

WESTFIELD RIVER WATERSHED
2001 WATER QUALITY ASSESSMENT REPORT



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WESTFIELD RIVER (SEGMENT MA32-07)

Location: Westfield/ West Springfield/Agawam city line to confluence with Connecticut River, Agawam.

Segment Length: 8.5 miles

Classification: Class B, Warm Water Fishery, CSO

The drainage area of this segment is approximately 516 square miles. Land-use estimates (top 3, excluding water) for the subwatershed (map inset, gray shaded area):

Forest 80%

Residential 7%

Agriculture 6%

The impervious cover area for the individual sub-basins located in this segment is 3.2%, thereby classifying this subwatershed as a low threat to water quality from impervious surface water runoff (CWP 1998).

From the Westfield city boundary with West Springfield and Agawam the Westfield River meanders in an easterly, then southeasterly, then northeasterly direction through a narrow floodplain with steep banks (this passing through Robinson State Park). The River then flows easterly by an industrial area (West Springfield side) and township of North Agawam (Agawam side), splits around an oxbow, flows southeasterly under the Route 147 bridge and continues easterly by the Eastern States Exposition Grounds (West Springfield side). The River continues east through a series of former oxbows on both sides, flows under Route 5, and reaches its confluence with the Connecticut River.



Based on the last evaluation of water quality conditions this segment of the Westfield River is listed in Category 3 of the 2002 Integrated List of Waters (MA DEP 2003a). The segment was not assessed for any uses.

WMA WATER WITHDRAWAL SUMMARY (APPENDIX H, TABLE H7)

Facility	WMA Registration Number	Sources	Authorized Withdrawal (MGD)
Southworth Company	10432501	Westfield River	0.15
DSI- West Springfield	10432502	Westfield River- Canal	0.11

NPDES WASTEWATER DISCHARGE SUMMARY (APPENDIX H, TABLES H2 AND H3)

Fiber Mark DSI (formerly Decorative Specialties International, Inc. and Rexam DSI), located at Front Street, West Springfield, is authorized to discharge < 1 MGD of non-contact cooling water via outfall #001 to the Westfield River (NPDES permit # MAG250966 issued July 2001). The individual permit (#MA0032492 issued to DSI in August 1992 and modified in 1994) was terminated in January 1999 when the facility received coverage under the general permit. Fiber Mark notified the MA DEP that production at the facility stopped and the discharge was ceased until further notice in June 2002 (Rose 2002).

The Town of Agawam had an NPDES permit (MA0101320) issued September 1995 to discharge combined sewer from eight pipes into the Westfield River. These combined sewer overflows (CSO) outfalls (004, 005, 006, 007, 008, 009, 014 and 015) were located downstream from the DSI Facility in West Springfield. According to the MA DEP Western Regional Office CSO outfall 004 was eliminated in

May 1994, CSO outfalls #008 and 009 were eliminated in July 1999, CSO outfall #005 was eliminated in September 1999, and CSO outfalls # 006, 007, 014 and 015 were eliminated in April 2000 (Boisjolie 2004a and 2004b). The permit was terminated by EPA in September 2000.

The Town of West Springfield had an NPDES permit (MA0101389) issued September 1995 to discharge sanitary sewer and/or emergency bypass from three pump station outfalls to the Westfield River (outfall # 001 near Mittineague Park, 003 near Park Street, and 004 near Agawam Bridge). According to MA DEP WERO these outfalls were eliminated by 1999 (Boisjolie 2004a). The permit was terminated by EPA in September 2000.

The City of West Springfield and Town of Agawam are Phase II Stormwater communities. These communities were issued stormwater general permits from EPA and MA DEP in 2003 and are authorized to discharge stormwater from their municipal drainage systems (MAR041024 and MAR041001, respectively). Over the five-year permit term these communities will develop, implement and enforce their stormwater management programs to reduce the discharge of pollutants from the storm sewer systems to protect water quality (Domizio 2004).

FERC (APPENDIX H, TABLE H4)

A & D Hydro, Inc. is licensed (transfer approved by FERC in May 2004) to operate the West Springfield FERC Project No. 2608. Prior license holders include FiberMark, FiberMark DSI, Inc. and Rexam DSI, Inc. The license was last issued on 24 October 1994. The total installed capacity is 1,400 kW (DSI, Inc. 1991). The project's powerhouse, power canal, head gate structure intake, and tail-race lie in the town of West Springfield. The dam for the project, known both as the West Springfield Dam and the Mittineague Dam, spans the river between the town of West Springfield and the town of Agawam. There are two Rodney Hunt-Biggs vertical Francis turbine generating units.

Unit. 1 has a rated hydraulic capacity of 400 cfs and can generate 900 kW

Unit. 2 has a rated hydraulic capacity of 222 cfs and can generate 500 kW

The generating unit capacities listed above are for each unit operating alone. If both units are operating together, flow limitations of the power canal and tailrace result in a maximum plant capacity of 1,200 kW (800 kW for No. 1 and 400 kW No. 2) (DSI, Inc. 1991). The power canal is 6 feet by 50 feet wide and extends approximately 2,610 feet.

It should also be noted that the Southworth Company was allowed to draw a maximum of 61 cfs (39.4 MGD) from the power canal at FERC Project No. 2608 through an intake along the south bank of the canal through a water right agreement for use in their plant operations (DSI, Inc. 1991). The unlicensed Southworth Company hydroelectric facility has not operated for the last ten years (Lak 2004).

USE ASSESSMENT

AQUATIC LIFE

Habitat and Flow

USGS gage 01183500 is located just upstream from this segment of the Westfield River. The USGS remarks for this gage indicate that flow is regulated by several factors including: Borden Brook Reservoir, Cobble Mountain Reservoir, Knightville Reservoir and Littleville Lake, and diversion from Little River for municipal supply of Springfield (Socolow *et al.* 2003). The estimated 7Q10 flow for this gage is 69.5 cfs (USGS 2002). Evidence of regulation at this stream gaging location can be observed using on-line real-time USGS gaging data (USGS 2004).

A & D Hydro, Inc. is licensed to operate the West Springfield FERC Project No. 2608. The project is supposed to operate in a strict run-of-river mode with inflows to the project impoundment passed instantaneously through the project works or over the dam. The project's bypass reach extends from the dam to the confluence with the project tailrace (approximately 0.5 river miles). The license requires that a continuous minimum instream flow of 125 cfs or inflow, whichever is less, from 1 April to 15 July and from 1 September to 31 October and 85 cfs or inflow, whichever is less, the remainder of the year be released into the Westfield River bypass reach (LoVullo 2001). The minimum flow requirement was violated from 21 September 2001 through 11 October 2001 when only approximately 65 cfs was released into the bypass reach (Taylor 2002). A new fishway, a denail type

ladder, was constructed at the Project in the fall of 1995. The fish ladder is designed to allow upstream passage of anadromous and resident fish and downstream passage for Atlantic salmon smolts, American shad and blueback herring (MCFWRU 2004). Eel passage at the fishway was also installed in 2002 (WRWA 2002 and Poggi 2001).

Biology

MDFW regularly stocks trout in the Westfield River.

American shad returns at Holyoke Dam have fluctuated greatly over the last 10 years (counts ranged between 170,000 and 370,000). Westfield River shad returns at DSI appear to be declining from 2001 through 2004 (Table 4). According to the anadromous fish management plan for the Westfield River male American shad mature one year earlier than females and return as virgin spawners at ages three, four or five while females return to spawn at ages four, five or six (Slater 2001). While the reason for a decline in the American shad spawning run is not specifically known, it is interesting to note that three years after a documented minimum flow violation at FERC Project No. 2608, coincident with the outmigration of juvenile shad (fall 2001), there was a substantial decrease in the Westfield River 2004 annual return of adult American shad.

Table 4. Counts of anadromous fish between 2000 and 2004 migrating through the fish passageway at the West Springfield DSI Dam on the Westfield River in West Springfield (USFWS 2004a and USFWS 2004b).

Species	Anadromous Fish Management Plan (AFMP) goal for the Westfield River by 2010	2000	2001	2002	2003	2004
American Shad	annual spawning run of 15,000 adult American shad	3,558	4,720	2,762	1,729	913
Atlantic Salmon	annual spawning population of 500 adult Atlantic salmon for natural production, sport fishing, and aesthetic purposes	11	8	5	5	11
Blueback Herring	annual spawning run of 15,000 adult Blueback herring		2	4	5	1
Sea Lamprey	no GOAL stated	2,040	2,345	3,638	361	1,171

In August 2001 MDFW conducted boat electrofishing in the Westfield River near the Route 5 Bridge in Agawam (Station 559, Richards 2003). Ten fish species collected, in order of abundance, were rock bass, red breast sunfish, white sucker, smallmouth bass, largemouth bass, sea lamprey, tessellated darter, black crappie, and an individual each of bluegill and common carp. Although the assemblage was dominated by macrohabitat generalists, this is consistent with deep, slow-moving habitats associated with larger river systems.

Chemistry – water

DWM collected *in-situ* measurements and water quality samples from one station on the Westfield River 260 feet upstream from Route 5 bridge, Agawam (Station WSFR00.2) between 1 August and 3 October 2001. *In-situ* parameters measured included dissolved oxygen, pH, temperature, conductivity and total dissolved solids (Appendix 2 of Appendix A). Grab samples were collected and analyzed for alkalinity, hardness, chloride, suspended solids (n=4) (Appendix 3 of Appendix A).

DO

The instream DO measured by DWM ranged from 6.3 to 9.7 mg/L (72% to 93% saturation)

Temperature

Temperatures recorded by DWM ranged from 14.3 to 23.7°C.

pH

pH measurements recorded by DWM ranged from 7.1 to 7.2 SU.

Conductivity

Conductivity reported by DWM ranged from 158 to 259µS/cm.

Solids

Total suspended solid concentrations were low ranging from <1.0 to 4.8 mg/L.

Alkalinity

The alkalinity reported by DWM ranged from 18 to 39 mg/L.

Hardness

Hardness values reported by DWM ranged from 28 to 42 mg/L.

Too limited data are available for this segment of the Westfield River, so the *Aquatic Life Use* is not assessed. This use is identified with an Alert Status, however, because of the evidence of alterations in normal streamflow conditions.

PRIMARY CONTACT AND SECONDARY CONTACT RECREATION AND AESTHETICS

DWM and ESS both collected fecal coliform bacteria samples from the Westfield River near the Route 5 bridge, Agawam (DWM Station WSFR00.2 and ESS Station PS-5). Fecal coliform bacteria counts of samples collected by DWM between 1 August and 3 October 2001 (n=4) ranged from 24 to >10,000 cfu/100 ml, although only one count of the four was >52 cfu/100 ml. The replicate fecal coliform bacteria counts reported by ESS for samples collected at PS-5 on 28 December 1999 were 310 and 250 cfu/100 ml (ESS 2000). No objectionable odors and very little trash debris or other objectionable deposits were noted by the field survey crews (MA DEP 2001b).





Two tributaries to this segment of the Westfield River were also sampled by DWM or ESS in 2001 and 1999, respectively. The locations sampled and the results of the analyses are summarized below:

- ESS collected one fecal coliform bacteria sample from an unnamed tributary at Route 20 (south of Sibley Avenue), West Springfield (Station SS-13), on 30 September 1999. The count was 11,000 cfu/100 mls.
- DWM collected a total of four fecal coliform bacteria samples from Block Brook at Plymouth Terrace crossing, West Springfield (Station BLBR01.0), between 1 August and 3 October 2001. Results ranged from 170 to 900 cfu/100 ml. Three of the four sampling events exceeded 200 cfu/100 ml. No objectionable deposits, trash or debris or other conditions were noted (MA DEP 2001b).

DWM also collected fecal coliform bacteria samples from the Westfield River near the Robinson State Park in Agawam (Station WSFR01.5) and near the Route 5 bridge in Agawam (Station WSFR00.2) in May and August 1996 as part of the 1996 Westfield River Watershed monitoring survey (Appendix G, Table G4).

Given the variability in the limited fecal coliform bacteria dataset for this segment of the Westfield River the *Primary Contact Recreational Use* is not assessed. The *Secondary Contact Recreational Use* is assessed as support. The *Recreational Uses* are identified with an "Alert Status", however, because of the very high bacteria count and the elevated counts in tributaries to this segment of the Westfield River. The *Aesthetics Use* is assessed as support.

Westfield River (MA32-07) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact*	Secondary Contact*	Aesthetics
				
NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	SUPPORT	SUPPORT

*Alert Status issues identified, see details in use assessment section

RECOMMENDATIONS WESTFIELD RIVER (MA32-07)

- There are currently no known CSO discharges to this segment of the Westfield River. Therefore, during the next revision of the Massachusetts Surface Water Quality Standards the CSO designation should be removed.
- Conduct bacteria monitoring to assess the *Primary* and *Secondary Contact Recreational* uses and the effectiveness of the City of West Springfield and Town of Agawam's Phase II stormwater management permits and programs. Further investigation should also be conducted on two small

- tributaries to this segment of the Westfield River where elevated bacteria counts were documented.
- Further investigate source(s) of aberrant streamflow fluctuations observed using on-line real-time data for the USGS gage 01183500. Ideally, a natural flow regime should be restored in the Westfield River.
 - To ensure run-of-river operations all dam operators should install, calibrate and maintain a continuous streamflow monitoring gage, or determine some other method to ensure compliance with run-of-river operations.
 - Conduct additional biomonitoring (benthic macroinvertebrate and fish community sampling) within this segment of the Westfield River to assess the status of the *Aquatic Life Use*.
 - Review West Springfield (MAR041024) and Agawam (MAR041001) Phase II Stormwater SWPPPs, extent of compliance, and the effectiveness in minimizing impacts of stormwater runoff from their facilities into the Westfield River and subwatershed tributaries.