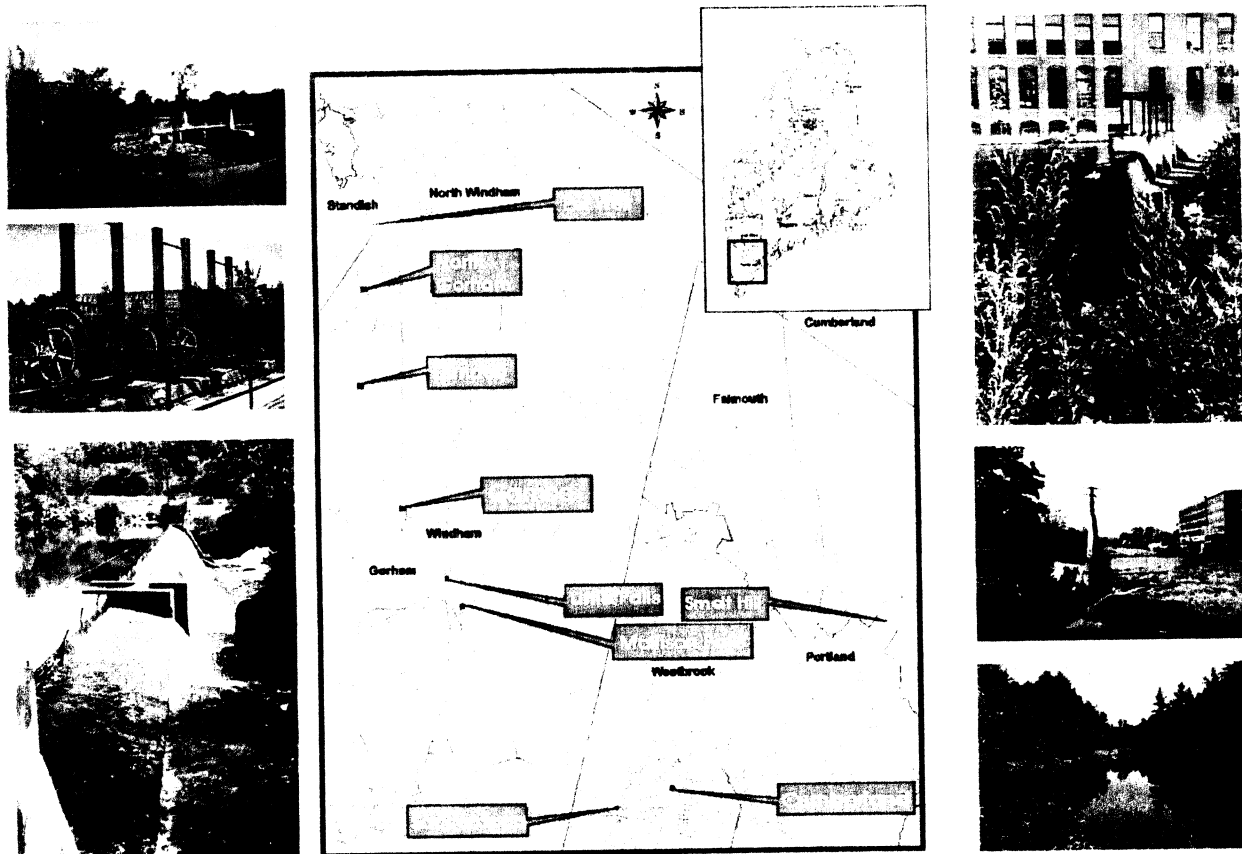


PART 2042



**Federal Energy Regulatory Commission
Office of Energy Projects**
June 2002

Final Environmental Impact Statement (FERC/FEIS-0139F)



**Presumpscot River Projects
Maine**

**Dundee Project (FERC Project No. 2942)
Gambo Project (FERC Project No. 2931)
Little Falls Project (FERC Project No. 2941)
Mallison Falls Project (FERC Project No. 2932)
Saccarappa Project (FERC Project No. 2897)**

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Smelt Hill dam may be removed, which would likely have a positive effect on eel migration in the river along with the proposed enhancement measures.

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Anadromous Fish

As described above, the construction of dams within the Presumpscot River Basin, along with other factors such as water pollution and overfishing, has eliminated anadromous species from most of the Presumpscot River Basin where they once occurred.³⁵ Only a relatively small run of river herring (primarily alewife) and a remnant population of American shad remain in the lower river downstream of the Cumberland Mills dam. The sea-run Atlantic salmon, which once occurred in the basin (although again the precise distribution is not known), no longer occurs in the basin, except for occasional reports of individuals whose origins are unknown.

Recent efforts to restore anadromous species to the river have included the construction of fish passage facilities at the Smelt Hill dam and at the outlet to Highland Lake, to allow alewife to spawn in the lake. The facilities at Smelt Hill, however, were destroyed in a 1996 flood. Since that event, some fish passage has occurred via the sluice gates (which have been left open) or via trucking of alewife by the state of Maine. No other efforts have been made by the resource agencies or any private organizations, although the three state of Maine fishery agencies have recently issued a fishery management plan for the Presumpscot River Basin, that calls for the restoration of anadromous species to the river (Wippelhauser et al., 2001).

These agencies and other parties have recommended fish passage at the dams, and the FWS has prescribed fish passage, pursuant to Section 18 of the FPA. However, no fish passage now occurs at the downstream, nonjurisdictional Cumberland Mills dam. S.D. Warren indicates it has no plans to construct fish passage facilities at Cumberland Mills.

S.D. Warren does not propose any measures for enhancement of anadromous species within the basin, other than to consult with the MASC through the term of the license, to determine any progress in salmon restoration efforts, and potential triggers for construction of fish passage. Staff is also not proposing any immediate measures for the enhancement of anadromous fishes, although is recommending, consistent with agency

³⁵ As described elsewhere in this document, the historical distribution of these species within the basin is not precisely known, and may have been limited by the falls.

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recommendations and the FWS prescription, that construction of fish passage facilities occur at the projects when fish passage is resolved at the downstream dams (probable removal of Snellet Hill dam and provision of fish passage at Cumberland Mills). Once fish passage occurs at Cumberland Mills, we recommend phased development of fish passage at the project dams, beginning with Saccarappa and extending upstream to Dundee dam. Development of fish passage at a specific dam would be contingent upon the successful passage of fish at the next downstream dam, as measured by specific trigger numbers.

The eventual timing of any fish passage development would depend on the rate of success for passive re-seeding of the basin by remnant stocks, or whether or not the agencies (or private organizations) implement any active restoration programs involving the stocking of adult or juvenile fish. Active programs typically speed up the restoration timetable, compared to passive programs. No agencies or private organizations, however, have yet committed to any active restoration programs for the Presumpscot River.

Based on the current status of the anadromous fish populations in the river (only small populations occur downstream of Cumberland Mills), the existence of migratory barriers downstream of the projects, and the current lack of an active restoration program by the resource agencies, the continued operation of the five projects would not have any cumulative adverse effects on anadromous fishes in the basin. Our recommendation to provide fish passage in the future, once passage occurs at the downstream dams, would also assure that continued operation of the projects would not have any adverse cumulative effects on any programs to restore anadromous fishes to the river. Rather, timely construction of fish passage at the project dams, pursuant to the FWS prescription, would have positive effects on restoration of anadromous species to the Presumpscot River.

4.3.2.4 Unavoidable Adverse Effects

Continued operation of the projects, with all the proposed enhancement measures would enhance fish populations in the Presumpscot River Basin. Resident species would continue to be subjected to minor impoundment fluctuations associated with occasional deviations from ROR operations, potentially affecting fish utilization of shallow, littoral zone habitat. These species would also be subjected to low levels of turbine entrainment mortality, although we would not expect adverse effects on the fish population. Anadromous species do not currently occur in the project areas. If, however, anadromous species are eventually restored to the project reaches of the river, these fish could experience some level of delay and potential mortality associated with the

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operation of the projects and the fish passage facilities (few fish passage facilities are 100 percent effective). Similar potential effects would likely occur with the American eel, although compared to existing conditions with no provisions for eel passage, the passage measures proposed by the applicant and recommended by staff should enhance American eel passage.

4.3.3 Terrestrial Resources

4.3.3.1 Affected Environment

Vegetative Resources

The Presumpscot River is located in the Northern Hardwoods Ecoregion of northern New England. The upper section of the Presumpscot River, between the outlet of Sebago Lake and the Gambo Project, is relatively rural and densely forested. Although mixed hardwood forest and coniferous forest cover types dominate the landscape of the upper reaches, small, isolated areas of agriculture, residential development, open uplands, and palustrine wetlands occur interspersed throughout the riparian zone.

Forested cover types dominate the middle section of the river as well, including the Little Falls and Mallison Falls project areas in the towns of Windham and Gorham. Managed landscapes, more prevalent in this portion of the study area,³⁶ have resulted in the introduction of various fruit trees and hedge bushes to the natural vegetative communities.

Vegetative resources are limited on the lower segment of the Presumpscot River, specifically at the Saccarappa Project, downstream of the Westbrook City line. As a result of the high intensity of development along these reaches of the river, a prevalence of exotic species exists. Narrow stretches of naturally vegetated riparian habitat does

³⁶ The study area is defined as the impoundment, tailwaters, and immediate shoreline of the combined five projects, which encompasses the entire 12-mile stretch of the Presumpscot River from the upstream end of the Dundee Project to the Saccarappa Project tailwaters. The landward boundary of the study area extends from the edge of the river to a variable distance of between 300 and 500 feet horizontally from the river, terminating at logical landmarks, such as roads and railroad tracks, and including 1,225 acres.

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 extend along the river banks, however, and includes some isolated upland forest stands and palustrine wetlands.

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The dominant habitat of the Presumpscot River study area is approximately 60 percent forest, consisting predominantly of mixed hardwood forest and coniferous forest with some smaller palustrine forested wetland areas. Approximately 27 percent of the study area consists of intensively managed vegetated surfaces and impervious surfaces. The remaining, less prevalent cover types include shrub/successional field and non-forested wetlands. Table 43 provides a summary of plant associations in the Presumpscot River.

Table 43. Summary of plant associations in Presumpscot River study area (Source: S.D. Warren, 1999a).

Cover association	Percent study area	Population stratum	Species
Mixed hardwood forest	30	canopy	red oak, red maple, sugar maple, American beech, black cherry, yellow birch, white pine with quaking and big tooth aspen, white ash, eastern hemlock, gray birch, white birch, red pine, basswood
		shrub	beech/hemlock saplings, witch-hazel, striped maple, beaked hazelnut, hobblebush, eastern hophornbeam
		ground	Canada mayflower, bracken fern, bunchberry, purple trillium, wild sarsaparilla, common woodsorrel, spinulose woodfern
Coniferous forest	25	canopy	white pine, eastern hemlock, northern whitecedar, red pine, balsam fir, red spruce
		shrub	hemlock
		ground	wintergreen, starflower, Canada mayflower

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 Table 43: Summary of plant associations in Presumpscot River study area (Source: S.D. Warren, 1999a). **Filed**

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Cover association	Percent study area	Population stratum	Species
Shrub/successional field	9	shrub	quaking aspen, white birch, gray birch, white pine saplings, common juniper, staghorn sumac
		ground	Queen Anne's lace, Canada goldenrod, bracken fern, common milkweed, New England aster, witch grass, hawkweed
Agriculture/maintained field	9	field cover crops	corn, hay, market vegetables, row crops, pasture
		pasture	Timothy grass, little bluestem, blue-joint grass, fescues, clover, New England aster, common lamb's-quarters, common milkweed, wild oats, witch grass, common strawberry, common goldenrod, Queen Anne's lace, thistle

Wetland Resources

According to the Interior's National Wetlands Inventory (NWI), field surveys conducted by S.D. Warren during the 1997 growing season, and staff surveys conducted during late summer 2000, four wetland community types exist within the combined project study area. These include palustrine forested, palustrine scrub/shrub, palustrine emergent, and palustrine unconsolidated bottom. Because of the well-defined, steep river banks which transition abruptly from the normal high water level of the river to well-drained soils, wetlands comprise less than ten percent of the study area. The majority of the existing wetlands within the study area are closely associated with the river, relying on river flooding and/or wicking of river waters as the primary hydrologic inputs. Some wetlands are fed primarily by runoff from the contributing watershed or are located along tributary streams and, therefore, do not rely on flooding of the Presumpscot River for hydrologic input. Table 44 details the cover type, area, and location of wetlands in the project study area.

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Palustrine forested wetlands are the most common wetland cover type found in the study area, comprising more than half of the total wetland cover. Vegetation characteristic of this cover type consists of red maple, American elm, green ash, black willow, tamarack, black spruce, and northern white cedar. Red-osier dogwood, speckled alder, nannyberry, and saplings dominate the midstory, shrub/shrub layer. Jack-in-the-pulpit, mountain avens, dewberry, cinnamon fern, and false hellebore dominate the ground cover. Wetlands of this type are most prevalent between the Mallison Falls and

Table 44. Wetlands in the project study area (Source: S.D. Warren, 1999a).

Project	Cover type	Total acres
Dundee	palustrine forested	2.1
	palustrine scrub/shrub	3.0
Gambo	palustrine forested	1.4
	palustrine scrub/shrub	6.6
	palustrine emergent	5.6
	palustrine unconsolidated bottom	0.6
Little Falls	palustrine forested	4.8
	palustrine scrub/shrub	2.4
	palustrine emergent	0.8
	unconsolidated bottom	0.9
Mallison Falls	palustrine scrub/shrub	1.9
	unconsolidated bottom	0.2
Saccarappa	palustrine forested	48.2
	palustrine scrub/shrub	20.8
	palustrine emergent	7.5
	unconsolidated bottom	0.9
Total		107.7

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Saccarappa dams, with the most extensive area occurring above Saccarappa dam immediately downstream of the River Meadow Golf Course.

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Palustrine emergent wetlands occur in approximately one percent of the study area and are characterized by herbaceous, perennial species such as pickerelweed, wool grass, soft rush, rice cutgrass, rush, three-way sedge, common cattail, rice cutgrass, blue flag, sweetflag, sensitive fern, small bedstraw, nightshade, beggar-tick, Joe-pye weed, and spotted jewelweed. Occasional woody species include buttonbush, speckled alder, black willow, and common winterberry. Palustrine emergent wetlands are found primarily at the mouth of the Pleasant River and between the Westbrook City line and Saccarappa dam, along some of the tributary streams such as the Little River, and in limited areas between Saccarappa and Cumberland Mills dams. The palustrine emergent wetlands found within the project area in the southern reaches downstream of Saccarappa dam are dominated by cattail species.

Palustrine scrub-shrub wetlands comprise approximately three percent of the study area and are most frequently associated with tributary streams and islands within the river. Dominant species include buttonbush, speckled alder, red-osier dogwood, black willow, sweet gale, and highbush blueberry. Emergent species associated with the palustrine scrub-shrub include those listed above.

Palustrine unconsolidated bottom wetlands, characterized by filamentous and unicellular algae, may occur in less than one percent of the project area. Typical species include duckweed and coontail.

Wildlife Resources

Wildlife habitat prevails within the riparian zone of the Presumpscot River. The interface between land and water provides abundant edge habitat, benefitting many species which utilize the aquatic and terrestrial habitats. This riparian zone also provides wildlife with undeveloped travel corridors, a type of habitat that is becoming more scarce in this part of Maine (letter from J.M. Stolfo, Agency Counsel, Office of the Solicitor, Department of the Interior, Newton, MA, dated February 2, 2001). The 1997 vegetative cover mapping conducted by S.D. Warren also included a habitat-based assessment of the wildlife resources present in the project study area. Table 45 provides a summary of wildlife known to potentially occur in the habitat types defined by S.D. Warren.

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 Table 4. Summary of potential wildlife resources in the study area (Source: S.D. Warren, 1999a).

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Habitat cover			
type	Class	Species	
Mixed hardwood forest	mammalian	deer mouse, chipmunk, red squirrel, smoky shrew, northern flying squirrel, woodland jumping mouse, coyote, gray and red fox, porcupine, southern red-backed vole, gray squirrel, snowshoe hare, white-tailed deer, black bear, moose	
	avian	red-eyed vireo, American redstart, veery, hairy woodpecker, eastern wood peewee, ruffed grouse, white-throated sparrow, dark-eyed junco, purple finch, northern water thrush, mourning warbler, Canada warbler, black-throated blue warbler, Tennessee warbler, hermit thrush, red-tailed hawk, broad-winged hawk, common raven, black-capped chickadee, brown creeper, golden-crowned kinglet, oven bird, northern oriole, cedar waxwing, wood thrush, wild turkey	
	amphibian	redback salamander, northern dusky salamander, blue-spotted salamander, Jefferson salamander, gray treefrog, spring peeper, wood frog, American toad	
	reptilian	eastern garter snake, eastern milk snake, ringneck snake, redbelly snake, wood turtle	
Coniferous forest	mammalian	fisher, deer mouse, red squirrel, smoky shrew, longtailed shrew, southern red-backed vole, gray squirrel, northern flying squirrel, woodland jumping mouse, snowshoe hare, coyote, white-tailed deer, black bear, moose, bobcat, porcupine	
	avian	warblers, evening grosbeak, blue jay, golden-crowned kinglet, solitary vireo, pine grosbeak, red crossbill, boreal chickadee, pileated woodpecker, hairy woodpecker, black-capped chickadee, red-breasted nuthatch, purple finch, winter wren, hermit thrush, dark-eyed junco, Swainson's thrush, pine siskin	

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 Table 45. Summary of potential wildlife resources in the study area (Source: S.D. Warren, 1999a).

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habitat cover type	Class	Species
Shrub/ successional field	amphibian	wood frog, redback salamander, American toad
	reptilian	eastern garter snake, eastern milk snake, redbelly snake, ringneck snake
	mammalian	striped skunk, field mouse, red fox, eastern mole, meadow jumping mouse, meadow vole, woodchuck, white-tailed deer
	avian	American robin, short-eared owl, American tree sparrow, eastern screech owl, eastern bluebird, red-tailed hawk, vesper sparrow, savannah sparrow, mourning warbler, Tennessee warbler, barn swallow, brown-headed cowbird, eastern meadowlark, American crow, American kestrel
Palustrine forested wetlands	reptilian	redbelly snake, smooth green snake, eastern garter snake, eastern milk snake
	mammalian	white-tailed deer, moose, raccoon, water shrew, snowshoe hare, red squirrel, northern flying squirrel
	avian	northern saw-whet owl, belted kingfisher, red-eyed vireo, American redstart, red-bellied woodpecker, pileated woodpecker, yellow warbler, ruffed grouse, wood duck, black capped chickadee
	amphibian	spring peeper, spotted salamander, wood frog, pickerel frog
Palustrine scrub/ shrub wetlands	reptilian	eastern garter snake, painted turtle
	mammalian	raccoon, mink, moose, red squirrel, weasel, snowshoe hare, short-tailed shrew

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 Table 4. Summary of potential wildlife resources in the study area (Source: S.D. Warren, 1999a).

Date: 06/30/2002

Habitat cover	type	Class	Species
Palustrine emergent wetlands	avian		American woodcock, common yellow throat warbler, common snipe, belted kingfisher, yellow warbler, blackburnian warbler, mourning warbler, northern waterthrush, southern red backed vole
	amphibian		green frog, gray tree frog, American toad, spring peeper, redback salamander
	reptilian		eastern garter snake, redbelly snake
	mammalian		water shrew, meadow jumping mouse, muskrat, beaver, river otter, meadow vole, striped skunk, moose, raccoon, red fox
	avian		great blue heron, barn swallow, red-winged blackbird, swamp sparrow, song sparrow, common yellow throat warbler, common grackle, common snipe, belted kingfisher, spotted sandpiper, American black duck, mallard, common loon, ring-necked duck, red-breasted merganser
Palustrine unconsolidated bottom	amphibian		American toad, spring peeper, northern leopard frog, pickerel frog, bullfrog
	mammalian		beaver, muskrat
	amphibian		bullfrog
	reptilian		snapping turtle, painted turtle

Threatened and Endangered Species

S.D. Warren conducted a Rare, Threatened, and Endangered Species Study in the summer of 1997. Fauna surveyed after consultation with state and federal agencies included the brook floater mussel, squawfoot mussel, wood turtle, and bald eagle. None of the species surveyed were observed; however, suitable habitat is present in the upper and middle portions of the Saccarappa Project area for wood turtle, and bald eagle may

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over winter in the project area. Open water created by the dams could potentially attract bald eagles providing a wintering location.

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Botanical species surveyed during the 1997 field studies included the federally listed small whorled pogonia and the state-listed variegated horsetail, water awlwort, spice bush, Vasey's pondweed, and spotted pondweed. Surveyors found several of the federally threatened small whorled pogonia plants in the Dundee Project area. The Commission requested additional threatened and endangered species information from the FWS Field Office on February 21, 2001. The FWS has documented small whorled pogonia in the North Gorham vicinity near the Dundee Project (letter from K. Tripp, Environmental Species Specialist, FWS Maine Field Office, Old Town, ME, to D. Boergers, FERC, Washington, DC, May 3, 2001).

4.3.3.2 Environmental Consequences

S.D. Warren's Proposed Action and Modifications

S.D. Warren proposes to continue ROR operations and improved daily headpond monitoring to facilitate better headpond control for protection of riparian resources at all five projects and the small whorled pogonia at the Dundee Project. S.D. Warren also proposes recreational enhancements described in section 2.1.2 and discussed in detail in section 4.3.5. Recreational resources would involve expansion of existing access for boating and fishing and mechanical control of vegetation near recreational facilities.

The FWS, in its letter dated February 2, 2001, indicated that the federally threatened small whorled pogonia occurs within the project area and recommends protection measures to improve and protect habitat for this species. Studies by the applicant determined that three plants were found in a remote wooded area adjacent to the Dundee impoundment on a parcel of land along the northwestern shore between the shoreline and power transmission line associated with the project. The plants were located in proximity to one another within 10 to 20 feet of the Presumpscot River shoreline.

S.D. Warren states that the Dundee Project operates in a ROR mode and potentially damaging impoundment fluctuations do not occur. In addition, maintenance activities that occur in the vicinity of the power transmission lines would not be expected to affect the plants. Although the plants were located in close proximity to one another within 10 to 20 feet of the Presumpscot River shoreline within the 100-year floodplain, they are located in a well-drained upland area well above normal high water levels. The FWS recommends that protection and enhancement of the habitat for this species be

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Finally, a number of commenting parties, which includes resource agencies and NGO's, request the consideration of dam removal, including the removal of Saccarappa, Mallison, and Little Falls dams, the removal of Saccarappa dam only, and the removal of Mallison and Little Falls dams only. These three alternatives all pose significant potential effects on the terrestrial resources within the project area, specifically riparian and wetland habitats.

Impoundment Fluctuations

The existing licenses for the five projects do not limit or prevent S.D. Warren from drawing down the impoundments when necessary to perform maintenance. Drawdowns occur as necessary to facilitate maintenance and repair of structures, debris removal, etc. Many of the wetlands that exist within the project area rely on flooding and direct hydrologic connection to the river. As such, we agree with the FWS that the potential exists for project operations to affect most of the bordering wetland areas. S.D. Warren proposes to continue ROR operations and would improve daily head pond monitoring procedures in an effort to reduce impoundment fluctuations that can affect riparian and wildlife resources. We conclude these changes to project operations would benefit wetlands and associated wildlife resources.

Shoreline Management Plan

In addition to those measures proposed by S.D. Warren, the FWS in its letter dated February 2, 2001, recommends that S.D. Warren develop an SMP, in consultation with the MSPO, MDIFW, FWS, the NPS, and the MDOC, for licensee-owned lands abutting project waters within 500 feet of the normal high water elevation that are determined to be needed for project-related purposes, such as fish and wildlife habitat protection, providing public access for recreation or protecting sensitive, unique, or scenic areas such as those supporting the small whorled pogonia. The FWS recommends that the plan include: (1) a description of those lands covered by the plan including a drawing or map showing their location relative to project facilities or project waters (those lands shall be included within the project boundary); (2) for each parcel of shore land covered by the plan, a description of how the land would be managed and used; (3) a discussion of how the plan addresses (a) a selection of lands that are largely undisturbed and free from any observable past alterations that may have impaired their ability to provide the necessary protection and enhancement of wildlife and plant species, (b) selection of

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We do not agree with the FWS recommendation that inclusion of licensee lands to within 500 feet of the shoreline in an SMP is necessary to protect sensitive, unique, or scenic areas throughout the entire study area. We do agree with the FWS, however, that S.D. Warren should maintain a buffer zone on a selection of lands that are largely undisturbed and free from any observable past alterations that may have impaired their ability to provide the necessary protection and enhancement of wildlife and plant species within the project boundaries up to 200 feet from the normal high water mark. These lands would provide additional buffering capacity against adjacent land disturbances in ecologically sensitive areas, specifically, those areas where the federally threatened small whorled pogonia occurs at the Dundee Project, and would protect riparian corridors. We conclude that protection of these lands is critical to the survival of the rare plant and, because considerable recreation use occurs at the Dundee and Gambo projects (see section 4.3.5), we conclude that the establishment of a shoreline buffer zone at these two projects is warranted.

Maintenance of a buffer zone addressing those licensee-owned lands abutting the Dundee and Gambo project waters within 200 feet of the normal high water elevation and that are determined to be needed for project-related purposes, would promote the protection of wetland habitats and sensitive areas such as those well-drained upland areas where the small whorled pogonia occurs. A buffer zone would also promote the protection of the Dundee and Gambo projects' aesthetic resources and recreational opportunities, which we discuss in sections 4.3.4 and 4.3.5, respectively. The 200-feet above high water elevation is consistent with Commission policy regarding adequate buffer zones around licensed projects and would ensure compliance with existing land use ordinances along the Presumpscot River. The MDEP requires all municipalities in Maine to adopt ordinances regulating land-use activities adjacent to certain bodies of water under the Mandatory Shoreland Zoning Act (38 MRSA sections 435-449). These municipal shoreland zoning ordinances establish land use standards for numerous activities that occur within the shoreland zone. The law requires land use controls for all land areas within 250 feet of rivers with watersheds of at least 25 square mile drainage area (MDEP, 1994). This is intended to protect water quality, wildlife habitat, wetlands, archaeological sites and historic resources, and commercial fishing and maritime industries; and to conserve shore cover, public access, natural beauty, and open space in much the same way a shoreline management plan is intended to define protection measures. We conclude that the establishment of a buffer zone on licensee-owned lands within the project boundary up to 200 feet from the normal high water mark at Dundee

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and Gambo would protect and enhance sensitive habitats, specifically those of the small whorled pogonia, and riparian areas along the undeveloped areas of the shoreline.

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We made a preliminary determination that FWS's recommendation for SMPs at all five project is inconsistent with section 10(a) of the FPA. At the request of the FWS, we conducted a meeting on February 19, 2002, to attempt to resolve this issue. However, FWS provided no new information concerning the need for SMPs to protect fish and wildlife, including rare plants. We continue to find no demonstrated need to expand project boundaries to include additional lands outside of the Commission's standard 200-foot buffer zone for the protection of rare plants at this time.^{37, 38}

Threatened and Endangered Species

Regarding threatened and endangered species occurring within the project boundaries, the small whorled pogonia, a federally listed threatened species, was surveyed and located within 10 to 20 feet of the shoreline of the Presumpscot River, within the 100-year floodplain. They are located in well-drained soils in upland areas well above the normal high water levels of the river channel. We conclude there would be no effect on the small whorled pogonia or its habitat with the continued ROR operations at the Dundee and Gambo projects. The development and implementation of a buffer zone including licensee-owned lands within 200 feet of the normal high water mark would include protection measures for the small whorled pogonia habitat at the Dundee Project.

Because the development of a plan to maintain a buffer zone would affect project economics, we address the costs in section 5, *Developmental Analysis*, and make our final recommendations in section 6.1, *Comprehensive Development and Recommended Alternative*.

Dam Removal Alternatives

Removal of Little Falls, Mallison Falls, and Saccarappa Dams

The three alternative dam removal scenarios would directly affect the terrestrial resources existing on those stretches of the river. Staff surveys conducted in the summer of 2000 (Berger, 2001) determined that changes in water levels resulting from the

³⁷ 77 FERC ¶61,068 (1996).

³⁸ 81 FERC ¶61,251 (1997).

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breaching of all three dams, Saccarappa only, or Little Falls and Mallison Falls only would directly affect areas subject to the Natural Resources Protection Act (NRPA).³⁹ NRPA requires a permit from the MDEP before: (1) placing fill or disturbing/bulldozing soil within 100 feet of the normal high water line of the river; (2) filling, dredging, or removing vegetation below the normal high-water line; or (3) constructing, repairing, or altering any permanent structure located in, on, or over the river.

Dam breaching, no matter how accomplished, would shift the normal high water elevation along those reaches of river up and downstream of the dam. Furthermore, dam breaching or removal could potentially affect the distribution and density of habitat types along the affected reaches of the river. Specifically, a shift in wetland habitat could be expected. The majority of the existing wetlands within the study area are closely associated with the river, relying on river flooding and/or wicking of river waters as the primary hydrologic inputs. Some wetlands are fed primarily by runoff from the contributing watershed or are located along tributary streams and, therefore, do not rely on flooding of the Presumpscot River for hydrologic input. Approximately 88 acres of wetlands occur between the Gambo and Saccarappa dams, 88 percent of which are palustrine forested or palustrine scrub-shrub occurring along the shoreline of the impoundments. Greater than 70 percent of the wetland habitats identified in the area of the projects are located within the Saccarappa Project area.

Low flow model runs indicate dam removal would result in a 4 to 5 foot decrease in water elevations within the Little Falls and Mallison Falls projects and up to a 10 foot water level change upstream of Saccarappa. A portion of the 88 acres of existing wetlands would be eliminated or degraded with the draining of the impoundments. However, it may be assumed that some palustrine forest, or palustrine shrub wetlands would naturally establish along the river in those areas where the slope of the river bank and the substrate is conducive to wetland development. Emergent wetlands could form in a few years, while forest and shrub wetlands would take from 10 to 20 years to establish under the new hydrologic regime. The wetland types would form in abandoned channels, backwaters, and oxbows once the river dynamics are relatively stabilized (NPS, 1996).

Examination of FWS NWI maps, in conjunction with field surveys and hydrologic analyses, indicate that the majority of the mapped wetlands occurring between Gambo and Saccarappa dams would be affected by the water level changes if the three dams were removed. A successional shift in habitat would move downslope with upland

³⁹ 38 M.R.S. Sections 480-A through 480-Z.

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species colonizing those wetlands where the hydrology has been removed. Not only could a reduction in the size of the existing wetlands occur, a shift in species composition could also occur with changes in flow velocities.

Removal of Saccarappa Dam Only

The removal of Saccarappa dam would result in the highest potential loss of wetlands, because 70 percent of the wetlands are located at the Saccarappa Project.

Removal of Little Falls and Mallison Falls Dams

Removal of Little Falls and Mallison Falls dams would reduce the potential amount of wetland loss to a maximum of 13 percent. This assumes 100 percent loss within those project boundaries.

4.3.3.3 Unavoidable Adverse Effects

Vegetative clearing associated with the development of canoe portages, car-top boating access, or parking would represent a minor, long-term unavoidable adverse impact. Wildlife disturbance during the construction of the specified recreational facilities (section 4.3.5) would represent a short-term minor adverse impact, and any displacement would represent a long-term, minor adverse impact. Removal of all three dams or just Saccarappa dam would result in a loss of wetlands. Removal of Little Falls and Mallison Falls dams would result in short-term minor adverse effects on existing wetland types, but would likely be replaced by new wetlands over time.

4.3.4 Land Use and Aesthetic Resources

4.3.4.1 Affected Environment

Undeveloped land uses dominate the upstream projects, while more industrialized land use and development tend to occur at the downstream projects.

The Dundee Project is located in a rural area of the towns of Windham and Gorham, with little commercial or residential, and no industrial development outside of the town centers which are several miles away. Forests and agricultural areas dominate the landscape.

Upland forests and agriculture dominate the Gambo impoundment shoreline. Urban and industrial development occur on the eastern shore adjacent to the Gambo

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Project facilities and on the western shore approximately 1,500 feet upstream from the project. Residential development is relatively low density with permanent residences interspersed with seasonal dwellings.

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Industrial, commercial, and residential development surround the Little Falls impoundment. Adjacent to the project, on the Windham side of the river, industrial uses include an abandoned steel converting plant. Extensive commercial and residential development occurs near the project.

Industrial and residential lands surround the Mallison Falls impoundment. On the east side of the river, the former Rich Tool and Die Company Mill is directly across from the project in an industrially zoned area. Various private lots line the shores of the river both upstream and downstream of the project.

The Saccharappa Project is located near the center of the city of Westbrook. The shoreline of the upstream portions of the impoundment include considerable undeveloped and agricultural lands. However, commercially and industrially zoned lands surround the portion of the impoundment closest to the project dam and powerhouse.

The aesthetics of the projects also vary from upstream to downstream. Dundee Park provides views of the primarily forested shoreline and impoundment of Dundee Pond. The views from the pond by boat consist of undeveloped shoreline. The downstream end of Dundee Pond, including the dam and powerhouse, cannot be readily viewed from any roads. Forested shoreline exists along the river downstream of the dam, and can be viewed from the portage route. According to local assessor records, at the Dundee project, S.D. Warren owns a small parcel of land (approximately 1 acre) on the town of Windham side of the river and no land beyond the project boundary on the town of Gorham side of the river.

The Gambo portage take-out offers views of the forested shoreline. The portage path follows a portion of the canal tow path trail. Individuals walking along the tow path view numerous structural remains of the historic Oriental Gunpowder Mill. The Gambo Project works consist of a powerhouse and dam that contrast with the forested shoreline in the vicinity.

At Little Falls, the project facilities consist of a powerhouse and dam that blend with the industrial buildings adjacent to them and contrast with the forested shoreline downstream. The eastern shoreline of the Little Falls impoundment contains industrial lands, while the Gorham side includes numerous commercial and residential lands. The

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bridge upstream of the project offers views of the impoundment and the undeveloped shoreline downstream of the project. According to local assessor records, at the Little Falls project, S.D. Warren owns 2 very small parcels on the shoreline of the Little Falls project totaling approximately 1 acre on the town of Windham side of the river.

A bridge directly upstream of the Mallison Falls Project offers views of the lower project impoundment, which is surrounded by industrial and residential lands. The project works consist of a dam that blends with the adjacent industrial buildings and a powerhouse that contrasts with the early industrial character of the surrounding buildings. According to local assessor records, S.D. Warren owns 1 parcel of land (approximately 8 acres) on the shoreline at the Mallison Falls project on the town of Windham side of the river.

Located in the city of Westbrook, industrial and commercial lands surround the Saccarappa Project near the dam and powerhouse. Considerable undeveloped shoreline surround the upstream portions of the impoundment. Roads along the shoreline and Saccarappa Park, as well as the portage take-out offer views of the project. According to local assessor records, S.D. Warren owns 6 parcels of land in the city of Westbrook; however these parcels are located in downtown Westbrook and offer little in the way of habitat or recreational access.

4.3.4.2 Environmental Consequences

S.D. Warren's Proposed Action and Modifications

S.D. Warren proposes no specific enhancements to modify the existing land use or aesthetic resources for the five projects. Proposed enhancements to recreational resources could affect the aesthetics of the area.

The FWS recommends the development of an SMP for licensee-owned lands abutting project waters within 500 feet of the normal high water elevation.

The relicensing of the Presumpscot River projects could affect the land use and aesthetics of the area. The donation of 0.8 acre on the island across from the Hawkes property from S.D. Warren to the Gorham Land Trust would have no effect on the land use of the area since this land is already used for recreational access. S.D. Warren's proposed recreational enhancement would allow more public access to project lands and waters for boating, camping, and fishing (see section 4.3.5, *Recreational Resources*).

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We do not agree with FWS that inclusion of licensee lands to within 500 feet of the shoreline in an SWMP is necessary to protect the land use and aesthetic resources of the projects. We agree with the FWS that the undeveloped portions of shoreline enhance the aesthetic experience of anglers and boaters who use project waters.

As discussed in section 4.3.5, maintenance of a buffer zone on licensee-owned lands within the project boundaries up to 200 feet from the normal high water mark would also serve to protect recreational access to project lands and waters. Therefore, we conclude that a buffer zone on licensee-owned lands within the project boundary up to 200 feet from the normal high water mark at Dundee and Gambo, where most of the project-related recreation occurs, would help to preserve the undeveloped character of the shoreline. The effects of project operation and increased access generally occur within 200 feet of the edge of the impoundment.

The proposed recreational enhancements to the portage trail, and proposed development of angler access at Dundee would have minor short-term negative effects on local aesthetics during construction. The proposed improvements to the portage trail, angler access to the bypass channel, and car-top boat access at the Gambo facility would have minor, short-term negative effects on the aesthetics of the area during any construction and maintenance associated with these enhancements. The improvements to the bridge would enhance the aesthetics in the area of the bridge after construction is completed. At all of the projects, there would be minor and temporary negative effects on the aesthetics of the area during any construction or maintenance activities associated with improvements to the portage trails and carry-in access areas for boaters.

Dam Removal Alternatives

Removal of Little Falls, Mallison Falls, and Saccarappa Dams

The removal of three minor project dams would change the scenic character of this section of the Presumpscot River from the palustrine setting that now occurs to a riverine environment. At all locations, there would be an initial negative impact on aesthetics when the land that is currently underwater becomes exposed. As the water level drops, exposure of substrate would occur. Also, newly exposed rocks would likely be water stained due to the amount of time that they have been submerged. Over time, this effect would, likely, be reduced and eventually disappear as the area is revegetated with plants adapted to the new environment and as high flow events carry the sediments downstream.

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Views looking upstream from the shore of the river toward the former dam locations would be enhanced as the area is returned to its natural riverine state. The natural falls that are currently under water would return, further enhancing the aesthetics of the area. It is likely that the powerhouses would remain intact in the event of dam removal. The views and scenery associated with these structures would remain the same. After activities associated with the dam removal are complete, there could be a slight decrease in traffic to and from the powerhouses and a decrease in project-related noise.

Removal of Saccarappa Dam Only

The effects of the removal of Saccarappa dam only would be as described in the discussion of the removal of all three minor projects.

Removal of Little Falls and Mallison Dams

The effects of the removal of Little Falls and Mallison Falls dams only would be similar to effects described for the removal of all three dams.

4.3.4.3 Unavoidable Adverse Effects

None.

4.3.5 Recreation Resources

4.3.5.1 Affected Environment

The region provides opportunities for a variety of both land- and water-based activities. The region includes hundreds of rivers, streams and brooks, which flow for approximately 9,300 miles in the state of Maine and approximately 4,400 miles in the state of New Hampshire. There are approximately 123 formal access sites within 60 miles of the project that provide recreational opportunities in a variety of riverine and palustrine environments (S.D. Warren, 2000). The most notable of the regional recreational opportunities occur on Sebago Lake just upstream of the projects. Sebago Lake offers 18 public boat ramps, sand beaches, campgrounds, and resort areas. During the summer, the more traditional activities that occur in the area include canoeing, hiking, camping, open water fishing, and swimming. Fall offers the opportunity to view foliage, as well as deer hunting. The winter months offer downhill and cross country skiing, ice fishing, and snowmobiling.

Existing Recreational Facilities

Table 46 summarizes existing formal recreation sites within the Presumpscot river projects. In addition to the public and commercial recreational opportunities that are available, there are also a number of residential facilities that provide private recreational access at the projects. At the Little Falls impoundment, there are five structures: two piers, one set of stairs to the water, and two floating docks. The Mallison impoundment contains one dilapidated pier. The largest number of private facilities occur on the Saccarappa impoundment. Currently, there are eight private piers in various states of repair and disrepair, one set of steps into the river, and a private concrete boat ramp.

Current recreational use levels are estimated at approximately 14,768 annual recreation days⁴⁰ for the Dundee Project. According to the town of Windham, Dundee Park supports 5,000 to 10,000 recreation days annually. Estimates for the facilities at the other projects are not available, although they are considered to be significantly less than the use levels at Dundee. Anecdotal and casual observation at the projects indicates that motor boating, hiking, swimming, picnicking, canoeing, fishing, hunting, ice fishing and walking occur at the projects at both formal and informal recreation sites. Angling opportunities at the projects include boat and shoreline based opportunities at the impoundments and shoreline based opportunities at the bypassed reaches. The state stocks the Presumpscot River and its tributaries with land-locked salmon, brown trout, and brook trout, as discussed in section 4.3.2.

4.3.5.2 Environmental Consequences**S.D. Warren's Proposed Action and Modifications**

S.D. Warren proposes to continue current operations at the projects with the following proposed protection and enhancement measures that may affect recreational use at the projects:

⁴⁰ A recreation day is defined as "each visit by a person to a development for recreational purposes during any portion of a 24-hour period."

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Table 4a. Existing recreation sites at the Presumpscot River projects (Source: S.D. Warren, 1999a, as modified by Staff).

Project	Site	Facilities
Dundee	Portage route	Trail, directional signs
Dundee	Dundee Park	Picnic tables, grills, bathrooms, changing rooms, shower, swimming/sunbathing beach, float, docks, pathways, horseshoe pits, basketball and volleyball courts, unimproved hand carry put-in site, parking, angler/hunter access
Dundee	Car-top boat launch*	Car-top boat access
Gambo	Unmarked portage	Unmarked trails, roadway, parking
Gambo	Cummings Property	Unmarked trail
Gambo	Pleasant River access	Unmarked trail, informal hunter/angler access
Gambo	1/4 mile loop trail	Unmarked trails, parking, angler/hunter access
Little Falls	Unmarked portage	Unmarked trail
Little Falls	Gorham Land Trust Property	Unmarked trail, hunter/angler access
Mallison Falls	Unmarked portage	Unmarked trails, roadway, parking, hunter/angler access
Saccarappa	Unmarked portage	Unmarked trail, roads
Saccarappa	Boat launch	Commercial boat ramp, dock space, parking
Saccarappa	Saccarappa Park	Benches, walkways
Saccarappa	Saccarappa take-out	Unimproved take-out, angler/hunter access

* The boat launch is a part of FPL Energy Maine Hydro, LLC's North Gorham Project, but does provide access to the Dundee Pond.

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At Dundee, S.D. Warren proposes to reroute the portage trail to pass around the lower portion of the dam, complete bank stabilization at the portage put-in, and mechanically control vegetation near portage route signs, develop angler and vehicular access to the bypassed reach by seeking easements, changes in conditions, etc., from local parties to enhance the recreational access to the put-and-take coldwater fishery in the bypassed reach.

At Gambo, S.D. Warren proposes to clearly delineate the portage trail with signs, consult among interested parties to develop a formal portage trail including a cooperative maintenance agreement, and mechanically control vegetation, develop walk-in angler access to the bypassed reach by creating a portage route spur and facilitating safe descent to the river, develop car-top boat access, including a vehicle parking area with signs, at the portage take-out site, develop and install signage explaining the history of the Oriental Powder Mill Complex, after consultation with the MHPC.

At Little Falls, S.D. Warren proposes to clearly delineate the portage trail with signs, and consult among interested parties to develop a formal portage trail including a cooperative maintenance agreement, and mechanically control vegetation, assist the Gorham Land Trust in developing a car-top boat access including a vehicle parking area with signs at the Gorham Land Trust Property off Tow Path Road. S.D. Warren also proposes to donate 0.8 acres of land to Gorham Trails.

At Mallison Falls, S.D. Warren proposes to clearly delineate the portage trail (to be located on the Gorham shore) with signs, and mechanically control vegetation at the portage take-out site, provide car-top boat access above the dam at the portage take-out, including signage and parking on S.D. Warren property at the corner of Mallison Falls Road and Canal Street, install signage designating the car-top boat access point below the dam at the Mallison Falls powerhouse, explore the feasibility of providing a car-top boat unloading point next to the bridge abutment by consulting with the town of Gorham and the MDOT, continue to investigate opportunities for providing angler access to the bypassed reach, and, if feasible, implement such access.

At Saccarappa, S.D. Warren proposes to establish a formal take-out site that would also allow car-top boat access to the impoundment, post signage appropriate to these uses, establish space for parking, and mechanically remove vegetation.

The FWS, in its letter dated February 2, 2001, recommends monitoring recreational use of the project area, along with consultation with the MSPD, MDIFW, FWS, NPS, MDOC, and affected municipalities and organizations. The FWS also recommends the development of an SMP that would include provisions for public

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recreational access and maintaining the undeveloped character of the recreational experiences currently being provided.

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The NPS, in its letter dated February 2, 2001, recommends using stairs or a ramp to reduce the length of the portage around Dundee dam and that stairs be installed at the put-in location, redesigning the applicant's proposed angler access to the impoundment, and developing formal car-top boat access on the Gorham side of the development. The NPS recommends that the put-in point for the portage around Gambo include a hard ramp or bridge with a stairway, the informal takeout area should be stabilized, a car-top ramp should be installed, and fallen trees should be removed from the river. The MDOC previously stated that several trees had fallen in the river downstream of the tailrace at Gambo and should be removed for safety reasons (letter from George W. Hannum, MDOC, Bureau of Parks and Lands, Augusta, ME, to Tom Howard, Project Engineer, S.D. Warren, Westbrook, ME, dated July 10, 1996). The NPS further recommends that, at Little Falls, the portage route should include stairs at the take-out, if agreements with private property owners at the preferred portage route cannot be reached. The portage route should also include a hard or concrete take-out area and signs and a crosswalk across Route 202. At Mallison Falls, the NPS recommends additional signage and safety improvements be installed uphill from the crossing of the portage at Mallison Street and formal angler access, including stairs, should be developed at Canal Street. Finally if Saccarappa dam is removed, the NPS recommends that Warren provide access and a take-out for the whitewater run that would be created. If Saccarappa dam is not removed, a formal access point above the dam on the west side of the river is needed.

The MDIFW, by letter dated January 31, 2001, recommends: (1) a wadability study that encompasses the bypassed reaches of all five projects; (2) an assessment at each project of project operations and opportunities for minor operational or structural modifications that would minimize flows to the bypasses that diminish or preclude angling opportunities; (3) the development, in consultation with interested parties, of a plan for walk-in public access at Dundee, Gambo, and Mallison bypass channels, including an implementation schedule; and (4) the development in consultation with interested parties, of an access plan for car-top boat access to all five impoundments, including an implementation schedule.

Access for Boating and Fishing

The relicensing of the Presumpscot River projects could affect the recreational resources of the area. S.D. Warren proposes to formalize and maintain portage at four of the dams. S.D. Warren does not propose portage at Saccarappa dam because of concerns over the safety of boaters attempting to cross the streets that would be involved in the

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portage. The proposed improvements to the portage routes, take-outs and put-ins, including maintenance, bank stabilization, signage, and vegetation removal would provide long-term recreational access to and enhanced recreational opportunities at the project.

S.D. Warren's proposal to reroute the portage at Dundee would make the portage location more visible and extend the length of the portage to be approximately one-third of a mile. Even though the extension of the portage route could make portage more difficult for some individuals, this length portage is not unreasonable or uncommon. However, the stairs or ramp over the dam, as suggested by the NPS, at Dundee would be excessive. Stairs at the put-in point, as suggested by the NPS, should not be necessary after bank stabilization is completed by S.D. Warren.

The NPS suggests a hard ramp or bridge with a stairway at the put-in below Gambo dam. NPS also makes specific recommendations in regard to portage at Little Falls and Mallison Falls. Because the final portage routes at these locations have not been developed, decisions regarding specific requirements for enhancements associated with the portage routes should be addressed as a part of a revised Final Recreational Facilities Enhancement Plan (final recreation plan).⁴¹

S.D. Warren declines to enhance portage around Saccarappa dam, citing safety issues related to traffic on the roads that would need to be crossed by boaters. The MDOC has suggested that Saccarappa dam be the ending point for canoe excursions on the Presumpscot River (letter from George W. Hannum, MDOC, Bureau of Parks and Lands, Augusta, ME, to Tom Howard, Project Engineer, S.D. Warren, Westbrook, ME, dated July 10, 1996). The FOPR and Gorham Trails advocate a formal portage route around Saccarappa (KA, 1998a). We would generally agree that portage around a dam is warranted. However, there is no portage around Cumberland Mills dam located about 1 mile downstream. Canoeists traveling along the Presumpscot River that find their way past Saccarappa to Cumberland Mills are required to take out in an S.D. Warren parking lot upstream of the dam and car portage 2.7 miles to the US 302 bridge in Westbrook (AMC, 1991). Providing a formal put-in below Saccarappa dam would afford access to only about 1 mile of river reach in a relatively developed area. Also, we do not know the number of users who would benefit from such a put-in, but we expect it would be small. We would not expect high usage along this short stretch of river until portage is provided around Cumberland Mills dam. Therefore, we agree with the MDOC that

⁴¹ S.D. Warren filed a final recreation facilities enhancement plan with its license application in January 1999.

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Saccarappa would make a logical ending point for canoe excursions at the current time. This means that boaters wishing to continue through to Casco Bay would be required to car portage approximately 4 miles from Saccarappa dam to the US 302 bridge. If portage becomes available at Cumberland Mills dam in the future, and recreational use figures indicate a need, then portage around Saccarappa should be reconsidered.

S.D. Warren's proposal to formalize car-top boat access and construct needed facilities for such access at the Gambo, Mallison Falls, Little Falls, and Saccarappa impoundments would allow for enhanced access for car-top boating and would provide car-top boating at all of the project impoundments. The NPS makes recommendations in regard to car-top boat access at Gambo. Need for car-top boat access should be assessed in the final recreation plan and should include an assessment for the need for additional facilities based on the recreation study. We agree with the MDIFW recommendation that S.D. Warren be required to collaborate with interested parties in ongoing studies of available options and consideration of future car-top boat access at all of the impoundments. S.D. Warren's participation in such consultation would further enhance the options and availability of car-top boat access at the projects. Consideration of future car-top access should be included in the final recreation plan.

The bypassed reaches at each of the projects provide opportunities for angling that are very different from the opportunities provided on the impoundments. Developing angler access as proposed by S.D. Warren at the bypassed reaches would enhance the angling opportunities in the area. We agree with the MDIFW's recommendation that S.D. Warren be required to consult with interested parties to resolve walk-in public access issues at Dundee, Gambo, and Mallison Falls. S.D. Warren's consultation could expand on the available options for angler access to the bypassed reaches, further enhancing the access opportunities. Consideration of future walk-in public access at all five projects should be included in the final recreation plan.

We agree with the FWS that S.D. Warren should develop recreation use estimates in consultation with the FWS, MDIFW, MDOC, and MDMR. Data about the precise levels of use at all of the projects is not available. The three minor projects are exempt from Form 80 requirements. Therefore, we agree that a study of recreation use levels would be beneficial in determining the adequacy of the recreational facilities at the projects. The recreational enhancements proposed by S.D. Warren involve formalizing access sites and portage routes that are currently used on an informal basis. Therefore, it would be reasonable to determine the level of recreational use of the facilities after these sites have been formalized and facilities for parking and access have been constructed. This initial estimate of use at the projects should occur after construction of the recreational enhancements and in conjunction with the Form 80 filings for the Dundee

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and Gambo projects. The study could then be used to determine the adequacy of the recreational enhancements, including public walk-in access to the bypassed reaches and car-top boat access, to meet current demand. It would be reasonable for S.D. Warren to meet with state agencies to update and report the annual recreation use figures to the Commission every 12 years, thereafter, occurring with every other Form 80 filing.

We agree with the NPS recommendation that S.D. Warren monitor fallen trees at the Gambo Project and remove any that pose a threat to public safety. This activity would improve the safety of recreational boating and fishing on the Presumpscot River in the vicinity of the Gambo Project.

Many of the enhancements proposed by S.D. Warren require landowner permission and easements. Portage routes, walk-in angler access, and car-top boat access are dependent, in some cases, on S.D. Warren's ability to obtain such easements. To ensure that public access to the projects is realized, we conclude that S. D. Warren should prepare a final recreation plan including final plans for portage routes, car-top boat access, walk-in angler access to the bypassed reaches, and monitoring for fallen trees at Gambo. The plan should be completed in consultation with the MDIFW, MDOC, NPS, FWS, the CBEP, and MDMR. The final recreation plan should include a schedule of implementation for the facility enhancements.

Shoreline Management Plan

FWS recommends that S.D. Warren prepare an SMP for licensee-owned lands needed for project-related purposes including public access for recreation. However, no such lands have been identified. We agree with FWS that the undeveloped portions of shoreline enhance the recreational experience of anglers and boaters who use project waters and would protect recreational access to project lands and waters. As discussed in section 4.3.4, a requirement that S.D. Warren maintain a buffer zone on project lands to 200 feet from the normal high water mark also would serve to maintain the current shoreline and protect the visual resources of the projects. }

At the section 10(j) meeting on February 19, 2002, FWS indicated the Commission's recommendation to prepare an SMP for only the Dundee and Gambo projects does not adequately consider either the changing resource values of the concerned agencies, or the expected increase in recreational use that would result from increased minimum flows. FWS further indicated that the Commission's SMP recommendation did not consider the Casco Bay watershed planning efforts. FWS indicated that it is more interested that the scope of the planning effort involve all five projects than in the specific width of the buffer zone. We resolved at this meeting that

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the primary goal of an SMP would be to ensure S.D. Warren's continued involvement in the CBEP planning process.

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By letter dated February 18, 2002, MSPO provided comments in support of an SMP, indicating that an SMP encompassing all five projects would assist in providing information essential to the design of appropriate mitigation and enhancement measures to compensate for project effects. MSPO indicated that the Commission would be receiving a copy of The Presumpscot River Management Plan prepared by the CBEP. This plan conveys the local urban vision for the preservation of the Presumpscot River corridor. MSPO indicates that the means of preserving the open space along the river would remain unexplored without the aid of an inclusive SMP, prepared by S.D. Warren. The CBEP filed only an outline and sample maps on March 1, 2002.

Based on the section 10(j) meeting and the subsequent filings, we continue to conclude that an SMP including only project lands owned by S.D. Warren at the Dundee and Gambo projects would be adequate to address future recreation needs and open space protection along the river where the most project-related future use would be expected to occur. We do not find adequate justification to require S.D. Warren to purchase additional lands in the project area. Nor do we agree that S.D. Warren should address general land use planning along the corridor in the absence of either a draft or final Presumpscot River Management Plan. However, coordination with the CBEP in the development of any revised final recreation plan would be reasonable to ensure that S.D. Warren remains cognizant of local planning efforts as they relate to project recreational facilities and opportunities. Therefore we include the CBEP among those entities with which S.D. Warren must consult in the preparation of the final recreation plan.

We continue to conclude that a buffer zone on licensee-owned lands within the project boundary up to 200 feet from the normal high water mark at Dundee and Gambo, where most of the project-related recreation occurs, would protect recreational access and preserve the recreational experiences provided by the undeveloped character of the shoreline.

Wadability Study

The MDIFW recommends that Warren be required to undertake a wadability study at all five projects. As discussed in section 4.3.2, operational changes at the projects would not significantly reduce the amount of water passing into the bypassed reaches during high flow periods. Because the projects operate in ROR mode with little storage capability, S.D. Warren would not be able to substantially reduce the amount of

Dam Removal Alternatives

Removal of Little Falls, Mallison Falls, and Saccarappa Dams

The removal of the three minor project dams would change the character of recreation along this stretch of the Presumpscot River. The drop in water level and faster current would eliminate most of the flatwater boating opportunities on the impoundments. Dam removal would enhance opportunities for quickwater or whitewater boating. The section of free flowing river would be 7 miles long and drop a total of 68.6 feet for an average drop of 9.8 feet per mile. The amount of elevation change for individual sections of the river varies. Dam removal would allow canoeists access to a relatively unimpaired 7.8 mile stretch of river, including the impoundment of Cumberland Mills dam. Unpassable natural formations in the river could exist, especially at the dam sites, which are on the locations of the former falls. At these locations, it is possible that a short portage along the river shore would still be necessary. It is also possible that these locations would offer whitewater opportunities that would attract kayakers and canoeists. Portage around each of the dams would no longer be necessary for boaters attempting to travel downstream along the Presumpscot.

The boating opportunities offered by the free flowing stretch of river would vary depending on the time of year and the amount of water available. The Presumpscot River can be compared to other rivers in Maine that have similar geologic histories and gradients. For instance, the Androscoggin, Sheepscot, and Saco rivers located in the coastal Maine region provide opportunities for quickwater boating with an occasional class II or III rapid. The Androscoggin River to the north has an overall gradient of about 8 feet per mile and provides opportunities for class I, II, and III whitewater (AMC, 1991). The natural falls located at the current dam locations could provide whitewater opportunities or be unpassable barriers. Because of releases from the Eel Weir Project, the river could be passable for most of the year.

Waterfowl hunting opportunities that currently occur on the impoundments would be greatly diminished. Angling opportunities on this stretch of the river would change from boat-based pond or lake type opportunities to shoreline-based riverine type fishing experience. As the fisheries resources of the area change, the angling opportunities would change as well.

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At the Little Falls impoundment, we would expect a number of changes in the character of recreation to result from dam removal. The Gorham Land Trust property would still provide access to the area, although the character of the area that is accessed would change to a more riverine setting. The five private facilities that provide access to the impoundment would be adversely affected because the piers and stairs would no longer provide access to standing water. The floating docks would be useless because of the faster currents and lower water levels. The pier that currently provides private access to the impoundment would no longer reach the water. The boat launch located at the downstream end of the impoundment would no longer provide access to the existing pond. Motorboats would no longer be usable on the impoundment. The Saccarappa impoundment currently has the largest number of private facilities that would be affected. The private piers would no longer provide access to the water. Their location would change such that they would be up to 10 feet from the new water level of the river. The stairs would no longer provide access, nor would the concrete boat ramp. The public boat ramp would no longer be able to operate without modification.

Removal of Saccarappa Dam Only

The effects of the removal of Saccarappa dam only would be similar to the potential effects described for the removal of all three dams.

Removal of Little Falls and Mallison Falls Dams

The effects of the alternative of removal of Little Falls and Mallison Falls dams would be similar to the potential effects described for the removal of all three dams, but with fewer private piers affected.

4.3.5.3 Cumulative Effects

Relicensing of the projects would enhance the recreational boating opportunities available in the region. Formal portage take-out and put-in areas with appropriate signage and parking (where they coincide with car-top boat access locations) would enhance the boating experience for canoeists. Portage is available around the Eel Weir and North Gorham projects upstream of Dundee. The improvements to the portages around Dundee, Gambo, Mallison Falls, and Little Falls, as well as the formal take-out above Saccarappa, would allow canoeists better access to the Presumpscot River from Sebago Lake to Saccarappa dam. This 14-mile stretch of river would offer recreational canoe touring opportunities that are not otherwise found in the vicinity of the projects.

4.3.5.4 Unavoidable Adverse Effects

None.

4.3.6 Cultural Resources

4.3.6.1 Affected Environment

In association with its relicensing efforts, S.D. Warren commissioned studies to identify prehistoric or historic districts, sites, buildings, structures, or objects included in or eligible for inclusion in the National Register (hereinafter "historic properties") within the Area of Potential Effect (APE) of each of the projects. For each project, S.D. Warren, in consultation with the SHPO, defined the APE as shorelines affected by water level fluctuations along both sides of the river and reservoirs from the Saccarappa tailwater to the upper limit of the Dundee impoundment.

The studies, conducted between 1997 and 2000, included an evaluation of project facilities for National Register eligibility (Roberts and Ball 1997); two archaeological sensitivity assessments, called "Phase 0" surveys in Maine (Corey et al., 1997; Wilson, 1998); surveys to locate prehistoric sites, called Phase I surveys in Maine; and surveys to evaluate National Register eligibility of sites, called Phase II surveys in Maine (Wilson, 1999; Wilson and Bourque, 2000). In addition, a Phase I historic archaeological survey was performed, focusing on the current condition of the Cumberland and Oxford Canal and the Oriental Powder Mills Complex, also known as the Gorham-Windham Powder Mill Complex (Dinsmore and Reiss, 1998). All of these cultural resource studies were developed in consultation with the SHPO, which reviewed the resulting reports and concurred with the ultimate findings.

According to Dean R. Snow's article on the Eastern Abenaki in *Handbook of North American Indians*, Vol. 15 (Trigger, 1978), the Presumpscot River lies within the ancestral territory of the Eastern Abenaki, now represented within Maine by the Penobscot Nation at Old Town, Maine. Other federally recognized tribes in Maine whose ancestral lands lay north of those of the Eastern Abenaki (and thus far from the Presumpscot River) are the Aroostook Band of Micmac, the Houlton Band of Maliseet, the Passamaquoddy Tribe - Indian Township Reservation, and the Passamaquoddy Tribe - Pleasant Point Reservation. We wrote to the SHPO and the Bureau of Indian Affairs (BIA) on June 25, 2001, requesting guidance on the geographic extent of the aboriginal territories of the federally recognized tribes in Maine. In response, the BIA indicated that all four of the federally recognized tribes in Maine have identified the Presumpscot River as an area within their aboriginal territory and an area to which they attach religious and

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cultural significance (letter from Terence N. Martin, Team Leader, Office of Environmental Policy, Bureau of Indian Affairs, dated July 27, 2001). We provided each of these tribes with a copy of the DEIS, which summarized what we know about historic properties in the areas of the project. In our transmittal letter to the tribes, we requested consultation with them to discuss any concerns with the findings relative to the historic properties identified in the DEIS. None of the tribes responded to our request or filed comments on the DEIS.

There are three identified historic properties within the APE of the Dundee Project. One, prehistoric site 13.50, contains a significant early Archaic component represented by quartz unifaces, cores, and flakes associated with abrading stones, hammers, and stone rods. Portions of the site are located along the shoreline margin, while another portion is submerged as a result of construction of Dundee dam. Construction of the dam also inundated portions of the Cumberland and Oxford Canal, which operated from 1820 to the 1870s between Sebago Lake and Portland and is listed in the National Register. Portions of the canal remain visible near the edge of the impoundment, while other portions are submerged within the impoundment. Dundee Project facilities constitute the third historic property in this project's APE. Consisting of the dam, forebay, intake, tailrace, powerhouse and historic equipment, the project facilities were designed and built by Stone and Webster Engineering Corporation, and as such constitute an example of work by one of the leading engineering firms of the period.

The APE of the Gambo Project contains four historic properties. The Gambo Project contains the National Register-eligible prehistoric site 13.51, an early Archaic site used for stone toolmaking. Portions of the Cumberland and Oxford Canal remain visible near the west edge of the impoundment, while other portions are submerged within the impoundment. On an island just above Gambo dam are partially submerged remains of a 19th century charcoal-production facility associated with the historic Oriental Powder Mills Complex, most of which lies downstream of Gambo dam in the Little Falls Project APE. Between the dam and the island is the National Register-eligible 1912 Gambo Pony Bridge, now consisting of one Warren pony truss span and several concrete piers from which the superstructure has been removed.

The APE of the Little Falls Project contains three historic properties. National Register-eligible prehistoric site 8.19, located near the confluence of Black Brook with the Presumpscot River, contains early Archaic period material, including a feature containing a gouge, red pebbles, abrading stones, quartz flakes, and charcoal. The remains of the Oriental Powder Mills Complex are listed in the National Register as part of the Cumberland and Oxford Canal historic district. The complex extends about 0.75 mile along both banks of the Little Falls impoundment below Gambo dam. This

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gunpowder manufactory was established around 1824 and became one of the largest of its kind in Maine. After many episodes of construction and reconstruction, the mill complex finally closed in 1905. The site today contains remains of numerous buildings, structures, water conveyances, and transportation systems. Remains of the Cumberland and Oxford Canal itself lie west of the river and the mill complex, at distances ranging from immediately beside to over 50 feet away.

The only historic property in the APE of the Mallison Falls Project is the Cumberland and Oxford Canal, portions of which exist at varying distances from the project along the west side of the river.

The APE of the Saccarappa Project contains three historic properties. Prehistoric site 8.20, situated on the east side of the river a short distance below Mallison Falls dam, is eligible for the National Register as a large multi-component site with archaeological materials dating from the early Archaic to early historic period. Remains of the Cumberland and Oxford Canal exist on the west side of the project, some quite close to the river. The project facilities, including the dam, forebay, intake, tailrace, powerhouse and historic period equipment, are eligible for the National Register as an example of early 20th century hydroelectric station design and construction, and as illustration of the manner in which S.D. Warren developed electrical generating capacity to operate its paper mill in Westboro.

4.3.6.2 Environmental Consequences

S.D. Warren's Proposed Action and Modifications

At Dundee, S.D. Warren proposes to provide protection and mitigation of impacts on significant archaeological resources; consult with the SHPO prior to initiating any non-routine actions that could affect historic Dundee Project facilities; develop, in consultation with the SHPO, plans for recording any adversely affected historic project facilities; develop a plan for protection of the Cumberland and Oxford canal and towpath from project-related activities including monitoring impacts on canal section "Dundee Section 2" during major flood events; and consult with the SHPO regarding recreation enhancements that could affect historic properties.

At Gambo, S.D. Warren's proposals are similar to those proposed for the Dundee Project, except that no consultation with the SHPO is proposed regarding the Gambo Project facilities, which are not eligible for the National Register. In addition, S.D. Warren proposes to develop plans for monitoring flood impacts on Gambo Section 15 of the Cumberland and Oxford Canal and to the Gambo Pony Bridge.

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At Little Falls, S.D. Warren's proposals with regard to historic properties are similar to those proposed for the Dundee Project, except that no consultation with the SHPO is proposed regarding the Little Falls Project facilities, which are not eligible for the National Register. S.D. Warren does propose, if necessary based on consultation with the SHPO, to develop a plan to mitigate or prevent further erosional impacts on Feature D of the Oriental Powder Mills Complex.

At Mallison Falls, S.D. Warren's proposals with regard to historic properties are similar to those proposed for the Dundee Project, except that no consultation with the SHPO is proposed regarding the Mallison Falls Project facilities, which are not eligible for the National Register.

At Saccarappa, S.D. Warren's proposals with regard to historic properties are similar to those proposed for the Dundee Project. In addition, S.D. Warren proposes to develop plans for shoring or other stabilization of tow path walls in Cumberland and Oxford Canal Saccarappa Sections 9 and 15, and for monitoring flood impacts on these sections of the canal.

S.D. Warren's proposed historic properties protection and enhancement measures generally incorporate recommendations provided by the SHPO in letters dated December 16, 1997, and April 23, 1998. Subsequent to S.D. Warren's filing of its applications, the SHPO reviewed results of Phase II archaeological investigations. In its letter of April 12, 2000, the SHPO recommended that further Phase II testing be completed at Site 8.19 in the Little Falls Project, prior to determining the need for mitigation, and that National Register-eligible sites 8.20, 13.50, and 13.51 be monitored on a long-term basis for erosion and vandalism. The SHPO also recommended that plans for this monitoring, and for treatment of Site 8.19 following the further investigation, be incorporated into a HPMP.

Continued operation of the Dundee and Saccarappa projects would maintain the historic facilities at these projects in productive use for the purpose for which they were originally designed and built, and would therefore, be beneficial. However, historic project facilities would require maintenance, repair and possibly alteration to meet changing circumstances over the license period. Appropriate procedural provisions within a HPMP, prepared in consultation with the SHPO, would ensure that potential adverse effects on historic properties resulting from such future actions would be avoided or satisfactorily mitigated.

Recreation enhancements proposed by S.D. Warren or recommended by other entities such as N.S. could affect historic properties, particularly the Cumberland and

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Oxford Canal (all five projects) and the Oriental Powder Mill Complex (Gambo and Little Falls projects). Development of plans for these enhancements, in consultation with the SHPO, would ensure that any potential adverse effects on historic properties resulting from enhancement of recreational facilities would be avoided or satisfactorily mitigated.

Fish passage facilities recommended by agencies would affect National Register-eligible elements, such as the dams, at the Dundee and Saccarappa projects. Development of plans for these fish passage facilities in consultation with the SHPO would ensure that potential adverse effects on historic properties resulting from this form of fisheries enhancement would be avoided or satisfactorily mitigated.

Maintenance of existing impoundment levels and operating regimes could affect various segments of the Cumberland and Oxford Canal that are vulnerable to shoreline erosion or flooding; and to elements of the Oriental Powder Mill Complex now partially submerged in the Gambo and Little Falls impoundments. Development of plans for monitoring, and as necessary mitigating, known and possible future project-related impacts on these historic properties and to sites 8.19, 8.20, 13.50, and 13.51, in consultation with the SHPO, would ensure that adverse effects on these resources are appropriately addressed.

To ensure that adverse effects on known and potential historic properties, and to any as-yet unidentified archaeological resources are satisfactorily resolved over the term of the licenses, the Commission would execute a PA with the SHPO and Advisory Council, with the licensee as an invited signatory. The PA would cover all five projects, with provision for modifications relieving the licensee of certain obligations should one or more of the dams be removed subsequent to license issuance. The PA would require the licensee to prepare a HPMP, in consultation with the SHPO. The PA would specify that the HPMP contain principles and procedures to address identification, continued use, and protection of historic properties; mitigation of unavoidable adverse effects; compliance with laws and regulations governing human remains; and discovery of previously unidentified resources. The PA would also specify that the HPMP should incorporate the SHPO recommendations made subsequent to filing of the license applications. Execution of the PA and implementation of its measures would document the Commission's consideration of the effects of relicensing the five projects on historic properties.

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Dam Removal Alternatives

Removal of Little Falls, Mallison Falls, and Saccarappa Dams

Removal of Little Falls, Mallison Falls and Saccarappa dams could potentially benefit archaeological sites 8.19 and 8.20, and also Sections 9 and 15 of the Cumberland and Oxford Canal in the Saccarappa Project. With dam removal and subsequent lowering of the impoundments, the long-term rate of erosion of these sites, which are at or above current water level, would diminish, slowing the loss of cultural remains. Assuming that project operations contributed to the erosion of these sites, dam removal would have a beneficial impact. Lowering of the Little Falls impoundment might also benefit remains of the Oriental Powder Mills Complex that are now partially submerged in the Little Falls impoundment and thus subject to erosion and other damage from water level fluctuations and ice flows.

Removal of the dams could also adversely affect historic properties. Removal of Saccarappa dam would have an adverse effect on the National Register-eligible Saccarappa Project facilities, of which the dam is a contributing element. Removal of the dams and lowering of the impoundments could expose previously submerged sites (known and as yet unknown) that could be adversely affected by erosion and by human scavenging. Full (or greater) exposure of portions of archaeological sites 8.19, 8.20, and the Oriental Powder Mills now partially or wholly submerged could subject these resources to inadvertent damage by recreationists or to vandalism. Finally, the low bench portion of site 8.20, situated about 400 feet below Mallison Falls dam, may be vulnerable to damage from demolition staging or sudden release of water during demolition of this structure.

Removal of Saccarappa Dam Only

Removal of Saccarappa dam alone would have no effect on historic properties in the remaining four projects. Removal of Saccarappa dam could potentially benefit archaeological site 8.20, and also Sections 9 and 15 of the Cumberland and Oxford Canal in the Saccarappa Project. With dam removal and subsequent lowering of the impoundments, the long-term rate of erosion of these sites, which are at or above current water level, would diminish, slowing the loss of cultural remains. Assuming that project operations contributed to the erosion of these sites, dam removal would have a beneficial impact. However removal of Saccarappa dam would have an adverse effect on the National Register-eligible Saccarappa Project facilities, of which the dam is a contributing element. Full (or greater) exposure of portions of archaeological site 8.20

Removal of Little Falls and Mallison Falls Dams

Removal of Little Falls and Mallison Falls dams would have similar effects on site 820 and the remains of the Oriental Powder Mill Complex as the alternative to removal of all three minor project dams except that there would be no effect on the characteristics that qualify the Saccharappa Project for listing in the National Register.

Although the Commission could require S.D. Warren to mitigate adverse effects on historic properties resulting from dam removal, S.D. Warren would no longer have any obligation to undertake any of the enhancement and protection measures it has proposed in its license applications for the Little Falls, Mallison Falls and Saccharappa projects. These include providing protection and mitigation of project-related impacts on archaeological sites, and developing a plan to protect vulnerable portions of the Cumberland and Oxford Canal from project-related activities at Saccharappa.

4.3.6.3 Cumulative Effects

Implementation of S.D. Warren's proposed measures to protect and maintain portions of the Cumberland and Oxford Canal that occur within the project boundary would benefit an historic property of regional significance. Removal of Saccharappa dam only would adversely affect the portions of the Cumberland and Oxford Canal because S.D. Warren would not shore up Sections 9 and 15 that occur within the project boundary.

4.3.6.4 Unavoidable Adverse Effects

None.

4.4 Irreversible and Irretrievable Commitment of Resources

Continued operation of the existing projects would continue to commit most of the lands and waters previously developed for energy production. If the Commission were to order the removal of the three minor project dams, land removed from the project boundary would be available for other uses. Effects on habitat changed due to construction of recreational facilities at the project would diminish in time with proper soil erosion control and revegetation techniques.

Our recommended operating alternative for the project is expected to provide at least an average of about 38,428,000 kWh of energy each year to the region. This long-term productivity would tend at least as long as the duration of the new licenses. Our recommendations are designed to minimize or avoid, in certain cases, long-term decreases in biological productivity of the system, as well as enhance aquatic habitat and local and regional recreational opportunities.

If the project 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 habitat availability. Moreover, efforts to enhance recreational opportunities at the projects would be foregone.

With our recommended operating mode, as well as with appropriate enhancement or protection measures, the project would continue to provide a low-cost, environmentally sound source of power. Moreover, the project, with our recommendations, would further the many goals and objectives identified by the agencies and other interested parties for managing the resources of the Presumpscot River.

5.0 DEVELOPMENTAL ANALYSIS

In this section, we analyze the projects' use of the water resources of the Presumpscot River to generate hydropower, estimate the economic benefits of the Presumpscot River projects, and estimate the cost of various environmental protection and enhancement measures and the effects of these measures on project operations.

Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division,⁴² the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no forecasts concerning potential future inflation, escalation, or deflation beyond the license issuance date. The Commission's economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

⁴² 72 FERC ¶ 61,027 (July 13, 1995).

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For our economic analysis of the alternatives, we used the assumptions, values, and sources shown in table 47, which apply to all five projects unless otherwise noted.

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S.1 Dundee

5.1.1 Power and Economic Benefits of the Project as Proposed

The proposed action consists of the operation of the Dundee Project with S.D. Warren's proposed environmental measures, as shown in table 48.

Table 47. Staff assumptions for economic analysis of the Presumpscot River projects (Source: Staff).

Assumption	Value
Energy value ^a (2001)	40.47 mills/k Wh
On-peak capacity value ^b (2001)	\$0/kW-yr
Period of analysis	30 years
Interest/discount rate ^c	8 percent
Cost of money ^c	8 percent
Bond/debt ratio ^d	0.5
Federal tax rate	34 percent
Local tax rate	3 percent
Insurance rate	0.25 percent of cost of construction
Term of financing	20 years
Escalation rate	0 percent
Operations & maintenance (O&M) costs (2001\$) ^{e,f}	\$118,460 (each project)
Net investment (2001\$) ^g	\$879,100 (Dundee) \$284,800 (Gambo) \$347,700 (Little Falls) \$ 274,400(Mallison Falls) \$148,600 (Saccarappa)
Relicensing costs (2000\$) ^h	\$137,400 (each project)

^a Energy value is the average daily market clearing price for the period January 1, 2001 through December 31, 2001 (source: www.iso-ne.com, accessed January 3, 2002).

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- Because the market for installed capacity has not yet been established, we have not applied a value for installed capacity at this time, although it may be appropriate in the future.
- Discount rate of 8 percent is typical for this type of analysis and reflects the average cost of debt financing.
- d Assuming 50 percent of project capital costs would be financed, while remainder would be paid for out of internal capital.
 - e S.D. Warren provided an average O&M cost for each of the five projects of \$115,000 per year in 2000 dollars in its September 5, 2000, additional information response.
 - f Annual FERC fees were assumed to be included in the annual O&M cost.
 - g The project net investment values as of December 31, 1999, were provided by S.D. Warren in its additional information response dated September 5, 2000. These values were depreciated by staff to 2001 values at a rate of 1/30 per year.
 - h S.D. Warren provided a current total of direct relicensing costs for the five projects of \$687,006.08 in its September 5, 2000, additional information response. This cost was divided equally among the five projects by staff and added to the net investment in 2000.

Table 48. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Dundee Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$) ^a	Annual energy cost (2001\$)	Total annualized cost (2001\$)
Continue to operate in ROR mode.	\$0	\$0	\$0	\$0
Improve operations to better control impoundment fluctuations.	\$0	\$4,300	\$0	\$4,300
Avoid drawing down impoundment during May and June.	\$0	\$110	\$0	\$110

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 Table 48. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Dundee Project as proposed by S.D. Warren (Source: Staff).

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Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$) ^a	Annual energy cost (2001\$)	Total annualized cost (2001\$)
Contact MDIFW staff before any planned drawdowns.	\$0	\$0	\$0	\$0
After drawdown periods, provide controlled refill of the impoundment.	\$0	\$280	\$0	\$280
Provide 57cfs (May - Sep), 20 cfs (Nov - Mar) and 30 cfs (Apr and Oct) into the bypassed reach ^b	\$2,120	\$420	\$32,420	\$33,130
Develop means for monitoring compliance with minimum flows.	\$0 ^c	\$0	\$0	\$0
Install upstream eel passage facilities to operate from May to Oct.	\$36,750	\$810	\$0	\$5,790
Protect down-migrant adult eels by shutting down generation for 4 hours per night during four, 7-day periods in the autumn and conduct a 3-year study to determine peak seasonal and daily timing of downstream eel migration.	\$48,450	\$1,780	\$7,730	\$16,080

Table 49. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff).

Environmental measures	Recommending entity	Annual costs,			Total annualized cost (2001\$)	Adopted by staff (Yes/No)
		Capital and one-time costs (2001\$)	including O&M (2001\$)	Annual energy costs (2001\$)		
Maintain minimum flows of 60 cfs (May - Nov) and 40 cfs (Dec - Apr) in the bypassed reach. ^a	MDEP	\$0	\$0	\$22,380	\$22,380	No
Maintain year-round minimum flow of 57 cfs in bypassed reach. ^a	FWS	\$0	\$0	\$27,720	\$27,720	No
Maintain minimum flow of 57 cfs (Mar - Dec) and 30 cfs (Jan - Feb) in bypassed reach. ^a	MDIFW	\$0	\$0	\$21,690	\$21,690	No
Provide spill of 50 cfs when river temperatures exceed 24 degrees C. ^b	MDEP	\$0	\$0	\$0	\$0	Yes

Table 49.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by Staff (Yes/No)
Determine appropriate minimum bypassed reach flows for adult spawning, egg incubation, and production of juvenile Atlantic salmon.	MASC	\$5,150 ^c	\$0	\$0	\$0	No
Conduct a wadability study for safe angling.	MDIFW	\$5,150 ^c	\$0	\$0	\$0	No
Evaluate minor operational or structural modifications that could enhance angling.	MDIFW	\$520 ^c	\$0	\$0	\$0	No
Determine acceptable ramping rates to minimize fish stranding and injury.	MDIFW	\$520 ^c	\$0	\$0	\$0	No
Provide a deepwater release to provide cooler water to bypassed reach.	MDIFW	\$15,450 ^c	\$5,150	\$0 ^d	\$7,250	No

Table 49. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff).

Environmental measures	Recommending entity	Annual costs,		Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by Staff (Yes/No)
		Capital and one-time costs (2001\$)	including O&M (2001\$)			
Prepare a plan to monitor minimum flows and impoundment levels.	FWS, MDIFW, Staff	\$10,300 ^e	\$0	\$0	\$1,400 ^e	Yes
Provide upstream (u/s) fish passage for shad and herring.	FWS	\$4,423,570 ^e	\$20,000 ^e	\$0	\$620,550 ^e	Yes
Provide downstream (d/s) fish passage for shad and herring.	FWS	\$803,480 ^e	\$10,000 ^e	\$0	\$119,280 ^e	Yes
Provide attraction flows for upstream and downstream passage of shad, herring and eels	FWS	\$0	\$0	\$37,560 ^f	\$37,560 ^f	Yes

Table 49.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff).

Environmental measures	Recommending entity	Annual costs, including			Total annualized cost (2001\$)	Adopted by Staff (Yes/No)
		Capital and one-time costs (2001\$)	O&M (2001\$)	Annual energy costs (2001\$)		
Protect down-migrant adult eels by ceasing generation for 8 hours per night (Sep-Oct) and conduct a 3-year study to determine best peak seasonal and daily timing for downstream eel migration. ²	FWS	\$0	\$0	\$23,190	\$23,190	Yes
Provide plans for u/s and d/s passage facilities for shad and herring.	MDMR	\$30,900 ^c	\$0	\$0	\$4,090	No
Include recopener clause for u/s and d/s passage for diadromous fish once passage at Cumberland Mills dam is achieved.	MASC	\$0	\$0	\$0	\$0	Yes
Develop a fish passage implementation plan.	Staff	\$7,730	\$0	\$0	\$1,050	Yes

Table 49. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff)

Environmental measures	Recommending entity	Annual costs, including O&M		Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by Staff (Yes/No)	Document Accession #:
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)				
Develop an SMP including licensee-owned lands within 500 feet of shoreline.	FWS	\$10,300 ^c	\$0	\$0	\$1,400	No	2009024-0169
Maintain a buffer zone on licensee-owned lands within the project boundary up to 200 feet from the normal high water mark.	Staff	\$2,580 ^c	\$0	\$0	\$350	Yes	2009024-0169
Develop plan for walk-in angler access to bypassed reach.	MDIFW	\$1,750 ^c	\$0	\$0	\$240	Yes	2009024-0169
Develop plan for public access to the impoundment.	MDIFW	\$1,030 ^c	\$0	\$0	\$140	Yes	2009024-0169
Monitor recreational use every 6 years.	FWS	\$4,120 ^c	\$0	\$0	\$560	No	2009024-0169

Table 49.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs, (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost, (2001\$)	Adopted by staff (Yes/No)	Accession #
Conduct a recreational use monitoring study in conjunction with the Form 80 filing in 2010 and file and update every 12 years thereafter.	Staff	\$6,180 ^c	\$0	\$0	\$840	Yes	20090324-0169
Modify and relocate the existing portage.	NPS	\$15,450 ^c	\$0	\$0	\$200	Yes	20090324-0169
File a Final Recreational Facilities Enhancement Plan for all five projects ^a	MDIFW, Staff	\$3,090 ^c	\$0	\$0	\$420	Yes	20090324-0169
Develop a HPMP for all five projects ^a	Staff	\$3,090 ^c	\$0	\$0	\$420	Yes	20090324-0169
Total cost of applicant's proposal from table 48. ^c		\$155,610	\$26,900	\$40,150	\$88,160		

Table 49.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Dundee Project (Source: Staff).

Environmental measures	Recommending entity	Annual		Total annualized cost (2001\$)	Accounted by Staff (Yes/No)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)		
Total cost of applicant's proposed action with additional staff-recommended measures.		\$5,541,841 0	\$57,800	\$100,900	\$893,620
Total cost without costs for preliminarily prescribed fish passage facilities for shad and herring.		\$191,360	\$26,900	\$63,340	\$116,210

a Existing leakage would provide part of the minimum flow.

b Since we cannot predict how frequently this measure would need to be implemented, we have attached no costs for its implementation or any associated lost generation.

c Costs were estimated by staff.

d Staff assumed that no additional energy losses would occur because the minimum flow would be released from a different location.

e Capital costs were estimated by the FWS; O&M costs were estimated by staff.

f Energy estimates were based on attraction flows required per FWS prescription.

g This cost is an incremental cost beyond the applicant's proposed shutdowns due to the longer shutdown duration. We assume that S.D. Warren would develop one plan for all five projects; accordingly we assign one fifth of our staff estimated cost to this project.

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facilities at the Dundee Project would be considerably delayed after license issuance because of downstream obstacles and the phased approach to installation based on the presence of trigger populations of target species immediately below the dam. Therefore, we also provide the net annual benefit of the project without the prescribed fish passage facilities. The annual net benefit without the prescribed facilities would be \$293,650 (13.48 mills/kWh).

5.1.3 No Action

Under the no-action alternative, the Dundee Project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The annual net benefit for the no-action alternative would be \$409,830 (25.61 mills/kWh). The estimated average annual output of the project would be 16,000,000 kWh.

5.1.4 Economic Comparison of the Alternatives

Table 50 presents a summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Dundee Project.

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Table 50. Summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Dundee Project (Source: Staff).

	No action	Applicant's proposed action	Applicant's proposed action with additional staff-recommended measures	Applicant's proposed action with additional staff-recommended measures (except fish passage for shad and herring)
Installed capacity (kW)	2,400	2,400	2,400	2,400
Annual generation (kWh)	16,000,000	15,008,000	13,507,000	14,435,000
Annual power benefit (mills/kWh)	\$647,520	\$607,370	\$546,620	\$584,180
Annual cost (mills/kWh)	40.47	40.47	40.47	40.47
Annual cost (mills/kWh)	\$237,690	\$285,700	\$1,030,390	\$290,540
Annual net benefit (mills/kWh)	14.86	19.04	76.29	26.99
Annual net benefit (mills/kWh)	\$409,830	\$321,670	-\$483,770	\$293,650
Annual net benefit (mills/kWh)	25.61	21.43	-35.82	13.48

* S.D. Warren stated in its license application for the Dundee Project that the installed capacity is 2,400 kW and the average annual generation is 16,000,000 kWh.

The enhancements proposed by S.D. Warren for the Dundee Project would decrease annual net benefits by \$88,160 from the no action alternative. The annual generation would decrease from 16,000,000 kWh to 15,008,000 kWh.

Recommendations by staff and others for the Dundee Project would decrease annual net benefits by \$893,620 from the no action alternative. The annual generation for the proposed project with recommendations by staff and others would be 13,507,000 kWh.

With the staff-recommended measures, except the prescribed facilities, the annual net benefits would decrease only \$1116,210 from the no action alternative.

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5.2 Gambo
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5.2.1 Power and Economic Benefits of the Project as Proposed

The proposed action consists of the operation of the Gambo Project with S.D. Warren's proposed environmental measures, as shown in table 51.

Table 51. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Gambo Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$) ^a	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Continue to operate in a ROR mode.	\$0	\$0	\$0	\$0
Improve operations to better control impoundment fluctuations.	\$0	\$4,300	\$0	\$4,300
Avoid drawing down impoundment during May and June.	\$0	\$110	\$0	\$110
Contact MDIFW staff before any planned drawdowns.	\$0	\$0	\$0	\$0
After drawdown periods, provide controlled refill of the impoundment.	\$0	\$180	\$0	\$180
Provide minimum flow of 40 cfs (Apr-Oct) and 30 cfs (Nov-Mar) into the bypassed reach.	\$2,120	\$420	\$0 ^b	\$710

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Table 21. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Gambo Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$) ^a	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Develop means for monitoring compliance with minimum flows.	\$0 ^c	\$0	\$0	\$0
Protect down-migrant adult eels by ceasing generation for 4 hours per night during four, 7-day periods in the autumn and conduct a 3-year study to determine best peak seasonal and daily timing for downstream eel migration.	\$48,450	\$1,780	\$4,090	\$12,440
Clearly delineate the portage trail, control vegetation, and develop a car-top boat access with parking and signage at the portage take-out.	\$16,550	\$2,120	\$0	\$4,360
Develop walk-in angler access to the bypassed reach.	\$3,180	\$0	\$0	\$430
Develop and install signage explaining the history of the Oriental Powder Mill Complex.	\$10,610	\$530	\$0	\$1,970
Conduct road grading, repair and construction and install a road gate on 1,700 feet of Gambo Road in Gorham.	\$36,340	\$2,120	\$0	\$7,050

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Environmental measures	Capital and one-time costs (2001\$)*	Annual costs, including O&M (2001\$)*	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Provide protection and mitigation of impacts on any archaeological sites.	\$TBD	\$TBD	\$0	\$0
Develop a plan to protect the canal and towpath and monitor impacts on the "Dundee Canal Section 2."	\$2,550	\$950	\$0	\$1,300
Develop a plan for monitoring flood impacts on the Gambo Pony Bridge.	\$2,120	\$530	\$0	\$820
Consult with the MHPC regarding recreational enhancements that may affect historic resources.	\$1,020	\$0	\$0	\$140
Develop plan for impacts on Oriental Powder Mill Complex feature D.	\$TBD	\$TBD	\$0	\$0
Total cost of proposed measures	\$122,940	\$13,040	\$4,090	\$33,810

- * Costs taken from S.D. Warren response to additional information request dated June 14, 1999. The costs were then escalated to 2001 dollars.
- b The minimum flow requirement would be met by existing leakage.
- c We assume this cost is included in S.D. Warren's minimum flow cost estimate.

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Based on the assumptions in table 47 and the costs of proposed enhancements shown in table 51, we estimate that the annualized cost of S.D. Warren's proposed Gambo Project would have a net annual benefit of \$153,110 (18.23 mills/kWh). The estimated annual output of the project would be 8,599,000 kWh.

5.2.2 Modifications to the Proposed Actions

In table 52, we present the costs of additional measures recommended by staff and others, in addition to those proposed by S.D. Warren.

Based on the assumptions in table 47 and the costs of the enhancements shown in tables 51 and 52, we estimate that the total annualized cost of the Gambo Project as proposed by S.D. Warren, including additional measures by staff and others that were recommended by staff, would have a net annual benefit of -\$289,000 (-39.62 mills/kWh). The estimated average annual output of the project would be 7,294,000 kWh.

Given the likelihood that installation of fish passage facilities at the Gambo Project would be considerably delayed after license issuance because of downstream obstacles and the phased approach to installation based on the presence of trigger populations of target species immediately below the dam, we also provide the net annual benefit of the project without the prescribed fish passage facilities. The annual net benefit without the prescribed facilities would be \$130,630 (13.78 mills/kWh).

Table 52. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)		Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)	
							Yes	No
Maintain year-round minimum flow of 40 cfs in bypassed reach. ^a	FWS, Staff	\$0	\$0	\$0	\$0 ^b	\$0	Yes	
Maintain year-round minimum flow of 60 cfs in bypassed reach. ^a	MDEP	\$0	\$0	\$0	\$8,740 ^c	\$8,740	No	
Provide spill of 100 cfs when river temperatures exceed 24 degrees C. ^d	MDEP	\$0	\$0	\$0	\$0	\$0	Yes	
Maintain minimum flow of 40 cfs (Mar-Dec) and 30 cfs (Jan-Feb) in bypassed reach. ^a	MDIFW	\$0	\$0	\$0	\$0 ^b	\$0	No	
Determine appropriate minimum bypassed reach flows for adult spawning, egg incubation and production of juvenile Atlantic salmon.	MASC	\$5,150 ^e	\$0	\$0	\$0	\$700	No	

Table 52. Summary of capital and one-time costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff)

Environmental measures	Recommending entity	Annual			Total annualized cost (2001\$)	Adopted by staff (Yes/No)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)	Annual energy costs (2001\$)		
Conduct a wadability study for safe angling.	MDIFW	\$5,150 ^e	\$0	\$0	\$700	No
Evaluate minor operational or structural modifications that could enhance angling.	MDIFW	\$520 ^e	\$0	\$0	\$70	No
Determine acceptable ramping rates to minimize fish stranding and injury.	MDIFW	\$520 ^e	\$0	\$0	\$70	No
Prepare a plan to monitor minimum flows and impoundment levels.	FWS, MDIFW, Staff	\$10,300 ^e	\$0	\$0	\$1,400	Yes
Provide upstream (u/s) fish passage for shad, herring and eels.	MDMR, FWS	\$1,885,080 ^f	\$20,600 ^f	\$0	\$276,270	Yes
Provide downstream (d/s) fish passage for shad and herring.	MDIFW, MDMR, FWS	\$741,670 ^f	\$10,300 ^f	\$0	\$110,890	Yes

Table 52.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Provide u/s eel passage.	MDMR, FWS, Staff	\$20,600 ^a	\$2,060 ^a	\$0	\$4,850	Yes
Provide attraction flows for upstream and downstream fish passage of shad, herring and eels.	FWS	\$0	\$0	\$32,460 ^a	\$32,460 ^a	Yes
Protect down-migrant adult eels by ceasing generation for 8 hours per night (Sep-Oct) and conduct a 3 year study to determine best peak seasonal and daily timing for downstream eel migration. ^b	FWS	\$0	\$0	\$12,260	\$12,260	Yes
Provide plans for u/s and d/s passage for American shad and blueback herring.	MDMR	\$20,600 ^a	\$0	\$0	\$2,790	No

Table 52. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Annual			Total annualized cost (2001\$)	Adopted by staff (Yes/No)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)	Annual energy costs (2001\$)		
Include reopener clause for u/s and d/s passage of diadromous fish once passage at Cumberland Mills dam is achieved.	MASC	\$0	\$0	\$0	\$0	Yes
Develop a fish passage implementation plan	Staff	\$7,730	\$0	\$0	\$1,050	Yes
Develop an SMP including licensee-owned lands within 500 feet of shoreline.	FWS	\$10,300 ^e	\$0	\$0	\$1,400	No
Maintain a buffer zone on licensee-owned lands within the project boundary up to 200 feet from the normal high water mark.	Staff	\$2,580 ^e	\$0	\$0	\$350	Yes

Table 52. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Annual			Total annualized cost (2001\$)	Adopted by staff (Yes/No)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)	Annual energy costs (2001\$)		
Develop plan for walk-in angler access to bypassed reach.	MDIFW	\$1,750 ^a	\$0	\$0	\$240	Yes
Develop plan for public access to the impoundment.	MDIFW	\$1,030 ^a	\$0	\$0	\$140	Yes
Provide a car-top boating access area at northern end of impoundment.	NPS	\$20,600 ^a	\$1,240 ^a	\$0	\$4,060	No
Tree monitoring and removal.	NPS, Staff	\$0	\$520 ^a	\$0	\$520	Yes
Monitor recreational use every 6 years.	FWS	\$4,120 ^a	\$0	\$0	\$560	No

Table 52.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Completed by staff (Yes/No)
Conduct a recreational use monitoring study in conjunction with the Form 80 filing in 2010 and file an update every 12 years thereafter.	Staff	\$6,180*	\$0	\$0	\$800	Yes
File a Final Recreational Facilities Enhancement Plan for all five projects. ¹	MDIFW, Staff	\$3,090*	\$0	\$0	\$400	Yes
Develop a HPMP for all five projects. ¹	Staff	\$3,090*	\$0	\$0	\$420	Yes
Total costs of applicant's proposal from table 51.		\$122,940	\$13,040	\$4,090	\$33,810	
Total cost of applicant's proposed action with additional staff-recommended measures.		\$2,806,040	\$46,520	\$48,810	\$475,930	

Table 52.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Gambo Project (Source: Staff).

Environmental measures	Recommending entity	Annual			Total annualized cost (2001\$)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)	Annual energy costs (2001\$)	
Total cost without costs for preliminary fish passage facilities for shad and herring.		\$179,290	\$15,620	\$16,350	\$56,370

^a This cost is an incremental cost beyond the applicant's proposed flow release.

^b The minimum flow requirement would be met by existing leakage.

^c Existing leakage would provide the majority of the minimum flow requirement.

^d Since we cannot predict how frequently this measure would need to be implemented, we have attached no costs for its implementation or any associated lost generation.

^e Costs were estimated by staff.

^f Capital costs were estimated by the FWS; O&M costs were estimated by staff.

^g Energy estimates were based on attraction flows required per FWS prescription.

^h This cost is an incremental cost beyond the applicant's proposed shutdowns due to the longer shutdown duration. We assume that S.D. Warren would develop one plan for all five projects; accordingly we assign one fifth of the cost staff estimated cost to this project.

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5.2.3 No-Action

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Under the no-action alternative, the Gambo Project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The annual net benefit for the no-action alternative would be about \$186,910 (21.99 mills/kWh). The estimated average annual output of the project would be 8,500,000 kWh.

5.2.4 Economic Comparison of the Alternatives

Table 53 presents a summary of the annual net benefits for no-action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Gambo Project.

The enhancements proposed by S.D. Warren for the Gambo Project would decrease annual net benefits by \$33,810 from the no-action alternative. The annual generation would decrease from 8,500,000 kWh to 8,399,000 kWh.

Recommendations by staff and others for the Gambo Project would decrease annual net benefits by \$475,930 from the no-action alternative. The annual generation for the proposed project with recommendations by staff and others would be 7,294,000 kWh.

With the staff-recommended measures, except the prescribed fish passage facilities, the annual net benefits would decrease only \$56,310 from the no-action alternative.

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Table 53. Summary of the annual net benefits for no action, applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Gambo Project (Source: Staff).

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	No action	Applicant's proposed action	Applicant's proposed action with additional staff-recommended measures	Applicant's proposed action with additional staff-recommended measures (except fish passage for shad and herring)
Installed capacity (kW)	1,900	1,900	1,900	1,900
Annual generation (kWh)	8,500,000	8,399,000	7,294,000	8,096,000
Annual power benefit (mills/kWh)	\$344,000	\$339,910	\$295,190	\$327,650
	40.47	40.47	40.47	40.47
Annual cost (mills/kWh)	\$157,090	\$186,800	\$584,190	\$197,020
	18.48	22.24	80.09	26.69
Annual net benefit (mills/kWh)	\$186,910	\$153,110	-\$289,000	\$130,630
	21.99	18.23	-39.62	13.78

- * S.D. Warren stated in its license application for the Gambo Project that the installed capacity is 1,900 kW and the average annual generation is 8,500,000 kWh.

5.3 Little Falls

5.3.1 Power and Economic Benefits of the Project as Proposed

The proposed action consists of the operation of the Little Falls Project with S.D. Warren's proposed environmental measures, as shown in table 54.

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 Date: 06/30/2002
 Table 64. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Little Falls Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Continue to operate in a ROR mode.	\$0	\$0	\$0	\$0
Improve operations to better control impoundment fluctuations.	\$0	\$4,300	\$0	\$4,300
Avoid drawing down impoundment during May and June.	\$0	\$110	\$0	\$110
Contact MDIFW staff before any planned drawdowns.	\$0	\$0	\$0	\$0
After drawdown periods, provide controlled refill of the impoundment.	\$0	\$200	\$0	\$200
Protect down-migrant adult eels by ceasing generation for 4 hours per night during four, 7-day periods in the autumn and conduct a 3-year study to determine best peak seasonal and daily timing for downstream eel migration.	\$48,450	\$1,780	\$4,820	\$13,170

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Table 54. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Little Falls Project as proposed by S.D. Warren (Source: Staff).

Date: 06/30/2002

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Clearly delineate the portage trail, develop a cooperative maintenance agreement, and control vegetation.	\$11,880	\$1,060	\$0	\$2,670
Donate 0.8 acres on the island offshore of Hawkes property to the Gorham Land Trust.	\$10,610	\$0	\$0	\$1,440
Assist in developing a car-top boat access and parking area on Gorham Land Trust property off Tow Path Rd.	\$10,930	\$1,060	\$0	\$2,540
Provide protection and mitigation of impacts on any archaeological sites.	\$TBD	\$TBD	\$0	\$0
Develop a plan to protect the canal and towpath.	\$2,550	\$950	\$0	\$1,300
Consult with the MHPC regarding recreational enhancements that may affect historic resources.	\$1,020	\$0	\$0	\$140
Total cost of proposed measures	\$85,440	\$9,460	\$4,820	\$25,870

^a Costs taken from S.D. Warren response to additional information request dated June 14, 1999. The costs were then escalated to 2001 dollars.

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Based on the assumptions in table 47 and the costs of proposed enhancements shown in table 54, we estimate that S.D. Warren's proposed Little Falls Project would have a net annual benefit of \$165,159 (40.47 mills/kWh). The estimated annual output of the project would be 4,081,000 kWh.

5.3.2 Modifications to the Proposed Actions

In table 55, we present the cost of additional measures recommended by staff and others, in addition to those proposed by S.D. Warren.

Based on the assumptions in table 47 and the costs of the enhancements shown in tables 54 and 55, we estimate that Little Falls Project as proposed by S.D. Warren, including additional measures by staff and others that were recommended by staff, would have a net annual benefit of -\$531,800 (-152.33 mills/kWh). The estimated average annual output of the project would be 3,491,000 kWh.

Given the likelihood that installation of fish passage facilities at the Little Falls Project would be considerably delayed after license issuance because of downstream obstacles and the phased approach to installation based on the presence of trigger populations of target species immediately below the dam, we also provide the net annual benefit of the project without the prescribed fish passage facilities. The annual net benefit without the prescribed facilities would be -\$45,080 (-35.38 mills/kWh).

Table 55. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff or others for the Little Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Conduct a wadability study for safe angling.	MDIFW	\$5,150 ^a	\$0	\$0	\$700	No
Evaluate minor operational or structural modifications that could enhance angling.	MDIFW	\$520 ^a	\$0	\$0	\$70	No
Determine acceptable ramping rates to minimize fish stranding and injury.	MDIFW	\$520 ^a	\$0	\$0	\$70	No
Prepare a plan to monitor minimum flows and impoundment levels.	FWS, MDIFW, Staff	\$10,300 ^a	\$0	\$0	\$1,400	Yes
Provide upstream (u/s) eel passage.	MDMR, FWS	\$20600 ^a	\$2,060 ^b	\$0	\$4,850	Yes
Provide u/s fish passage for shad and herring.	MDMR, FWS	\$2,642,200 ^b	\$20,600 ^b	\$0	\$378,960	Yes
Provide downstream (d/s) fish passage for shad and herring.	MDIFW, MDMR, FWS	\$648,960 ^b	\$10,300 ^b	\$0	\$98,320	Yes

Table 55. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff or others for the Little Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)	Accession #	Filed
Provide attraction flows for upstream and downstream fish passage of shad, herring and eels.	FWS	\$0	\$0	\$9,430 ^c	\$9,430 ^c	Yes	2009034-0169	Yes
Protect down-migrant adult eels by ceasing generation for 8 hours per night (Sep-Oct) and conduct a 3 year study to determine best peak seasonal and daily timing for downstream eel migration. ^d	FWS	\$0	\$0	\$14,450	\$14,450	Yes		
Provide plans for u/s and d/s passage for American shad and blueback herring.	MDMR	\$20,600 ^a	\$0	\$0	\$2,790	No		
Develop a fish passage implementation plan	Staff	\$7,730	\$0	\$0	\$1,050	Yes		
Include reopening clause for u/s and d/s passage of diadromous fish once passage at Cumberland Mills dam is achieved.	MASC	\$0	\$0	\$0	\$0	Yes		

Table 55.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff or others for the Little Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)		Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)	Accession #	Filed
Develop an SMP including licensee-owned lands within 500 feet of shoreline.	FWS	\$10,300*	\$0	\$0	\$0	\$1,400	No	2009030169	Yes
Develop plan for public car-top boating access to the impoundment.	MDIFW	\$1,030*	\$0	\$0	\$0	\$140	Yes		
Monitor recreational use every 6 years.	FWS	\$4,120*	\$0	\$0	\$0	\$560	No		
Conduct a recreational use monitoring study in conjunction with the Form 80 filing in 2010 and file an update every 12 years thereafter.	Staff	\$6,180*	\$0	\$0	\$0	\$840	Yes		
File a Final Recreational Facilities Enhancement Plan for all five projects*	MDIFW, Staff	\$3,090*	\$0	\$0	\$0	\$420	Yes		
Develop a HPMP for all five projects	Staff	\$3,090*	\$0	\$0	\$0	\$420	Yes		

Table 55. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff or others for the Little Falls Project (Source: Staff).

Environmental measures	Recommending entity	Annual		Total annualized cost (2001\$)	Adopted by staff (Yes/No)
		Capital and one-time costs (2001\$)	costs, including O&M (2001\$)		
Total cost of applicant's proposal from table 54.		\$85,440	\$9,460	\$4,820	\$25,870
Total cost of applicant's proposed action with additional staff-recommended measures.		\$3,428,620	\$42,420	\$28,700	\$536,150
Total cost without costs for preliminarily prescribed fish passage facilities for shad and herring.		\$137,460	\$11,520	\$19,270	\$49,440

^a Costs were estimated by staff.

^b Capital costs were estimated by the FWS; O&M costs were estimated by staff.

^c Energy estimates were based on attraction flows required per FWS prescription.

^d This cost is an incremental cost beyond the applicant's proposed shutdowns due to the longer shutdown duration.

^e We assume that S.D. Warren would develop one plan for all five projects; accordingly we assign one fifth of the our staff estimated cost to this project.

Under the dam removal alternative, it was assumed that the Little Falls dam would be removed from the powerhouse on the east shore to the west shore. The powerhouse intake and discharge openings would be sealed and the powerhouse secured.

S.D. Warren would cease power generation at the site and have to replace the station generation by purchasing replacement energy on the open market at prevailing market prices to meet the power needs of its mill facilities in Westbrook.

Under this alternative, it was assumed that S.D. Warren would surrender its FERC license and would not provide any environmental enhancements besides removal of the dam.

Because the project would no longer generate electricity, the annual power benefit would be the cost of purchasing replacement energy, or -\$169,970. The only annual costs would be those associated with the removal of the dam, or \$114,300. The resulting annual net benefit for the dam removal alternative would be about -\$284,270.

It should also be noted that this alternative would increase annual costs at the Gambo and Mallison Falls projects because the transmission line from the Gambo powerhouse to S.D. Warren's mill facilities in Westbrook is used by all three projects. Currently, the \$75,000 per year annual maintenance cost is divided equally among the three projects. If the Little Falls dam is removed and the project no longer generates electricity, the maintenance cost would have to be borne by the remaining active generating stations.

5.3.4 No Action

Under the no-action alternative, the Little Falls Project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The annual net benefit for the no-action alternative would be about \$4,350 (1.04mills/kWh). The estimated average annual output of the project would be 4,200,000 kWh.

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Table 56 presents a summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Little Falls Project.

Table 56. Summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Little Falls Project (Source: Staff).

	No action	Applicant's proposed action	Applicant's proposed action with additional staff- recommended measures	Applicant's proposed action with additional staff- recommended measures (except fish passage for shad and herring)
Installed capacity (kW)	1,000	1,000	1,000	1,000
Annual generation (kWh)	4,200,000	4,081,000	3,491,000	3,724,000
Annual power benefit (mills/kWh)	\$169,970	\$165,150	\$141,270	\$150,700
Annual cost (mills/kWh)	40.47	40.47	40.47	40.47
Annual net benefit (mills/kWh)	\$165,620	\$186,670	\$673,070	\$195,780
Annual net benefit (mills/kWh)	39.43	45.74	192.80	75.85
Annual net benefit (mills/kWh)	\$4,350	\$-21,520	- \$531,800	\$-45,080
Annual net benefit (mills/kWh)	1.04	-5.27	- 152.33	-35.38

- a S.D. Warren stated in its license application for the Little Falls Project that the installed capacity is 1,000 kW and the average annual generation is 4,200,000 kWh.

The enhancements proposed by S.D. Warren for the Little Falls Project would decrease annual net benefits by \$25,870 from the no-action alternative. The annual generation would decrease from 4,200,000 kWh to 4,081,000 kWh.

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Recommendations by staff and others for the Little Falls Project would decrease annual net benefits by \$536,150 from the no-action alternative. The annual generation for the proposed project with recommendations by staff and others would be 3,491,000 cwh.

With the staff and agency-recommended measures, except the prescribed fish passage facilities, the annual net benefits would decrease only \$49,430 from the no-action alternative.

5.4 Mallison Falls

5.4.1 Power and Economic Benefits of the Project as Proposed

The proposed action consists of the operation of the Mallison Falls Project with S.D. Warren's proposed environmental measures, as shown in table 57.

Table 57. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Mallison Falls Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Continue to operate in a ROR mode.	\$0	\$0	\$0	\$0
Improve operations to better control impoundment fluctuations.	\$0	\$4,300	\$0	\$4,300
Avoid drawing down impoundment during May and June.	\$0	\$110	\$0	\$110
Contact MDIFW staff before any planned drawdowns.	\$0	\$0	\$0	\$0

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Table 5. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Mallisen Falls Project as proposed by S.D. Warren (Source: Staff).				
Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
After drawdown periods, provide controlled refill of the impoundment.	\$0	\$180	\$0	\$180
Provide minimum flow to the bypassed reach of 60 cfs (May-Sep), 40 cfs (Apr and Oct), and 20 cfs (Oct-Mar).	\$2,120	\$420	\$5,630 ^b	\$6,340
Develop means for monitoring compliance with minimum flows.	\$0 ^c	\$0	\$0	\$0
Protect down-migrant adult eels by ceasing generation for 4 hours per night during four, 7-day periods in the autumn and conduct a 3-year study to determine a best peak seasonal and daily timing for downstream eel migration.	\$48,450	\$1,780	\$3,840	\$12,190
Clearly delineate the portage trail with signage, and control vegetation at the take-out site.	\$0	\$0	\$0	\$0

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 Table 57. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Mallison Falls Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Provide car-top boat access above dam at portage take-out including signage and parking, signage for access below dam, and explore feasibility of providing an unloading point near bridge.	\$42,970	\$1,060	\$0	\$6,890
Continue to investigate opportunities for providing angler access to the bypass reach, and implement, if feasible.	\$TBD	\$TBD	\$0	\$0
Provide protection and mitigation of impacts on any archaeological sites.	\$TBD	\$TBD	\$0	\$0
Develop a plan to protect the canal and towpath.	\$2,550	\$950	\$0	\$1,300
Consult with MHPC regarding recreational enhancements that may affect historic resources.	\$1,020	\$0	\$0	\$140
Total cost of proposed measures	\$97,110	\$8,800	\$9,470	\$31,450

- ^a Costs taken from S.D. Warren response to additional information request dated June 14, 1999. The costs were then escalated to 2001 dollars.
- ^b The existing leakage would provide part of the minimum flow requirement.
- ^c We assume this cost is included in S.D. Warren's minimum flow cost estimate.

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Based on the assumptions in table 47 and the costs of proposed enhancements shown in table 57, we estimate that S.D. Warren's proposed Mallison Falls Project would have a net annual benefit of -\$47,150 (-4.32 mills/kWh). The estimated annual output of the project would be 3,966,000 kWh.

5.4.2 Modifications to the Proposed Action

In table 58, we present the costs of additional measures recommended by staff and others.

Based on the assumptions in table 47 and the costs of the enhancements shown in tables 57 and 58, we estimate that the Mallison Falls Project as proposed by S.D. Warren, including additional measures recommended by staff and others, would have a net annual benefit of -\$402,680 (-111.88 mills/kWh). The estimated average annual output of the project would be 3,599,000 kWh.

Given the likelihood that installation of fish passage facilities at the Mallison Falls project would be considerably delayed after license issuance because of downstream obstacles and the phased approach to installation based on the presence of trigger populations of target species immediately below the dam, we also provide the net annual benefit of the project without the prescribed fish passage facilities. The annual net benefit without the prescribed facilities would be -\$38,570 (-20.48 mills/kWh).

Table 58.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost ^a (2001\$)	Added by staff (2001\$)	Accepted by staff (2001\$)
Provide minimum flow to the bypassed reach of 60 cfs (May-Sep), 40 cfs (Oct-Mar). ^a	Staff	\$0	\$0	\$530 ^b	\$530	\$530	Yes
Maintain year-round minimum flow of 63 cfs in bypassed reach. ^a	FWS	\$0	\$0	\$2,140 ^b	\$2,140	\$2,140	No
Maintain minimum flow of 63 cfs (Mar-Dec) and 20 cfs (Jan-Feb) in bypassed reach. ^a	MDIFW	\$0	\$0	\$1,540 ^b	\$1,540	\$1,540	No
Maintain minimum flow of 60 cfs (May-Nov) and 40 cfs (Dec-Apr). ^a	MDEP	\$0	\$0	\$1,300 ^b	\$1,300	\$1,300	No
Determine appropriate minimum bypassed reach flows for adult spawning, egg incubation, and production of juvenile Atlantic salmon.	MASC	\$5,150 ^c	\$0	\$0	\$700	\$700	No

Table 58.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Conduct a wadability study for safe angling.	MDIFW	\$5,150 ^c	\$0	\$0	\$760	No
Evaluate minor operational or structural modifications that could enhance angling.	MDIFW	\$520 ^c	\$0	\$0	\$0	No
Determine acceptable ramping rates to minimize fish stranding and injury.	MDIFW	\$520 ^c	\$0	\$0	\$70	No
Prepare a plan to monitor minimum flows and impoundment levels.	FWS, MDIFW, Staff	\$10,300 ^c	\$0	\$0	\$1,400	Yes
Provide upstream (u/s) fish passage for shad and herring.	MDMR, FWS	\$1,900,530 ^d	\$20,600 ^d	\$0	278,370	Yes
Provide downstream (d/s) fish passage for shad and herring.	MDIFW, MDMR, FWS	\$535,650 ^d	\$10,300 ^d	\$0	\$82,950	Yes
Provide u/s eel passage.	MDMR, FWS	\$20,600 ^c	\$2,060 ^c	\$0	\$4,850	Yes

Table 58.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs		Annual energy costs	Total annualized cost	Accepted by staff
		costs (2001\$)	including O&M (2001\$)	(2001\$)	(2001\$)	Y (No)
Provide attraction flows for upstream and downstream fish passage of shad, herring and eels.	FWS	\$0	\$0	\$2,790 ^e	\$2,790	Yes
Protect down-migrant adult eels by ceasing generation for 8 hours per night (Sep-Oct) and conduct a 3-year study to determine best peak seasonal and daily timing for downstream eel migration. ^f	FWS	\$0	\$0	\$11,530	\$11,530	Yes
Provide plans for u/s and d/s passage for American shad and blueback herring.	MDMR	\$20,600 ^e	\$0	\$0	\$2,790	No
Develop a fish passage implementation plan	Staff	\$7,730	\$0	\$0	\$1,050	Yes

Table 58.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Include recopener clause for u/s and d/s passage for diadromous fish once passage at Cumberland Mills dam is achieved.	MASC	\$0	\$0	\$0	\$0	Yes
Develop an SMP including licensee-owned lands within 500 feet of shoreline.	FWS	\$10,300 ^c	\$0	\$0	\$1,400 ^c	Yes
Develop plan for walk-in angler access to bypassed reach.	MDIFW	\$1,750 ^c	\$0	\$0	\$240 ^c	Yes
Develop plan for public car-top boating access to the impoundment.	MDIFW	\$1,030 ^c	\$0	\$0	\$140 ^c	Yes
Monitor recreational use every 6 years.	FWS	\$4,120 ^c	\$0	\$0	\$560 ^c	No

Table 58.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost by staff (2001\$)	Adopted by staff (Yes/No)
Conduct a recreational use monitoring study in conjunction with the Form 80 filing in 2010 and file an update every 12 years thereafter.	Staff	\$6,180 ^c	\$0 ^c	\$0	\$840	Yes
File a Final Recreational Facilities Enhancement Plan for all five projects. ^a	MDIFW, Staff	\$3,090 ^c	\$0	\$0	\$420	Yes
Develop a HPMP for all five projects. ^a	Staff	\$3,090 ^c	\$0	\$0	\$420	Yes
Total cost of applicant's proposal from table 57. ^f		\$97,110	\$8,800	\$9,470	\$31,450	
Total cost of applicant's proposed action with additional staff-recommended measures.		\$2,587,060	\$41,760	\$24,320	\$416,980	

Table 58. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Mallison Falls Project (Source: Staff).

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Total cost without costs for preliminarily prescribed fish passage facilities for shad and herring.		\$150,880	\$10,860	\$21,530	\$52,870	
<p>a This cost is an incremental cost beyond the applicant's proposed flow release.</p> <p>b Existing leakage would provide part of the minimum flow requirement.</p> <p>c Costs were estimated by staff.</p> <p>d Capital costs were estimated by the FWS; O&M costs were estimated by staff.</p> <p>e Energy estimates were based on attraction flows required per FWS fishway prescription.</p> <p>f This cost is an incremental cost beyond the applicant's proposed shutdowns because of the longer shutdown duration.</p> <p>g We assume that S.D. Warren would develop one plan for all five projects; accordingly we assign one fifth of our staff estimated cost to this project.</p>						

Under the dam removal alternative, it was assumed that Mallison Falls dam would be removed from the industrial building on the east shore to the canal headworks structure. The canal headworks structure would remain in place with the gate opening sealed and the canal would be back-filled. The powerhouse intake and discharge openings would be sealed and the powerhouse secured.

S.D. Warren would cease power generation at the site and have to replace the station generation by purchasing replacement energy on the open market at prevailing market prices to meet the power needs of its mill facilities in Westbrook.

Under this alternative, it was assumed that S.D. Warren would surrender its FERC license and would not provide any environmental enhancements besides removal of the dam.

Because the project would no longer generate electricity, the annual power benefit would be the cost of purchasing replacement energy, or -\$169,970. The only annual costs would be those associated with the removal of the dam, or \$115,350. The resulting annual net benefit for the dam removal alternative would be about -\$285,320.

It should also be noted that this alternative would increase annual costs at the Gambo and Little Falls projects because the transmission line from the Gambo powerhouse to S.D. Warren's mill facilities in Westbrook is used by all three projects. Currently, the \$75,000 per year annual maintenance cost is divided equally among the three projects. If Mallison Falls dam is removed and the project no longer generates electricity, the maintenance cost would have to be borne by the remaining active generating stations.

5.4.4 No Action

Under the no-action alternative, the Mallison Falls Project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The annual net benefit for the no-action alternative would be about \$14,300 (3.40 mills/kWh). The estimated average annual output of the project would be 4,200,000 kWh.

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Table 59 presents a summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Mallison Falls Project.

Table 59. Summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Mallison Falls Project (Source: Staff).

	No action	Applicant's proposed action	Applicant's proposed action with additional staff- recommended measures	Applicant's proposed action with additional staff- recommended measures (except fish passage for shad and herring)
Installed capacity (kW)	800	800	800	800
Annual generation (kWh)	4,200,000	3,966,000	\$3,599,000	\$3,668,000
Annual power benefit	\$169,970	\$160,500	\$145,650	148,440
(mills/kWh)	40.47	40.47	40.47	40.47
Annual cost	\$155,680	\$177,650	\$548,330	\$187,010
(mills/kWh)	37.07	44.79	152.35	60.95
Annual net benefit	\$14,300	-\$17,150	-\$402,680	-\$38,570
(mills/kWh)	3.40	-4.32	-111.88	-20.48

^a S.D. Warren stated in its license application for the Mallison Falls Project that the installed capacity is 800 kW and the average annual generation is 4,200,000 kWh.

The enhancements proposed by S.D. Warren for the Mallison Falls Project would decrease annual net benefits by \$31,450 from the no-action alternative. The annual generation would decrease from 4,200,000 kWh to 3,966,000 kWh.

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Recommendations by staff and others for the Mallison Falls Project would increase annual net benefits by \$416,980 from the no-action alternative. The annual generation for the proposed project with recommendations by staff and others would be 3,599,000 kWh.

With the staff-recommended measures, except the prescribed fish passage facilities, the annual net benefits would decrease only \$52,870 from the no-action alternative.

5.5 Saccarappa

5.5.1 Power and Economic Benefits of the Project as Proposed

The proposed action consists of the operation of the Saccarappa Project with S.D. Warren's proposed environmental measures, as shown in table 60.

Table 60. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Saccarappa Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$)*	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Continue to operate in ROR mode.	\$0	\$0	\$0	\$0
Improve operations to better control impoundment fluctuations.	\$0	\$4,300	\$0	\$4,300
Avoid drawing down impoundment during May and June.	\$0	\$110	\$0	\$110
Contact MDIFW staff before any planned drawdowns.	\$0	\$0	\$0	\$0

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Table 60: Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Saccarappa Project as proposed by S.D. Warren (Source: Staff).

Environmental measures	Capital and one-time costs (2001\$)*	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
After drawdown periods, provide controlled refill of the impoundment.	\$0	\$190	\$0	\$190
Protect down-migrant adult eels by ceasing generation for 4 hours per night during four, 7-day periods in the autumn and conduct a 3-year study to determine best peak seasonal and daily timing for downstream migration.	\$48,450	\$1,780	\$4,330	\$12,680
Consult with the MASC to develop a schedule for construction of u/s and d/s passage for Atlantic salmon.	\$0	\$1,060	\$0	\$1,060
Establish a formal take-out site for car-top boat access to the impoundment, post signage, establish parking, and control vegetation.	\$14,270	\$2,280	\$0	\$4,220
Provide protection and mitigation of impacts on any archaeological sites.	\$TBD	\$TBD	\$0	\$TBD

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 Table 60. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures for the Saccarappa Project as proposed by S.D. Warren (Source: Staff).

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Environmental measures	Capital and one-time costs (2001\$) ^a	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)
Consult with the MHPC before conducting non-routine maintenance on eligible or National Register-listed structures.	\$0	\$6,370	\$0	\$6,370
Develop recordation plan of affected resources.	\$0 ^b	\$0	\$0	\$0
Develop a plan to protect the canal and towpath and construction plans for shoring "Saccarappa Canal Sections 9 and 15."	\$39,680	\$9,440	\$0	\$14,820
Consult with the MHPC regarding recreational enhancements that may affect historic resources.	\$1,020	\$0	\$0	\$140
Total cost of proposed measures	\$103,420	\$25,530	\$4,330	\$43,890

^a Costs taken from S.D. Warren response to additional information request dated June 14, 1999. The costs were then escalated to 2001 dollars.

^b We assume the cost of recordation is included in the cost estimate for consultation with the MHPC for non-routine maintenance of National Register-eligible structures.

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Based on the assumptions in table 47 and the costs of proposed enhancements shown in table 60, we estimate that S.D. Warren's proposed Saccarappa Project would have a net annual benefit of \$125,070 (-6.69 mills/kWh). The estimated annual output of the project would be 1,493,000 kWh.

5.5.2 Modifications to the Proposed Actions

In table 61, we present the costs of additional measures recommended by staff and others.

Based on the assumptions in table 47 and the costs of the enhancements shown in tables 60 and 61, we estimate that the Saccarappa Project as proposed by S.D. Warren, including additional measures by staff and others that were recommended by staff, would have a net annual benefit of \$-553,900 (-84.13 mills/kWh). The estimated average annual output of the project would be 6,584,000 kWh.

Given the likelihood that installation of fish passage facilities at the Saccarappa Project would be considerably delayed after license issuance, we also provide the net annual benefit of the project without the prescribed fish passage facilities. The annual net benefit without the prescribed facilities would be \$102,960 (0.36 mills/kWh).

Table 61.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Saccarappa Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost by staff (2001\$)	Adopted by staff (Yes/No)
Conduct a wadability study for safe angling.	MDIFW	\$5,150 ^a	\$0	\$0	\$700	No
Evaluate minor operational or structural modifications that could enhance angling.	MDIFW	\$520 ^a	\$0	\$0	\$70	No
Determine acceptable ramping rates to minimize fish stranding and injury.	MDIFW	\$520 ^a	\$0	\$0	\$70	No
Prepare a plan to monitor minimum flows and impoundment levels.	FWS, MDIFW, Staff	\$10,300 ^a	\$0	\$0	\$1,400	Yes
Provide u/s eel passage.	MDMR, FWS	\$20,600 ^a	\$2,060 ^a	\$0	\$4,550	Yes
Provide u/s fish passage for shad and herring.	MDMR, FWS	\$1,580,000 ^b	\$20,060 ^b	\$0	\$565,480	Yes
Provide downstream (d/s) fish passage for shad and herring.	MDIFW, MDMR, FWS	\$422,340 ^b	\$10,300 ^b	\$0	\$67,580	Yes

Table 61.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Saccarappa Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Adopted by staff (Yes/No)
Provide attraction flows for upstream and downstream fish passage of shad, herring, and eels.	FWS	\$0	\$0	\$23,800*	\$23,800	Yes
Provide plans for u/s and d/s passage for American shad and blueback herring.	MDMR	\$20,600*	\$0	\$0	\$2,790	No
Develop a fish passage implementation plan	Staff	\$7,730	\$0	\$0	\$1,030	Yes
Include reopener clause for u/s and d/s passage of diadromous fish once passage at Cumberland Mills dam is achieved.	MASC	\$0	\$0	\$0	\$0	Yes
Develop an SMP including licensee-owned lands within 500 feet of shoreline.	FWS	\$10,300*	\$0	\$0	\$1,400	No
Develop plan for public car-top boating access to the impoundment.	MDIFW	\$1,030*	\$0	\$0	\$140	Yes

Table 61.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Saccarappa Project (Source: Staff)

Environmental measures	Recommending entity	Capital and one-time costs (2001\$)	Annual costs, including O&M (2001\$)	Annual energy costs (2001\$)	Total annualized cost (2001\$)	Should be staff project? (Yes/No)
Monitor recreational use every 6 years.	FWS	\$4,120 ^a	\$0	\$0	\$840	No
Protect down-migrant adult eels by ceasing generation for 8 hours per night (Sept. to Oct.), and conduct a 3-year study to determine best seasonal and daily timing for downstream eel migration. ^a	FWS	\$0	\$0	\$12,990	\$12,990	Yes
Conduct a recreational use monitoring study in conjunction with the Form 80 filing in 2010 and file an update every 12 years thereafter.	Staff	\$6,180 ^a	\$0	\$0	\$840	Yes
File a Final Recreational Facilities Enhancement Plan for all five projects. ^c	MDIFW, Staff	\$3,090 ^a	\$0	\$0	\$420	Yes
Develop a HPMP for all five projects. ^c	Staff	\$3,090 ^a	\$0	\$0	\$420	Yes

Table 61.

Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures recommended by staff and others for the Saccarappa Project (Source: Staff).

Environmental measures	Recommending entity	Capital and Annual costs,		Annual energy costs (2001\$)	Total annualized cost (2001\$)
		one-time costs (2001\$)	including O&M (2001\$)		
Total cost of applicant's proposal from table 60.		\$103,420	\$25,530	\$4,330	\$43,890
Total cost of applicant's proposed action with additional staff-recommended measures.		\$4,595,160	\$58,490	\$41,120	\$722,860
Total cost without costs for preliminarily prescribed fish passage facilities for shad and herring.		\$ 155,440	\$27,590	\$17,320	\$66,000

^a Costs were estimated by staff.

^b Capital costs were estimated by the FWS; O&M costs were estimated by staff.

^c Energy estimates were based on attraction flows required per FWS prescription.

^d This cost is an incremental cost beyond the applicant's proposed shutdowns due to the longer shutdown duration.

^e We assume that S.D. Warren would develop one plan for all five projects; accordingly we assign one fifth of the our staff estimated cost to this project.

Under the dam removal alternative, it was assumed that both the east and west sections of Saccarappa dam would be removed to bedrock. The entire east dam would be removed from the eastern shore to the island. The western dam would be removed from the island to the abutment of the forebay headgate structure. The headgate structure and forebay spillway would also be removed. The intake and discharge openings in the powerhouse would be sealed and the powerhouse secured. It was assumed that the tailrace training wall would remain.

S.D. Warren would cease power generation at the site and have to replace the station generation by purchasing replacement energy on the open market at prevailing market prices to meet the power needs of its mill facilities in Westbrook.

Under this alternative, it was assumed that S.D. Warren would surrender its FERC license and would not provide any environmental enhancements besides removal of the dam.

Because the project would no longer generate electricity, the annual power benefit would be the cost of purchasing replacement energy, or -\$307,570. The only annual costs would be those associated with the removal of the dam, or \$101,840. The resulting annual net benefit for the dam removal alternative would be about -\$409,410.

5.5.4 No Action

Under the no-action alternative, the Saccarappa Project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The resulting annual net benefit for the no-action alternative would be about \$168,960 (22.23 mills/kWh). The estimated average annual output of the project would be 7,600,000 kWh.

5.5.5 Economic Comparison of the Alternatives

Table 62 presents a summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Saccarappa Project.

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Table 62. Summary of the annual net benefits for no action, the applicant's proposed action, and the applicant's proposed action with additional staff-recommended measures for the Saccarappa Project (Source: Staff).

	No action	Applicant's proposed action	Applicant's proposed action with additional staff- recommended measures	Applicant's proposed action with additional staff- recommended measures (except fish passage for shad and herring)
Installed capacity (kW)	1,350	1,350	1,350	1,350
Annual generation (kWh)	7,600,000	7,493,000	6,584,000	7,172,000
Annual power benefit (\$1,000)	\$307,570	\$303,240	\$266,450	\$290,250
(mills/kWh)	40.47	40.47	40.47	40.47
Annual cost (\$1,000)	\$135,700	\$176,200	\$483,590	\$185,040
(mills/kWh)	18.24	23.78	124.60	40.11
Annual net benefit (\$1,000)	\$168,960	\$125,070	-\$553,900	\$102,960
(mills/kWh)	22.23	16.69	-84.13	0.36

* S.D. Warren stated in its license application for the Saccarappa Project that the installed capacity is 1,350 kW and the average annual generation is 7,600,000 kWh.

The enhancements proposed by S.D. Warren for the Saccarappa Project would decrease annual net benefits by \$43,890 from the no action alternative. The annual generation would decrease from 7,600,000 kWh to 7,493,000 kWh.

Recommendations by staff and others for the Saccarappa Project would decrease annual net benefits by -\$722,860 from the no-action alternative. The annual generation for the proposed project with recommendations by staff and others would be 6,584,000 kWh.

We anticipate that it will take several years to remove or breach Smelt Hill dam and several years for the state to require and S.D. Warren to provide fish passage at Cumberland Mills dam. We also do not know how long it will take for target species to

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become established below Saccarappa dam once these downstream obstacles are removed. Given the likelihood that installation of fish passage facilities at Saccarappa would be considerably delayed after license issuance, we also provide the net annual benefit of the project without the prescribed fish passage facilities. Without the prescribed facilities, the annual net benefit would decrease only \$66,000 from the no action alternative.

5.6 Greenhouse Gas Effects

By producing hydroelectricity, the five projects included in this FEIS displace the need for other power plants, primarily fossil-fueled facilities, to operate, thereby avoiding some power plant emissions and creating an environmental benefit. If the electric generation capacity of the five projects were replaced with other fossil-fueled capacity, greenhouse gas emissions could potentially increase by 8,000 metric tons of carbon per year. The three projects considered for dam removal—Little Falls, Mallison Falls, and Saccarappa—reduce the amount of carbon emissions by 830 metric tons, 830 metric tons, and 1,501 metric tons, respectively.”

S.D. Warren’s biomass-fired generator uses waste byproducts from its mill operations to generate electricity for use by the mill. The trees that are planted to replace the trees used in the mill operations (which produces the fuel for the biomass facility) absorb carbon dioxide emitted by burning biomass and other fuels, thus recycling the carbon emissions. The biomass facilities produce less carbon dioxide than fossil fueled facilities. Biomass fuels contain less sulfur than fossil fuels, and therefore emit less sulfur dioxide. Therefore, biomass fuels are considered to produce less air pollutants than traditional fossil fuels.

6.0 STAFF’S CONCLUSIONS

Sections 4(e) and 10(a) of the FPA require that the Commission give equal consideration to all uses of the waterway on which the projects are located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreational, cultural, and other nondevelopmental values of the involved waterway equally with its electric energy and other developmental values. In determining whether, and under what circumstances, to license a project, the Commission must weigh the various economic and environmental tradeoffs involved in the decision.

6.1 Comprehensive Development and Recommended Alternative

Based on our independent review and evaluation of the proposed actions, the proposed actions with the additional staff-recommended measures, the dam removal

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alternatives, and no action, we select the proposed action with the additional staff recommended measures and modifications as the preferred alternative.

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We recommend this alternative because: (1) issuance of the licenses would allow S.D. Warren to continue to operate the five projects as dependable sources of electric energy; (2) continued operation of the projects would avoid the need for an equivalent amount of fossil-fuel-fired electric generation and capacity, continuing to help to conserve these nonrenewable energy resources and reduce atmospheric pollution; and (3) the recommended environmental measures would improve water quality, protect and enhance fish and terrestrial resources, improve public use of recreational facilities and resources, and protect and maintain historic and archaeological resources within the area affected by the operations of the projects.

We recommend including the following environmental measures in any licenses issued for the five projects included in this FEIS.

S.D. Warren's proposed enhancement measures (measures apply to all five projects unless otherwise noted) that we recommend are as follows:

- continue to operate the projects in a ROR mode;
- continue daily headpond monitoring to facilitate better headpond control;
- notify personnel at the Region A Fisheries Headquarters, MDIFW, in Gray, Maine, prior to any planned drawdowns, and avoid impoundment drawdowns during the months of May and June;
- after drawdown periods, and if allowed by the Sebago Lake LLMP, temporarily increase Sebago Lake outflows to refill the impoundments while maintaining tailrace flows greater than or equal to those required by the flow/temperature curve; or, if the LLMP does not allow for increased outflow from Sebago Lake, use a maximum of 25 percent of Sebago Lake outflow for refill, while at least 75 percent of the Sebago Lake outflow would be released below the Dundee Project;
- design and install upstream eel passage facilities at the Dundee Project;
- conduct a 3-year downstream migrating eel study to assess timing of peak eel movement;
- improve portage around Dundee, Gambo, Little Falls, and Mallison Falls dams;
- improve car-top boating facilities at the Gambo, Little Falls, Mallison Falls, and Saccarappa projects;
- improve angler and vehicle access to the Dundee, Gambo, and Mallison Falls bypassed reaches;
- provide protection and mitigation of adverse effects on any archaeological sites identified by ongoing studies;

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- consult with the MHPC before conducting non-routine maintenance on buildings or structures eligible for listing or listed in the National Register at the Dundee and Saccarappa projects;
- if completing work that causes an adverse effect, develop (in consultation with the MHPC) a plan for recording of the affected resource(s);
- develop a plan to protect the historic canal and towpath from future construction activity related to project maintenance and monitor impacts; and
- consult with the MHPC regarding recreation enhancements that may affect historic resources.

Additional staff-recommended measures (measures apply to all five projects unless otherwise noted) are as follows:

- provide minimum flows to the bypassed reaches at Dundee, Gambo, and Mallison Falls as follows:

Project	Minimum Flow (cfs)				
	Jan - Mar	April	May - Sept	October	Nov - Dec
Dundee	20	30	57	30	20
Gambo	40	40	40	40	40
Mallison Falls	40	40	60	40	40

and conduct additional instream flow studies in the future, if specific triggering events occur, such as introduction of anadromous species to specific bypassed reaches, or establishment of a winter trout fishery, to allow future adjustment of minimum flows, as required;

- provide 50 cfs of additional spillage at Dundee and 100 cfs at Gambo, whenever river water temperatures at Gambo exceed 22 degrees C, to maintain state DO standards, and monitor the effectiveness of this spillage in maintaining DO standards;
- prepare and implement a headpond elevation and minimum flow monitoring plan in consultation with the resource agencies, and include a provision to investigate alternative measures (such as turbine venting, air/oxygen injection, etc.) that could be implemented to meet water quality standards in lieu of spillage;
- design and install upstream and downstream fish passage facilities for American shad and river herring based on a phased approach, generally as prescribed by FWS, with the exception that any fish passage facilities constructed under the first phase of development should be designed so that expansion of fish facility capacity

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can be accommodated without major renovation or demolition of the initial facilities; develop a fish passage implementation plan for the Dundee, Gambo, Little Falls, Mallison Falls, and Saccarappa projects with the Commission approving the final fish passage designs and construction schedules, which would be developed in consultation with the state and federal fishery agencies, consistent with the FWS prescription;

- design and install upstream eel passage facilities at Gambo, Little Falls, Mallison Falls, and Saccarappa project dams, with the Commission approving the final designs and construction schedules, which would be developed in consultation with the state and federal fishery agencies, consistent with the FWS prescription;
- protect down-migrant adult eels by ceasing generation for 8 hours per night, for eight, 7-day periods;
- reserve Interior's authority to prescribe fishways in the event that additional prescriptions are necessary in the future;
- maintain a shoreline buffer zone on licensee-owned lands within the project boundary up to 200 feet of the normal high-water level at the Dundee and Gambo projects;
- monitor and remove trees that pose hazards to boating downstream of the Gambo Project;
- conduct a recreational use monitoring study after construction of the formal recreational facilities in conjunction with the Form 80 filing, and report annual recreation use every 12 years thereafter;
- develop plans for public walk-in angler access to the bypassed reaches and car-top boating access to the impoundments;
- develop and implement a revised final recreational facilities enhancement plan, including resolution of public access and the locations of proposed portage and car-top boating access points, final designs for new facilities and improvements to existing facilities, and an implementation schedule; and
- develop and implement a HPMP in accordance with the PA to be executed among the Advisory Council, SHPO, and Commission.

The costs of some of the measures that we recommend would reduce the net benefit of the projects. We discuss the basis for each additional measure below.

6.1.1 Minimum Flows to the Bypassed Reaches

S.D. Warren initially proposed seasonally adjusted minimum flows to the Dundee, Gambo, and Mallison Falls bypassed reaches of 60 cfs, 33 cfs, and 60 cfs, respectively, from May 1 through November 30. Following issuance of the DEIS, however, S.D.

Warren agreed with the minimum flows proposed by staff. The objective of these flows was to allow establishment of a seasonal trout fishery in the bypassed reaches, which would be made possible by trout stocking by the MDIFW. The MDIFW initial flow recommendations were generally consistent with those proposed by S.D. Warren, although the MDIFW also recommended an unspecified flow during the winter months. The FWS recommends minimum flow levels similar to S.D. Warren and MDIFW-recommended levels, but advocates that S.D. Warren maintain these minimum flow levels year round, in order to maximize suitable habitat for the natural reproduction of resident fishes, and to maintain a proposed winter fishery. The MDIFW has stated, however, that natural reproduction of trout within these bypassed reaches is unlikely and is not a management objective for the state, although also agrees that higher winter flows are needed to support a proposed winter fishery. The MDEP provided its final minimum flow recommendations to S.D. Warren in February 2002, which included seasonal minimum flows to support aquatic life, and spillage in the Dundee and Gambo bypassed reaches to maintain state DO standards during warm, dry weather conditions.

Staff's assessment of the minimum flow issue for the three bypassed reaches is that the provision of minimum flows into these reaches would have the potential to produce a significant sport fishery relatively close to the heavily populated area near Portland and Westbrook. The bypassed reach fishery at the upstream Eel Weir Project (FERC No. 2984) has been cited previously in this document as an example of a successful enhancement made possible by a combination of instream flow releases and salmonid stocking by the MDIFW. The Eel Weir Project is located only about 3 miles upstream of the Dundee Project, so the experience at Eel Weir would have applicability to the potential enhancements at the Dundee, Gambo, and Mallison Falls projects.

The MDIFW has monitored the development of the sport fishery at Eel Weir since the establishment of the year-round bypassed reach minimum flows in July 1992 (Brautigam, 1997). Prior to establishment of the minimum flows, the MDIFW had stocked the 6,700-foot-long bypassed reach with brook trout and landlocked salmon, to provide a short-lived spring put-and-take fishery, which would terminate when spring spillage into the bypassed reach ceased. Following establishment of the minimum flows, the MDIFW increased the intensity of stocking to include greater numbers of fish and both spring and fall stocking. The year-round minimum flows allowed for the overwintering of fish in the bypassed reach, which in turn provided fish of good size quality (the mean length of brook trout caught in 1995 and 1996 was 12 and 12.4 inches, respectively).

As a result of this newly created fishery, angler usage increased from 2,811 angler trips in 1993 to 6,826 trips in 1995. This has developed into one of the most intensive

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fisheries in southern Maine, perhaps in the entire state (Brautigam, 1997). The 1995 effort reaches to 379 angler trips per acre, or 5,251 trips per mile of stream. For comparison, 23 salmonid lakes in southern Maine (including Sebago Lake) had usage ranging from 1.04 to 6.06 angler trips per acre in 1996, while the Little Androscoggin River, a popular stream fishery near Lewiston and Auburn, Maine, had 94 trips per acre in 1996 (Brautigam, 1997). In 1995 and 1996, salmonids (brook and brown trout, landlocked salmon) comprised about 88 percent of the catch at Eel Weir, with smallmouth bass and other resident species comprising 12 percent. The salmonid catch rate per angler trip has ranged from 0.85 to 1.44, from 1993 through 1996, with good size quality for brook trout, exceeding 12 inches in 1995 and 1996. Another characteristic of the fishery noted by Brautigam (1997) was the strong catch-and-release ethic exhibited by anglers, with the percentage of legal-sized brook trout released ranging from 90 to 95 percent. This high percentage of released fish would increase the importance of over-winter flows, as higher numbers of stocked fish would survive as carry-overs to following years.

Provision of minimum flows to the Dundee, Gambo, and Mallison Falls bypassed reaches would provide about 2,050 feet of riverine habitat capable of supporting a fishery for stocked salmonids and other resident species. This would be about a third of the length of the Eel Weir bypassed reach. If a similar angler response to these newly created fisheries occurs (which we would expect, since the three reaches are located in the same general area as Eel Weir), there is the potential to create a fishery with an angler effort numbering in the hundreds, and perhaps up to a few thousand angler trips per year. An important component of the minimum flow regime to sustain such a fishery, would be the over-winter flows. These flows would sustain the over-wintering trout, as well as the macroinvertebrate populations that serve as the food source for both over-wintering and summer resident fishes. Sustaining winter flows could be lower than flows during the fishing season (at Eel Weir, the winter minimum flow is 25 cfs, compared to minimum flows of 50 to 75 cfs during the fishing season), since fewer fish would likely be present than during the peak of the fishing season, soon after stocking, when the number of anglers would also be high.

Therefore, we recommend seasonally adjusted minimum flows that maximize habitat during the spring-summer-fall fishing season (as generally agreed to by the applicant and all commenting agencies), with over-winter flows having a combination of good WUA, to sustain over-wintering trout and landlocked salmon, and relatively high wetted area, to sustain macroinvertebrate populations. Our recommended minimum flows for each project are identified above in section 6.1. These recommended flows include some changes from our original recommendations in the DEIS, as the result of consideration of comments received on the DEIS, and our 10(j) negotiations with FWS. We are now recommending a year-round 40-cfs minimum flow at Gambo, to provide

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maximum habitat value and high wetted area. This higher flow is recommended in response to agency recommendations, and because there are no data available at flows less than 40 cfs, for determining the habitat value of lower flows. A flow of 40 cfs can also be provided at the same cost, compared to our previously recommended 30 cfs because leakage flows are 41 cfs. At the Mallison Falls Project, we are now recommending a minimum flow of 40 cfs for the over-winter period (instead of 20 cfs), because 40 cfs would provide a higher habitat value more similar to that at Dundee, plus it can be provided at a relatively low additional cost of \$530. In consideration of agency concerns about the adequacy of staff-recommended flows for future fisheries (should anadromous species become established in the reaches, or should an important winter fishery develop), we are also recommending future instream flow studies, with the potential for adjustment of these flows, should these future events occur.

We are also recommending 50 cfs of additional spillage at Dundee and 100 cfs at Gambo, whenever river water temperatures at Gambo exceed 22 degrees C, to maintain state DO standards. This recommendation is in response to the MDEP final flow recommendations. Associated with this spillage, we are recommending that S.D. Warren monitor the effectiveness of this spillage in maintaining DO standards, and investigate alternative measures (such as turbine venting, air/oxygen injection, etc.) that could be implemented to also meet water quality standards. Because this spillage would occur during the summer low-flow period, this spillage would potentially result in high energy losses (because all the flow is typically used for power generation at this time of year). If alternative cost-effective measures to maintain DO can be developed, these could be implemented in lieu of spillage.

We estimate the total annualized cost for our recommended minimum flows to be about \$33,130 for Dundee, \$710 for Gambo, and \$6,870 for Mallison Falls, for a total of \$40,710. This compares to the estimated value of future bypassed reach trout fisheries of \$15,000 for Dundee, \$6,150 for Gambo, and \$13,850 at Mallison Falls. We are unable to estimate the cost for the spillage flows at Dundee and Gambo, for DO maintenance, because the initiation and duration of these flows would depend on the river water temperatures reaching and exceeding 22 degrees C, which cannot be reasonably predicted.

6.1.2 Headpond Elevation and Minimum Flow Monitoring Plan

S.D. Warren currently monitors daily headpond elevations, and proposes to develop a means to monitor compliance with the proposed minimum flows to the bypassed reaches at the Dundee, Gambo, and Mallison Falls projects. Instrumentation to monitor headpond elevations is already in place to document compliance with ROR operations. However, documentation of compliance with our bypassed reach minimum

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flow recommendations would be necessary. Therefore, we recommend that S.D. Warren file, for FERC commission approval, a plan for monitoring ROR operations, in-kind payment levels, and recommended bypass reach minimum flows at all projects. We estimate that the annual cost of this monitoring and documentation of compliance with our recommended flows and water surface elevation regimes would be \$1,400 for each project.

6.1.3 Anadromous Fish Passage Facilities

S.D. Warren does not propose to install upstream or downstream fish passage facilities at any of the five projects, because no anadromous species now occur in the project reaches. The FWS's final fishway prescription, described in section 3.5 and summarized in table 20, includes upstream and downstream fish passage facilities designed to pass Atlantic salmon, American shad, alewife, and blueback herring. The recent draft fishery management plan for the Presumpscot River, prepared by MDMR, MDIFW, and MASC, calls for installation of upstream and downstream fish passage facilities, although none of the agencies have yet initiated an active anadromous fish restoration program. The FOPR and American Rivers recommend installation of upstream and downstream fish passage facilities at the Dundee and Gambo projects, and at the three minor project dams only as an alternative to the removal of these dams.⁴³

All of the above entities condition installation of fish passage facilities on successful passage at the downstream Smelt Hill and Cumberland Mills dams. We agree that there would be no need for anadromous fish passage facilities at the project dams if at least one of the downstream dams does not provide for fish passage. Should populations of anadromous fish gain access to the river immediately below Saccarappa dam, then fish passage would have the potential to benefit anadromous species.

Our analysis indicates that providing fish passage at the project dams would result in a higher production potential for the anadromous clupeids (American shad and river herring), than with the removal of the three lower minor project dams (Saccarappa, Mallison Falls, and Little Falls). If, however, dam removal is combined with installation of fish passage at the remaining dams, the production potential for the clupeids is slightly

⁴³ We analyzed the merits of dam removal alternatives for the minor project dams and concluded that removal of one or more of these dams is not warranted as a means to restore anadromous species to the river because obstacles to upstream migration exist downstream of these projects (i.e., Cumberland Mills dam), and the potential production for the anadromous clupeids is actually higher with the dams in place (with fishways), compared to dam removal by itself.

higher. As described more fully in section 4.3.2.2., we estimate that the Presumpscot River (including the tributaries) with the alternative of relicensing the proposed projects with appropriate anadromous fish passage facilities, could support a run of 10,600 to 60,300 American shad, 198,000 alewife, and 127,000 blueback herring. Under this alternative, the mainstem Presumpscot River would provide a relatively small amount of habitat for Atlantic salmon, although salmon habitat in the tributaries would be made available. We estimate that if all available salmon rearing habitat in the basin was fully seeded by stocking, there is the potential for a run of 62 to 186 adult salmon.

We conclude that fish passage facilities at the Dundee, Gambo, Little Falls, Mallison Falls, and Saccarappa projects would be warranted in the future, when the fish passage issues at the two lowermost dams on the Presumpscot River are resolved.⁴⁴ However, since fish passage at S.D. Warren's projects would depend on somewhat uncertain future events (fish passage and anadromous fish population growth in downstream reaches), it would be premature to recommend or require the design of specific passage measures at this time. Since future advances in fish passage technology, particularly in the area of downstream fish passage (e.g., fish-friendly turbines), are possible, different designs, based on the best available technology at that time, may better serve passage needs on the Presumpscot River.

Since the construction of fish passage facilities would depend on future events (fish passage being achieved at the downstream Cumberland Mills and Smelt Hill dams, and the development of future runs of anadromous fish), the Commission must have a mechanism for monitoring future events, to determine when fish passage must be ordered, pursuant to the FWS prescription. Thus, we recommend that the licensee be required to file a fish passage implementation plan for the Dundee, Gambo, Little Falls, Mallison Falls, and Saccarappa projects that includes: (1) a schedule and format for filing an annual status report with the Commission, reporting the progress of restoration activities in the river (including efforts to remove or provide passage at downstream Smelt Hill and Cumberland Mills dams), and fish counts at any downstream dams where fish passage has been installed; and (2) proposed time intervals for future development of individual fish passage design plans for the five project dams, once determination is made by the Commission that fish passage is required. Fishway development would be based on a

⁴⁴ For purposes of our economic analysis in this multiple-project FEIS, we estimate the total annualized cost for the installation of upstream and downstream fish passage facilities for anadromous fish at Saccarappa, Mallison Falls, Little Falls, Gambo, and Dundee, using the specific measures prescribed by FWS, to be about \$2,199,450 for upstream passage and \$479,020 for downstream passage, and \$106,040 for lost generation due to attraction flows and zone-of-passage flows.

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phased approach, as prescribed by FWS, whereby preparation of design plans at a given dam would be triggered by the passage of a specific number of anadromous fish at the next downstream dam. Future fish passage designs and construction schedules would be prepared by S.D. Warren in consultation with the state and federal fishery agencies, and filed with the Commission for approval. The fish passage implementation plan should also be prepared in consultation with the state and federal fishery agencies, and filed with the Commission within 6 months of any license issued for the projects. We estimate that the annual cost of developing a fish passage implementation plan would be \$1,050 for each project.

6.1.4 Eel Passage Facilities

S.D. Warren proposes to install upstream eel passage facilities at the Dundee Project, the tallest of the five dams. S.D. Warren conducted a study of upstream eel migration and concluded that upstream eel passage facilities were not warranted at the remaining four projects. The FWS's final fishway prescription, however, requires upstream eel passage at all five projects. The recent draft fishery management plan for the Presumpscot River, prepared by MDMR, MDIFW, and MASC, also calls for installation of upstream eel passage facilities at all five projects.

S.D. Warren conducted studies (described in section 4.3.2.2) that documented the presence of several age classes of American eel throughout the five-project reach of the Presumpscot River. The numbers of eels collected downstream of the dams, within the bypassed reaches, was generally higher than the numbers collected within the project impoundments. This, however, may only be an indication of the collection efficiency of the sampling gears employed within the areas sampled (eels are probably easier to collect in the bypassed reaches, because they are more concentrated than in the open reservoirs). S.D. Warren also made observations below all of the five dams to determine passage routes for upstream-migrating eels. Several hundred eels were observed below the dams, but only very small numbers were observed successfully passing upstream over the dams. These studies indicate that some American eel are successfully migrating upstream over the dams, but that the dams are still an obstruction (although not a total barrier) to migration.

The American eel is a species of primary concern to both state and federal fishery agencies, because of the apparent decline in the population along the Atlantic coast of North America. Providing upstream eel passage at all five project dams would be a significant enhancement to eels ascending the Presumpscot River, which would improve access to about 12.2 miles of mainstem rearing habitat, plus habitat in the tributaries to the river. This enhancement could be implemented at a relatively low cost at each project,

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because of the nature of upstream eel passage facilities (they are simple in design and use very little water). We estimate the annualized cost of providing upstream eel passage to be about \$5,790 at the Dundee Project and \$4,850 at each of the four remaining dams. Thus, we recommend that S.D. Warren design and install appropriate upstream eel passage facilities. Designs for the eel passage facilities should be developed in consultation with the state and federal fishery agencies, and should be filed for Commission approval within 6 months after the issuance of any licenses for these projects.

S.D. Warren is proposing to provide for downstream eel passage by shutting down the projects and spilling water for 4 hours per night, during four, 7-day periods in the fall migratory period. S.D. Warren is also proposing to conduct a 3-year study to determine the timing of the downstream eel migration and in turn the optimum times for spilling water for passage. The FWS fishway prescription, however, and the recent draft fishery management plan call for 8-hour-per-night shutdowns for 8 weeks (September 1 through October 31). We believe that an 8-week shutdown period may be excessive, in that MDMR eel weir data indicate the peak of the outmigration typically occurs over a much shorter time period. We conclude that S.D. Warren's proposal to implement 4-hour-per-night shutdowns for the four, 7-day periods, and to conduct the 3-year monitoring study to determine the environmental variables that are most important for eel movement, and develop methodologies for real-time monitoring of eel movement would be sufficient. It would allow refinement of the shutdown periods, to maximize eel passage while minimizing energy losses. However, because the FWS prescription is mandatory, any license issued would include the 8-hour-per-night shutdown for 8 weeks. The annualized costs for providing these measures would be as follows: \$39,270 for Dundee; \$24,700 for Gambo; \$27,620 for Little Falls; \$23,720 for Mallison Falls; and \$25,670 for Saccarappa.

6.1.5 Shoreline Buffer Zone

The FWS, by letter dated February 2, 2001, recommends the development of an SMP that would include all licensee-owned lands abutting the project within 500 feet of the high water elevation that are determined to be needed for project-related purposes, including protection of fish and wildlife habitat, provision of public access, or protection of sensitive, unique or scenic area. We note that no such licensee-owned lands abutting the project within 500 feet of the high water elevation have been determined necessary for project-related purposes.

We agree with the FWS that protection of currently undeveloped shoreline would maintain the recreational experience of anglers and boaters who use the project lands and waters. However, the majority of recreation use occurs at the Dundee and Gambo

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projects. We do not find sufficient justification to warrant the development of an SMP at all five projects. Instead, we conclude that maintenance of a buffer zone on licensee-owned lands within the project boundary up to 200 feet of the normal high water level at the Dundee and Gambo projects would be adequate to protect these projects' visual resources and future recreational access. The 200 feet above high water elevation is consistent with previous Commission-approved buffer zones around project reservoirs.

The federally threatened small whorled pogonia occurs at the Dundee Project in isolated areas close to the impoundment, but away from current informal and proposed formal recreational use. We conclude in section 4.3.3 that this plant would not be affected by current or proposed project operations, including the construction of proposed recreational facilities. However, should this plant occur on licensee-owned lands abutting the project boundary, we would recommend that the project boundary be amended to include licensee-owned lands within 200 feet of the normal high water mark at the northern end of the Dundee impoundment that contain these plant species. Inclusion of such lands in the project boundary and provision of measures to protect known occurrences would help to preserve suitable habitat for this federally threatened species.

Therefore, we recommend that S.D. Warren develop, in consultation with the FWS, a plan to implement a shoreline buffer zone at the Dundee and Gambo projects. We further recommend that the plan include in the Dundee Project boundary the licensee-owned lands within 200 feet of the normal high water mark on which the small whorled pogonia is known to occur and measures to protect the habitat. We estimate the annualized cost for our recommended plan to implement a shoreline buffer zone to be about \$350 per project.

6.1.6 Recreational Use Monitoring Study

The FWS recommends that S.D. Warren monitor recreational use to determine whether existing facilities are meeting the demands for public use of fish and wildlife resources. Currently, the three minor projects are exempt from Form 80 requirements, and use data are unavailable. Given the likelihood that angling and boating use would increase with the improved facilities and access, we agree with the FWS that S.D. Warren should monitor recreation use. Our recommended recreational use monitoring study in conjunction with the Form 80 filing in 2010 would address the adequacy of the recreational facilities, including public walk-in angler access and car-top boating access, at the projects. However, we would only require meeting with state agencies and updating and reporting the annual recreation use figures to the Commission every 12 years after the initial study, rather than every 6 years as recommended by the FWS. We

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At the Section 90(j) meeting on February 12, 2002, FWS indicated that it was concerned about planning for future recreational use and access at all five projects and S.D. Warren's role in the CBEP's planning for the Presumpscot River. We recognize the possibility that recreational use may increase at these projects once increased minimum flows are implemented and if fisheries goals are realized, but conclude that our recommended recreational use monitoring would be a reasonable measure to assess this possibility. To ensure that S.D. Warren takes into account regional planning efforts, we would require consultation with the CBEP during the development and implementation of the revised final recreational facilities enhancement plan. We estimate the annualized cost for our recommended recreational use monitoring study to be about \$840 per project.

6.1.7 Revised Final Recreation Facilities Enhancement Plan

Many of the enhancements proposed by S.D. Warren require landowner permission and easements. Portage routes, walk-in angler access, and car-top boat access are dependent, in some cases, on S.D. Warren's ability to obtain such easements. The MDIFW recommends public access plans for walk-in angling in the bypassed reaches and boating in the impoundment.

To ensure that public access to the projects is realized, we recommend that S.D. Warren file a revised final recreation facilities enhancement plan that includes final locations and design drawings for portage routes, car-top boat access, and walk-in angler access to the bypassed reaches, and monitoring for fallen trees at Gambo. The final recreation plan should be completed in consultation with the MDIFW, MDOC, NPS, FWS, the CBEP, and MDMR, and should include a schedule of implementation for the final facility enhancements. We estimate the annualized cost for our recommended final recreational facilities enhancement plan to be about \$420 per project.

6.1.8 Historic Properties Management Plan

To ensure that adverse effects on known and potential historic properties, and to any as-yet unidentified archaeological resources, are satisfactorily resolved over the term of the licenses, the Commission would execute a PA with the SHPO and Advisory Council. The licensee would be an invited signatory. The PA would require the licensee to prepare a HPMP, in consultation with the SHPO. The HPMP would contain the principles and procedures to address the proposed continued use, and protection of, historic properties; mitigation of unavoidable adverse effects; compliance with laws and

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regulations governing human remains; and discovery of previously unidentified resources. We estimate the annualized cost for our recommended HPMP to be about \$400 per project.
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6.2 Cumulative Effects Summary

Water quality, aquatic resources including the American eel and anadromous fish, recreational access, and cultural resources may be cumulatively affected by the relicensing of the Presumpscot River projects. We would expect water quality in the Presumpscot River to experience a positive cumulative effect as a result of increased flows to the bypassed reaches, including additional spillage at Dundee and Gambo to maintain DO standards, and limitations in drawdowns at the project impoundments.

Continued operation of the five projects with upstream eel passage facilities and measures to facilitate downstream eel migration would have an overall beneficial cumulative effect on the American eel within the Presumpscot River Basin. Although other barriers to eel migration and other potential sources of mortality would remain in the basin (there currently are four more dams on the river that are not associated with this relicensing), relicensing of the Presumpscot River projects, with the proposed enhancement measures, would improve migratory conditions for the eel. Migratory delays and mortality associated with passage at the hydroelectric projects should be reduced. Also, eel passage measures would allow better distribution of eels within the basin and improve the survival of eels within the river. This would have a positive effect on the eel population.

Dam removal would provide a greater level of eel protection, by eliminating the primary source of delay (the dam) and mortality (associated with turbine passage). However, staff is not recommending removal of the dams. The downstream Smelt Hill dam may be removed, however, which would likely have a positive effect on eel migration in the river, along with the proposed enhancement measures.

Based on the current status of the anadromous fish populations in the river, the existence of migratory barriers downstream of the projects, and the current lack of any active restoration program by the resource agencies, the continued operation of the five projects would not have any cumulative adverse effects on anadromous fishes in the basin at this time. Our recommendation to provide fish passage in the future, once passage occurs at the downstream dams, would help assure that continued operation of the projects would not have any adverse cumulative effects on any programs to restore anadromous fishes to the river. Timely construction of fish passage at the dams, pursuant

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Relicensing of the projects would enhance the recreational opportunities available in the region. Formal portage take-out and put-in areas, with appropriate signage and parking (where they coincide with car-top boat access locations), would enhance the boating experience for canoeists. Portage is available around the Eel Weir and North Gorham projects upstream of Dundee. The improvements to the portages around Dundee, Gambo, Mallison Falls, and Little Falls, as well as the formal take-out above Saccarappa would allow canoeists better access to the Presumpscot River from Sebago Lake to Saccarappa dam. This 14-mile stretch of river would offer recreational opportunities that are not otherwise found in the vicinity of the projects.

Implementation of S.D. Warren's proposed measures to protect and maintain portions of the Cumberland and Oxford Canal, that may occur within project boundary, would benefit an historic property of regional significance. Removal of Saccarappa dam only could adversely affect portions of the Cumberland and Oxford Canal because S.D. Warren would not shore up Sections 9 and 15 that occur within the project boundary unless required to do so as part of any license termination conditions.

6.3 Fish and Wildlife Agency Recommendations

Under the provisions of Section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by the federal and state fish and wildlife agencies for the protection, mitigation, and enhancements of fish and wildlife resources affected by the projects. Moreover, Section 10(j) states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. Recommendations that we consider outside of the scope of Section 10(j) have been considered under Section 10(a) of the FPA, and are addressed in the specific resource sections of this document

The FWS is the only entity to have filed 10(j) recommendations for the Presumpscot River Project.⁴⁵ No state fish and wildlife agency has filed recommendations under Section 10(j) of the FPA. The MSPO provided the comments of the MDIFW and

⁴⁵ The FWS filed one set of recommendations under Section 10(j) pertaining to all five of the Presumpscot River projects on February 2, 2001.

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MDMR, however, by Executive Order of the Governor of the state of Maine, the terms and conditions contained in Maine's 401 WQC, when issued, would represent the state's official recommendations on all issues regarding the application, including fish and wildlife, and supersede all preliminary recommendations by individual state agencies. Thus, in this section, we deal only with 10(j) recommendations submitted by the FWS.

Table 63 lists the FWS recommendations subject to Section 10(j), and indicates whether the recommendations are adopted under the staff alternative. Under Section 10(j) of the FPA, we made the determination that one of the FWS's recommendations, and a portion of a second recommendation, may be inconsistent with the purpose and requirements of Part 1 of the FPA or other applicable law.

Recommendations in the DEIS

We did not recommend adopting FWS's recommendation to provide year-round minimum flows at the Dundee, Gambo, and Mallison Falls bypassed reaches to maximize year-round habitat for riverine salmonids and other aquatic resources. This is because such flows would have a significant effect on the economics of generation at the projects, while providing only marginal benefit for the fishery. We did not agree that the same level of minimum flows are needed from October through April. Natural reproduction of salmonids (trout) within these bypassed reaches is unlikely, and therefore, there would be little need to maximize habitat during the winter months. Our recommended lower minimum flow level, we believed, would provide adequate protection of any holdover trout, and would sustain the macroinvertebrate production in the bypassed reaches during the winter months. Therefore, we found that the recommendation is inconsistent with the comprehensive planning standard of Section 10(a) of the FPA, including the equal consideration provision of Section 4(e) of the FPA.

We did not recommend adopting part of FWS's recommendation that the SMP include all licensee-owned lands abutting the project, within 500 feet of the normal high water level to provide protection for fish and wildlife resources, as well as habitat of the small whorled pogonia, a federally listed threatened and endangered plant. We agreed that S.D. Warren should develop a plan to implement a shoreline buffer zone at the Dundee and Gambo projects and include in the buffer zone any of its lands within 200 feet of the normal high water mark that contain known occurrences of the small whorled pogonia. The FWS had not demonstrated that any additional lands are needed for project purposes or that the recommended 200-foot buffer zone would provide inadequate protection. Therefore, we found that the recommendation is inconsistent with the comprehensive planning standard of Section 10(a) of the FPA, including the equal consideration provision of Section 4(c) of the FPA.

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Table 63. Analysis of fish and wildlife agency recommendations for the
20090324-0169 Presquesee River projects (Source: Staff).

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Recommendation	Agency	Within scope of Section 10(j)?	Total annualized cost ^a (2000\$)	Staff recommend adoption?
1. Maintain ROR operations such that instantaneous outflow equals inflow, and keep impoundment fluctuations at a minimum at all times at all five projects.	FWS	Yes	\$0	Yes
2. Maintain year-round minimum flows of 57 cfs, 40 cfs, and 63 cfs, respectively in the Dundee, Gambo, and Mallison bypassed reaches.	FWS	Yes	\$70,750	No, we recommend seasonally adjusted minimum flows that would provide similar fish benefits at a reduced cost
3. Prepare plan in consultation with FWS, USGS, MDEP, MDMR, MASC, and MDIFW to monitor minimum flows and impoundment water levels at all five projects.	FWS	Yes	\$7,000	Yes

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Table 63. Analysis of fish and wildlife agency recommendations for the Presumpscot River projects (Source: Staff). **Filed**

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Recommendation	Agency	Within scope of Section 10(j)?	Total annualized cost ^a (2000\$)	Staff recommend adoption?
4. Develop a detailed SMP for licensee-owned lands abutting the project up to 500 feet from the normal high water elevation that are determined to be needed for project-related purposes such as protection of fish and wildlife habitat.	FWS	Yes	\$7,000	No, no such lands have been identified. Our recommended buffer zone on licensee-owned lands within the project boundaries of the Dundee and Gambo projects of up to 200 feet from the shoreline would be adequate.
5. Monitor recreation use in consultation with the FWS, MDIFW, MDOC, and MDMR, beginning within 6 years of licensing, compiling annual recreation use data, and meeting with agencies.	FWS	No, not a specific measure to protect fish and wildlife	\$2,800	Yes
6. As part of the recreational use monitoring, meet with agencies and file a report with the Commission every 6 years.	FWS	No, not a specific measure to protect fish and wildlife	\$0	No, meeting with agencies and filing an update every 10 years after completion of the recreational use monitoring study would be adequate.

* Combined total annual cost based on individual project cost estimates for each project provided in tables 49, 52, 55, 58, and 61.

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Because staff's initial minimum flow recommendations, and recommendations on the SMP, included in the DEIS, did not fully adopt those of the FWS, Commission staff and FWS staff met in Portland, Maine, on February 19, 2002, pursuant to Section 10(j) of the FPA, to discuss and resolve the proposed minimum flows for the Dundee, Gambo, and Mallison Falls projects, and the SMP's for the five projects. Others in attendance at the meeting included: MDEP, MDIFW, MDMR, MASC, MSPO, Friends of the Presumpscot River (FOPR), Friends of Sebago Lake, the CBEP, American Rivers, and Kleinschmidt, representing the licensee, S.D. Warren. Approximately one week before the meeting, the MDEP presented new recommended minimum flows to S.D. Warren, for the five Presumpscot River projects (letter from Dana Paul Murch, Dams & Hydro Supervisor, MDEP, to Thomas P. Howard, Project Engineer, S.D. Warren, February 11, 2002). A copy of this letter was also provided to Commission staff, other state and federal agencies, and at least one intervenor (FOPR).

The discussion of minimum flows centered on MDEP's flow recommendation, with MDEP explaining the basis for their recommendation. The MDEP indicated that it would be sending Commission staff copies of reports and the analysis that were used to develop their recommendations (this information was sent on April 1, 2002). The MDEP also indicated that it intended to meet with S.D. Warren regarding these recommendations, and that, depending on any negotiations with S.D. Warren, the minimum flows to be required by MDEP in the WQC may be different than those now recommended.

The FWS reiterated their recommendation for higher year-round minimum flows to support a year-round trout fishery to be established by the MDIFW. They also suggested that additional instream flow studies may be needed to determine minimum flow needs for species that were not considered during the earlier flow studies, but that are now proposed for reintroduction to the Presumpscot River (anadromous species). Staff questioned whether FWS could agree to interim minimum flows, as part of any license order, with a license requirement to conduct additional studies and to modify the flows, once the additional species are reintroduced to the specific project reaches. FWS staff indicated that such a scenario may be acceptable, assuming that future studies and flows are tied to specific measurable events. The FWS and Commission staff, however, did not agree on specific interim flow releases.

As a result of the 10(j) negotiations, and the additional information provided by MDEP, staff has modified its minimum flow recommendations, by increasing the over-winter flows for the Gambo and Mallison Falls bypassed reaches, and recommending

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additional spillage flows at Dundee and Gambo, for maintenance of DO standards during the summer months. These modified recommendations are in agreement with FWS at the Gambo project, but still differ with FWS for the over-winter period, at the Dundee and Mallison Falls projects. We find that the FWS recommendations for Dundee and Gambo are inconsistent with the comprehensive planning standard of Section 10(a) of the FPA, including the equal consideration provision of Section 4(e) of the FPA.

The discussion of the SMPs focused on the concern for the retention of open space and the undeveloped nature of the shorelines at all five projects. FWS reiterated its view that SMPs at all five projects were necessary to ensure the protection of recreational access in the future. Commission staff indicated that SMPs are typically required only for major projects when there is a need to resolve a current resource issue, such as the small-whorled pogonia at the Dundee Project. Further, licensees of minor projects are usually not required to prepare and implement an SMP because the Commission's regulations do not require licensees of minor projects to file exhibits demonstrating land ownership (Exhibit G drawings).

FWS indicated that its primary goal was to engage S.D. Warren and the Commission in a process whereby sufficient undeveloped lands remain along the river corridor. We concluded at the meeting that if the CBEP provides the Commission with its draft open space plan in a timely fashion, the staff would revisit the desirability of recommending that the licensee cooperate with the CBEP in ensuring that sufficient licensee-owned lands remain undeveloped or made available for future public river access. The CBEP filed an outline and maps, but has not as yet filed its draft plan for the Presumpscot River. Further, S.D. Warren indicates by letter dated March 5, 2002, that it has been and would continue to be involved in the CBEP planning. Therefore, we would recommend only that the licensee consult with the CBEP in the development and implementation of its revised final recreational facilities enhancement plan.

6.4 Consistency with Comprehensive and Other Resource Plans

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by a project. Under Section 10(a)(2), federal and state agencies filed a total of 14 qualifying comprehensive plans, of which we identified 5 Maine and 4 federal to be applicable.⁴⁶ We did not find any conflicts.

⁴⁶ (1) Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American Waterfowl Management Plan. Department of the Interior. May 1986. 19 pp. (2) Fish and Wildlife Service. 1989. Final environmental impact statement -

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FWS and state agencies have encouraged the Commission to take into account the CBEP's planning efforts for the Presumpscot River. We note that a conceptual management plan for Casco Bay was prepared in 1992 and that a specific plan for the Presumpscot River is being crafted. Given that the draft plan has not been made available to the Commission, we cannot make any conclusions regarding consistency with this plan. However, we recognize the regional importance of Casco Bay and conclude that it would be desirable for the licensee to consult with the CBEP in the development and implementation of its final recreation plan (see section V.C.4.3.5, *Recreational Resources*).

In December 2001, the three state of Maine fishery agencies prepared a "Draft Fishery Management Plan for the Presumpscot River Drainage" (Wippelhauser et al., 2001). This plan has not yet been officially filed as a comprehensive plan with the Commission. Our recommendations for the relicensing of these projects, however, are generally consistent with this plan, since we are recommending measures for the upstream and downstream passage of the American eel, bypassed reach instream flows for the establishment of sport fisheries, and future measures for the restoration of anadromous species, once fish passage is resolved at downstream dams.

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6.5 Relationship of License Process to Laws and Policies

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6.5.1 National Historic Preservation Act
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Relicensing is considered an undertaking within Section 106 of the NHPA of 1966, as amended (P.L.89-665; 16 U.S.C.470). Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register.

To meet the requirements of Section 106, the Commission will execute a PA for the protection of historic properties from the effects of the continued operation of the Presumpscot River Project. The terms of the PA would ensure that S.D. Warren would address and treat all historic properties identified within the project area through a HPMP. The HPMP entails ongoing consultation involving historic properties for the term of the license.

6.5.2 Americans with Disabilities Act

Public recreation facilities must comply with the Americans with Disabilities Act (ADA) of 1990 (P.L. 101-336) to the extent possible. We recommend that, in developing recreational enhancements, S.D. Warren consider provisions for access for the disabled in compliance with the ADA.

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APPENDIX A
STAFF RESPONSES TO COMMENTS ON THE DEIS

Date: 06/30/2003

The Commission sent its multiple project Draft Environmental Impact Statement (DEIS) for the proposed relicensing of the Dundee, Gambo, Little Falls, Mallison Falls, and Saccarappa projects to the U.S. Environmental Protection Agency (EPA) on September 25, 2001, and EPA issued it on October 5, 2001. The Commission requested that comments be filed within 60 days from the issuance date (by December 4, 2001). The following entities filed comments pertaining to the DEIS. In this appendix, we summarize the comments received, provide responses to those comments, and indicate where we have modified the text of the DEIS. The comments are grouped by topic for convenience.

Commenting Entity

Date of Letter

William Sweeney (Sweeney)

November 16, 2001

Lois Winter

November 17, 2001

Gorham - Sebago Lake Regional Land Trust

November 26, 2001

State of Maine Department of Inland Fisheries and Wildlife (MDIFW)

November 26, 2001

State of Maine Atlantic Salmon Commission (MASC)

November 27, 2001

State of Maine Department of Marine Resources (MDMR)

November 28, 2001

State of Maine Executive Department State Planning Office (MSPO)

November 29, 2001

Robert M. Sanford

November 29, 2001

American Rivers and Friends of the Presumpscot River (AR&FOPR)

November 30, 2001

U.S. Department of the Interior (Interior)¹

December 3, 2001

Saco River Salmon Club Hatchery (Saco)

December 3, 2001

Trout Unlimited, Sebago Chapter

December 3, 2001

U.S. Environmental Protection Agency (EPA)

December 4, 2001

S.D. Warren Company (S.D. Warren)

December 4, 2001

Friends of Sebago Lake and Maine Council of the Atlantic Salmon Federation (FOSL&MCASF)

December 6, 2001

¹ Interior's letter represents comments from the U.S. Fish and Wildlife Service (FWS), National Park Service (NPS), and Bureau of Indian Affairs (BIA).

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S.D. Warren filed additional comments by letter dated January 4, 2002, responding to the comments filed by the agencies and non-governmental organizations.

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Procedural and General

Comment: Interior comments that the DEIS is fundamentally inadequate and the Commission should issue a supplemental DEIS to correct the inadequacies and incorporate new information. The Department of the Interior is willing to assist the Commission in producing a supplemental DEIS.

Response: We disagree with Interior's comment. We have received comments from EPA that recommend additional analysis in the FEIS to address agency issues. We have included in the FEIS additional analysis of existing substrate and habitat potential for salmon, as suggested by EPA.

Comment: Interior comments that the DEIS should incorporate all the licensing activity in the basin and not just the subject projects.

Response: We include information about the remaining hydroelectric projects and non-hydropower dams on the Presumpscot River and discuss how they influence the five projects subject to this proceeding. The Commission is handling licensing activity for the Eel Weir Project separately. Further, the existing license for the North Gorham Project, No. 2519, does not expire until December 31, 2034 (Errata notice issued December 7, 1995 on order on rehearing at 73 FERC paragraph 61,149).

Comment: Interior comments that, although we included the alternative of decommissioning and removing one or more of the five projects in the DEIS, the analysis of environmental benefits falls far short of the equal consideration standard required under the Federal Power Act (FPA). It suggests that if we had included a full accounting of all environmental benefits and costs this would have clearly supported the removal of one or more of the dams as the best alternative for the public interest.

Response: Economic values for environmental benefits have not been developed for non-power measures, but staff has provided qualitative assessments of the potential benefits and/or effects of all measures. This is consistent with the intent of the equal consideration standard in the FPA Act. The FPA requires equal consideration, but does not require equal treatment.

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Comment: Interior indicated that we failed to note that it had filed a motion on November 8, 2001, to supplement its prior motion to intervene on behalf of the BIA and NPS.

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Response: We have requested a copy of the November 8, 2001, filing from Interior and will address the filing in any licenses issued for these projects.

Comment: EPA is currently working to develop a comprehensive watershed management plan for the Presumpscot River with draft options to be presented at public meetings in early 2002 and a final plan to be completed in fall 2002. EPA indicates that there is no mention of this planning process in section 6.4 of the DEIS, and suggests that the FEIS should explain how relicensing would be consistent with the comprehensive plan.

Response: Section 6.4 includes plans filed with the Commission and determined by the Commission to be comprehensive plans, or that have been filed by agencies and others during a license proceeding. The Casco Bay Estuary Project filed an outline and sample maps of the Presumpscot River Corridor on March 11, 2002. We have still not received a draft or final plan, but now include a discussion of the planning process in section 6.4 of the FEIS.

Comment: EPA rates the DEIS as "Environmental Concerns, Insufficient Information," and suggests that we adopt the fisheries recommendations of federal and state agencies to provide the opportunity for substantial and long-term relief from existing environmental impacts on the river and its resources.

Response: We recommend adoption of most of the fisheries agencies recommendation for fish passage and for seasonally adjusted minimum flows. We disagree that year-round minimum flow releases at the level requested by FWS are necessary.

Comment: S.D. Warren supports the Commission staff's conclusion in the DEIS that dam removal is not warranted, and it requests that S.D. Warren's previous filings be considered if other comments on the DEIS suggest additional analysis of the dam removal alternative.

Response: Staff has re-analyzed the potential effects of the dam removal alternative, using the additional information provided by both S.D. Warren and other parties providing comments on the DEIS. Although this analysis indicates there may be a somewhat greater potential for Atlantic salmon production than previously estimated, staff has not changed their conclusion that dam removal is not warranted at this time.

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Comment: S.D. Warren requests that a 50-year license term be granted for each of the projects.

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Response: The Commission typically specifies a 40-year license term when moderate construction or significant enhancement is required. We will address the terms of the license in any orders issued for the projects.

Comment: S.D. Warren requests that, should these enhancements be required, the license articles specify that the headpond control and minimum flow monitoring plans, the American eel passage and monitoring plans, and the historic properties management plans be filed within 12 months of licensing, and that the final recreation plan and shoreline management plan be filed within 18 months of licensing. S.D. Warren further proposes to prepare the anadromous fish restoration plan in consultation with relevant agencies and file it no later than 2 years following the later of: (1) the date the passage facilities are operational at the Smelt Hill dam, or the dam has been removed; and (2) the date on which any required fish passage facilities are fully operational at the Cumberland Mills dam.

Response: We will consider these timeframes in any licenses issued for these projects.

Comment: AR&FOPR object that we have not included a separate need for power analysis in section 1.2 for the minor projects (the Saccarappa, Mallison Falls, and/or Little Falls) because these three projects are controversial.

Response: We consider this to be a reasonable request and have revised the need for power discussion in section 1.2 to address separately the three projects being considered for dam removal.

Comment: AR&FOPR comment that a temporal scope of 30 to 50 years is reasonable. However, they object that we did not apply this temporal scope to the predicted ocean return rate for Atlantic salmon.

Response: There is no basis for predicting ocean survival rates for Atlantic salmon 30 to 50 years into the future. The survival rate used by staff in its analysis (0.5 to 1.5 percent) is based on the 25 years of survival data for hatchery-reared salmon smolts released into the Penobscot River, presented in Baum (1997). Although Baum (1997) also states that survival rates for wild smolts in two Maine rivers in the 1950's ranged as high as 3 to 15 percent, Penobscot River adult returns since 1969, and more recently documented returns to other Maine rivers, indicates that ocean survival rates are much less than 1 percent. Baum (1997) postulates that "...it is possible that marine survival of Atlantic salmon is

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cyclical," but offers no predictions of what future survival rates may be. Staff is unaware of any reasonable methodology for predicting future survival rates.

Comment: S.D. Warren comments that the summary of enhancement measures on page xvii of the DEIS is unclear regarding Form 80 requirements and it suggests that Dundee and Gambo be specified because the smaller projects are exempt.

Response: We intend that the recreational use monitoring include recreational use at the three minor projects after the construction of the portage facilities. We recommend that S.D. Warren file the monitoring results for Little Falls, Mallison Falls, and Saccarappa projects with the Form 80 reports for the Dundee and Gambo projects, only for convenience.

Comment: S.D. Warren suggests that the summary of enhancement measures on page xvii of the DEIS should include the proposed monitoring of the Gambo Pony Truss Bridge under the historic property plan, donation of the Hawkes Property as a recreation and land use enhancement at the Little Falls Project, and removal of nearshore tree snags to provide portage access and egress at the Gambo Project.

Response: The executive summary is not intended to include all the specifics of each recommended measure. These proposals are included in item 19 of the summary, and the details are included in section 6.1, *Comprehensive Development*.

Comment: S.D. Warren suggests that the last sentence on page 3 of the DEIS be corrected to reflect that no power from hydroelectric projects is sold to third parties; all power is used by S.D. Warren.

Response: We have corrected the text in section 1.2.

Comment: S.D. Warren suggests that the last paragraph on page 4 of the DEIS be revised to more accurately describe the existing situation relative to energy costs and requests that its suggested language be used.

Response: We have revised the text per S.D. Warren's suggested language in section 1.2.

Comment: S.D. Warren comments that section 2.1.2 of the DEIS does not reflect its proposed measures regarding the monitoring of the Gambo Pony Truss Bridge, and that though included in table 1, the written summary of its proposed measures on pages 7-14

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of the DEIS does not include the donation of the Hawkes Property as a recreation and land use enhancement at the Little Falls Project.

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Response: We agree and have added those enhancement measures to section 2.12 of this FEIS.

Comment: S.D. Warren suggests amending footnote 3 on page 13 of the DEIS to reflect the 2000 amendment to the Lake Level Management Plan (LLMP) and suggests language for doing so.

Response: We revised the footnote as suggested by S.D. Warren.

Cumulative Effects

Comment: Interior comments that we fail to acknowledge that hydropower development in the Presumpscot is the principal reason that anadromous fish runs were severely reduced or eliminated and unless one or more dams are removed, it will not be possible to achieve Interior's fish restoration goals.

Response: The FEIS states that dam construction was the major reason for the reduction or elimination of anadromous fish runs in the Presumpscot River. The FWS, through its final fishway prescription, and the state of Maine agencies, through the draft fishery management plan for the river, call for the restoration of anadromous species via the construction of fish passage facilities. These agency documents indicate that dam removal is not the only method available for restoration of anadromous fish runs. As Interior is aware, fish passage facilities at hydropower dams on many rivers throughout Maine, the Northeast, and North America have been successful in restoring or maintaining anadromous fish populations.

Comment: FOSL & MCASF comment that the statement "the construction of dams within the Presumpscot River basin, along with other factors such as water pollution and overfishing has eliminated anadromous species from most of the Presumpscot River Basin where they once occurred," on page 126 of the DEIS, is wrong because there is no evidence that overfishing or water pollution caused the elimination of anadromous fish species in the Presumpscot, but that it was due solely to the construction of dams.

Response: We stated in the DEIS that dam construction was the major reason for the reduction or elimination of anadromous fish runs in the Presumpscot River. There is evidence, however, that water pollution and overfishing have adversely affected the

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Presumpscot River fishery. We have added a discussion of all of these factors to the FEIS in section 4.3.2.

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Comment: FOS & MCASH comment that the cumulative effects section of the DEIS lacks analysis of the cumulative effects of the five dams on anadromous Atlantic salmon in the Presumpscot River and should explicitly state that the five dams have destroyed all of the historical Atlantic salmon habitat in the Presumpscot River from Saccarappa Falls in Westbrook to the upper limit of the Dundee Falls dam impoundment in Gorham. They also comment that the EIS should state that the continued existence of these five dams and their impoundments will cause continued extirpation of anadromous salmon.

Response: The fisheries analysis in the DEIS indicated that very little salmon habitat now remains in the reach of the Presumpscot River occupied by the five projects. The revised fisheries analysis in the FEIS further examines the issue of available salmon habitat in the Presumpscot River Basin, but also shows that the continued presence of the projects does not preclude the future restoration of an Atlantic salmon run to the Presumpscot River.

Water Quality and Quantity

Comment: Interior and MDIFW comment that, based on the new fishery management strategy, including a fall stocking program, angler use will likely increase from October into December. MDIFW requests that the Commission reconsider the lower flow regimen proposed from November 1 to April 30 and maintain year-round minimum flows at Gambo, Dundee, and Mallison Falls, except during January and February when lower flows proposed by the Commission would satisfy anticipated low angler use. EPA also suggests that the Commission consider higher flows at Dundee, Gambo, and Mallison Falls bypasses not only for angling, but also for water quality. MASC also supports the year-round minimum flows, as recommended by FWS, of 57 cfs at the Dundee Project bypass, 40 cfs at the Gambo Project bypass, and 63 cfs at the Mallison Falls Project bypass.

Response: The MDIFW letter dated November 26, 2001, states that "...year-round fishing regulations will be considered for the rest of the river once adequate provisions for minimum flows, angler access, and stocking access have been developed. A spring and fall stocking program will also be initiated to support enhanced management efforts." Based on this comment, a year-round fishery will not occur until some time into the future, once a number of other events occur, including obtaining good public access to these reaches. Even once year-round regulations are implemented, it may take some years for a fishery to develop. For example, Brautigam (1997), in reporting on the Eel

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Weir fishery indicates that the largest increase in angler trips to the reach did not occur until 3 years after year-round minimum flows and increased stocking were first implemented. This is probably typical, in that it takes some time for "the word to get out" on a new or developing fishery.

Staff, however, has revised its recommended minimum flows, by increasing the over-winter flows at Gambo and Mallison Falls, to provide maximum habitat value at Gambo, and about 73 percent of maximum WUA at Mallison Falls (which would be similar to what staff's proposed flows at Dundee would provide). The ratio of recommended minimum winter flows to the maximum recommended summer flows for the Dundee (35 percent), Gambo (100 percent), and Mallison Falls (67 percent) bypassed reaches, are higher than the current ratio for the Eel Weir bypassed reach (33 percent), which reportedly supports a "good" winter fishery. The over-winter flows recommended by staff would provide a minimum of 70 percent of the maximum WUA for adult trout. We are also now recommending future instream flow studies, for possible adjustment of minimum flows, should specific triggering events occur (such as introduction of anadromous species, or establishment of a major winter fishery).

Comment: Saco comments that the DEIS gives no consideration to the value of flood control through decreases in river width and depth.

Response: In section 4.3.1 of the DEIS, we discussed the effects of dam removal on flooding and concluded that the floodway within the lower portion of the Saccarappa reach would decrease.

Comment: EPA comments that we fail to properly analyze the effect dam removal might have on water quality.

Response: We discussed our analysis of the anticipated effects of dam removal on temperature and dissolved oxygen in section 4.3.1.2 of the DEIS. We do not anticipate that a more complex analysis would have yielded significantly different results.

Comment: FOSL&MCASF comment that on page 115 of the DEIS we dismiss the benefits of dam removal for resident salmonid species, claiming without evidence that the "marginal" water temperature conditions would preclude the reach from being suitable habitat. They comment that we fail to identify a cause for increased water temperature, rebut the conclusion of Dr. Dadswell that the summer water temperature regime is within that tolerated by Atlantic salmon and brown trout, and rebut historical evidence that the river hosted a healthy population of wild salmonids prior to the construction of the dams.

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Response: Staff does not conclude that any reaches exposed by dam removal would be unsuitable salmonid habitat because of water temperatures. We state that the water temperatures would be “marginal” for resident salmonids, in that during the summer months the temperatures would be expected to be in the higher end of the “tolerable” range for these species. Dr. Dadswell is correct that Atlantic salmon and brown trout can “tolerate” relatively high water temperatures, but other salmonids, such as brook trout, require much colder temperatures. The optimum range for brook trout is cited as 8 to 11 degrees C, with an upper lethal limit of 25 degrees C (Bell, 1991; 25 degrees C is within the range of water temperatures commonly reached in the Presumpscot River during the summer months). As Dr. Dadswell has pointed out, during these higher temperature periods, brook trout would likely seek cooler water refugia (springs or small tributary streams). During these periods brook trout may be more limited in distribution (concentrated in the cold water refugia), and may not be available to a fishery throughout the entire reach of river.

We clearly stated on page 115 of the DEIS that “We expect that if the state of Maine were to stock trout in the riverine reaches that would be made available by dam removal, there is the high likelihood that a popular trout fishery would develop, similar to what exists in the Eel Weir Project bypassed reach.” Although wild populations of salmonids (Atlantic salmon and brook trout; brown trout are not a native species) may have existed prior to dam construction, a self-sustaining population of brook trout would unlikely be re-established by dam removal, even if the resulting habitat were optimal. The heavy fishing pressure of a year-round fishery (which is the ultimate management objective of MDIFW) would likely require continued stocking to maintain the fishery (as is currently done in the Eel Weir bypassed reach).

Comment: S.D. Warren opposes the requirement that headpond and tailrace monitoring gages be installed in publicly accessible locations based on safety and security reasons. S.D. Warren requests that the FEIS be revised to require data to be available upon request, rather than requiring public access to the gages themselves.

Response: We recognize that security and public safety are important considerations at hydroelectric projects. Visual inspection of an external staff gage in areas ordinarily accessible to the public would not jeopardize project security in any way. While it is common practice to place headpond and tailrace monitoring gages where they can be accessed by the general public and regulatory agencies, circumstances may dictate that some gages may not be able to be accessed, except by appointment. Because we are recommending a monitoring plan, S.D. Warren, in consultation with the agencies, can propose alternative means for ensuring compliance with the intent of the monitoring.

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Comment: S.D. Warren objects to the requirement to install remote alarm systems that notify operators if bypass flows are not maintained on the grounds that it may preclude consideration of other monitoring/flow management options. Thus, S.D. Warren requests that the FEIS modify this provision to allow for development of other options in consultation with FERC and relevant agencies.

Response: Remote alarm systems to notify operators of bypass flow operation and maintenance are necessary because the projects are not continuously manned. Similarly, spillage to the bypassed reaches needs to be monitored to ensure that fish stranding and flushing does not occur under the operating conditions of the LLMP. We anticipate that the same system can be used for monitoring minimum required bypass flows and potential fish stranding and flushing events. Because we recommend that S.D. Warren file a monitoring plan, S.D. Warren could explore, in consultation with the resource agencies, other alternatives that would accomplish the same result and make an alternative recommendation in the plan.

Comment: S.D. Warren disagrees with the recommendation to monitor spillage to the bypassed reaches to assess the potential for fish stranding and flushing because it is inconsistent with other findings in the DEIS as follows: (1) "... During spillage conditions, S.D. Warren would have little flow control capabilities that could significantly modify the timing and magnitude of flows." (page 80); and (2) "...Because the projects are operated in ROR mode with little storage capability, S.D. Warren would not be able to substantially reduce the amount of water flowing into the bypassed reach." (pages 151-152)

Response: Staff is recommending flow monitoring plans for the projects, which would include monitoring minimum flows in the pertinent bypassed reaches. Staff anticipates that this would also allow for monitoring of spillage flows (because the flow monitoring system would already be in place). We also anticipate that any observations of the bypassed reaches would be limited in nature, to verify that concentrations of stranded fish were not present after the cessation of high spill events. We are not recommending extensive follow-up studies.

Comment: AR&FOPR comment that on pages 43 to 45 of the DEIS, we incorrectly state that the impounded waters upstream of the Saccarappa dam are meeting water quality criteria for dissolved oxygen, because this conclusion was based on a single year (1997) of data. AR&FOPR suggest that we identify ongoing violations from other years (1993, 1999, 2000, and 2001) or incorporate changes that the Maine Department of Environmental Protection (MDEP) will require as part of its Water Quality Certification (WQC).

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Response: We based our statement that the impounded waters upstream of the Saco dam were meeting water quality criteria for dissolved oxygen based on the State of Maine 1996 305(b) Water Quality Assessment Report to Congress. Since the January 1999 license application filing, a more recent MDEP 305(b) Water Quality Assessment Report has been published that identified portions of the river near Windham and Gorham as "non-attainment." Similarly, past and current 305(b) reports also identify the tributaries entering the Presumpscot River below Sebago Lake, such as Otter Brook, Nason Brook, Pleasant River, Inkhorn Brook, and Colley Wright Brook, as "non-attainment" because of urban and rural non-point source pollution. Non-attainment of applicable water quality standards in the tributaries is not attributable to project operations. Loadings from these tributaries may be contributing to non-attainment in the mainstem.

Dissolved oxygen levels in the mainstem of the Presumpscot River generally complied with the applicable standards, with the exception of a few locations where non-point source pollution from tributaries may have been a factor in minor instances of non-attainment. In most cases, the dissolved oxygen readings were taken in the morning hours, during which time dissolved oxygen levels are at their lowest due to biological respiration from aquatic plants and algae. We would expect that dissolved oxygen levels throughout the day would not drop below these values.

Overall, data from recent water quality surveys show that the mainstem waters of the Presumpscot River above Westbrook generally meet or exceed applicable state water quality Class A and B criteria. Some instances of non-attainment were noted, and subsequently, portions of the Presumpscot River were listed as not attaining state water quality standards. The conditions of the WQCs are attached to and become part of any licenses issued for these projects.

Comment: AR&FOPR object to our omission of a discussion about increases in riverine aquatic invertebrate organisms resulting from dam removal and suggest that we include such changes as part of our water resources discussion in the FEIS.

Response: We discuss the potential effects of project operations on aquatic species, including macroinvertebrates, in our fisheries section. Specific effects to aquatic habitat, including substrate suitability, from dam removal were evaluated in the DEIS.

Although several locations along the Presumpscot River were observed during the September 2000 Dam Removal Study, detailed sampling of benthic macroinvertebrate communities was beyond the scope of the study. However, fisheries habitat and substrate data were collected during field investigations, and indicated that most of the substrate in

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the surveyed impoundments consisted of sand, gravel, cobble, boulders, and bedrock, with only small amounts of silt/clay. The exception is the lower reach of the Saccarappa impoundment, where the surface sediments consist of a layer of predominantly fine-grained sediment (sand/silt/clay).

Removal of the dams would likely transform this impounded reach of the Presumpscot River into a shallower, higher-velocity reach of river with a greater riverine character, which would likely provide some enhancement of dissolved oxygen levels because of reaeration by exposed riffles and rapids. The initial removal may result in some flushing of softer sediments downstream. However, based on our field observations, this flushing would likely mobilize only a limited amount of fine-grained sediment (silt/clay). Portions of the river may be restored to a higher quality cobble and gravel substrate providing some benthic habitat enhancement. As a result, a likely shift in the benthic macroinvertebrate community may occur with the removal of the dams. Under the dam removal alternative, colonization of more pollution-sensitive insect taxa, such as the Ephemeroptera-Plecoptera-Trichoptera (EPT) group, may benefit over the pollution-tolerant, low-flow species.

Comment: AR&FOPR appreciate the evaluation of substrate in the Little Falls, Mallison Falls, and Saccarappa impoundments. However, they object to our omission of the substrate analysis performed by Northern Ecological Associates (NEA) and suggest we include it in the FEIS.

Response: Staff reviewed the substrate analysis conducted by NEA, and concluded that it generally corroborated the substrate analysis conducted by Berger (2001). Staff chose to use the Berger substrate analysis because it was more comprehensive. Berger established a total of 19 transects in the three-project reach (compared to 12 by NEA), and characterized substrate at 17 to 24 locations per transect (compared to 5 per transect by NEA). Berger also was able to characterize substrate at all sample locations by probing with a PVC pipe or using a weighted line, while NEA was only able to characterize sediment where the Ponar sampler was able to "grab" a bottom sample. NEA admits on page 3 of their June 2001 Supplemental Report that obtaining a sample "...was not possible in all cases because of bedrock outcrops or the presence of large stones that could not easily be picked up in the sampler."

Comment: S.D. Warren comments that on page 40 of the DEIS, the minimum river flows are incorrectly stated at the Eel Weir project as 25 cfs. It states that this is the level for the bypassed reach in the winter, but that normal flow conditions, under the LLMP, in the river below the Eel Weir powerhouse are 330 cfs.

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Response: We modified the text in section 4.3.1.1 of the FEIS to give the reader a better understanding of the required minimum flows and the normal flows below the Eel Weir Project under the current LLMP.

Comment: S.D. Warren comments that the discussion of state dissolved oxygen standards on page 43 of the DEIS is incorrect and that Maine law does include requirements for higher dissolved oxygen, but only in designated spawning and egg incubation areas, none of which occur in the Presumpscot. Therefore, only the general dissolved oxygen standards for Class A, B, and C waters apply to these projects.

Response: We agree and have deleted the reference to the designated spawning and egg incubations areas which do not apply to the Presumpscot.

Comment: S.D. Warren comments that the discussion of temperature-based minimum flow plans on page 45 of the DEIS is outdated. It was originally part of an agreement between S.D. Warren and the state of Maine, but has since been incorporated into the amended LLMP.

Response: We have updated section 4.3.1.1 of the FEIS to reflect the current agreement.

Fisheries and Aquatic Resources

Comment: AR&FOPR are disappointed by our failure to recommend removal of the Saccarappa, Mallison Falls, and Little Falls dams, and strongly disagree with key analytic findings on which recommendations against dam removal are based. They are especially disappointed with the dismissal of several studies they submitted pertaining to extensive substrate analysis and historical accounts of fisheries, and claim that we cannot fairly consider dam removal if the assumptions used to compare dam removal and fishway installation are skewed. For example, they claimed we used the lowest end of ocean return rates for Atlantic salmon, we failed to evaluate and quantify the economic benefits from multiple dam removals, and we failed to give equal consideration to the recommendation for removal of the three dams comparing the benefits of power to a restored fishery. Sweeney supports AR&FOPR's plan for dam removal and river restoration and requests that we reconsider our findings and support dam removal.

Response: As described above, staff did not "dismiss" any of the studies or reports submitted by AR&FOPR. All such materials were reviewed by staff, but in the case of the historical reports, there is disagreement among the many parties to this relicensing (S.D. Warren, the non-governmental organizations, and agencies) as to what the actual distribution and abundance of anadromous species were within the Presumpscot River

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Basin. However, the abundance 200 years ago does not define what the abundance would be today, with or without the dams in place. This is because the existing river environment has been extensively modified by dam construction, industrial and urban development, land use changes, and a significant increase in the human population.

Staff, however, has revised its fisheries analysis based on the comments received on the DEIS analysis. This revised analysis considers the potential anadromous fish production in the entire Presumpscot River Basin under different alternatives, including all the dam removal alternatives. This analysis indicates that there is a higher production potential for Atlantic salmon and other anadromous species in the basin than is reported in the DEIS, but we have not changed our conclusions regarding the potential benefits of dam removal. We provide additional basis for rejecting the dam removal alternatives, and show that maintaining the dams does not preclude the re-establishment of a run of salmon or other anadromous species in the Presumpscot River. We also provide some information on the potential benefit of a salmon run in the river (number of fish that could be taken in a fishery). We do not, however, conduct a full economic analysis of the potential benefits of dam removal, because most of the perceived benefits are speculative at this time, and would be difficult to quantify.

Comment: FOSL&MCASF disagree with our conclusion that the Atlantic salmon population resulting from selective dam removals, is not sufficiently large to justify removals because the population size is based on flawed quantitative analysis, the quantitative estimate of Atlantic salmon habitat is not correct, the selected return rate is lower than documented elsewhere, and we fail to specify what number of salmon would be enough to justify dam removal. Furthermore, they assert that if the Atlantic salmon population projection in the DEIS is not valid, then the rationale for rejecting dam removal also is not invalid.

Response: As noted above, staff has revised its analysis of Atlantic salmon potential for the Presumpscot River Basin by: (1) revising its substrate analysis (resulting in a greater length of suitable river), (2) incorporating potential habitat unit data provided by MASC for the tributaries and other reaches of the Presumpscot River, and (3) incorporating dam passage survival, so that the effects of dam passage can be compared to the dam removal alternatives (where passage is assumed to be 100 percent where a dam has been removed). As noted in a previous comment, however, we have maintained an ocean survival rate (smolt to adult) of 0.5 to 1.5 percent. This is based on the 25 years of survival data for hatchery-reared salmon smolts released into the Penobscot River, presented in Baum (1997). Although Baum (1997) also states that survival rates for wild smolts in two Maine rivers in the 1950's ranged as high as 3 to 15 percent, Penobscot River adult returns since 1969, and more recent documented returns to other Maine

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Rivers, indicates ocean survival rates of much less than 1 percent. We have included in the FES marine survival data from the Saco River, which has shown survival rates of only 0.1 to 0.5 percent, based on adult returns from smolt stocking. Baum (1997) estimates that "...it is possible that marine survival of Atlantic salmon is cyclical," but offers no predictions of what future survival rates may be. Survival rates as high as 15 percent for wild smolts from one river nearly 50 years ago do not appear to be reasonable to use in estimating potential future adult returns from hatchery releases in the Presumpscot River. Staff's objective is to present as realistic an analysis as possible, and based on the past 30 + years of adult salmon returns in Maine, return rates greater than 1.5 percent, for hatchery reared fish (which initially would comprise 100 percent of the salmon in the Presumpscot River), do not appear to be realistic.

Staff does not intend to "specify what number of salmon would be enough to justify dam removal," as this is but one factor under consideration in our assessment of dam removal. However, based on our revised analysis, using realistic ocean survival rates that have prevailed in Maine rivers over the past 30 + years, the dam removal alternatives would incrementally increase salmon production potential from 31 to 65 percent over the potential with the dams remaining in place (with fish passage). For the range of survival rates used by staff, this would potentially result in an additional 19 to 40 adult fish returns at the lowest survival rate modeled (0.5 percent) and 56 to 120 adult fish at the highest survival rate modeled (1.5 percent). Although the Atlantic salmon fishery is currently closed throughout Maine until further notice, if fishing were allowed, with an assumed exploitation rate of 10 percent, dam removal would result in an increase in the potential catch of 2 to 12 fish (from a total potential catch of 6 to 18 fish under existing river conditions with the dams in place). Because: (1) these numbers are all "theoretical" (there currently are no Atlantic salmon in the Presumpscot River, other than occasional "strays" from other rivers), (2) a salmon restoration program has not yet been initiated by any state or federal agency on the river, (3) fish passage has not yet been provided at the two lowermost dams on the river, and (4) some benefits could be provided with fish passage on the existing project dams, there is not sufficient justification at this time to recommend removal of any of the Presumpscot River dams, specifically to benefit Atlantic salmon.

Comment: MDMR comments that our analysis of Alternative 4 was incomplete because passage efficiency and habitat suitability were ignored. It suggests that we consider the cumulative lethal impacts of inefficient downstream passage on all migratory species. MDMR asserts that for all migratory species, downstream mortality would be significantly reduced under Alternative 3 as compared to Alternative 4.

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Response: As described in the FEIS, the staff analysis of the potential anadromous fish production in the Presumpscot River is an order of magnitude analysis, meaning that staff is not attempting to precisely predict potential run sizes, but instead make general predictions and provide a comparative analysis of the alternatives. The methodology used by staff in estimating the potential production of shad and herring, using production of adults per area (acre) of habitat, is the same methodology used by MDMR in its assessment of the anadromous clupeid potential of the Presumpscot River, and is not a "precise" methodology that considers habitat suitability. It considers all wetted habitat available to spawning fish as suitable, and likely overestimates the amount of habitat actually available. Staff's revised analysis, however, does consider the cumulative efficiency of passage over one or more dams, so habitat located farther upstream of several dams would not be fully utilized, in that fewer fish would reach that habitat. For comparison to the dam removal alternatives, passage over the former dam sites is considered 100 percent efficient; this may also overestimate the benefits of dam removal, since passage over natural falls may result in some fish delay or mortality.

Comment: AR&FOPR comment that we have not referenced or used extensive historical information collected and submitted by AR&FOPR regarding anadromous fish, and we have failed to explicitly state that dam construction was the cause of the decimation of alewife and shad populations and near extirpation of Atlantic salmon populations.

Response: As stated above, staff reviewed and considered the information filed by AR&FOPR,² and clearly stated that dam construction was the primary reason for the reduction or elimination of anadromous fish runs in the Presumpscot River.

Comment: MDMR commends our rejection of S.D. Warren's position that anadromous fish should not be restored to the Presumpscot River. MDMR also agrees with the Commission's assessment that there needs to be more efficient upstream and downstream passage, although it considers the analysis incomplete.

Response: Staff has revised its analysis of the potential for anadromous fish production within the entire Presumpscot River Basin, and concludes that there is the potential for restoration of anadromous species to the Presumpscot River.

² This includes the filings and attachments thereto of: February 2, 2001; February 12, 2001; May 23, 2001; June 21, 2001; July 5, 2001; July 16, 2001; and November 30, 2001.

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Comments: AR&FOPR comment that if we persist in rejecting dam removal at any project, the requirements must be made consistent with the final Section 18 prescription for Fishways. Interior also expects that we will include Interior's Modified Prescriptions for Fishways, due to be filed by February 1, 2002 in the FEIS and any license(s) issued.

Response: Staff has included a detailed description and analysis of the final fishway prescription (which was filed on February 7, 2002) in the FEIS. Staff will adhere to its responsibilities under Section 18 of the FPA. However, regardless of the mandatory prescription, we provide our own independent analysis of whether the prescription is in the public interest.

Comment: MDMR disagrees that S.D. Warren be given responsibility for developing a fish passage implementation plan and fish passage designs. Typically, MDMR and Interior work together to develop designs for fish passage facilities.

Response: A requirement that the licensee develop plans for fish passage at its project(s) is a "standard" requirement, and is consistent with the Commission specifying a licensee's responsibility to provide fishways. The licensee is required to file any fishway design plans for Commission approval, because installation of a fishway would constitute a change in project structures. The Commission, however, also requires that these plans be prepared in consultation with state and federal agencies, and that agency comments on the plans be included in the Commission filing. The licensee's proposed plans generally must be agreed upon with any recommending or prescribing agency before the Commission approves their construction.

Comment: Interior and AR&FOPR comment that our failure to include the Interior's Prescription of Fishways at Dundee is in blatant disregard of the requirements of Section 18 of the FPA. Likewise, Interior claims that we have not acknowledged or accepted the conceptual fishway designs, have rejected the schedule for installing fishways at Saccarappa when passage is attained at the downstream Smelt Hill and Cumberland Mills, and have failed to acknowledge the need for Interior to review and approve all proposed design plans and operation procedures. They state that the prescription is mandatory upon the Commission and must be incorporated, unreviewed and unaltered, in any license issued by the Commission.

Response: As noted above, staff will adhere to current Commission policies regarding Section 18 prescriptions. Nevertheless, staff's independent analysis in the EIS may present different conclusions, based on the information available to staff at the time of its analysis. Staff included table 17 in the DEIS, which describes the conceptual fishway designs provided by FWS in its preliminary prescription. Staff has revised both this table

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and the text in the FEIS, and has added a new table to section 3.6 (table 2) to reflect the final prescription.

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Because the construction of fish passage at the project dams would not occur until fish passage is provided at two downstream dams, it would be premature to conduct a detailed analysis of the prescribed designs at this time. As noted above, the Commission's standard practice is to require that final designs for fish passage facilities be developed in consultation with state and federal agencies, prior to the final designs being filed for Commission approval. This is typically done about one year or less before actual construction, to take advantage of any improvements in fish passage technology that may have occurred since any Commission order requiring fish passage.

Comment: EPA suggests that the conclusion that fish passage is preferable to any of the dam removal alternatives cannot be supported and suggests that we include a revised and complete analysis of dam removal alternatives both individually and compared to installation of fish passage at project dams.

Response: As previously noted, staff has revised its analysis of the potential anadromous fish production in the Presumpscot River Basin under the various dam removal and fish passage alternatives.

Comment: Interior states that the positions of the state and federal natural resource agencies are closer than is portrayed in the DEIS. The state agencies are in the process of updating their management objectives, and Interior will provide updated restoration and management goals when it submits its modified fishway prescription.

Response: A description of the draft fishery management plan for the Presumpscot River, prepared by MDMR, MDIFW, and MASC in December 2001, and the FWS final fishway prescription, have been included in the FEIS.

Comment: MDIFW comments that we refer to an outdated proposed management program for resident salmonids. Based on new information, its management strategy has changed from a seasonal put-and-take fishery to a season-long fishery for stocked salmonids.

Response: As noted above, staff has included the latest fishery management strategies in the FEIS.

Comment: MDIFW suggests that the discussion of angler use following dam removal is not well developed in the DEIS. It states that the discussion presents a cursory analysis

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that suggests angler use to be five times higher if the Mallison and Little Falls dams are removed.

Response: We agree that there is a high demand for quality trout fishing experiences in southern Maine, as evidenced by the level of use that the Eel Weir bypass receives. However, the limiting factor along the project portion of the Presumpscot River would be the availability of angler access. We have modified section 4.3.5.2 of the FEIS to include additional analysis of angler use following dam removal. With the dams in place, we agree that the bypassed reaches offer additional opportunities to provide quality trout fishing experiences. The Final Recreational Enhancement Plan is designed to ensure that access to these bypassed reaches is realized.

Comment: MASC was surprised that there was not a holistic approach to the analysis of the effects of the Presumpscot River projects, especially regarding anadromous fish species such as the Atlantic salmon. It suggests that a global approach is needed to fully realize their continuing effects on the river, and that we should note that continued operation of the projects affects restoration of the Atlantic salmon in the Presumpscot River watershed by limiting their access to critical life history requirements.

Response: As previously noted, staff has revised its analysis for salmon and other anadromous species, and now presents production potential for the entire Presumpscot River Basin under existing conditions, under the alternative of fish passage at all the project dams, and under the three dam removal alternatives.

Comment: MASC comments that we neglected to account for salmon production in the tributaries above and below the Presumpscot River projects and how each tributary contributes to the overall Presumpscot River returns. In the affected reach from Saccarappa dam to the Gambo tailrace, Little River is listed as a contributor, but Colley Wright Brook is not. MASC further presents estimated numbers for Atlantic salmon smolt production within Presumpscot River tributaries.

Response: At the time the DEIS was prepared, the MASC had not yet presented any data on potential salmon habitat in the tributaries, and staff had no other means to obtain this information. Our revised salmon analysis incorporates these recent MASC data.

Comment: MASC rejects Berger's conclusion that each of the three dam removal alternatives would only marginally increase potential salmon habitat. MASC estimates gains as high as 42 percent under Alternative 1 (remove Little Falls, Mallison Falls, and Saccarappa dams), 12 percent under Alternative 2 (remove Saccarappa dam), and 26 percent under Alternative 3 (remove Little Falls and Mallison Falls dams).

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Response: Staff's revised analysis indicates that salmon-rearing habitat would increase by 40 percent under Alternative 1, 17 percent under Alternative 2, and 23 percent under Alternative 3, compared to existing conditions in the Presumpscot River Basin.

Comment: MASC suggests that the only mainstem reach of the Presumpscot River that could produce Atlantic salmon smolts is the Eel Weir bypass. Furthermore, it assumes, for the purposes of this analysis, that although other bypassed reaches may have favorable habitat, they will not produce salmon smolts even with the projected minimum flows. Therefore, the Presumpscot River is estimated to be capable of producing 2,178 smolts.

Response: Staff has used this new information in its revised analysis, but questions whether the Eel Weir bypass could support significant smolt production because of the large number of stocked trout (potential competitors) and the intense trout fishery (potential source of "by-catch" mortality for smolts).

Comment: EPA comments that we understate the effect of dam removal in combination with adequate fish passage on restoration of the aquatic resources of the river, and that there is a significant discrepancy between the MDMR and Commission estimates for potential adult returns of various anadromous fish.

Response: As noted, staff has revised its analysis, and our projections of potential production of shad and river herring are similar to the MDMR estimates. Where our estimates are lower, staff has factored-in passage efficiency/survival, which MDMR did not do in its recent estimates. EPA should also be aware that both staff and MDMR estimates are "order-of-magnitude," and small differences between the estimates are not significant.

Comment: MASC suggests we underestimated Atlantic salmon habitat currently impounded by the Saccarappa, Little Falls, and Mallison Falls dams by using the width of the transects at full pond. MASC suggests that the finer substrates found in the former flood plain and presently inundated would bias the estimated percentage of coarser substrates downward. Furthermore, MASC objects to the categorical exclusion of sand as a habitat variable because it oversimplifies the analysis and underestimates potential Atlantic salmon habitat. FOSL&MCASF also suggest that we grossly underestimate the quantity of Atlantic salmon productive habitat that would exist under dam removal and cite several errors made in the analysis that led to the conclusion.

Response: Staff has revised its analysis, using only those substrates that would remain wetted after dam removal (based on the HEC-2 analysis), and has included sand as a

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substrate that would provide suitable rearing habitat, based on Stanley and Trial (1995). This may, however, overestimate the amount of suitable salmon rearing habitat, because Stanley and Trial (1995) indicate that sand has a relatively low suitability index of 0.2 (on a scale of 0 to 1.0) for parr, and 0.5 ("medium" suitability) for fry. Our analysis does not "discount" the suitability of sand, and assumes equal suitability with other more suitable substrates, such as cobble (suitability of 1.0 for parr and 0.8 for fry). Because this is an "order-of-magnitude" analysis, and we do not have detailed post-dam substrate data for the entire dam-removal reaches, we have not "graded" the suitability of the various substrates. We have, however, revised our analysis by removing "concrete" and "bedrock" as suitable rearing substrates (we previously considered them suitable). Stanley and Trial (1995) do not mention either substrate as suitable rearing habitat. As noted above, our revised analysis in the FEIS (which includes the entire river basin) does indicate a somewhat higher production potential for salmon than the production potential presented in the DEIS.

Comment: MASC rejects Berger's claim that constructing fish passage facilities would provide very little habitat. MASC states that although the Commission is correct in its analysis that limited amounts of Atlantic salmon habitat would be available in the mainstem of the Presumpscot River, staff ignores the substantial habitat that would become accessible in the tributaries.

Response: Berger (2001) and staff do acknowledge that tributary habitat could be important in any restoration program on the river, but had no data on tributary habitat until it was provided by MASC in its letter of comment on the DEIS. Based on other salmon restoration programs in Maine, however, upstream fish passage facilities would not initially be critical for any salmon restoration program in the river. Initial efforts would likely involve stocking of fry, parr, or smolts in suitable habitat upstream of the existing (or removed) dams, with the objective of developing a Presumpscot River run of adult salmon, which could then be used as brood stock for additional river-specific hatchery operations. This would require at least one fish-trapping facility on the lower river (such as at Cumberland Mills dam), where returning adult fish could be collected, enumerated, and transported to the hatchery. Through time, as the number of adult returns increase in excess of hatchery requirements, surplus fish would likely be allowed to spawn naturally, with the objective that eventually, natural spawning would replace hatchery operations (this, however, has not yet occurred on any of Maine's major salmon rivers, with even those rivers where the Atlantic salmon has been listed as endangered, continuing to receive significant hatchery releases). Upstream passage facilities for Atlantic salmon would not be necessary until the decision is made to allow some numbers of adult fish to migrate upriver for natural spawning or to provide a sport fishery. The issue of fish passage for salmon, however, may be a moot point, if fish

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passage facilities are developed for shad and river herring (as recommended by staff and prescribed by FWS). Any fish facility designed for shad and river herring could incorporate design parameters for salmon, and could be constructed long before there is any need for upstream salmon passage.

Comment: MASC and Interior comment that we underestimated potential returns of mature Atlantic salmon to the Presumpscot River by using only the Saccarappa to Little Falls reach, and ignoring smolt production from tributaries and the Eel Weir bypass. MASC predicts that 124–620 adult Atlantic salmon would return to the Presumpscot. Interior's Modified Prescription for Fishways, including appropriate measures for the potential salmon run, will be mandatory and must be included in any license issued.

Response: As noted above, staff has revised its analysis of salmon production potential for the Presumpscot River Basin, based on the new salmon habitat information provided by MASC, and estimates that the basin as it exists today (with no dam removal) has the potential to produce an adult salmon run of 62 to 186 fish. With removal of the Saccarappa, Mallison Falls, and Little Falls dams, the potential run size increases to a range of 102 to 306 fish. Any licensing order issued by the Commission for the Presumpscot River projects will be consistent with its requirements under Section 18 of the FPA.

Comment: Sweeney, MASC, MDMR, AR&FOPR, and Interior object to the concept of full habitat utilization downstream of a project before fishway construction is triggered at that particular project. MASC states that this approach artificially increases the risk to the fish of some environmental catastrophe and prevents the Atlantic salmon from freely choosing the habitat preferred for spawning. MDMR suggests that the trigger for each phase of fish passage be a clearly defined event, such as 20 to 25 percent of the estimated total production for habitat above a dam be met before fish passage is required at the next upstream dam. AR&FOPR suggest that we fully define and clarify what we mean by "phased approach" in the FEIS. Interior, in its Final Fishway Prescription, calls for installation of a fishway at Saccarappa within 2 years after installation of a fishway at Cumberland Mills dam, with installation of fish passage at upstream dams after specific trigger numbers of fish have been met.

Response: Staff has clarified its recommendation for a "phased approach" to fish passage development in the FEIS, which would generally be consistent with the FWS prescription for a Phase 1 and Phase 2 development of fish passage, using the trigger numbers prescribed by FWS. Staff, however, does not agree with the FWS prescription that Phase 1 Denil fish ladders be replaced with Phase 2 fish lifts, if the design populations of the Phase 1 facilities are met or exceeded. Modification or demolition of

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fishways to replace them with fish lifts would be expensive and make little sense. Phase 1 facilities should be designed so that they could easily be modified to accommodate larger fish populations, without the need for demolition. Staff is also recommending that the final design and construction schedule for each fish passage facility would be approved by the Commission, after preparation of the design and schedule by S.D. Warren, in consultation with the state and federal fishery agencies.

Comment: S.D. Warren comments that, if the FEIS recommends fish passage, then phased development is the only logical approach and requests that, under a phased approach, FWS's reservation to require passage later be eliminated as unnecessary.

Response: Staff is recommending phased development of fish passage facilities, generally consistent with Interior's final fishway prescription, with the exceptions noted above. Because this final prescription has further reserved Interior's authority to prescribe fishways, it is our policy to include a reservation to prescribe fishways in any license order issued.

Comment: S.D. Warren does not support our recommendations regarding fish passage for shad, herring, and Atlantic salmon, primarily because the historical range of these species in the Presumpscot River is still unknown. Therefore, S.D. Warren asserts that installation of fish passage facilities on the Presumpscot would constitute enhancement rather than restoration. Furthermore, S.D. Warren asserts that it is premature to require fish passage at upstream projects until passage over Smelt Hill and Cumberland Mills is ensured. Therefore, S.D. Warren recommends that the FEIS maintain the clause reserving FWS's future prescription authority.

Response: S.D. Warren is correct that it is unclear exactly how far upstream anadromous species historically migrated in the Presumpscot River. The Commission, however, may order measures to enhance fishery resources, if it is in the public interest. Based on staff analysis in the FEIS, there is the potential for development of sizable runs of shad and river herring in the river if fish passage facilities are constructed. We agree that it would be premature to require fish passage at any of the five project dams until fish passage is assured at Smelt Hill and Cumberland Mills dams, and for that reason, staff has recommended a phased approach to fish passage development, keyed to clearly defined events, along with the requirement for S.D. Warren to regularly report to the Commission on the status or progress of anadromous fish restoration activities on the Presumpscot River.

Comment: MDMR stated that the Commission endorsed MDMR's methodology for estimated production potential for American shad. However, in the DEIS, the

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Commission uses a range of 25 to 142 shad per acre, whereas MDMR uses a single production value of 111 shad per acre, based on shad restoration in the Connecticut River in the 1980's. A more recent long-term average was 98.8 shad per acre on the Connecticut River. Using this value, MDMR's estimate would decrease by 4,000 fish.

Response: Staff has continued to use the range of 25 to 142 shad per acre to estimate production potential, which brackets the values cited by MDMR. Shad have demonstrated a wide range of production on many rivers (like the Connecticut River), and using the range cited by staff provides a more realistic representation of the potential run sizes that could develop.

Comment: MDMR strongly objects to our statement that the probability of restoring a shad run appears low. It presents documentation on three shad restoration programs in Maine that are progressing well.

Response: Staff appreciates the updated information on shad restoration programs in Maine. Staff's statement regarding the probability of a shad run developing was in reference to the potential for developing the maximum estimated run size, and the long time it may take to develop such a run using only a passive restoration program. Referencing the information provided by MDMR, for two out of the three rivers mentioned (the Androscoggin and Kennebec Rivers), more than 15 years were required before positive restoration results were obtained (although on the Kennebec River, the Edwards dam did not have a state-of-the-art, efficient fishway prior to the dam's removal). On the Saco River, where the shad run size tripled in 9 years, as indicated by MDMR, the remnant population of shad was larger than anticipated (an average of about 800 fish). This is also much larger than the documented remnant shad population on the Presumpscot River, which was last counted at 31 fish at the Smelt Hill dam in 1996, prior to destruction of the fishlift by flooding. The FEIS has been revised, to clarify staff's discussion of the potential for restoration of shad to the Presumpscot River, using the information provided by MDMR.

Comment: MDMR agrees with our recommendation that installation of fish passage for American shad and river herring be contingent upon passage being achieved by either dam removal or installation of fish passage at the Smelt Hill and Cumberland Mills dams.

Response: This recommendation is consistent with the FWS final fishway prescription. Without passage at Smelt Hill and Cumberland Mills, anadromous species would not have access to the project reaches of the Presumpscot.

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Comment: Saco comments that the DEIS gives consideration neither to the success of Atlantic salmon restoration on the Saco River nor to the value of restoring Atlantic salmon to a river that was once prolific in its production of salmon.

Response: Staff has reviewed the success of salmon restoration efforts in the Saco River, which recorded returns of 69 adult fish in 2001 and 46 fish in 2000. Staff has also considered the potential value of restoring salmon to the Presumpscot River, which is one reason that it has devoted considerable effort to the analysis of the salmon potential of this river.

Comment: Interior objects to the DEIS not considering any of the river above the Gambo Project as potential habitat for Atlantic salmon since MASC has identified plans to restore salmon runs as far upstream as the Eel Weir dam.

Response: As noted above, staff has revised its fisheries analysis to estimate the salmon production potential for the entire Presumpscot River Basin using habitat data recently provided by MASC, as well as staff's estimate of salmon-rearing habitat in the mainstem of the river.

Comment: Interior comments that the Commission did not do a population model for American shad. If such an analysis were performed, it would be clear that achieving the MDMR's goals for restoring shad will require removal of one or more dams.

Response: The DEIS did not include a detailed population model for American shad, but staff's revised analysis in the FEIS includes a spreadsheet analysis of the shad population potential for the Presumpscot River under several alternatives, including the construction of fish passage facilities and the three dam removal alternatives (with and without fish passage at the remaining dams). Fish passage efficiency/survival was factored into this analysis for both upstream and downstream migrants. This analysis indicates that the highest shad production potential is with dam removal, plus the installation of fish passage at the remaining dams, although the alternative of installation of fish passage at the five project dams has only a slightly lower production potential. Dam removal, without installing fish passage at the remaining dams, has the lowest production potential. All of these alternatives assume that Smelt Hill dam is removed and passage is achieved at the Cumberland Mills dam. The analysis indicated that removal of the S.D. Warren projects is not required to successfully restore a shad population, assuming the installation of fish passage facilities.

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Comment: Interior suggests that the Commission treat current management of the alewife in the Presumpscot as an "active" program because the "free swim" approach does not make the restoration program any less "active."

Date: 06/30/2002

Response: Staff's use of the term "active" restoration program specifically refers to a program where adult fish are released into the river from outside sources (trucked in), or fry/juvenile fish are released into the river from hatchery sources. This type of program may jump-start a rebuilding population, by adding adult spawners or progeny that would be in addition to any free-swimming spawners/progeny that may enter the river on their own.

Comment: Interior objects to referring to fish passage at dams below Saccarappa as a "somewhat uncertain future event." Interior argues that the U.S. Army Corps of Engineers is scheduled to remove the Smelt Hill dam by fall 2002, and that state agencies are committed to pursuing passage at Cumberland Mills.

Response: Based on recent information about the Smelt Hill dam that has come to light since the preparation of the DEIS, the removal of the Smelt Hill dam appears to be more certain. In fact, staff's revised fisheries analysis, described above, assumes that the dam will be removed. As for the Cumberland Mills dam, provision of fish passage at that dam still appears to be uncertain as to if or when that may occur. Staff is unaware of any legal action taken at the state level to compel fish passage construction, and even if such action has taken place, staff would be unable to predict the outcome of any such action.

Comment: AR&FOPR object to our refusal to directly state that the resident fishery in the three lower impoundments is characterized by low abundance and limited, relatively poor quality habitat, and that the DEIS includes only a minimal description of the fishery.

Response: Staff adequately and objectively describes the resident fishery in the project areas, consistent with AR&FOPR's observations. Readers of the EIS may draw their own conclusions regarding the quality of the habitat and fishery.

Comment: AR&FOPR comment that we fail to note that the lack of fish passage is the reason anadromous species do not exist within project waters and that shad, alewife, and Atlantic salmon have been sighted below the Smelt Hill dam within the last several years.

Response: As noted above, staff described on pages 60 to 62 of the DEIS that dam construction was the major reason for the elimination of the anadromous fishery in the Presumpscot River, and also described that there currently are no fish passage facilities at any of the dams on the river. We also provide the passage data for the now-abandoned

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Smelt Hill dam fishlift (prior to its destruction in the flood of 1996), and note that Atlantic salmon have occasionally been observed in the lower river.

Date: 06/30/2003

Comment: AR&FOPR and FOSL&MCASF agree that our recommendation (fish passage, without dam removal[s]) would not significantly benefit Atlantic salmon and they suggest that if we maintain the position without recommending dam removal, we are effectively rejecting the only mechanism to restore meaningful numbers of Atlantic salmon to the Presumpscot River, and are thus going against the position of the legislature of the State of Maine (12MRSA, §9901) to restore Atlantic salmon to all native rivers, which we should make clear in the FEIS.

Response: The FEIS clarifies that maintenance of the existing dams (with fish passage) would not provide significant additional salmon habitat within the project areas, but would provide salmon access to tributaries and portions of the upper mainstem that, according to MASC, do contain suitable Atlantic salmon habitat. Dam removal is not the only mechanism available to restore runs of salmon to the Presumpscot River. As AR&FOPR and FOSL&MCASF should be aware, salmon restoration programs are in progress on several rivers in Maine (and elsewhere in New England) that have existing hydropower dams along most of the mainstem reaches of the rivers, with much of the salmon habitat contained in the tributaries (Saco, Kennebec, Penobscot, Merrimack, and Connecticut Rivers). A combination of fish passage construction and hatchery releases are the primary measures being used in those restoration programs (except on the Kennebec River where Edwards dam was removed, but upstream dams are proposed for fish passage). A similar fish passage and hatchery program could be implemented on the Presumpscot River. Staff has already recommended the development of fish passage facilities for other anadromous species, which could also be used by salmon. AR&FOPR and FOSL&MCASF should also be aware that the MDMR, MDIFW, and MASC have recently released (December 2001) a draft fishery management plan for the Presumpscot River, which calls for the restoration of Atlantic salmon and other anadromous species via construction of fish passage facilities at the mainstem dams.

Comment: AR&FOPR reject our conclusion that shad and river herring will be restored as well with fishways as with dam removal because they claim our conclusion is based on 100 percent return rates with fishways, which is unrealistic.

Response: As noted above, staff has revised its fisheries analysis, which now includes fishway efficiency factors. This analysis indicates that the highest potential shad and herring production occurs with dam removal plus the provision of fish passage at the remaining project dams, although this estimated production is not significantly higher

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than with fish passage at the five project dams. All alternatives assume that Snellet Hill dam is removed and passage is achieved at the Cumberland Mills dam.

Date: 06/30/2002

Comment: AR&FOPR reject the assumption that possible past human alterations to the falls at the three dams have made them impassable without the dams in place, but if so, that this can be corrected and repaired during dam removal.

Response: The question of the "configuration" of the falls underlying the current dams is an important consideration that would need to be answered before any dam removal. If the falls had been modified by original dam construction, we agree that any dam removal should ensure that fish passage conditions are adequate. If, however, it becomes evident that the original configuration of the falls was not changed by original dam construction, and was impassable by fish, we question whether S.D. Warren should also be responsible for modifying the original configuration of the falls at the time of any dam removal to ensure fish passage.

Comment: AR&FOPR reject the conclusion that shad are not re-establishing themselves and cite examples of other Maine rivers where numbers have increased.

Response: Staff agrees that shad are slowly re-establishing themselves in a few rivers in Maine, but as noted above, restoration of shad (and river herring) using only a "passive" program would require many years to reach the restoration goals.

Comment: AR&FOPR comment that we failed to acknowledge the obvious differences between the isolated salmonid fishery created by rewatering the bypassed reaches versus the larger, continuous salmonid fishery created by dam removal.

Response: Staff has acknowledged that dam removal would have the potential to establish a riverine salmonid fishery in the formerly impounded reaches (assuming trout stocking), but as the Eel Weir bypassed reach has demonstrated, a significant fishery can be established in "isolated" reaches by the combination of instream flows and stocking.

Comment: Interior suggests that we require additional studies to address the flow needs of salmon before it can make a determination as to the public interest in issuing any new licenses for the Presumpscot River projects.

Response: Staff notes that the MASC, in its November 27, 2001, letter of comment on the DEIS, has endorsed the Interior flow recommendations as being suitable for the life stages of salmon that would likely utilize the project bypassed reaches. Staff is also now recommending that future instream flow studies be conducted, should specific triggering

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events occur, such as introduction of salmon or other anadromous species to the bypassed reaches. The project bypassed reaches may not, however, be considered important salmon habitat, because the November 27, 2001, letter from the MASC indicates that for its recent analysis of the potential rearing habitat in the mainstem of the river, they assumed that smolts would not be produced in the project bypassed reaches. MASC, however, does not state why it has excluded the potential habitat value of the bypassed reaches.

Comment: Interior comments that the DEIS fails to consider flows necessary to accomplish fish passage objectives at all five projects (not just the three that have potential for trout fishing or salmon rearing). Interior states that it will provide more information in its modified fishway prescription.

Response: Staff did not assess instream flow needs for fish passage, because any implementation of fish passage measures would likely be some years into the future, after fish passage is resolved at the downstream Smelt Hill and Cumberland Mills dams. The FWS final fishway prescription, however, included zone-of-passage flows for the bypassed reaches, and specific attraction flows for each of the prescribed facilities. The final prescription is described in the FEIS.

Comment: MDMR and AR&FOPR support our recommendation for construction of upstream passage facilities for the American eel; however, they are concerned that the proposed project shutdowns for downstream passage will be insufficient because eels are active all night (not just four hours), and may not pass all five projects in one week. AR&FOPR suggest requiring downstream monitoring studies to determine if the shutdown periods are sufficient.

Response: The FWS final fishway prescription includes 8-hour-per-night shutdowns for 8 weeks, for downstream eel passage. Staff believes that shutdowns of this duration, however, likely exceed the duration of the eel outmigration period, so we are recommending a 3-year monitoring program to determine the most effective time period for project shutdowns. It is anticipated that effective shutdowns could be provided for less than 8 hours per night, during different days or weeks, depending on the location of the project within the watershed.

Comment: EPA comments that aside from an upstream eel passage facility at the Dundee Project, the applicant has not proposed any fish passage measures for anadromous fish that would help achieve fishway management goals. Furthermore, the DEIS modifies Interior's proposed Prescription of Fishways such that fish passage may

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take many more years than necessary (i.e., "full utilization of river habitat downstream"). EPA suggests adopting the Interior's Preliminary Fishway Prescription.

Response: We clearly stated in section 3.5 of the DEIS, *Fishway Prescription*, that Interior's fishway prescriptions are mandatory and would be included in any licenses issued for these projects. As noted above, staff has recommended phased development of fish passage facilities at the project dams, generally consistent with Interior's final fishway prescription, with the exceptions noted above about the replacement of Phase 1 Denil ladders with Phase 2 fish lifts.

Comment: AR&FOPR suggest that according to Dr. Dadswell's study, our 6 to 16 percent mortality rate for eels may be conservative, and that we should discuss the cumulative effect of this level of downstream mortality in the FEIS.

Response: The FEIS has been revised to reflect that cumulative mortality would occur with no provision for downstream passage. Staff, however, has recommended downstream passage measures (project shutdowns), as well as a 3-year study to "refine" the shutdown periods. These measures would reduce the degree of downstream mortality experienced by eels.

Comment: FOSL&MCASF disagree with the following statement on page 127 of the DEIS, "Continued operation of the projects, with all the proposed enhancement measures would enhance fish populations in the Presumpscot River Basin," because it fails to mention the DEIS conclusion that retention of all five dams would result in continued extirpation of anadromous Atlantic salmon from all of their historical habitat in the Presumpscot River above Saccarappa dam. They recommend that the FEIS explicitly state that continued extirpation of Atlantic salmon is due to not recommending dam removal.

Response: As previously noted, the FEIS clarifies that maintenance of the existing dams (with fish passage) would not provide significant additional salmon habitat within the project areas, but would provide salmon access to tributaries and portions of the mainstem that, according to MASC, do contain suitable Atlantic salmon habitat. Dam removal is not the only means available to restore runs of salmon to the Presumpscot River. As FOSL&MCASF should be aware, salmon restoration programs are in progress on several rivers in Maine (and elsewhere in New England) that have existing hydropower dams along most of the mainstem reaches of the rivers, with much of the salmon habitat contained in the tributaries (Saco, Kennebec, Penobscot, Merrimack, and Connecticut Rivers). A combination of fish passage construction and hatchery releases are the primary measures being used in those restoration programs (except on the

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Newfound River where Edwards dam was removed, but upstream dams are proposed for fish passage). A similar fish passage and hatchery program could be implemented on the Presumpscot River. Staff has already recommended the development of fish passage facilities for enhancement of other anadromous species, which could also be used by salmon. Other measures recommended by staff (minimum flow releases into three of the bypassed reaches) would also enhance habitat for both resident and anadromous species in those reaches. Staff recommendations are consistent with the MDMR, MDIFW, and MASC recently released (December 2001) draft fishery management plan for the Presumpscot River, which calls for the restoration of Atlantic salmon and other anadromous species via construction of fish passage facilities at the mainstem dams.

Recreational Resources

Comment: MDIFW concurs with the staff recommendations for development of a Final Recreation Facilities Enhancement Plan and would be pleased to participate in S.D. Warren's development of such a plan.

Response: We will include MDIFW as one of the agencies to be consulted during preparation of any required Final Recreation Facilities Enhancement Plan.

Comment: Interior agrees with our comment that most of the regional recreation occurs on Sebago Lake, but argues that we fail to address the recreation on rivers, which it claims is the dominant type of use in the project area.

Response: The intent of the recreational use monitoring plan and final facilities enhancement plan is to further investigate the amount of use that occurs at all five projects and to develop the appropriate enhancements.

Comment: Interior comments that we focus on existing recreational uses without consideration of needs or demands. Interior suggests undertaking a Recreational Needs Assessment or Recreation Demand Study instead of using Form 80 data to determine recreational use.

Response: The projects involved in this proceeding are small projects with limited capacity to provide recreational opportunities. The purpose of the Final Recreational Facilities Enhancement Plan is to develop plans for facilities that allow public access to all of the experiences that the projects have to offer. Once the facilities are in place, the recreational monitoring that is proposed will enable the Commission to determine if there is a need for additional facilities due to overuse. We disagree that a full recreation needs assessment for the region is warranted.

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Comment: Interior suggests that because some enhancements require landowner permission and easements, the applicant should provide alternative mitigation and enhancement measures that can occur if current proposals are not accomplished within certain time frames.

Response: The final recreation plan, which would be developed in consultation with Interior, would address the issue of landowner permission and easements. The plan calls for a schedule of implementation and the development of final access plans based on consultation with the necessary parties.

Comment: Interior disagrees that street crossings are a legitimate reason not to provide portages and suggests that signage and crosswalks be considered for adequate portage development.

Response: We agree that street crossings are not a legitimate reason not to provide portages and have never suggested that to be true. S.D. Warren suggests that concerns over street crossings would preclude portage. However, the staff recommendation is based upon the lack of portage at Cumberland Mills and the lack of benefit of providing a put-in below Saccarappa.

Comment: Interior questions waiting 12 years to reassess recreational demands and recommends that the standard Form 80 process be followed involving reassessment of recreational demands and needs every 6 years.

Response: Dundee and Gambo are still required to follow the Form 80 process. The three minor projects are exempt from the Form 80 process. Staff agree that recreational use pressures on the entire system are high, and has recommended that a recreational use monitoring study be implemented for all five projects. Given the amount of time that it will take to finalize the proposed recreational facilities enhancements, staff feels that the given schedule is appropriate.

Comment: S.D. Warren disagrees with the recommended recreation monitoring at minor projects because minor projects are exempt from Form 80. It asserts that the FEIS should recommend monitoring every 12 years only at Dundee and Gambo, in conjunction with the Form 80 reports required under the Commission's regulations.

Response: Given the proximity to Portland and the potential use pressures, staff recommends that all of the projects be included in the recreation use assessment. Based on the recreation use assessment, the Commission would be able to determine whether or not additional recreational enhancements are necessary.

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Comment: S.D. Warren suggests that we clarify the recommendation to monitor fallen trees in the Gambo Project area to improve the safety of recreation boating. They suggest that the FEIS specify only those trees that pose a threat to public safety in the immediate vicinity of the portage put-in because tree snags are a natural occurrence that canoeists must maneuver, and these trees provide important cover and habitat for resident fisheries.

Response: We agree that the fallen tree monitoring program should not include trees that do not pose a threat to boaters in the vicinity of the project. In addition, trees that are floating in the impoundment would pose a threat to boaters and should be included in the monitoring plan.

Comment: S.D. Warren suggests that the discussion of recreation enhancements at the Little Falls Project on page 147 of the DEIS include their donation of the Hawkes property to Gorham Trails.

Response: We agree and have corrected the omission.

Comment: S.D. Warren comments that the statement on page 151 of the DEIS that a new put-in below Saccarappa should be included in the recreation plan should be corrected so that it is consistent with the statement on page 149 stating that the put-in is not necessary because there is no portage around Cumberland Mills.

Response: We agree and have made the appropriate change.

Comment: S.D. Warren requests that the list of enhancement measures on pages 219–220 of the DEIS be revised to correct the omissions and inaccuracies as noted above.

Response: We have corrected the list of enhancements in section 6.1 of the FEIS as suggested by S.D. Warren.

Terrestrial, Land Use and Aesthetic Resources

Comment: Interior comments that the Commission did not adopt Interior's recommendation for riparian buffers at all five projects, and instead called for shoreline management plans (SMPs) at Dundee and Gambo. Interior suggests that a complete analysis of potential land uses and development must be undertaken before the Commission can conclude that an SMP is only needed for limited areas of the project. It

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further suggests that the licensee have plans in place for all projects to respond to and manage growth and recreational needs, while protecting environmental values.

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Response: Licensees have a responsibility to ensure that shoreline development activities that occur within project boundaries are consistent with project license requirements, purposes, and operations. A comprehensive plan such as an SMP can assist the licensee in meeting its responsibilities throughout the term of its license. An SMP is a comprehensive plan to manage the multiple resources and uses of the project's shorelines in a manner that is consistent with license requirements and project purposes. Licensee-owned lands within the 500-foot buffer requested by Interior are limited, and sensitive habitats as well as the majority of recreational enhancements are located upstream at the Dundee and Gambo projects. In addition, the Commission has established precedent for the implementation of a 200-foot shoreline buffer in its SMPs. Finally, the Natural Resources Protection Act requires a permit from the MDEP prior to allowing any work within 100 feet of the normal high-water line, thus providing additional protection measures along the shoreline. The MDEP requires all municipalities in Maine to adopt ordinances regulating land-use activities adjacent to certain bodies of water under the Mandatory Shoreland Zoning Act (38 MRSA sections 435-449). These municipal shoreland zoning ordinances establish land use standards for numerous activities that occur within the shoreland zone. The law requires land use controls for all land areas within 250 feet of ponds and non-forested freshwater wetlands that are 10 acres or larger; rivers with watersheds with at least a 25-square-mile drainage area; coastal and tidal wetlands; and all land areas within 75 feet of certain streams (MDEP, 1994). This is intended to protect water quality, wildlife habitat, wetlands, archaeological sites and historic resources, and commercial fishing and maritime industries; and to conserve shore cover, public access, natural beauty, and open space in much the same way a shoreline management plan is intended to define protection measures.

As it now stands, the recommendation for a 500-foot buffer zone on all project lands would provide limited benefits at the Dundee and Gambo projects and no apparent benefit to any specific fish or wildlife resource at the Little Falls, Mallison Falls, and Saccarappa projects. As discussed in section 4.3.3 of the FEIS, the federally threatened small whorled pogonia occurs at the Dundee Project on licensee-owned lands in isolated areas close to the impoundment but away from existing informal and proposed formal recreational uses. We concluded that protection of these lands is critical to the survival of this rare plant and, because considerable recreation use occurs at the Dundee and Gambo projects (see section 4.3.5 of the DEIS), establishing a shoreline buffer zone at these two projects is warranted. However, we find no demonstrated need to expand project boundaries to include additional lands outside of the Commission's standard 200-

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foot buffer zone for project purposes.^{3,4} Moreover, there is no evidence to suggest that development of an SMP or establishment of buffer zones at the remaining three projects under consideration is warranted. Therefore, we continue to recommend that the licensee-owned lands on which the small whorled pogonia are located be included within the Dundee Project boundary and subject to shoreline buffer zone provisions. We also recommend that the licensee establish shoreline buffer zones at the Dundee and Gambo projects to protect the natural resources within these project areas. Specifically, this would require the licensee to maintain a buffer zone on existing project lands that abut project waters and are located within 200 feet of the high water elevation.

Comment: Interior comments that we should better explain its basis for limiting buffer zones to 200 feet, when the presence of sensitive environmental areas or demands for recreation and public use would lead to the need for greater protection.

Response: An SMP is a comprehensive plan to manage the multiple resources and uses of the project's shorelines in a manner that is consistent with license requirements and project purposes. The Commission has established precedent for the implementation of a 200-foot shoreline buffer^{5,6} in its SMPs. As discussed in section 4.3.3 of the DEIS, the federally threatened small whorled pogonia occurs at the Dundee Project on licensee-owned lands in isolated areas close to the impoundment but away from existing informal and proposed formal recreational uses. We conclude that protection of these lands is critical to the survival of this rare plant and, because considerable recreation use occurs at the Dundee and Gambo projects (see section 4.3.5 of the EIS), we conclude that the establishment of a shoreline buffer zone at these two projects is warranted. However, we find no demonstrated need to expand project boundaries to include additional lands

³ 77 FERC ¶ 61,068 (1996).

⁴ 81 FERC ¶ 61,251 (1997).

⁵ 81 FERC ¶ 61,116 (1999). Order on Rehearing.

⁶ 18 CFR § 4.51(h)(i)(B) Revised as of April 2001. The boundary must be located no more than 200 feet (horizontal measurement) from the exterior margin of the reservoir, defined by the normal maximum surface elevation, except where deviations may be necessary in describing the boundary according to the above methods, or where additional lands are necessary for project purposes, such as public recreation, shoreline control, or protection of environmental resources.

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outside of the Commission's standard 200-foot buffer zone for project purposes.^{7,8} Moreover, there is no evidence to suggest that development of an SMP or establishment of buffer zones at the remaining three projects under consideration is warranted.

Demands for recreation and public use are not expected to extend beyond 200 feet from the impoundments. The staff proposed recreational facilities enhancements will provide additional recreational facilities for public use. Additionally, the Recreation Use Assessment will measure the amount of use that the additional facilities receive. The 200-foot buffer is reasonable for protection of the recreational experiences that are provided on the impoundments and in the bypassed reaches.

Comment: Interior comments that we fail to account for recreational use pressures at project facilities other than Gambo and Dundee, and additional recreation is especially likely if one or more of the dams is removed. These areas should be identified as part of an aesthetic plan prepared by the applicant in consultation with appropriate agencies, including the NPS, to determine appropriate areas for adjacent buffer zones.

Response: Commission staff is not recommending dam removal. With dam removal, the aesthetic plan and adjacent buffer zones are unwarranted.

Cultural Resources

Comment: EPA indicates that a draft Programmatic Agreement (PA) states that the licensee "will avoid destroying, demolishing or otherwise altering the projects" (Dundee and Saccharappa). EPA comments that this language is premature prior to conclusion of the National Environmental Policy Act (NEPA) process, and while it recognizes one set of potential negative historic resource impacts, it ignores the potential positive cultural resource benefits associated with "destruction" or "alteration" of the projects such as important historic and cultural fisheries.

Response: The PA would not go into effect unless and until new licenses are issued by the Commission for the projects in question. Any new licenses will not be issued until completion of the NEPA process.

Section 106 of the National Historic Preservation Act, under which the PA has been prepared, addresses potential effects of federal undertakings on historic properties,

⁷ 77 FERC ¶ 61,068 (1996).

⁸ 81 FERC ¶ 61,251 (1997).

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which are defined in 36 CFR 800 as buildings, structures, sites, objects, etc. that are listed or eligible for listing in the National Register of Historic Places (National Register). The available record does not provide information about fisheries on the Presumpscot to support a finding that they are eligible for listing in the National Register.

Developmental Analysis

Comment: Interior states that we fail to place an economic value on environmental resources and other non-use values. It contends that the failure to do such analysis leads to an inaccurate conclusion with insufficient evidence.

Response: While staff has not applied a dollar value to some of the environmental measures, we have identified potential societal and public benefits associated with the various proposed and recommended measures. We find that not all benefits lend themselves to the assignment of economic values, but that qualitative discussions can provide an adequate basis for the balancing of resource issues.

Comment: FOSL&MCASF comment that we fail to conduct a meaningful analysis of the tradeoffs of various public benefits, power and non-power, under the various licensing options. While we carefully calculate the cost and "lost" financial value to the license applicant for fish passage and dam removal, we neglect to estimate values for the public benefits of dam removal, fish passage, and the development of a successful fishery and the lost value to the public of dam retention and continued extirpation of Atlantic salmon from the Presumpscot River.

Response: We believe that a fair balance can still be reached even if the benefits and impacts are not all compared on a dollar-for-dollar basis. We have attempted to realistically identify public and societal benefits and effects of all measures.

Comment: S.D. Warren agrees with the DEIS that intangible values such as values for fishing, aesthetics, etc. do not need to be included in the economic analysis. However, should the Commission decide to consider these values, S.D. Warren requests that they also assign values to the benefits derived from the Westbrook Mill, which is supported by the hydroelectric projects.

Response: We have not endeavored to explicitly apply intangible value to environmental benefits nor have we applied intangible value to the benefits derived from operation of S.D. Warren's Westbrook mill.

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Comment: Saco commented that there was no consideration to the value of renewed connections between oceans and rivers that enhance the food web for all species.

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Response: Although the DEIS does not specifically mention this concept, staff is recommending the phased development of fish passage facilities to allow for the upstream and downstream migration of anadromous and catadromous species between the river and the ocean. Fish passage development at the S.D. Warren projects, however, cannot proceed until fish passage is resolved at the downstream Smelt Hill and Cumberland Mills dams.

Comment: Saco and Interior comment that we give no consideration to economic development opportunities that could result from a greatly improved fishery and riverine boating. Interior also claims that we have not attempted to evaluate the value of existing recreational uses either.

Response: We have not applied economic values to improved fisheries or recreational uses, but the fishery improvements have been quantified and benefits of those issues have been considered and are discussed in a qualitative manner in the FEIS.

Comment: Interior argues that the timing for achieving passage at the Smelt Hill and Cumberland Mills dams is likely shorter than portrayed in the DEIS, and suggests immediate installation of passage at Saccarappa as soon as the impediments are removed at the downstream barriers.

Response: As noted above, staff has revised its fisheries analysis on the potential anadromous fish returns to the Presumpscot River, and now assumes that Smelt Hill dam will be removed. Staff, however, has no basis on which to estimate when the fish passage issue would be resolved at Cumberland Mills. Staff, nonetheless, has revised its recommendations for phased fish passage development upstream of Cumberland Mills, to be generally consistent with the FWS final fishway prescription, which is keyed to clearly defined events (completion of passage at downstream dams, and attainment of specific trigger numbers of fish). As noted above, however, staff does not agree with the prescription to replace Phase 1 fish ladders with Phase 2 fish lifts, if the numbers of fish increase. Phase 1 facilities should be designed to accommodate growing fish populations without major modifications or demolition.

Comment: Interior and AR&FOPR suggest revising its greenhouse gas emission estimates to reflect estimates based on the alternatives contained in the DEIS (i.e., remove 1, 2, or 3 of the dams) instead of the estimate for replacing all five hydropower projects. AR&FOPR suggest figures. Also, Interior suggests that we indicate if S.D.

Warren's biomass-fired generator or the new gas-fired plant in nearby Westbrook emit the same levels of greenhouse gas as traditional oil- or coal-fired power plants.

Response: We consider this to be a reasonable request and we have provided separate emission reduction estimates for the three projects considered for dam removal in section 5.6. We have also provided a qualitative discussion of emissions produced by biomass fuels as compared to fossil fuels.

Comment: Interior indicates that there is insufficient information provided for how the annualized costs for implementing the SMP (\$340), the Recreation Use Monitoring Study (\$340), and the Recreational Facilities Enhancement Plan (\$780) were obtained. They imply that our figures result in a cost of \$10,400 for each the SMP and Recreation Use Monitoring Study and a cost of \$23,400 for the Recreation Facilities Enhancement Plans.

Response: The total cost in 2001 dollars estimated for the SMP is \$5,160—2,580 per project for Dundee and Gambo (see tables 49 and 52). This results in an annualized cost of \$350 per project. Staff estimated this figure based on the relatively small size of the projects and limited amount of land owned by S.D. Warren.

Similarly, the total cost in 2001 dollars estimated for the Recreation Use Monitoring Study is \$30,900, or \$6,180 for each of the projects (see tables 49, 52, 55, 58, and 61). This results in an annualized cost of \$840 for each project. We have corrected this error. Staff estimated this figure based on the level of effort required to collect this information.

Finally, the total cost estimated for the Recreational Facilities Enhancement Plan is \$15,450, which amounts to \$3,090 for each project (see tables 49, 52, 55, 58, and 61). This results in an annualized cost of \$420 for each project. We have corrected this error. Staff estimated this figure based on the level of effort required to complete the necessary consultation and design for the plan.

Comment: S.D. Warren questions the conclusions on page 218 of the DEIS because the three-fold increase in the cost of producing power from the five stations threatens their viability.

Response: The Commission is tasked with giving equal consideration to power and non-power resources when reviewing projects for relicensing, pursuant to Sections 4(e) and 10(j) of the FPA. Nothing in the FPA states that the economic viability of the licensed project must be preserved, nor does it state that non-power benefits should take

precedence over power benefits. Sections 4(e) and 10(j) are intended to ensure that both power and non-power resources are equally considered.

Staff has performed its "balancing" of resources, in some cases adopting the positions and recommendations of resource agencies and others, and in some cases not adopting those positions and recommendations, or adopting some aspects of them. Similarly, in some cases, we have adopted S.D. Warren's proposals, and in some cases we have not adopted those proposals, or have modified them. Staff acknowledges that the economic benefit of the projects has been reduced as a result of the relicensing process, but we have maintained our position in favor of retaining the hydroelectric facilities at Little Falls, Mallison Falls and Saccarappa with future fish passage facilities as opposed to adopting a position supporting the removal of the dams and the retirement of the generating facilities. This is a clear example of staff's efforts to balance power and non-power resources. We believe that the fisheries resources can be adequately protected and enhanced by providing fish passage at the existing dams without retiring the generating facilities, removing the dams and returning the river to a riverine condition.

If the economic viability of a project is "threatened" by the requirements of a new license, then the ultimate decision of whether or not to continue to operate projects as recommended for licensing lies with the licensee.

Comment: AR&FOPR object to the use of \$80.65 per MWh as a "hard number" and state that we have ignored some previous filings and request that we give Dr. Parker's filings relating to economic value more careful and impartial attention.

Response: We have reviewed our energy values and Dr. Parker's filings, and subsequently we have revised the energy values to reflect current market values. The basis for the new values is provided in section 5, *Developmental Analysis*.

Comment: AR&FOPR claim that the brief cost-benefit analysis of dam removal is misleading and skewed because it overstates the cost of lost power, which should not be greater than \$50.00 per MWh and it completely discounts any economic benefit to be derived from dam removal. Sweeney also comments that the DEIS undervalues the benefits to the community of dam removal and a restored fishery and focuses only on the costs to S.D. Warren.

Response: As stated above, we have revised the energy values used in the economic analysis in section 5.0 and we have qualitatively assessed the benefits associated with

Date: 08/30/2002
Comment: AR&FOPR agree that floodway widths would decrease in the area of the Saccarappa impoundment if it is removed, however, object to our omission of this in the calculation of the economic benefits of the dam removal.

Response: We did not attempt to develop dollar values for non-power environmental impacts or benefits, such as the value of reduced flood damages that could result from removal of the Saccarappa dam, but we did qualitatively consider the benefits in our deliberations.

Comment: AR&FOPR suggest that the computation of Atlantic salmon returns with dam removals is wrong because it significantly undercounts spawning and rearing habitat and uses too narrow a range for the ocean return rate. AR&FOPR further present alternative sources and numbers for these figures. FOSL&MCASF agree that the DEIS uses too narrow a range for the ocean return rate since it depends on an arbitrary maximum of 1.5 percent. FOSL&MCASF suggest using the maximum observed return rate of 15 percent as cited by Baum, which would project a much higher adult salmon population.

Response: As noted above, staff has revised its analysis of potential Atlantic salmon habitat due to dam removal, and has estimated potential adult returns for the entire river basin. We, however, continue to use an ocean survival rate of 0.5 to 1.5 percent, because this provides a more realistic projection of potential adult returns. This is based on the 25 years of survival data for hatchery-reared salmon smolts released into the Penobscot River, presented in Baum (1997), plus more recent Saco River survival data (Saco River Coordinating Committee, 1999). Although Baum (1997) also states that survival rates for wild smolts in two Maine rivers in the 1950's ranged as high as 3 to 15 percent, Penobscot River adult returns since 1969, and more recent documented returns to other Maine Rivers, indicates ocean survival rates of much less than 1 percent (recent Saco River return rates have ranged from 0.1 to 0.5 percent). Baum (1997) postulates that "...it is possible that marine survival of Atlantic salmon is cyclical," but offers no predictions of what future survival rates may be. Survival rates as high as 15 percent for wild smolts from one river nearly 50 years ago do not appear to be reasonable to use in estimating potential future adult returns from hatchery releases in the Presumpscot River. Staff's objective is to present as realistic an analysis as possible, and based on the past 30 + years of adult salmon returns in Maine, return rates greater than 1.5 percent do not appear to be realistic.

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