

Rapid Bioassessment in Wadeable Streams & Rivers by Volunteer Monitors

Annual Summary Report # 9 2007



State of Connecticut
Department of Environmental Protection
Bureau of Water Protection & Land Reuse
Gina McCarthy, Commissioner

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COVER: Boots are optional. Stream flow statewide approached or equaled record daily lows for much of September and October. The record low flows made collect a challenge in most small to medium rivers. The impact on aquatic life will probably be observed in 2008 with lower than normal abundance.

Executive Summary

The Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors program (RBV) is a macroinvertebrate collection protocol developed by the Connecticut Department of Environmental Protection, Bureau of Water Protection and Land Reuse, Ambient Monitoring Program (herein referred to as DEP). The goal of RBV is to provide volunteer monitoring programs with a quick, efficient, and standardized methodology for the collection of macroinvertebrate community data from wadeable streams. This data can be used to screen for either very good or very poor water quality and augment monitoring conducted by DEP. All support materials including a more detailed description of the program, the RBV methodology, data sheets, sorting guides, macroinvertebrate cards, informational brochure, and annual summary reports are available on the DEP volunteer monitoring web page (http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325606&depNav_GID=1654). To obtain additional information about RBV or to become involved, please contact Mike Beauchene, volunteer monitoring coordinator, by phone (860) 424-4185 or email mike.beauchene@po.state.ct.us

**2007
PARTICIPATION
STATISTICS:**

Number of monitoring locations (Appendix A)	92
Number of samples collected	98
Number of waterbodies monitored	66
Number of fall samples > or = 4 "Most Wanted" types	17
Number of individual participants	325
Number of groups participating in 2006	26
Number of groups participating for the first time	6
Number of groups returning for another year	20

The DEP would like to thank all of the participants who collected RBV data under the sponsorship of the following groups: **Boy Scout Troop 925/Turkey Hill School PTA Orange, [Connecticut Audubon Society at Pomfret](#), [Connecticut River Watch \(Bolton Conservation Commission, \[Eightmile River Watershed\]\(#\) and \[Hockanum River Watershed Associations\]\(#\)\)](#), [Connecticut Fly Fisherman's Association](#), [Enfield Conservation and Inland Wetlands Commissions](#), [Farmington River Watershed Association](#), Ginny and Walt Smith, Hammonasset Watershed Coalition, [Housatonic Valley Association](#), [Lisbon Central School Environmental Club](#), MDC-Poquonock WPCF, [Mystic Marinelife Aquarium](#), [Nature Conservancy-Devils Den](#), [Pomperaug River Watershed Coalition](#), [Quinnibaug/Shetucket Heritage Corridor \(Five Mile River Watershed Association, \)](#), [Quinnipiac River Watershed Association](#), [Salmon Brook Watershed Association](#), [Three Rivers Community Technical College](#), [Trout Unlimited-Candlewood Valley Chapter](#), [UCONN Soil and Water Conservation Society](#), [Washington Montessori School](#), and [Westover School](#).**

The RBV Program

The RBV protocol includes 33 macroinvertebrate taxa, each with distinct shape, structure, color, or behavior (Appendix B). In order for an organism to make the RBV list each must meet 3 criteria; first the organism should have a statewide distribution, second the organism should provide key information about the river system, and third the organism has a unique behavior or morphological characteristic easily observed by first time participants. Each of these organisms has been placed into 1 of 4 categories *most wanted* (panels 1-8b) consists of macroinvertebrates typically found in streams characterized by outstanding water quality. *Moderately wanted* (panels 9-14) are those found in a range of conditions from outstanding to good water quality. *Least wanted* (panels 15a-g) consists of those found in all types of water quality conditions, from outstanding to poor. *Others* (no panels have been developed) represent organisms that can be very common but do not provide enough information to be included in the RBV method. The "other" category of organisms was added to the RBV program starting in 2005 based on suggestions from RBV participants. Detailed information about each organism can be found on the field identification panels. The panels are available on the DEP web page at (http://www.ct.gov/dep/lib/dep/water/volunteer_monitoring/rbvcards.pdf). The name of each of the 3 qualitative categories is intended to characterize water quality and is not intended to imply that those in the least wanted category are harmful or result in nuisance conditions. No organism included in the RBV protocol has higher or lower ecological value than any other.

The RBV Method

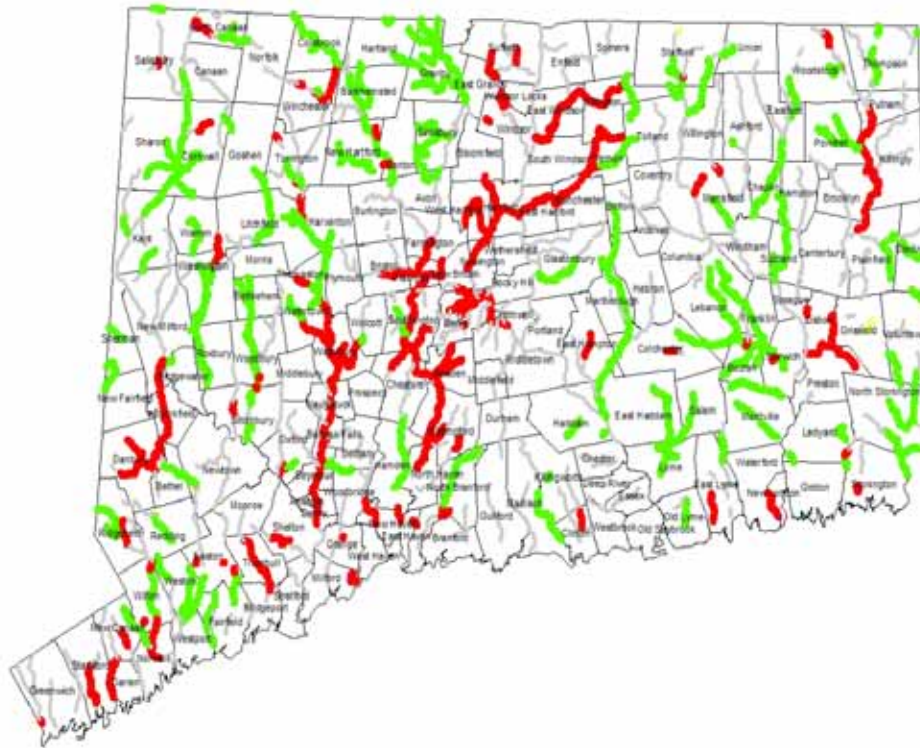
The RBV method is based upon the Rapid Bioassessment Protocols developed by the US EPA and implemented by DEP ambient monitoring staff (Barbour et al 1999, Plafkin et al 1989). The RBV protocol requires that the participants sample the macroinvertebrate community from a stream riffle habitat and produce a voucher collection accompanied by a data sheet (Appendix B). A voucher collection is produced by placing at least one specimen of each type of organism collected into a leak-proof container with a descriptive label and isopropyl alcohol. The data sheet documents the different organisms present at the site as well as the relative abundance of each in the sample. Both the voucher sample and the data sheet are submitted to the DEP. The contents of the vial are verified against the field data sheet and then entered into a Microsoft Access database. It is important to note that the final data for the sample is based upon the voucher collection and not what has been recorded on the data sheet. If an organism is listed on the data sheet but not present in the voucher collection, it does not count.



The RBV program occurs annually in the fall and takes approximately 2 hours to complete at the monitoring site. Prior to collecting the macroinvertebrates most participants attended a 3-hour training session in which the DEP volunteer monitoring coordinator describes the program and introduces the participants to the RBV methodology. The DEP has 20 sets of equipment available for short-term loan to participants. Those groups that have participated for at least 2 years and feel confident with the methodology may opt to forgo the official DEP training session and simply borrow the equipment.



Biological data use: The primary use of macroinvertebrate data by the DEP is to compare the community structure to narrative biological criteria described in the current water quality standards. This process is described in the [Consolidated Assessment and Listing Methodology](#) (CT CALM 2006). This comparison can provide an assessment of the degree of impairment and therefore the degree to which water quality standards are supported (CT 305(b) 2006). The figure below represents the aquatic life use support assessments reported in the 2006 [Water Quality Report to Congress](#) (CT 305(b) 2006).



Additional information regarding CALM and the 305(b) report can be found on the DEP web site and links are provided at the end of this report.

Data collected according to the RBV protocol can be used as a screening tool to identify stream sections with either very high or very low water quality. The documentation (voucher collection) of key indicator organisms (the most wanted) in a section of a stream provides a record of the benthic community present for a collection date and time. However, the absence of such indicators in any sample does not automatically mean the water quality is low, but rather further information may be required. In some situations current DEP protocol may be necessary to definitively assess water quality. It is important to note that the "least wanted" are able to thrive in many environmental conditions while the "most wanted" thrive only under conditions of low environmental stress. Therefore the most definitive RBV data are the collections with good representation of organisms in the "most wanted" category.

For those samples with 4 or more types of organisms in the "most wanted" category the DEP is confident the location fully supports the [state water quality standard](#) for aquatic life (CT WQS 1997). Samples with 3 or fewer types in the "most wanted" category do not definitively indicate impairment or water quality degradation. In these situations additional review is conducted by DEP to determine the particular species present, land use characteristics upstream of the monitoring location, and the potential for sampling/methodology errors.

RBV limitations

The RBV method was developed to be a simple, non-technical, and enjoyable method for use by citizens interested in evaluating the water quality of a local resource while concurrently generating useful information for the DEP. To date the program has been successful at meeting both objectives. However, to accomplish these, the RBV method requires the participant preserve at least one of each different type of organism present. The final list of organisms in a sample is based on DEP review of the datasheet against the organisms present in the voucher collection. If the organism is not in the voucher but recorded on the datasheet, it is not counted as part of the sample, even if the organism was actually present. Successful implementation of the RBV method is dependant upon an adequate collection of a sample from a riffle habitat, sorting organisms to find all of the different types present, and most importantly placing 1 of each into a leak-proof container with alcohol and a label. It is not dependant upon accurate identification by the participant. Any variable (site selection, incomplete collection, high stream flow, inclement weather conditions, nuisance insects, rushed time constraints, or rotted/desiccated voucher specimens) that reduces the quality or completeness of any step in the RBV method may ultimately reduce the number of different types found. As a result, errors made will tend to underestimate the macroinvertebrate community present and may overestimate water quality degradation. To insure that each organism present at a site is documented, it is critical that at least one of each different type of organism is placed in the voucher collection. In most situations sampling by DEP using the current DEP protocol will be necessary to definitively assess water quality.

TO BECOME INVOLVED

A daylong training/data collection workshop can be held for your organization free of charge*. The workshop is structured around instructional power-point presentations in the morning and data collection in the afternoon.

The data collection process is completed on site at a riffle (fast flowing rocky bottom). Participants wade into the water, dislodge the organisms into a net by scrubbing the rocks, sort and identify the different organisms present, and preserve a representative set of organisms for verification. At the completion of the session the data is submitted to the CT DEP for incorporation into water quality assessments.

RBV workshops are scheduled on a first come first serve basis with priority for first time programs. Since the data collection occurs in the fall and there are a fixed number of weekend days, it is better to schedule well in advance. Every attempt will be made to accommodate each workshop request. The CT DEP will provide all of the necessary equipment **except for waders, hip boots or other waterproof foot ware.**

TO BECOME INVOLVED*:

The prerequisites to sponsor a workshop are to:

- 1.) Assemble a group of a least 6 adults
- 2.) Reserve a meeting room centrally located to the potential monitoring stations. The room must have electricity and be capable of holding all of the participants.
- 3.) Contact Mike Beauchene to schedule a workshop date by phone (860) 424-4185 or email at mike.Beauchene@po.state.ct.us

*Individuals not associated with a monitoring program can be linked with a program in their local area.



2007 RBV Summary:

2007 marked the 9th year citizen groups collected and submitted samples to DEP. Approximately 325 participants collected a record-tying 98 (92 fall and 6 spring) samples (Figure 1).

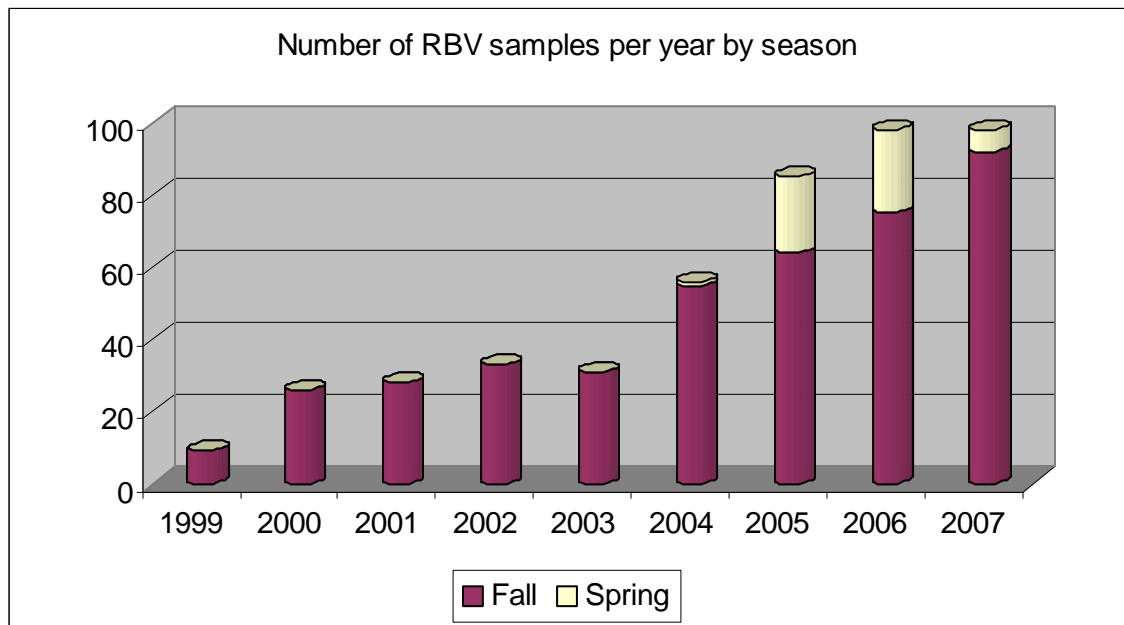


Figure 1. The number of RBV samples collected and submitted to DEP by RBV participants. The number of samples has grown 5 fold since the program inception.

Fall 2007 was especially challenging as most small to medium sized rivers and streams had very little water to form riffles. Data from USGS stream gages (<http://waterdata.usgs.gov/ct/nwis/current/?type=flow>) showed near or record daily low flows for most of the gages. Many of these have data going back decades (Figure 2). This was very visible in USGS graphics where in the period from 9/27/07 to 10/08/07 stream flows dropped to less than the 5th percentile statewide (Figures 3a and 3b). The impact of such low stream flow may be reflected in samples collected in 2008.

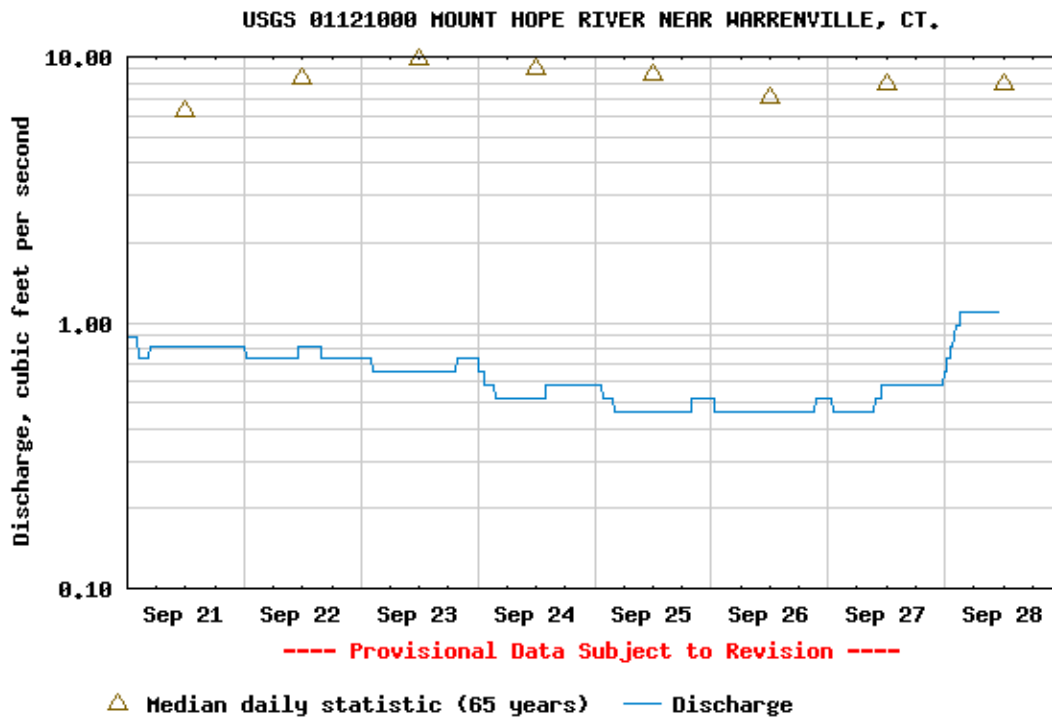
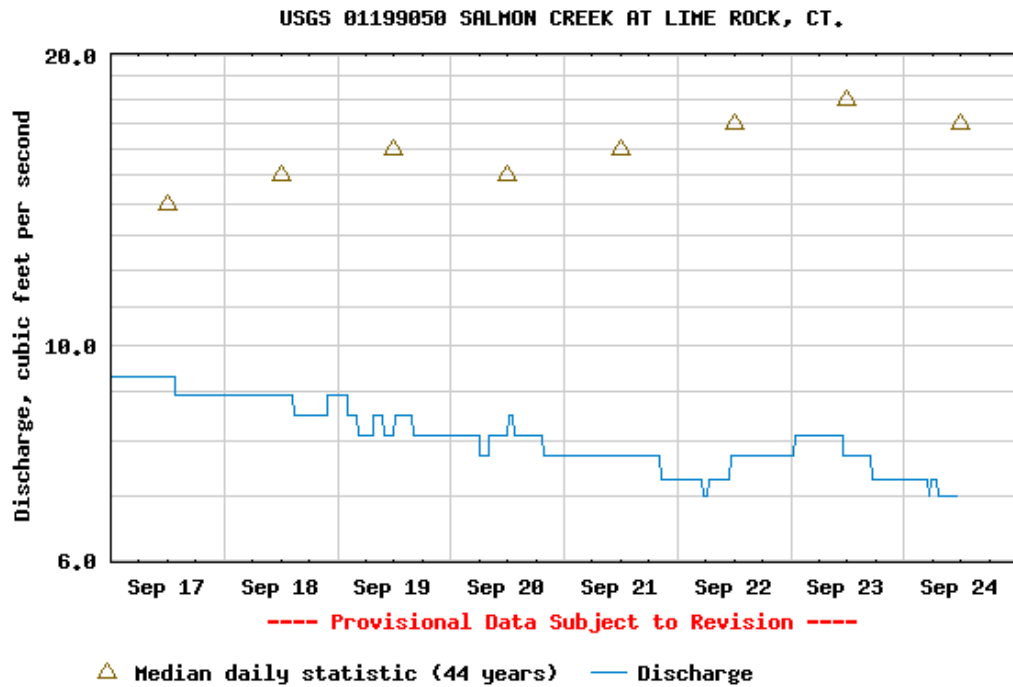
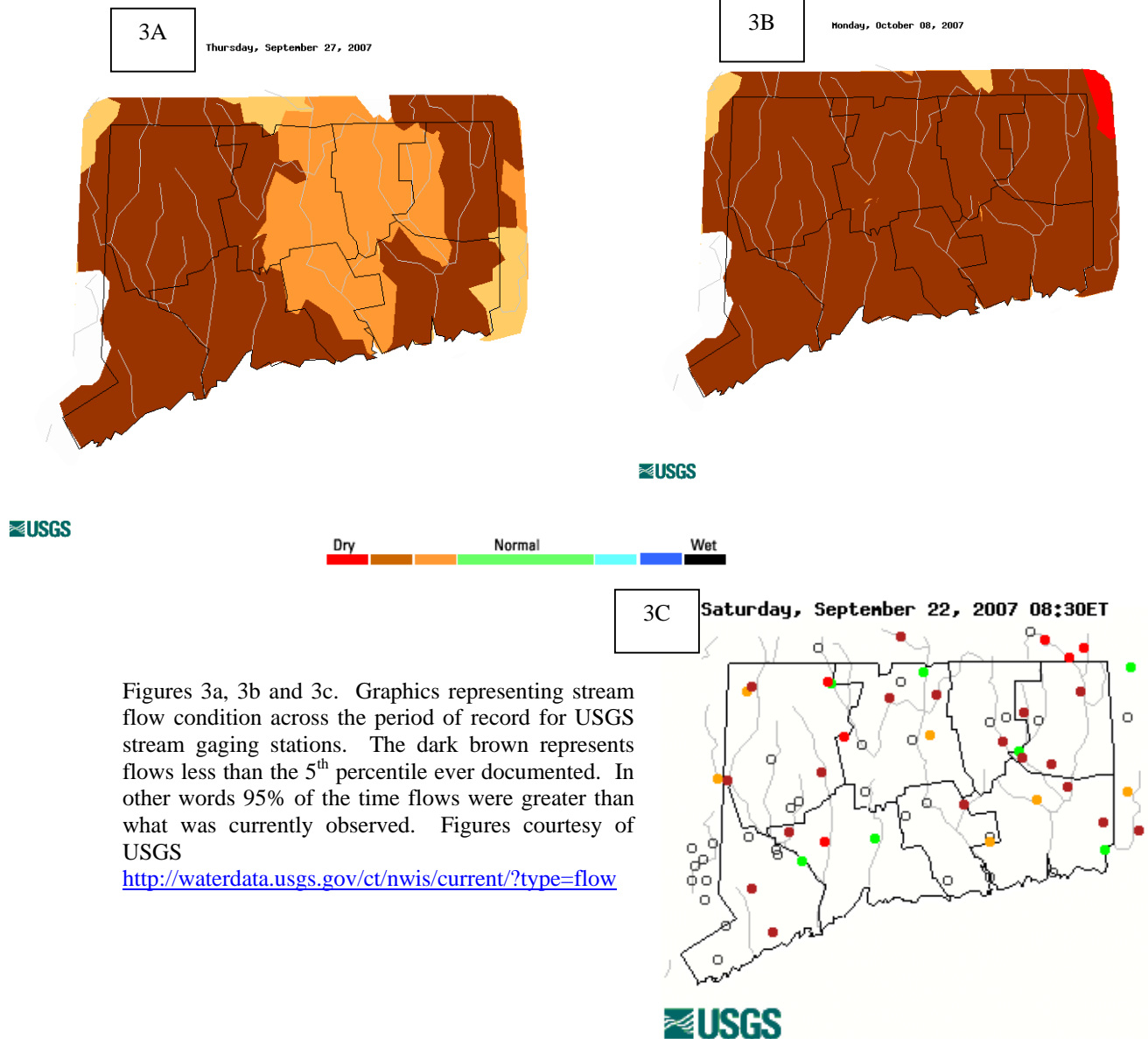


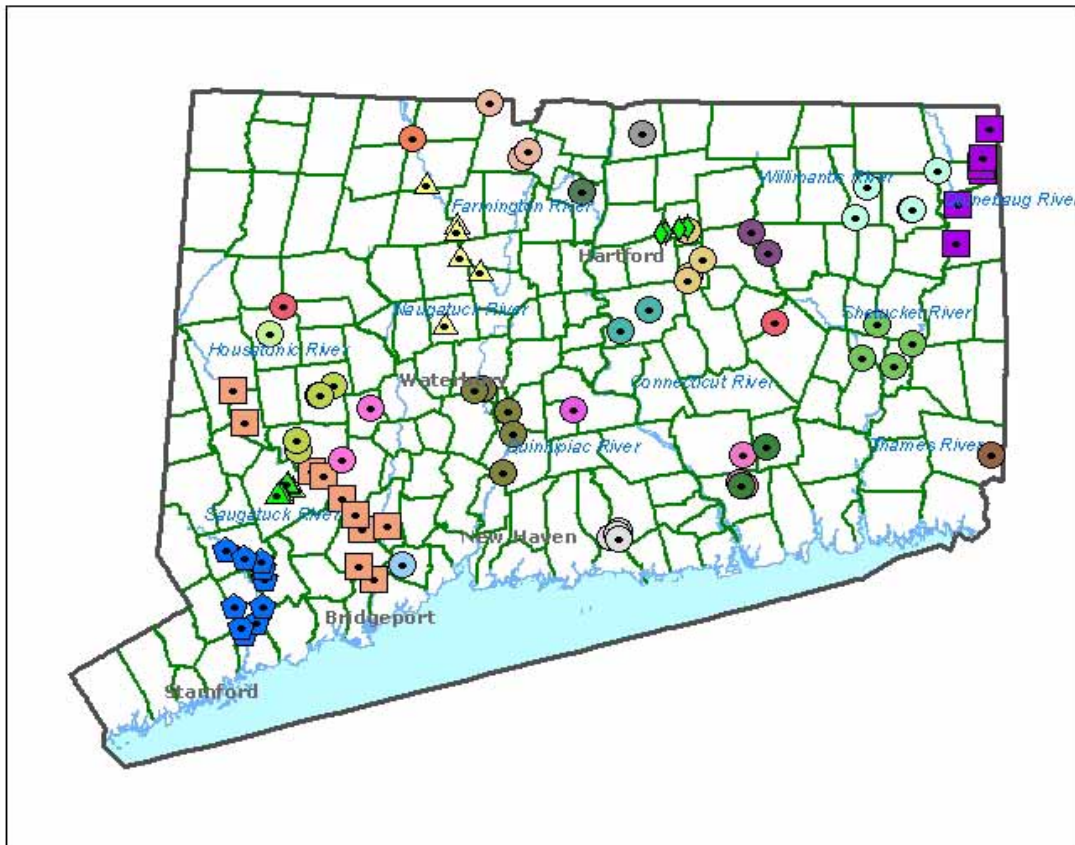
Figure 2. Examples of hydrographs from select USGS gages. The triangle represents the median flow for that particular date. The line is the measured flow on the same date. Many gages set new record daily lows during September and October 2007. Bottom line there was very little water in the streams. Figures courtesy of USGS <http://waterdata.usgs.gov/ct/nwis/current/?type=flow>



Figures 3a, 3b and 3c. Graphics representing stream flow condition across the period of record for USGS stream gaging stations. The dark brown represents flows less than the 5th percentile ever documented. In other words 95% of the time flows were greater than what was currently observed. Figures courtesy of USGS
<http://waterdata.usgs.gov/ct/nwis/current/?type=flow>

Locations: Twenty-six citizen groups collected 98 samples from 92 locations on 66 different waterbodies during 2007 (Figure 4). A description of each sample location is provided in Appendix A.

Table 1 is a list of each RBV organism present in each of the voucher collections submitted to DEP for 2007. The entries in the table are sorted alphabetically by stream name and basin number and then by greatest number of "most wanted" types to least. Each row is a sample as described by the stream name, collection date, basin id and site number. The number at the top of each column in the table corresponds to the panel number on the RBV datasheet and RBV identification materials. Panels 1-8b are in the most wanted category, 9-14 in the moderately wanted category, and panel 15a-15g are in the least wanted category.



Legend

RBV participating group 2007

- | | |
|---|---|
| ● Bolton Conservation Commission | ● Lisbon School Environmental Club |
| ● Boy Scout Troop 925, Turkey Hill School PTA | ● MDC-Poquonock WPCF |
| ● CT Audubon Society-Pomfret | ● Mystic Marine Life Aquarium |
| ● CT Riverwatch | ● Pomperaug River Watershed Coalition |
| ● Connecticut Fly Fishermans Association | ● Quinnipiac River Watershed Association |
| ● Eightmile River Watershed Association | ● RBV Workshop Prep |
| ● Enfield Conservation Commission | ● Salmon Brook Watershed Association |
| ▲ Farmington River Watershed Association | ● The Nature Conservancy-Devils Den |
| ■ Five Mile River Watershed Association | ● Three Rivers Community Technical College |
| ● Ginny and Walt Smith | ▲ Trout Unlimited-Candlewood Valley Chapter |
| ● Hammonasset watershed Coalition | ● UCONN Soil and Water Conservation Club |
| ◆ Hockanum River Watershed Association | ● Washington Montessori School |
| ■ Housatonic Valley Association | ● Westover School |

Figure 4. 2007 RBV sample collection locations. A description of each of the locations can be found in Appendix A.

Table 1. The organisms present in each of the 98 voucher collections submitted to DEP during 2007. The samples are sorted alphabetically by stream name and basin number and then descending by the greatest number of most wanted types present in a voucher. The panel number corresponds to the RBV datasheet, identification cards, and sorting guide. Samples with an "X" in the first column represent those with at least 4 "most wanted" types present in the voucher sample. Of the 98 samples collected, only those with a fall sample date (BOLD) are used to indicate full support of aquatic life use goals.

4 or more (fall)	Stream Name	site #	Date	basin	1	2	3	4	5A	5B	5C	6A	6B	7	8A	8B	Tot. MOST	9	10	11	12	13A	13B	14	Tot. MOD.	15A	15B	15C	15D	15E	15F	15G	Tot. LEAST	Total ALL	
X	Aspetuck River	48-014	9/29/07	7202		X	X		X			X					4	X	X	X	X		X	X	6								0	10	
	Aspetuck River	48-009	9/29/07	7202		X			X								2	X	X	X		X	X	X	6								0	8	
	Aspetuck River	48-010	9/29/07	7202		X			X								2	X		X	X	X	X		5								0	7	
	Aspetuck River	48-012	9/29/07	7202		X			X								2	X	X				X	X	4								0	6	
	Aspetuck River	48-013	9/29/07	7202		X			X								2		X	X	X		X	X	5				X				1	8	
X	Beaver Brook	26-005	10/13/07	4803		X			X			X			X		4	X	X	X	X		X	X	6				X			X	2	12	
	Beaver Brook	9-012	9/29/07	6900-40								X					1	X	X	X					3		X		X	X			3	7	
	Blackledge River	35-002	10/28/07	4707													0						X		1								0	1	
	Blissville Brook	60-001	11/26/07	3800-16-2-R1											X		1	X					X		2					X			1	4	
	Bolton Pond Brook	35-005	10/28/07	3108-02-1													0								0						X		1	1	
	Bungee Brook	21-008	10/6/07	3201					X								1	X	X		X	X		X	5								0	6	
X	Bunnell Brook (Burlington Brook)	7-012	10/13/07	4311		X		X	X			X					4		X	X		X	X	4				X			X	2	10		
	Burhams Brook	26-008	10/13/07	4800				X									1		X	X			X	X	4				X				1	6	
	Chatfield Hollow Brook	55-007	9/8/07	5105		X			X					X			3	X	X	X		X	X	X	6									0	9
	Chatfield Hollow Brook	55-005	9/8/07	5105		X			X								2		X	X		X	X	X	5				X					1	8
	Cherry Brook	7-006	10/13/07	4309		X			X								2	X	X	X			X		4									0	6
	Coginchaug River	2-001	11/3/07	4607					X								1	X	X	X	X	X		X	6	X			X				2	9	
	Cory Brook	60-002	10/23/07	3715-00-2-R5		X			X								2		X	X		X	X		4								0	6	

4 or more (fall)	Stream Name	site #	Date	basin	1	2	3	4	5A	5B	5C	6A	6B	7	8A	8B	Tot. MOST	9	10	11	12	13A	13B	14	Tot. MOD.	15A	15B	15C	15D	15E	15F	15G	Tot. LEAST	Total ALL
X	Deep Brook	50-016	5/12/07	6019		X	X				X			X			4	X	X	X	X		X		5				X			X	2	11
	Deep Brook	50-003	10/20/07	6019		X			X			X					3	X	X	X	X		X		5								0	8
	Deep Brook	50-012	10/19/07	6019								X					1	X	X	X			X		4			X					1	6
	Deep Brook	50-014	5/12/07	6019										X			1	X	X	X	X		X		5		X						1	7
	Deep Brook	50-016	10/20/07	6019		X											1	X	X	X	X		X	X	6				X				1	8
	Deep Brook	50-012	5/12/07	6019													0	X		X	X				3				X		X		2	5
	Deep Brook	50-014	10/19/07	6019													0	X	X	X	X				4		X				X	X	3	7
	Deep Brook	50-015	10/20/07	6019													0	X	X	X	X		X		5					X	X		2	7
	Eagleville Brook	38-005	11/16/07	3100-19					X					X			2	X	X		X		X	X	5								0	7
X	East Branch Salmon Brook	24-006	11/5/07	4320		X	X	X	X		X	X					6	X	X	X			X	X	5								0	11
X	East Branch Salmon Brook	24-002	11/3/07	4320		X		X	X	X	X						5	X	X	X	X		X	X	6		X			X	X		3	14
X	Eightmile Brook	9-009	10/13/07	6023		X	X	X	X			X					5	X	X		X		X		4					X			1	10
	Eightmile Brook	61-002	10/21/07	6023					X								1	X					X	X	3								0	4
	Eightmile River	49-002	10/13/07	4800		X			X								2	X		X	X		X	X	5								0	7
	Farmill River	9-015	9/30/07	6025		X			X								2	X	X	X			X		4					X			1	7
	Farmill River	9-014	9/30/07	6025					X								1	X	X	X					3					X			1	5
	Farmington River	7-010	10/26/07	4300		X			X			X					3	X	X	X					3		X			X			2	8
X	Fivemile River	59-006	10/6/07	3400		X			X		X		X				4		X	X			X	X	4								0	8
	Fivemile River	59-001	10/13/07	3400		X			X								2	X		X	X			X	4		X				X		2	8
	Fivemile River	59-002	10/5/07	3400		X			X								2					X		X	2					X			1	5
	Fivemile River	59-003	10/17/07	3400		X			X								2	X				X	X		3								0	5
	Fivemile River	59-004	10/21/07	3400		X			X								2	X	X	X		X	X	X	6						X		1	9
	Fivemile River	59-005	10/20/07	3400													0	X	X	X		X		X	5				X	X		X	3	8
	Fourmile River	9-011	10/28/07	6000-64					X			X					2	X	X				X	X	4					X	X		2	8

4 or more (fall)	Stream Name	site #	Date	basin	1	2	3	4	5A	5B	5C	6A	6B	7	8A	8B	Tot. MOST	9	10	11	12	13A	13B	14	Tot. MOD.	15A	15B	15C	15D	15E	15F	15G	Tot. LEAST	Total ALL
	French Brook	35-003	10/28/07	4707													0						X		1							0	1	
x	Green Fall River	63-001	8/26/07	1002		X	X		X		X	X		X	X		7	X	X	X			X	X	5				X	X			2	14
x	Hammonasset River	55-001	9/8/07	5106		X			X			X			X		4	X		X	X		X	X	5							X	1	10
x	Hammonasset River	55-008	9/8/07	5106		X			X		X			X			4	X	X	X		X	X	X	6	X				X		X	3	13
	Harbor Brook	3-016	11/10/07	5206													0	X	X	X			X		4	X					X		2	6
x	Harris Brook	49-001	4/21/07	4801		X	X		X					X			4	X		X		X	X	X	5					X			1	10
	Harris Brook	49-001	10/13/07	4801		X			X								2	X	X	X	X	X	X	X	7			X					1	10
	Hitchcock Mill Brook	9-005	10/20/07	6000				X	X							X	3	X	X	X	X		X		5						X		1	9
	Hop Brook	61-001	10/21/07	6916		X			X			X					3	X	X	X	X		X		5								0	8
	Indian Hole Brook	9-010	9/29/07	6000-71					X			X					2	X							1						X		1	4
	Kettletown Brook	9-003	10/21/07	6021		X											1	X		X			X	X	4								0	5
	Lee Brook	9-002	10/21/07	6000-56							X		X				2	X	X		X		X		4								0	6
	Little River	21-012	10/12/07	3708		X			X								2	X		X	X		X	X	5			X					1	8
x	Little River	60-003	10/23/07	3805		X			X		X			X			4		X	X	X	X	X	X	5			X			X		2	11
	Little River	48-018	9/29/07	7201		X			X								2	X	X	X		X	X		5								0	7
	Mashamoquet Brook	21-006	10/25/07	3710					X		X						2			X	X		X	X	4								0	6
	Mashamoquet Brook	21-005	9/21/07	3710					X								1			X	X				2			X					1	4
	Meetinghouse Brook	3-027	11/10/07	5200-10								X					1	X							1						X		1	3
	Misery Brook	3-026	11/10/07	5203													0		X	X	X		X	X	5	X							1	6
	Morgan Brook	7-005	10/13/07	4305		X			X		X						3	X	X	X	X		X		5								0	8
	Natchaug River	21-004	9/14/07	3200					X								1	X		X	X		X	X	5								0	6
x	Nonnewaug River	54-006	9/14/07	6802		X			X			X			X		4	X		X	X		X	X	5	X			X	X			3	12

4 or more (fall)	Stream Name	site #	Date	basin	1	2	3	4	5A	5B	5C	6A	6B	7	8A	8B	Tot. MOST	9	10	11	12	13A	13B	14	Tot. MOD.	15A	15B	15C	15D	15E	15F	15G	Tot. LEAST	Total ALL
	Nonewaug River	54-004	9/14/07	6802		X			X								2	X	X		X		X		4								0	6
	Pequabuck River	7-013	10/21/07	4315		X						X	X				3	X	X						2								0	5
	Phelps Brook	56-001	10/26/07	4300-54								X	X				2	X	X				X		3	X	X			X			3	8
	Pomperaug River	54-001	9/14/07	6800		X			X					X			3	X	X	X	X		X		5								0	8
X	Pootatuck River	50-006	10/20/07	6020		X			X	X				X			4	X	X	X	X		X		5	X					X	X	3	12
	Pootatuck River	50-001	10/20/07	6020		X			X	X							3	X	X	X	X		X	X	6	X							1	10
	Railroad Brook	35-004	10/28/07	4503					X								1	X			X		X	X	4								0	5
X	Roaring Brook	64-002	10/20/07	4009				X	X			X	X	X	X		5	X		X		X	X	4						X		1	10	
	Roaring Brook	64-001	9/22/07	4009					X								1	X	X		X		X	X	5								0	6
	Roaring Brook	7-011	10/13/07	4312					X								1	X	X	X	X		X	X	6			X	X				2	9
	Saugatuck River	48-001	9/29/07	7200		X											1	X	X		X	X		4		X						X	2	7
	Saugatuck River	48-015	9/29/07	7200		X											1	X	X	X	X	X		6								X	1	8
	Scantic River	36-001	10/27/07	4200		X			X								2	X	X			X	X	4	X								1	7
X	Shepaug River	19-005	6/9/07	6700		X	X		X		X			X	X		6	X					X	2	X			X	X				3	11
	Shepaug River	62-001	11/2/07	6700		X			X					X			3	X		X	X	X		4								X	1	8
	Shetucket River	60-004	11/5/07	3800		X			X								2	X	X	X		X		4									0	6
X	Tankerhoosen River	32-001	10/6/07	4503					X	X		X	X	X			4	X	X	X	X		X	X	6				X		X	X	3	13
	Tankerhoosen River	32-002	10/6/07	4503					X	X				X			3	X	X	X	X		X	X	6							X	1	10
	Tankerhoosen River	32-003	10/6/07	4503					X								1	X	X	X		X	X	5								X	1	7
	Tankerhoosen River	32-004	10/6/07	4503					X								1	X	X	X	X			4				X					1	6
	Ten Mile River	3-028	11/10/07	5202					X		X						2	X	X	X		X		4	X							X	2	8
4 or more (fall)	Stream Name	site #	Date	basin	1	2	3	4	5A	5B	5C	6A	6B	7	8A	8B	Tot. MOST	9	10	11	12	13A	13B	14	Tot. MOD.	15A	15B	15C	15D	15E	15F	15G	Tot. LEAST	Total ALL

“4 or MORE”

DEP use of the RBV data for aquatic life use support assessments = "4 or more types of the most wanted category":

The distribution of most wanted types in the 98 samples by season was 0 to 7 for spring 2007 and 0 to 6 for fall 2007. Seventeen of the fall 2007 voucher samples had 4 or more types in the most wanted category (Table 2) while 14 voucher samples just missed with 3 (Table 3).

The 2007 RBV samples will add approximately 96 miles on 16 different waterbody segments to the ALUS support assessments reported by the DEP in the 2008 Water Quality Report to Congress (Figure 5). To date the RBV program has added approximately 323 miles on 70 waterbody segments to the Biennial water quality report (Figure 6).

Table 2. 2007 RBV voucher samples that contained 4 or more “Most Wanted” types. The data are sorted alphabetically by stream name and then by the greatest number of “Most Wanted” types.

collection date	site number	Stream Name	location	town	basinid	most wanted
9/29/07	48-014	Aspetuck River	Rock House Road at nature preserve	Easton	7202	4
10/13/07	26-005	Beaver Brook	bridge at 55-123 Beaver Brook Road	Lyme	4803	4
10/13/07	7-012	Bunnell Brook (Burlington Bk)	Punch Brook confluence and Route 179	Burlington	4311	4
5/12/07	50-016	Deep Brook	Bushy Hill Road in Dickenson park	Newtown	6019	4
11/5/07	24-006	East Branch Salmon Brook	Northwoods Road	Granby	4320	6
11/3/07	24-002	East Branch Salmon Brook	Route 20	Granby	4320	5
10/13/07	9-009	Eightmile Brook	Loughlin Road	Oxford	6023	5
10/6/07	59-006	Fivemile River	Spicer Road	Thompson	3400	4
8/26/07	63-001	Green Fall River	confluence with Wyassup Bk US Clarks Fall Rd.	N. Stonington	1002	7
9/8/07	55-001	Hammonasset River	Hog Brook Confluence adjacent Summer Hill Rd	Madison	5106	4
9/8/07	55-008	Hammonasset River	Green Hill Road	Madison	5106	4
4/21/07	49-001	Harris Brook	Mouth	Salem	4801	4
10/23/07	60-003	Little River	Little River near Hanover	Sprague	3805	4
9/14/07	54-006	Nonewaug River	Route 47 (Washington Road)	Woodbury	6802	4
10/20/07	50-006	Pootatuck River	Tom's Brook Confluence (DS STP outfall)	Newtown	6020	4
10/20/07	64-002	Roaring Brook	Shoddy Mill Road	Glastonbury	4009	5
6/9/07	19-005	Shepaug River	Rte 202 adjacent to dirt road	Washington	6700	6
10/6/07	32-001	Tankerhoosen River	Bolton Road	Vernon	4503	4
9/21/07	26-007	Tributary to Eight Mile River (PV BK)	trail crossing off MacIntosh Road	Lyme	4800	5
9/8/07	42-005	West Branch Farmington River	Hogsback Road	Hartland	4300	4

Table 3. 2007 RBV voucher samples that contained 3 “Most Wanted” types.

collection date	site number	Stream Name	location	town	basinid	most wanted
10/6/07	32-002	Tankerhoosen River	Tunnel Road	Vernon	4503	3
10/20/07	50-001	Pootatuck River	Wasserman Way on Game Club Property (Mile Hill Rd)	Newtown	6020	3
10/20/07	50-003	Deep Brook	Pootatuck River	Newtown	6019	3
6/2/07	51-001	Wepawaug River	Route 121	Orange	5307	3
9/14/07	54-001	Pomperaug River	off Flagg Swamp Road	Southbury	6800	3
9/14/07	54-003	Weekepeemee River	Jacks Bridge Road at USGS gage	Bethlehem	6804	3
9/8/07	55-007	Chatfield Hollow Brook	Mouth on River Road	Madison	5105	3
10/21/07	61-001	Hop Brook	Route 188 bridge near firehouse	Middlebury	6916	3
11/2/07	62-001	Shepaug River	adjacent to Bee Brook Confluence	Washington	6700	3
8/26/07	63-002	Wyassup Brook	upstream of Clarks Falls Road	North Stonington	1001	3
10/13/07	7-005	Morgan Brook	Morgan Brook Road	Barkhamsted	4305	3
10/26/07	7-010	Farmington River	Steele bridge on Old Town Bridge Road	Canton	4300	3
10/21/07	7-013	Pequabuck River	Jacob street & southern end of Rockwell park	Bristol	4315	3
10/20/07	9-005	Hitchcock Mill Brook	Sunny Valley Preserve Bridge near camp silverman	Bridgewater	6000	3

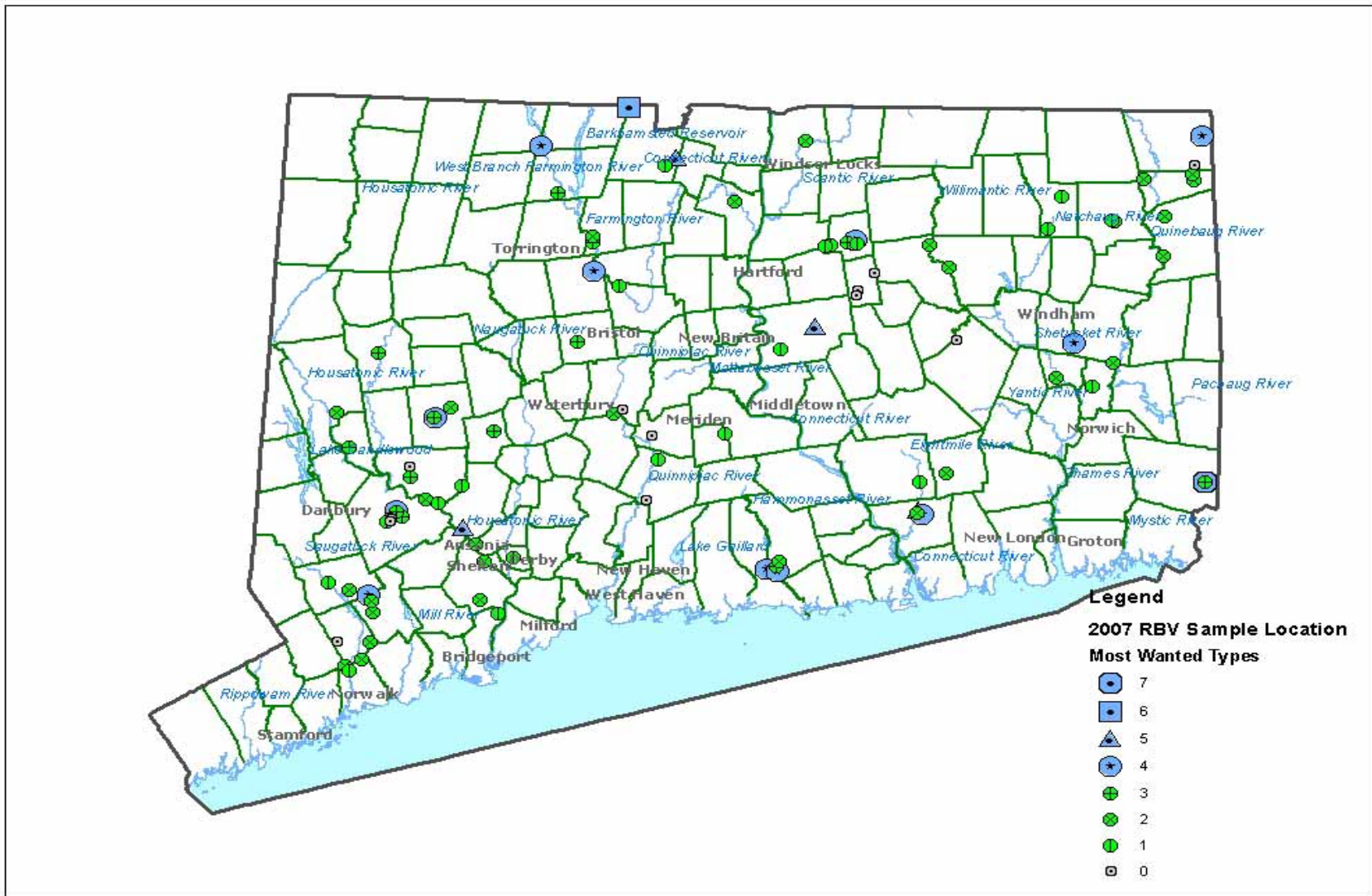


Figure 5. The number of most wanted types present in voucher samples submitted to DEP collected in fall 2007. Fall samples with 4 or more indicate full support of ALUS goals. Site numbers can be cross-referenced with Table 2 or Appendix A.

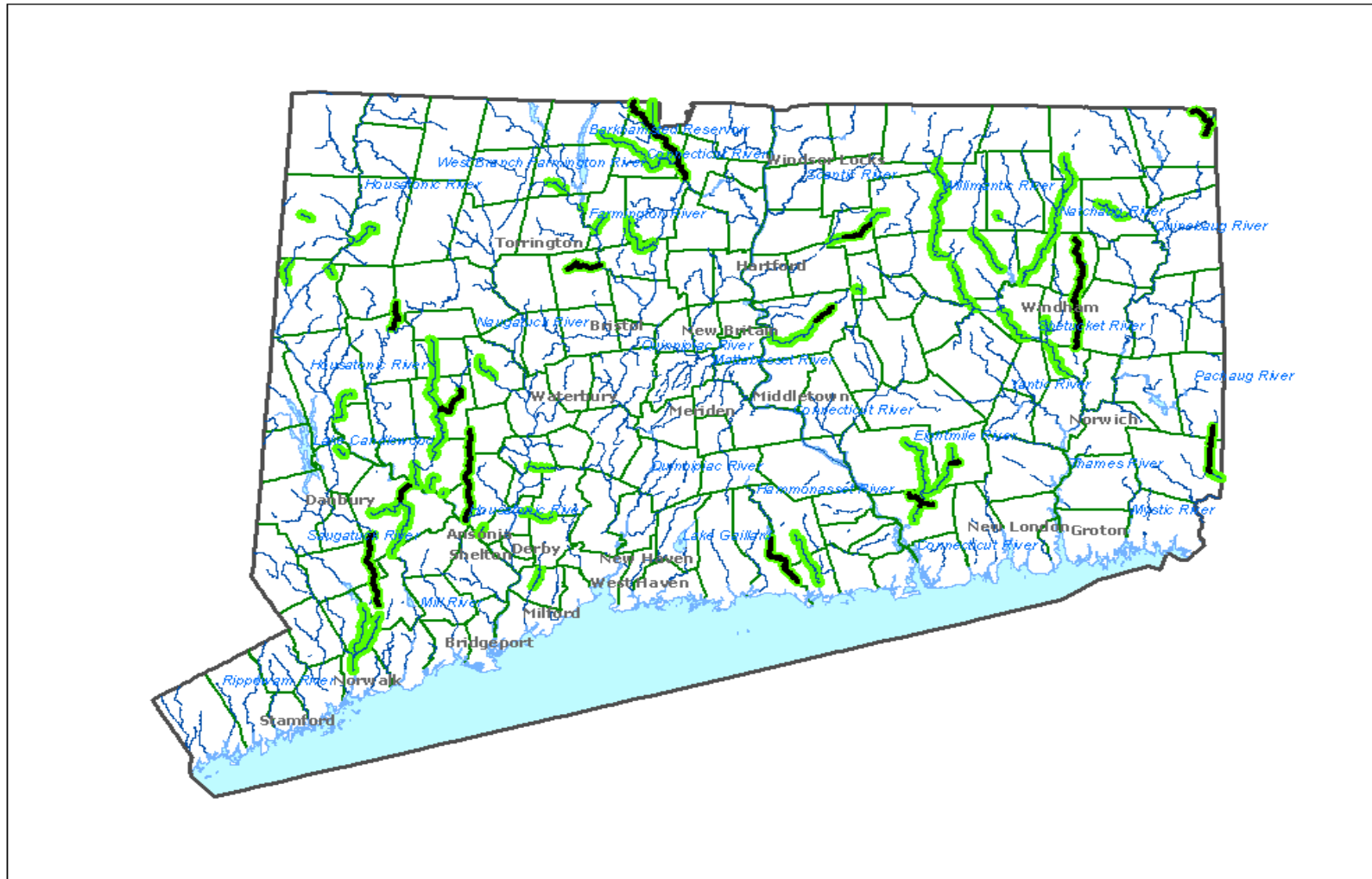


Figure 6. Waterbody segments where RBV data was used to indicate full support of Aquatic Life Use Support goals. During 2007 RBV data indicated full support (green with black core) on 16 segments totaling 96 miles. Since 1999 data from the RBV program has contributed to ALUS assessments on approximately 323 miles covering 70 waterbody segments (thick green lines).

References:

Barbour, M.T., J. Gerritsen, B.D. Synder, and J.B. Stribling. 1999. *Rapid Bioassessment in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish*. Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

<http://www.epa.gov/owow/monitoring/rbp/>

CT 305(b) 2006. *2006 Water Quality Report To Congress*. Bureau of Water Management, Planning and Standards Division, Hartford, CT.

http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325610&depNav_GID=1654

CT CALM 2006. *Consolidated Assessment and Listing Methodology for 305(b) and 303(d) Reporting*. Bureau of Water Management, Planning and Standards Division, Hartford, CT.

http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325612&depNav_GID=1654

CT WQS 1997. *Water Quality Standards*. Bureau of Water Management, Planning and Standards Division, Hartford, CT

http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325620&depNav_GID=1654

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/444/4-89-00. <http://www.epa.gov/owow/monitoring/rbp/>

Additional links with relevant information

USEPA volunteer monitoring: <http://www.epa.gov/OWOW/monitoring/vol.html>

USEPA biological monitoring: <http://www.epa.gov/bioindicators/html/invertebrate.html>

USGS water resources data for Connecticut: <http://ct.water.usgs.gov/>

Appendix A. The following provides a description of the location where an RBV sample was collected during 2007. Locations are sorted alphabetically by stream name then ascending site number.

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Aspetuck River	7202	upstream	Bayberry Lane	Fairfield	The Nature Conservancy-Devils Den	48-009	41.18643	-73.3429
Aspetuck River	7202	at	Judges Hollow Road	Fairfield	The Nature Conservancy-Devils Den	48-010	41.2132	-73.3291
Aspetuck River	7202	at	Silver Hill Road	Easton	The Nature Conservancy-Devils Den	48-012	41.2589	-73.3247
Aspetuck River	7202	adjacent	Valley Road pull-off and trail head	Easton	The Nature Conservancy-Devils Den	48-013	41.2771	-73.3275
Aspetuck River	7202	upstream	Rock House Road at nature preserve	Easton	The Nature Conservancy-Devils Den	48-014	41.2865	-73.3327
Beaver Brook	4803	Downstream	bridge at 55-123 Beaver Brook Road	Lyme	Eightmile River Watershed Association	26-005	41.41005	-72.3289
Beaver Brook	6900-40	at	62 Beaver Street	Ansonia	Housatonic Valley Association	9-012	41.34425	-73.0714
Blackledge River	4707	500 DS Downstream	Deming Road	Bolton	Bolton Conservation Commission	35-002	41.75184	-72.4454
Blissville Brook	3800-16-2-R1	at Lisbon Meadows Park	off Rte 169	Lisbon	Lisbon School Environmental Club	60-001	41.6039	-72.0192
Bolton Pond Brook	3108-02-1	at	Mark Anthony Lane	Bolton	Bolton Conservation Commission	35-005	41.7784	-72.4167
Bungee Brook	3201	downstream	Mill Bridge Road	Eastford	CT Audubon Society-Pomfret	21-008	41.89566	-72.0714
Bunnell Brook (Burlington Brook)	4311	between	Punch Brook confluence and Route 179	Burlington	Farmington River Watershed Association	7-012	41.7831	-72.9248
Burhams Brook	4800	at	Mouth	East Haddam	Eightmile River Watershed Association	26-008	41.46031	-72.3343
Chatfield Hollow Brook	5105	at	Papermill Road	Killingworth	Hammonasset watershed Coalition	55-005	41.3392	-72.5906
Chatfield Hollow Brook	5105	at	Mouth on River Road	Madison	Hammonasset watershed Coalition	55-007	41.3314	-72.595

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Cherry Brook	4309	upstream	Route 44	Canton	Farmington River Watershed Association	7-006	41.8365	-72.9295
Coginchaug River	4607	at	beach interceptor pipe	Middlefield	CT Riverwatch	2-001	41.53474	-72.6865
Cory Brook	3715-00-2-R5	at Powerline crossing	Off Depot Road	Canterbury	Lisbon School Environmental Club	60-002	41.6403	-71.9808
Deep Brook	6019	upstream	Pootatuck River	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-003	41.41313	-73.2823
Deep Brook	6019	between	old bridge crossing and Mile Hill Road and Queen st	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-012	41.40229	-73.2947
Deep Brook	6019	at	Route 25	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-015	41.39774	-73.2946
Deep Brook	6019	upstream	Wasserman way (mile hill Road)	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-014	41.4019	-73.2934
Deep Brook	6019	upstream	Bushy Hill Road in Dickenson park	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-016	41.3976	-73.3006
Eagleville Brook	3100-19	upstream	Route 32	Mansfield	UCONN Soil and Water Conservation Club	38-005	41.78825	-72.2776
East Branch Salmon Brook	4320	Downstream	Route 20	Granby	Salmon Brook Watershed Association	24-002	41.955	-72.7794
East Branch Salmon Brook	4320	at	Northwoods Road	Granby	Salmon Brook Watershed Association	24-006	42.0339	-72.8625
Eightmile Brook	6023	upstream	Route 188	Southbury	Westover School	61-002	41.4539	-73.1649
Eightmile Brook	6023	upstream	Loughlin Road	Oxford	Housatonic Valley Association	9-009	41.3885	-73.1648
Eightmile River	4800	Downstream	Macintosh Road	Lyme	Three Rivers Community Technical College	49-002	41.41143	-72.3389
Farmill River	6025	upstream	Route 110	Stratford	Housatonic Valley Association	9-014	41.25909	-73.0979
Farmill River	6025	at	Judson Street and Commerce Street	Shelton	Housatonic Valley Association	9-015	41.27849	-73.1302
Farmington River	4300	100 meters upstream	Steele bridge on Old Town Bridge Road	Canton	Farmington River Watershed Association	7-010	41.82569	-72.9295

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Fivemile River	3400	near	mouth	Killingly	Five Mile River Watershed Association	59-001	41.80205	-71.8868
Fivemile River	3400	at	Route 12 and Huntley Road on town property	Killingly	Five Mile River Watershed Association	59-002	41.8638	-71.8834
Fivemile River	3400	200 feet South	Route 44	Putnam	Five Mile River Watershed Association	59-003	41.918	-71.83
Fivemile River	3400	100 feet north	Munyan Road	Putnam	Five Mile River Watershed Association	59-004	41.9277	-71.8327
Fivemile River	3400	south of	Quaddick Road	Thompson	Five Mile River Watershed Association	59-005	41.9411	-71.8301
Fivemile River	3400	south of	Spicer Road	Thompson	Five Mile River Watershed Association	59-006	41.9865	-71.8154
Fourmile River	6000-64	upstream	Route 34 adjacent to Route 188	Seymour	Housatonic Valley Association	9-011	41.36449	-73.1399
French Brook	4707	at	French Road	Bolton	Bolton Conservation Commission	35-003	41.74422	-72.4485
Green Fall River	1002	upstream	confluence with Wyassup Bk US Clarks Fall Rd.	North Stonington	Mystic Marine Life Aquarium	63-001	41.45677	-71.8169
Hammonasset River	5106	downstream	Hog Brook Confluence adjacent Summer Hill Rd	Madison	Hammonasset watershed Coalition	55-001	41.32748	-72.6109
Hammonasset River	5106	downstream	Green Hill Road	Madison	Hammonasset watershed Coalition	55-008	41.32362	-72.5927
Harbor Brook	5206	upstream	Coe Road	Meriden	Quinnipiac River Watershed Association	3-016	41.53135	-72.8218
Harris Brook	4801	at	Mouth	Salem	Three Rivers Community Technical College	49-001	41.47329	-72.2851
Hitchcock Mill Brook	6000	at	Sunny Valley Preserve Bridge near camp silverman	Bridgewater	Housatonic Valley Association	9-005	41.51124	-73.3702
Hop Brook	6916	200 feet downstream	Route 188 bridge near firehouse	Middlebury	Westover School	61-001	41.5377	-73.1075
Indian Hole Brook	6000-71	upstream	state park road crossing	Shelton	Housatonic Valley Association	9-010	41.33881	-73.1246
Kettletown Bk	6021	at	Mouth	Southbury	Housatonic Valley Association	9-003	41.42704	-73.206

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Lee Brook	6000-56	between	Lakemere Road and Lee Farm Drive	Southbury	Housatonic Valley Association	9-002	41.43336	-73.2289
Little River	3708		50 m us of dam in town swimming area	Putnam	CT Audubon Society-Pomfret	21-012	41.92081	-71.9228
Little River	3805	near	USGS gage near Hanover	Sprague	Lisbon School Environmental Club	60-003	41.67167	-72.0528
Little River	7201	at	Newtown Turnpyke	Redding	The Nature Conservancy-Devils Den	48-018	41.2931	-73.3678
Mashamoquet Brook	3710	500 meters DS	Route 44 in State Park	Pomfret	CT Audubon Society-Pomfret	21-005	41.8579	-71.9812
Mashamoquet Brook	3710	end	paved section of road in state park	Pomfret	CT Audubon Society-Pomfret	21-006	41.85614	-71.9758
Meetinghouse Brook	5200-10	DS	Route 5	Wallingford	Quinnipiac River Watershed Association	3-027	41.4941	-72.8096
Misery Brook	5203	at	South End Road crossing (house # 475-482)	Southington	Quinnipiac River Watershed Association	3-026	41.56986	-72.8733
Morgan Brook	4305	downstream	Morgan Brook Road	Barkhamsted	Farmington River Watershed Association	7-005	41.90226	-72.9933
Natchaug River	3200	at	Route 198 entrance to Natchaug SF	Eastford	CT Audubon Society-Pomfret	21-004	41.84577	-72.0976
Nonewaug River	6802	upstream	Minortown road adjacent to Mill Road	Woodbury	Pomperaug River Watershed Coalition	54-004	41.57284	-73.1844
Nonewaug River	6802	downstream	Route 47 (Washington Road)	Woodbury	Pomperaug River Watershed Coalition	54-006	41.55753	-73.2122
Pequabuck River	4315	at	Jacob street & southern end of Rockwell park	Bristol	Farmington River Watershed Association	7-013	41.67427	-72.956
Phelps Brook	4300-54	at mouth	confluence with Farmington River	Windsor	MDC-Poquonock WPCF	56-001	41.88907	-72.6683
Pomperaug River	6800	adjacent Bent-Of-River Audubon Center	off Flagg Swamp Road	Southbury	Pomperaug River Watershed Coalition	54-001	41.46723	-73.258
Pootatuck River	6020	downstream	Wasserman Way on Game Club Prop. (Mile Hill Rd)	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-001	41.40637	-73.272

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Pootatuck River	6020	adjacent	Tom's Brook Confluence (DS STP outfall)	Newtown	Trout Unlimited-Candlewood Valley Chapter	50-006	41.41486	-73.2827
Railroad Brook	4503	at footbridge	In Valley Falls St. Park, Northern end of Freja Park	Vernon	Bolton Conservation Commission	35-004	41.82421	-72.4454
Roaring Brook	4009	upper end of Cotton Hollow Reserve	at Hopewell Road and Matsun Hill Road	Glastonbury	Ginny and Walt Smith	64-001	41.66389	-72.5861
Roaring Brook	4009	at	Shoddy Mill Road	Glastonbury	Ginny and Walt Smith	64-002	41.6979	-72.5263
Roaring Brook	4312	upstream footbridge	Lions pool 300 meters US Cottage St.	Farmington	Farmington River Watershed Association	7-011	41.75944	-72.8808
Saugatuck River	7200	at	DS end of Fly Fishing Only Area (1 Ford Rd)	Westport	The Nature Conservancy-Devils Den	48-001	41.16932	-73.367
Saugatuck River	7200	at Saugatuck Falls Natural area	off Route 53 across from John Reed Middle School	Redding	The Nature Conservancy-Devils Den	48-015	41.3041	-73.4041
Scantic River	4200	downstream 100 meters	South Maple Street	Enfield	Enfield Conservation Commission	36-001	41.98203	-72.5407
Shepaug River	6700	500 meters Downstream	Rte 202 adjacent to dirt road	Washington	RBV Workshop Prep	19-005	41.7019	-73.2904
Shepaug River	6700	upstream route 47	adjacent to Bee Brook Confluence	Washington	Washington Montessori School	62-001	41.6568	-73.318
Shetucket River	3800	uptstream	Route 97 on west bank	Sprague	Lisbon School Environmental Club	60-004	41.61749	-72.085
Tankerhoosen River	4503	DS	Bolton Road	Vernon	Hockanum River Watershed Association	32-001	41.82944	-72.4482
Tankerhoosen River	4503	upstream	Tunnel Road	Vernon	Hockanum River Watershed Association	32-002	41.8272	-72.464
Tankerhoosen River	4503	US	Small pond (below dobsonville pond)	Vernon	Hockanum River Watershed Association	32-003	41.82323	-72.4934
Tankerhoosen River	4503	upstream 100 m	mouth at golf land	Vernon	Hockanum River Watershed Association	32-004	41.82009	-72.5033
Ten Mile River	5202	downstream	Route 322	Southington	Quinnipiac River Watershed Association	3-028	41.56552	-72.8905
Tenmile River	3110	East of Rte 87	at Viaduct	Lebanon	RBV Workshop Prep	xxxxxx	41.6757	-72.2675

Stream	basin	proximity	landmark	town	group	Site number	YLat	XLong
Town Farm Brook	6000	at	Dorwin Hill Road (RTE 67 intersection)	New Milford	Housatonic Valley Association	9-006	41.56485	-73.3936
Transylvania Brook	6806	25 meters downstream	Whale Road	Southbury	Pomperaug River Watershed Coalition	54-005	41.48264	-73.2595
Tributary to Eight Mile River (PV brook)	4800	at	trail crossing off MacIntosh Road	Lyme	Eightmile River Watershed Association	26-007	41.4155	-72.3396
Weekepeemee River	6804	downstream	Jacks Bridge Road at USGS gage	Bethlehem	Pomperaug River Watershed Coalition	54-003	41.55753	-73.2155
Wepawaug River	5307	downstream	Route 121	Orange	Boy Scout Troop 925, Turkey Hill School PTA	51-001	41.28347	-73.0409
West Branch Farmington River	4300	adjacent	Hogsback Road	Hartland	Connecticut Fly Fishermans Association	42-005	41.974	-73.0216
West Branch Salmon Brook	4319	Adjacent	Salmon Brook Park	Granby	Salmon Brook Watershed Association	24-001	41.94378	-72.7957
West Branch Saugatuck River	7203	at	Cavalry Road	Weston	The Nature Conservancy-Devils Den	48-016	41.17798	-73.3742
West Branch Saugatuck River	7203	at Biscegli Park	upstream Route 57 and 53	Weston	The Nature Conservancy-Devils Den	48-017	41.214	-73.3889
Wharton Brook	5207	US	Northfield Road and Park Lane At House #25	Wallingford	Quinnipiac River Watershed Association	3-025	41.4324	-72.8321
Willimantic River	3100	downstream	Merrow Road	Mansfield	UCONN Soil and Water Conservation Club	38-004	41.82298	-72.314
Wyassup Brook	1001	at mouth	upstream of Clarks Falls Road	North Stonington	Mystic Marine Life Aquarium	63-002	41.45664	-71.8172

Appendix B: The RBV Datasheet.

RAPID BIOASSESSMENT IN WADEABLE STREAMS AND RIVERS BY VOLUNTEER MONITORS FIELD DATA SHEET

SUBMIT DATA TO: MIKE BEAUCHENE (mike.Beauchene@po.state.ct.us)
PHONE (860) 424-4185

WATERBODY NAME:			COLLECTION DATE:			COLLECTION TIME:		
LOCATION DESCRIPTION:			COLLECTORS NAMES:					
TOWN:			NOTES/COMMENTS:					
MOST	1 Body builder mayfly Trichoptera	2 Minnow mayfly Isauroptera	3 3-tailed flat head mayfly Ephemera	4 Roach-like stonefly Plecoptera	5A Common stonefly Perlidae	5B Giant stonefly Plecoptera	5C Misc Stonfly	
	Locs 1&2							
	Locs 3&4							
Locs 5&6								
MOST	6A Saddle-case caddis Glossosoma	6B Cornucopia case caddis Apatania	7 Michelin Man caddis Rhyacophila	8A Mid-size plant case caddis Brachycentrus	8B Lepidostoma			
	Locs 1&2							
	Locs 3&4							
Locs 5&6					DATA INTERPRETATION # OF TYPES OF THE "MOST" 5 OR MORE WATER QUALITY EXCEPTIONAL 3 TO 4 EXCELLENT 1 TO 3 VERY GOOD 0 MORE INFO NEEDED TO ASSESS			
MODERATE	9 Common net-spinner Hydropsychidae	10 Fingernet Caddis Limnephila	11 Flat Head mayfly Neonema	12 Water Penny Psephenus	13A Dobsonfly Megaloptera	13B Fishfly Mgarrata	14 Dragonfly & Damselfly Zygoptera	
	Locs 1&2							
	Locs 3&4							
Locs 5&6								
LEAST	15A Amphipod	15B Isopod	15C Leech	15D Midge	15E Black fly	15F Snail	15G Worm	
	Locs 1&2							
	Locs 3&4							
Locs 5&6								
OTHERS	OTHER COMMONLY COLLECTED RIFFLE-DWELLING MACROINVERTEBRATES							
	Crayfish	Crane fly larvae	Rifle Beetle adult/larva	Small minnow mayfly	Water snipe fly	Planaria	Fingernail clamb/susnet	
Present								

ALL RBV MATERIALS ARE AVAILABLE AT: <http://dep.state.ct.us/wtr/volunmon/volopp.htm>

PLEASE NOTE: BE SURE TO INCLUDE AT LEAST 1 OR 2 OF EACH ORGANISM IN YOUR VOUCHER COLLECTION!!
INCLUDE A SPECIMEN FROM EVERY TYPE YOU THINK IS A DIFFERENT, EVEN IF IT IS NOT PICTURED ON THIS DATASHEET. IF AN ORGANISM IS NOT INCLUDED IN THE VOUCHER COLLECTION IT WILL NOT BE INCLUDED IN THE FINAL DATA ASSESSMENT!!