



# PROPOSAL FOR AQUATIC INVASIVE SPECIES MANAGEMENT IN THE HOUSATONIC RIVER

HOUSATONIC RIVER NATURAL RESOURCE DAMAGES FUND  
MASSACHUSETTS WATERSHED  
EEA 09 NRD 02

Prepared for:

Housatonic River NRD Fund  
Stantec Consulting  
30 Park Drive  
Topsham, ME 04086

Prepared by:



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Wellesley, MA 02482

In Association with:



Housatonic Valley Association  
PO Box 251  
1383 Route 102  
South Lee, MA 01260

May 5, 2009

ESS Proposal No. 13724





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SPECIES MANAGEMENT IN THE HOUSATONIC RIVER  
Housatonic River Natural Resource Damages Fund  
Massachusetts Watershed  
EEA 09 NRD 02

*Prepared For:*

Housatonic River NRD Fund – Project Proposal  
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**HOUSATONIC RIVER NATURAL RESOURCE DAMAGES FUND  
 ROUND 2, 2008  
 Massachusetts SubCouncil**

**Project Proposal Form**

**PART A. APPLICANT AND PROJECT INFORMATION.**

Responses may be entered electronically, saved, and printed. Or, print and complete form with black ink.

**APPLICANT INFORMATION**

**Type of Entity** Check the box that best describes the applicant.

- |  |   |
|--|---|
| <input type="checkbox"/> Private individual      | <input type="checkbox"/> Municipal government               |
| <input type="checkbox"/> Non-profit organization | <input checked="" type="checkbox"/> Corporation or Business |
| <input type="checkbox"/> State government        | <input type="checkbox"/> County government                  |
| <input type="checkbox"/> Federal government      | <input type="checkbox"/> Academic Institution               |
| <input type="checkbox"/> Tribal government       | <input type="checkbox"/> Other (explain)                    |

**Authorized Representative of Applicant**

Carl Nielsen

Name

Senior Water Resources Scientist

Title

ESS Group, Inc.

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Address

Welleslev.	Massachusetts	02482
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City

State

Zip

Phone:

401-330-1224

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**Contact Person (if different)**

Name

Title

Address

Address

City

State

Zip

Phone:

Email:

---

**Project Name** Provide a brief working name:

Aquatic Invasive Species Management in the Housatonic River

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**Project Location**

Attach an 8.5 x 11-inch map or copy of an aerial photograph showing project location and extent. Include pertinent topographic and geographic information, a scale, and north arrow.

State(s), Municipality/ies:

Longitude for approximate center of project area:

Latitude for approximate center of project area:

---

**Restoration Priority Category** See instructions for category descriptions.

Primary Category. Check one box.

- Aquatic Biological Resources and Habitat  
 Wildlife Resources and Habitat

Secondary Categories. Check all relevant boxes.

- Aquatic Biological Resources and Habitat  
 Wildlife Resources and Habitat  
 Recreational Uses  
 Environmental Education and Outreach

---

**List Specific Injured Natural Resources and/or Impaired Natural Resource Services to Benefit from Project** (see Section 1.2 of the Restoration Project Selection Procedure for a summary of injuries)

Aquatic biological resources and habitat were damaged by the release of PCBs to the Housatonic River. This, in turn, has damaged recreational fishing. This project is needed to exclude the zebra mussel, quagga mussel, spiny water flea, fishhook water flea, and rock snot (*Didymo*) from the Housatonic River system. These aquatic invasives have been documented as close as the Housatonic River watershed itself (e.g., zebra mussels in Schenob Brook/Twin Lakes of Salisbury, Connecticut) and will exacerbate the damage to the Housatonic River should they become established. Fishhook and spiny water fleas threaten fishery resources by altering plankton communities. Rock snot threatens coldwater tributaries that are essential to trout reproduction. Zebra and quagga mussels threaten fish and wildlife resources, rare native mussel populations, and human health and recreation through alteration of food webs, smothering of native mussels, and bioaccumulation of PCBs, respectively.

**Project Type** See instructions for project type descriptions. Check all relevant boxes.

Resource-based

Access-based

Maintenance-based

**Project Budget Summary**

Complete the table below to summarize the budget information that is detailed in Part E: Project Budget. Applicants are advised to complete Part E of the proposal (Project Budget) before filling in the boxes below.

Housatonic River NRD Fund – Requested	Other Contributions Cash or In-Kind (Committed)	Other Contributions Cash or In-Kind (Not Committed)	Total Project Cost (boxes 1+2+3)
1. \$144,100	2. \$7,000	3. \$17,000	4. \$168,100
<b>Amount of Other Contributions to Be Considered as Cost-Share to NRD Fund Request (boxes 2+3)</b>			
			5. \$24,000

**Authorizing Statement**

I hereby declare that the information included in this project proposal and all attachments is true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local, and federal laws and regulations.

  
 \_\_\_\_\_  
**Signature of Applicant or Applicant Representative**

\_\_\_\_\_  
 5/5/09  
**Date**

## PART B PROJECT ABSTRACT

The release of PCBs to the Housatonic River resulted in extensive damage to aquatic biological resources, recreational resources and public perception. Additionally, damage was extended to wildlife through bioaccumulation of PCBs up the food chain to terrestrial predators. The ultimate success of recovery efforts related to each of these damaged resources will be severely hampered or even imperiled by the spread of aquatic invasive species within the Housatonic River watershed.

The proposed project will prevent the spread of aquatic invasive species within the Housatonic River watershed. The proposed project focuses on those invasive species that are not yet targeted by the Massachusetts DCR Weed Watchers program and/or have the potential to significantly alter food webs, should they become established in the Housatonic River watershed. Species that will be targeted by this project include the following:

- Zebra and quagga mussels - threaten fish and wildlife resources, rare native mussel populations, and human health and recreation through smothering of native mussels, alteration of food webs, and bioaccumulation of PCBs;
- Fishhook and spiny water fleas - threaten the already damaged fishery resources by altering planktonic communities (food webs); and
- Rock snot (*Didymo*) - threatens pristine coldwater tributaries by smothering instream substrates and encouraging shifts in the macroinvertebrate community, both of which are essential to trout reproduction.

Each of these species is literally on the doorstep of the Housatonic River watershed and threatens to exacerbate the damage done to aquatic biological, terrestrial wildlife, and recreational resources. One species, the zebra mussel, has *already been found* within the Housatonic River watershed. The Nature Conservancy has documented the zebra mussel in both the Twin Lakes of Salisbury, Connecticut and Schenob Brook, which drains northeast into the Housatonic River in Sheffield, Massachusetts (Nature Conservancy, 2006).

The ESS/HVA approach will be to implement a sustainable and comprehensive monitoring and prevention network that addresses aquatic invasive species threats specific to the Housatonic River and is integrated with current early detection and rapid response programs at the state level. By setting up a first line of defense against aquatic invasive species, the biological integrity and recreational value of the Housatonic River can be preserved for current and future generations of stakeholders.

The sites chosen for inclusion in the monitoring program will be based both on risk and potential for sustainability through support of local non-profits, private organizations, and governmental agencies. We will use available geographical distributions of the species in question, patterns of recreational boating and fishing, and knowledge of each species' ecological preferences to target high-risk locations to establish permanent monitoring stations throughout the watershed. Through outreach and education efforts and purchase of dedicated monitoring kits for volunteer groups, the ESS/HVA team will set up a

volunteer and community-based, sustainable monitoring and action network to prevent the spread of aquatic invasive species into the Housatonic River watershed.

This project will directly benefit aquatic life, including fishery resources and rare and threatened invertebrates. Additionally, it will also benefit predatory mammals, reptiles, and birds that are at-risk for problems associated with bioaccumulation of PCBs and other contaminants in the food chain. Key recreational uses, including fishing, also stand to benefit from this project. Furthermore, benefits of the project will likely be shared with industries that depend on the river for power generation or as a source of water. By preventing the spread of zebra and quagga mussels, this project will help prevent clogging of intakes and other structures that would otherwise result in costly direct control measures for these facilities.

The project will cost \$144,100 in NRD funds and will be completed within 28 months of funding.

Project tasks include:

1. Coordination with regional, state, and interstate agencies to integrate and standardize the monitoring protocols and education program;
2. Invasion risk assessment for each targeted aquatic invasive species throughout the watershed;
3. Baseline invasive species monitoring of 30 lake, pond, and stream sites throughout the watershed;
4. Purchase of up to six invasive species field monitoring kits and three lab kits;
5. Presentation of up to four regional workshops to enlist and train citizen and volunteer groups;
6. Development and distribution of educational materials within the watershed;
7. Development and implementation of an ongoing monitoring network and program (including one year of oversight by ESS/HVA);
8. Annual reporting and final project summary report.

## PART C PROJECT NARRATIVE

### 1. List Project Goals and Objectives

The primary goal of this project is to avoid subsequent impact to the PCB damaged aquatic biological and recreational resources of the Housatonic River by preventing the spread of encroaching aquatic invasive species, including the zebra mussel (*Dreissena polymorpha*), quagga mussel (*D. bugensis*), fishhook water flea (*Cercopagis pengu*), spiny water flea (*Bythotrephes longimanus*), and rock snot (*Didymosphenia geminata*). The best approach to achieve this goal will be to implement a sustainable and comprehensive monitoring and prevention network that addresses aquatic invasive species threats specific to the Housatonic River and is integrated with current early detection and rapid response programs at the state level. By setting up a first line of defense against aquatic invasive species, the biological integrity and recreational value of the Housatonic River can be preserved for current and future generations of stakeholders.

### 2. Project Benefits

The invasive aquatic species covered by the scope of this project *imminently* threaten to exacerbate the damage done to aquatic and terrestrial food webs by the release of PCBs into the Housatonic River, due to geographic proximity and/or rapid rate of range expansion. Once populations of these species are established in a water body, there is no accepted, legally permissible method to actively control or eradicate them. Therefore, the *only* effective way to manage these species is by preventing their spread within the Housatonic River. This project will set up a first line of defense to prevent the spread of these species into the Housatonic River, directly benefiting aquatic life, including fishery resources and rare and threatened invertebrates. It will serve as a major advancement in the invasive species early warning system for communities within the Housatonic River watershed and subsequently at the state and regional level. Additionally, it will also benefit predatory mammals, reptiles, and birds that are at-risk for problems associated with bioaccumulation of PCBs and other contaminants in the food chain. Bioaccumulation is a particular risk with filter feeding zebra and quagga mussels, which essentially accelerate bioaccumulation by making concentrated amounts of PCBs more available to favored prey species in aquatic ecosystems (Bruner et al, 1994). These prey species are consumed by larger invertebrates, fish, or birds which may in turn be consumed by higher-level predators up the food chain (including humans) and result in an accumulation of PCBs in fatty tissues. Compounding the risk associated with bioaccumulation is that this process mobilizes PCBs through the organisms that have consumed them. This means that PCBs that were once essentially contained in a small area will more easily be able to travel both up and down the Housatonic River and even into the terrestrial environment.

Due to its proximity to the Great Lakes and Hudson River (major entry points for aquatic invasive species), its abundant and popular ponds, and its calcium-rich waters, the Housatonic River is at high risk for introductions of devastating aquatic invasive species. Additionally, the location of the Housatonic River watershed on Massachusetts' western border means that there is no political buffer between it and surrounding states with already infested waters (Vermont, New York, and Connecticut). Recreation at public access points, including those funded as part of the "Enhancement of Public Access to the Housatonic River" project during Round I of the NRD Restoration funding, will also benefit from the public outreach and education components of this project, which will enhance safe recreation while minimizing

the risk of introducing aquatic invasive species. Fishing, in particular, will benefit as a direct consequence of instream habitat preservation and protection of key food webs in the Housatonic River, its impoundments and its tributaries.

All of these benefits are anticipated to be viewed with approval from key state agencies, including the Massachusetts Department of Conservation and Recreation (MassDCR), the Massachusetts Department of Environmental Protection (MassDEP), and the Natural Heritage and Endangered Species Program (NHESP) of the Massachusetts Department of Fish and Game. Furthermore, the benefits of the project will likely be shared with industries that depend on the river for power. By preventing the spread of zebra and quagga mussels, this project would help prevent clogging of intakes and other structures that would otherwise result in costly and sometimes environmentally disruptive direct control measures for these facilities.

### 3. Project Implementation Plan

#### a. Brief Description of Overall Approach to Project Implementation

Lakes and ponds are most likely to be the stage from which future invasions of zebra mussel, quagga mussel, spiny water flea and fishhook water flea will launch into the Housatonic River. This is due to the increased risk of introduction associated with motorized boat traffic and other recreation at many of these water bodies. Once these species have become established in a lake or pond, they are likely to spread quickly downstream, colonizing available in-line habitat in the mainstem of the Housatonic River. Likewise, rock snout is most likely to be introduced at access points on coldwater streams. As with the other species of interest, rock snout can naturally spread in the downstream direction once it has become established in a tributary. Therefore, it is imperative that a strong and regionally integrated monitoring network be facilitated to prevent the spread of these species into any of the waters in the Housatonic River watershed.

The ESS/HVA team proposes to establish such a monitoring network through the following steps:

1. Establishing protocols for monitoring, tracking, and reporting invasive species that can be made available to the appropriate state agencies for review and comment
2. Conducting a season of monitoring at targeted locations throughout the watershed to establish a baseline dataset.
3. Identifying and training "steward groups," which may include citizen groups, municipalities, and private organizations within the watershed to take ownership of future monitoring responsibilities at discrete locations. Non-profit groups would be equipped with monitoring kits and educational materials to undertake their responsibilities. Private organizations would be encouraged to make in-kind contributions to the effort by purchasing their own monitoring kits.
4. Overseeing a season of monitoring conducted by steward groups and assisting with continued outreach to Housatonic River stakeholders and users.

5. Evaluating the success of the monitoring program and providing guidance for future success and sustainability.

The proposed approach is described in further detail on a task-by-task basis in the following sections.

#### Task 1

The ESS/HVA team will meet/coordinate with representatives from local, state, and regional agencies/organizations to integrate the proposed aquatic invasive species monitoring and education program with existing efforts. This will help ensure that the geographic coverage, monitoring methods, and overall message of the proposed program are complementary to and compatible with that of existing programs, as much as practical. One of the keys to successful invasive species education and outreach is standardization of symbols, logos, messages, and methodologies across broad geographic areas so that all visitors - especially those from outside the local area - will quickly recognize important messages associated with aquatic invasive species prevention programs. Therefore, the proposed project will work within the existing framework set up by local, state, and regional agencies/organizations as much as practicable.

This initial coordination will help bring legitimacy to the proposed program by establishing early contacts with state and local agencies and organizations that will be able to make use of the data or other services it generates. Additionally, this will also serve as an opportunity for the ESS/HVA team to gather existing data for incorporation into later tasks.

#### Task 2

The ESS/HVA team will perform an initial screening of the water bodies proposed for monitoring (see supporting documentation in Part b of Section 7) of targeted aquatic invasive species based principally on risk of invasion, connectivity to the Housatonic River, and accessibility (with the understanding that greater accessibility raises the risk of invasion). Given the working familiarity of the ESS/HVA team with the water bodies proposed, screening will be conducted mostly as a desktop analysis based on existing invasive species distribution, water quality, and recreation data. Additionally, the ESS/HVA team will consult with state and local agencies and organizations including MassDCR Lakes and Ponds, the Massachusetts Division of Fisheries and Wildlife (MassWildlife), municipalities, lake and pond associations, and potentially other conservation agencies/organizations to ensure sufficient coverage of the most popular recreational access points. However, visits to sites on some of the water bodies proposed for monitoring may be necessary to confirm the feasibility of including them in the monitoring program.

Up to thirty (30) sites will be chosen for incorporation into the monitoring program. Of these, the target distribution of selected monitoring sites will consist of 30 percent on the Housatonic River or its impoundments, 40 percent on lakes and ponds in the watershed, and 30 percent on coldwater tributaries. This distribution reflects the need to focus sufficient attention on the most likely sources for each target species. However, the actual distribution of final monitoring sites will remain flexible, in order to account for any significant range expansions of the target species within the Housatonic River watershed prior to implementation of the monitoring program.

### Task 3

Once the monitoring sites have been selected, the ESS/HVA Team will conduct a sampling campaign to establish baseline conditions and assess the presence of any target aquatic invasive species at each of these sites. The presence of any non-target aquatic invasive species will also be noted. Two rounds of sampling are planned to take place mainly between June and October, when the target organisms are likely to be most abundant.

Sampling for zebra and quagga mussels will focus on the larval, or veliger, stage which is planktonic (suspended in the water column). The focus of on early life stages of these species will allow detection and assessment of invasions even before these species become firmly established in a water body. Sampling will be conducted with a fine mesh plankton net to capture both zebra and quagga mussel veligers as well as the larger fishhook and spiny water flea. Because introductions of these species are most likely to be sourced from lakes and ponds, active collection of plankton samples will focus on monitoring sites in these habitats as well as stream habitats that are located downstream from lakes or ponds.

Sampling for rock snot will involve field assessment of stream habitat and a rapid assessment of periphyton at each monitoring site. In addition periphyton (attached algae) samples will be collected from natural substrates, preserved, and returned to the lab for processing and analysis. Rock snot sampling will focus on streams, with an emphasis on coldwater fishery resource waters, which are the habitats most likely to be loci of invasions.

All samples will be adequately preserved in the field and processed in the lab by ESS. Positive identifications of any target invasive species will be immediately reported to the appropriate state office/s and voucher specimens will be submitted upon request.

The results of the baseline monitoring will be mapped using Geographic Information System (GIS) software and incorporated into a geodatabase, which will then be made available to state agencies, such as the MassDCR Lakes and Ponds Program, MassWildlife, and MassDEP. GIS shapefiles generated during this task will be compatible with MassGIS (currently NAD83 Massachusetts State Plane Coordinate System, Mainland Zone [meters]).

The ESS/HVA team will use clean sampling techniques to ensure that any invasive species present at the monitoring sites are not spread through the monitoring program itself. Where possible, this will involve coordination with individual lake and pond associations to use local watercraft that do not travel between water bodies. In addition, the ESS/HVA team will adhere to operating protocols that allow for thorough disinfection of all sampling equipment and in-water gear (e.g. boats, waders) prior to sampling at a different location. Disinfection may include drying, freezing, washing, or chemical treatment of equipment or any combination of these.

### Task 4

The ESS/HVA team will provide ready-to-use aquatic invasive species monitoring kits to the monitoring program. HVA will serve as head steward of the monitoring kits and program and will coordinate the transfer of stewardship to citizen groups or other organizations within the Housatonic River watershed.

In all, up to six invasive species field monitoring kits will be purchased on behalf of monitoring program steward groups. Each kit will include all non-personal field equipment (Global Positioning System [GPS] units, sample containers, field sheets, preservative, nets, disinfectant, laminated operating protocols, and associated supplies) necessary for collection of aquatic invasive species monitoring samples.

In addition to the purchase of field kits, the ESS/HVA team will also purchase up to three lab processing kits on behalf of monitoring program steward groups. These kits will include high-power dissecting microscopes, processing supplies, and digital cameras. This will allow steward groups to perform initial screenings of collected samples, reducing the need for them to send or deliver each sample to state officials or other experts. By including digital cameras in the lab processing kit, photographs of suspected target species may be instantly sent to state agencies. This will allow for faster response from state officials to suspected infestations.

All kits will be packed in reusable containers for portability and protection of the equipment.

#### Task 5

The ESS/HVA team will deliver up to four workshops to train local citizen and volunteer groups in the methods used to collect and process aquatic invasive species monitoring samples. As part of a previous project with MassDCR Lakes and Ponds, ESS delivered an initial zebra and quagga mussel monitoring workshop to members of COLAP/LAPA-West in May 2008 and will build on the sampling and record-keeping skills that were introduced at that time. The workshops will be held in different locations in order to allow those from all parts of the watershed to participate.

Training sessions will include an introduction to each of the target aquatic invasive species as well as hands-on sampling demonstrations. Attendees will learn why each target species is a threat to the Housatonic River, how to identify these species, as well as how to conduct outreach to other users and stakeholders. Attendees with particular interest or expertise in conducting field monitoring for aquatic invasive species will receive additional training on how to use, maintain, and properly clean sampling and lab equipment.

In addition to receiving hard copies of the educational materials used in each workshop, complete electronic copies of workshop presentations will be distributed to attendees so that they are equipped to, in turn, spread the message about aquatic invasive species in the Housatonic River. These will be designed so that workshop participants have everything they need to educate others on aquatic invasive species, including step-by-step guidance on how to deliver their own presentation or workshop to their friends, organizations, or neighbors. In this way, the project will seek to generate a "ripple effect" of awareness and action against aquatic invasive species in the Housatonic River watershed.

#### Task 6

The ESS/HVA team will work together to design and produce educational signage for posting at access points determined to be at high risk for invasion. It is currently anticipated that 30 signs (i.e., one sign per monitoring site) will be produced and installed. However, this number may be increased or decreased somewhat depending on actual conditions at the time that project work moves forward. For instance, some lakes and ponds with multiple access points may benefit from additional signage. In cases where

signage regarding target species is already present, the HVA/ESS team will avoid duplication of messages and efforts by evaluating the content of the sign in question and, if an update is deemed necessary, consulting with the sign sponsor to gain approval for sign replacement. If no update is considered necessary at the site in question, signage will not be purchased for that site.

Metal signs are expected to provide the most durable and cost-effective solution while still permitting the use of graphics in their design. These have been used with success by MassDCR Lakes and Ponds. However, other materials may be considered, as appropriate to local site constraints. The ESS/HVA team will oversee installation of the signs for compliance with applicable ordinances and to ensure the visibility of other signs (if extant) at each site is not compromised. Signage will be installed with permission from the landowner and in accordance with all applicable local and state ordinances and regulations. As part of the effort to standardize invasive species educational signage within and beyond the Housatonic River watershed, the ESS/HVA team anticipates incorporation of free, branded logos such as the "Stop Aquatic Hitchhikers!" campaign materials from Protectyourwaters.net. These logos are used on signage and educational materials by many other agencies and organizations across the Northeast.

Additional educational materials to be produced include brochures and fact sheets, both electronic (for posting on websites of partner organizations) and hard copy. The ESS/HVA team will guide and assist steward groups in the distribution hard copy brochures to their membership as well as the public at targeted monitoring locations.

The ESS/HVA team anticipates developing one brochure that details how users of the Housatonic River watershed can help prevent the spread of target aquatic invasive species. Additionally, one fact sheet will be developed for each target species, for a total of five fact sheets. The number of brochure and fact sheet hard copies to be printed is flexible and can be adjusted to account for differences in demand. However, the current budget anticipates that the program will be able to use 2000 copies of the brochure and 1000 copies of each fact sheet. As part of public outreach efforts, the ESS/HVA team will also distribute electronic copies of these fact sheets to key citizen groups throughout the watershed for posting on their websites.

### Task 7

The ESS/HVA team will work with identified monitoring stewards to transfer responsibility for long term monitoring to these entities. ESS and HVA will provide oversight of the program, which is anticipated to include accompanying volunteers on field monitoring events to ensure adequate conformance with standard operating protocols, including operation and disinfection of all field equipment. Additionally, the ESS/HVA team will assist with data management and quality control/quality assurance measures for field collection and lab processing of samples. At the end of Project Year 2, the ESS/HVA team will conduct an evaluation of program success as measured by participation, distribution of educational materials, commitment of steward groups to continue with future monitoring, and establishment of clear communication pathways with state and local government. If target species are detected at any time during the project, program success can also be measured by response to and containment of the infestation. Results of this evaluation will be used to guide the project in Project Year 3 and beyond.

Task 8

The ESS/HVA Team will submit annual reports prior to the end of each fiscal year to keep the Trustees informed of progress made on the project. This will include a brief narrative describing progress on a task-by-task basis as well as a summary of results in tabular format. The presence of target invasive species at any monitoring site will be noted and accompanied by a record of actions taken in response (e.g., reporting to appropriate state agencies).

The ESS/HVA Team will submit a final report prior to the end of Fiscal Year 3. The final report will summarize the results of the baseline monitoring program (Project Year 1) and the success of setting up an effective and sustainable volunteer/citizen monitoring network during Project Years 2 and 3. An evaluation of the monitoring program during Project Year 2 will accompany a narrative of the recommendations for subsequent years of the program. Relevant outcomes and successes of the project will be detailed. All GIS files developed for this project will be submitted with the final report. Additionally, electronic copies of all educational materials developed as part of the project will be included as an appendix to the final report.

b. Project Schedule

Although some of the groundwork on this project has already been completed, funding will be needed to advance the project further. The ESS/HVA Team has the resources to immediately begin working on tasks scoped in this proposal upon release of funding. The overall completion time for the project is anticipated to be 28 months.

Task	Anticipated Completion*		
	Date	Fiscal Year	Project Year
1. Coordination with regional, state, and interstate agencies	June 2011	FY2	2
2. Invasion risk assessment for each targeted aquatic invasive species throughout the watershed	June 2010	FY1	1
3. Baseline invasive species monitoring of 30 lake, pond, river, and stream sites throughout the watershed	December 2010	FY2	1
4. Purchase of up to six invasive species field monitoring kits and three lab kits	June 2011	FY2	2
5. Presentation of up to four regional workshops to enlist and train citizen and volunteer groups	June 2011	FY2	2
6. Development and distribution of educational materials within the watershed	June 2011	FY2	2
7. Development and implementation of an ongoing monitoring network and program (including one year of oversight by ESS)	June 2012	FY3	3
8. Annual reporting and final project summary report	June 2012	FY3	3

\* Assumes a March 2010 funding of the project

### c. Major Project Phases and Milestone Tasks or Activities

As described above in parts a and b of Section 3, the project consists of eight project phases, or tasks. These tasks will be completed in accordance with the schedule set forth in section b above and include all planning and monitoring activities necessary to meet the goals of the project. This is a multi-year project that will be completed in accordance with the schedule set forth in the table above in part b of Section 3.

### d. Property Access Agreements, Easements, Rights-of-Way, or Other Agreements

In most cases, property access is not expected to be an issue because the monitoring program will focus on public access points. Where private property must be crossed to obtain access to a monitoring location, the ESS/HVA team will work on a case-by-case basis with the property owner. If, after contacting the property owner, access cannot be gained to a site, the ESS/HVA team will consider the next available access point *downstream* and work with that property owner, as necessary, to obtain access for monitoring.

### e. Measures to Ensure Long-Term Effectiveness and Sustainability

The ESS/HVA Team will work with established organizations within the Housatonic River watershed that have a significant stake in the success of the proposed project. Many of these organizations are already conducting some kind of monitoring within their sphere of interest and are well-positioned to take ownership of the monitoring program over the long term. By providing the necessary equipment, training, and initial oversight the ESS/HVA team will ensure the sustainable success of the proposed monitoring program.

HVA is committed to enlisting the help of volunteers to assist with site monitoring. HVA will also act as head steward of the monitoring kits and facilitate communication among steward groups after the funded period of the project has come to an end.

### f. Coordination/Integration with Other Restoration Activities

The ESS/HVA team is extremely knowledgeable about a wide variety of ongoing and planned restoration activities for the Housatonic River watershed. The local presence of HVA within the watershed will allow the project team to easily network with stakeholders as the project progresses. Monitoring for aquatic invasive species will be simple to coordinate at most sites and may be strategically integrated to take advantage of new improvements, including the new public access points to be constructed as part of the "Enhancement of Public Access to the Housatonic River" project, which was funded by Housatonic River Natural Resources Damage Round I funds.

### g. Proposed Project and Existing Plans

The Massachusetts Department of Conservation and Recreation Lakes and Ponds Program (MassDCR Lakes and Ponds) oversees invasive species early detection and rapid response planning in lakes and ponds of the Commonwealth. The Program continues to support implementation of an invasive species monitoring, outreach and education program in the Berkshire region. The calcareous surface waters in the Housatonic River watershed provide unique habitat for many species of plants and animals that are not found in the softer waters of central and eastern Massachusetts. Unfortunately, this same feature

makes the watershed more susceptible to invasion from the numerous exotic species currently found in the Great Lakes region. Additionally, due to its significant coldwater fisheries resources, the Housatonic River watershed is susceptible to invasion by rock snot, which could be introduced by out-of-state anglers or even local anglers who have taken fishing trips to infested areas in North America or beyond.

The proposed project would be consistent with the goals of state agencies, but would not be limited by some of the restrictions that the state must meet. This would allow the project greater flexibility to address aquatic invasive species issues in a critical watershed. The ESS/HVA Team would communicate directly with MassDCR Lakes and Ponds and other state agencies to coordinate efforts on this project with those funded by the Commonwealth. Duplication of efforts in monitoring, education, and outreach will be avoided throughout the duration of the proposed project.

#### 4. Technical/Technological Feasibility

This project will employ accepted techniques for the implementation of watershed improvement projects designed to benefit the public.

##### a. Description of Methods Used for Major Tasks

Methods are described on a task-by-task basis in Section 3 (Implementation Plan). Additional detail of sampling methods will be provided to steward groups during workshops and reinforced as part of the monitoring oversight that the ESS/HVA team will provide.

##### b. How Approach/Method Has Been Successful for the Housatonic River Watershed or Elsewhere

The approach proposed in the ESS/HVA team approach has been successfully implemented to monitor and control the same target aquatic invasive species across the nation and even as far away as New Zealand. The state of Wisconsin, through its Department of Natural Resources and the University of Wisconsin Extension, has a particularly thorough, citizen-based monitoring program. Massachusetts has begun to implement similar techniques as part of its zebra and quagga mussel annual monitoring, education and outreach efforts. Major programs advocate monitoring and prevention (through outreach and education) as the preferred control methods for the species targeted by the proposed project. Therefore, this is the approach that the proposed project will take.

Work is currently being done to allow the use of DNA analysis to identify low level presence of rock snot in a stream (Cary et al., 2007). This method appears to be gaining scientific acceptance but has not yet been thoroughly tested in North America and requires sampling and processing techniques that may be difficult to implement among volunteer monitors. Likewise, in New Zealand, some novel approaches to the control of rock snot have been explored, including application of copper sulfate and other chemicals. Although some of these approaches have met with success on a very small scale, none is currently recommended for eradication of rock snot over an entire stream bed. Therefore, at this time, monitoring and prevention remain the only effective methods for rock snot control. The proposed project will take an approach consistent with established methods.

c. Certainties and Uncertainties with Innovative Approaches

This project will not employ techniques that rely on unproven or innovative approaches.

d. Other Technical/Technological Feasibility Uncertainties

There are no known technical/technological feasibility uncertainties associated with this project.

e. Potential Technical/Technological Complications

No technical/technological complications are foreseen for this project.

5. Monitoring/Evaluation and Contingency Plan

a. Monitoring and Evaluation Methods

The ESS/HVA team will monitor progress of the proposed project toward key goals and objectives. The parameters currently proposed for measurement of the progress toward each objective are detailed below.

Goal	Objective	Parameter(s) to Be Measured	Target Value
Avoid subsequent impact to the PCB damaged resources of the Housatonic River by preventing the spread of encroaching aquatic invasive species, including the zebra mussel, quagga mussel, fishhook water flea, spiny water flea, and rock snot.	<i>Structural:</i> Establish watershed-wide monitoring program for target aquatic invasive species	Number of sites monitored	30
		Number of monitoring events per year	2
	<i>Functional:</i> No new infestations of target species at monitoring sites	Number of new (post-baseline) infestations	0
	<i>Educational/Outreach:</i> 1. Identify and educate steward groups to take on long-term monitoring at sites.	Number of steward groups	6
		Number of monitoring sites adopted per group	5
		Number of workshops delivered by the ESS/HVA team	4
	<i>Educational/Outreach:</i> 2. Provide signage at each monitoring site to educate users on how to reduce the risk of transferring target aquatic invasive species.	Number of signs posted at access points	30

As part of the monitoring and evaluation process, the ESS/HVA Team will submit reports prior to the end of each fiscal year to keep the Trustees informed of progress made on the project. This will include a brief narrative describing progress on a task-by-task basis as well as a summary of results in tabular format. The presence of target invasive species at any monitoring site will be noted and accompanied by a record of actions taken in response (e.g., reporting to appropriate state agencies).

The ESS/HVA Team will submit a final report prior to the end of Fiscal Year 3. The final report will summarize the results of the baseline monitoring program (Project Year 1) and document the transfer of monitoring responsibilities to the long term stewards during Project Year 2. An evaluation of the monitoring program during Project Year 2 will accompany a narrative description of the recommendations made for subsequent years of the program. Relevant outcomes and successes of the project will be detailed. All GIS files developed for this project will be submitted with the final report. Additionally, electronic copies of all educational materials developed as part of the project will be included as an appendix to the final report.

#### b. Data Collection

Data collection is a principal component of the monitoring program described in this proposal. In addition to field-based collection of aquatic invasive species data, the ESS/HVA team will also collect qualitative data from program participants to help evaluate the success of the project.

#### c. Contingency Plan

Due to the nature of biological invasions, the ESS/HVA team understands that flexibility will be important to the success of aquatic invasive species control in the Housatonic River and its watershed. As such, the team is prepared to address contingencies that may arise as the project progresses.

The most obvious contingency that may arise is the detection of one or more target species in the watershed during the duration of the proposed project. If a target species report comes from within the monitoring program, the ESS/HVA team will inform and consult with the appropriate state agencies to initiate the state's rapid response program. The key objective under this scenario would likely be to monitor and delineate the zone of natural dispersal in the downstream direction and then focus on containment of the target species within this zone through enhanced outreach and education at access points.

Depending on the approach taken by the state, the proposed monitoring project may find it advantageous to increase the coverage or frequency of monitoring and outreach to recreational users near or downstream of the site of first detection. This could be accomplished without altering the project budget by increasing volunteer sampling effort or temporarily suspending/reducing the level of monitoring at sites that are upstream of or distant from the site of first detection.

Other contingencies are unlikely to arise, as progress toward other key project objectives can be controlled internally. Additionally, the project already has support from the non-profit, public, and private sectors. HVA has an established presence in the Housatonic River watershed that will give the proposed project flexibility in building and sustaining collaborative effort with these and potentially other groups

and organizations throughout the watershed. Consequently, the success and sustainability of the proposed project will not depend on any single group. This is anticipated to make it robust to any contingencies involving program participation.

If progress on a project task is significantly delayed, the ESS/HVA team will consult with the Trustees regarding the delay and take action to expedite future progress on the task. However, the direct involvement of senior staff in the project will help to ensure that significant delays on project work do not occur.

#### d. Integration with Existing Monitoring

The ESS/HVA team will integrate the efforts of the proposed project with zebra and quagga mussel monitoring and outreach that may be undertaken by MassDCR Lakes and Ponds, in association with volunteers from citizen groups. Additionally, the ESS/HVA team will integrate aquatic invasive species monitoring with ongoing monitoring at each of the public access points to be completed as part of the “Enhancement of Public Access to the Housatonic River” project, which was funded by Housatonic River Natural Resources Damage Round I funding.

The ESS/HVA team will also consider integrating the proposed project with other local, statewide, or regional water quality or invasive species monitoring efforts that may emerge in the future.

## 6. Qualifications of Applicant and Project Team

### a. Technical Capacity

#### i. Project Team's Capacity, Qualifications, Past Experience

##### ESS Group, Inc.

For more than 20 years, the hallmark of ESS success has been our commitment to service and technical excellence. ESS is a full-service environmental consulting and engineering firm serving clients throughout the northeast. Our team of more than 50 scientists, engineers, and environmental specialists gives us the in-house ability to manage and deliver scientific services within many technical disciplines, including resource inventory, analysis, design, and implementation of water resource projects, environmental permitting, and public outreach and education. The ESS Team is led by Carl Nielsen, a Certified Lake Manager, and includes a Certified Aquatic Macroinvertebrate Taxonomist, Professional Geologists, Professional Engineers, Professional Wetland Scientists, wildlife biologists, and avian, regulatory, GIS, and Low Impact Development (LID) experts. All have practical experience in working with state agencies, municipalities, private businesses and non-profit groups throughout the northeastern United States.

ESS consulting assignments vary in scale and complexity. We specialize in managing and directing multi-disciplinary environmental and engineering teams for large-scale projects.

Many of our Senior Project Managers hold advanced degrees or professional certifications and have more than 15 years of experience in consulting. This allows ESS to provide a strategic, efficient, often innovative approach to design, engineering, and permitting.

Our relationships with regulatory staff facilitate communication and cooperation, key factors when timely and effective resolution is required. In addition, ESS frequently teams with local and regional experts whose recognition in certain specialty fields ensures that the best available talent is on the ESS team.

With offices in Wellesley, Massachusetts and East Providence, Rhode Island, ESS is ideally situated for working on projects throughout the Commonwealth of Massachusetts. As a privately held company, we do not have the typically high overhead costs that many of our larger competitors must pass on to their clients. Consequently, ESS is able to provide additional services and a superior level of quality at a very competitive price. In short, ESS has established a reputation for consistently exceeding client expectations.

##### ESS Core Services

- Civil Engineering Services
- Land Development and Engineering
- Marine and Coastal Services
- Industrial Compliance and Permitting
- Due Diligence, Site Investigation, and Remediation
- Ecological Services and Environmental Permitting
- Air Quality Consulting and Measurement
- Energy Facility Development and Licensing
- Regulatory Strategy and Permitting
- Water Supply and Water Resource Management

## ESS Qualifications

### Lake, Pond & River Watershed Management

ESS is a leader in the complete analysis of aquatic ecosystems, including lakes, ponds, reservoirs, and riverine systems. With the in-house experience and capability to undertake a full range of physical, chemical, and biological studies, ESS is a one stop shop for any lake, pond, or stream management project.

ESS lake, pond, and river watershed management services are headed by a Certified Lake Manager with extensive experience in the study and management of both natural and manmade water bodies. Our staff of experienced ecologists, hydrologists, engineers, and regulatory specialists provides clients with a complete toolbox for addressing a wide variety of management options.

ESS has performed numerous diagnostic and feasibility studies for lakes, ponds, reservoirs, riverine systems, and storm water conveyance systems. However, we also recognize that the management challenges of each water body are unique and can tailor our study approach to meet the specific needs of any project. We strive to provide management recommendations that are both cost-effective and compliant with regulatory requirements. As a result, our clients receive the highest quality product in a prompt and timely manner.

#### Aquatic Ecosystem & Water Quality Expertise

- Invasive Species Monitoring, Education, and Outreach
- Aquatic Invertebrate Sampling and Analysis
- Fish Surveys
- Plankton Analysis
- Wildlife Surveys
- Vegetation Mapping
- Watershed Delineation & Characterization
- Surface Water Monitoring & Assessment
- Groundwater Monitoring & Assessment
- Drinking Water Supply Protection
- Pollution Source Investigation
- Nutrient Loading Analysis, Modeling, and TMDL Development
- Hydrologic Modeling and Hydrogeologic Assessments
- Watershed Build-Out Analysis
- Aquatic Restoration Design, Evaluation, Permitting, and Monitoring
- Management Alternatives Analysis
- Funding Options Review and Grant Application Assistance

### ESS Project Descriptions

Massachusetts Executive Office of Energy and Environmental Affairs – NRD Round One Funding - Enhancement of Public Access to the Housatonic River; Housatonic River Watershed, MA. ESS worked in partnership with the Housatonic Valley Association and community members to screen over 40 sites along the Housatonic River in Western Massachusetts for enhanced public access. The screening was based on land availability and physical, hydrological, and natural resources. The list of potential sites was refined and five access points were nominated for improvements. The ESS team developed conceptual designs for each site, coordinated a round of watershed stakeholder review, and is currently obtaining the necessary permits. Five new canoe launch sites will be constructed under this project. Additionally, a monitoring program will be designed and implemented to minimize the potential for invasive plant species to become established at new access points. In addition, informational signage will be available at each access facility.

Massachusetts Department of Conservation and Recreation, Lakes and Ponds Program - Zebra and Quagga Mussel Education, Monitoring and Outreach – ESS worked with the MassDCR Lakes and Ponds Program to develop a volunteer-based quagga and zebra mussel monitoring and

prevention program. As part of the invasive mussel prevention program, ESS designed and produced educational brochures for outreach to boaters, anglers, and residents. Additionally, the ESS project team developed full-color educational signs for MassDCR, which were posted at strategically targeted water bodies. ESS and MassDCR also conducted a training session for volunteers from LAPA-West, who were trained to collect and process invasive mussel samples using kits developed and provided by ESS. The focus of the monitoring program on early life stages of invasive mussels allows detection and assessment of invasions before these species become firmly established in a water body.

Massachusetts Department of Environmental Management - Hinsdale Flats ACEC Lake and Watershed Management Plan, Hinsdale, Massachusetts: ESS completed an investigation of Plunkett Reservoir and Ashmere Lake and their watersheds located within the 14,500-acre Hinsdale Flats Area of Critical Environmental Concern (ACEC). The Hinsdale Flats ACEC consists of extensive wetlands and floodplains associated with the headwaters of the East Branch of the Housatonic River that are known to harbor several state-listed Endangered and Threatened Species, and four state-listed Species of Concern.

ESS evaluated the physical, chemical, and biological condition of each of the lakes and conducted field investigations within each of their watersheds to locate these state-listed species. Based on these investigations, ESS developed a cost effective lake and watershed management plan for each lake that will improve water quality, reduce nuisance and exotic aquatic vegetation, and still protect the critical resources of the ACEC.

Town of Lee - Laurel Lake Diagnostic/Feasibility Study Lee and Lenox, Massachusetts: ESS conducted a thorough investigation of Laurel Lake in the towns of Lee and Lenox located in western Massachusetts during the summer and early fall of 2002. The investigation was initiated to serve as the basis for the development of a lake and watershed management plan. The primary issue facing Laurel Lake is the ongoing encroachment of aquatic and semi-aquatic vegetation. In particular, the exotic and invasive species Eurasian watermilfoil (*Myriophyllum spicatum*) has recently expanded its coverage into the Lake's open water habitat to the detriment of the more desirable native plant species.

The investigation of Laurel Lake consisted of eight key components:

1. Assessing the in-lake water quality, including a phytoplankton and zooplankton analysis;
2. Evaluating the quantity and quality of water entering the lake from tributaries and storm drains and leaving the lake from its outlet structure, during dry and wet weather conditions;
3. Assessing the quantity and quality of groundwater entering the Lake along key shoreline segments;
4. Assessing the Lake's aquatic plant community;
5. Documenting fish and wildlife occurring in the Lake and watershed via direct observation and through a historic data review;
6. Characterizing and determining the quality of in-lake sediments;

7. Assessing aquatic invertebrate communities in and around the Lake; and
8. Using data collected and long-term climatological data to calculate the annual hydrologic and nutrient budget for the Lake.

The investigation was conducted in order to provide viable management alternatives and approximate cost estimates for improving the overall quality of Laurel Lake. A lake and watershed management plan was prepared for the Town of Lee.

Town of Brookfield – Phosphorous and Sediment Reduction Project in Quagboag and Quacumquasit Ponds; Brookfield, Massachusetts. ESS was retained by the of Town of Brookfield, in partnership with the Quaboag and Quacumquasit Lake Association (QQLA), to complete a scope of work which included the following seven primary tasks under the 319 NPS Grant: develop a Quality Assurance Project Plan (QAPP); conduct a watershed wide non-point source pollution assessment; design, permit, and construct two stormwater Best Management Practices (BMPs); perform a hydrologic and structural evaluation of a gate-style flow barrier within the channel connecting the two ponds; conduct outreach and education; develop an invasive aquatic plant management plan; and implement local BMPs.

Under the 319 NPS Grant, ESS conducted a pilot study to evaluate the potential effectiveness of the public's response to managing plants in a large waterbody using defined boating channels that connected shoreline areas to deeper (weed-free) portions of the lake. This approach was intended to foster boating access while minimizing treatment costs and ecological impacts.

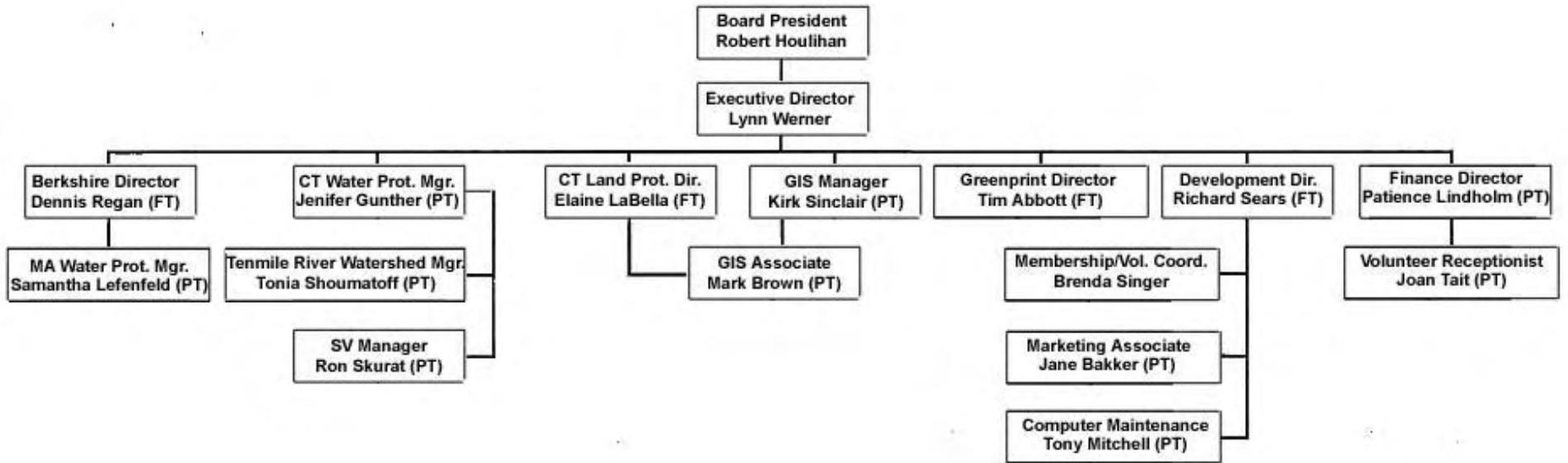
### Housatonic Valley Association

The Housatonic Valley Association (HVA) is dedicated solely to protecting the Housatonic River and its entire 2,000-square-mile watershed, stretching from the Berkshires in Massachusetts, through western Connecticut and part of eastern New York State, to Long Island Sound. Its mission is to save the natural character and environmental health of our communities by protecting land and water in the Housatonic watershed.

Since 1941, HVA has fulfilled its mission through research, education, advocacy, and technical assistance to communities. It has a strong, credible record of land conservation, river monitoring, educational programs, river cleanups, watershed awareness programs with the assistance of volunteer involvement and relationship building. HVA is headquartered in Cornwall Bridge, Connecticut, with its Berkshire Program Office in South Lee, Massachusetts.

Please see following page for HVA's Organizational Chart.

HVA ORGANIZATIONAL CHART  
2009



Grants Consultant: Carol Powers

May 2009

ii. Proven Ability to Effectively Manage and Oversee All Project Phases

The ESS/HVA Team has effectively managed and overseen a large number projects similar in scale to the currently proposed project, including "Enhancement of Public Access to the Housatonic River," which was funded by Housatonic River Natural Resources Damage Round I funds. Our project management experience is extensive and covers a wide variety of project work. ESS has successfully managed numerous projects for large state and federal government agencies as well as municipalities, non-profits, major corporations, and others.

iii. Resumes of Primary Project Personnel

Please see Resumes of Primary Project Personnel beginning on the following pages.

Carl D. Nielsen, CLM  
Senior Water Resources Scientist

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*EXPERIENCE*

ESS Group, Inc. - January 1998 to Present  
Years of Prior Related Experience - 8

*EDUCATION*

MS, Fisheries and Wildlife, University of Missouri - Columbia, 1994  
BA, Biology, Colgate University, 1990  
Tufts University, Water Quality Modeling for TMDLs, 40-hr. Workshop, 2001

*SUMMARY OF PROJECT EXPERIENCE*

Mr. Nielsen has over 18 years of experience in the assessment and evaluation of marine and freshwater ecosystems. He uses his knowledge of water chemistry and biology to go beyond basic assessments that just identify whether a waterbody is meeting the regulatory standards. Mr. Nielsen has worked extensively in identifying and understanding the ecology of most aquatic organisms including aquatic plants, algae, zooplankton, aquatic invertebrates, fish, reptiles and amphibians. He is also actively involved in the restoration of aquatic systems and has worked to improve water quality and aquatic habitat conditions in numerous lake and river systems throughout New England. Mr. Nielsen's representative project experience includes:

- Massachusetts Department of Conservation and Recreation – Diagnostic/Feasibility Assessment of Big Pond, Otis, Massachusetts. Mr. Nielsen designed and conducted an investigation of Big Pond and its watershed to gather baseline information on water quality, stormwater quality, macroinvertebrate community composition, aquatic and wetland plants, fish, and wildlife. Mr. Nielsen made recommendations for monitoring and preserving the ecological integrity of this relatively healthy aquatic system.
- Neponset River Watershed Association - Neponset River Flow Stressed Stream Habitat Assessment & Fish Passage Evaluations, Boston, Massachusetts. Mr. Nielsen evaluated streamflow augmentation and instream habitat restoration alternatives and recommended enhancements that would restore habitat for macroinvertebrates and a target list of freshwater fish species in six sub-watersheds draining to the East Branch of the Neponset River, a tributary to Boston Harbor. Mr. Nielsen served as the macroinvertebrate expert on a team designated as the “trio of experts” (a fisheries biologist, macroinvertebrate specialist, and stream hydrologist) charged with assessing 12 selected stream reaches within the study area during a variety of flow regimes. Mr. Nielsen was responsible for preparing the final report.
- Town of Hinsdale, Massachusetts – Diagnostic/Feasibility Assessment of Ashmere Lake and Plunkett Reservoir, Hinsdale, Massachusetts. The Hinsdale lakes are located in a Massachusetts ACEC (area of critical environmental concern). Mr. Nielsen designed and carried out an assessment of the physical, chemical and biological characteristics of these lakes which included water quality assessment, fish and wildlife evaluations, rare/threatened/endangered species investigations, and wetland plant assessments. The work served as the basis for making recommendations for controlling nuisance aquatic vegetation within the lakes while minimizing the potential to cause adverse effects on sensitive or rare species common to the ACEC and their watersheds.

- Town of Westford, Massachusetts. Baseline Characterization, Drawdown Feasibility Assessment, and Long-term Monitoring Program for Nabnasset Lake, Westford, Massachusetts. Mr. Nielsen is serving as Project Manager and lead scientist in an investigation of the baseline characteristics of Nabnasset Lake and a hydrologically-linked wetland system known as Shipley Swamp. The purpose of the investigations was to determine the nature of impacts that could be anticipated as a result of a proposed winter lake drawdown for the purpose of controlling nuisance aquatic plants. As part of the baseline assessments, Mr. Nielsen established numerous plant monitoring plots within the wetland, biological monitoring stations within the wetland and lake, and established aquatic plant transects within the lake. These stations are currently being monitored annually to determine the response to drawdown (if any) to allow for immediate management actions to be taken as necessary to prevent significant damage from occurring to the ecosystem. Mr. Nielsen also prepared and filed a Notice of Intent for the control of nuisance aquatic plants at Nabnasset Lake by lake drawdown.
  
- Rhode Island Department of Environmental Management – Statewide Biomonitoring of Rhode Island’s Wadeable Streams, Rhode Island. Mr. Nielsen is currently responsible for managing and conducting a long-term biomonitoring program for wadeable streams of Rhode Island. The purpose of the program is to provide the Rhode Island Department of Environmental Management (RIDEM) with benthic macroinvertebrate and stream habitat data from selected streams within the state’s two main eco-regions. The biological data collected is being used to fulfill the state’s 305(b) reporting requirements and to provide a greater understanding of the relationship between the macroinvertebrate community and stream habitat. ESS collected and analyzed macroinvertebrate data according to the US EPA’s Rapid Bioassessment Protocol, which allows for predictions and or inferences to be made on aquatic ecosystem quality from a relatively “rapid” assessment of the prevailing macroinvertebrate community composition. A total of up to 50 stream segments are assessed each year during the contract period. Mr. Nielsen also provided a multi-year data trend analysis along with recommendations for future monitoring and stream restoration as part of the comprehensive final report. This contract began in 2002 and has been renewed for the period from 2006-2009.

#### *PROFESSIONAL REGISTRATIONS AND AFFILIATIONS*

- North American Lake Management Society – Certified Lake Manager (CLM)
- New England Chapter – North American Lake Management Society
- North American Benthological Society
- Northeast Aquatic Plant Management Society



Daniel J. Herzlinger, PWS  
Environmental Scientist

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*EXPERIENCE*

ESS Group, Inc. – January 2006 to Present  
Years of Prior Related Experience – 3

*EDUCATION*

MEM, Resource Ecology, Duke University, 2001  
BA, Biology, Bates College, 1997

*SUMMARY OF PROJECT EXPERIENCE*

Mr. Herzlinger is a Professional Wetland Scientist (PWS) with over five years of experience conducting ecological field studies, wetland delineations, environmental permit review/preparation, natural resource site assessments, wildlife habitat evaluations and rare species surveys. Mr. Herzlinger's range of project experience includes the siting and permitting of energy generation facilities and infrastructure, commercial development, lake and pond management and watershed assessments for non-point source pollution. He also has expertise in the use of Geographic Information Systems (GIS), sub-meter accuracy Global Positioning Systems (GPS) and laser rangefinder for visual assessments.

Mr. Herzlinger has a strong working knowledge of the Massachusetts Wetlands Protection Act (WPA), Massachusetts Environmental Policy Act (MEPA), Rhode Island Freshwater Wetlands Act, Section 401 and 404 of the Clean Water Act and New York State Article 7 Certificate of Environmental Compatibility and Public Need for Electric and Gas Transmission Facilities. As the former Conservation Agent for the Town of Acushnet, Massachusetts, Mr. Herzlinger served as the Chair of the Town's NPDES Phase II Storm Water Committee and assisted drafting a Storm Water Bylaw for the town. He managed over 250 acres of open space in Acushnet and assessed the ecological value of various town-owned parcels. Mr. Herzlinger's representative project experience at ESS includes the following:

- Housatonic River Natural Resource Damage Fund — Housatonic River Enhanced Public Access Project, MA. Assisting project manager in partnership with the Housatonic Valley Association (HVA) to perform an initial screening of 40 potential sites for enhanced public access to the Housatonic River in western Massachusetts. The screening is based on land availability and physical, hydrological, and natural resource constraints. Responsible for assessing rare species issues, conducting field surveys and compiling data on each site. Conducted field surveys for presence of Jefferson and Four-toed Salamanders, which are listed as species of special concern in Massachusetts. Mr. Herzlinger delineated jurisdictional wetland resource areas at five selected sites and is preparing the Notice of Intents for the canoe launch construction under the Massachusetts Wetlands Protection Act.
- Narragansett Bay Commission — Midge Larvae Monitoring and Management Recommendations, Bucklin Point, East Providence, RI. The focus of this study was to establish a baseline data set to develop site-specific management recommendations and assist the Narragansett Bay Commission with community outreach activities. Mr. Herzlinger conducted invertebrate monitoring at set locations numerous times throughout the season and documented the numbers of midge larvae found. Habitat data was also collected in order to identify habitat conditions that typically correlate with high midge concentrations (i.e., water depth, DO at bottom, salinity, algal density, and substrate type). Mr. Herzlinger

was responsible for data analysis and final report preparation.

- Target Corporation — Compensatory Wetland Mitigation Plan, Torrington, CT. Responsible for implementing a Compensatory Mitigation Plan for compliance with a federal wetland permit for a retail development. Permit conditions require the enhancement of several acres of existing wetlands through invasive species removal and native species plantings. Evaluated wetland functions, mapped extent of invasive species within wetland resource areas using sub-meter accuracy GPS and monitored progress of invasive species removal within the wetland enhancement area. Prepared annual mitigation monitoring report for submission to the U.S. Army Corps of Engineers.
- Plymouth EDF — Rare Species and Habitat Mapping, Plymouth, MA. Completed a survey of a 1,000-acre parcel to assess natural communities at the site and evaluate constraints on development based on the presence of rare natural communities and species. Mapped the location of rare natural communities and produced GIS figures delineating sensitive areas based on the field assessment.
- Wilcox and Barton – Guilford Commons Monitoring Program, Guilford, CT. Conducted field work including habitat assessment, water quality sampling and biomonitoring at three sites along Spinning Mill Brook, as well as plant and bathymetry mapping of a small pond in line with the stream. The biomonitoring design employed quantitative methods for sampling macroinvertebrates, periphyton and fish within the brook. The primary purpose of this project was to establish baseline conditions in the stream prior to completion of new storm and waste water systems on the Guilford Commons property. This will permit the evaluation of post-construction water quality, sedimentation and biological conditions in Spinning Mill Brook, as needed.
- Private Landowner – Residential Pier and Floating Dock Permitting, Hingham, MA. Responsible for delineating coastal wetland resource areas for the construction of a pier and floating dock at a residential property. Conducted a survey of shellfish resources at the proposed site, assisted with the preparation of the Notice of Intent filing under the Massachusetts Wetlands Protection Act, assessed project impacts to resource areas and developed plans for mitigation.
- Town of Brookfield — 319 Non-point Source Pollution Grant, Brookfield, East Brookfield, and Spencer, MA. Mr. Herzlinger is assisting the project manager with the implementation of this state grant for the Town of Brookfield and the Quaboag/Quacumquasit Lake Association. Assisted with the plant mapping of Quaboag Pond and completed a field assessment to determine sources of phosphorous loading within the Quaboag and Quacumquasit Pond watersheds. Mr. Herzlinger prepared and filed the Notice of Intent (NOI) to implement the lake management plan developed for Quaboag/Quacumquasit Ponds and the NOI to operate the existing flow barrier between the lakes. He was also responsible for collection of water quality data at targeted sites throughout the watershed. The results of the monitoring and watershed assessment were used to design and implement Best Management Practices (BMPs) to address non-point source pollution in Quaboag Pond. Prepared Request for Determination of Applicability (RDA) for the construction of the BMP within jurisdictional wetland resource areas under the Massachusetts Wetlands Protection Act.

#### *PROFESSIONAL REGISTRATIONS AND AFFILIATIONS*

- Society of Wetland Scientists - Professional Wetland Scientist (PWS)
- Member of Society of Wetland Scientists
- Association of Massachusetts Wetland Scientists – Full Voting Member



Matthew D. Ladewig  
Environmental Scientist

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*EXPERIENCE*

ESS Group, Inc. – September 2006 to Present  
Years of Prior Related Experience – 3

*EDUCATION*

MS, Aquatic Resource Ecology and Management, University of Michigan, 2006  
BA, Geography, University of Illinois at Urbana-Champaign, 2000

*SUMMARY OF EXPERIENCE*

Mr. Ladewig possesses a broad range of skills useful in bioassessment, monitoring, modeling, and management of aquatic ecosystems. He has conducted numerous fish and wildlife surveys in a wide variety of environments. Mr. Ladewig's understanding of hydrology, geomorphology, and ecology allow him to make holistic evaluations of lakes, ponds, streams, and their watersheds. He draws upon this knowledge and experience to develop sound approaches for monitoring and managing aquatic invasive species. Mr. Ladewig also has extensive expertise in freshwater and marine macroinvertebrate identification and is certified by the North American Benthological Society as a Level II EPT Taxonomist. His analytical skills are anchored by a strong background in Geographic Information System (GIS) software, statistical analysis, and data management.

Mr. Ladewig's representative work experience includes the following:

- Massachusetts Department of Conservation and Recreation, Lakes and Ponds Program – Quagga and Zebra Mussel Education, Monitoring and Outreach; Western MA. Managed project designed to help prevent the spread of invasive quagga and zebra mussels into the waters of western Massachusetts. The approach of this project was multifaceted and incorporated education, monitoring and outreach activities. The project team developed educational materials, including brochures for outreach to boaters and anglers as well as metal signs for posting at strategically targeted water bodies. On the monitoring front, volunteers from the Lakes and Ponds Association of Western Massachusetts (LAPA-West) were trained to collect and process samples using kits developed by ESS that focus on early life stage detection. In this way invasions of quagga and zebra mussels can be detected and assessed before they become firmly established in a water body.
- Housatonic River Natural Resource Damage (NRD) Fund – Enhancement of Housatonic River Public Access; Western MA. Assisted with field data collection for the assessment of 41 potential public access improvement sites along the Housatonic River. Five sites were chosen for design, permitting and construction of canoe launches based on the assessment results. The assessment was based mainly on feasibility of access, ecological constraints and distance to the nearest existing river access point.
- Rhode Island Department of Environmental Management (RIDEM) - Statewide Biomonitoring and Habitat Assessment of Rhode Island's Wadeable Streams. Responsible for the annual collection and identification of macroinvertebrates from 50 sites across the state of Rhode Island. Analyzes the habitat, water quality and macroinvertebrate community data and summarizes the results in report form for submission to the U.S. Environmental Protection Agency as part of Rhode Island's 305(b) reporting requirements. Additionally, participated in an August 2007 review of Rhode Island's stream biomonitoring

program. The purpose of this multi-year program is to provide RIDEM with benthic macroinvertebrate and stream habitat data from selected streams within the state's two main eco-regions. The biological data collected are being used to provide a greater understanding of the relationship between the macroinvertebrate community and stream habitat.

- RIDEM – Characterization of Buckeye Brook Biological Impairment; Warwick, RI. Collected and identified quantitative macroinvertebrate samples from six sites in the Buckeye Brook system and one reference site used in the annual statewide biomonitoring program for wadeable streams. Also collected and analyzed results of quantitative periphyton and particulate organic matter samples. Buckeye Brook is on the Rhode Island 303(d) list for biodiversity, *Enterococcus*, and fecal coliform impairments. Results of the study are being used to help identify potential sources of contamination within this highly urbanized watershed.
- Aquarion Water Company — Midge Larvae Monitoring and Management Recommendations; Bucklin Point, East Providence, RI. Conducted an invertebrate monitoring effort in order to identify non-biting midge larvae “hot spots” in the mud flats of the area of concern. Monitoring involved sampling set locations within the mud flats several times throughout the season for midge larvae. The focus of this study was to develop site-specific management recommendations and assist the Narragansett Bay Commission with community outreach activities.
- Massachusetts Department of Conservation and Recreation – Ponkapoag Golf Course, Water Supply Development and Ecological Monitoring; Canton, MA. Conducts biological surveys for several state-listed butterflies, damselflies and dragonflies. Monitors water levels in Ponkapoag Pond and Bog in compliance with an Order of Conditions and Water Level Monitoring Plan issued by the Canton Conservation Commission. These efforts are conducted to preserve the fragile ecosystem of an Atlantic white cedar/emergent/scrub-shrub wetland.
- Confidential Client - Housatonic River Freshwater Mussel Survey; Stockbridge, MA. Assisted with a field survey for rare or endangered freshwater mussels in the Housatonic River. Filed a Rare Animal Observation Form with the Massachusetts Natural Heritage and Endangered Species Program when evidence of a state-listed mussel species was found.

#### *PROFESSIONAL REGISTRATIONS AND AFFILIATIONS*

- North American Benthological Society: Level II Ephemeroptera, Plecoptera and Trichoptera (EPT) Certified Macroinvertebrate Taxonomist for Eastern North America
- American Fisheries Society
- Coastal and Estuarine Research Federation
- Northeast Aquatic Plant Management Society
- Rhode Island Natural History Survey
- New Hampshire Lakes Association

#### *PRESENTATIONS*

- Nielsen, C.D. and M.D. Ladewig. Got Swarms? Successful Management of the Non-biting Midge Population in Seekonk River, Rhode Island. Estuarine Research Federation 2007 Conference, November 2007. Providence, RI.
- Ladewig, M.D. and C.D. Nielsen. The Benefits of Biomonitoring for Watershed Assessment. Charles River Watershed Association. June 2007. Weston, MA.



Carissa T. Lord  
GIS Analyst

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*EXPERIENCE*

ESS Group, Inc. – July 2007 to Present  
Years of Prior Related Experience – 2

*EDUCATION*

MA, Marine Affairs, University of Rhode Island, 2005  
BA, Environmental Studies, Dickinson College, 1998

*SUMMARY OF PROJECT EXPERIENCE*

Ms. Lord has a broad range of geographical information system (GIS) skills useful in natural resource management, urban planning, and other environmental analyses. As a Certified Floodplain Manager, Ms. Lord is also familiar with floodplain management issues and current FEMA regulations. Since joining ESS Group, Inc., Ms. Lord has been primarily involved in using GIS to analyze how proposed transmission lines, pipelines, and generating stations will affect the surrounding landscape and environment. Ms. Lord's representative project experience includes:

- Housatonic River Natural Resource Damage Fund — Housatonic River Enhanced Public Access Project, MA. Assist project manager in partnership with the Housatonic Valley Association (HVA) to perform an initial screening of 40 potential sites for enhanced public access to the Housatonic River in western Massachusetts. The screening is based on land availability and physical, hydrological, and natural resource constraints. Responsibilities include creating field maps and generating a computer animated model of the river and the potential public access locations.
- Massachusetts Department of Conservation and Recreation, Lakes and Ponds Program – Quagga and Zebra Mussel Education, Monitoring and Outreach; Western MA. Created GIS map and database of quagga and zebra mussel distribution in the northeast United States. This map was incorporated into education and outreach materials as part of a regional aquatic invasive species prevention project.
- Town of Hopedale, Massachusetts, Diagnostic/Feasibility Study of Hopedale Pond, Hopedale, MA. Project involves developing a pond and watershed management plan to ensure the future protection of Hopedale Pond. As part of the diagnostic/feasibility study, Ms. Lord has been responsible for assisting project manager in collecting water quality samples at various locations and mapping existing conditions of Hopedale Pond.
- Confidential Client, New York Public Service Commission Article VII Application, Jefferson and Oswego Counties, New York. Ms. Lord has performed GIS analyses for a 48-mile long (8 miles subaquatic, 40 miles terrestrial overhead) electric transmission line Article VII application to the New York State Public Service Commission. The project includes routing analysis, environmental analysis (cultural, geologic, wetland, habitat, and rare species) and visual analysis.
- New York Regional Interconnect, Inc., New York Regional Interconnection Project, NY. Project includes routing evaluations, assessment of environmental impacts for the project route and alternatives, visual assessments, and the preparation of the Article VII

- application to the New York State Public Service Commission. Responsibilities include use of GIS software as part of the preliminary Article VII regulatory assessment of a 190 mile transmission line. Ms. Lord has also been responsible for managing the Article VII post-filing requests for information from participating parties.
- Confidential Energy and Carbon Sequestration Project in the Northeast U.S. An integrated gasification combined cycle plant with carbon capture and sequestration capabilities is being developed. Ms. Lord's responsibilities include desktop GIS analysis for routing evaluation of the proposed pipeline which will transport sequestered CO<sub>2</sub> to an offshore storage facility.
  - NEPA Environmental Impact Statement – Vermont Wind Project. Responsibilities include project maps for an EIS in conformance with the NEPA requirements as the third-party contractor to the U.S. Forest Service for the Deerfield Wind Project in southeastern Vermont. Data overlays of proposed turbine location, elevation, potential wind speeds, and existing transmission lines aid in finalizing project site location.
  - Lake Road Generating Company, L.P., Petition for Declaratory Ruling, Killingly, CT. Analysis of the Unit 4 Expansion Project capable of producing an additional 411 MW to the already existing 786 MW facility. Responsible for creating an environmental GIS assessment analysis based on a GIS based desktop study regarding floodplains, zoning, and land use.
  - Astoria Generating Company, L.P., a USPowerGen Company, South Pier Improvement Project, Brooklyn, New York - Expansion project at the existing Gowanus Generating Station which consists of the addition of approximately 100 MW of new, cleaner, state-of-the-art electric generation while reducing the actual net emissions from the modified facility. Responsible for assessment of sensitive resources based on GIS desktop analysis. Field work included GPS and visual data collection for sites which may be visually impacted by the proposed expansion project.
  - Cat Island LLC - Environmental Impact Assessment, Cat Island Beach Resort, Cat Island, The Bahamas. The proposed project encompasses approximately 1,906 contiguous acres and includes a residential community comprised of single-family homes, townhomes, and golf cottages; and a resort component consisting of several hotels, condominiums, a village center, beach club, 36 holes of golf, and associated infrastructure. Created GIS analysis of the site location including geology, shoreline characteristics, hurricane history, and topography mapping for an Environmental Impact Statement (EIS). Authored a section on hazard mitigation for the Environmental Management Plan (EMP) for the proposed Cat Island Beach Resort.
  - Rhode Island Emergency Management Agency – Map Modernization Planner, Cranston, RI. Coordinated efforts between FEMA and local communities, during the flood map adoption process. Organized meetings to disseminate mapping information to communities and professionals. Drafted new local floodplain ordinances that are NFIP compliant. Responsible for tracking spending and creating quarterly FEMA reports for Map Modernization Management Support grant. Supported State Floodplain Manager on a variety of responsibilities including grant program applications and local Flood Mitigation Assistance/Pre-Disaster Mitigation project identification.

### *CERTIFICATIONS*

- Certified Floodplain Manager, 2006 to Present



## DENNIS C. REGAN

Housatonic Valley Association  
PO Box 251  
South Lee, Ma. 01206  
(413)394-9796 [dregan@hvatoday.org](mailto:dregan@hvatoday.org)

881 East Washington Rd.  
Hinsdale, Ma. 01235  
(413)655-8145  
[cgsandl@bcn.net](mailto:cdsandl@bcn.net)

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### **RELEVANT SKILLS AND EXPERIENCE:**

- Experience and success in developing working partnerships and coordinating efforts of diverse interest groups and governmental agencies to reach desired goals.
- Success in developing positive working relationships with staff, Board members, and volunteers in developing and implementing strategic plans and mission statements.
- Ability to develop and implement appropriate training and educational programs to foster appreciation, continued use, and protection of natural resources.
- Success in developing, writing and managing grant proposals, effective management plans, and budgets for multiple programs.
- Effective use of oral, written and interpersonal communication skills to promote resource protection.
- Effective experience in dealing with various media resources.

### **EMPLOYMENT:**

**Massachusetts Program Director,** Housatonic Valley Association. Responsibilities include developing partnerships within the community on issues affecting the quality of the Housatonic River Watershed and the development of programs to effectively reach identified goals. Specific programs include development of data collection programs, greenway development, educational programs, and coordination of community involvement. Tasks included supervision of staff and volunteer development, with major emphases on grant and report writing and budget development and management with Board involvement. 1999 - present

**Regional Director,** Appalachian Mountain Club. Responsibilities included developing and implementing regional land use and protection programs in Massachusetts, Connecticut, New York and Pennsylvania. Emphasis was on developing partnership programs with federal, state, and local governmental agencies and volunteers in managing and maintaining public lands. Developed and implemented environmental education and trail programs based at the Mt. Greylock Regional office. Managed budget and staff. 1988 - 1998

**Trails Coordinator,** Appalachian Mountain Club. Responsibilities included developing and implementing trail management programs on regional, state, and national trail systems. These programs included coordinating efforts with National Park Service and state governmental agencies on trail acquisition, layout and maintenance and development of Cooperative Agreements and management plans. Emphasis on Appalachian Trail use, management and acquisition issues in Massachusetts and Connecticut. Managed budget and staff. 1982 - 1988

**Marine Advisory Service Extension Agent,** University of North Carolina Sea Grant. Assisted local, state and regional community groups, both public and private, in developing educational programs associated with coastal waterways resource use. Identified needs and provided assistance through research and/or education programs. 1977 - 1981

**EDUCATION:**

Master of Agriculture in Natural Resource Development. Texas A&M University, College Station, Texas. December 1977

Bachelor of Science Degree in Community and Outdoor Recreation, Springfield College, Springfield MA. May 1974

**PROFESSIONAL AFFILIATIONS:**

President - Massachusetts Watershed Coalition

Member - Advisory Committee of Massachusetts Environmental Trust; Ecosystem Grants

Board Member – Upper Housatonic Valley National Park Service Heritage Designation

Previous Board Member - Executive Committee of Housatonic River Restoration

Previous Board Member – Appalachian Trail Conference

**Samantha Lefenfeld**

PO Box 907  
Stockbridge, MA 01262  
413-298-5369  
Cell: 413-717-1133  
slefenfeld@gmail.com

**Present: Water Protection Manager, Housatonic Valley Association**

I coordinate many aspects of the Berkshire's water quality work, including shoreline surveys, volunteer water quality monitoring, river clean-ups, and data collection and reporting. I have also taken the lead in designing HVA's Storm Drain Awareness and water quality education programs in area schools.

**2008-2009 Berkshire Museum, Pittsfield, MA**

As the Education Specialist, I am responsible for teaching museum programming to schools and the general public. I'm also in charge of hiring and coordinating the museum's docents and volunteers. Other responsibilities include booking and developing programs and organizing special events for the educational department.

**Summer, 2008: Mass Audubon Society, Pleasant Valley Wildlife Sanctuary, Lenox, MA**

Where I was the Director of a science-based day camp. I managed a staff of 14 people and I was responsible for 250 children ranging in age from 6-13. I am certified by the American Camp Association as a new camp director.

**2006-2008: Berkshire Botanical Garden, Stockbridge, MA**

As the Education Assistant I worked directly with the Youth Education Coordinator where I assisted in the development and teaching of the school programs. I worked with children ranging in age from 3-12. All programs I taught were hands-on inquiry based lessons that were consistent with the Massachusetts Curriculum Frameworks for science. I assisted in the creation of the children's garden and developed and taught the curriculum for the summer family programs.

**2005-2006: Berkshire South Regional Community Center, Great Barrington, MA**

Where I was a counselor in the Out of School Adventures and Vacation Camp Program. I worked with children ranging from ages 5-12. Responsibilities included supervising homework, games, art projects and swimming. I also taught a weekly ceramics class.

**2003-2005: Crafted in Kathmandu, Great Barrington, MA**

A project created to help sustain the living heritage of artists in the Kathmandu Valley of Nepal by providing a global market for their artwork. I spent a month in Nepal to tour the city, learn about the culture and interview the artisans the project supports. I assisted in the creation of a website by merging photography and my biographies of each artist to better communicate our goals to the general public. I participated in the launching of the first CIK store and managed the store. Daily responsibilities included merchandising, selling, bookkeeping, computer work, shipping, banking, window and store displays.

**1996-2002: B&H Artworks. New York, NY and Great Barrington, MA**

Wholesale home lighting and accessories business.

Traffic Manager: Responsible for all shipping and packing of merchandise, invoicing, purchase orders, bookkeeping, and customer service.

Ceramic Production: Operated the ceramic division. Duties consisted of making, firing, glazing of dinnerware, general upkeep of studio and mixing glazes.

Also computerized the business, produced editorial and promotional materials and created "Sammyware", a personal line of bowls, plates, mugs and sculpture.

**Education:**

**2005-2008:** B.A. Liberal Arts, Umass Amherst. Graduated with honors.

**Certification:** Initial Massachusetts Elementary 1-6 Teaching License.

**2002-2003:** Berkshire Community College: A.S. in Environmental Science. Graduated with honors.

**\*Member of the National Scholars Honor Society.**

**Special Skills:**

Macintosh and PC operating systems, SOLO Wilderness First Aid certified, First aid/CPR certified.

**References:**

**Rene Laubach**, Sanctuary Director, Mass Audubon, (413) 637-0320

**Lydia Silva**, Youth Education Coordinator, Berkshire Botanical Garden, (413) 298-3926 ext: 16

**Kathy DeVarenes**, Second Grade Teacher, Lee Elementary School, (413) 243-0336 ext: 1222

b. Administrative Capacity

ESS has the ability to manage this project as the prime contractor and will serve as the point of contact for all administrative requirements in servicing the needs of this project from a fiscal management perspective. ESS is a full-service environmental consulting company capable of leading the scientific data collection effort, providing oversight of the monitoring program, and handling technical communication including workshops and reporting. ESS will also support HVA in the development and production of educational materials.

HVA will take a central role in developing educational materials and handling organizational communications with non-profit, private and public sector partners for the project. Additionally, HVA will assist in initial screen of monitoring sites as well as the field collection of monitoring samples during the baseline monitoring effort.

The ESS/HVA team will work closely with all partner organizations to ensure an efficient and streamlined use of project funding.

7. Supporting Technical Documentation

Supporting documentation includes a summary of our Team's response to the project restoration selection criteria, a list and map of proposed water bodies for monitoring as part of the proposed aquatic invasive species management project, and letters of support.

a. Summary of the ESS/HVA Team's Response to Proposed Restoration Selection Criteria

EVALUATION CRITERIA	ESS/HVA TEAM RESPONSE
Relevance and Applicability of Project	
Natural Recovery Period	<ul style="list-style-type: none"> <li>Project will clearly provide restoration benefits in advance of the natural recovery period.</li> </ul>
Location of Project	<ul style="list-style-type: none"> <li>Project takes place entirely within the Housatonic River watershed and will positively affect injured natural resources and their services.</li> </ul>
Sustainable Benefits	<ul style="list-style-type: none"> <li>Long-term and sustainable benefits are likely to require periodic maintenance or management that represents a relatively small investment to provide continuing benefits.</li> </ul>
Magnitude of Ecological Benefits	<ul style="list-style-type: none"> <li>Project will provide a high level of ecological benefits.</li> </ul>
Human Health and Safety	<ul style="list-style-type: none"> <li>Project has minimal or no potential for adverse effects on human health and safety.</li> </ul>
Benefits to Multiple Restoration Categories	<ul style="list-style-type: none"> <li>Project will clearly benefit more than one restoration priority category (aquatic biological resources and habitat, wildlife resources and habitat, recreational uses, and environmental education and outreach).</li> </ul>
Enhancement of Remedial Actions	<ul style="list-style-type: none"> <li>To a limited degree, project complements completed, ongoing or planned remediation or response actions. Synergistic benefits may be possible, but not substantiated.</li> </ul>

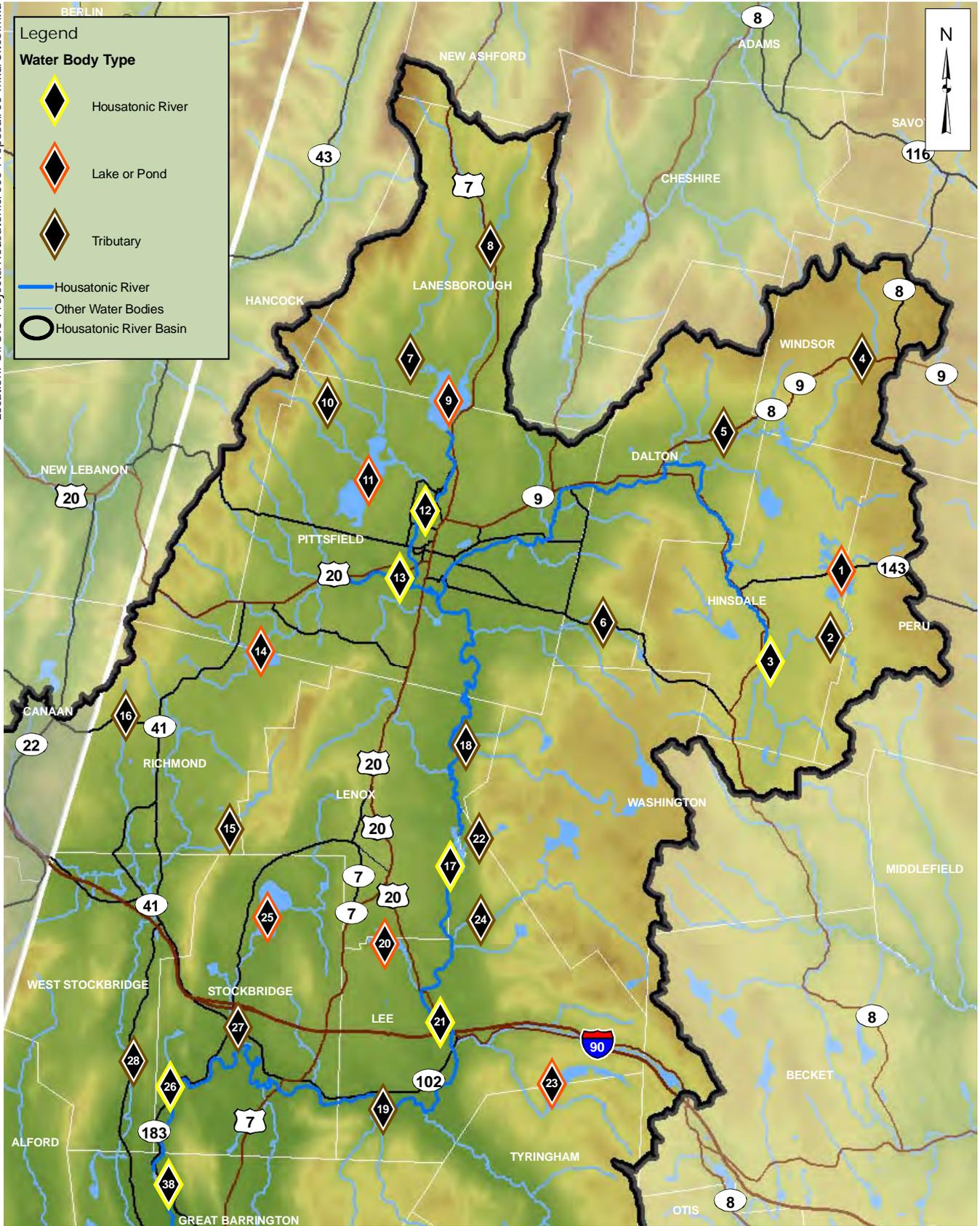
EVALUATION CRITERIA	ESS/HVA TEAM RESPONSE
Technical Merit	
Technical/Technological Feasibility	<ul style="list-style-type: none"> <li>▪ Methods are widely regarded as, or based on, proven techniques/technologies for achieving stated project objectives. Likelihood of success in the proposed project location is high. Applicant clearly demonstrates technical/technological feasibility of project.</li> </ul>
Technical Capacity of Applicant and Project Team	<ul style="list-style-type: none"> <li>▪ The applicant demonstrates considerable relevant technical qualifications, experience and capacity. The project team has an established record of success in the implementation of projects of similar technical complexity, and/or they have a record of highly effective management of projects with similar scale and scope.</li> </ul>
Adverse Environmental Impacts	<ul style="list-style-type: none"> <li>▪ Project has little to no potential for adverse environmental impacts.</li> </ul>
Measurable Results	<ul style="list-style-type: none"> <li>▪ Project success can be and will be directly measured using quantitative endpoints or other professionally accepted methods. Project includes a clear budget for monitoring and/or evaluation.</li> </ul>
Contingency Actions	<ul style="list-style-type: none"> <li>▪ Project demonstrates foresight for effectively and efficiently addressing potential problems throughout project life. Applicant appears well-prepared and demonstrates clearly how impacts to project goals would be minimized or eradicated, should a problem occur.</li> </ul>
Administrative Capacity of Applicant and Project Team	<ul style="list-style-type: none"> <li>▪ The applicant demonstrates considerable administrative resources, capacity and experience necessary to conduct a project of the proposed complexity, scale and scope.</li> </ul>
Project Budget	
Relationship of Expected Costs to Expected Benefits	<ul style="list-style-type: none"> <li>▪ The project's qualitative cost-benefit relationship demonstrates high net benefits.</li> </ul>
Implementation-oriented	<ul style="list-style-type: none"> <li>▪ Project has a high ratio of NRD funding dedicated to implementation relative to general program support.</li> </ul>
Budget Justification and Understanding	<ul style="list-style-type: none"> <li>▪ Budget is highly detailed, reasonable, realistic, and strongly justified for the proposed project.</li> </ul>
Leveraging of Additional Resources	<ul style="list-style-type: none"> <li>▪ Project budget demonstrates an average of \$0.10 - \$0.99 in non-NRD funding for every \$1.00 requested</li> </ul>
Coordination and Integration	<ul style="list-style-type: none"> <li>▪ Project is clearly coordinated and integrated with other ongoing or planned restoration activities. A high potential for synergistic benefits is demonstrated and integration with state and local governments is included.</li> </ul>
Comparative Cost-effectiveness	<ul style="list-style-type: none"> <li>▪ N/A</li> </ul>
Socioeconomic Merit	
Enhancement of Public's Relationship with Natural Resources	<ul style="list-style-type: none"> <li>▪ Project will significantly enhance the public's relationship with, and their ability to utilize, the Housatonic River watershed. Project would result in aesthetic enhancements that are highly likely to be viewed favorably by the public at large. Project will rely on education of the public and subsequent hands-on involvement with the river system.</li> </ul>

EVALUATION CRITERIA	ESS/HVA TEAM RESPONSE
Fostering Future Restoration and Stewardship	<ul style="list-style-type: none"> <li>▪ Project will encourage, develop, or influence a specific behavior that has a direct and long-lasting and positive effect on the injured natural resources and their services. Project provides a critical foundation for future restoration activities and long-term stewardship</li> </ul>
Community Involvement	<ul style="list-style-type: none"> <li>▪ Project includes significant and meaningful community involvement opportunities throughout the life of the project (planning, implementing, monitoring, and maintaining).</li> </ul>
Adverse Socioeconomic Impacts	<ul style="list-style-type: none"> <li>▪ Project has little to no potential for adverse socioeconomic impacts.</li> </ul>
Complementary with Community Goals	<ul style="list-style-type: none"> <li>▪ Project will complement one or more community goals, needs and/or recommendations as expressed in existing plans.</li> </ul>
Public Outreach	<ul style="list-style-type: none"> <li>▪ Project includes clear plans for conducting public outreach and demonstrates that a transparent and open process will enable the public to learn the details of the project.</li> </ul>
Diverse Partnerships	<ul style="list-style-type: none"> <li>▪ Project demonstrates a considerable diversity of partners contributing directly the project. The partners represent a broad range of community resources (e.g., individuals, private foundations, conservation organizations, municipalities, state agencies, private consulting, etc.).</li> </ul>

b. Map of Water Bodies Proposed for Aquatic Invasive Species Monitoring

Please see maps on the following pages.

Location: G:\GIS-Projects\Housatonic\000-Proposal\00-mxd\Sites.mxd



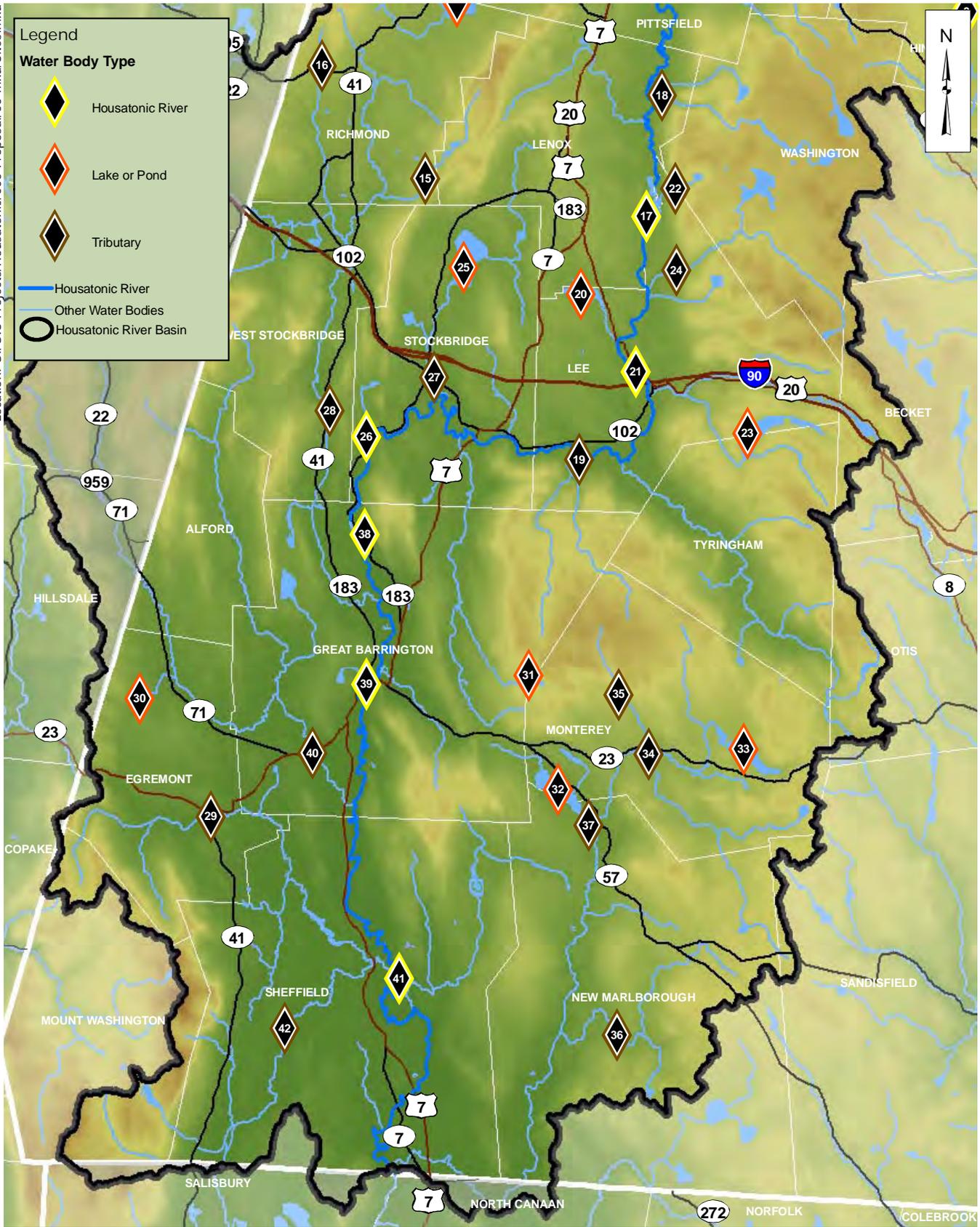
**HOUSATONIC RIVER  
WESTERN MASSACHUSETTS**

Scale: 1" = 3 Miles

- Source: 1) ESS, Monitoring Sites, 2009  
 2) MassGIS, Town Boundaries, 2002  
 3) MassGIS, Basin Boundaries, 2002  
 4) ESRI Data & Maps 9.3, Base Data, 2001-2008

**Water Bodies Proposed for  
Aquatic Invasive Species Monitoring  
(North)**

Figure



**HOUSATONIC RIVER  
WESTERN MASSACHUSETTS**

Scale: 1" = 3 Miles

- Source: 1) ESS, Monitoring Sites, 2009  
 2) MassGIS, Town Boundaries, 2002  
 3) MassGIS, Basin Boundaries, 2002  
 4) ESRI Data & Maps 9.3, Base Data, 2001-2008

**Water Bodies Proposed for  
Aquatic Invasive Species Monitoring  
(South)**

Figure

c. List of Water Bodies Proposed for Aquatic Invasive Species Monitoring

Final monitoring sites will be chosen during the risk assessment phase of the proposed project. However, a preliminary list of targeted water bodies is presented, by municipality, below. Note that each Housatonic River and tributary location below represents the extent of the water body within the boundaries of the respective town. More than one final monitoring site may be located within each waterbody, as necessary. Map location codes correspond to maps in section (b).

Town	Name of Water Body	Type of Water Body	Map Location Code
Hinsdale	Ashmere Lake	Lake or Pond	1
Hinsdale	Bennett Brook	Tributary	2
Hinsdale	Housatonic River	Housatonic River	3
Windsor	Windsor Brook	Tributary	4
Dalton	Waconah Falls Brook	Tributary	5
Dalton	Sackett Brook	Tributary	6
Lanesborough	Secum Brook	Tributary	7
Lanesborough	Town Brook	Tributary	8
Pittsfield	Pontoosuc Lake	Lake or Pond	9
Pittsfield	Lulu Cascade Brook	Tributary	10
Pittsfield	Onota Lake	Lake or Pond	11
Pittsfield	West Branch Housatonic River	Housatonic River	12
Pittsfield	Southwest Branch Housatonic River	Housatonic River	13
Richmond	Richmond Pond	Lake or Pond	14
Richmond	Lenox Mountain Brook	Tributary	15
Richmond	Furnace Brook	Tributary	16
Lenox	Woods Pond	Housatonic River (Impoundment)	17
Lenox	Roaring Brook	Tributary	18
Lee	Beartown Brook	Tributary	19
Lee	Laurel Lake	Lake or Pond	20
Lee	Housatonic River	Housatonic River	21
Lee	Felton Brook	Tributary	22
Lee	Washington Mountain Brook	Tributary	23
Tyringham	Goose Pond	Lake or Pond	24
Stockbridge	Stockbridge Bowl	Lake or Pond	25
Stockbridge	Housatonic River	Housatonic River	26
Stockbridge	Larrywaug Brook	Tributary	27
West Stockbridge	Williams River	Tributary	28
Egremont	Hubbard Brook	Tributary	29
Egremont	Prospect Lake	Lake or Pond	30

Town	Name of Water Body	Type of Water Body	Map Location Code
Monterey	Benedict Pond	Lake or Pond	31
Monterey	Lake Buel	Lake or Pond	32
Monterey	Lake Garfield	Lake or Pond	33
Monterey	Konkapot River	Tributary	34
Monterey	Swann Brook	Tributary	35
Monterey	Umpachene Brook	Tributary	36
New Marlborough	Konkapot River	Tributary	37
Great Barrington	Rising Pond	Housatonic River (Impoundment)	38
Great Barrington	Housatonic River	Housatonic River	39
Great Barrington	Green River	Tributary	40
Sheffield	Housatonic River	Housatonic River	41
Sheffield	Schenob Brook	Tributary	42

d. Letters of Support

Please see letters of support on the following pages.



April 16, 2009

Housatonic River Natural Resource Trustees  
c/o Stantec Consulting  
30 Park Drive  
Topsham, ME 04086-1737

**Re: Proposal for Aquatic Invasive Species Management in the Housatonic River**

Dear Housatonic River Natural Resource Trustees:

I am writing on behalf of The Massachusetts Department of Conservation and Recreation Lakes and Ponds Program to express our strong support for the "Proposal for Aquatic Invasive Species Management in the Housatonic River" submitted by ESS Group, Inc. (ESS) in partnership with the Housatonic Valley Association (HVA) for NRD Round II funding.

Our Program is largely responsible for the Massachusetts' aquatic invasive species effort and we are keenly aware of the very real threat that aquatic invasive species pose to the ecology and beauty of the Housatonic River and its watershed. We are especially concerned about the potential for these species to tarnish the success of the remediation and natural resource restoration efforts in the river and connected lakes and ponds. Our time to act appears to be limited. Therefore, setting up a sustainable watershed-wide program to immediately monitor and manage this threat is essential to preventing the incursion of these species into our water resources.

It is our opinion that the timing of this project could not be better and we are pleased to offer our full support to the ESS/HVA team on their proposal. Furthermore, we look forward to working with the project team to streamline and integrate the efforts of the proposed Housatonic River watershed monitoring program with ongoing aquatic invasive species prevention efforts at the State level. We are particularly concerned with three aquatic invasive species groups that may be spread through the river system: Zebra and Quagga mussels, Didymo (Rock-Snot), Spiny Water Flea and Fish Hook Flea. We would look forward to working with the ESS/HVA team to expand on education, prevention, and early detection of these devastating species.

In light of the urgency for action on this issue, we strongly encourage the NRD Trustees to accept this project proposal.

Sincerely,

Tom Flannery, Aquatic Ecologist  
MA DCR Lakes and Ponds Program

COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

Department of Conservation and Recreation  
251 Causeway Street, Suite 600  
Boston MA 02114-2119  
617-626-1250 617-626-1351 Fax  
www.mass.gov/dcr



Deval L. Patrick  
Governor

Timothy P. Murray  
Lt. Governor

Ian A. Bowles, Secretary, Executive  
Office of Energy & Environmental Affairs

Richard K. Sullivan, Jr., Commissioner  
Department of Conservation & Recreation



**THE CITY OF PITTSFIELD, MASSACHUSETTS**  
**Department of Community Development**

Deanna L. Ruffer  
Director

James M. Ruberto  
Mayor

April 15, 2009

Housatonic River Natural Resource Trustees  
c/o Stantec Consulting  
30 Park Drive  
Topsham, ME 04086-1737

Re: Proposal for Aquatic Invasive Species Control in the Housatonic River

Dear Housatonic River Natural Resource Trustees,

I am writing on behalf of the City of Pittsfield to express our support for the "*Proposal for Aquatic Invasive Species Control in the Housatonic River*" submitted by ESS Group, Inc. (ESS) in partnership with the Housatonic Valley Association (HVA) for NRD Round II funding.

As the lake manager for the City of Pittsfield, I am keenly aware of the very real threat that aquatic invasive species pose to the ecology and beauty of water resources in the watershed, especially at Onota and Pontoosuc lakes. We are continually challenged by the presence of aquatic invasive species at our city lakes and have taken an active role in trying to prevent and/or manage this issue. Most recently, the city has been actively engaged with the MA DCR Lakes and Ponds Program on a zebra mussel prevention program, though more needs to be done. Establishing a watershed-wide program to monitor and manage the threat that aquatic invaders pose is critical to preventing the further incursion of these species into our water resources.

The City supports the proposal by ESS and HVA and urges the Trustees to give the project every consideration.

Sincerely,  


James McGrath  
Park, Open Space, & Natural Resource Program Manager



**LITTLEVILLE POWER COMPANY, INC.**  
A SUBSIDIARY OF ENEL NORTH AMERICA, INC.

Energy in tune with you.

Enel North America, Inc.

One Tech Drive, Suite 220, Andover, MA 01810  
Tel. 978 681 1900 Fax 978 681 7727

April 21, 2009

Housatonic River Natural Resource Trustees  
c/o Stantec Consulting  
30 Park Drive  
Topsham, ME 04086-1737

Re: Housatonic River NRD Program Round II Funding;  
Proposal for Aquatic Invasive Species Management in the Housatonic River.

Dear Housatonic River Natural Resource Trustees:

Littleville Power Company, Inc. owns and operates the Glendale Hydroelectric Project, which is located on the Housatonic River in Stockbridge, MA. As a company that is dependent upon the river resource, we are quite aware of the threat that aquatic invasive species pose to the ecology and function of the Housatonic River. We are especially concerned about the potential for these species to tarnish the success of the remediation and natural resource restoration efforts in the river. As zebra mussels have already been found in the Housatonic drainage, it is essential that a watershed-wide invasive species monitoring and management program be implemented immediately to prevent any further incursion of these species into the basin.

Therefore, we would like to express our strong support for the "Proposal for Aquatic Invasive Species Management in the Housatonic River" submitted by ESS Group, Inc. (ESS) in partnership with the Housatonic Valley Association (HVA) for Natural Resource Damages Assessment and Restoration (NRD) Round II funding. While the current proposal is limited to the monitoring and management of aquatic invasive species, we believe that the program should eventually address plants and other invasive species which may threaten the well-being of the river. We believe that the ESS/HVA team is especially qualified to design and implement such a program, and we are pleased to offer them our full support on their proposal. We look forward to working with the project team in the future as this program develops.

In light of the urgency for action on this issue, we strongly encourage the NRD Trustees to accept and fully fund the ESS/HVA team's proposal.

Thank you for your consideration of this letter of support. Please do not hesitate to contact me at (978) 681-1900, extension 809 if you have any questions concerning this matter.

Sincerely,  
Littleville Power Company, Inc.

A handwritten signature in black ink, appearing to read "Kevin M. Webb".

Kevin M. Webb  
Environmental Affairs Coordinator

cc: V. Engel, LPC

PART D ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS

The MA SubCouncil will review the information provided and determine whether further information is required.

**CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS**

Project Name: Aquatic Invasive Species Control in the Housatonic River

Applicant: ESS Group, Inc. and Housatonic Valley Association

Impact Category	Impact	No Effect	Minimal Adverse Impacts*	Significant Adverse Impacts*	Beneficial Impacts*	Mitigation Required*	Permit or Approval Required**
<b>Environmental</b>	Air quality impacts	X					
	Instream flow impacts	X					
	Surface water quality impacts				X		
	Sediment quality impacts	X					
	Soil quality impacts	X					
	Groundwater quality impacts	X					
	Wetlands quality and services	X					
	Diversity and abundance of aquatic species					X	
	Diversity and abundance of terrestrial wildlife species					X	
	Diversity of plant communities					X	
	Other:						
	Other:						

1. Impact Checklists

The MA SubCouncil will review the information provided and determine whether further information is required.

**CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS**

Project Name: Aquatic Invasive Species Control in the Housatonic River

Applicant: ESS Group, Inc. and Housatonic Valley Association

Impact Category	Impact	No Effect	Minimal Adverse Impacts*	Significant Adverse Impacts*	Beneficial Impacts*	Mitigation Required*	Permit or Approval Required**
<b>Social</b>	Impacts on minority or low income populations				X		
	Impacts on local sense of community and well being				X		
	Impacts on aesthetics				X		
	Impacts on public health or safety				X		
	Impacts on recreational activity				X		
	Impacts to Native American Trust Resources	X					
	Impacts on non-Tribal cultural sites	X					
	Impacts on education				X		
	Impacts on local partnerships and collaborative efforts				X		
	Impacts on availability and quality of drinking water	X					
	Impact on subsistence activity				X		
	Nuisance impacts				X		
	Other:						

The MA SubCouncil will review the information provided and determine whether further information is required.

**CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS**

Project Name: Aquatic Invasive Species Control in the Housatonic River

Applicant: ESS Group, Inc. and Housatonic Valley Association

Impact Category	Impact	No Effect	Minimal Adverse Impacts*	Significant Adverse Impacts*	Beneficial Impacts*	Mitigation Required*	Permit or Approval Required**
<b>Economic</b>	Short-term commercial economic impact of restoration action	X					
	Impacts on property values				X		
	Impacts on recreational expenditures and related businesses				X		
	Impacts on existing resource-based industries				X		
	Impacts on commercial water users				X		
	Impacts on river-based commercial navigation	X					
	Impact on wastewater dischargers	X					
	Other:						
	Other:						

\* Requires narrative discussion; see instructions in text.

\*\* List and description of permits required; see instructions in text.

## 2. Impact Narrative

### Environmental Impacts:

- **Surface Water Quality Impacts:** The proposed project is expected to have beneficial impacts on surface water quality in the Housatonic River. In addition to preventing potential phytoplankton blooms that could be brought on by established populations of spiny or fishhook water fleas, this project will help prevent state listing of waters in the Housatonic River watershed due to invasive species.
- **Diversity and Abundance of Aquatic Species:** By controlling the spread of aquatic invasive species in the Housatonic River, this project will help prevent the potential collapse of populations of some native aquatic species. Native freshwater mussels would receive protection from zebra and quagga mussels, species that are known to compete with native mussels for food and even colonize native mussel valves to the point that they are sealed shut (resulting in the death of the organism). Predatory and planktivorous fishes would benefit from the preservation of their food sources and reduced bioaccumulation of PCBs. Aquatic insect diversity and abundance would benefit from prevention of rock snot growth, which tends to reduce available habitat and favor a less diverse community.
- **Diversity and Abundance of Terrestrial Wildlife Communities:** By controlling the spread of zebra and quagga mussels, this project will help prevent the bioaccumulation of PCBs through the food chain and therefore help preserve the diversity and abundance of semi-aquatic and terrestrial predators (Bald Eagle, Osprey, and river otter among others).
- **Diversity of Plant Communities:** Although each of the targeted aquatic invasive species is likely to impact aquatic plant communities in some way, rock snot would be most likely to impact diversity by smothering or outcompeting native mosses, liverworts, and other aquatic or semi-aquatic plants growing in streams. Therefore, preventing the invasion of rock snot is anticipated to have a beneficial impact on the diversity of instream plant communities.

### Social Impacts:

- **Impacts on minority or low income populations:** The proposed project would prevent the risk of increased exposure of families who practice some form of subsistence fishing (which tends to disproportionately consist of minorities and low income populations) to PCBs. Maintaining the aesthetic appeal (see below) of the Housatonic River will also benefit these populations.
- **Impacts on local sense of community and well being:** The proposed project would involve significant participation of citizen groups and unite them around the Housatonic River in a common cause. This engagement is expected to have a beneficial impact on local sense of community and well being.
- **Impacts on aesthetics:** Aesthetics of the water bodies in the Housatonic River watershed could suffer greatly from the uncontrolled expansion of aquatic invasive species. Zebra and quagga mussels frequently die off in large numbers and end up littering banks and shorelines. Spiny and fishhook

water fleas tend to reduce densities of other zooplankton, which are important grazers on phytoplankton, and their establishment could increase the risk of algae blooms. Lastly, rock snot turns clear, pristine trout streams into unsightly masses of brownish-yellow mounds and strands. Rock snot, as its common name implies, is slimy-looking up close and often described as looking like “toilet paper” in flowing water. Implementation of the proposed project would help protect the natural beauty of lakes, ponds, and streams within the Housatonic River watershed.

- Impacts on public health or safety: The proposed project would help prevent the increased risk of bioaccumulation of PCBs posed by the establishment of zebra or quagga mussels. Additionally, this project would help combat the risk of lacerations associated with walking on or playing around empty zebra and quagga mussel valves (which have sharp edges and tend to accumulate on beaches and bars).
- Impacts on recreational activity: The proposed project is anticipated to help prevent additional damage to fishery resources and aesthetics in the Housatonic River watershed. As healthy fishery resources and aesthetics are recreational resources, their protection represents a positive impact on recreational activity.
- Impacts on education: The project would enhance public education in the Housatonic River watershed through workshops to steward groups and dissemination of information to stakeholders and users through brochures, educational signage, and electronic educational materials.
- Impacts on local partnerships and collaborative efforts: The proposed project targets partnerships with citizen groups, state agencies, municipalities, and private organizations to train, mobilize, and integrate steward groups into a watershed-wide monitoring program/control effort. Local organizations will be responsible for the long term sustainability of the monitoring program.
- Impact on subsistence activity: This project would beneficially impact subsistence activity by helping prevent the risk of increased exposure to PCBs that would be associated with the spread of zebra and quagga mussels in the Housatonic River watershed.
- Nuisance impacts: By preventing the spread of aquatic invasive species this project will have a beneficial impact on nuisances to stakeholders and users of the Housatonic River and its watershed. The infestation or spread of any of the project’s target species to water bodies in the watershed would increase the nuisance to recreational users. Fishhook and spiny water fleas would be likely to foul fishing lines and nets and could trigger algae blooms by preying on zooplankton that feed on algae. Zebra and quagga mussels would likely litter beaches and bars with their empty valves while live mussels could colonize and clog intake pipes at industrial facilities along the river. Rock snot could result in unsightly stream or river reaches and make wading more difficult by coating river rocks in thick algal mats.

### Economic Impacts:

- Impacts on property values: By preventing the unsightly and potentially dangerous masses of rock snot and zebra and quagga mussels, the proposed project would be likely to help maintain property values within sight of water bodies in the Housatonic River watershed.
- Impacts on recreational expenditures and related businesses: The proposed project would be likely to be a benefit to tourism by helping avoid the negative attention of press releases associated with invasive species problems. Likewise, the collaborative efforts associated with the proactive control of aquatic invasive species could generate positive press for the Housatonic River and encourage visitors to seek recreation in waters that are unspoiled by some of the most notorious invasive species in the U.S. and Canada. The continued influx of tourists is likely to benefit local businesses by helping maintain revenues at local businesses. Affected businesses potentially include guide services, bait and tackle shops, sporting goods stores, hotels, grocery stores, and gas stations.
- Impacts on existing resource-based industries: By preventing the spread of zebra and quagga mussels into the Housatonic River, industries that rely on the river for power and cooling are expected to benefit. Intake pipes and screens that are infested with zebra or quagga mussels can quickly become clogged and require costly chemical, thermal, and/or mechanical treatments to control. Additionally, the businesses associated with the recreational fishing industry (bait and tackle, guide services, local restaurants and lodging, etc.) will also benefit. Keeping target aquatic invasive species out of the Housatonic River is the best way to avoid the related negative impacts to these industries.
- Impacts on commercial water users: By preventing the spread of zebra and quagga mussels into the Housatonic River, commercial water users are expected to benefit. Intake pipes and screens that are infested with zebra or quagga mussels can quickly become clogged and require costly chemical, thermal, and/or mechanical treatments to control.

### 3. Permits and Regulatory Approvals

The Massachusetts Division of Fisheries and Wildlife does not issue permits for the scientific collection of samples proposed herein. The aquatic invasive species monitoring program is not likely to require any permits or regulatory approvals but will comply with all relevant federal, state, and local laws and regulations.

The ESS/HVA project team will coordinate with MassDCR Lakes and Ponds, other state agencies, and respective municipal bodies, lake or pond associations, and private landowners as appropriate in order to minimize loss or damage of monitoring equipment and signage to theft or vandalism and to avoid conflicts with recreational uses.

PART E. PROJECT BUDGET

**TABLE 1. HOUSATONIC RIVER NRD FUNDING ALLOCATION BY FISCAL YEARS<sup>1</sup>**

<b>PROJECT TITLE:</b>	Aquatic Invasive Species Management in the Housatonic River							
<b>APPLICANT NAME:</b>	ESS Group, Inc.							
EXPENSE CATEGORY	FISCAL YEAR 1		FISCAL YEAR 2		FISCAL YEAR 3		FISCAL YEAR 4	
	Housatonic River NRD Funds		Housatonic River NRD Funds		Housatonic River NRD Funds		Housatonic River NRD Funds	
A. SALARIES	N/A		N/A		N/A		-	
B. EMPLOYEE BENEFITS	N/A		N/A		N/A		-	
C. CONTRACTED SERVICES	\$22,500		\$56,000		\$28,440		-	
D. SUPPLIES, MATERIALS AND EQUIPMENT	\$2,500		\$27,185		\$1,050		-	
E. TRAVEL	\$1,900		\$3,425		\$1,100		-	
F. OTHER (LIST)	N/A		N/A		N/A		-	
G. OTHER (LIST)	N/A		N/A		N/A		-	
<b>TOTAL BY FISCAL YEAR</b>	<b>1</b>	\$26,900	<b>2</b>	\$86,610	<b>3</b>	\$30,590	<b>4</b>	-
<b>GRAND TOTAL (sum of boxes 1+2+3+4)</b> [This sum is the total NRD fund request and should match Part A, Budget Summary, Box 1]					\$144,100			

<sup>1</sup> The fiscal year is July 1 – June 30. If the proposed project will be completed in one year, fill in only the column titled "Fiscal Year 1."

**TABLE 2. PROJECT BUDGET SUMMARY BY TASK AND FUNDING SOURCE**

<b>PROJECT TITLE:</b>		<b>Aquatic Invasive Species Management in the Housatonic River</b>							
<b>APPLICANT NAME:</b>		ESS Group, Inc.							
<b>TASK<sup>2</sup></b>	<b>HOUSATONIC RIVER NRD FUNDS</b>		<b>OTHER CONTRIBUTIONS</b>				<b>TOTAL COST BY TASK</b>		
			<b>COMMITTED</b>		<b>NOT COMMITTED</b>				
1 Coordination with regional, state, and interstate agencies		\$4,050		0		0		\$4,050	
2 Invasion risk assessment for each targeted aquatic invasive species throughout the watershed		\$4,000		0		0		\$4,000	
3 Baseline invasive species monitoring of 30 lake, pond, river, and stream sites throughout the watershed		\$41,500		\$5,000		0		\$46,500	
4 Purchase of up to six invasive species field monitoring kits and three lab kits		\$16,800		0		0		\$16,800	
5 Presentation of up to four regional workshops to enlist and train citizen and volunteer groups		\$7,800		0		0		\$7,800	
6 Development and distribution of educational materials within the watershed		\$14,500		\$2,000		0		\$16,500	
7 Development and implementation of an ongoing monitoring network and program (including one year of oversight by ESS)		\$39,000		0		\$17,000		\$56,000	
8 Annual reporting and final project summary report		\$16,450		0		0		\$16,450	
<b>TOTAL BY FUNDING SOURCE</b>	5	\$144,100	6	\$7,000	7	\$17,000	8	<u>GRAND TOTAL</u> \$168,100	

<sup>2</sup> The listed tasks should correspond with information provided in the Project Implementation Plan.

## Budget Narrative

Additional details on the proposed budget are presented in Appendix A.

The following expense categories are described for the major budget items listed in the Project Budget Tables:

A. Salaries – None will be covered by these funds.

B. Employee Benefits – None will be covered by these funds.

C. Contracted Services – Carl Nielsen will be the primary advisor to the project from ESS and will be assisted by other support staff including environmental scientists, GIS specialists, seasonal field assistants, and administrative staff as necessary. It is estimated that ESS will provide approximately 698 hours of service over the duration of the project, or an average of approximately 233 hours per fiscal year.

ESS will provide consulting-related service valued at approximately \$84,630, in addition to in-kind contributions of \$5,000. Other work will be subcontracted to HVA. HVA will provide additional service of approximately \$22,310 as a subcontractor to ESS, in addition to an in-kind contribution of \$2,000. HVA will provide an estimated 330 hours of service with NRD funds.

D. Supplies, Materials and Equipment – Costs of major supplies, materials and equipment necessary to prepare, conduct, or otherwise implement this project are expected to cost on the order of \$30,735 for monitoring equipment, education and outreach materials, copies, and other supplies.

E. Travel – Travel will be required by the ESS/HVA team to conduct field monitoring at 30 sites twice during Project Year 1 (Fiscal Year 2). It is estimated that this will require travel for a total of two staff from ESS and/or HVA on approximately 16 dates to complete (8 for each round of monitoring). Travel will originate from ESS offices in Wellesley, Massachusetts or East Providence, Rhode Island and/or HVA Berkshire offices in South Lee, Massachusetts, as applicable. However, travel costs will be kept to a minimum by conducting field monitoring on consecutive dates and acquiring overnight lodging, as necessary. Associated costs incurred for meals or lodging will not exceed current state or federal employee rates. Additional travel will be required for one to two staff from the ESS/HVA team to deliver up to four workshops, oversee field monitoring, conduct further outreach, post educational materials. Travel time for one to two staff from the ESS/HVA team has also been budgeted for coordination with state and regional agencies.

Travel will be accrued on a per mile basis in accordance with the standard federal rates in each fiscal year and is anticipated to total \$6,425 for the three fiscal years of this project.

F. Other – It is anticipated that watershed stakeholders will contribute to the long-term maintenance of items associated with the monitoring program. HVA will serve as head steward of all monitoring equipment purchased by the proposed project.

Volunteer effort will be part of the project and is valued at a minimum of \$17,000 during the funding period. The project may also require volunteer time to extend the monitoring program beyond the funding period

Appendix A

Detailed Costing Sheet



Project: **Aquatic Invasive Species Management in the Housatonic River**  
 Client: Housatonic River NRD Round II Funding  
 Project / Proposal Number: 13724  
 Type of Bid (fixed or T&M): T&M  
 Automatic Markup (if none - enter 1): 1.15  
 Comments: (enter 1.15 for 15%)

Revised By: **Nielsen**  
 Date Revised: **4/30/2009**  
**Total Cost (Including in-kind) \$168,100**

TASK	TITLE	PERSONNEL	BCL/ RATE	HOURS	TOTAL LABOR	EXPENSES	TOTAL COST
<b>TASK 1. State and Regional Integration of Program</b>							
	ESS Staff (blended rate)	Nielsen, Ladewig	\$115	24	\$2,760		\$2,760
	HVA Staff	Regan	\$75	8	\$600		\$690
	HVA Staff		\$50	0	\$0		\$0
	travel				\$0	\$368	\$423
	materials, supplies, equipment				\$0	\$154	\$177
	<b>Task Total</b>			<b>32</b>	<b>\$3,360</b>	<b>\$522</b>	<b>\$4,050</b>
<b>TASK 2. Risk Assessment of Sites</b>							
	ESS Staff (blended rate)	Nielsen, Ladewig, Lord	\$115	24	\$2,760		\$2,760
	HVA Staff	Regan	\$75	8	\$600		\$690
	HVA Staff		\$50	0	\$0		\$0
	travel				\$0	\$225	\$259
	materials, supplies, equipment				\$0	\$253	\$291
	<b>Task Total</b>			<b>32</b>	<b>\$3,360</b>	<b>\$478</b>	<b>\$4,000</b>
<b>TASK 3. Baseline Monitoring</b>							
	ESS Staff (blended rate)	Nielsen, Ladewig, Herzlinger, Lord	\$125	240	\$30,000		\$30,000
	HVA Staff	Regan	\$75	10	\$750		\$863
	HVA Staff	Support	\$50	60	\$3,000		\$3,450
	travel				\$0	\$2,500	\$2,875
	materials, supplies, equipment				\$0	\$3,750	\$4,313
	<b>Task Subtotal</b>			<b>310</b>	<b>\$33,750</b>	<b>\$6,250</b>	<b>\$41,500</b>
	<i>ESS in-kind</i>						\$5,000
	<b>Task Total</b>						<b>\$46,500</b>
<b>TASK 4. Kit Purchase</b>							
	ESS Staff (blended rate)	Ladewig, Administrative Staff	\$85	8	\$680		\$680
	HVA Staff		\$75	0	\$0		\$0
	HVA Staff		\$50	0	\$0		\$0
	travel				\$0	\$0	\$0
	materials, supplies, equipment				\$0	\$14,017	\$16,120
	<b>Task Total</b>			<b>8</b>	<b>\$680</b>	<b>\$14,017</b>	<b>\$16,800</b>
<b>TASK 5. Workshops</b>							
	ESS Staff (blended rate)	Nielsen, Ladewig, Administrative Staff	\$115	48	\$5,520		\$5,520
	HVA Staff	Regan	\$75	8	\$600		\$690
	HVA Staff	Support Staff	\$50	8	\$400		\$460
	travel				\$0	\$654	\$752
	materials, supplies, equipment				\$0	\$329	\$378
	<b>Task Total</b>			<b>64</b>	<b>\$6,520</b>	<b>\$983</b>	<b>\$7,800</b>

**TASK 6. Educational Materials**

ESS Staff (blended rate)	Nielsen, Ladewig, Lord, Administrative Staf	\$115	24	\$2,760		\$2,760
HVA Staff	Regan	\$75	24	\$1,800		\$2,070
HVA Staff	Support Staff	\$50	36	\$1,800		\$2,070
travel				\$0	\$0	\$0
materials, supplies, equipment				\$0	\$200	\$230
Brochure/fact sheet printing				\$0	\$5,202	\$5,982
Signs				\$0	\$1,207	\$1,388
<b>Task Total</b>			<b>84</b>	<b>\$6,360</b>	<b>\$6,609</b>	<b>\$14,500</b>

**TASK 7. Monitoring Network**

ESS Staff (blended rate)	Nielsen, Ladewig, Herzlinger	\$115	220	\$25,300		\$25,300
HVA Staff	Regan	\$75	50	\$3,750		\$4,313
HVA Staff	Support Staff	\$50	110	\$5,500		\$6,325
travel				\$0	\$1,650	\$1,898
materials, supplies, equipment				\$0	\$1,013	\$1,165
<i>Task Subtotal</i>			380	\$34,550	\$2,663	\$39,000
<i>HVA in-kind</i>						\$2,000
<i>Volunteer (uncommitted) in-kind</i>						\$17,000
<b>Task Total</b>						<b>\$58,000</b>

**TASK 8. Reporting**

ESS Staff (blended rate)	Nielsen, Ladewig, Lord, Administrative Staf	\$135	110	\$14,850		\$14,850
HVA Staff	Regan	\$75	8	\$600		\$690
HVA Staff	Support Staff	\$50	0	\$0		\$0
travel				\$0	\$190	\$219
materials, supplies, equipment				\$0	\$601	\$691
<b>Task Total</b>			<b>118</b>	<b>\$15,450</b>	<b>\$791</b>	<b>\$16,450</b>

Project Total  
(minus in-kind): \$144,100

ESS hours	698	ESS Labor	\$84,630
HVA hours	330	HVA Labor	\$22,310
		Travel	\$6,425
		Supplies	\$30,735