



Connecticut River Watch Program

HOCKANUM RIVER RAPID BIOASSESSMENT SUMMARY REPORT



Funded in part by the CT DEP through a US EPA Clean Water Act §319 nonpoint source grant



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Hockanum River Rapid Bioassessment Summary Report
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With funding from the Connecticut Department of Environmental Protection through a US Environmental Protection Agency Clean Water Act §319 nonpoint source grant, in cooperation with the Hockanum River Watershed Association

INTRODUCTION

During the fall of 2003 the Connecticut River Watch Program (CRWP), in cooperation with the Hockanum River watershed stakeholder groups and the Connecticut Department of Environmental Protection (DEP), conducted a rapid bioassessment of the Tankerhoosen River. Teams of volunteers, including riparian landowners, land use commissioners, members of the Hockanum River Watershed Association and the Hockanum River Linear Park Committee, a science teacher and students from Rockville High School, and members of the community assisted with the bioassessment, a survey of the benthic macroinvertebrate community following the DEP protocol: *Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors*.

The monitoring project was the fourth component of an effort to assess the health of the Hockanum River begun in 1999. The study began with a physical survey of the Hockanum River, and continued in 2000 with a physical survey of the Tankerhoosen River. In 2002, the first bioassessment of the Hockanum and Tankerhoosen Rivers was conducted. It is our hope that the effort will evolve into a long-term community-based monitoring and assessment program, designed to help insure the improvement and protection of this valuable resource.

Goals of the monitoring program include: to collect baseline information about the condition of the Hockanum River and its tributaries; to identify areas of the river in need of protection or restoration; and to raise community awareness of the River and the need to restore and protect it. Information collected will be used to identify, plan and prioritize conservation and improvement efforts. The CRWP monitoring program is intended to complement and build upon ongoing efforts to improve conditions in the watershed and raise public awareness of the river.

BACKGROUND

The Hockanum River Watershed

The Hockanum River is a major tributary of the Connecticut River located in north central Connecticut. From its beginnings in Shenipsit Lake in Ellington, the Hockanum flows approximately twenty-five (25) miles to its confluence with the Connecticut River in East Hartford. The River's watershed comprises a seventy-seven (77) square mile area draining large portions of Ellington, Tolland, Vernon and Manchester, and smaller portions of Somers, Stafford, Bolton and East Hartford. While areas of the watershed are undeveloped, the Hockanum flows through an increasingly urbanized landscape as it travels downstream. The River also assimilates waste from three sewage treatment plants.

The Hockanum River is included in Connecticut's Unified Watershed Assessment as a category 1 (impaired) watershed, and was recommended for monitoring/assessment by the



Department of Environmental Protection (DEP) ambient monitoring group. The River is on DEP's list of impaired waters (Vernon to Mouth), with impairments listed as aquatic life support, contact recreation/bacteria, and inadequate fish passage. Suspected causes of these water quality impairments include agriculture, landfills, highway maintenance and runoff, urban runoff and wet weather discharges. Shenipsit Lake is also included on the list due to flow modification from public water supply diversion.

Despite its water quality problems, the Hockanum River is a well-used recreational resource. An annual spring canoe race brings many enthusiasts to the river. The Hockanum River Linear Park not only protects areas of the river and riparian habitats, but also contains a network of riverside hiking trails. The trails provide casual hikers the opportunity to enjoy the natural beauty of the river, even in some bustling commercial areas. Further, the presence and use of the Linear Trail helps to promote stewardship of the river.

Hockanum River Restoration Efforts

The Hockanum River has been the focus of a number of local and regional efforts to improve its health. In 1995, the Tolland and Hartford County Soil and Water Conservation Districts (now the North Central Conservation District) initiated a watershed management project with funding from the DEP through a grant from the US Environmental Protection Agency (EPA) under Section 319 of the Clean Water Act. Activities undertaken as part of this project have focused on identifying and reducing pollution problems associated with storm water runoff, and restoring fish and wildlife habitat.

Five different restoration and stabilization projects in the Hockanum River and tributaries have been funded through the DEP River Restoration Grant program, one in East Hartford, two in Vernon, and two in Manchester. In addition, the DEP is currently conducting intensive water quality monitoring on the river under their TMDL (Total Maximum Daily Load) program.

The Hockanum River Watershed Association (HRWA) and North Central Conservation District sponsor annual river clean-ups, as well as other outreach and education activities, and town based Hockanum River Linear Park committees in Manchester and Vernon create and maintain a network of trails.

About the Hockanum River Study

The Connecticut River Watch Program is working in conjunction with the Hockanum River Watershed Association (HRWA) and the North Central Conservation District to develop and support a community-based river monitoring and assessment program in the Hockanum River watershed. This effort is part of the expanded Connecticut River Watch Program, and is one the new watershed monitoring and assessment programs initiated in 1999 as part of this new basin-wide program.

The Hockanum River is included in Connecticut's Unified Watershed Assessment as a category 1 (impaired) watershed, and was recommended for monitoring/assessment by the Department of Environmental Protection (DEP) ambient monitoring group. The CRWP monitoring program is intended to complement and enhance existing efforts to improve conditions in the watershed and raise public awareness of the river by the HRWA, the Linear Park committees, the North Central Conservation District, and the watershed municipalities. Improvements have been implemented as part of a watershed management project funded by the DEP through a U.S. Environmental Protection Agency §319 nonpoint source grant watershed project. In 1998, CRWP was asked by the DEP and EPA to help develop a volunteer monitoring program in conjunction with the watershed project.

The study began in 1999 with a Stream Walk Survey—a survey of physical characteristics—of the Hockanum River main stem, and continued in 2000 with a similar survey of the Tankerhoosen River, the Hockanum’s major tributary. The surveys were conducted with assistance from members of the Hockanum River Watershed Association and the watershed community.

A number of management considerations were raised by the surveys. In the Hockanum, much of the river appeared to be impacted adversely by human development as evidenced by inadequate stream buffers, adjacent residential, commercial and industrial development, non-native invasive plants, yard waste, algae growth, exposed streambank soils, and sedimentation. At the same time, in areas protected by the Hockanum River Linear Park, the river seems to support a diversity of wildlife, as well as provide many opportunities for public access and recreation. In the Tankerhoosen, similar problems were uncovered, though several areas of the river appear to be in relatively good condition, both upstream and downstream. Also, there are very few areas where stream buffers are less than 25 feet and where there are lawns adjacent to the stream. Further, numerous opportunities for recreational access and use were identified in the survey; development and use of new access areas will help to heighten awareness of the river’s values and promote stewardship activities. Recommendations included addressing concerns and threats identified by the stream surveys, completing the collection of baseline information by surveying other streams in the watershed, and conducting additional river monitoring activities to assess in-stream health.¹

In 2002, a macroinvertebrate assessment was undertaken using the Connecticut DEP Rapid Bioassessment for Volunteers (RBV) protocol. The focus of the assessment was on the Tankerhoosen River, though Hockanum River sites were also included. The study was planned and conducted with assistance from the Vernon Linear Park Committee and the Hockanum River Watershed Association. Results of the study revealed an upstream-downstream decline in water quality on both the Tankerhoosen and Hockanum Rivers. Recommendations included conducting a Rapid Bioassessment on an annual basis.²

The Connecticut River Watch Program

The Connecticut River Watch Program (CRWP) is a volunteer water quality monitoring, protection and improvement program for the Connecticut River and its tributaries. CRWP is sponsored by the Connecticut River Coastal Conservation District (formerly, Middlesex County Soil and Water Conservation District) and was initiated in 1992 in cooperation with River Watch Network, a national organization based in Vermont (now part of the national River Network).

Over its first eight years CRWP focused its monitoring activities on the lower Connecticut River main stem and two tributary watersheds, the Mattabesset and the Coginchaug. The program generated an extensive water quality database for these rivers, and raised local awareness of river resources and water quality issues through public involvement and outreach activities. Information collected through CRWP has been used by towns to investigate potential sources of pollution, and by the state for planning purposes. It has become a model program, with wide support from the local communities and

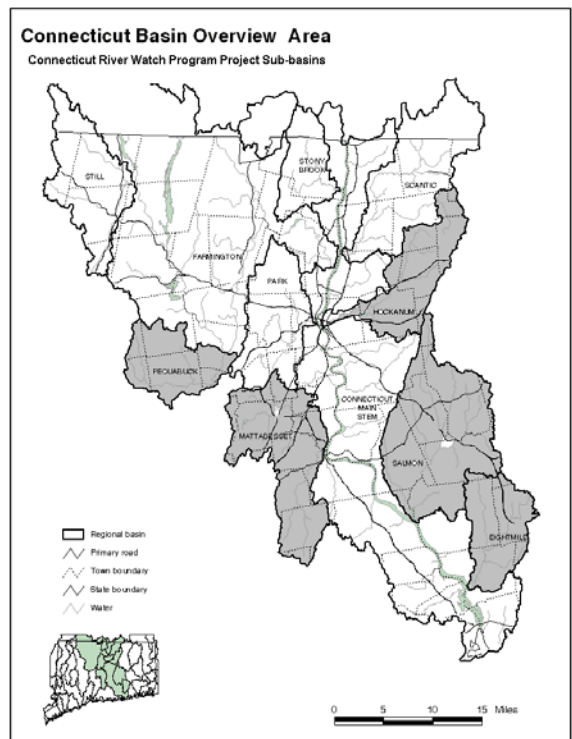
¹ Additional information about the surveys, including data summaries, can be found in the *Hockanum River Stream Walk Summary Report* (May 2000), and *Tankerhoosen River Stream Walk Summary Report* (September 2001), both published by the Middlesex County Soil and Water Conservation District.

² Additional information about the rapid bioassessment, including data summaries, can be found in the *Hockanum River Rapid Bioassessment Summary Report*, published by the Middlesex County Soil and Water Conservation District in December 2002.

state and federal environmental officials. Funding for CRWP has come primarily from the DEP through grants from the US EPA under Section 319 of the Clean Water Act.

In 1999, CRWP expanded into new watersheds within the Connecticut River basin. Now a regional support service, the program's focus is to initiate, support and coordinate community-based river monitoring, assessment and improvement programs in regional watersheds throughout the basin. Through the new program, CRWP continues to put water quality and physical survey information into the hands of local communities, and support efforts to use that information to direct river and other watershed protection and improvement efforts.

Current project areas include the Mattabeset/Coginchaug, Hockanum, Eightmile, Salmon and Pequabuck River watersheds.



PROJECT SUMMARY

Goals

The Hockanum River Rapid Bioassessment was undertaken as part of an ongoing community-based effort to document the health of the Hockanum River watershed. Based on local input, it was decided that a rapid bioassessment of both the Hockanum and Tankerhoosen Rivers would be the focus of this fourth year's effort.³ The overall goals include:

- ◆ Develop a baseline of information about the condition of the Hockanum River and tributaries
- ◆ Identify areas of concern and potential pollution problems that can be used to plan conservation and improvement efforts
- ◆ Raise public interest in and knowledge of the Hockanum River, both about the resources it has to offer and the problems it faces
- ◆ Develop public awareness of water quality issues and human impacts on our rivers
- ◆ Build on the existing local constituency for the Hockanum River and expand the base of active volunteers
- ◆ Form the basis for more complex water quality monitoring activities that can be pursued in future years according to needs, level of interest, ability to commit time, and the availability of other resources

Study Design and Methodology

The DEP's Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors (RBV) is a benthic macroinvertebrate assessment protocol designed specifically for volunteer programs. Benthic macroinvertebrates are bottom dwelling aquatic organisms that can be seen with the unaided eye, such as stonefly, mayfly and caddisfly nymphs. They are good indicators of water quality for several reasons: many are sensitive to pollution, the composition of the community is a good reflection of long-term water quality (since they live there year-round), they cannot easily escape pollution, and they are relatively easy to collect. In addition, there are many established methods for using macroinvertebrate data to assess water quality and stream health. Benthic macroinvertebrates are collected from shallow riffle areas by disturbing the stream bottom and catching the dislodged organisms in a net. The DEP uses the riffle-dwelling benthic macroinvertebrate community as the primary indicator of biological integrity of freshwater streams.

The RBV protocol is designed to help identify streams with pollution sensitive benthic macroinvertebrate communities. It is not a definitive assessment procedure; data are used primarily for screening purposes, to identify streams with either very high or very poor water quality. There are twenty-six organisms included in the RBV protocol (see list, Attachment A). They are easily identified due to their distinct shape, structure, color, or behavior. Each also provides key ecological information about the stream environment. RBV organisms are categorized in one of three groups:

- ◆ *Most Wanted* – The most sensitive to pollution, requiring a narrow range of environmental conditions. When abundant they are a sign of a non-impaired stream;

³ Though originally the study was to include sites on both rivers, project leaders had decided in advance to focus on the Tankerhoosen River unless there were enough volunteers to cover Hockanum River sites as well.

- ◆ *Moderately Wanted* – Less sensitive to pollution and found in a variety of water quality conditions. When abundant, more information is needed about upstream conditions to infer water quality;
- ◆ *Least Wanted* – Least sensitive to pollution and tolerant of the widest range of conditions. When they make up the majority of a sample, they indicate some level of water quality impairment.

RBVs are generally scheduled to take place in the fall, during October and November, to document the condition of the macroinvertebrate community following the summer, a “high stress” time for streams due to low flows and higher water temperatures.

Volunteers receive training in the RBV protocol in an indoor training session prior to conducting the assessment. Sampling and analysis equipment and supplies, as well as reference materials to aid in identification of organisms, are provided by the DEP. Benthic macroinvertebrates are collected using a large flat-bottom net 12” high X 18” wide with a mesh size no larger than a #30 sieve (0.59 mm). Volunteers collect three replicate samples, each consisting of two one square meter collections or “kicks”, sort and identify the organisms in the field, and document relative abundance of key organisms on official field data sheets for the RBV protocol (see Attachment B). Volunteers also keep a representative voucher collection consisting of at least one of each type of organism found, preserved in 91% isopropyl alcohol. The voucher collection is returned to the DEP along with the data sheets.⁴

Eight sites were identified for inclusion in the study (though only four were assessed). Sites were selected to provide an upstream-downstream assessment of the Hockanum River, and a more in-depth assessment of the Tankerhoosen (see site map, Attachment C). As indicated in the table below, several of the sites are also DEP monitoring sites, last sampled as part of the 1998-1999 Connecticut River basin survey.

Table 1. Hockanum and Tankerhoosen River RBV Sites (listed upstream to downstream by river)

| Site # | River | Location | Rationale |
|------------|-----------------|--|--|
| HR2 (DEP) | Hockanum R. | Lower Butcher Road in Ellington (upstream) | Upstream site; upstream of Vernon STP |
| HR6 | Hockanum R. | Confluence with Tankerhoosen R. in Vernon (100 meters upstream) | Mid-stream site; prior to Tankerhoosen influence |
| HR9a | Hockanum R. | Behind Adams Mill Restaurant in Manchester (downstream) | Downstream site; integrator site for point and nonpoint sources |
| HR7b | Tankerhoosen R. | Bolton Road in Vernon (downstream) | Upstream site; control site for watershed |
| HR7a (DEP) | Tankerhoosen R. | Tunnel Road in Vernon (upstream) | Mid-stream site; downstream of agriculture |
| HR7c | Tankerhoosen R. | Downstream of Dobsonville Pond in Vernon | Impacts of pond, geese |
| HR7 (DEP) | Tankerhoosen R. | Golfland, near confluence with Hockanum R. (100 meters upstream) | Downstream site; integrator site for nonpoint sources |
| HR7d | Gages Brook | Behind the Tolland Agricultural Center, at the footbridge on the walking trail | Impacts of Interstate 84 and upstream development in the Tolland Industrial Park |

⁴ DEP website: <http://dep.state.ct.us/wtr/volunmon/volopp.htm>

Volunteer Recruitment, Training and Participation

A recruitment flyer was sent to all Hockanum CRWP volunteers, and Hockanum River Watershed Association and Linear Park Committee members. Notices were also sent to the local newspapers. Fourteen people attended the training session, held on November 1, 2003 at the Tolland Agricultural Center in Vernon. The agenda included an introduction to the Connecticut River Watch Program and Hockanum River Study, presented by the Connecticut River Watch Program Director; an introduction to local Hockanum River protection and improvement efforts by the North Central Conservation District, Hockanum River Linear Park Committee and Hockanum River Watershed Association; and a training program on the DEP RBV protocol, presented by the Connecticut Department of Environmental Protection Volunteer Monitoring Coordinator.



Following the indoor training session, volunteers were grouped into four teams and assigned a specific river site. Each team was provided with sampling and analysis equipment and supplies: a kicknet, gloves, white plastic trays, forceps, hand lenses, ice cube trays (for sorting), field identification cards, a data sheet, and a vial filled with 91% isopropyl alcohol for the voucher collection. Maps were also provided showing the location of each sample site. Volunteers were also requested to complete a site sheet to document stream habitat characteristics, including river bottom composition, water depth and width, current velocity, and stream shading (not part of the RBV protocol).

Teams proceeded to their sites to complete their fieldwork. They first identified three different locations in the riffle where samples would be collected, then collected, sorted and identified organisms from each of the three samples. Relative abundance of each RBV organism was recorded on the RBV data sheet, and at least one of each type of organism found was placed in the vial filled with alcohol for the voucher collection. The DEP Volunteer Monitoring Coordinator and CRWP Director circulated between the sites to assist the volunteer teams.



After completing their fieldwork, volunteers reconvened at the Tolland Agricultural Center to turn in their data sheets, voucher collections, and equipment and supplies.



SURVEY RESULTS

RBV data sheets were reviewed and voucher collections examined by the DEP Volunteer Monitoring Coordinator. A list of all organisms included in the voucher collection was generated for each sample site, and an overall assessment of the health of the river made based on the data collected.⁵ Rapid bioassessment results are summarized in a table format (Attachment D). The table includes information about RBV organisms, as well as additional organisms that were included in the voucher collections.

The RBV data show good representation among organisms from all categories (*most wanted, moderately wanted, and least wanted*). Results indicate a general upstream-downstream decline in water quality, seen in the decreasing numbers of *most wanted* organisms found. As seen in Table 2 below, the best representation of *most wanted* organisms was found at the Gages Brook site, with 6 or 50% of the organisms in this category. Fewer *most wanted* organisms were found at the two upstream Tankerhoosen sites—4 and 5 (about 40%). At the most downstream on the Tankerhoosen, 31% of the organisms found were in the *most wanted* category with the highest percentage in the *least wanted* category, indicating potential impacts at this site. *Most wanted* organisms were the most commonly collected organisms.

Table 2. Occurrence of different types of organisms in each RBV category by site and as compared with a high quality reference site. Good representation (3 or more) of organisms in the *most wanted* category—the most sensitive to pollution—is an indicator of very good water quality. Sites with 5 or more organisms in the *most wanted* category are considered by DEP to have reference conditions and in full support of the standards for aquatic life.⁶

| Site # | River | Location | Most | Moderate | Least | Total # |
|--------|------------------------|--|-----------|-----------|---------|---------|
| HR7d | Gages Brook | Behind TAC at footbridge in Vernon | 50% (6) | 25% (3) | 25% (3) | 12 |
| HR7b | Tankerhoosen R. | Bolton Road in Vernon | 40% (4) | 50% (5) | 10% (1) | 10 |
| HR7a | Tankerhoosen R. | Tunnel Road in Vernon | 41.5% (5) | 41.5% (5) | 17% (2) | 12 |
| HR7 | Tankerhoosen R. | Golfland, near confluence with Hockanum R. | 31% (4) | 31% (4) | 38% (5) | 13 |
| NA | REFERENCE ⁷ | Compilation of high quality sites | 47% (7) | 40% (6) | 13% (2) | 15 |

The most commonly collected organisms (found in at least three of the four sites) were:

- ◆ Perlidae (Panel 5 – Common Stonefly – Most);
- ◆ *Glossosoma* (Panel 6 – Mini-stone Case Makers – Most);
- ◆ *Rhyacophila* (Panel 7 – Michelin Man Caddisfly – Most);
- ◆ Hydropsychidae (Panel 9 – Common Netspinner Caddisfly - Moderate);
- ◆ *Chimarra* (Panel 10 – Fingernet Caddisfly – Moderate);
- ◆ *Nigronia* (Panel 13 – Fishfly Larva – Moderate);
- ◆ Odonata (Panel 14 – Dragonfly, Damselfly Nymphs – Moderate);
- ◆ Oligocheata (Panel 15 – Aquatic Earth Worm – Least).

⁵ According to the RBV protocol, only organisms in the voucher collection can be confirmed as present at the site.

⁶ Personal communication with Mike Beauchene, CT DEP, April 1, 2004

⁷ Reference statistics compiled and provided by Mike Beauchene, CT DEP, based on DEP collected data from high quality streams around the state, including the Natchaug River, Eightmile River, Sandy Brook, Salmon River, Saugatuck River, Green Fall River and Whitford Brook. Median percentages for each category are reported here.

In general, streams with representation from all RBV categories indicate good water quality.⁸ Based on the RBV organisms found, especially the high numbers of *most wanted* organisms, one can infer that all sites assessed have very good water quality. The relatively higher numbers of *most wanted* organisms at the Gages Brook site and Tunnel Road Tankerhoosen sites indicate that these sites approximate reference conditions and are considered to be fully supporting the criteria in the CT Water Quality Standards for aquatic life use.⁹

Included in the voucher collections were ten additional (non-RBV) organisms. Four ranged in tolerance value from 0-2 (*most wanted* in RBV terms); five ranged in tolerance value from 3 to 5 (*moderately wanted* in RBV terms); and the remaining one had a tolerance value of 6 (*least wanted* in RBV terms).

Differences between the results at the four sites are likely not significant, with the possible exception of the lower number of *most wanted* organisms at the Bolton Road and downstream Tankerhoosen sites; the higher percentage of *least wanted* organisms at the downstream Tankerhoosen site noted above, and; total diversity. As shown in Table 2, diversity (the number of different types of organisms found) varies between a high of 17 at the Tunnel Road Tankerhoosen site, and a low of 12 at the Bolton Road Tankerhoosen site.¹⁰ These differences in results may be due to sampling and observation techniques, as well as the level of care taken in ensuring that all types of organisms identified were included in the voucher collection; future rapid bioassessments will help determine whether they reflect actual differences in the benthic macroinvertebrate communities.

Table 3. Occurrence of different types of RBV and non-RBV organisms by site, with total diversity for each site (listed upstream to downstream by river)

| Site # | River | Location | RBV # | Non RBV # | Total # |
|--------|-----------------|--|-------|-----------|---------|
| HR7d | Gages Brook | Behind TAC at footbridge in Vernon | 12 | 3 | 15 |
| HR7b | Tankerhoosen R. | Bolton Road in Vernon | 10 | 2 | 12 |
| HR7a | Tankerhoosen R. | Tunnel Road in Vernon | 12 | 5 | 17 |
| HR7 | Tankerhoosen R. | Golfland, near confluence with Hockanum R. | 13 | 3 | 16 |

The Hockanum RBV results compare favorably with similar volunteer bioassessments done in 25 different rivers around the state. In fact, two of the sites—Gages Brook and the Tunnel Road Tankerhoosen site—are among the exceptional sites (those with 5 or more *most wanted* organisms), of which there are only four out of a total of 31 sites. The Gages Brook site is the only site assessed in 2003 with more than 5 *most wanted* organisms. As illustrated in the RBV 2003 summary report, *Rapid Bioassessment in Wadeable Streams and Rivers By Volunteer Monitors-Year 2003 Summary Report*, when all sites are sorted according to numbers of *most wanted* organisms, the Hockanum sites are at the top of the range with 4 to 6 *most wanted* organisms (45% of the RBV sites statewide fall in this range). According to the report, sites with 4 *most wanted* organisms lack the few extra types of organisms that make the sites with 5 or more exceptional, though they are likely in full support of the aquatic life standards.¹¹

⁸ Written communication from Mike Beauchene, CT DEP, November 2002.

⁹ *Rapid Bioassessment in Wadeable Streams and Rivers By Volunteer Monitors-Year 2003 Summary Report* (March 2004), CT Department of Environmental Protection

¹⁰ In general terms, the greater the number, the healthier the community.

¹¹ The RBV report is available on DEP's website, <http://www.dep.state.ct.us/wtr/volunmon/2003rbvsummary.pdf>

As seen in Tables 4 and 5 below, when comparing results from 2002 and 2003 at sites assessed in both years, a general decline can be seen in numbers of *most wanted* organisms and RBV organisms overall, a possible sign of a decline in water quality. The exception is the downstream Tankerhoosen site, where an increase is seen in *most wanted* organisms and the number of RBV organisms is the same, indicating a possible improvement. While these changes may be significant, they are more likely due to differences in sampling, observation and preservation techniques, perhaps related to the make-up of teams and level of experience of team members. Future assessments will help determine whether these are in fact real trends.

Table 4. Comparison of 2002 and 2003 *Most Wanted* RBV organisms by site (listed upstream to downstream)

| Site # | River | Location | Most Wanted RBV # | |
|--------|-----------------|--|-------------------|-----|
| | | | '02 | '03 |
| HR7b | Tankerhoosen R. | Bolton Road in Vernon | 6 | 4 |
| HR7a | Tankerhoosen R. | Tunnel Road in Vernon | 8 | 5 |
| HR7 | Tankerhoosen R. | Golfland, near confluence with Hockanum R. | 2 | 4 |

Table 5. Comparison of 2002 and 2003 RBV and non-RBV organisms by site, with total diversity for each site (listed upstream to downstream)

| Site # | River | Location | RBV # | | Non RBV # | | Total # | |
|--------|-----------------|--|-------|-----|-----------|-----|---------|-----|
| | | | '02 | '03 | '02 | '03 | '02 | '03 |
| HR7b | Tankerhoosen R. | Bolton Road in Vernon | 12 | 10 | 0 | 2 | 12 | 12 |
| HR7a | Tankerhoosen R. | Tunnel Road in Vernon | 17 | 12 | 2 | 5 | 19 | 17 |
| HR7 | Tankerhoosen R. | Golfland, near confluence with Hockanum R. | 13 | 13 | 3 | 3 | 16 | 16 |

RECOMMENDATIONS

The information collected from the 2003 Rapid Biological Assessment provides a baseline against which we can measure future changes, and also points to the need to conduct ongoing monitoring to refine results and validate conclusions. Overall the results of the assessment are positive, although a possible decline is seen at some sites in comparisons of the 2002 and 2003 results. These, coupled with threats to the Rivers' health identified in the stream walk surveys conducted in 1999 and 2000, point toward the need for river improvement and protection projects (some of which are underway). If these concerns and threats are not addressed in a timely way, water quality may be further affected. Continued monitoring will help to assess changes in water quality over time, and document improvements resulting from ongoing management and restoration activities.

As a follow-up to this year's monitoring effort in the Hockanum River watershed, general recommendations include:

- ◆ Conduct a Rapid Biological Assessment on an annual basis;
- ◆ Continue the collection of baseline information by conducting physical surveys of additional streams in the watershed;
- ◆ Follow up on stream walk survey data collected, as recommended in the 1999 and 2000 stream walk summary reports;
- ◆ Conduct additional river monitoring activities to assess in-stream health, including additional benthic macroinvertebrate surveys, and analysis of water samples for chemical, physical and biological indicators of water quality;
- ◆ Monitor river segments periodically to assess conditions. This could be accomplished through a stream segment adoption program whereby volunteers make visual observations on an annual basis and file a written status report.

For assistance and further information, please contact:

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Jesse Merriman
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Cooperating Organizations, Businesses and Municipalities

Hockanum River Linear Park Committee – Vernon: Special thanks to *Ann Letendre*, who helped schedule the bioassessment activity, made arrangements for the training facility, publicized the event and recruited volunteers, provided local input in the study design, and participated in the assessment.

Hockanum River Watershed Association: Special thanks in particular to members *Doug Smith and George Arthur*, for assistance in planning the biological assessment, recruiting volunteers, and performing the assessment.

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Connecticut Department of Environmental Protection: Special thanks to *Mike Beauchene*, who provided DEP input in the study design, trained volunteers, brought field equipment, assisted volunteers with the assessment work in the field, and reviewed results and performed the quality assurance checks on voucher collections.

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This project was funded in part by the Connecticut Department of Environmental Protection through a US Environmental Protection Agency Clean Water Act §319 non-point source grant.

Attachments

A – RBV Organism List

B – RBV Field Data Sheet

C – Site Map

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Attachment A – RBV Organism List

Rapid Bioassessment for Volunteers – Organism List

| RBV Panel # | Genus | Family | Order | Common Name | RBV Category | Tolerance Value |
|-------------|----------------------|--|---------------|-----------------------------|--------------|-----------------|
| 1 | <i>Drunella</i> | Ephemereillidae | Ephemeroptera | Body-Builder Mayfly | MOST | 0 |
| 2 | <i>Isonychia</i> | Isonychidae | Ephemeroptera | Minnow Mayfly | | 2 |
| 3 | <i>Epeorus</i> | Heptageniidae | Ephemeroptera | Flat-headed Mayfly | | 0 |
| 4 | | Peltoperlidae | Plecoptera | Roach-like Stonefly | | 0 |
| 5 | | Perlidae | Plecoptera | Common Stonefly | | 1 |
| 5 | <i>Pteronarcys</i> | Pteronarcyidae | Plecoptera | Giant Stonefly | | 0 |
| 5 | | Miscellaneous | Plecoptera | Stonefly | | 1 |
| 6 | <i>Apatania</i> | Limnephilidae | Trichoptera | Cornucopia Case Maker | | 0 |
| 6 | <i>Glossosoma</i> | Glossomatidae | Trichoptera | Mini-stone Case Maker | | 0 |
| 6 | <i>Rhyacophila</i> | Rhyacophilidae | Trichoptera | Michelin-Man Caddisfly | | 0 |
| 8 | <i>Brachycentrus</i> | Brachycentridae | Trichoptera | Mid-size Plant Case Builder | | 1 |
| 8 | <i>Lepidostoma</i> | Lepidostomatidae | Trichoptera | Mid-size Plant Case Builder | | 1 |
| 9 | | Hydropsychidae | Trichoptera | Common Netspinner | | MODERATE |
| 10 | <i>Chimarra</i> | Philopotamidae | Trichoptera | Fingernet Caddisfly | 3 | |
| 11 | <i>Stenonema</i> | Heptageniidae | Ephemeroptera | Flat-headed Mayfly | 4 | |
| 12 | <i>Psephenus</i> | Psephenidae | Coleoptera | Water Penny Beetle Larva | 4 | |
| 13 | <i>Corydalus</i> | Corydalidae | Megaloptera | Dobsonfly Larva | 6 | |
| 13 | <i>Nigronia</i> | Corydalidae | Megaloptera | Fishfly Larva | 4 | |
| 14 | | Aeshnidae Gomphidae Coenagrionidae | Odonata | Dragonfly, Damselfly Nymphs | 3 | |
| 15 | | Amphipod | Amphipoda | Scud | LEAST | 8 |
| 15 | | | Oligochaeta | Aquatic Earth Worm | | 9 |
| 15 | | Isopod | Isopoda | Sowbug | | 8 |
| 15 | | Simuliidae | Diptera | Black Fly Larva | | 6 |
| 15 | | | Hirudinea | Leech | | 8 |
| 15 | | Chironomidae | Diptera | Midge Fly Larva | | 6 |
| 15 | | | Gastropoda | Snail | | 7 |













Attachment B – RBV Field Data Sheet








Stream Name: _____ **Site number:** _____ **Collection Date:** _____ **Collection Time:** _____








Collection Location (up or downstream of a permanent landmark): _____ **Town:** _____

Approximate stream width: _____ **Approximate stream depth:** _____ **Collectors** _____

Comment or observation about the general condition of the stream: _____

| | | | | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Panel number | 1 | 2 | 3 | 4 | 5 | 5 | 5 | 6 | 6 | 7 | 8 | 8 |
| Name | Drunella | Isonychia | Epeorus | Peltoperlidae | Perlidae | Pteronarcys | Stonefly | Glossosoma | Apatania | Rhyacophila | Brachycentrus | Lepidostoma |
| |  |  |  |  |  |  |  |  |  |  |  |  |
| Kicks 1-2 | | | | | | | | | | | | |
| Kicks 3-4 | | | | | | | | | | | | |
| Kicks 5-6 | | | | | | | | | | | | |
| Total for Site | | | | | | | | | | | | |

| | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|
| Panel number | 9 | 10 | 11 | 12 | 13 | 13 | 14 |
| Name | Hydropsychidae | Chimarra | Stenonema | Psephenus | Corydalus | Nigronia | Odonata |
| |  |  |  |  |  |  |  |
| Kicks 1-2 | | | | | | | |
| Kicks 3-4 | | | | | | | |
| Kicks 5-6 | | | | | | | |
| Total for Site | | | | | | | |

| | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|
| Panel number | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Name | Amphipod | Isopod | Leech | Midge | Simuliidae | Snail | Worm |
| |  |  |  |  |  |  |  |
| Kicks 1-2 | | | | | | | |
| Kicks 3-4 | | | | | | | |
| Kicks 5-6 | | | | | | | |
| Total for Site | | | | | | | |

Instructions:

- Record few, some, or many for each of the types of organisms you collected during kicks 1&2, 3&4, 5&6, and total for the site. **FEW, SOME, & MANY are based upon the abundances of each type of organism in this sample only.**
- Place 1 of each type of organism you identified into a vial containing isopropyl alcohol.
- Place a pencil written label into the vial. Include, stream name, date of collection, collectors, and location of collection.
- Submit the vial and datasheet to:

Mike Beauchene
 (860) 424-4185
 mike.beauchene@po.state.ct.us

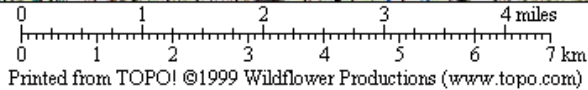
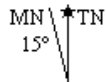
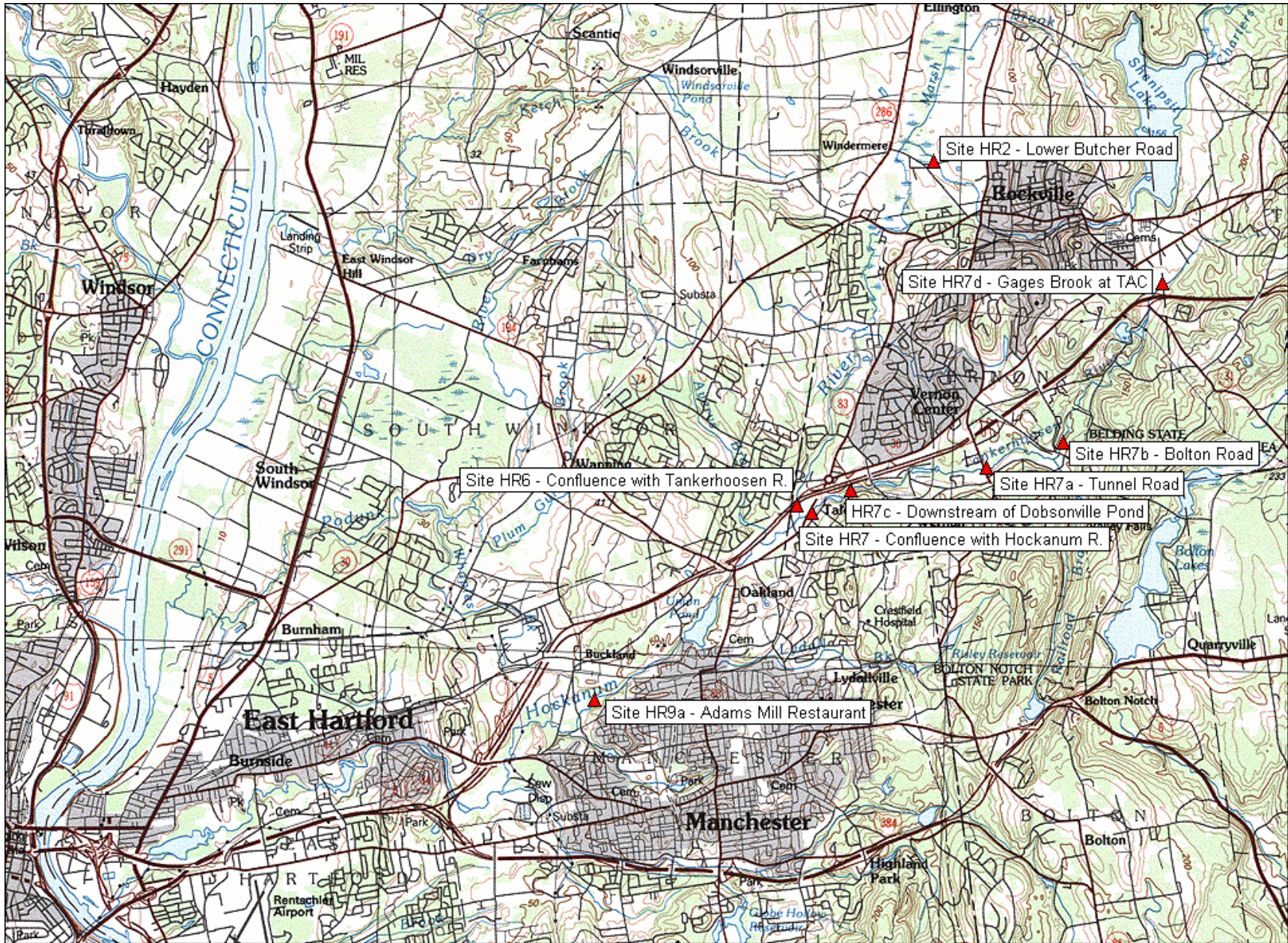


Most Wanted

Moderately Wanted

Least Wanted

Attachment C - Site Map



Attachment D – Hockanum River Rapid Bioassessment – Summary of Organism Data from 11/1/03

| RBV Panel # | Genus | Family | Order/Class | Common name | RBV Category | Tolerance Value | Gages Brook | Tankerhoosen River | | |
|-------------|----------------------|--|---------------|------------------------------|--------------|-----------------|-------------------------------|--------------------|-------------------|-----------------------------|
| | | | | | | | Footbridge behind TAC, Vernon | Bolton Rd, Vernon | Tunnel Rd, Vernon | At mouth (Golfland), Vernon |
| 4 | | Plecoptera | Plecoptera | Roach-like Stonefly | MOST | 0 | some | few | | |
| 5 | | Perlidae | Plecoptera | Common Stonefly | | 1 | many | few | many | some |
| 5 | <i>Pteronarcys</i> | Pteronarcyidae | Plecoptera | Giant Stonefly | | 0 | | | some | |
| 5 | | | Plecoptera | Miscellaneous Stoneflies | | 1 | | few | | some |
| 6 | <i>Apatania</i> | Limnephilidae | Trichoptera | Cornucopia Case Maker | | 0 | few | | some | |
| 6 | <i>Glossosoma</i> | Glossomatidae | Trichoptera | Mini-stone Case Makers | | 0 | many | | some | many |
| 7 | <i>Ryacophila</i> | Ryacophilidae | Trichoptera | Michelin-man Caddisfly | | 0 | many | few | some | |
| 8 | <i>Brachycentrus</i> | Brachycentridae | Trichoptera | Mid-size Plant Case Builders | | 1 | some | | | few |
| 9 | | Hydropsychidae | Trichoptera | Common Netspinner | MODERATE | 4 | many | some | many | many |
| 10 | <i>Chimarra</i> | Philopotamidae | Trichoptera | Fingernet Caddisfly | | 3 | few | many | many | many |
| 11 | <i>Stenonema</i> | Heptageniidae | Ephemeroptera | Flat-head Mayfly | | 4 | | many | | many |
| 12 | <i>Psephenus</i> | Psephenidae | Coleoptera | Water Penny Beetle Larva | | 4 | | | many | |
| 13 | <i>Nigronia</i> | Corydalidae | Megaloptera | Fishfly Larva | | 4 | | some | few | some |
| 14 | | Aeshnidae Gomphidae Coenagrionidae | Odonata | Dragonfly, Damselfly Nymphs | | 3 ¹ | few | some | few | |
| 15 | | | Isopoda | Aquatic Sowbug | LEAST | 8 | few | | | few |
| 15 | | | Hirudinea | Leech | | 8 | | | | few |
| 15 | | <i>Chironomidae</i> | Diptera | Midge Fly Larva | | 6 | | | few | few |
| 15 | | Simuliidae | Diptera | Black Fly Larva | | 6 | | | | few |
| 15 | | | Gastropoda | Snail | | 7 | some | | | |
| 15 | | | Oligochaeta | Aquatic Earth Worm | | 9 | some | few | some | few |

¹ The RBV protocol assigns these organisms an overall tolerance value of 3. The families found have the following tolerance values: Aeshnidae, 3; Gomphidae, 1; Coenagrionidae, 9.

Additional Organisms In Voucher Collection (not on RBV list)

| RBV Panel # | Genus | Family | Order | Common name | RBV Category | Tolerance Value | Gages Brook | Tankerhoosen River | | |
|-------------|------------------|-------------------|---------------|--------------------------------------|--------------|-----------------|-------------------------------|--------------------|-------------------|-----------------------------|
| | | | | | | | Footbridge behind TAC, Vernon | Bolton Rd, Vernon | Tunnel Rd, Vernon | At mouth (Golfland), Vernon |
| -- | | Odontoceridae | Trichoptera | Strong Case Makers | | 0 | X | | | |
| -- | | Ephemerellidae | Ephemeroptera | Spiny Crawler Mayflies | | 1 | | X | X | |
| -- | | Athericidae | Diptera | Aquatic Snipe Flies | | 2 | X | | X | |
| -- | | Ptilodactylidae | Coleoptera | Toed Winged Beetle Larva | | 2 | | X | | |
| -- | <i>Neophylax</i> | Uenoidae | Trichoptera | Uenoid Case Maker Caddisflies | | 3 | | | X | |
| -- | | Elmidae | Coleoptera | Riffle Beetle Larva | NA | 4 | X | | X | |
| -- | | Hydroptilidae | Trichoptera | Micro Caddisflies | | 4 | | | | X |
| -- | | Baetidae | Ephemeroptera | Small Minnow Mayfly Larva | | 4 | | | | X |
| -- | | Planariidae | Turbellaria | Flatworm | | 4 | | | | X |
| -- | | Polycentropodidae | Trichoptera | Trumpetnet & Tube-making Caddisflies | | 6 | | | X | |