

**HOUSATONIC RIVER WATERSHED
2007 FISH POPULATION DATA**

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Introduction

In late summer and early fall of 2007, fish population surveys were conducted in the Housatonic River Watershed at six stations using techniques similar to Rapid Bioassessment Protocol V as described originally by Plafkin et al. (1989) and later by Barbour et al. (1999) (See Table 1). Standard Operating Procedures are described in MassDEP Method CN 075.1 *Fish Collection Procedures for Resident Fish Populations* (MassDEP 2006). Fish surveys also included a habitat assessment component modified from that described in Barbour et al. (1999).

Methods

Fish Collections

Fish collections were conducted by electrofishing using a Smith Root Model 12 battery-powered backpack electrofisher. A reach of between 70m and 100m was sampled by passing one or more pole mounted anode ring(s) side to side through the stream channel and in and around likely fish holding cover. All fish shocked were netted and held in buckets. Sampling proceeded from an obstruction or constriction, such as a waterfall or shallow riffle, upstream to an endpoint at another obstruction or constriction. Following completion of a sampling run, all fish were identified to species and a subsample were measured and weighed, after which all fish were released.

Habitat Assessment

An evaluation of physical habitat quality is critical to any assessment of ecological integrity (Karr et al. 1986; Barbour et al. 1999). Habitat assessment helps to support understanding of the relationship between physical habitat quality and biological conditions, identifies obvious constraints on the attainable potential of a site, assists in the selection of appropriate sampling stations, and provides basic information for interpreting biosurvey results (US EPA 1995). Before leaving the sample reach during the 2007 fish population surveys, habitat qualities were scored using a modification of the evaluation procedure in Barbour et al. (1999). The matrices used to assess habitat quality are based on stream flow, key physical characteristics of the water body, and riparian area. Most parameters evaluated are instream physical attributes often related to overall land use and are potential sources of limitation to the aquatic biota (Barbour et al. 1999). The ten habitat parameters for moderate to high gradient streams are as follows: instream cover for fish, epifaunal substrate, embeddedness, sediment deposition, channel alteration, velocity/depth combinations, channel flow status, right and left bank vegetative protection, right and left bank stability, and, right and left bank riparian vegetative zone width. For moderate to low gradient streams, instream cover for fish is replaced with bottom substrate/available cover, epifaunal substrate is replaced with pool substrate characterization, embeddedness is replaced with pool variability, and velocity-depth combinations is replaced with channel sinuosity. Habitat parameters are scored, totaled, and when appropriate compared to a reference station to provide relative habitat ranking.

Results

Results of the fish population surveys can be found in Table 2. A total of twelve species were collected. It should be noted that young of the year (yoy) fish from most species (with the exception of salmonids) were not targeted for collection. Young of the year fishes that were collected, intentionally or not, are noted in Table 2. Scientific names of fishes are taken from American Fisheries Society Special Publication 29 (Nelson et al. 2004). Seven of the twelve species collected are "fluvial (dependant or specialist) species" and five are considered "macrohabitat generalists". At least one Intolerant species was present at five of the six stations sampled. Results of the habitat assessment can be found in Table 3. All stations were evaluated using moderate to high gradient scoring criteria.

The RBP V protocol (Plafkin et al. 1989 and Barbour et al. 1999) calls for the analysis of the data generated from fish collections using an established Index of Biotic Integrity (IBI) similar to that described by Karr et al. (1986). Since no formal IBI for Massachusetts currently exists, the data provided by this sampling effort may be used to qualitatively assess the general condition of the resident fish population as a function of the overall abundance (number of species or richness, as well as individuals) and species composition (classifications listed below).

Tolerance Classification - Classification of tolerance to environmental stressors similar to that provided in Plafkin et al. (1989), Barbour et al. (1999), and Halliwell et al. (1999). Final tolerance classes are those provided by Halliwell et al. (1999).

Macrohabitat Classification – Classification by common macrohabitat use as presented by Bain and Meixler (2000) modified regionally following discussions between MassDEP and Massachusetts Department of Fish and Game (MA DFG) fishery biologists.

Literature Cited

- Bain, M. B., and M. S. Meixler. 2000. Defining a target fish community for planning and evaluating enhancement of the Quinebaug River in Massachusetts and Connecticut. Final report by the New York Cooperative Fish and Wildlife Research Unit, Cornell University, Ithaca, NY to the New England Interstate Water Pollution Control Commission, Lowell, MA. 51 p.
- Barbour, M. T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. EPA 841-B-99-002. Office of Water, US Environmental Protection Agency, Washington, DC. 151 p. + appendices
- Halliwell, D.B, Langdon, R.W., Daniels, R.A., Kurtenbach, J.P., and R.A. Jacobson. 1999. Classification of Freshwater Fish Species of the Northeastern United States for Use in the Development of Indices of Biological Integrity, with Regional Applications. pp. 301-338 in T. P. Simon (ed.). Assessing the Sustainability and Biological Integrity of water Resources Using Fish Communities. CRC Press, Boca Raton, FL. 671 p.
- Karr, J. R., K. D. Fausch, P. L. Angermeier, P. R. Yant, and I. J. Schlosser. 1986. Assessing Biological Integrity in Running Waters: A Method and Its Rationale. Special Publication 5. Illinois Natural History Survey. Champaign, IL. 28 p.
- MassDEP. 2006. *Fish Collection Procedures for Evaluation of Resident Fish Populations (Method 003/11.20.95) CN 75.1*. Massachusetts Department of Environmental Protection, Division of Watershed Management, Worcester MA.
- Nelson, J. S., E. J. Crossman, H. Espinosa-Perez, L. T. Findley, C. R. Gilbert, R. N. Lea, and J. D. Williams. 2004. Common and scientific names of fishes from the United States, Canada, and Mexico. American Fisheries Society. Special Publication 29, Bethesda, Maryland.
- Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross, and R. M. Hughes. 1989. *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*. EPA/440/4-89-001. Office of Water, US Environmental Protection Agency, Washington, DC.
- US EPA. 1995. Generic Quality Assurance Project Plan Guidance for Programs Using Community Level Biological Assessment in Wadeable Streams and Rivers. U.S. Environmental Protection Agency, Office of Water. 71 p.
- USGS. 2009. [Online] *Streamstats Massachusetts*.
http://streamstatsags.cr.usgs.gov/ma_ss/default.aspx?stabbr=ma&dt=1297449524090
23 December 2009.

Table 1. List of biomonitoring stations sampled for fish during the 2007 Housatonic River Watershed biomonitoring survey including selected watershed and flow characteristics determined from USGS StreamStats (USGS 2013).

Station ID	Unique ID	Drainage Area (mi ²)	Waterbody Name	Site Description	Sampling Date	7-Day 10-Year Low Flow (cfs)	Forest (%)
15A	P0111	50	Hubbard Brook	just downstream from Rte 7, Sheffield	7-Sept-2007	8.13	59.8
06A	P0110	43.3	Williams River	upstream from Division Street, Great Barrington	7-Sept-2007	3.99	69.7
06B	P0113	36.4	Williams River	approximately 400 feet downstream of East Alford Road, West Stockbridge	7-Sept-2007	2.82	69.1
WM01	P0115	8.73	Washington Mountain Brook	most downstream crossing of Washington Mountain Road, Lee	5-Sept-2007	0.42	81.1
CB01	P0116	3.6	Cady Brook	upstream and downstream of Old Windsor Road, Hinsdale	5-Sept-2007	0.11	89.4
SA01	P0114	8.69	Sackett Brook	just upstream from East New Lenox Road, Pittsfield	5-Sept-2007	0.38	84.2

Table 2. Species and counts for fish collected during the 2007 Housatonic River Watershed biomonitoring survey. Refer to Table 1 for a listing and description of sampling stations. The number in parentheses indicates the number of young of the year and is included in the total count.

Common Name	Scientific Name	Tolerance ¹	Macrohab. Class. ²	Station					
				15A	06A	06B	WM01	CB01	SA01
blacknose dace	<i>Rhinichthys atratulus</i>	T	FS		38	2	39(1)	70	171
longnose dace	<i>Rhinichthys cataractae</i>	M	FS		56(1)	41	53(1)		
fallfish	<i>Semotilus corporalis</i>	M	RFS	2	23				
white sucker	<i>Catostomus commersonii</i>	T	FD	1	4		3		1
brown trout	<i>Salmo trutta</i>	I	FS		5	1	5		13
brook trout	<i>Salvelinus fontinalis</i>	I	FS				12(1)	43(13)	9(1)
slimy sculpin	<i>Cottus cognatus</i>	I	FS				98(1)		95(3)
rock bass	<i>Ambloplites rupestris</i>	T	MHG		17	31			
redbreast sunfish	<i>Lepomis auritus</i>	T	MHG	5					
pumpkinseed	<i>Lepomis gibbosus</i>	T	MHG	3					
smallmouth bass	<i>Micropterus dolomieu</i>	M	MHG	3	19(7)	24			
tessellated darter	<i>Etheostoma olmstedii</i>	M	MHG	5	4				

¹Tolerance Classification from Halliwell et al. (1999).

T = tolerant
M = moderately tolerant
I = intolerant

² Macrohabitat Classification from Bain and Meixler (2000).

FS = fluvial specialist
FD = fluvial dependant
MHG = macrohabitat generalist
RFS = regional fluvial specialist (as determined by regional biologists)

Table 3: Moderate to high gradient habitat assessment summary for fish population stations sampled during the 2007 Housatonic River Watershed biomonitoring survey. For primary parameters, scores ranging from 16-20 = optimal; 11-15 = suboptimal; 6-10 = marginal; 0-5 = poor. For secondary parameters, scores ranging from 9-10 = optimal; 6-8 = suboptimal; 3-5 = marginal; 0-2 = poor. Refer to Table 1 for a listing and description of sampling stations.

Stations		15A	06A	06B	WM01	CB01	SA01
Primary Habitat Parameters In-stream							
INSTREAM COVER (for Fish)		10	15	16	17	17	16
EPIFAUNAL SUBSTRATE		4	17	17	19	18	19
EMBEDDEDNESS		4	17	11	19	20	19
CHANNEL ALTERATION		18	19	18	15	18	19
SEDIMENT DEPOSITION		14	17	18	19	19	19
VELOCITY-DEPTH COMBINATIONS		10	14	14	16	15	13
CHANNEL FLOW STATUS		8	7	16	8	8	10
Secondary Habitat Parameters Riparian							
BANK VEGETATIVE PROTECTION	left	7	9	8	9	10	10
	right	4	9	8	9	9	10
BANK STABILITY	left	7	8	7	8	8	7
	right	2	9	9	8	8	7
RIPARIAN VEGETATIVE ZONE WIDTH	left	7	8	4	7	10	5
	right	9	3	2	7	10	7
Total Score		104¹	152	148	161	170	161

¹ although the sampling station was noted to be very low gradient, station was scored using moderate to high gradient criteria