project's hydraulic capacity, and turbine passage at the powerhouse. Annually, river flows exceed the project's hydraulic capacity approximately 62% of the time, which is the most frequent spillage of the seven projects covered by the DEIS. Additionally, the canal and intake velocities commonly occurring at Public Service Gorham are well within the range of salmonid escape velocities. It seems premature to conclude from this that the currently low entrainment rates believed to be occurring at Public Servic Gorham are more indicative of the overall lack of adequate quality fishery habitat, and fish, than the low entrainment potential of the project.

PSNH is not proposing to increase capacity at Public Service Gorham. Increased capacity could have an impact on salmonids migrating downstream by reducing spillage at the dam and increasing the likelihood that fish would encounter mortalities. In fact, spillage at Gorham Dam will increase and become continuous once minimum flow releases are initiated. The minimum flow release at the dam would serve as a fish bypass flow for downstream fish passage. As such, the flashboard panel modification proposed by PSNH for minimum flow releases would also serve as the Commission's recommended downstream fish passage facility.

PSNH does not dispute the Commission's belief that salmonid populations should increase once the NHF&GD's fish stocking program is implemented and minimum flow releases are initiated. PSNH does disagree with the DEIS conclusion that an increased salmonid population will automatically result in unacceptably higher entrainment rates at Public Service Gorham. PSNH believes it should be given the opportunity to evaluate the entrainment issue at Public Service Gorham after the minimum flow/fish bypass flow releases have been implemented and the NHF&GD stocking program has been

128. We do not conclude that an increased salmonid population would automatically result in unacceptably higher entrainment rates at Public Service Gorham. Rather, we conclude that an increased salmonid population (due to significantly enhanced salmonid habitat and stocking) could be cumulatively affected from the operation of the projects, and that fish protection/bypass facilities would provide increased protection (see section 4.2.3.3). Further, we have neither precluded nor prevented Public Service from evaluating the entrainment issue. However, we believe that our recommendation for fish bypass facilities at both Gorhams, along with Interior's prescription at Cascade, would provide the best environmental enhancement balance between the available resources at all 7 projects.

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initiated. It is important to note that the NHF&GD concurs with PSNH on this matter. In their letter to the Commission dated January 18, 1993, NHF&GD states "With regard to downstream fish passage, the Department recommends that the licensee be required to install, operate, and maintain downstream fish passage facilities if significant mortalities of fish from impingement and/or entrainment occur at any time during the life of the new license."

PSNH believes the need to replace the trashracks or provide some other screening measure at Public Service Gorham can be justified only after an unacceptable entrainment problem has been documented.

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ORIGINAL

JAMES RIVER - NEW HAMPSHIRE ELECTRIC, INC.
600 Main Street, Berlin, NH 03570 (603) 342-2304

OFFICE OF THE SECRETARY
93 AUG 10 AM 10:39
FEDERAL ENERGY REGULATORY COMMISSION

COPY

August 10, 1993

P-2422-004
P-2326-002
P-2327-002
P-2311-001
P-2300-002

Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, DC 20426

Comments on the Upper Androscoggin River Basin Hydroelectric Projects DEIS
James River-New Hampshire Electric, Inc.

Dear Secretary Cashell:

Enclosed for filing are an original and 8 copies of James River-New Hampshire Electric, Inc.'s comments on the Upper Androscoggin River Basin Hydroelectric Projects Draft Environmental Impact Statement. Copies of this response are also being provided to the official Service List for the project.

Should you have any questions regarding this response, please feel free to call me at (603) 342-2304.

Sincerely,

George W. Hill, Jr. P.E.
Agent
James River-New Hampshire Electric, Inc.

GWH:gls
Encl.
cc: Peter Kohn, Esq.
Service List

129. No response is required.

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JAMES RIVER - NEW HAMPSHIRE ELECTRIC, INC.
BERLIN, NEW HAMPSHIRE

OFFICE OF THE SECRETARY
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FEDERAL ENERGY REGULATORY COMMISSION

COMMENTS ON
UPPER ANDROSCOGGIN RIVER BASIN HYDROELECTRIC PROJECTS
DRAFT ENVIRONMENTAL IMPACT STATEMENT

I. *EXECUTIVE SUMMARY*

James River-New Hampshire Electric, Inc. (James River) owns and operates the Sawmill (FERC Project No. 2422), Cross (FERC Project No. 2326), Cascade (FERC Project No. 2327), Gorham (FERC Project No. 2311) and Shelburne (FERC Project No. 2300) Projects that are evaluated under the Upper Androscoggin River Basin Draft Environmental Impact Statement (DEIS) prepared by the Federal Energy Regulatory Commission (FERC). This document provides James River's comments on the DEIS.

The DEIS is comprehensive, well written and thorough, providing an accurate assessment of conflicting viewpoints and seeking to resolve areas of dispute. James River has carefully reviewed, and is in general agreement with the DEIS. However, we disagree with certain project- specific recommendations that are not fully supported by study data, the record, or by any other evidence. James River concurs with DEIS recommendations regarding water quality and recreation. However, recommendations regarding minimum flows, downstream fish passage, and buffer zones at the Cascade and Gorham projects could render the proposed expansions infeasible if they were incorporated into new licenses. James River requests that the final EIS reevaluate these issues, which are discussed in detail below as they relate to James River's expansion proposals.

130. Comment is noted.

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II. *CASCADE PROJECT*

The DEIS recommends significant modifications to James River's proposals for the Cascade project. If a new license were issued that incorporated all the modifications recommended by the DEIS, the proposed expansion may not be feasible, thus negating the potential environmental and energy benefits of the project. Key power and non-power resource issues related to the feasibility of the expansion are discussed below.

A. Non-Power Resources

1. Fish Resources

a. *Minimum Flows*

The DEIS recommends an interim 100 cfs minimum flow release in the bypassed reach between the dam and the existing tailrace (upper bypass). The DEIS recommendation is apparently based on a recommendation by the U.S. Fish and Wildlife Service (USFWS), although the USFWS previously did not object to the 6 cfs flow proposal (See James River's filing dated March 30, 1993, for a complete discussion of this issue). The New Hampshire Fish and Game Department (NHF&G) supports the 6 cfs flow proposed by James River.

As staff observed in its November, 1993 pre-scoping site visit, the upper bypass is composed primarily of ledge substrate, with little valuable habitat, especially when compared to the 1.5 miles of optimized habitat that would be provided by the Pulsifer expansion. The 100 cfs flow provides only slightly more habitat than the 6 cfs flow in the majority of this inaccessible bypass (DEIS, pg. 4-11). The flow reduces the project's levelized annual economic benefit ($1,070,000 [DEIS, Table 2-6, pg. 2-20]) by more than half ($617,000 [DEIS, Table 5-1, pg.5-10]). In light of the low habitat value, the

131. Our recommendation in section 4.2.3.1 is to provide an interim minimum flow of 100 cfs after the start-up of the Pulsifer Rips powerhouse. Our recommendation would only require this flow until an appropriate instream flow study could be conducted that takes into account the new back watering effects of the Cascade tailrace. Based on the results of the study, the 100 cfs minimum flow could, and probably would, be lowered. We do not recommend that the minimum flow be raised any higher. Thus, we see no significant economic impact on the project.

131. James River has incorrectly interpreted that the minimum flow of 100 cfs would reduce more than half of the project's levelized annual economic benefits ($617,000/$1,070,000). In our analysis, we calculated that the minimum flow of 100 cfs would reduce the total expanded project's (which includes Cascade unit number 1 modification and the development of the Pulsifer Rip powerhouse) 50-year levelized annual net benefits of about $4,929,000 by about $500,000 (See Table A-1, page A-3).

Furthermore, the following is a clarification of what is included in the economic analysis that resulted in the dollar amounts James River has quoted:

$1,070,000 (Table 2-6): This is the 50-year levelized annual net benefits for the expansion of the Pulsifer Rip powerhouse, ONLY.

$617,000 (Table 5-1): This is the additional costs which the "entire" Cascade project is expected to incur annually. The analysis of the "entire" Cascade project includes all expansions at the Cascade project (e.g., modification of unit number 1 in the Cascade powerhouse and the building of the entire Pulsifer Rips development), loss due to the minimum flow spillage of 100 cfs in the upper bypass, and downstream fish protection device (trashracks at smaller spacings).

inaccessibility of the area, the high cost of the habitat, and agency recommendations that support a 6 cfs flow release, James River recommends that the final EIS recommend a 6 cfs flow release to the upper bypass.

b. *Fish Passage*

The DEIS recommends installation of fish bypass facilities at the Pulsifer intake, based on a "prescription" by the USFWS. After conducting a Freedom of Information Act review of the USFWS's project records, James River found that USFWS had no basis for making the prescription. Comments on the prescription were filed on March 30, 1993. We request that the final EIS specifically address the contents of that filing.

Since the DEIS recommendation for passage is based on the increased opportunity for entrainment/impingement that would result from the Pulsifer expansion, there would be no justification for a fish passage facility if the project is not constructed.

132. To the extent that the March 30, 1993, comments address the qualification of Interior's prescription as a fishway prescription under section 18 of the Federal Power Act, we defer consideration of this filing to the Commission. However, we recommend installation of these facilities for the reasons specified in section 4.2.3.2.

2. Cultural Resources

The DEIS recommends preparation of an agreement to protect both the archaeological resources and the historic integrity of the Cascade powerhouse and the associated mill facilities. We request that the EIS, when finalized, incorporate the provisions of the draft Programmatic Agreement prepared in consultation with the State Historic Preservation Officer and FERC staff, and filed with the Commission on April 22, 1993.

133. The final programmatic agreement (PA) (between the Commission, the New Hampshire State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation) for managing historic properties likely to be affected the seven hydroelectric projects covered by the EIS may or may not contain portions or all of the provisions contained in the draft PA filed by James River on April 22, 1993.

The DEIS also indicates that the proposed expansion would have adverse impacts on cultural resources because of the modification of Unit 1 in the existing powerhouse, and because of the construction of new

134. Comment is noted.

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CASCADE PROJECT (cont.)

facilities on or near other significant cultural features. James River wishes to clarify that if the proposed Pulsifer expansion is not pursued, these adverse cultural impacts would be eliminated.

3. **Aesthetics**

The DEIS recommends that James River prepare and file a plan "to protect the aesthetic and public access of the shoreline within 200 feet of the Cascade, Gorham, and Shelburne impoundments' and bypassed reaches' normal maximum surface elevations." (DEIS pg. 4-47).

James River objects to this unprecedented recommendation to acquire large tracts of land around these projects. As far as James River has been able to ascertain, no relicense applicant in the history of the Commission has been required to establish such extensive buffer strips. Further, not one resource agency nor any local governmental entity has recommended the establishment of any buffer strip. Apparently, the buffer strip recommendation was prompted by the Conservation Law Foundation, *et al.* (CLF), which requested immense buffer zones in its filings. However, it is inappropriate to resolve such a resource issue by arbitrarily adopting a percentage of an intervenor's request. NEPA recommendations must be based on substantial evidence showing a need for the measures, and the DEIS does not establish a need for 200-foot-wide buffer strips.

According to the DEIS, the buffer strips are needed to protect public access and aesthetics. However, the public access measures proposed by James River, together with the recreational measures recommended in the DEIS (which James River does not oppose), will ensure sufficient public access at these projects during the new license terms (DEIS, §4.2.3). There is also no "aesthetic" need for the 200-foot-wide buffer strip. While a 200-foot-wide buffer strip for aesthetic reasons may be more appropriate for projects located in wilderness areas

135. See response comment 37.

untouched by man, of which there are hundreds of miles of river and lake shoreline near the projects, they are inappropriate and unnecessary in the heavily developed area of James River's projects.

The DEIS also relies on Order No. 313 to support its recommendation (DEIS, pg. 4-47, footnote 8). However, Order No. 313 merely established 200 feet as the upper limit on buffer strips, not as a "rule-of-thumb" for all projects. Further, the purpose of the buffer strips discussed in Order No. 313 is to enhance recreation. However, as just explained, James River's projects will fully meet recreational demands in the project areas for the term of the license. Therefore, the DEIS' reliance on Order No. 313 is misplaced.

Finally, James River notes that the DEIS, by recommending 200-foot-wide buffer strips, may have a chilling effect on the owners of the property within the proposed strips. Given the DEIS recommendation, the ability of these land owners and their Towns to freely plan for the use of their property may be hindered. In fact, the DEIS conflicts with the approved master plans that were prepared by Berlin, Gorham and Shelburne under existing state and federal regulations. Also, by changing the tax classifications of the affected lands, such a buffer strip could also reduce property tax income to these towns. James River recommends that the final EIS eliminate the recommendation to investigate buffer strips.

Based on the conclusion that the project would have moderate short and long-term adverse impacts on aesthetics, the DEIS also recommends aesthetic measures proposed by James River, including a one-time payment to the Town of Gorham for landscaping and additional screening of the proposed structures. These mitigation measures would not be justified if the Pulsifer expansion is not pursued, since there would be no adverse impacts.

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CASCADE PROJECT (cont.)

B. Power Resources

James River has reevaluated the economics of the proposed Pulsifer expansion to determine the impacts associated with the recommendations contained in the DEIS. The DEIS estimated that the proposed expansion would yield an internal rate of return of 10.94% as proposed by James River. The DEIS analysis was based on industry averages for operating and maintenance costs and a 16% discount rate. James River's similar analysis was updated using 1993 levelized power values, James River's average operating and maintenance costs and an 18% discount rate. Based on our re-evaluation, the expansion proposed by James River would produce power at $172/MWH, (a 14.3% rate of return). The impacts of the modifications proposed in the DEIS are discussed below.

1. Fish Resources

a. *Minimum Flows*

The DEIS recommends a 100 cfs minimum flow release in the upper bypass The DEIS estimates that this minimum flow release would reduce generation by 4,610 MWH, which increases the cost of the power to $177/MWH, and provides a 13.4% rate of return.

b. *Fish Passage*

The DEIS recommends installation of a downstream fish passage, and conservatively estimates the costs of constructing the facilities at $140,000, and the corresponding energy loss at about 630 MWH. No provisions were made for operating and maintenance costs at the facilities in FERC's economic evaluation. This measure would further increase the cost of energy to $178/MWH and reduce the rate of return to 13.2%.

136. We note James River's economics results and confirm that in our analysis we also derived a power value of about $174/MWh for the expansion of the Cascade powerhouse and the Pulsifer Rips development. However, we would like to clarify that we used a 11% discount rate, instead of the 16% discount rate which James River has quoted. We think that much of the confusion of James River's concern in this comment is attributed to a typo in Table 2-5: "Basic assumptions for James River's alternative power costs". The conclusion of this table should read "RESULTS: Levelized alternative power cost (1994$)" (and not "value"). The data and results in Table 2-5 are based on information, provided by James River (FAX, 1993), for the avoided cost of purchased power which the company buys from Public Service. For more detail, please see the support for calculations attached to each of the individual project's "Safety and Design Assessment" in the Commission's public files.

137. Regarding the additional operation and maintenance costs at the facilities with new trashracks, we have corrected our economic analysis to include this cost. The results are reflected in Tables 2-7, 5-1, A-1, and A-2.

2. Aesthetics

An aesthetic buffer zone to screen the project structures was proposed by James River. The DEIS further recommends that James River investigate the feasibility of adding a 200-foot-wide buffer zone around the entire project. Contrary to assumptions mode in the DEIS, James River and its parent company only own a portion of the land that would be within the 200 foot zone. Using the valuation method described in the DEIS indicates that the buffer zone could cost as much as $57,000. This modification will have a negligible impact on the project financing, but could add to the project costs.

The above analysis shows that the cost of producing power at the proposed Pulsifer expansion with the recommendations in the DEIS does not compare favorably to the 50-year levelized annual cost of purchased power shown in the DEIS ($162/MWH). In fact, decreased power rates following submittal of the Pulsifer application may make James River's expansion proposal infeasible under current conditions.

138. See our response to comment 30. We are not recommending that James River be required to purchase in fee a 200-foot-wide buffer zone around the entire reservoir. Criteria for selecting the appropriate width of the zone need to be developed. Three major factors would reduce the cost of establishing a buffer zone: (1) James River already owns some of the shore land; (2) less-than-fee- purchases can be used rather than fee title purchases; (3) in some areas, local zoning ordinances that protect shore land are already in effect which may negate the need for James River to obtain land rights; and (4) due to shore terrain and topography, it may not be necessary to obtain land rights to a 200-foot-wide zone.

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III. *GORHAM PROJECT*

The DEIS also recommends significant modifications to James River's proposals for the Gorham expansion. If a new license were issued that incorporated all the modifications recommended by the DEIS, the proposed expansion would not be feasible, thus negating the potential benefits of the project. Key power and non-power resource issues related to the feasibility of the expansion are discussed below.

139. Comment is noted.

A. Non-Power Resources

1. Fish Resources

a. *Minimum Flows*

James River proposed a 50 cfs minimum flow release that would, as noted in the DEIS, protect and enhance trout located in the project bypass, adding significant enhancements over existing (baseline) conditions (6 cfs). Because of economic constraints placed on the project, James River proposed a phased approach providing a higher minimum flow that optimizes fish habitat when angler demand increases in the area.

The DEIS recommends the flow that optimizes habitat for all trout life stages (400 cfs from March 1 through June 15, and 200 cfs for the rest of the year). This approach overlooks the value of the existing environment, focusing instead on maximizing the fishery resource to the detriment of the project. We request that the final EIS reconsider this flow recommendation in favor of the alternative flows discussed below. James River also notes that the New Hampshire Department of Environmental Services, its July 13, 1993 comments on the DEIS, recommended that the final EIS consider such an alternative flow.

140. Comments are noted. See section 4.2.3.1 for a discussion of alternative minimum flow scenarios.

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b. *Alternative Minimum Flow Analysis*

FERC's assessment of alternatives did not include providing a flow release that involved a 400 cfs flow from March 1 through June 15, and a 75 cfs flow during the remainder of the year. This alternative would have a far less severe impact on James River's generation, but would match or exceed the habitat values contained in the agency recommendations. The following paragraphs briefly analyze such an alternative minimum flow scenario.

A 400/75 cfs minimum flow release at Gorham would yield between 70 and 100% of the maximum habitat available for all species and lifestages. The 400/200 cfs flow also yields 70 to 100% of total habitat. In fact, a 400/75 cfs flow regime would provide greater total habitat for all non-spawning life stages of rainbow trout (785,000 square-feet total habitat area [THA] *vs.* 772,000 THA) and only 7.4% less brown trout habitat (551,000 THA *vs.* 595,000 THA). Additionally, the 400/75 cfs actually provides 4% more brown trout THA if nose velocities are considered. This flow regime would have virtually no difference from the 400/200 cfs flow, and should clearly promote the NHF&G's management goal to develop self-sustaining trout populations in the reach.

Additionally, James River believes that sustaining optimum habitat benefits river management very little in a reach that is not expected to see any significant recreational use. In this case, optimizing the habitat in the bypass is not as practical as protecting and enhancing the habitat to begin establishing self-propagating populations. The 400/75 cfs flow fully considers the existing and future environment, but within the constraints of existing project economics.

141. Comments are noted, see section 4.2.3.1.

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Since the alternative flow would provide a relatively high percentage of the available suitable habitat, we request that the final EIS recommend the alternative flow release of 400/75 cfs, or that FERC request additional modeling of other alternative releases (*e.g.*, 400/50 cfs) that may meet resource objectives for this reach.

c. *Fish Passage*

The USFWS recommended a fish bypass for the Gorham Project. The DEIS agreed with the recommendation on the basis that "[i]ncreasing tha flows to the powerhouse (by increasing the proposed hydraulic capacity by 500 cfs) and decreasing the occurrence of periodic spillage (down from 32 percent to 18 percent) would likely result in increased fish entrainment rates as fish would have less available options for bypassing the project turbines." Based on the reasoning in the DEIS, such a fish passage facility would not be justified if the proposed development were not pursued.

142. Comments are noted.

2. Aesthetics

The DEIS recommends that James River investigate the feasibility of maintaining a 200-ft-wide buffer zone around the Gorham Project. Based on the reasoning advanced above under our discussion of the Cascade Project, James River urges the preparation of a final EIS that eliminates this recommendation.

143. See response to comment 37.

B. Power Resources

James River has reevaluated the economics of the proposed Gorham expansion to determine the impacts associated with the recommendations contained in the DEIS. The DEIS estimates that the proposed expansion would

144. See comment 136.

yield an internal rate of return of 13.5% as proposed by James River. The DEIS analysis was based on industry averages for operation and maintenance costs and a 16% discount rate. James River's similar analysis, which uses James River's average operating and maintenance costs and an 18% discount rate, shows that the proposed expansion would produce power at $133/MWH, (a 16.8% rate of return). The impacts of the modifications proposed in the DEIS are discussed below.

1. **Fish Resources**

a. *Minimum Flows*

With the 400/200 cfs spill option currently recommended in the DEIS, FERC estimated that the power produced by the project would be reduced by 2,500 MWH annually. This alternative would also require construction of a bridge over the bypass to provide access to the powerhouse, at a cost of about $50,000 (1993$). Under these assumptions, the proposed unit would produce power at $218/MWH (8.8% rate of return).

b. *Fish Passage*

The DEIS recommends the installation of downstream fish passage facilities, and estimates the costs of constructing the facilities at $530,000, and the corresponding energy loss at 580 MWH. FERC estimates that construction of the fish passage facilities would reduce project benefits by $105,000 annually, but no provisions were made for operation and maintenance costs at the facilities in FERC's economic evaluation. Even with no annual costs, this measure will reduce the project's rate of return to 5.2%, and increase the cost of the power production to $306/MWH.

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2. Aesthetics

The DEIS recommends that James River investigate the feasibility of adding a 200-ft-wide buffer zone around the entire project. Using FERC's costing method indicates that the buffer zone could cost as much as $59,000, which is a significant cost for this small expansion. This modification will further increase the cost of producing the power to $313/MWH (a 5.0% rate of return).

3. Alternative Minimum Flows

If the project were licensed as modified by the recommendations in the DEIS, its cost of power would be $313/MWH, which can not compete with alternative sources. If a license were issued containing James River's recommended alternative 400/75 cfs minimum flow release and the other recommendations of the DEIS regarding buffer zones and fish passage, the project would produce power at $166/MWH (a 12.4% rate of return). Eliminating the buffer zone requirement would further reduce the cost of power to $163/MWH for a 12.7% rate of return. This alternative could more closely compare to the 40-year levelized annual cost of purchased power referenced in the DEIS ($158/MWH).

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IV. *CONCLUSION*

The DEIS (pg. 1-1) correctly notes that, "[t]he Pulp and paper products industry is highly competitive and energy-intensive. James River [Paper Company's] competitive position depends heavily on the availability of low cost electric power." As the paper company's principal supplier, James River constantly strives to minimize power costs, in order to address the continuing need for reliable, cost-competitive power. The proposed Cascade and Gorham expansions are two of a number of options currently being analyzed. The projects must compete with power sources that are currently providing energy at a cost of $60/MWH or less and that have levelized annual costs of about $160/MWH for the proposed license terms.

Analysis of the non-power issues at these two projects investigates enhancements of cultural resources, short and long-term aesthetic resource values, minimum flows, downstream fish passage, and buffer zones. Analysis of the power resources includes costs associated with providing those enhancements.

In consideration of both the power and non-power issues, the current analysis indicates the proposed and modified Cascade and Gorham expansions do not produce power at a competitive rate and can not economically sustain the requested enhancement measures. While James River is committed to being responsible stewards of the resources which it affects, its need to help sustain and enhance its competitive position with cost effective sources of power renders the modified expansions potentially infeasible under the enhancement measures proposed in the DEIS.

145. Comment is noted.

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August 10, 1993

Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

re: Draft Environmental Impact Statement - Federal Energy Regulatory Commission Relicensing of Seven Existing Projects in the Upper Androscoggin River Basin, New Hampshire

Dear Ms. Cashell:

The Environmental Protection Agency in accordance with its responsibilities under the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and Section 404 of the Clean Water Act (CWA) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed relicensing of seven existing hydropower projects in the Upper Androscoggin River basin in New Hampshire.

According to the DEIS the Federal Energy Regulatory Commission (FERC) is proposing to relicense the Sawmill, J. Brodie Smith, Cross, Cascade, James River Gorham, Public Service Gorham and Shelburne Hydroelectric projects in the Androscoggin River Basin near Berlin, New Hampshire. The proposed relicensing actions include relicensing with no project or operational changes at the Cross facility; planned releases of minimum flows into the bypassed reaches of five of the dams; construction of an additional intake structure, penstock, and powerhouse in an area known as Pulsifer Ripe at the Cascade project; and raising of the reservoir level by 1.7 feet at the Shelburne project.

In this letter, EPA provides comments to FERC on specific concerns regarding the project's potential adverse impacts to water quality, wetlands, and wildlife resources. Additionally, we discuss our concerns about the scope of analysis and range of alternatives considered in the DEIS. Our comments include recommendations for the Final EIS's (FEIS) evaluation of potential project impacts and mitigation measures to offset adverse impacts. EPA appreciates the efforts of FERC to coordinate the preparation of this DEIS with the state and federal resource agencies and we are available to work with FERC to assure that the concerns we've raised in this letter are addressed adequately in the FEIS.

146. No response required.

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Scope of Analysis

In our November 23, 1992 scoping letter we recommended that FERC expand the scope of the EIS from the 8 projects identified in FERC's original scoping document to all proposed and existing hydropower projects on the Androscoggin River. EPA is concerned by FERC's decision not to include, at a minimum, the headwater reservoirs located upstream of the Upper Androscoggin projects. EPA disagrees with FERC's statement in the DEIS that "no action with respect to the Upper Androscoggin projects being considered in this EIS would affect the headwaters reservoirs" (page 4-22).

The upstream reservoirs allow for regulation of the Androscoggin River and make it possible to provide uniform year around flows. As decisions regarding the Upper Androscoggin projects are based on the assumption that uniform flows will be provided over the life of these licenses, reservoir management is an integral part of the Upper Androscoggin project operations. Therefore, EPA believes that the EIS should include an evaluation of the management of flow releases from these reservoirs, an evaluation of what effect alternative flow release regimes would have on the proposed projects and whether these release regimes are reasonable and less environmentally damaging, practicable alternatives. Additionally, the FEIS should discuss the corresponding environmental impacts from these alternative flow releases.

The CEQ regulations (§1508.7) require that the EIS include an analysis of cumulative impacts of past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes the action. As we stated in our November 23, 1992 scoping letter to FERC, we believe a basin-wide analysis is necessary to adequately assess the cumulative impacts to the Androscoggin River. Although FERC maintains that the relicensing and NEPA processes are inextricably intertwined, we believe FERC's proposed approach of delaying analysis of cumulative impacts for these reasonably foreseeable actions until completion of the relicensing process is inconsistent with the requirements of both NEPA and §404 of CWA. Therefore, EPA again recommends that the FEIS include a basin-wide cumulative impacts evaluation.

Alternatives

The Council on Environmental Quality regulations implementing NEPA at 40 CFR §1502.14(a) require a rigorous exploration and evaluation of all reasonable alternatives, while §230.10(a) of the 404(b)(1) guidelines implementing §404 of CWA provides that only the least environmentally damaging practicable alternative be permitted. Reasonable (NEPA) and practicable (§404) alternatives are those which are available and feasible from the technical and economic standpoint; they are not limited to those that are desirable from the standpoint of the applicant.

EPA believes that the DEIS does not adequately address a reasonable range of alternatives to the proposed action. While the DEIS

147.

147. Comment is noted. Reasons for the scope of the EIS are discussed in section 1.3. Further, re-opener articles would make it possible to require changes, should modifications to the Upper Androscoggin projects become necessary based on subsequent environmental analysis of upstream projects in the basin.

148. We considered three major alternatives: (1) the projects as proposed; (2) the projects with staff's additional mitigation or enhancement measures; and (3) no action, i.e. continued operation of the projects as they have in the past.

148. The environmental consequences of alternative (1) are discussed in section 4.1 and the consequences of alternative (2) are discussed in section 4.2. Alternative (3), the no action alternative, would result in maintaining the existing environment, described in section 3. Both the Executive Summary and section 5.15.1 list the environmental impacts and enhancements that would result from the alternatives.

dismisses several alternatives as unreasonable, it fails to provide any substantive discussion documenting why these alternatives (e.g. dam removal, annual license renewal) should not be considered reasonable or practicable alternatives. Similarly, the DEIS fails to demonstrate that the preferred alternative, relicensing the seven dams as proposed in the DEIS, is the least environmentally damaging alternative. In fact, the DEIS does not discuss the environmental impacts associated with any of the other alternatives considered.

In addition, the DEIS compares the costs and lost generation of power associated with increasing minimum flows, construction of fishways, and purchasing land buffers as potential "environmental enhancement options." While the Section 404(b)(1) guidelines do allow applicants to take cost into consideration when determining the least environmentally damaging alternative, a mere increase in cost does not render a particular alternative impracticable.

EPA recommends that the FEIS explore energy conservation as an alternative to the proposed relicensing. The DEIS states that hydropower is "environmentally sound" and, along with energy conservation, should be developed to the maximum extent possible as an alternative to energy generation from fossil fuels. However, the DEIS states that energy conservation and hydropower generation are not mutually exclusive, therefore they are not considered to be alternatives to each other. While it may be correct that fossil fuels are less "environmentally sound" than hydropower, the DEIS fails to acknowledge that hydropower is not without adverse impacts to the environment. Therefore, the most "environmentally sound" alternative may be the reduction of energy requirements by maximizing the efficient use of energy. While conservation may not alleviate the need for all seven dams, it may allow the applicants to forego the new powerhouse at Pulsifer Ripe, abandon the proposal to raise the Shelburne reservoir, or allow an increased minimum flow to be released at the other dams. Given the adverse environmental impacts associated with the proposed projects, the FEIS must give these alternatives greater scrutiny.

149. Comment is noted. As discussed in section 5.1, implementation of the recommended alternative would result in substantial environmental enhancement. See also our revised discussion of energy conservation as an alternative in section 2.4 and our comment 22.

Water Quality

EPA believes the proposed projects may violate the Class B water quality standard assigned to this stretch of the Androscoggin River. In fact, the DEIS states that FERC agrees with EPA's concern over possible violations of Maine's water quality standards for dissolved oxygen (DO) concentrations, asserting that "[c]ontinued operation of the projects along with proposed new developments could cumulatively affect DO levels downstream of the project" (DEIS, p. 4-28). The DEIS proposes only to provide for monitoring of the downstream DO levels, and to modify the project operations if DO violations occur. Section 230.10(b) of the 404(b)(1) guidelines prohibits issuance of a Section 404 permit if the proposed discharge would cause or contribute to a violation of any State water quality standard. Therefore, the proposed projects would likely not be in compliance with the 404(b)(1) guidelines and

150. The EIS does state that the continued operation of the projects along with proposed new developments could cumulatively affect DO levels downstream of the project (see sections 3.1.3, 4.1.2.7, and 4.2.2.4). However, James River and Public Service would be required to not only monitor downstream DO levels to ensure compliance with state water quality standards, but also to develop a plan of mitigative action should DO violations occur. The plan would likely involve a step-wise plan, including provisions to re-route flows, stop project generation, and/or take other actions necessary to immediately return water quality to within state standards for New Hampshire and Maine.

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any proposed discharge of dredged or fill material to waters of the United States would not be permitted.

Additionally, EPA is concerned that dissolved oxygen data cited in the DEIS may not accurately reflect the conditions on this stretch of the Androscoggin River. In our comment letter to FERC on the Shelburne project (FERC Docket No. 2300), dated January 15, 1993, we identified several issues of concern regarding the applicant's evaluation of DO. In March, 1993, James River submitted a supplemental report on DO (Kleinschmidt Associates, 1993). This report contains the result of additional model runs for alternative BOD (biological oxygen demand) loadings from the Cascade and Burgess mills and a recalculation of ultimate BOD (UBOD) to BOD5 rations. This supplemental report does not provide sufficient information for EPA to determine whether our concerns regarding the addendum to the applicant's original water quality report (KA, 1991) are addressed. Specifically, we need the opportunity to review model input data, and model calibration and model verification data in order to evaluate the assumptions and outputs of the March, 1993 submittal. In addition, EPA believes that additional documentation supporting the revised UBOD to BOD5 ratios is necessary.

EPA does not believe the 25,600 lbs/day alternative BOD loadings from James River's paper mills utilized in the supplemental report is an appropriate value for the DO model. While 25,600 lbs/day is the limit contained in the discharge permit issued by EPA on June 10, 1992 (NPDES No. NH0000655), the discharge permit has not gone into effect as James River appealed the permit on July 9, 1992 with its request for an evidentiary hearing. Currently, the permitted discharge of BOD from the Burgess and Cascade Mills is 27,000 lbs/day at paper production levels of less than 1063 tons and 31,000 lbs/day at paper production levels of greater than 1063 tons. Therefore, to model critical flow DO concentrations, EPA recommends that the 31,000 lbs/day value be used in the DO model.

EPA believes the DEIS does not include an adequate analysis of the relationship between project operations and levels of 2378-TCDD (dioxin) in sediments and aquatic organisms, and human health. As is noted in the DEIS, it is likely that dioxin, produced as a result of the production of bleach kraft paper pulp, has accumulated in reservoir sediments trapped behind dams. However, the DEIS states (page 5-2) that run-of-river project operations and minimal impoundment level fluctuations restrains dioxin and other toxic contaminants at their present locations and controls resuspension and transport downstream. Additionally, the DEIS states (page 4-49) that "recommended measures would not affect the existing dioxin levels found in fish below the project area." These conclusions appear to be in contradiction to the fact that under current operating regimes, dioxin has accumulated in aquatic life (possibly having traveled up the food chain from the sediments) at such concentrations that a State health advisory recommends restrictions on the consumption of fish from the Androscoggin River downstream of the James River mill (page 3-4).

151. 151. The March 1993 submittal containing the results of the alternative BOD loadings from Cascade and Burgess mills differs only slightly from the original model (KA, 1991). KA clearly defined which variables of the input data were altered, and the model did not need to be recalibrated or verified. In essence, KA further refined the model to reflect changes in the system (i.e., loadings and potential low river flow), thus more accurately predicting the expected water quality.

152. We agree that the permitted BOD loadings do make a difference in the overall outcome of the model, and whether or not violations are predicted below Shelburne. Our final recommended mitigative measures do consider this issue.

152. 153. As stated in responses to comments 17 and 122, the seven hydroelectric projects examined in the Upper Androscoggin River do not produce, originate, or discharge dioxin into the Androscoggin River. EPA's comment is correct that continued existence of the dam (even in the absence of hydropower operation) would continue to trap sediments and potentially concentrate toxic pollutants. Our recommended action would result in a cumulative impact in conjunction with continued inputs

153. of dioxin from the paper plants, in that for the present and foreseeable future the dams would continue to trap sediments. Given the existing contamination levels in the river (and without knowledge of what the system would be like if the sediment-bound dioxin was allowed to move freely downriver), we concluded that continued operation of the hydroelectric facilities was the best available option. That is, given the existing contamination of the forebay sediments, continued sequestering of dioxin in these sediments is advantageous to flushing them downriver.

EPA believes that the FEIS should address the potential relationship between project operations and the accumulation of dioxin in fish tissue and evaluate alternative operations that would minimize those impacts.

The need for additional dioxin analysis is particularly acute for assessing the potential impacts associated with the proposed Pulsifer Ripe development. The DEIS (page 4-51) states that an increase in water turbidity would be associated with the construction of the proposed development, potentially resulting in the resuspension of dioxin contaminated sediments. EPA recommends that the FEIS include an analysis of the concentrations of dioxin in the sediments that will be disturbed as a result of the construction of the Pulsifer Ripe development and evaluate the potential impact of this sediment resuspension on water quality, aquatic life and human health. The FEIS should also discuss erosion and sediment control measures to be implemented to prevent or minimize the possible resuspension of sediments.

154.

155.

Wetlands

EPA is concerned with the project's potential impacts to wetlands, riffle and pool complexes, water quality and fish and wildlife resources. Although the DEIS does not discuss whether a §404 permit for the discharge of dredged or fill material into wetlands or waters is required, it is unlikely that the project as proposed would comply with the Section 404(b)(1) guidelines. Specifically, if a §404 permit is required, the FEIS should demonstrate that the proposed alternative is the least environmentally damaging, and that the project will not violate State water quality standards. Further, it should disclose all potential impacts to resources of environmental concern and proposed efforts to minimize impacts to wetlands and other aquatic resources. Finally, the FEIS should discuss compensatory mitigation to offset unavoidable loss of wetlands and other special aquatic sites.

156.

It is unclear from the DEIS whether the applicant will seek a Section 404 permit for the proposed structures at Pulsifer Ripe. While the DEIS does disclose that construction at Pulsifer Ripe will occur on 27 acres of forested and scrub-shrub area, the DEIS does not state whether that 27 acre impact includes the discharge of dredged or fill material into any waters or wetlands.[1] The FEIS should disclose these impacts, whether the proposed action includes a discharge of dredged or fill material into any waters or wetlands, and whether a Section 404 permit will be required. The DEIS states that the proposed construction area at Pulsifer Ripe has a "kame-and-kettle" or pit and mound topography. In New England, these pit and mound forested areas often contain valuable

[1] Page 4-16 of the DEIS indicates that 0.1 acres of persistent emergent wetland vegetation would be "removed," but it is not clear whether this work will involve a discharge of dredged or fill material.

154. We address the specific erosion control measures to be implemented to prevent or minimize the possible resuspension of sediments (see sections 4.1.1, 4.2.1, and 4.2.2.3). As stated in our response to comment 33, 87, our analysis concluded that the continued operation of the hydroelectric facilities in a run-of-river mode with minimal headwater fluctuations would not appreciably resuspend any existing contaminants presumed trapped in the sediments. We do not, however, quantify the extent of contamination of the sediment at the Pulsifer Rips development, nor discuss the expected impacts should sediment be disturbed by the construction activity.

We would speculate further, however, that since much of this dioxin would already be sediment bound, the presence in the water column would be as a suspension only (i.e., it would still be only minimally bio-available to aquatic microorganisms to concentrate as the base of the food chain). Therefore, besides the possibility of redistributing the sediments elsewhere within or below the project area, it is doubtful that there would be any significant impact, given the already high levels of dioxin contamination in and below the project area.

155. James River's proposed erosion and sediment control measures are presented in the plan filed with the application, and discussed in section 4.1.1.

156. There is no proposal to discharge of dredged or fill material to the water.

We disagree that relicensing the seven projects as proposed would result in substantial impacts to wetlands and wetland or water dependent fish and wildlife (see sections 4.1 and 5.1.1). Further, staff's proposed measures would result in additional environmental enhancement in the project area (see sections 4.2 and 5.1.2). No evidence is provided that would alter this conclusion.

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vernal pool habitat. The FEIS should discuss this area in greater detail and disclose whether vernal pools will be affected adversely by the proposed project. Regardless of the necessity of a Section 404 permit, the proposed relicensing of the seven dams as proposed will likely result in substantial impacts to wetlands and wetland or water dependent fish and wildlife.

The proposed actions also include raising the water level of the Shelburne impoundment by 1.7 feet along 2,200 feet of the Androscoggin River. There are approximately 110 acres of wetlands in the vicinity of the proposed projects, 66 of which are associated with the Shelburne reservoir. These wetlands provide good habitat for great blue heron, moose, waterfowl, and other wildlife. The DEIS states that there would be a loss of 1.3 acres of nonpersistent emergent wetland and 10.4 acres of scrub-shrub wetland; there would be a gain of 3.0 acres of aquatic bed wetland, 2.2 acres of persistent emergent wetland, and 2.1 acres of forested wetland. The DEIS also states that there will be a net loss of less than five acres of wetlands due to the proposed Shelburne impoundment.

When evaluating projects under Section 404 of the Clean Water Act, EPA examines the loss of wetland functions and values, and requires an applicant to compensate for any unavoidable losses. Different wetland types provide different functions; for example, a forested wetland may provide excellent wildlife habitat, while an emergent wetland along the shores of a river may provide good flood storage. While most wetlands provide some valuable function, each provides a somewhat unique mixture of functions and values.

In this case, it is highly unlikely that the functions provided by the 10.4 acres of scrub-shrub wetlands that would be inundated by the proposed project could be compensated for by the creation of aquatic beds and emergent wetlands. The scrub-shrub wetlands, contrary to FERC's assumption that they are of low value, likely provide good nesting and feeding habitat for a variety of wildlife species. The species that utilize these scrub-shrub wetlands would not simply relocate to the newly created emergent wetlands; rather, there would be a loss of wildlife habitat for those species that depend on the scrub-shrub areas. Therefore, FERC's statement that there would be a net loss of less than 5 acres of wetland is misleading. EPA recommends that the FEIS assess the functions and values of the wetlands that would be inundated, and examine compensatory mitigation to offset the loss of these particular functions and values.

Other Special Aquatic Sites

Given the description of the free-flowing reach of the Androscoggin above the existing Shelburne dam, it is likely that this reach contains riffle and pool complexes, a special aquatic site under the Section 404(b)(1) guidelines. EPA recommends that the FEIS discuss whether the proposed action will result in the inundation of these riffle and pool complexes. As discussed above in the

As stated in the exhibit E of the application (page E3.2-7), the .1-acre of emergent wetland that would be lost is on the downstream tip of the small island in the impoundment; no filling or placement of dredged material is proposed for this site.

There are no vernal pools in the irregular glacial kame terrace area that would be affected by project construction activities. The deposits are coarse sands and gravels, and the ground surface is well above the water table.

157. There is no proposal at Shelburne to discharge of dredged or fill material to the water. The water level would be raised by installing flashboards which requires no ground disturbing activity (see section 2.1.1).

We recommend, in section 4.2.4, that James River undertake measures to eliminate or minimize adverse impacts or mitigate unavoidable losses to wetlands. Section 4.1.4.1 notes that higher water level elevations could result in more or less wetlands at the project than we predict. James River's proposed monitoring would verify the effect of higher water levels. At the same time, James River provides a monitoring plan they should provide a plan to eliminate, minimize, or mitigate for any loss in wetland habitat value.

158. The inundation of the free-flowing reach and the associated impacts are discussed in section 4.1.3.4.

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general discussion on alternatives, both NEPA and the 404(b)(1) guidelines require that alternatives to the proposed action be evaluated, and that the approved project be the least environmentally damaging practicable alternative. Additionally the impacts to these special aquatic sites, just as for wetlands, must be minimized, and compensation provided for all unavoidable losses of functions and value. The DEIS does not assess the proposed impact to these complexes, nor does it demonstrate that the destruction of these riffle and pool complexes is unavoidable. EPA recommends that the FEIS include a discussion of alternatives to this proposed action, and assure compliance with the 404(b)(1) guidelines.

Wildlife Impacts

The bald eagle and the peregrine falcon, two federally-listed species, and the osprey, a state-listed species, utilize the project area. All three of these birds are water or wetland dependent, and may be adversely affected by the proposed projects. Additionally, a heron rookery exists just upstream of the Shelburne dam.

The DEIS rejects the possibility that the proposed project would adversely impact bald eagles and, also implicitly rejects possible project related adverse impacts for the other avian species found in the area. Specifically, FERC states that "the projects' contribution to exposure of occasional transient bald eagles to contaminated fish during winter, would be insignificant in relation to the rest of the year" (p. 4-18). FERC does not offer any evidence to support this contention, nor does it describe any possible adverse effects on the falcon, osprey, or herons in the area. The FEIS should explain how FERC reached this conclusion, and assess the impacts to other fish-eating birds.

EPA agrees with the FERC recommendations, modifications and additional enhancements with regard to fish passage provisions and minimum flows to support fisheries in project bypasses. EPA believes that implementation of these flows and provision of the facilities to allow for the upstream and downstream passage of fish are consistent with the federal Clean Water Act goal to provide for the protection and propagation of fish and recreation in and on the water (Federal Water Pollution Control Act, as amended, §101(a)(2)).

On the basis of the comments above, we have rated this project "Environmental Objections - Insufficient Information" (EO-2). Please see the attached sheet for a fuller explanation of this rating.

We would be pleased to work with you to assure that the concerns we've raised on the DEIS are addressed adequately in the FEIS. If you have any questions regarding our comments please contact Steven John, Environmental Review, at 617/565-3426, Kyle Bennett,

159. We discuss the relationship between the hydroelectric projects, toxic pollutants, and contaminated fish (*cf.* sections 3.1.3, 3.1.4, 4.1.2.1, 4.1.3, 4.1.3.5). Hydroelectric projects do not generate toxic pollutants. Any toxic pollutants trapped in sediments behind the projects' dams is part of the existing environment. Consequently, any adverse effects to fish eating species resulting from feeding on contaminated fish is not a consequence of continued hydroelectric project operation (see also discussion in section 4.1.3). Toxic pollutants discharged into the ecosystem are best eliminated at the source.

160. On the basis of our responses to the comments above, we believe that sufficient information to fully assess environmental impacts have been provided.

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Wetlands, at 617/565-4436, or David Turin, Water Quality Management, at 617/565-3543.

Sincerely,

Elizabeth Higgins Congram
Assistant Director
Environmental Review

cc: Service List

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United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

AUG 13 1993

ER 93/517

Honorable Lois D. Cashell
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Ms. Cashell:

The Department of the Interior wishes to amend its comments of August 6, 1993, on the draft environmental statement (DEIS) for the Upper Androscoggin River Basin Hydro Projects in Maine. We have those additional comments and recommendations.

GENERAL COMMENTS

Our National Park Service (NPS) has identified three basic areas where the DEIS is deficient: 1) the methodology used to evaluate the information presented in the applications, 2) the failure of FERC to require additional information from the applicants and to develop new information on issues inadequately addressed by the applicants, and 3) the scope of the information presented in the DEIS.

The methodology used by FERC was essentially a summary of the information presented by the applicants, inclusion of descriptions of the recommendations provided by the intervenors and the conclusion that there will be no impacts on the recreational and other resources, including water quality and fisheries, as a result of implementing the proposed run-of-the-river regime.

Several issues were not addressed by the applicants, and the DEIS failed to develop new information regarding those issues, such as an evaluation of the feasible alternatives to the upper basin water use management scenario, or an attempt to measure or determine appropriate mitigation for the cumulative impacts of this project on the river basin as a whole.

The DEIS asserts that since the dams are already built, the relicencing will cause no change to existing conditions. the DEIS thus fails to evaluate the continuing adverse impacts of the proposed operation of the project and does not require adequate

161. Comment is noted.

162. See our response to comment 27.

mitigation for those impacts. By this omission, the public is not adequately informed of the real impacts of hydroelectric relicensing.

SPECIFIC COMMENTS

Recreation

NPS acknowledges that public access to the river near the projects is limited due to development and safety concerns. There are also limits as to opportunities for onsite recreational enhancements. We are concerned, however, that FERC is considering existing conditions as the baseline for determining the adequacy of recreational facilities and opportunities. FERC's apparent rationale is that because the loss of any current or future recreational opportunities occurred when the seven projects were built, there is no need to consider off site mitigation for continuing impacts (DEIS at page 4-40). NEPA requires that continuing impacts be addressed and mitigated (40 CFR 1502.16).

The DEIS at page 4-41 states that there is no evidence that the public desires additional recreational development at the projects. that statement is made without any analysis and fails to take into consideration the state agency plans which call for increased recreational development and the resource agency comments recommending such development.

Due to the magnitude and nature of the continuing impacts from the operation of the seven projects, it is critical that FERC analyze and require adequate off site, in kind mitigation for onsite impacts. The project area encompasses a major population and tourist center where both flat water and white water and swimming opportunities have been precluded by past hydroelectric development. FERC must take into account the need for mitigating the effects of that continuing impact, and, given the lack of onsite opportunities, must not limit the actual mitigation actions to the project area.

FERC has called for the development of a post-license recreation plan to expand the current access at the James River-Gorham facility. Allowing for such post licensing mitigation plans ignores NEPA and abrogates FERC's responsibilities for providing equal consideration for the impacts of hydroelectric development on all users of natural resources (Federal Power Act, Section 15 and CEQ NEPA Regulations, 40 CFR 1506.10).

Land Protection

Although FERC supports the need for increased project buffer zones to enhance public access and aesthetics and the DEIS states

163. Comment is noted. The statement on page 4-41 of the DEIS regarding the public's desire for recreation facilities, refers to the James River Gorham Project, not all the projects. Recreational enhancements are proposed and recommended at the other projects. Also, see section 4.2.7 and our response to comment 28.

164. See response to comment 37.

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at page 4-46 that site specific criteria should be developed prior to determining the actual buffer zones, FERC made an apparently arbitrary decision to request development of a post-licensing shorelands protection plan that only covers 200 feet at the Shelburne, Gorham, and Cascade reservoirs.

The 200 foot figure is derived from a 1965 Commission order which established 200 buffer zones as a standard. Since that time there have been significant changes in both development pressures and scientific understanding of buffers. It would therefore appear appropriate for FERC to develop a new standard of protection and to require the establishment of permanent buffer zones as a condition of licensing. This is especially critical due to the recent sale by James River Corporation of a major portion of its high quality lands within the watershed to the John Hancock Corporation, which may have a different set of priorities and constraints regarding the use of these lands.

The DEIS did not address the adequacy of existing land protection measures surrounding the projects and especially the reservoirs. FERC was apparently concerned that no information was provided as to the likelihood of development of shorelands in the project area or as to current pressures, but did not examine this issue by developing information to answer this critical question.

The DEIS did not investigate the capability of the James River Corporation to provide off site mitigation for continuing impacts to water quality, wildlife, ecological, and recreation resources by protecting littoral zones that it owns at other locations in the watershed. There was no attempt by FERC to investigate ownership patterns to determine if protection of critical lands would actually cost the company less than projected, even though FERC acknowledges that the James River Corporation owns substantial lands within the watershed. It is apparent that FERC looked only at the cost factor when attempting to set buffers and in rejecting the buffers recommended by a Coalition of Intervenors (Coalition) referred to in the DEIS as Conservation Law et al (DEIS at page 4-47).

Note also that recent land exchanges and sales indicate that the cost per acre may be lower than the figure provided by the Coalition.

<u>Comprehensive Plans</u>

The DEIS states at page 5-7 that the projects are consistent with twelve listed comprehensive plans without any justification for that statement. There is no analysis of the goals and provisions of these plans. The DEIS has not provided a meaningful review as to the project's level of conformity with those plans as is required by Section 10(a) of the Federal Power Act.

165. See response to comment 32, 51.

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The No Action Alternative

The DEIS has defined the "no action" alternative as no change to the existing environment (DEIS at page 2-13). This definition is not entirely accurate. To allow the current conditions to continue would result in a continuing adverse impact, resulting in a change to the existing environment.

166. Comment is noted.

Other Alternatives

The only alternatives to the respective applicant's proposals analysed in the DEIS were Federal takeover, issuance of an annual license and issuance of a non-power license (DEIS at page 2-13). Meaningful alternatives to the operating regime proposed by the applicants exist and must be considered in order to meet the requirements of NEPA (40 CFR Part 1502.14).

FERC did not consider any other operating scenario, nor did it consider energy conservation as recommended by the Coalition. FERC stated at page 2-13 that it believes the "energy conservation and utilization of environmentally sound hydropower...used to be developed to the maximum extent possible as an alternative to energy generated from fossil fuels". FERC further stated that it does not consider energy conservation and hydropower generation to be alternatives to each other. In the same paragraph, FERC acknowledged the value of energy conservation, stated that it is a viable alternative to fossil fuels and yet rejected it as an alternative hydropower. This constitutes not only a gap in logic, but a lack of understanding of the spirit and letter of NEPA which requires a meaningful analysis of alternatives (40 CFR Part 1502.14).

167. See our responses to comments 22, 23, and 27.

FERC analysed impacts of increased minimum flows by calculating the cost of replacement power. That is a valid comparison, but it fails to also compare the impacts of those increased minimum flows with the impacts of energy conservation. Therefore, the entire analysis performed by FERC is incomplete. Section 4(e) of the Federal Power Act specifically requires equal consideration of energy conservation.

168. See comment 22.

The DEIS should have considered the relationship between all the various resources in the entire basin under alternative flow regimes and water levels in the headwater lakes and upper basin area. Such a methodology was required by FERC of New England Power Company on the Deerfield River (FERC No. 2323) using the HEC-5 model. This methodology allows for an evaluation of the costs and benefits of moderating the flow regime to determine impacts on economic and resources.

169. See our responses to comments 14 and 18.

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The current flow regime results in serious impacts to the basine resources, which at a minimum, should be quantified, and mitigated. This ignores the requirement of Section 4(e) of the Federal Power Act that FERC give equal consideration to power and non-power values (see also 40 CFR 1502.14(f)).

Cumulative Impacts

The DEIS looks at the impacts of seven projects that are clustered together, but fails to look at other projects on the river, including the headwater storage projects. All are interdependent upon each other. Therefore, the DEIS does not provide a meaningful cumulative analysis of impacts on a basin-wide level. At page 4-22, the DEIS states that actions taken now with respect to the Upper Androscoggin projects will not constrain future decisions regarding the operation of the headwaters projects. The DEIS further states that no actions taken with respect to the projects being considered in the DEIS will affect the headwater reservoirs. This reasoning constitutes a major gap in the "cumulative" analysis attempted by FERC.

FERC is required to ensure that relicensed projects are "best adapted" to existing comprehensive plans for improving a waterway. The DEIS should be the document wherein FERC develops such a comprehensive plan. The projects being considered in the DEIS are operationally dependent upon the headwater reservoirs, and any change in the operations at one and impacts operations at the other, and throughout the river basin. The DEIS has failed to consider how the seven projects should be managed to optimize natural resource and energy values in the entire river basin. The DEIS cannot be called cumulative because it takes a tunnel vision approach. Any conditions imposed upon the operation of the seven projects in the context of thirty year licenses will severely constrain the management of the headwater lakes. When some of these licensed projects come up for relicensing or initial licensing, the conditions imposed at those times will be dependent upon the conditions imposed on the seven projects today.

The DEIS at pages 4-1 to 4-5 does mention some of the impacts associated with fluctuating water levels, it fails to examine these impacts in the headwater lakes. Those impacts are directly related to the seven project's current and proposed operating regime and should be analyzed as indirect, cumulative impacts. The DEIS also fails to analyze the cumulative impacts of fluctuating water levels on any resources other than fisheries and water quality. There is no analysis of the impacts on recreational boating and fishing, cultural resources, wildlife or wetlands.

170. See our response to comment 18.

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Conclusion

Instead of focusing on requiring separate mitigation for each of the seven projects evaluated in the DEIS, FERC should look at how an overall mitigation package for the river basin can best serve the needs of the public, the natural resources and the applicants. FERC, by undertaking a comprehensive look at the Upper Androscoggin River Basin through its preparation of an EIS, has the opportunity to take a truly comprehensive look at the impacts of these seven projects on the river as a whole.

FERC should require the James River Corporation and the Public Service Company of New Hampshire to combine their effort to provide coordination of flows to protect and enhance the natural values present in the Androscoggin River and to develop a meaningful plan to protect riparian habitat in the river basin. To require less than this will have resulted in a lost opportunity to provide a comprehensive protection strategy for the Upper Androscoggin river Basin.

Sincerely,

for Wilbur K. Tyler

Jonathan P. Deason
Director
Office of Environmental Affairs

171. Comment is noted.

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1) PICK OUT THINGS ~~[illegible]~~ NOT NEEDED

- PROVIDE RATIONALE FOR NEEDED / NOT NEEDED

- 1) MIN FLOWS - ROR
  2) FISH PASSAGE - COSTS
  3) H_2O QUALITY (?)

2) WHAT WOULD LICENSE LOOK LIKE

Document Content(s)

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