Housatonic River Basin Natural Resources Restoration Project
Natural Resources Trustee SubCouncil for Connecticut
Request for Supplemental Information (RSI)
INSTRUCTIONS

PART A: SPONSOR AND PROJECT SUMMARY FORM

Please read "Request for Supplemental Information (RFI) OVERVIEW" and this document, "Request for Supplemental Information (RSI) INSTRUCTIONS" before completing this form.

Part A must be completed using this "Sponsor and Project Summary Form"

SPONSOR INFORMATION

Type of Entity Check the box that best describes the sponsor.

- ☐ Private individual
- ☒ Non-profit organization
- ☐ State government
- ☐ Federal government
- ☐ Tribal government
- ☐ Municipal government
- ☐ Corporation or Business
- ☐ County government
- ☐ Academic Institution
- ☐ Other (explain)

Authorized Representative of Sponsor
Kirt Mayland, Trout Unlimited (National Office)

Name
Kirt Mayland

Title
Eastern Water Project Director

Address
206 Pleasant Street

City **State** **Zip**
Housatonic MA 01236

Phone
413-274-6329

Email
kmayland@tu.org

Contact Person (if different from Authorized Representative):

Name

Title

Address

City **State** **Zip**

Phone

Email

RECEIVED
JUN 20 2007
INLAND FISHERIES

Project Name Provide a brief working name:

Trout Unlimited Salmon Kill Restoration and Enhancement

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: Salisbury, CT

Longitude for approximate center of project area: 41 56'33.83"N

Latitude for approximate center of project area: 73 23'28.11" W

NOTE: If a specific location(s) has/have not been selected yet, include in Part C a narrative describing how project location(s) will be selected.

Restoration Priority Category *See Appendix C of these Instructions for Restoration Priority Category Descriptions*

Primary Category. *Check the restoration category that is the primary goal of the project.*
Check one box.

- ☐ Aquatic Natural Resources Restoration/Enhancement
- ☒ Riparian & Floodplain Natural Resources Restoration/Enhancement
- ☐ Restoration/Enhancement of Recreational Uses of Natural Resources

Secondary Categories. Check all relevant boxes.

- ☒ Aquatic Natural Resources Restoration/Enhancement
- ☐ Riparian & Floodplain Natural Resources Restoration/Enhancement
- ☐ Restoration/Enhancement of Recreational Uses of Natural Resources

List Specific Injured Natural Resources and/or Impaired Natural Resource Services to Benefit from Project

Salmon Kill and the Housatonic River. Injured and impaired natural resources in the Housatonic River that will benefit from this project include water quality, health and abundance of wild fish communities, recreational fishing and boating, and biodiversity.

Project Budget Summary

Complete the table below to summarize the budget information that is detailed in Part D: Project Budget Narrative and Forms. Sponsors are advised to complete Part D (Project Budget Narrative and Forms) before filling in the table below.

Housatonic River NRD Funds – Requested	Other Contributions (Committed)	Other Contributions (Not Committed)	Total Project Cost (boxes 1+2+3)
1. From Part D, Table 2, Box 5 $617,260	2. From Part D, Table 2, Box 6 $44,000	3. From Part D, Table 2, Box 7 $600,000	4. From Part D, Table 2, Box 8 $1,261,260
	Amount of Other Contributions to Be Considered as Cost-Matching to NRD Fund Request		
	5. 644,000		

Authorizing Statement

I hereby declare that the information included in this project submission 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.

Kirt Mayland 06/20/07

Signature of Sponsor or Sponsor Representative **Date**

Kirt Mayland

Name of Sponsor or Sponsor Representative
(Type or print clearly)

Housatonic River Basin Natural Resources Restoration project
Natural Resources Trustee SubCouncil for Connecticut

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PART B. PROJECT ABSTRACT

The Trout Unlimited Salmon Kill project proposes to restore and enhance the riparian corridors and instream habitat of 1.8 miles of the Salmon Kill Creek. Currently, there is little riparian vegetation, the streambanks are eroded and incised, the water is thermally charged, and biodiversity and suitable habitat in both the instream and riparian zones is severely limited.

The instream work will consist of placement of instream structures (rock, log flow structures) and grade controls to improve instream habitat and oxygenation and allow for restoration of the natural hydrologic regime. The riparian restoration will generally consist of reparation and stabilization of erosive streambanks, and the repair and restoration of forested riparian buffers through selected native specie tree plantings.

The result will be cleaner water from riparian filtration, shaded and stable streambanks that reduce thermal loading, sedimentation and turbidity, and a more naturally functioning stream habitat and hydraulics resulting in greater biodiversity.

The project timeline is for design and survey work to take place during year one (and to begin monitoring), restoration work to take place during years two and three, and for post-project monitoring/outreach/education to run for 5 years or more.

Current partners on the project are the landowners, the CT Council of TU, the NW CT TU Chapter, The Nature Conservancy, Salisbury Land Trust, Weantinogue Land Trust, Salisbury, the Upper Housatonic Valley National Heritage Area, and area schools.

PART C. PROJECT NARRATIVE

1.0 GENERAL DESCRIPTION

General Background (Geography, Conservation information, Other Ecological Considerations): The 6 miles of the Salmon Kill Creek (the "creek", the "river" or the "Salmon Kill") run entirely through the town of Salisbury - from the confluence of several mountain streams to its eventual confluence with the Housatonic River across the river from the Housatonic Regional High School directly above the famous Housatonic Trout Management Area ("TMA"). Please see Exhibit 1 for a map of the entire stream length. The two sections upon which Trout Unlimited ("TU") is focused in this proposal (or "project") are the agricultural areas (or the "farmland") and the Industrial Area or Lime Rock Park (or the "race track"). A map showing a more exact location of the race track can be found at Exhibit 4, along with a map showing where exactly the creek flows in relation to the race track

Please note that TU has decided not to pursue the dam removal portion of the project. Due to the presence of an impassable, large barrier a half-mile upstream of the dam and after a cost-benefit analysis, TU has decided to forego this aspect of its project for the creek.

The watershed of the creek includes Fisher Pond, Moore Brook, Lakeville Lake, Factory Brook, Burton Brook, Wachocastinook Brook, Brassie Brook, Ball Brook, Bigham Pond, Spruce Swamp Brook, White Hollow Brook, Garnett Brook Riga Lake, and Pettee Brook. Please see Exhibit 2 for a map of the creek's contributing watershed. The Salmon Kill valley (the "valley") and the creek itself have long been considered some of the most beautiful and ecologically valuable in the state. The valley and the creek are a corridor for wildlife, connecting the protected lands of the Appalachian Trail on the ridge to the west, north, and south, the undeveloped areas of Wells Hill, the swamps along Moore Brook, and the Mt. Riga forest. The valley holds a high value for the people of the area as well as its flora and fauna.

The creek, a second order stream, receives almost all of its streamflow from the headwater streams of Brassie Brook, Wachocastinook Brook, Factory Brook, Moore Brook, and Furnace Brook, all coldwater, unimpaired waterbodies, at least three of which support populations of native Connecticut brook trout. These brooks also contain healthy macroinvertebrate populations, relatively high pH, and healthy and diverse levels of aquatic plants.

As stated above, the creek, its riparian corridors and surrounding land have long been considered by numerous state, federal and conservation organizations to be one of the most unique and valuable, in the state, and potentially the country. Please see Exhibit 3, a map of all conserved lands in the Town of Salisbury as of 2004. Starting at the confluence, in the lower-righthand corner (southeast portion) of the map the confluence

of the creek with the Housatonic River (or the "main stem") is at #95. This land is held in conservation by the United States Park Service. Moving upstream, the Housatonic Valley Association holds development rights to 25 acres, and farther upstream the Town of Salisbury owns conservation easements on 50 acres (#105) of land along the river.

The Nature Conservancy holds extensive easements on Moore Brook due to its rare calcareous habitats. Wachocastinook Brook (aka "Riga Brook"), also flows through one of the oldest and largest private landholdings in the state (the Mount Riga Corporation) and is one of only a handful of rivers in the state managed by the state Department of Environmental Protection ("DEP") for management and protection of its native brook trout populations (a Wild Trout Management Area #1). All of the headwater streams, and the Salmon Kill itself, abut or are visible from the Appalachian Trail, a federal park, along with the various trail systems in the distant Taconic Range.

The Salisbury Land Trust's Dark Hollow preserve of 120 acres is at the east end of the valley and was the Land Trust's first major purchase, costing over one million dollars. This property protects wetlands to its east, which drain to the Salmon Kill, as well as Factory Brook to the west. The point where the Salmon Kill is ultimately formed by the confluence of Factory Brook and Spruce Swamp Brook is on a 129 acre parcel protected by a conservation restriction recently purchased by the Weantinogue Land Trust. The drainage to the north is protected by another conserved parcel of 205 acres and the Appalachian Trail. The Land Trust holds a conservation restriction on 40 acres of the MacLaren lands (part of the farmlands) between the creek and Salmon Kill Road, one of the sites proposed for restoration in this Proposal.

The State of Connecticut, the Nature Conservancy and the town of Salisbury along with private landowners are just a few other organizations that have selected the Salmon Kill watershed for various conservation measures. Please see Exhibit 11 for letters of support for this project from Senator Andrew Roraback, Representative Roberta Willis, the Town of Salisbury, the Salisbury Land Trust, The Nature Conservancy and the Upper Housatonic Valley National Heritage Area, Inc.

Notably, immediately downstream of the farmland, the largest private landowner along the Salmon Kill has placed his property holdings under conservation easements and has carried out extensive riparian and instream improvements at his own expense along the approximately mile-long section of the creek running through his property. TU has discussed the project with this landowner and he is supportive and willing to contribute to the effort.

Finally, the town and Regional plans of Conservation and Development all recognize the ecological and scenic value of the Salmon Kill. For instance, in the January 1, 1999 Town Plan, Section 4.15 reads, with respect to Moore Brook and the Salmon [River] Corridor: "[t]he 1975 regional report on Conservation and Preservation in Northwestern Connecticut identified this stream belt as one of the region's most scenic corridors. It noted that the Salmon River corridor outside of the village of Salisbury adds definition and scenic interest to the large area of farmlands in the Salmon River valley. The Moore

Brook, Spring Swamp and Salmon Brook stream belt corridor should be a top priority for preservation and conservation."

1.1 Project Goals and Objectives

a. Goals and Objectives:

The project, upon completion, would tackle and resolve all the issues laid out above and fulfill all three restoration goals outlined in the Request for Proposals. It would restore and enhance aquatic habitat, riparian and floodplain resources, and recreational uses of natural resources of the Housatonic River watershed.

1. The primary goal of the riparian improvements is to rehabilitate, enhance, and restore the streambanks, riparian forest and floodplain along the creek. This work would involve, among other things replanting the floodplains, replacing invasive species with natives, stabilizing streambanks, and removal of armoring and replacement with native species. Invasive species of flora along the streambanks include *Rosa multiflora,* Multiflora rose; *Rhamnus frangula*, Alder buckthorn; and *Celastrus orbiculatus*, Oriental bittersweet.

The objectives behind this work are to limit further impacts of eroded sediments and other pollutants, decrease summertime water temperatures by providing shading, and to slow water velocity to a more natural level. This work should also increase biodiversity and reestablish native life in the riparian forest and floodplain. Restoration of the riparian forest will also buffer the Salmon Kill from present land uses as well as possible future development along its banks.

2. The principal goal of the instream improvements is an increase in biodiversity, enhancement of instream habitat potentially for native brook trout in the upper reaches of the creek, the downstream wild brown trout populations and assorted aquatic life. The reach of the creek that flows by the race track was channelized decades ago during construction of the track, and instream life there would particularly benefit from the placement of rock weirs and other instream structures to improve habitat.

3. The tertiary goal is to educate the landowners and the public entities involved in both the instream and riparian improvements. Public participation and education will be utilized to help in the implementation of the riparian and instream improvements and to educate the landowners on the effects certain land uses can have on the creek. Several fishing clubs, shops and organizations currently fish along the river, including the Housatonic Valley Outfitters and the Northwest Rod and Gun Club. It is likely that recreational fishing opportunities will greatly increase along the river due to this work. The landowners have also indicated a willingness to allow public access to sections of their property for fishing.

These basic goals will be met by addressing these more specific objectives:

- Reconnecting the Salmon Kill to its floodplain;
- Enhancing and restoring the trout and other coldwater species' habitat;
- Enhancing and restoring the wildlife habitat along the stream;
- Buffering the stream to protect it from future development impacts;
- Removing invasive species of flora along the banks and strategically replanting with native species;
- Limiting the effects of stormwater runoff (erosion, velocity, and turbidity);
- Providing a corridor for wildlife movement;
- Protecting the scenic quality of the valley;
- Providing a model for future restoration projects in the state and region; (It is believed this will be the longest, in terms of stream length, project of its type in the state.)
- Educating landowners and townspeople throughout the state on conservation and the importance of healthy rivers, greenways and riparian forests;
- Providing a place for local educators to research and study riparian ecosystems and restorations with their students;
- Enhancing recreational fishing both in the creek and the main stem.

b. Parameters for Evaluating Success:

Essentially the project will be a success if, upon completion, the approximately 80 acres of riparian lands are replanted and restored, the streambanks are less incised and less unnaturally erosive (recognizing, that some level of erosion is natural and appropriate) and providing aquatic habitat, instream habitat for forage fish, coldwater species and macronivertebrates is restored, and birdlife and other riparian life returns to the area. The overarching parameter of success for the project is a healthy, natural functioning, coldwater sub-watershed. More specifically, the project will be a success if the quality of the water in the creek, and therefore the water entering the main stem, is higher when the project is completed in comparison to before the project began. Namely, the water should be cooler in temperature, have less turbidity, be slower in speed and contain less pollutants. The level elements will be determined and monitored at the beginning of the design phase, checked again at the completion of the project, and checked every year for five years after the completion of the project.. This will be a chance for local educators and students to help the partners of the project. By getting local educators and students involved in this process the project will also achieve its goal of providing a place for riparian ecosystem study.

Among other methods used to evaluate the success of the project, TU will carry out the following monitoring activities:

- **Install instream temperature monitors at critical locations.** The temperature monitors will aid in identifying segments being affected by increased temperature spikes, in addition to the identification of critical coldwater source entries

such as springs and streambed seeps. This information will help determine which segments need restoration first and will provide an excellent success parameter.

- **Perform benthic macroinvertebrate survey and complete habitat assessment (instream and riparian areas).** This activity will provide a full profile of the stream segment and floodplain, and establish a baseline to measure restoration effectiveness over time. These surveys will be performed pre-construction and on a yearly basis for a minimum of five years following construction activities.

- **Electro-fish stream sections**. This will be performed to determine population health, density and diversity of forage fish species and coldwater species both before the project and on a yearly basis for a minimum of five years following construction activities.

- **Invasive Species Inventory**: The number of invasive species will be inventoried during the design phase of the project and at the completion of the project. The maintenance of these species may require help from landowners beyond the completion of the project. Limiting the number of the invasive species from the riparian corridor will help to limit the number throughout the Salmon Kill watershed and in the main stem of the Housatonic itself. Weed pull days involving the local gardening clubs and other local groups, such as the Boy Scouts and Girl Scouts, and local schools will limit the number of invasive species along the banks of the creek and help fulfill the one of the education elements of the project.

If these parameters are not being met during the project, TU revisit its design and restoration plan and make the necessary changes to ensure success.

1.2 Project Scope and Project Implementation Plan

a. Current Condition

The Salmon Kill Valley is dominated by large blocks of undeveloped land. The ridge to the east rises almost 500 feet above the valley floor and the ridge to the west rises about 300 feet above the valley. The valley is narrow, measuring less than three quarters of a mile at its widest point and a few hundred feet at its narrowest. The Salmon Kill is approximately six miles long with a total elevation drop of about one hundred feet, much of which happens in one vertical drop near the old furnace, the site of the aforementioned impediment to fish passage and a principal reason for not removing the dam referenced in the pre-proposal for this project. The project area would include a 1.5 mile stretch of agricultural land along Salmon Kill Road, and a quarter mile section along the race track

Hayfields and cow pastures border the agricultural section. These land uses have removed much of the mature riparian forest and allowed invasive species such as *Rosa multiflora,* Multiflora rose; *Rhamnus frangula*, Alder buckthorn; non-native *Lonicera spp.,* Honeysuckle; and *Celastrus orbiculatus*, Oriental bittersweet to dominate the streambanks. Few native mature willows, *Salix spp*; white ash, *Fraxinus americana*; and

red maple, *Acer Rubrum*, shade the creek and cool its temperatures during the low water level periods. The race track is used for NASCAR Busch, Professional SportsCar and SCCA Pro Racing organization events, along with numerous car club events through the fall, spring and summer.

Small populations of wild brown trout occupy the deeper portions of the creek and the cut banks where they are protected from predators and can find cooler water temps in the hottest months of the year.

Migratory and resident bird populations use the valley, the meadows, and the existing shrubs along the creek for habitat. The valley is a regular stop for many bird watchers during the year.

Wildlife such as white-tailed deer, coyote, black bear, bobcat, woodchuck, and beaver call the valley and the surrounding undeveloped ridges home. However, the lack of riparian forest make it hard for wildlife to use the creek corridor as an avenue for movement.

Please note, Exhibit 5 contains several photographs documenting the current condition of the creek and its floodplains as it flows through the farmland. These photographs are generally representative of this entire 1.5 mile stretch. The creek bed has widened and dropped well below the old floodplain, leaving an incised creek instead of a creek with a small width to depth ratio The creek has almost no large woody debris ("LWD") or boulders in it to provide scour holes and expose the gravely substrate desirable for habitat of aquatic species. The regular erosion of stream banks along with sediments dumped during storm events and the limited drop in elevation has made the creek bottom silty and covered in fine sediments. The silty soil creates a large source of sediment, covering any gravelly areas, and the limited slope does not produce enough power to move it.

Please note that Exhibit 6 contains two photographs documenting a typical, heavily eroded streambank in the section flowing by the race track, and an overview photo. The quarter mile section along the race track is uncharacteristically straight and shallow. Rock armoring is lining the banks in an attempt to channel the creek and keep it away from the track itself. Due to the lack of riparian vegetation along the northern bank of the creek, sloughing banks occur regularly during storm events. Currently, grass lawn lines the northern bank. Small shrubs (2 to 3 feet) of redosier dogwood, *Cornus sericea*; and willow, *Salix spp.*, are spotted along portions of both banks and in a small floodplain area. Large sycamores, *Platinus occidentalis*, can be seen nearby but none are allowed to take root along the stream banks.

A few species of birds use this stretch, mostly due to the birdhouses placed upon the fence that lines the northern bank of the creek.

The stream banks and floodplain area are highly maintained to ensure a good view of the track. This leaves little to buffer the creek from track runoff and the large lawn viewing

area. Due to a lack of shade and a gravel bottom devoid of protective aquatic structures, summer temperatures can rise above levels unsupportive of coldwater fish life.

Essentially, while the farmland and adjacent properties are treasured and conserved by many, the river itself is in poor shape. Recent studies carried out near the bridge immediately below the farmland showed temperature levels in the low 80's and recent electro-shocking data show poor populations of coldwater species. While there is fish sampling as late as 1992 (carried out by the DEP) (see Exhibit 7) that show fairly vibrant populations of wild brown trout, dace and darter near the bridge below the farmland, more recent sampling (privately collected data unavailable for reproduction in this proposal) indicates that there is no longer an abundance of coldwater species.

In addition, numerous field visits to both the farmlands and the race track by TU and its river restoration experts, along with DEP, American Rivers, The Housatonic Valley Association, and the United States Department of Agriculture Natural Resources Conservation Service ("NRCS") have resulted in the following observations about the condition of the river and its riparian corridors:

- Unnatural levels of fine sediments on the stream bottom in most segments.
- Limited bank stability in meander bends.
- Riparian buffer areas which are sparsely covered with forested vegetation, or completely lack forested vegetation leading to unnaturally increased water temperatures. This is one of the primary limiting factors for trout and other coldwater species repopulation.
- Overall lack of instream structure and habitat required for trout cover and refuge.
- This system has a natural, low flow gradient. The historic removal of large woody debris, and sectional channel manipulation have resulted in an even greater reduction of elevation flow grades. This has rendered the stream somewhat limited in the effective movement of sediment and fine material through the system.

During the period where field visits were being made, the Salmon Kill also experienced extremely high flows and a flooding event on April 16, 2007, which essentially turned the valley and race track into lakes. See Exhibit 8 for two flood photos from the Farnam Road Bridge bisecting the farmland, a photo of the flooded race track, and the USGS streamflow gage from the week of the flooding, which is located at the bridge immediately downstream of the farmland. The quick and unnatural flooding of the valley further indicates a lack of adequate floodplain, riparian vegetation and the flashiness of the stream in its current condition.

Along with the field observations delineated above, TU's conservation success index (which can be found online at this website: http://tucsi.spatialdynamics.com/), primarily designed for brook trout habitat analysis, but generally applicable as an overall habitat tool, places a relatively low rating on the sub-watershed of the creek, 51/90 points. This low score is a result of low or average scores in the following categories (based on a scale of 1-5 with 5 being the highest):

Habitat Integrity:

- land stewardship: 1
- watershed conditions: 3 (approximately 60% forested)
- connectivity: 1
- water quality: 3 (15% agriculture and fairly high road density)
- flow regime: 4

Resistance to Future Change (Vulnerability):

- land Conversion: 3 (60% of land estimated to be vulnerable to conversion or development)
- climate change: 2 (fairly big threat - scored low because of only decent habitat, poor brook trout populations, terrible connectivity, and lower elevation).

b. Desired Future Condition

After the project, the farmlands within the floodplain and up to 100 feet from the creek will be thoroughly planted with native riparian species of trees and shrubs. This will provide shade to cool the waters during the warmest periods of the year and help to stabilize the banks and limit sloughing. This will also produce LWD creating more pockets and habitat for the trout population. This riparian corridor will provide habitat for wildlife and bird populations to move through and live in. The buffer created by this riparian corridor will help protect the creek from future development by filtering runoff of pollutants and sediment. Even a slight ten percent increase in impervious surface in a watershed can have a devastating effect on stream conditions and water quality according to the Center for Watershed Protection. This buffer will help to slow and filter during periods of high water storm events thereby limiting the velocity and turbidity of the creek downstream and as it enters the main stem of the Housatonic River.

Similar conditions should result on the section flowing by the race track, although the magnitude of the planting will be scaled back in light of the proximity of the stream to the race track and the desire of the race track owner to maintain open viewing for race track spectators.

The stabilization of the streambanks and placement of instream structures will reduce unnatural erosion, and create habitat and water high water quality for forage fish, coldwater species and macronivertebrates. The potential affects of the instream work component of this project is described more thoroughly in sections 2.1.4 and 2.2.1a.

c. Overall approach to Project Implementation:

The overall approach to project implementation seeks to limit adverse impacts on the creek wherever possible. The design phase incorporates the immediate vicinity of the creek as well as the valley as a whole, in the attempt to create a design that will not only better the habitat of the creek but also the valley. This design understands the ecology of the valley and works with it to provide the necessary connections between upland, riparian, and aquatic species. The use of equipment, both heavy and light, will be appropriate for the design and will limit the negative impacts of implementation.

d. Project Schedule

1. Grant Awards	3rd or 4th quarter 2008
2. Design/Preparation Phase	completed by 3rd or 4th quarter 2009
3. Implementation Phase	completed by 3rd or 4th quarter 2011
4. Planting Phase	completed by 3rd or 4th quarter 2011
5. Monitoring/Education/Outreach	carried out from 2008-2016

e. Project Phases

The major phases for restoration and enhancement of both the sections running through the farmland and the race track can be categorized into 4 basic steps:

1. Design/Preparation
2. Implementation
3. Planting
4. Monitoring/Education and Outreach.

Design/Preparation will involve establishing baseline data for stream flows (normal and rain event), spring flows (normal and rain event), benthic populations, fish populations, channel imbededness, water temperature profiles, erosivity, turbidity, vegetation growth, and science-based habitat evaluations. This baseline data will be used to establish a long-term monitoring protocol to identify the relationship between restoration activities and the overall improvement of watershed health. The requisite permits and other legal documents will be prepared at this time as well.

The implementation phase will involve (potential) repair of a tractor bridge whose abutments have channelized the river along the farmland; reestablishment of riparian corridors; reparation and stabilization of erosive, failing bank areas; structural improvement of instream habitat and restoration of the natural hydrologic regime in an attempt to reduce the adverse impacts during high-water events. These efforts will result in cleaner water from riparian filtration, shaded stream banks that reduce thermal loading, stable banks that reduce sedimentation and turbidity, and a more natural functioning stream habitat and hydraulics.

The planting phase will primarily involve removal of invasive species and strategic replanting of riparian trees and shrubs in new floodplains and along banks in accordance with design.

The monitoring/education and outreach phase will be continuous from the time of receipt of grant funds until approximately 5 years after the major restoration work is completed. As indicated earlier, there will be both pre- and post-construction monitoring consisting primarily of temperature monitoring, benthic surveys, evaluation of channel imbededness, turbidity and habitat assessments, and electro-fishing. Throughout the project, area schools will be participating in the monitoring and planting phases and several area Trout in the Classroom projects will also be established in coordination with this project. The outreach aspect of the project, both to schools and various media outlets, will also be continuous in order to help publicize the value of healthy watersheds.

f. Property Agreements:

The majority of the project will take place on private property. TU has already been in contact with landowners and received permission to complete project if funded. Phone conversations, personal meetings, and letters have kept landowners apprised of the process and the timeline. Close contact with private landowners will continue throughout the process. Written permission has already been secured by the MacLaren family which owns the upstream portion of the farmland (see Exhibit 9), upstream of the Farnam Road Bridge. The spokesperson for the Belter family which owns the remainder of the farmland is on vacation, but will be providing written permission upon his return as will the owner of the race track. Both can be obtained quickly upon request by the trustees. Of note, both families and the owner of the race track have given **exclusive** permission to TU to implement the project. TU will contribute the work of Kirt Mayland, a TU attorney, in drafting any property access agreements for design, construction, and post construction monitoring access on the farmland and race track.

g. Regulatory Approvals Required:

- Inland Wetlands and Water Sources Permit under the Connecticut General Statutes Sections 22a-36 through 22a-45, from the town of Salisbury, CT.
- Water Quality Certification under Section 401 of the Clean Water Act, 33 U.S.C. § 1341 (2007), from the Connecticut Department of Environmental Protection.
- Section 404 Dredge or Fill Permit under the Clean Water Act, 33 U.S.C. § 1344 (2007), from the U.S. Army Corps of Engineers.

2.0 EVALUATION CRITERIA NARRATIVE

2.1 Relevance and Applicability of Project

2.1.1 Location of Project

The project is located within the Housatonic River Watershed above the Derby Dam. It directly connects to the main stem of the Housatonic River above the Derby Dam. The confluence of the Salmon Kill and the Housatonic River is directly above the Housatonic River TMA in Cornwall, Connecticut and below the hydroelectric dam in Falls Village, Connecticut. Thus, the project is in direct contact with the injured natural resources and services of the main stem of the Housatonic River.

2.1.2 Natural Recovery Period

The Natural Recovery Period for this creek would be over the course of a decade or more. Time would be needed for trees to seed, germinate, and grow to a height that would allow them to stabilize the creek bank and shade the water. More years would be needed for these trees to die back or discard limbs into the stream to supply the LWD necessary for habitat. Creek channel stability might take even longer as the morphology of the stream restores the creek's connection to its floodplain by depositing sediment, building point bars, creating meanders and establishing the dense root mat associated with this type of stream. The project's removal of invasive species might not occur as might not the regrowth of the riparian forest, without this human intervention.

2.1.3 Sustainable Benefits

The sustainable benefits of the project include higher water quality, lower water temperatures, increased biodiversity, educational opportunities, reduced flooding, enhanced aesthetics, civic pride and recreational fishing opportunities. With respect to education, TU will also incorporate its Trout in the Classroom initiative, a growing program and will be designed to introduce area school children to the creek and the importance of high water quality for aquatic and floodplain habitat.

Once the plantings are established, they will require minimal to no maintenance on a yearly basis. Yearly mowing and monitoring will be required for the first five years after completion of the project to allow native tree, shrub, and grass species to gain a foothold. Invasive species will also be monitored with activities like weed pulls and other volunteer days to help curtail the cost of maintenance and continue the education of area volunteers about the project and ecology of the region.

TU will work extensively with landowners to devise the best management plan which landowners have expressed an early willingness to complete these management tasks. TU will also work hard with the landowners and local conservation groups to ensure the long-term success of the project.

2.1.4 Magnitude of Ecological Benefits

Riparian Buffers are key components in a landscape. They offer increased biodiversity, wildlife and fish habitat, aesthetic value, valuable open space, and property values. They decrease the effects of stormwater runoff by slowing water, and filtering out pollutants such as nitrogen, sediments, fertilizers and pesticides. The project will provide enhancement and restoration to over 80 acres of riparian habitat.

The Salmon Kill sits in an important part of the Housatonic River Watershed. Several areas of significance identified on the *State and Federal Listed Species and Significant Natural Communities* map are located along the stream itself as well as further up the Salmon Kill Watershed. These communities on the Salmon Kill itself include the area around Forge Mountain in Lime Rock, CT and just upstream of the confluence of the Salmon Kill and the Housatonic River. Areas of significance in the watershed include Lake Wononscapomuc, the confluence of Factory Brook and Pettee Brook, Spruce Swamp, Moore Brook, Fisher Pond, Ball Brook, Wachocastinook Brook, Bingham Pond Brook, Bingham Pond, White Hollow Brook, Bauer Pond and portions of Wells Hill along Route 112. These natural communities are significant because they are home to species that are considered threatened or of special concern. The project will inventory these species and help to provide important links between these natural communities of significance.

Restoration and enhancement of the riparian buffer and floodplain along the Salmon Kill can reduce up to 100% of the sediments and pesticides from runoff from entering the creek. Sedimentation can physically alter habitat by destroying the riffle-pool structure in creek systems. Also, riparian buffers have been documented to remove up to 90% of nitrogen and phosphorus from runoff.

Riparian buffers slow water during floods allowing the high waters to be filtered of sediments and pollutants while allowing water to infiltrate back into groundwater sources. Allowing water to be slowed during these storm events benefits those downstream as well by limiting the amount of water that reaches the downstream portions of the creek.

An increase of native trees, shrubs, and grasses and the removal of invasive species of flora will increase wildlife and fish habitat by providing places of refuge, shading the creek from the high summer temperatures, and creating important corridors for the movement of wildlife. Shading creeks can positively affect the mortality rates, metabolisms, and ability to resist disease of aquatic species by controlling the creek temperature.

The Salmon Kill Valley and its watershed are home to alluvial soils and areas of calcareous habitats. These geologic features are often home to rare and endangered species of flora and fauna. The project will determine what, if any rare and endangered species are present and work to enhance supporting habitat for these species.

The instream improvements will produce a number of overall benefits, including: increased grade elevation steps serving to gently increase flow velocity which will help transport fine sediments more effectively; a more well defined main, or low flow channel, improving hydraulic function and energy dispersal during high flows; deflection of stream energy to reduce near bank stress and erosion in areas of concern; create clean gravel areas below the structures which are necessary for trout spawning and more desirable macroinvertebrates; and provide habitat, feeding and hiding zones for trout and forage fish.

2.1.5 Magnitude of Recreational Benefits

The restoration and enhancement of the riparian buffer around Salmon Kill will increase fish habitat and provide a greenway corridor along the creek. The project will also increase the water quality of the creek itself and thus the water entering the main stem of the Housatonic River. This will provide for better habitat of main stem fish species and provide refuge for fish from the upper reaches of the TMA during periods of high temperature in the summer months. A clean cool flow of water entering the main stem of the Housatonic at the top of the TMA can only increase the productivity of the TMA itself which is already one of Connecticut's premier fishing spots.

Enhancing the buffer will also increase the opportunity for recreational fishing and hunting on the Salmon Kill itself. Currently, there is limited public fishing near the confluence with the Housatonic. The landowners have indicated a willingness to allow some public fishing along their properties.

2.2 Technical Merit

2.2.1 Technical/Technological Feasibility

a. Methods used for Major Tasks:

- **Perform a full hydrological survey of the stream on the proposed project area.** This practice will involve full stream measurements and cross-sectional measurements which will be used to determine the locations of instream grade controls and habitat structures. This will also provide an in-depth picture of how the stream is working at this time, and establish a baseline to evaluate adjusted flow characteristics in addition to identifying any additional flow alterations needed.
- **Install rock and/or log flow structures at strategic points along the stream segment.** See Exhibit 12 for examples and full explanations of potential instream structures that TU will utilize. These structures will produce a number of overall benefits, including: increased grade elevation steps serving to gently increase flow velocity which will help transport fine sediments more effectively; a more well defined main, or low flow channel, improving hydraulic function and energy dispersal during high flows; deflection of stream energy to reduce near bank stress

and erosion in areas of concern; create clean gravel areas below the structures which are necessary for trout spawning and more desirable macroinvertebrates; and provide habitat, feeding and hiding zones for trout and forage fish.

- **Repair and restore forested riparian buffers through selected species tree plantings**. Open areas and segments with sparse vegetation will be planted with rapid growth riparian trees such as sandbar willows, red osier dogwoods and silky dogwoods in the primary riparian area closest to the stream. The secondary riparian area outside the normal bankfull flows will be planted with other assorted tree species such as black willow, red and white oaks, elderberry, serviceberry and black cherry. The reestablished riparian area will result in benefits such as: bank stability and reduced erosion due to root system reinforcement; shading of the stream which will promote a more stable temperature regime eliminating midday temperature spikes which negatively impact trout; stream cover providing some refuge from bird predation; increased organic matter entering the stream which leads to a healthier macroinvertebrate population; and reduced flow energy during higher flow events.

b. Proven Success of Method on Similar Projects:

Since TU was founded in 1959, on-the-ground restoration of streams, watersheds, and fisheries has been the hallmark of the organization. TU's Watershed Programs and its Home Rivers Initiative has led the country in successful watershed restoration projects since its inception in 1994. Many examples can be found at http://www.tu.org/site/pp.asp?c=7dJEKTNuFmG&b=275422. One of TU's most notable successes includes the Potomac Headwaters Restoration Project where a combination of flooding and grazing had led to compromised water quality, so TU constructed miles of fencing to prevent cattle access, found alternative stock water sources, placed instream structures, and replanted to stabilize the streamside area. On the Kickapoo River Watershed in Wisconsin, TU completed 25 stream restoration projects on 14 tributaries, improving over 4.65 miles of in-stream habitat after farming practices had caused severe soil erosion, increased flooding, and devastated stream habitat. Also, at the birthplace of American fly fishing, the Beaverkill River and Willowemoc Creek, TU launched a comprehensive investigation into the major stressors causing the trout population to decline and successfully implemented numerous countermeasures including several tributary and main stem restoration projects involving extensive planting, bank stabilization and placement of instream structures.

c. Plan for Potential Technical Uncertainties:

TU is confident based on its extensive experience with river restoration projects and the various studies it has undertaken with respect to the creek, that the technical plan it has developed for this project will be successful. With NRCS as a partner, TU is confident that when problems arise with respect to, for instance, utilization of a particular bank stabilization method, it has the expertise to adapt and resolve the problems, such that the project and the project schedule will not be impacted.

2.2.2 Adverse Environmental Impact.

There will be little or no adverse environmental impact from this project. During the construction phase of the project there may be increased sediments flowing through downstream reaches. However, given the current sedimentation in the river due to unnaturally erosive streambanks, and the short-term nature of construction, the project will not have any lasting adverse impacts.

2.2.3 Human Health and Safety.

To the best of our knowledge, there will be no adverse effects on human health and safety. All construction activities will be carried out under NRCS guidelines and safety procedures, and given the nature of the activities, it is highly unlikely that human health and safety will be affected in any way.

2.2.4 Measurable Results

a. Monitoring/Evaluation Methods:

The major evaluation methods, parameters of success and monitoring activities have been outlined in section 1.1b above.

b. Data to be Collected (why, how, and by whom):

Data will be collected by TU volunteers, NRCS, local students, and an employee of TU. The "why and how" have been explained in 1.1b above.

c. Contingency Plan (if objectives are not being met):

TU and NRCS both have extensive experience with river restoration projects like this. As problems arise and new solutions become apparent, TU and NRCS will maintain the flexibility in their approach to apply new methods.

d. Coordination with other Monitoring/Evaluation on the Housatonic River Watershed:

TU will meet with other project teams working on similar projects in both the Massachusetts and Connecticut sections of the Housatonic watershed. We will compare methods, results, and make the necessary changes, based on the success rates of other projects, to ensure the maximum level of success on this project. TU is uniquely qualified in this regard with access to information and results from similar projects, through an extensive volunteer network in both states, and from prior work on various restoration initiatives in partnership with other groups.

2.3 Project Budget

2.3.1 Relationship of Expected Costs to Expected Benefits

Most of this information has been provided throughout this application and in particular, in sections 2.14 and 2.15. As stated previously, the Salmon Kill and its watershed is one of the most ecologically valuable and unique in the region. Protecting and enhancing this resource will benefit not only the ecological integrity of the watershed, but provide a model for other projects on how to tackle such a large scale project. Given the projected benefits of the project (social, economic, and environmental) the costs are relatively minimal, especially given the amount of matching funds provided, volunteer time provided by TU national staff, TU chapter volunteers and other volunteers in the region.

2.3.2 Implementation-Oriented

As indicated throughout this application, TU has already spent a considerable amount of time "studying" the Salmon Kill, and is prepared to move forward with design and implementation. The problems and solutions have been identified, and the only major pre-implementation tasks left relate to closely identifying the techniques to be employed on specific sections of the river. Implementation is the focus and main objective of this proposal.

2.3.3 Budget Justification and Understanding

See Part D pursuant to the instructions.

2.3.4 Leveraging of Additional Resources

TU and other volunteer time is expected to be extensive on this project, most likely approaching in the thousands of hours over the course of the project. In particular, TU will handle all the post-construction monitoring with volunteer time and national staff oversight. Based on past TU restoration efforts, this time could be worth as much as $20,000. TU will also be donating the time of its attorney in the region, Kirt Mayland, to handle all permit applications, access agreements, and the preparation of any other legal documentation. The value of his work is estimated to be approximately $12,000. TU will also donate the time of its administrative services to handle the grant funds, office space and the time of its press secretary for work on the outreach and education components. The press secretary time is valued at approximately $5000. TU has received financial commitments from its state council ($5000) and its NW Chapter ($2000), and expects to receive large financial commitments from affected private landowners as the project moves forward. Notably, TU will be working with NRCS on this project and thus far has received a promise of uncommitted funds of $600,000 from NRCS and its Wildlife Habitat Incentives Program ("WHIP"). TU will access this money and more, as it works with NRCS on this project over the years

2.3.5 Comparative Cost Effectiveness

TU has exclusive rights to implement this project on the farmland and race track. To the best of its knowledge no other applicant has received this permission and access. Therefore even if another organization or consulting firm presents a similar proposal at a lower cost, they would not be able to carry out the project and should not be compared to TU's proposal.

2.4 Socioeconomic Merit

2.4.1 Community Involvement and Diversity

The project will involve substantial public involvement, including but not limited to area schools such as the Housatonic Valley Regional High School, the Hotchkiss School and the Salisbury School. TU has already initiated discussions with these organizations. TU volunteers in the area will also play a large part in all aspects of this project. Both the Weantinogue Land Trust and the Salisbury Land Trust, and their members, will also be extensively involved in this project. In short, community involvement and diversity is a high priority for TU on this project, not only for the project itself, but in terms of its value as a model for students, conservation groups and others moving forward on similar initiatives.

2.4.2 Adverse Socioeconomic Impacts

To the best of our knowledge, there will be no adverse socioeconomic impacts from this project. The project will help the local sense of community, public health and safety for those hiking, bird-watching or fishing in the area. It will increase recreational fishing opportunities on the creek and in the main stem, greatly improve both instream and riparian aesthetics, provide an excellent field laboratory for education, and bring various local groups and partnerships to accomplish the ultimate objectives.

2.4.3 Coordination and Integration.

As indicated above in Section 1.0, the Salmon Kill is widely recognized by federal, state and local governments, conservation organizations and land trusts as an area of vital ecological significance. The town and Regional plans of Conservation and Development have all recognized the ecological and scenic value of the Salmon Kill. For instance, in the January 1, 1999 Town Plan, Section 4.15 reads, with respect to Moore Brook and the Salmon [River] Corridor: "[t]he 1975 regional report on Conservation and Preservation in Northwestern Connecticut identified this stream belt as one of the region's most scenic corridors. It noted that the Salmon River corridor outside of the village of Salisbury adds definition and scenic interest to the large area of farmlands in the Salmon River valley. The Moore Brook, Spring Swamp and Salmon Brook stream belt corridor should be a top priority for preservation and conservation."

2.4.4 Public Outreach

TU, with the donated time of its press secretary and attorney, Kirt Mayland, will undertake extensive public outreach throughout the project. TU will be involving local and area newspapers and other media outlets in all major stages of the project, to increase public awareness of the importance of healthy river systems. Due to the enormity of this project, TU will also be doing extensive outreach on a national scale through its website and various offices to encourage similar restoration efforts nationwide. TU has a vast amount of experience with public relations and outreach, and plans to utilize all the various avenues and outlets to increase watershed conservation awareness.

2.5 Applicant Implementation Capacity

2.5.1 Technical Capacity of Applicant and Project Team

The design and the implementation will be directed and managed by TU, one of the nation's leading river restoration organizations. TU has already received a commitment from NRCS to act as the official consultants and engineers for the project as part of a national Memorandum of Understanding between NRCS and TU dated February 21, 2003 (see Exhibit 10). NRCS has already visited the site on several occasions and has assisted in the preparation of this proposal. Both TU and NRCS are nationally recognized for their technical capacity with respect to river restoration.

2.5.2 Administrative Capacity of Applicant and Project Team

As a national leader in river restoration, TU has carried out hundreds of similar activities over the decades. With an administrative staff of over 30 people, it has the legal, accounting, organizational, technical and other expertise to administer this project without a problem.

2.5.3 Project Commitments

As indicated in Section 2.3.4, TU has already received several commitments from various groups to partner on this project. Kirt Mayland, the project contact, will be donating his legal time in terms of filling out permit applications and drafting access agreements, time valued at approximately $12,000. The TU press secretary will be assisting in the public outreach and education component of the project, at a value of approximately $5000. Also, the NW CT TU Chapter and the TU state council have both dedicated resources and volunteer time to the project as have area high schools. Conversations and verbal commitments have already been secured from the Hotchkiss School and the Salisbury School staff. Both the Salisbury Land Trust and the Weantinogue Land Trust plan on being actively involved in this project throughout its implementation. All the landowners have signed on to the project. In short, all the critical parties necessary for the fulfillment of the goals of the project are fully committed.

PART D. PROJECT BUDGET Narrative and forms

Project Title **Trout Unlimited Salmon Kill Restoration and Enhancement**

Sponsor Name **Trout Unlimited**

Table 1 **Housatonic River NRD Funding Allocation by Fiscal Years**

Expense Category	Fiscal Year 1 NRD Funds	Fiscal Year 2 NRD Funds	Fiscal Year 3 NRD Funds	Total
A. Salaries	$35,000.00	$35,000.00	$35,000.00	$105,000.00
B. Overhead/Benefits	$6,300.00	$6,300.00	$6,300.00	$18,900.00
C. Contracted Services	$168,302.22	$147,435.56	$147,435.56	$463,173.33
D. Supplies, Materials/Equip.	$15,093.33	$15,093.33		$30,186.67
E. Travel				
F. Other				
TOTAL BY YEAR	$224,695.55	$203,828.89	$188,735.56	$617,260.00
GRAND TOTAL			**$617,260.00**	

Table 2 **Housatonic River NRD Project Budget Summary by Task and Funding Source**

Project Title **Trout Unlimited Salmon Kill Restoration and Enhancement**

Sponsor Name **Trout Unlimited**

Task	NRD Funds	Other Contributions Committed	Other Contributions Uncommitted	Total Cost by Task
FARMLAND				
Design/Preparation	$87,618.19	$10,000.00	$93,092.14	$190,710.32
Planting	$31,258.16	$14,450.00	$41,473.70	$87,181.86
Implementation	$448,510.82		$414,589.62	$863,100.44
Monitoring/Outreach/Educ	$6,212.06	$12,750.00		$18,962.06
RACE TRACK				
Design/Preparation	$5,570.28	$2,000.00	$8,776.32	$16,346.60
Planting	$378.11	$2,550.00	$3,610.53	$6,538.64
Implementation	$37,128.98		$38,457.70	$75,586.67
Monitoring/Outreach/Educ.	$583.41	$2,250.00		$2,833.41
Total	$617,260.01	$44,000.00	$600,000.00	Grand Total: $ 1,261,260.00

2.0 BUDGET NARRATIVE

a. Explanation of expenses listed in Table 1

Please note that the bulk of the expenses prepared for Table 1 were done so with the help of Todd Bobowick at NRCS and come from longstanding WHIP cost structures, some of which appear in Exhibit 12. Also, due to NRCS budgeting practices, all of the work, except for the planting expenses, which appears in line item D (Supplies, Materials and Equipment) is bundled into Contracted Services. Notably, much of the significant equipment is already on site and has been committed to the project by the farmers and race track owners. Essentially both tables were prepared using numbers provided to TU by NRCS as follows:

Farmland Section (1.5 miles):

- $100/per linear foot for the extensive streambank work needed to be carried out – for a total implementation cost of $792,000 (Contracted Services)
- $80,000 for plant materials and planting (Supplies, Materials and Equipment)
- Design and construction inspection and permitting is estimated to cost $175,000 (Contracted Services)

Race Track Section (.3 miles):

- $40/linear foot for less extensive work compared to that on the farmland (due to the proximity of the river to the race track and a viewing area), for a total implementation cost of $63,600 (Contracted Services)
- $6000 for plant materials and planting (Supplies, Materials and Equipment)
- Design and construction inspection and permitting is estimated to cost $15,000 (Contracted Services)

The total expense of the project based on these calculations was estimated at $1,137,360.00. TU also built in a partial salary for one employee at $35,000 per year plus benefits off this partial salary (at 18%) in order to carry out the planting, monitoring, coordination with landowners, educational and outreach components, and in general, to be the project supervisor. Therefore the total cost of the project is estimated at $1,261,260.00.

In order to arrive at the total request amount from NRD at $611,260, TU took the total cost of the project and subtracted committed and uncommitted contributions (matching funds), as laid out in Table 2.

TU reduced each line item in Table 1 to correspond to the overall percentage that NRD is being asked to contribute to the project.

b. Explanation of "other contributions" in Table 2

The following contributions are expected for this project:

Committed:

- Kirt Mayland (volunteer time/legal help) - $12,000 (Design/Preparation)
- TU CT Council - $5000 donation divided evenly among "Planting" and "Monitoring/Outreach/Education"
- TU NW CT Chapter - $2000 donation divided evenly among "Planting" and "Monitoring/Outreach/Education"
- TU Volunteer time estimated at a $20,000 value
- TU press secretary time - $5000 value (Monitoring/Outreach/Education)

Uncommitted:

- WHIP funds from NRCS at $600,000 divided among Design/Preparation, Planting, and Implementation.

All of the committed and uncommitted funds were divided between the race track and the farmlands at percentages of 15% and 85% respectively, due to the difference in magnitude of work required on the two sections.

c. Price matching of "other contributions"

All of the "other contributions" should be considered as a cost match.

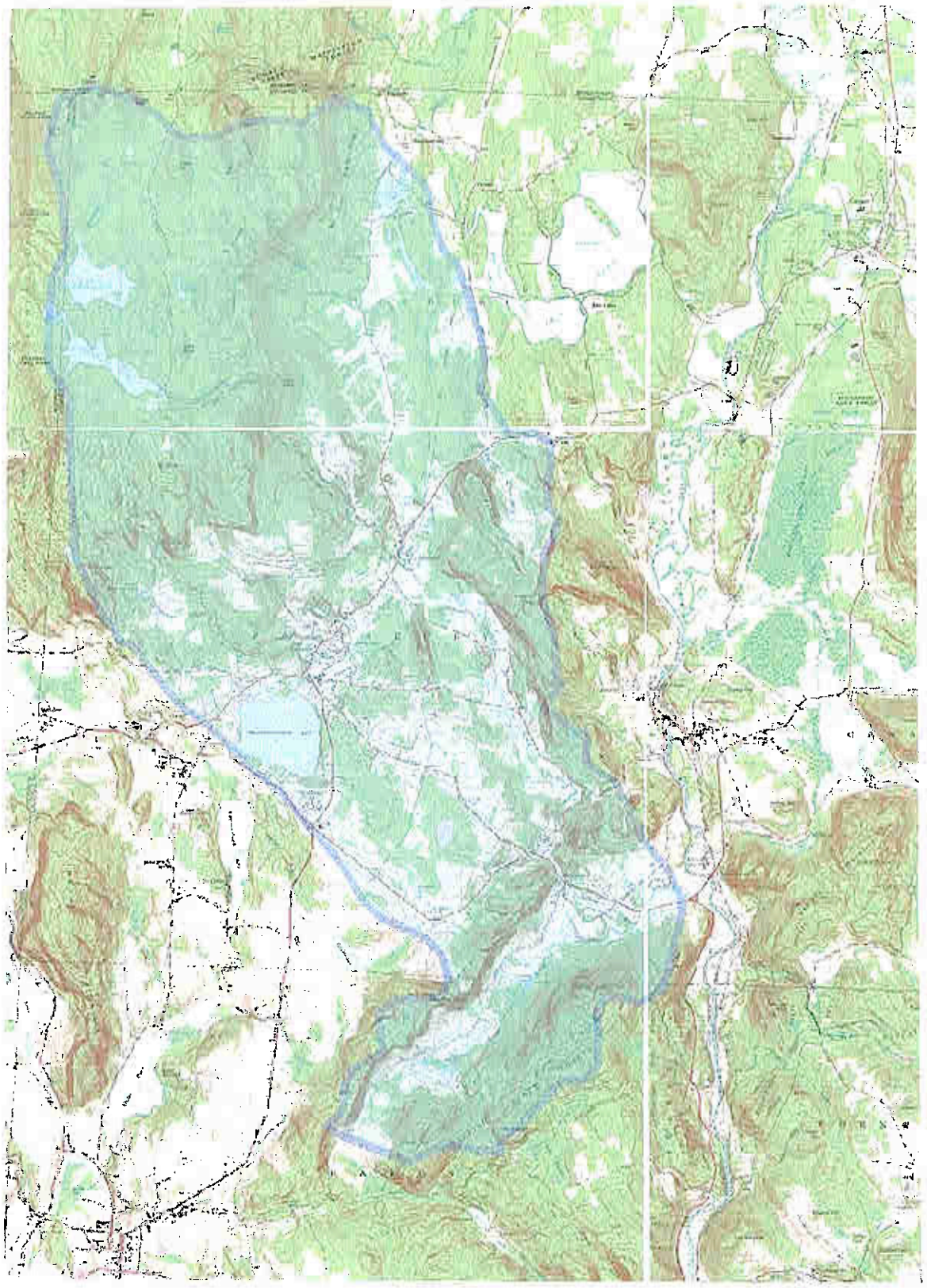
d. Acquiring any additional funds

The project will not require any funds beyond the time committed. TU may decide to monitor the project longer than a 5-year post-construction period along with continuing its education and outreach activities but it will do so at its own expense.

Exhibit 1
Map of Salmon Kill Creek


Source
Salmon Hill Creek
Agricultural Areas
Confluence
Damsite
Industrial Area
Lake Tayolan
Farnum Rd
Laddie Ln
Wells Hill Rd
Lime Rock Rd
Dublin Rd
Page Rd
Cove, The
Broad Falls
Sugar Hill Rd
Main St
Beebe Hill Rd
Easy St
Dugway Rd
126
112
7
Google

Exhibit 2
Map of Salmon Kill Creek Watershed



0 0.75 1.5 Miles

N
W E
S

Salmon Kill Watershed

salmon kill creek watershed

source: CT DEP GIS Database

map location

Exhibit 3
Salisbury Conservation Map

Salisbury Conservation Map

Prepared by the Salisbury Association Land Trust

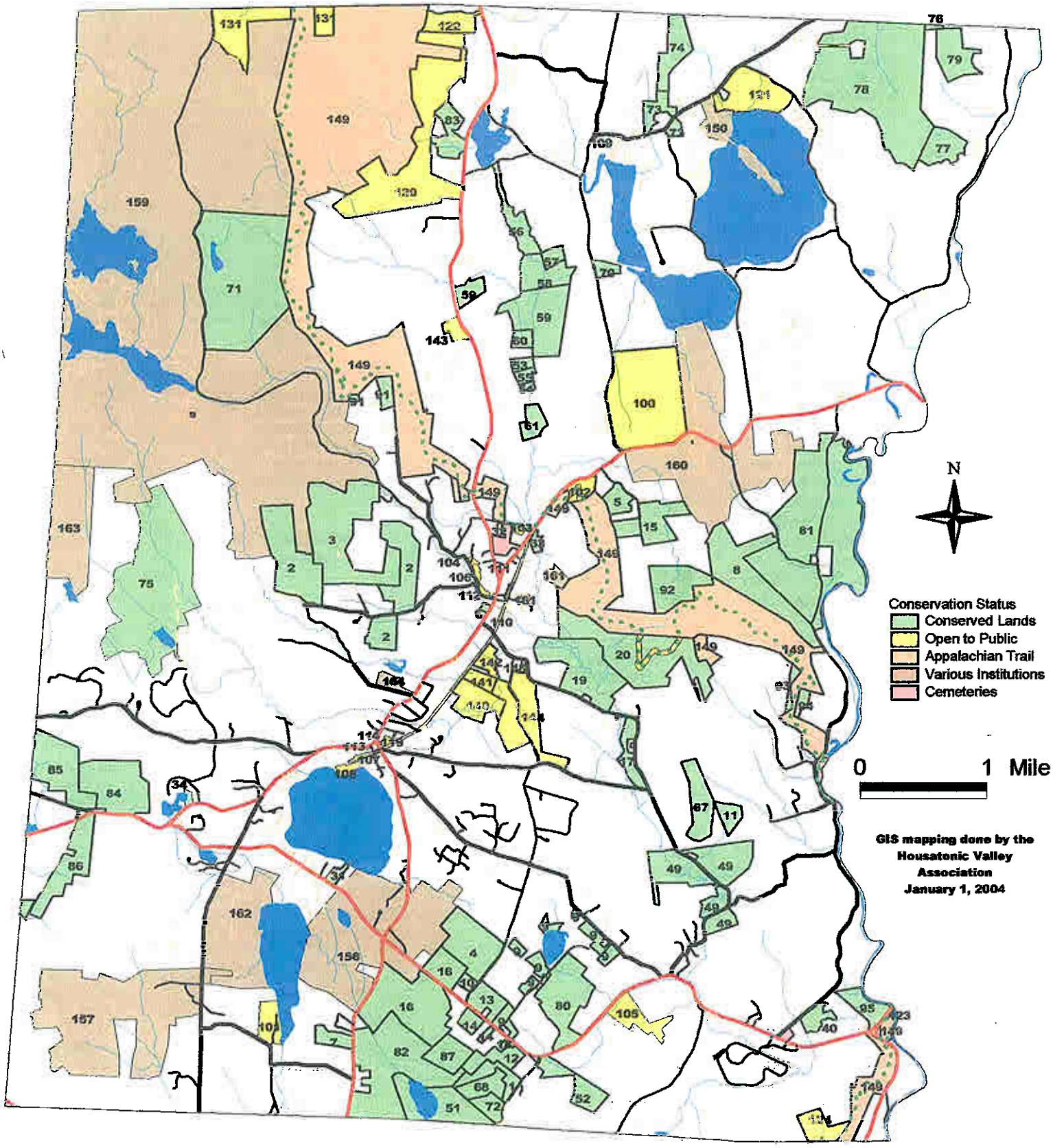
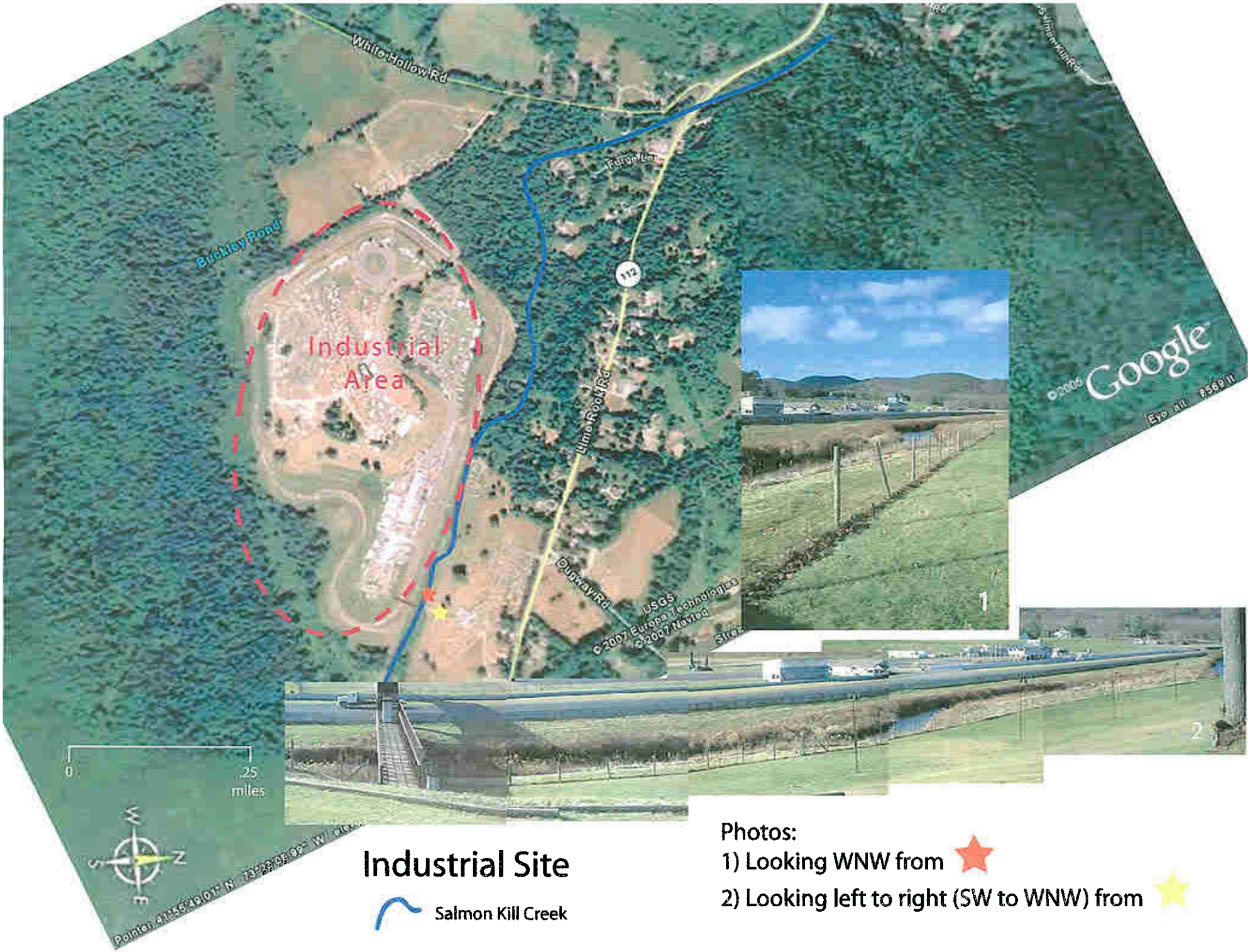


Exhibit 4

Map of Lime Rock Park
Map of Salmon Kill Flowing through Lime Rock Park



Industrial Site

Salmon Kill Creek

Photos:

1) Looking WNW from ★

2) Looking left to right (SW to WNW) from ★

LIME ROCK PARK

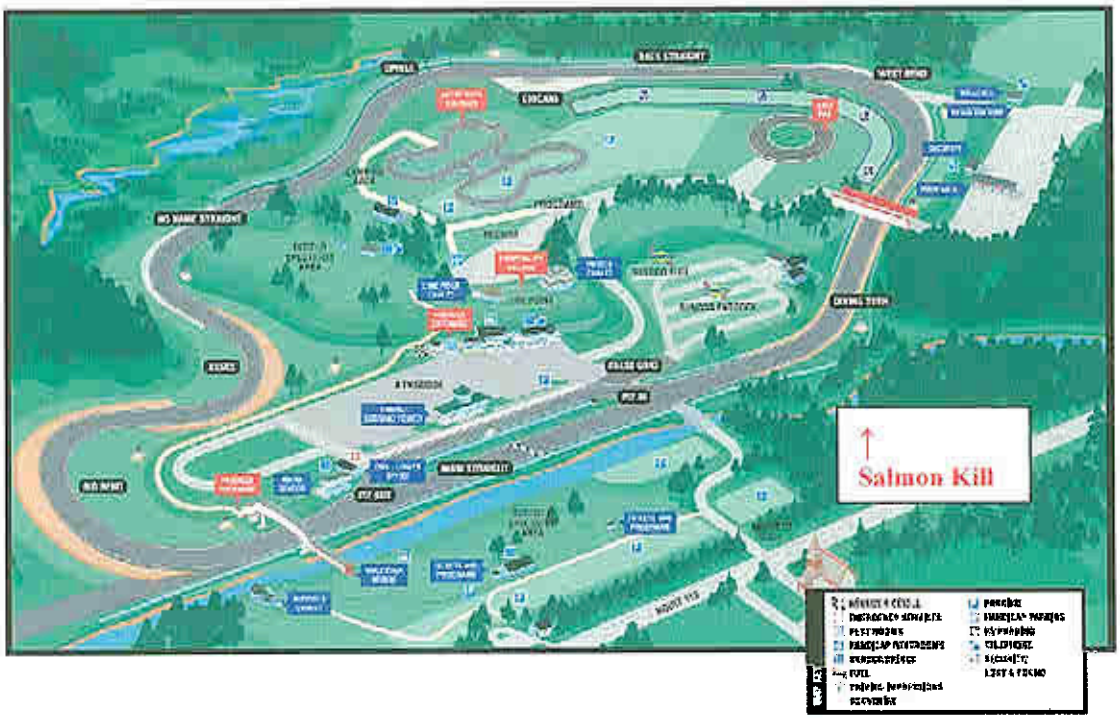


Exhibit 5

Farmland Photos

1. Salmon Kill Typical Stretch
2. Erosive Streambank
3. Lack of Riparian Vegetation/Typical Stretch

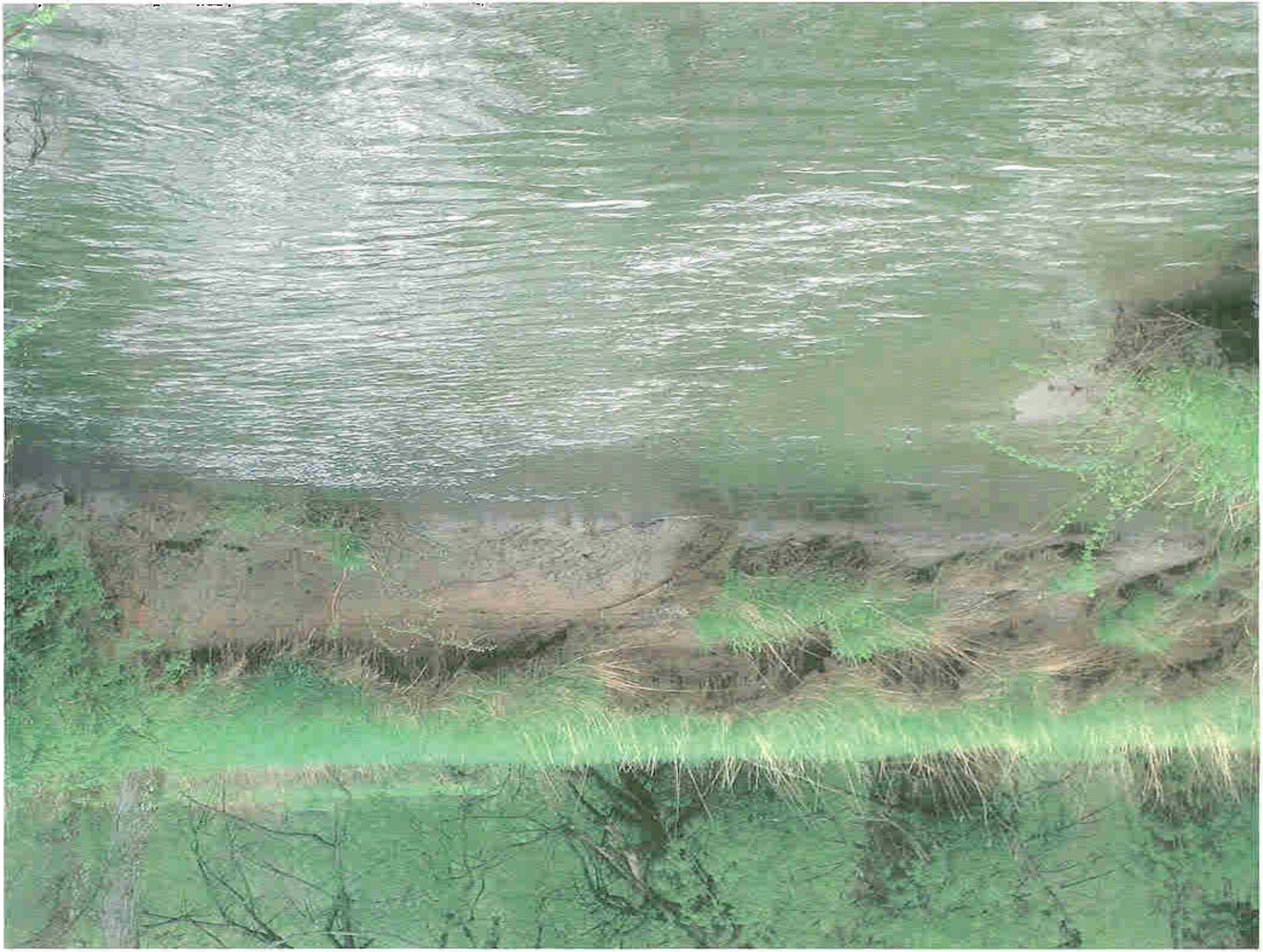


Exhibit 6

Race Track Photos:

1. Typical Section
2. Overview

Exhibit 7
DEP Fish Sampling Data

STREAM NAME : SALMON CREEK SITE #: 4010

SITE DESCRIPTION: UPSTREAM FROM BRIDGE AT "SALMON KILL FARM", SALISBURY

SAMPLE LENGTH : 150. SAMPLE DATE: 07/29/92

PHYSICAL		CHEMICAL	MEAN	STD
AIR TEMP. . . .	:25.00 (C)	DISSOLVED OXYGEN (mg/l). . :	7.4	0.00
WATER TEMP. . .	:16.00 (C)	pH . . . . . :	7.3	0.06
VELOCITY. . . .	: 0.1360(m/s)	COND . . . . . (uS/cm3). . :	224.7	13.6
DISCHARGE . . .	: 0.3060(m3/s)	ALKALINITY .(mg CaCO3 eq/l):	125.9	0.06

	MEAN	STD			
WIDTH. . . . . :	6.62	1.32	(m)		
DEPTH. . . . . :	42.47	31.59	(cm)		
DOMINANT SUBSTRATE TYPE. . :	3		POOL/RIFFLE RATIO . .:		74.00
TYPE THREE SUBSTRATE . . . :	0.36	(%)	AIR/WATER TEMP. RATIO:		
EMBEDDEDNESS OF TYPE THREE :	44.09	(%)			
OVERHEAD CANOPY. . . . . :		(%)			
INSTREAM SHELTER . . . . . :	483.6	(m2)			

BIOLOGICAL

SPECIES		POPULATION SIZE (Number/ha)	STANDARD ERROR (Number/ha)
Rhinichthys atratulus	blacknose dace (BL)	4656.8	42.8
Salmo trutta	brown trout (BN	461.8	0.0
Semotilus atromaculatus	creek chub (CR)	1029.5	66.1
juvenile cyprinid (CY)		500.3	17.5
Rhinichthys cataractae	longnose dace (LD)	153.9	0.0
Micropterus salmoides	large mouth bass (LM)	67.4	0.0
Etheostoma olmstedi	tessellated darter (TD)	288.6	0.0
Catostomus commersoni	white sucker (WS)	5397.7	110.5

WS	2	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4009 Sample Date: 06/15/1992

Stream Name: SPRUCE SWAMP BROOK

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BK	1	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
BL	1	0.	0.	8.	26.	10.	4.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BN	1	0.	1.	19.	12.	4.	0.	0.	1.	6.	3.	7.	1.	0.	2.	2.	2.	1.	1.	2.	0.	1.	2.	0.	2.	3.	1.	0.	1.
BN	2	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR	1	0.	0.	0.	0.	0.	0.	1.	0.	1.	2.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TD	1	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WS	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	3.	0.	2.	1.	2.	0.	1.	1.	1.	1.	1.	0.	0.	0.	0.

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4010 Sample Date: 07/29/1992

Stream Name: SALMON CREEK

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BL		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BL	1	0.	1.	0.	46.	63.	15.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

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BN	1	0.	0.	0.	0.	4.	5.	3.	1.	0.	0.	0.	0.	0.	3.	2.	2.	2.	2.	2.	1.	0.	2.	4.	3.	1.	0.	1.	2.
BN	2	5.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR	1	0.	6.	16.	1.	6.	29.	8.	4.	4.	1.	7.	5.	3.	0.	1.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CY		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CY	1	0.	29.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LD	1	0.	1.	0.	0.	4.	3.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LM	1	0.	1.	4.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TD	1	0.	1.	5.	3.	12.	8.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WS		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WS	1	0.	46.	39.	2.	0.	0.	22.	21.	4.	2.	2.	5.	5.	1.	2.	4.	3.	2.	6.	1.	3.	6.	8.	3.	3.	1.	6.	3.
WS	2	1.	3.	2.	2.	1.	1.	1.	2.	2.	1.	2.	1.	1.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4011 Sample Date: 07/27/1992

Stream Name: SALMON CREEK

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BB	1	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BL	1	0.	0.	3.	5.	11.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BM		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STREAM NAME : SALMON CREEK SITE #: 4011

SITE DESCRIPTION: 50 M UPSTREAM OF CONFLUENCE WITH HOUSATONIC RIVER, AT WHITE HOLLOW FARM. SALISBURY

SAMPLE LENGTH : 173. SAMPLE DATE: 07/27/92

PHYSICAL		CHEMICAL	MEAN	STD
AIR TEMP. . . . :	18.00 (C)	DISSOLVED OXYGEN (mg/l). . :	9.6	0.12
WATER TEMP. . . :	16.00 (C)	pH . . . . . :	7.7	0.02
VELOCITY. . . . :	0.2810(m/s)	COND . . . . . (uS/cm3). . :	251.0	5.3
DISCHARGE . . . :	0.6220(m3/s)	ALKALINITY .(mg CaCO3 eq/l):	135.0	1.80

	MEAN	STD	
WIDTH. . . . . :	9.83	2.77	(m)
DEPTH. . . . . :	15.98	13.78	(cm)
DOMINANT SUBSTRATE TYPE. . :	3	POOL/RIFFLE RATIO . .:	1.06
TYPE THREE SUBSTRATE . . . :	0.93 (%)	AIR/WATER TEMP. RATIO:	
EMBEDDEDNESS OF TYPE THREE :	39.68 (%)		
OVERHEAD CANOPY. . . . . :	8.00 (%)		
INSTREAM SHELTER . . . . . :	80.3 (m2)		

BIOLOGICAL

SPECIES	POPULATION SIZE (Number/ha)	STANDARD ERROR (Number/ha)
Ameiurus nebulosus brown bullhead (BB)	10.2	0.0
Rhinichthys atratulus blacknose dace(BL)	101.7	0.0
Pimephales notatus bluntnose minnow (BM)	1648.0	13.6
Salmo trutta brown trout(BN)	15.3	0.0
juvenile centrarchid(CE)	5.1	0.0
Semotilus atromaculatus creek chub(CR)	71.2	0.0
Luxilus cornutus common shiner(CS)	10.2	0.0
juvenile cyprinid(CY)	920.7	33.1
Semotilus corporalis fallfish(FA)	595.1	8.5
Notemigonus crysoleucas golden shiner(GS)	30.5	0.0
Fundulus diaphanus banded killifish(KI)	10.2	0.0
Rhinichthys cataractae longnose dace(LD)	213.6	6.0
Lepomis gibbosus pumpkinseed sunfish(PS)	25.4	0.0
Ambloplites rupestris rockbass (RB	71.2	0.0
Lepomis auritus redbreast sunfish(RS)	10.2	0.0
Micropterus dolomieu smallmouth bass (SM)	178.0	13.5
Notropis hudsonius spottail shiner(SS)	10.2	0.0
Etheostoma olmstedi tessellated darter(TD)	707.0	25.7
Catostomus commersoni white sucker(WS)	2182.1	43.0

4010

BN	1	0.	0.	0.	0.	4.	5.	3.	1.	0.	0.	0.	0.	0.	3.	2.	2.	2.	2.	2.	1.	0.	2.	4.	3.	1.	0.	1.	2.	
BN	2	5.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
CR	1	0.	6.	16.	1.	6.	29.	8.	4.	4.	1.	7.	5.	3.	0.	1.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
CY		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
CY	1	0.	29.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
LD	1	0.	1.	0.	0.	4.	3.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
LM	1	0.	1.	4.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
TD	1	0.	1.	5.	3.	12.	8.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
WS		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
WS	1	0.	46.	39.	2.	0.	0.	22.	21.	4.	2.	2.	5.	5.	1.	2.	4.	3.	2.	6.	1.	3.	6.	8.	3.	3.	1.	6.	3.	
WS	2	1.	3.	2.	2.	1.	1.	1.	2.	2.	1.	2.	1.	1.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4011 Sample Date: 07/27/1992

Stream Name: SALMON CREEK

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BB	1	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
BL	1	0.	0.	3.	5.	11.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
BM		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	

4011 part 1

M	1	0.	0.	0.	22.	80.	14.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
E	1	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
R	1	0.	0.	11.	1.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	1	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y	1	40.	56.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FA		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FA	1	0.	0.	5.	0.	2.	22.	60.	16.	2.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GS	1	0.	0.	0.	0.	3.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KI	1	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LD	1	0.	0.	33.	6.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

4011 part 2

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4011 Sample Date: 07/27/1992

Stream Name: SALMON CREEK

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
PS	1	0.	0.	0.	0.	0.	4.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB	1	0.	0.	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.	0.	1.	2.	5.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RS	1	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

4011 Part 3

SM	1	0.	3.	7.	3.	0.	0.	0.	2.	1.	0.	1.	0.	1.	1.	0.	1.	1.	0.	0.	0.	3.	1.	3.	1.	2.	0.	1.	0.	
SS	1	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
TD		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
TD	1	17.	47.	33.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
WS		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
WS	1	0.	30.	62.	32.	12.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	

4011 Part 4

Size range 1 is 2-29 cm size range 2 is 30-58 cm, size range 3 is 59-85 cm

Site Number: 4012 Sample Date: 07/02/1992

Stream Name: HOLLENBECK RIVER

Centimeter Groups (Values for range 1)

Species Code	Size Range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BL	1	0.	0.	0.	8.	6.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BN	2	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR	1	0.	0.	0.	0.	6.	11.	3.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS	1	0.	0.	7.	1.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FA	1	0.	0.	0.	0.	0.	4.	26.	4.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LD	1	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB	1	0.	0.	0.	4.	5.	1.	0.	2.	4.	0.	0.	0.	2.	1.	3.	2.	4.	1.	3.	0.	0.	0.	1.	0.	0.	0.	0.	0.
SM	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	1.	0.	0.	0.	0.

Exhibit 8
Salmon Kill (3) Flood Photos and USGS Streamflow Graph

USGS

USGS 01199050 SALMON CREEK AT LIME ROCK, CT.

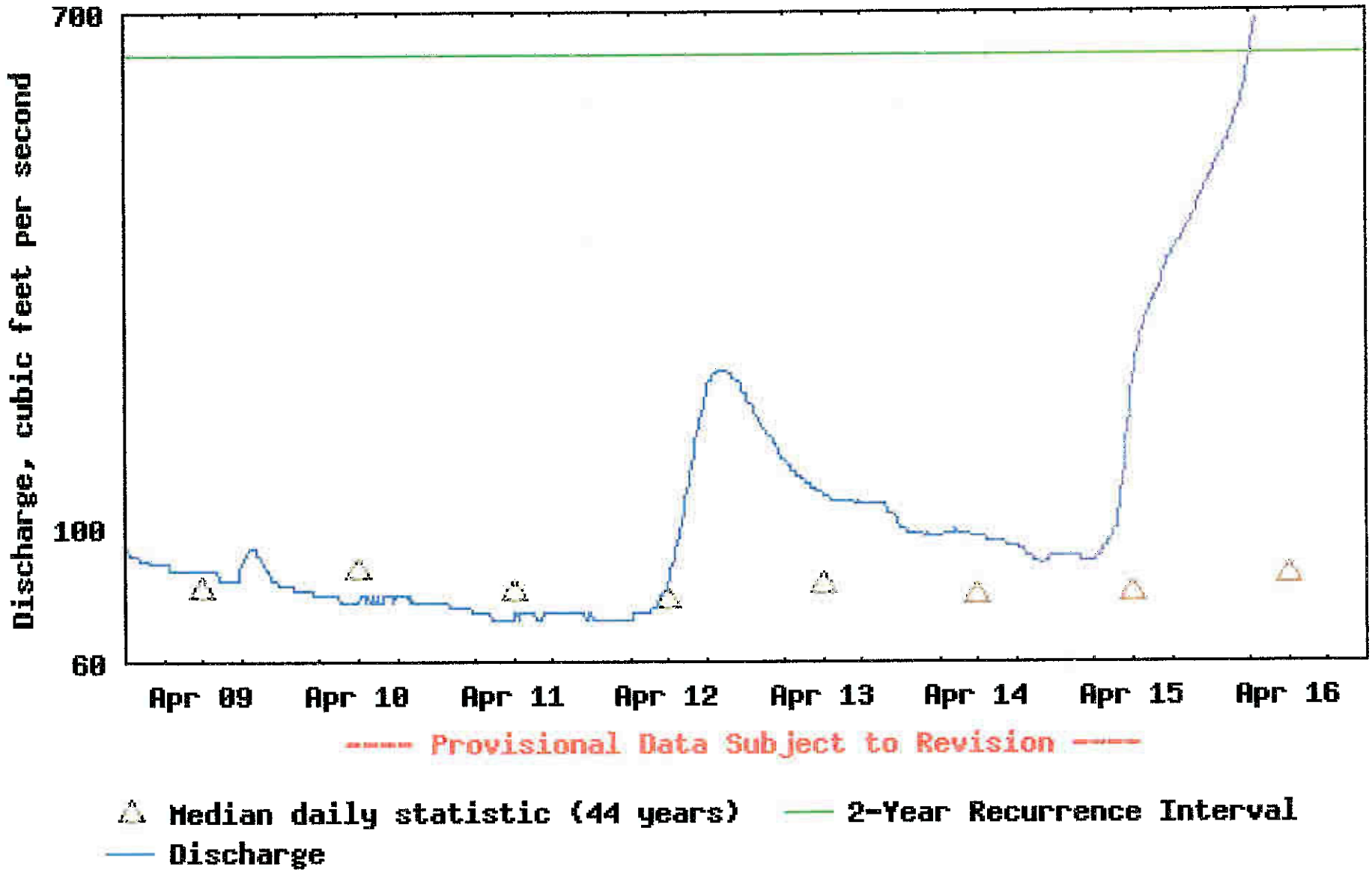


Exhibit 9
MacLaren Family Permission

Whippoorwill Farm
Malcolm MacLaren
Lakeville, Ct. 06039-0717
(860) 435-9657

BEEF PORK LAMB VEAL

ORGANICALLY GROWN
FROM THE GROUND UP

Board of Trustees
c/o of Michael J. Powers
CTDEP-Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm Street
Hartford CT 06106-5127

June 17, 2007

Dear Board of Trustees:

We own property on the Salmon Kill between the bridge on Farnam Road and the bridge on Salmon Kill Road. We have discussed the Trout Unlimited Salmon Kill Restoration and Enhancement Project with Ian Warner and would be happy to give permission to carry out all activities necessary to fulfill the objectives of the project once we know the means by which you intend to accomplish them. The east bank of the Salmon Kill on our property is under conservation easement and a conservation easement is being drawn up this summer that will include the west bank. Your activities must comply with the guidelines of our easements.

Sincerely,

Malcolm MacLaren

Malcolm MacLaren

Exhibit 10
Memorandum of Understanding between TU and NRCS dated February 21, 2003

MEMORANDUM OF UNDERSTANDING

BETWEEN THE

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

AND

TROUT UNLIMITED, INC.

This Memorandum of Understanding (MOU) is entered into and between the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) and Trout Unlimited, Inc. (TU).

I. PRINCIPAL AUTHORITIES

This MOU is entered into under the following principal authorities:

- Soil Conservation and Domestic Allotment Act, as amended [Public Law 74-46, 49 Stat. 163, 16 U.S.C. 590 b-f].
- Commodity Credit Corporation Charter Act as amended [15 U.S.C. 714c].
- Food Security Act of 1985 as amended [16 U.S.C. 3841 et. seq.].
- Food, Agriculture, Conservation and Trade Act of 1990 [Public Law 101-624].
- Farm Security and Rural Investment Act of 2002 [Public Law 107-171].

II. BACKGROUND

NRCS provides planning, technical, and financial assistance for the conservation of natural resources on private lands. Wetlands and aquatic habitats and the species utilizing them are considered to be two of several key resource concerns by NRCS in their ecosystem-based approach to conservation. Many aquatic species, including both coldwater and warmwater fishes, have specific habitat requirements that must be met to sustain their populations. USDA conservation programs such as the Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Wetlands Reserve Program (WRP), Environmental Quality Incentives Program (EQIP), and Wildlife Habitat Incentives Program (WHIP) help protect, restore, and enhance essential components of aquatic habitats, including clean water, stable streambanks, intact uplands and riparian areas, fish passage, instream, and floodplain geomorphology.

The mission of TU is to conserve, protect and restore North America's trout and salmon fisheries and their watersheds. TU accomplishes this mission on local, State, and national levels with an extensive and dedicated volunteer network. TU's national office, based just outside of Washington, D.C., and its regional offices employ professionals

who testify before Congress, publish a quarterly magazine, intervene in federal legal proceedings, and work with the organization's 125,000 volunteers in 500 chapters nationwide to keep them active and involved in conservation issues.

III. PURPOSE

The purpose of this MOU is to provide a framework for cooperative activities between NRCS and TU necessary to maintain and enhance wetland and aquatic habitats and associated fish, and aquatic species. Such activities can include, but are not limited to aquatic and riparian habitat improvement projects, fish passage projects, the provision of technical assistance, delivery of information and educational materials, collaboration on aquatic habitat and fisheries research, and the development of habitat improvement techniques.

IV. RESPONSIBILITIES

A. NRCS and TU mutually agree:

1. That each and every provision of this MOU is subject to the laws and regulations of the United States.

2. To attempt to identify and develop cooperative projects, including project title, description, scope, objectives, costs, anticipated outputs and period of performance for activities that advance aquatic habitat conservation.

3. To attempt to implement the most beneficial practices available for aquatic and riparian habitat conservation by seeking out and employing the latest technologies and practices, by forming partnerships with other governmental and/or non-governmental agencies, groups, and individuals to enter into innovative cooperative programs for more large scale conservation projects, and by working cooperatively to maximize the amount of federal funding that goes towards aquatic and riparian habitat conservation.

4. That this MOU is neither a fiscal, nor funds obligating document. Any endeavor by either party that involves the reimbursement, contribution of funds, transfer of anything of value between the parties will be handled in accordance with applicable laws, regulations, and procedures. Such endeavors shall be outlined in separate agreements; shall be made in writing by representatives of both parties; and will be independently authorized by appropriate statutory authority. This MOU does not provide such authority.

5. That either party may assume the responsibility for the design and implementation of projects under this MOU if such projects are completed subject to appropriate standards and specifications mutually agreed to by NRCS and TU in the project specific cooperative agreement, grant, task order, or contract.

6. To collectively review programs and activities associated with this MOU to assess progress and to plan future program direction as appropriate.

7. That nothing herein shall be construed as obligating NRCS to expend, or as involving the United States in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for these projects by NRCS.

8. That nothing herein shall be construed as obligating TU to expend, or as involving TU in any contract or other obligation for the future payment of money in excess of budgeted and available funds allocated for these projects by TU.

9. That each party agrees that it will be responsible for its own acts and shall not be responsible for the acts of other parties and the results thereof. Each party, therefore agrees, that it will assume all risk and liability to itself, its agents or its employees, for any injury to persons or property resulting in any manner from the conduct of its own operations, and the operations of its agents or employees, under this MOU, and for any loss, cost, damage, or expense resulting at any time from failure to exercise proper precautions, of or by itself or its own agents or its own employees, while occupying or visiting the projects under and pursuant to this MOU. The Government's liability shall be governed by the provisions of the Federal Tort Claims Act (28 U.S.C. 2671-80).

10. That each party recognizes that the other party may work independently and in cooperation with other entities in the completion of the type of conservation activities applicable to this agreement.

B. NRCS agrees:

1. To provide training, as it deems necessary, to its staff on fish and aquatic habitat conservation using as one of many technical sources the current technical information provided by TU.

2. To utilize its public information program to inform private landowners about aquatic and riparian habitat conservation practices and

programs, including when appropriate distribution of technical and financial assistance information is available through TU.

3. To provide appropriate recognition of TU on all cooperative projects conducted under this MOU.

4. To provide assistance for cooperative activities under this MOU subject to project specific cooperative agreements, grants, task orders, or contracts. Examples of activities that should receive assistance include, but are not limited to, riparian buffer improvements and planting of forest buffers, in-stream improvements such as stream channel modifications and restorations, stream bank protection and stabilization, fish passage projects, water conservation projects, livestock fencing, education and outreach programs, and any other projects that benefit aquatic and riparian habitats.

5. To provide assistance for implementing the use of innovative technologies and projects which address the mutual goals of TU and NRCS for aquatic and riparian habitat conservation.

C. TU agrees to:

1. Provide NRCS with information regarding the status of fish and other aquatic species populations and stream, lake, and riparian habitat management techniques.

2. To inform its members and the general public about aquatic and riparian habitat conservation projects conducted cooperatively with NRCS.

3. To inform its members and the general public about the conservation programs offered by NRCS, and to encourage those entities to apply for and undertake the practices necessary to become enrolled in those programs.

4. To assist NRCS in the training of its personnel in aquatic and riparian habitat conservation and management.

5. To provide assistance to NRCS for cooperative activities under this MOU subject to project specific cooperative agreements, grants, task orders, or contracts.

6. To provide appropriate recognition of NRCS, TU members, and the general public on all cooperative projects conducted under this MOU.

V. FUNDING

This MOU is to define, in general terms, the basis on which the parties concerned will cooperate, and as such, does not constitute a direct financial obligation for expenditures.

VI. CONTACTS

A. NRCS:

1. Howard Hankin (Technical)
   National Aquatic Ecologist
   P.O. Box 2890, Room 6150-S
   Washington, DC 20013-2890

2. Kathryn Staley (Technical)
   Fisheries Biologist
   Wildlife Habitat Management Institute
   Department of Fisheries and Wildlife
   104 Nash Hall
   Oregon State University
   Corvallis, OR 97331

3. Diane E. Gelburd
   Director, Ecological Sciences Division (Administrative)
   P.O. Box 2890, Room 6158-S
   Washington, DC 20013-2890

B. TU:

1. Joe McGurrin
   Resource Director
   1500 Wilson Boulevard, Suite 310
   Arlington, VA 22209-2310

2. Chris Wood
   Director of Watershed Programs
   1500 Wilson Boulevard, Suite 310
   Arlington, VA 22209-2310

3. Steve Moyer
   Vice President Conservation Programs
   1500 Wilson Boulevard, Suite 310
   Arlington, VA 22209-2310

VII. DURATION

This MOU shall become effective the date of the last signature and continue in effect for a period of 5 years or until modified or terminated. This MOU may be modified or amended upon written consent of both parties. This MOU may be terminated with a 30-day written notice from either party.

VIII. PROVISIONS

A. All activities and programs conducted under this MOU shall be administered in accordance with the requirements of Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, the Department of Justice regulations enforcing nondiscrimination requirements, and Agricultural departmental rules and regulations. Compliance ensures access in all aspects of program delivery of benefits and services to the public without regards to race, color, national origin, religion, sex, age, disability, marital status, familial status, parental status, sexual orientation, or because all or part of an individual's income is derived from any public assistance program.

B. All activities and programs conducted under this MOU shall be in compliance with the Drug-Free Workplace Act of 1988 (Public Law 100-690, Title V, Subtitle D).

The undersigned hereby agree to the above specified terms and conditions.

BRUCE I. KNIGHT (Date)	**CHARLES GAUVIN** (Date)
Chief	President
Natural Resources Conservation Service	Trout Unlimited

Exhibit 11
Letters of Support from:

- The Nature Conservancy
- Upper Housatonic Valley National Heritage Area, Inc.
- Town of Salisbury
- Senator Andrew Roraback
- Representative Roberta Willis
- The Salisbury Land Trust

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Berkshire Taconic Landscape Program
404 LeGeyt Road
Sheffield, MA 01257

tel [413] 229.0232
fax [413] 229.3034

nature.org

June 18, 2007

Mr. Mike Powers
Connecticut Inland Fisheries Division
vie email

Dear Mr. Powers,

I am writing to support Trout Unlimited's Salmon Kill restoration project as described in their application to the Trustee Subcouncil for Connecticut Housatonic Basin Natural Resource Damages.

The project accomplishes valuable restoration work in a high priority tributary of the Housatonic River in a manner that expedites the natural recovery period. Aquatic habitat restoration projects that address in-stream work as well as riparian condition benefit numerous resources that were damaged in the Housatonic. Native brook trout populations in the Salmon Kill benefit from habitat creation, improved riparian condition, and improved water quality. These benefits are equally applicable to the mainstem Housatonic, as the Salmon Kill is a relatively free-flowing stream connected to the Housatonic above Derby Dam.

The Nature Conservancy is interested in pursuing work which compliments the efforts of Trout Unlimited by protecting investments made in restoration through long-term conservation easements. Both projects stand alone in their value to the river, however, both organizations intend to work in close cooperation pending the results of funding decisions.

Sincerely,

Jason Miner
Geoffrey Hughes Berkshire Taconic Landscape Program Director
The Nature Conservancy
Sheffield, MA

Upper Housatonic Valley
National Heritage Area, Inc.

Board of Trustees
c/o Michael J. Powers
CTDEP - Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm Street
Hartford, CT 06106-5127

May 25, 2007

Dear Board of Trustees,

We wish to acknowledge support of Trout Unlimited's proposal to restore several long reaches of the Salmon Kill. We understand that the project parameters include extensive instream work, stream-bank stabilization and restoration, and floodplain restoration with native plantings along two long stretches of the river.

Further, we understand the the basic objective is to restore the river and its floodplains to a near natural state so that native species (coldwater fish, wetlands species, etc.) can once again inhabit the river and the floodplains. The reaches of the river that we are planning on working on run through Whippoorwill Farm (leased by the MacLarens) and the Belter family's property, and that the proposed project would also include some work on the reach that runs by Lime Rock Race Track.

The mission of the Upper Housatonic Valley National Heritage Area is to preserve and celebrate the region's cultural, historical and natural resource heritage, and we believe that this proposed project is in keeping with our stated mission. We sincerely appreciate your work!

On behalf of the UHVNHA Board of Trustees,

Dan T. Bolognani
Vice Chairman, UHVNHA, Inc.

Curtis Rand
First Selectman

Telephone: 860-435-5170
Fax: 860-435-5172
Email: tsalisbury@snet.net

TOWN OF SALISBURY
CONNECTICUT

James Dresser
Peter Oliver
Selectmen

Town Hall
P.O. Box 548
Salisbury, Connecticut 06068

Board of Trustees
c/o Michael J. Powers
CT DEP – Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm St.
Hartford, CT 06106-5127

June 11, 2007

Re: Salmon Kill Valley Stream Restoration

Dear Mr. Powers,

The purpose of my letter is to express support for the TU proposal to conduct restoration activities along several sections of the Salmon Kill in Salisbury, CT. I am familiar with these areas and I have reviewed the proposal personally as well as discussing it with the landowners involved.

The Salmon Kill valley is of great ecological and esthetic importance to the Town of Salisbury. Its productive soils have provided important agricultural benefits to our citizens for many years, and the valley and creek provide a significant riparian connection between the Housatonic River and several smaller streams and watersheds in our town. The 3 tributaries include Moore Brook, Wachocastinook Creek, and Factory Brook; each of these watersheds hold significant areas under permanent protection and contribute to the exceptional ecological functions of the Salmon Kill.

The proposed TU project is a logical and necessary restoration of a significant natural resource that benefits many citizens beyond our borders. While some of the past land uses provided consumptive benefits to society through gravel extraction and agriculture, it is now appropriate to restore some of the functions that were compromised in an earlier era. The project would have a direct benefit on the health of the Housatonic River through floodplain restoration and improvement of coldwater fishery habitat.

Thank you for your consideration of this important project.

Sincerely,

Curtis Rand
First Selectman

State of Connecticut

SENATE

STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

SENATOR ANDREW W. RORABACK
THIRTIETH DISTRICT

P.O. BOX 357, 455 MILTON ROAD
GOSHEN, CONNECTICUT 06756
TELEPHONE
WORK: 1-860-240-8800
TOLL FREE: 1-800-842-1421
HOME: 1-860-491-8617
FAX: 1-860-240-0023
E-MAIL: Andrew.Roraback@cga.ct.gov

CHAIRMAN
REGULATION REVIEW COMMITTEE

RANKING MEMBER
PUBLIC HEALTH COMMITTEE

MEMBER
FINANCE, REVENUE AND BONDING COMMITTEE
JUDICIARY COMMITTEE
LEGISLATIVE MANAGEMENT COMMITTEE

June 14, 2007

Board of Trustees
c/o Michael J. Powers
CT DEP – Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm Street
Hartford, CT 06106-5127

Dear Trustees,

I write in strong support of the application of Trout Unlimited to undertake an important and ambitious restoration project of the Salmon Kill as it runs through Salisbury. I can think of no more suitable investment of the NRD Funds which have been provided by the GE settlement than restoring this signature cold water stream of Northwest Connecticut.

As spelled out in detail in the application, restoration of this river will have numerous environmental and recreational benefits. In addition, as the river is located in a valley of unparalleled and unspoiled natural beauty, its restoration and enhancement will benefit all in the general public who enjoy this area in all seasons.

I am grateful for your willingness to take my comments into consideration. Please look to me for any additional support I might furnish for an application whose merit speaks for itself.

Sincerely,

Andrew Roraback

Andrew Roraback
State Senator, 30th District

State of Connecticut

HOUSE OF REPRESENTATIVES
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

REPRESENTATIVE ROBERTA B. WILLIS
SIXTY-FOURTH DISTRICT

LEGISLATIVE OFFICE BUILDING
ROOM 1802
HARTFORD, CT 06106-1591
HOME: (860) 435-0621
CAPITOL: (860) 240-8585
TOLL FREE: 1-800-842-8267
FAX: (860) 240-8833
E-mail: Roberta.Willis@cga.ct.gov

CHAIRMAN
HIGHER EDUCATION AND EMPLOYMENT ADVANCEMENT COMMITTEE

MEMBER
APPROPRIATIONS COMMITTEE
ENVIRONMENT COMMITTEE

June 18, 2007

Board of Trustees
c/o Michael J. Powers
Connecticut Department of Environmental Protection
Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm Street
Hartford, CT 06106-5127

Dear Mr. Powers:

It gives me pleasure to express my support for the proposed "Trout Unlimited Salmon Kill Restoration and Enhancement Project." Connecticut's plan for the restoration of the Housatonic River should include efforts that promise to improve water quality, revitalize native habitat, and support wildlife. The stated aims of this proposal offer to accomplish those goals.

The planned project area of the Salmon Kill is in the Town of Salisbury. The stream runs through a picturesque valley and the surrounding land includes acres of rolling hills and open fields that visually define the northwest corner of Connecticut. Clearly, this area could be described as having much of the wonderful natural features of Connecticut's landscape.

The Salmon Kill is an essential tributary. It enters the Housatonic River delivering a supply of revitalizing clean and cold water year round. This is critically important during the summer months when the river warms up considerably. In order to maximize the potential benefit to the Housatonic River, work could be done to stabilize and restore the stream banks, which will prevent future erosion and build-up of silt on the stream bottom. Since agriculture fields have bordered the stream in the valley, this has left little to buffer the salmon kill from run-off. The proposed restoration of the banks and the floodplain would vastly improve the existing situation.

This multi-faceted project proposal seems to be a most appropriate use of the Housatonic River restoration funds. Your consideration of the Salmon Kill Project is most appreciated.

Sincerely,

Roberta B. Willis

Roberta B. Willis
State Representative

The Salisbury Land Trust

Land Trust Committee of The Salisbury Association

The Salisbury Association Land Trust
24 Main Street
Salisbury CT 06068
June 12, 2007

To the Board of Trustees
c/o Michael J. Powers
CT DEP-Inland Fisheries Division
Housatonic River Natural Resources Restoration Project
79 Elm Street
Hartford CT 06106

The Salisbury Association Land Trust holds protection and enhancement of the Salmon Kill and its Valley as a top conservation priority in Salisbury, and the Salisbury Association Land Trust strongly supports the Trout Unlimited Salmon Kill Restoration and Enhancement Project. If the Spirit of Salisbury resides in the Riga Plateau then the heart of Salisbury is the Salmon Kill Valley, and it is the Salmon Kill which gathers those mountain waters from Fisher Pond, Brassie Brook, Ball Brook and Wachocastinook carrying them through the idyllic Salmon Kill Valley and on to the Housatonic River.

The Land Trust chose the Salmon Kill Valley for its first town land tour highlighting the geology, agriculture and ecology of the Valley. The Salmon Kill got double billing as a waterpower source for the iron industry and an historic trout stream. The Piel Family who lived at Salmon Kill Farm in the 30's and 40's had small maps that looked like a golf score card which the fishermen took out to record what they caught and where they caught it, with intriguing names for the many holes and riffles where fish were often caught. These records were entered in a book back at the farm.

With a good deal of land already protected along the Salmon Kill, it is a wonderful candidate for this project of ecological restoration. The Land Trust's Dark Hollow preserve of 120 acres is at the east end of the Valley. This was the Land Trust's first major purchase, over one million dollars. This property protects wetlands to its east, which drain to the Salmon Kill as well as Factory Brook to the west, which is a tributary of the Salmon Kill. The point where the Salmon Kill is formed by the confluence of Factory Brook, Wachocastinook and Spruce Swamp Brook is on a 129-acre parcel

The Salisbury Land Trust

Land Trust Committee of The Salisbury Association

protected by a conservation restriction. The drainage north of this point is protected by another conserved parcel of 205 acres and then the Appalachian Trail. The Salisbury Association Land Trust holds a conservation restriction on 40 acres of the MacLaren lands between the stream and Salmon Kill Road. The farmer who leases the land has put up fencing to protect the stream from the grazing cattle. Further down stream there are another 185 acres protected by an easement to The New England Forestry Foundation on Salmon Kill Farm, 25 acres protected by The Housatonic Valley Association and 18 acres protected by the National Park Service where the Salmon Kill flows into the Housatonic.

The Salmon kill and the Valley are specifically referred to in the Town and Regional plans of Conservation and Development. From the January 1, 1999 Town Plan:

"(4.15) Moore Brook, Salmon River Corridor. The 1975 regional report on Conservation and Preservation in Northwestern Connecticut identified this stream belt as one of the region's most scenic corridors. It noted that the Salmon River corridor outside of the village of Salisbury adds definition and scenic interest to the large area of farmlands in the Salmon River valley.

The Moore Brook, Spring Swamp and Salmon Brook stream belt corridor should be a top priority for preservation and conservation. Fortunately much or the headwater for Moore Brook is protected land. Private Land Trust protection action should extend protection of this greenway corridor, especially the extensive wetlands in Spruce Swamp and the stream belt and floodplain areas along the scenic Salmon River corridor."

The Salmon Kill Valley is a place of great diversity and inspiring beauty. Trout Unlimited's project will help provide an ecological beauty that is more than skin deep.

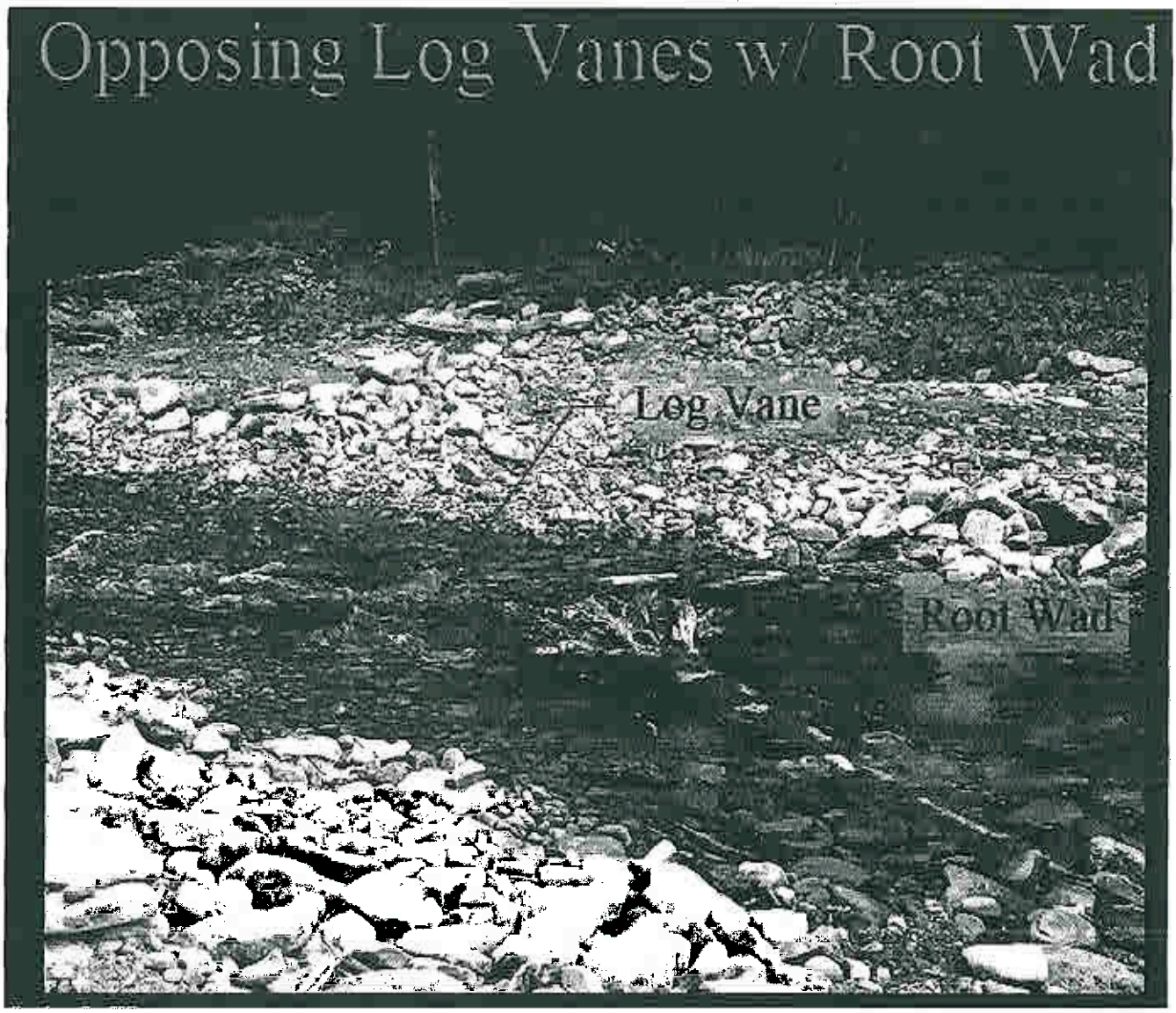
Sincerely,

George Massey
Lou Hecht

George Massey and Lou Hecht
Co-chairs Salisbury Association Land Trust

24 Main Street, Salisbury, Ct 06068 • Phone: 860-435-0566 • Fax: 860-435-6137

Exhibit 12
Instream Structures


Opposing Log Vanes w/ Root Wad
Log Vane
Root Wad

Wing Deflectors (single)

A single wing deflector is a triangular structure that extends out from the streambank into the stream, with the widest portion along the bank and the point extending into the channel. The purpose is to change or (deflect) the direction of stream flow either to narrow and deepen the baseflow channel or to create sinuosity in the channel. When used to narrow and deepen the baseflow channel they can also promote the formation of overhead cover (undercut banks) on the opposite bank.

Wing deflectors can consist of a rock filled log frame or they can be made entirely of rock. In urban stream applications they more often consist entirely of rock. Single wing deflectors are not often used in urban applications as they tend to force water toward the opposite bank, and unless the opposite bank is sufficiently stable or armored, bank erosion can ensue.

They are constructed by first digging two trenches that meet at the apex for installation of the footer stones. The footer stones should be spaced so that there is about 1/3 of the stone diameter separating them. This allows the weir stones to interlock when placed on top. Once the weir stones have been placed to form the two arms of the triangle, the central portion can be back filled with excavated material and large stone placed on top to achieve the desired elevation.

The wing deflector should extend up to the bankfull elevation at the streambank or to the height of the streambank which ever is higher. The structure grades down to the channel invert about 1/3 of the way across the channel. However, the distance the deflector extends out into the channel will depend upon the site-specific circumstances of the application (Figure 24).

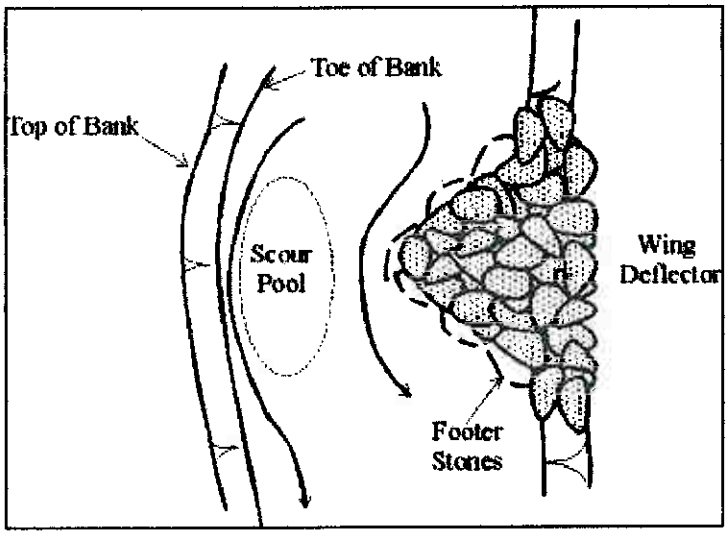


Figure 24: Plan View of Single Wing Deflector

Wing Deflectors (double)

When two wing deflectors are placed opposite each other they serve to narrow or constrict the flow of water. The double wing deflector is more often used in urban applications as it forces the water toward the center of the channel and deepens the baseflow channel. Double wing deflectors also create an area of increased velocity between them, enhancing riffle habitat between and just upstream of the structure. This increased velocity also creates an area of scour, creating pool habitat downstream of the

structure. The construction is the same as a single wing deflector except that in some instances, a rock sill at the stream invert may connect the two structures (Figures 25 and 26).

Both single and double wing deflectors have significant habitat enhancement potential. These structures enhance habitat through pool formation, the narrowing and deepening of the baseflow channel, and the enhancement of riffle habitat.

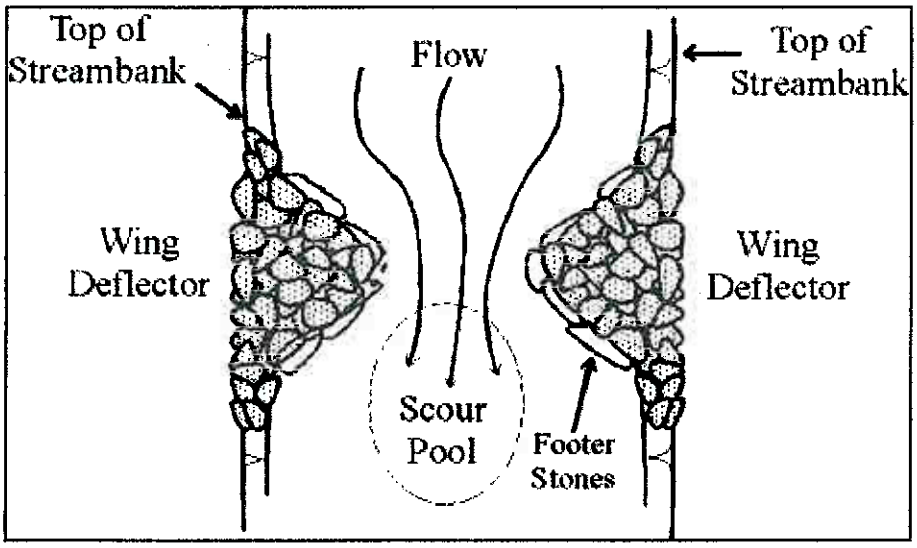


Figure 25: Plan View of Double Wing Deflector

Log, Rock, and J-Rock Vanes

Vanes are linear structures that extend out from the streambank into the stream channel in an upstream direction. They essentially mimic the effect of a tree partially falling into the stream. They are usually placed along the streambank where erosion is occurring along the toe of the slope. The purpose of vanes is to reduce erosion along the streambank by redirecting the stream flow toward the center of the stream. In addition, they tend to create scour pools on the downstream side. Vanes can be made of rock or log. They grade down from the bankfull elevation at the streambank to the channel invert at their terminus in the stream. Vanes generally extend out from the stream bank 1/3 of the bankfull width and are angled upstream from the bank at a 20 to 30 degree angle. They should be carefully located and installed so as not to produce additional erosion on the upstream side where they meet the bank (eddy scour) or allow flows to outflank them, exacerbating existing bank erosion problems. The only difference between the log vane and the rock vane is the material used. The *J* - vane is basically the same as a rock vane with the exception that it curls around at the end in the shape of a "J." The curved end portion serves to enhance downstream scour pool formation (Figures 27 - 29).

The rock vane is constructed by first excavating a trench for the footer stones. The footer stones are then placed in the trench so that there is a gap between them equal to 1/3 of the stone diameter. This gap will allow the vane stones to interlock with the footer stones. The vane stones should be placed on top of the footer stones so they are staggered over two adjacent footer stones and skewed slightly upstream of the footer stones. As the vane is built out and slopes down from the bank, footer stones will become unnecessary when the vane stones can be placed in the trench and extend up to achieve the desired elevation.

Rock, log and J-vanes have significant habitat enhancement potential through the creation of downstream scour pools, narrowing and deepening of the baseflow channel, and the enhancement of riffle habitat along the upstream side.

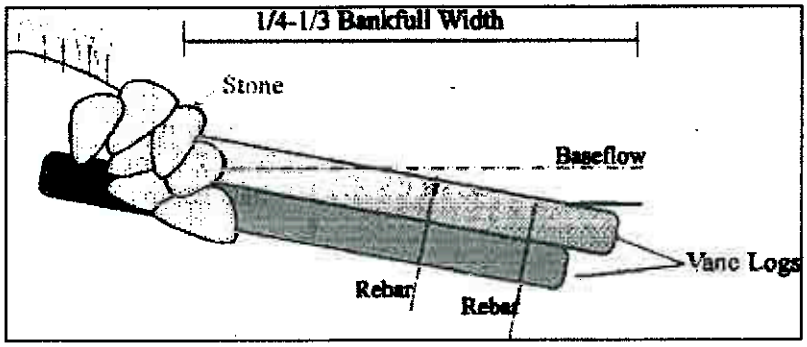


Figure 27: Section View of Log Vane

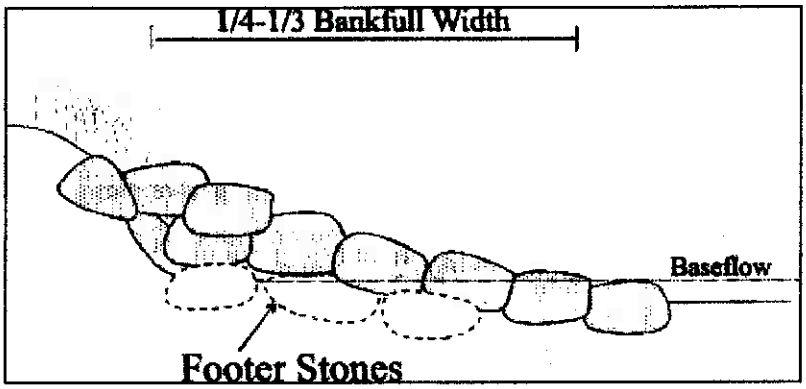


Figure 28: Section View of Rock Vane

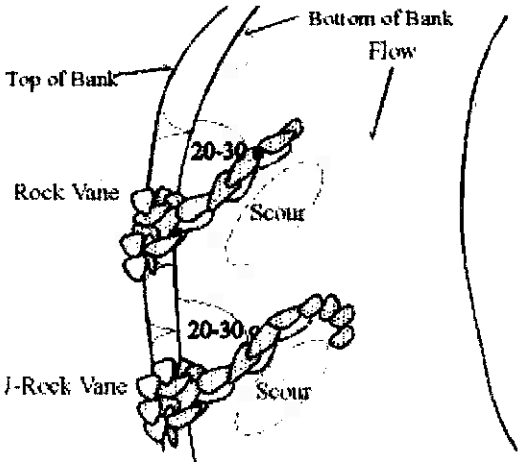
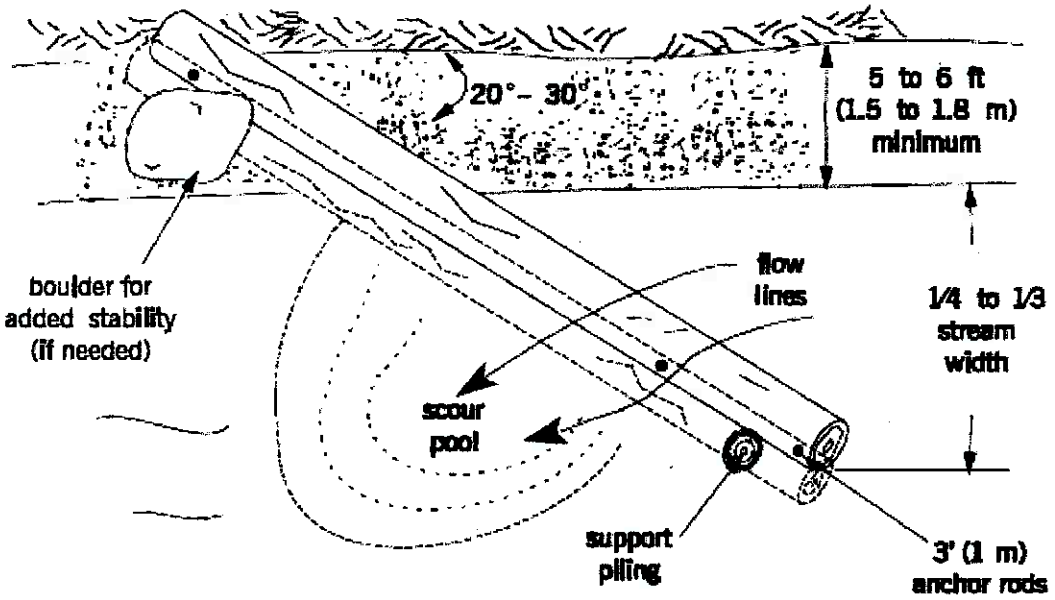


Figure 29: Plan View of Rock Vane and J-Rock Vane

PLAN VIEW: LOG VANE



SECTION VIEW: LOG VANE

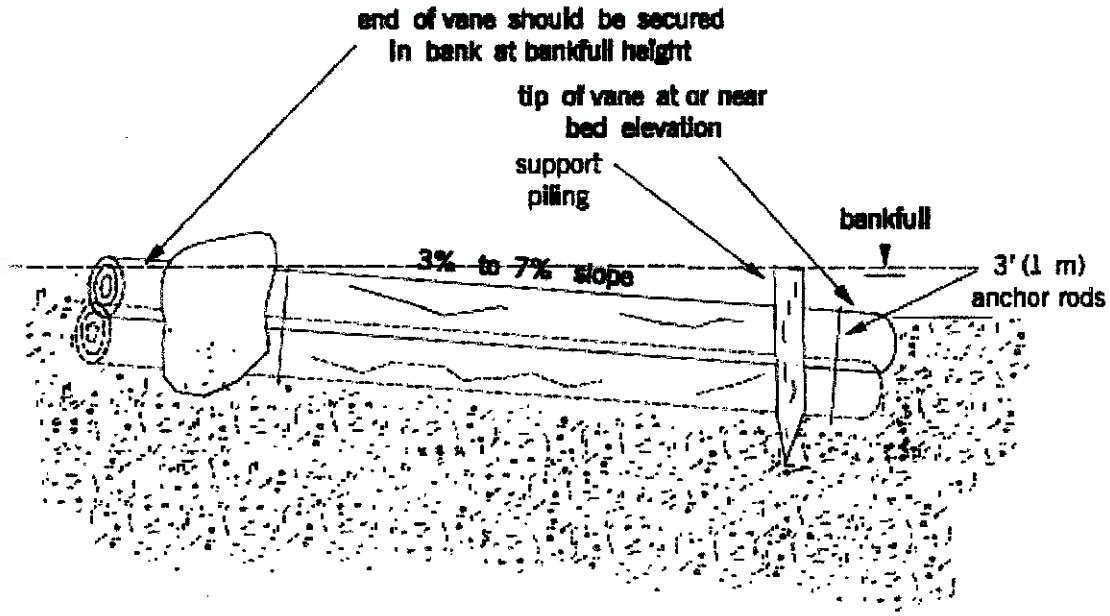


Exhibit 13

CT NRCS WHIP Practice Standards and Costs

Prescribed Burning: Code 338

Applying controlled fire to a predetermined area. The purposes are to 1) control undesirable vegetation, 2) to prepare sites for harvesting, planting or seeding, 3) to control plant disease, 4) to reduce wildfire hazards, 5) to improve wildlife habitat, 6) to improve plant production quantity and/or quality, 7) to remove slash and debris, 8) to enhance seed and seedling production, 9)to facilitate distribution of grazing and browsing animals and 10) to restore and maintain ecological sites.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Prescribed Burning (Code 338).

Prescribed Burn PB-1 AC $1,067/ac
Prescribed burning in grasslands, herbaceous and/or woodlands including xeric woodland. Requires a burn plan including smoke management, coordination with State Forestry Unit, Local Fire Marshall, and Local Fire Department. USFWS shall be consulted.

Fencing: Code 382

A barrier constructed to control animals or people. The purpose is to facilitate the application of conservation practices by providing a means to control movement of animals and people.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Fence (Code 382).

Fencing - Livestock exclusion CT-3 AC: $6.20/ft
Installation of 4 strand, barbed wire fence to exclude domestic livestock from natural ecosystems.

Fencing - Prevention of wildlife damage, people control CT-4 AC: $10/ft
Construction of a specialty fence to prevent damage by wildlife or domestic livestock. Specimen trees and shrubs will be enclosed with woven wire fence at least five feet beyond the plant. Includes beaver exclusion fences, fencing buried beneath the ground and underwater. Refer to design sheet specific to site.

Stream Habitat Improvement and Management: Code 395

To maintain, improve or restore physical, chemical and biological functions of a stream. The purposes are to 1) provide suitable habitat for desired aquatic species and diverse aquatic communities, 2) provide channel morphology and associated riparian characteristics important to desired aquatic species, 3) provide aesthetic values and recreation opportunities such as angling and fish viewing.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Stream Habitat Improvement and Management (Code 395).

AQUATIC- INSTREAM BOULDER: AQ-1 AC: $150/ea.
The placement of large boulders (>2 feet dia.) in the stream to provide instream velocity breaks and cover for fish. The boulders may be placed singularly in a "random" pattern or may be placed in groups of two or three. The boulders will be placed such that bank stability is not compromised.

AQUATIC - BANK-PLACED BOULDER: AQ-2 AC: $150/ea
The placement of large boulders (>2 feet dia.) along the stream bank to provide near bank cover and velocity breaks for fish. The boulders should be placed at least one foot apart and may be placed at a distance equivalent to twice the average diameter of the boulder immediately upstream. Boulders should be keyed into the bank and the streambed. Disturbed areas are to be seeded and stabilized as necessary.

AQUATIC - HALF-LOG STRUCTURE: AQ-3 AC: $100/ea
The placement of 8-10 foot half-logs in the stream to provide instream cover for fish as well as a substrate for insect production. The structures will be placed in a glide with insufficient instream cover and/or insufficient large woody debris (LWD). The logs should be braced above the stream bottom 0.5 feet, and pinned into the substrate with 3/4-inch reinforcing bar. The logs should be placed parallel to the direction of flow so as not to compromise the stability of the streambanks, and to maximize cover.

AQUATIC - BANK-LOG COVER: AQ-4 AC: $40/ft
The placement of large woody debris (LWD) at the bank toe to stabilize the toe of slope, provide near-bank cover for juvenile and adult fish, as well as provide a substrate for insect production. The LWD should have a DBH of 10 inches or greater and either be pinned into the substrate with 3/4-inch reinforcing bar, anchored with 8.00 mm wire rope and soil anchor devises, or braced with large boulders. Upstream rock keys, and soil stabilization will be implemented as necessary.

AQUATIC - COIR FIBER ROLL: AQ-5 AC: $60/FT
The placement of coir fiber rolls at the bank toe to provide temporary stabilization of the toe for the establishment of streamside vegetation. Should not be placed on the outside of a meander bend, where high stream velocities are expected. Rolls are to be keyed into the stream substrate and installed as per the manufactures' recommendations, or as directed by NRCS staff in the

field. Rock Keys are to be installed at the upstream end, and exposed soil wrapped in coir webbing and seeded / planted as necessary.

AQUATIC - ARTIFICIAL OVERHANGING BANK: AQ-6 AC: $100/FT

The installation of an artificial overhanging bank to provide near-bank overhead cover for fish. The artificial bank will be constructed in an area with sufficient scour to prevent sedimentation of the structure. All disturbed areas will be seeded / planted as necessary to stabilize the soil.

AQUATIC - FLOATING LOG COVER: AQ-7 AC: $160/ea.

The installation of floating logs to provide instream and / or near-bank overhead cover for fish. The floating log cover will be placed in a pool or glide, so as to provide overhead cover in low flows. Two logs with a minimum diameter of 8 inches and a total length of 6 to 10 feet will be lashed together with aircraft cable of a minimum diameter of 0.25 inches. The structure will be attached to a stable anchor point.

AQUATIC - INSTREAM LOG COVER: AQ-8 AC: $200/ea

The placement of large woody debris (LWD), with a minimum diameter of 8 inches and a minimum length of 15 feet, within the stream channel. The LWD will be of good condition, and will be pinned with 5-foot lengths of 3/4-inch reinforcing bar every five feet along the length of the LWD and will be anchored parallel to the direction of flow, or as directed by NRCS staff in the field. Sections of LWD with v-notches or branching are encouraged. LWD with branching will be placed such that the apex of the acute angle of the notch or branch is up-stream. The LWD can be incorporated with instream boulders to provide additional velocity breaks for fish.

AQUATIC – ROCK VANE: AQ-10 AC: $8,000/ea

The construction of a stream barb, J-Hook, cross vane, vortex weir, or other rock structure to provide channel stability and/or create a diversification of habitat. The design of the structure will be based on the identified bankfull flow for the targeted reach, and the size of the material used will be able to withstand the anticipated stress imposed on the structure from top of bank and out of bank flows.

Aquatic – Conifer Tree Revetment: AQ-11 AC: $50/ft

The installation of a conifer tree revetment to provide streambank protection, sediment attenuation, and/or channel constriction. Trees, are to be lashed with solid braided nylon rope of a minimum diameter of 3/8-inches to wooden stakes of a minimum cross-sectional area of 4 in^2 embedded into the streambed a minimum of 2 feet, or with aircraft cable of a minimum diameter of 8.00 mm. anchored to duckbill or similar soil anchor devices as specified by NRCS staff in the field. Additional anchors on the streambank may also be used.

AQUATIC – STREAMBANK SOIL BIOENGINEERING: AQ-12 AC: $60/ft

The implementation of soil bioengineering techniques to provide surface protection of the bank, a good medium for plant growth and near bank overhanging vegetation. This practice will often be used in combination with practice AQ-2, AQ-4, AQ-10, and AQ-15.

AQUATIC – LOG SPUR: AQ-14 AC: $1,500/EA.
The installation of a log spur to provide channel stability and/or create a diversification of habitat. The log(s) will have a minimum diameter of 10 inches. The log(s) will be of good condition and will be pinned with 5-foot lengths of 3/4-inch reinforcing bar every five feet along its entire length, or tethered with 8.00 mm wire rope to duckbill anchors or similar soil anchor devices driven into the streambed. In gravel bed streams, where post-construction piping of streambed materials is anticipated, a geotextile fabric may be used on the upstream portion of the structure to provide temporary stability. The log(s) may be used in combination with boulders.

Aquatic – Constructed Log Jam: AQ-15 AC: $7,000/ea
The installation of a constructed log jam to provide channel stability and/or create a diversification of habitat. The log jam will be anchored in place with boulders, aircraft cable, steel reinforcing bar, and/or soil anchor devices. Depending on location and anticipated stress on the structure, primary or key members may be embedded in the bank or bed of the stream. The log jam will be located in water depths between 1 and 4 feet, and will extend away from the bank, but no greater than 25% of the active channel width.

Aquatic – Rootwad: AQ-16 AC: $1,500/ea
The installation of a rootwad to create diversification of habitat within a pool. The bole of the rootwad will be buried into the adjacent bank. A footer log or rock will be included in the installation where necessary. The rootwad will be installed such that a minimum of 50% of the longitudinal cross-section of the rootwad is below the low-flow elevation in the pool. Rock ballast and soil-anchoring devices are to be used if warranted by soil and bank conditions.

Aquatic – Channel Rehabilitation-1: AQ-31 AC: $50/ft
The rehabilitation, restoration or construction of an existing or historic channel based on Natural Channel Design (NCD) principles. This practice may include modifications in the pattern, dimension and profile of the channel, and/or modifications of the floodplain to improve channel stability, aquatic habitat and channel-floodplain interactions. This practice may be used in combination with practices AQ-1 through AQ-16 to achieve the desired habitat and channel stability features. All necessary local, state and federal permits are the responsibility of the applicant. **NRCS staff must be present to guide implementation of this practice.**

Aquatic – Channel Rehabilitation-2: AQ-32 AC: $75/ft
The rehabilitation, restoration or construction of an existing or historic channel based on Natural Channel Design (NCD) principles. This practice may include modifications in the pattern, dimension and profile of the channel, and/or modifications of the floodplain to improve channel stability, aquatic habitat and channel-floodplain interactions. This practice may be used in combination with practices AQ-1 through AQ-16 to achieve the desired habitat and channel stability features. All necessary local, state and federal permits are the responsibility of the applicant. **NRCS staff must be present to guide implementation of this practice.**

Aquatic – Channel Rehabilitation-3: AQ-33 AC: $100/ft

The rehabilitation, restoration or construction of an existing or historic channel based on Natural Channel Design (NCD) principles. This practice may include modifications in the pattern, dimension and profile of the channel, and/or modifications of the floodplain to improve channel stability, aquatic habitat and channel-floodplain interactions. This practice may be used in combination with practices AQ-1 through AQ-16 to achieve the desired habitat and channel stability features. All necessary local, state and federal permits are the responsibility of the applicant. **NRCS staff must be present to guide implementation of this practice.**

Aquatic – Channel Rehabilitation-4: AQ-34 AC: $200/ft

The rehabilitation, restoration or construction of an existing or historic channel based on Natural Channel Design (NCD) principles. This practice may include modifications in the pattern, dimension and profile of the channel, and/or modifications of the floodplain to improve channel stability, aquatic habitat and channel-floodplain interactions. This practice may be used in combination with practices AQ-1 through AQ-16 to achieve the desired habitat and channel stability features. All necessary local, state and federal permits are the responsibility of the applicant. **NRCS staff must be present to guide implementation of this practice.**

Aquatic – Channel Rehabilitation-5: AQ-35 AC: $300/ft

The rehabilitation, restoration or construction of an existing or historic channel based on Natural Channel Design (NCD) principles. This practice may include modifications in the pattern, dimension and profile of the channel, and/or modifications of the floodplain to improve channel stability, aquatic habitat and channel-floodplain interactions. This practice may be used in combination with practices AQ-1 through AQ-16 to achieve the desired habitat and channel stability features. All necessary local, state and federal permits are the responsibility of the applicant. **NRCS staff must be present to guide implementation of this practice.**

Fish Passage: Code 396

The modification or removal of a barrier(s) that restrict or prevent the movement or migration of fish. The purpose is to allow upstream and downstream movement of fish past barriers where feasible or desirable.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Fish Passage (Code 396).

AQUATIC – FISHWAY: AQ-9 AC: $10,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired

AQUATIC – FISHWAY: AQ-91 AC: $20,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-92 AC: $40,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-93 AC: $60,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction

with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-94 AC: $80,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-95 AC: $100,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-96 AC: $120,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-97 AC: $140,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-98 AC: $160,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not

intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

AQUATIC – FISHWAY: AQ-99 AC: $180,000/ea

The construction of a fish passage facility and/or the removal or modification of an existing barrier to facilitate the passage of diadromous and/or resident fish species. This practice is not intended to address natural barriers, which have historically limited the passage of fish. This practice may include the removal or modification of a dam, or the installation of a ladder, bypass channel, rock ramp, or other fish passage structure. In the cases where the proposed means of passage will alter the existing water surface profile, this practice should be used in conjunction with practices AQ-31 through AQ-35, where natural reestablishment of the channel is neither feasible nor desired.

Fishpond Management: Code 399

To provide favorable habitat for fish and other aquatic organisms, to develop and maintain a desired species composition and ratio and to develop and maintain a desired level of production.

The planning and implementation of the following practice components are applicable under the current National Conservation Practice Standard for Fishpond Management (Code 399).

Aquatic – Mechanical ANV Management - hydrorake: AQ-17 AC: $3,200/ac
The management of aquatic nuisance vegetation (ANV) by the use of a hydro rake. The material harvested will be either hauled off-site or composted on site, in a suitable location. Multiple treatments may be necessary. All necessary local inland wetland, state and federal permits where applicable are the responsibility of the participant. All permits must be in place prior to commencing work.

Aquatic – Chemical ANV Management: AQ-18 AC: $300/ac
The management of aquatic nuisance vegetation (ANV) by chemical treatment alone or combined with mechanical treatment. Follow labeled recommendations and all safety precautions provided by the manufacturer. Multiple treatments may be necessary. All necessary local inland wetland, state and federal permits where applicable are the responsibility of the participant. All permits must be in place prior to commencing work.

Aquatic – Vegetation Restoration / Establishment: AQ-19 AC: $1,400/ac
The establishment or enhancement of aquatic vegetation by the planting of plugs or tubers to minimize shoreline erosion, and/or provide fish and wildlife food and cover. The establishment of burreed, bulrush, cattail, northern arrowhead, pickerelweed, spike rush, etc are suited to this type of establishment.

Aquatic–Open Water Habitat Management: AQ-21 AC: $21,000/ac
The management of pond/lake depths by the excavation of material, or the placement of material to create deep open water and/or littoral shelves within a pond/lake for the creation of habitat for the desired fish species. All necessary local inland wetland, state and federal permits where applicable are the responsibility of the participant. All permits must be in place prior to commencing work.

Aquatic – Water Control Structure: AQ-22 AC: $3,000/ea
The installation of a water control structure to facilitate the management of water levels in the impoundment to achieve a prescribed management objective.

Aquatic – Species Composition Management: AQ-23 AC: $500/ac
The removal or management of a targeted fish community by mechanical, chemical or biological means to achieve a prescribed management objective

Aquatic - Submerged Structure: AQ-24 AC: $3,100/ea
The creation of complex habitat in water bodies through the installation of submerged structure, including log cribs, rock piles, log and rock cribs, pipe or lumber cribs and conifer cribs. The structures will be placed within the littoral zone of the impoundment and anchored securely in

place. All necessary local inland wetland, state and federal permits where applicable are the responsibility of the participant. All permits must be in place prior to commencing work.

Aquatic – Biological ANV Control: AQ-25 AC: $555/ac

The control of aquatic nuisance vegetation (ANV) through the liberation of certified triploid grass carp, as per state guidelines. The practice will be repeated after 5 to 7 years, based on an evaluation of weed coverage and fish abundance. All permits are the responsibility of the applicant.

Aquatic – Mechanical ANV Management - harvester: AQ-26 AC: $540/ac

The management of aquatic nuisance vegetation (ANV) by the use of mechanical equipment such as weed harvesters, cutters and/or manual cut and rake or manual pulling. The material harvested will be either hauled off-site or composted on site, in a suitable location. Multiple treatments within the same year may be necessary. All necessary local inland wetland, state and federal permits where applicable are the responsibility of the participant. All permits must be in place prior to commencing work.

Field Access Road Code: 560

A travel-way for equipment and vehicles constructed as part of a conservation plan. The purpose is to provide a fixed route for vehicular travel while protecting the soil, water, air, fish, wildlife, and other adjacent natural resources.

The planning and implementation of the following practice components are applicable under the current Connecticut Practice Standard for Access Road (Code 560).

Field Access for Equipment Travel CT-1 AC: $17.75/ft

Development of travel ways, placement of stone, bankrun gravel, culverts, mechanical removal of woody materials, placement of gates and access control. All disturbed areas will be seeded. Solely for the purpose of ecosystem restoration.

Tree/Shrub Establishment Code: 612

Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration. The purpose is to establish woody plants for forest products, wildlife habitat, long-term erosion control and improvement of water quality, treat waste, increase carbon storage in biomass and soils, renewable energy production, energy conservation, and enhance aesthetics.

The planning and implementation of the following practice components are applicable under the current Connecticut Practice Standard for Tree/Shrub Establishment (Code 612).

Tree/Shrub Establishment TS-1 AC: $24/plant

Mixed hardwoods, softwoods, and desirable non-invasive shrubs. Plants may be bare rooted stock, whips, or balled and burlapped. Competitive vegetation will be removed from the planting site, and newly established plants adequately watered. A planting hole adequate for the size plant will be prepared. Soil will be loosened surrounding the plant, stones removed, and slow release fertilizer added for balled and burlapped stock. All soil will be packed around roots following planting to ensure no air pockets. All trees shall be protected by tree guards, during the establishment period. Plant spacing shall be specified on the planting plan.

Tree, shrub Establishment-Seeding TS-8 AC: $667/ac

Direct establishment of hardwoods, softwood, and desirable non-invasive shrubs. Establishment will be by seeding. Collect seed from the previous year mast crop or purchase native seed. Suitable species include; oak, maple, ash, elm, beech, pine, hemlock, cedar and tamarack and shrubs as available. Randomize placement of seed, and cover with soil to minimize utilization by wildlife and maximize soil contact for establishment.

Watering Facility Code: 614

A device (tank, trough, or other watertight container) for providing animal access to water. The purpose is to provide watering facilities for livestock and/or wildlife at selected locations in order to 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

The planning and implementation of the following practice components are applicable under the current Connecticut Practice Standard for Watering Facility (Code 614)

Watering Facility - Trough or Tank CT-1 AC: $700/ea

Livestock Watering Facility developed to keep livestock out of wetlands, watercourses, riparian lands and other sensitive landscapes.

Restoration And Management of Declining Habitats Code 643

Restoring and conserving rare or declining native vegetative communities and associated wildlife species. Refer to the conservation practice standard for the list of both general and ecosystem specific purposes.

The planning and implementation of the following practice components are applicable under the current Connecticut Practice Standard for Restoration and Management of Declining Habitats (Code 643). For the CT-NRCS 2005 WHIP Program, the state listed imperiled habitats may be included under this practice standard.

Threatened, Endangered, and Species of Special Concern TE-1 AC: $100/ac
The application of specific management practices unique to the targeted species, which would exceed the scope of the planned practices under the conservation practice standards 395, 396, 399, 644, 645 and 647, as outlined in the 2007 WHIP practice standards and components. The planned practices will be developed in partnership with the State Wildlife Unit, USFWS, and appropriate Non Governmental Organizations. This practice is considered a complementary practice to the planned practices in the WHDMP and not a stand-alone practice.

Threatened, Endangered, and Species of Special Concern TE-2 AC: $500/ac
The application of specific management practices unique to the targeted species, which would exceed the scope of the planned practices under the conservation practice standards 395, 396, 399, 644, 645 and 647, as outlined in the 2007 WHIP practice standards and components. The planned practices will be developed in partnership with the State Wildlife Unit, USFWS, and appropriate Non Governmental Organizations. This practice is considered a complementary practice to the planned practices in the WHDMP and not a stand-alone practice.

Threatened, Endangered, and Species of Special Concern TE-3 AC: $1000/ac
The application of specific management practices unique to the targeted species, which would exceed the scope of the planned practices under the conservation practice standards 395, 396, 399, 644, 645 and 647, as outlined in the 2007 WHIP practice standards and components. The planned practices will be developed in partnership with the State Wildlife Unit, USFWS, and appropriate Non Governmental Organizations. This practice is considered a complementary practice to the planned practices in the WHDMP and not a stand-alone practice.

Threatened, Endangered, and Species of Special Concern TE-4 AC: $2000/ac
The application of specific management practices unique to the targeted species, which would exceed the scope of the planned practices under the conservation practice standards 395, 396, 399, 644, 645 and 647, as outlined in the 2007 WHIP practice standards and components. The planned practices will be developed in partnership with the State Wildlife Unit, USFWS, and appropriate Non Governmental Organizations. This practice is considered a complementary practice to the planned practices in the WHDMP and not a stand-alone practice.

Wetland Wildlife Habitat Management: Code 644

Retaining, developing, or managing habitat for wetland wildlife. The purpose is to maintain, develop, or improve habitat for waterfowl, fur-bearers, or other wetland associated flora and fauna.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Wetland Wildlife Habitat Management (Code 644). For the CT-NRCS 2005 WHIP Program, the following habitats may be included under this conservation practice standard: inland wetlands, tidal wetlands, riparian areas and state listed imperiled habitats as appropriate.

Management of Seral Stage Vegetation & Invasives – Large Equipment

(Heavy) WW-1 AC: $4,100/ac
(Medium) WW-21 AC: $2,200/ac
(Light) WW-31 AC: $800/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control using large equipment (drum chop, low ground pressure, forestry mower, etc.). Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Manual Control

(Heavy) WW-2 AC: $2,270/ac
(Medium) WW-22 AC: $1,445/ac
(Light) WW-32 AC: $600/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using small equipment (chainsaw, brush cutter, hand tools, etc.). Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Brush Hog WW-3 AC:$400/ac
Managing medium to heavy density successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using a brush hog or similar rotary cutter. The timing of the cutting will be established to promote the desired plant community. **Do not cut between April 15 and August 1**. Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Chemical Control

(Heavy) WW-4 AC: $400/ac
(Medium) WW-6 AC: $200/ac
(Light) WW-7 AC: $100/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by chemical treatment alone or combined with mechanical treatment. Follow labeled recommendations and all safety precautions provided by the manufacturer. If a license is required for application of chemicals, by a licensed applicator, license must be available before practice is implemented. Timing of chemical application will be determined based upon the specie(s) to be controlled.

Habitat Creation WW -5 AC: $3,000/site

Create shallow, open water "potholes" (less than 2 FT depth, maximum ¼ ac area) utilizing amphibious and/or low ground pressure equipment. Permits are the responsibility of applicant.

Wetland - Hydrology Restoration: WL-1 AC: $5,000/site

Restoration of wetland hydrology to be accomplished using site appropriate measures. Measures include only the following:

1. Beaver Pipes: Install two PVC beaver pipes (sized appropriately for the watershed – 4-8" dia. for smaller watersheds, >8" dia. for larger watersheds) with inlet side upstream, near bottom of beaver impoundment, outlet set at desired water level, downstream side of beaver dam. Secure pipe inlet to bottom of reservoir; assure no erosion of streambed occurs from outlet splash.

2. Restoration by plugging an open ditch with earth fill. All disturbed areas will be seeded following construction. Ditch plugs will have 20-foot top width, 5:1 side slopes; maximum plug depth is 3 feet.

3. Restoration by crushing, removing, or filling existing tile lines with concrete. Requires plugging of ditch with earth where tile is removed. All disturbed areas will be seeded following construction.

4. Restoration by construction of earthen fill dike/dam using on-site fill material. May require PVC or concrete riser for flashboards. All disturbed areas will be seeded following construction. The land user is responsible for obtaining all necessary permits. This may include larger water control structures for beaver habitat management, not covered by WL-1 or WL-2. *Concrete and Steel risers, and aluminum or steel pipes and associated bedding materials are ineligible for WHIP Cost Sharing.*

5. Removal of fill or sediment and restoration of shallow (<3 ft) open water using wide track and pontoon excavators, dozers, or draglines. Spoil material may be used to create nesting islands, all open water areas interconnected. Spoil may be removed from the wetland for disposal. Spoil containing phragmites plant propagules, purple loosestrife or other invasive plants will be removed from the wetland.

Wetland - Vegetative Stabilization WL-7 AC: $330/ac.

Prepare seedbed and establish grass seeding of creeping red fescue, redtop, and native legume, or other suitable mixture, at a rate of 65 lbs/1000 square feet. Lime and fertilize as necessary, to assure successful establishment. The seedbed will be firmed following seeding and mulched as necessary.

Wetland - Vegetative Restoration WL-8 AC: $2,667/ac
Prepare seedbed and establish native herbaceous wetland plant seed mix appropriate to the wetland restoration (New England Wetland Seed Mix, switchgrass, Calamagrostis). Seed at rate as per on-site recommendation. Firm the seeded following seeding and mulch (weed free) as necessary. Use of grass plugs is allowable. Invasive plants will not be established.

Wetland - Vegetative Restoration WL-9 AC: $1,067/ac
Prepare seedbed and plant hardwood and/or softwood tree seed either mechanically or by hand. Assure the seed is covered with soil. Randomize seed mix for varieties and planting pattern. Use seed gathered from desirable tree species, gathered in the fruiting season prior to planting. Oak, maple, ash, sycamore, basswood, beech, pine, hemlock, cedar, larch, spruce, are suited to this method.

Salt Marsh Specific Practice Components:

Salt Marsh - Hydrologic Restoration SM-1 AC: $5,000/ac
Installation of culverts, removal of tide gates and other necessary elements to restore tidal flows. Includes necessary excavation of sediments, dredging to maintain surface water flows, necessary fill, placement of fill, and seeding of disturbed areas as necessary. Permits are the responsibility of the applicant(s).

Salt Marsh - Hydrologic Restoration SM-2 AC: $6.25/cyd
Removal of dredge spoil from tidal wetlands, and other cast spoil resulting from development actions by man. Included is transportation to disposal at non-wetland sites. Permits are the responsibility of the applicant(s).

Salt Marsh - Open Marsh Water Management SM-3 AC: $1,100/ac
Practice/plan to be developed jointly by local commissions, State Coastal Agency, USFWS, NMFS and others as appropriate. Cost share elements based on the final approved plan. Permits are the responsibility of the applicant.

Salt Marsh – Management of Seral Stage Vegetation & Invasives - Large Equipment
(Heavy) SM-4 AC: $4,100/ac
(Medium) SM-24 AC: $2,200/ac
(Light) SM-34 AC: $800/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control using large equipment (drum chop, low ground pressure, brush hog, forestry mower, etc.). Multiple treatments may be necessary. Woody plant control is best achieved in August.

The practice/plan for mechanical control of phragmites, and other invasive plants will be coordinated with local commissions, State Coastal Agency, USFWS, NMFS, and others as appropriate. Cost share elements based on the final approved plan. Permits are the responsibility of the applicant.

Salt Marsh – Management of Seral Stage Vegetation & Invasives – Manual Control

(Heavy) SM-5 AC: $2,270/ac
(Medium) SM-25 AC: $1,445/ac
(Light) SM-35 AC: $600/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using small equipment (chainsaw, brush cutter, hand tools, etc.) and manual labor. Multiple treatments may be necessary. Woody plant control best achieved in August.

The practice/plan for mechanical control of phragmites, and other invasive plants will be coordinated with local commissions, State Coastal Agency, USFWS, NMFS, and others as appropriate. Cost share elements based on the final approved plan. Permits are the responsibility of the applicant.

Upland Wildlife Management: Code 645

Creating, restoring, maintaining or enhancing areas for food, cover and water for upland wildlife and species which use upland habitat for a portion of their life cycle. The purpose is to; 1) provide a variety of food for the desired kinds of wildlife species, 2) provide a variety of cover types for the desired kinds of wildlife species, examples include nesting, fawning, loafing, resting, escape, travel lanes and thermal, 3) provide drinking water, 4) arrange habitat elements in proper amounts and locations to benefit the desired species, and 5) manage the wildlife habitat to promote viable populations of target species within their native geographic range.

The planning and implementation of the following practice components are applicable under the current CT Conservation Practice Standard for Upland Wildlife Habitat Management (Code 645). For the CT-NRCS 2005 WHIP Program, the following habitats may be included under this conservation practice standard: woodland, riparian areas and state listed imperiled habitats as appropriate.

Management of Seral Stage Vegetation & Invasives – Large Equipment

(Heavy) UW-1 AC: $4,100/ac
(Medium) UW-21 AC: $2,200/ac
(Light) UW-31 AC: $800/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control using large equipment (drum chop, low ground pressure, brush hog, forestry mower, etc.). Multiple treatments may be necessary. Woody plant control is best achieved in August.

Management of Seral Stage Vegetation & Invasives –Manual Control

(Heavy) UW-2 AC: $2,270/ac
(Medium) UW-22 AC: $1,445/ac
(Light) UW-32 AC: $600/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using small equipment (chainsaw, brush cutter, hand tools, etc.) and manual labor. Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Brush Hog UW-3 AC: $400/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using a brush hog or similar rotary cutter. The timing of the cutting will be established to promote the desired plant community. **Do not cut between April 15 and August 1**. Multiple treatments may be necessary. Woody plant control is best achieved in August.

Management of Seral Stage Vegetation & Invasives – Chemical Control;

Heavy density	**UW-4**	AC: $400/ac
Medium density	**UW-6**	AC: $200/ac
Light density	**UW-7**	AC: $100/ac-

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by chemical treatment alone or combined with mechanical treatment. Follow labeled recommendations and all safety precautions provided by the manufacturer. If a license is required for application of chemicals, by a licensed applicator, license must be available before practice is implemented.

Release of Mast Trees UW-5 AC: $200/ac

Release cut to the DBH plus 12 feet. Selected species are hard mast trees including oak, maple, ash, hickory, and beech. Soft mast trees include shadblow or shadbush, apple, and hawthorn. The number of release cuts shall be determined by the conservationist to achieve stated wildlife habitat objectives.

EARLY SUCCESSIONAL HABITAT DEVELOPMENT / MANAGEMENT CODE 647

The management of early plant succession to benefit desired wildlife or natural communities. The purpose is to 1) increase plant community diversity, 2) provide wildlife or aquatic habitat for early successional species, and 3) provide habitat for declining species.

The planning and implementation of the following practice components are applicable under the current National Conservation Practice Standard for Early Successional Habitat Development/Management (Code 647). For the CT-NRCS 2006 WHIP Program, the following habitats may be included under this conservation practice standard: meadow, old-field, early successional woodland, warm season grasslands, cool season grasslands, riparian areas and state listed imperiled habitats as appropriate.

Management of Seral Stage Vegetation & Invasives - Large Equipment

(Heavy) ES-1 AC: $4,100/ac
(Medium) ES-21 AC: $2,200/ac
(Light) ES-31 AC: $800/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control using large equipment (drum chop, low ground pressure, brush hog, forestry mower, etc.). The removal and or disposal of the vegetation, where planned is included in this practice. Multiple treatments may be necessary. Woody plant control is best achieved in August.

Management of Seral Stage Vegetation & Invasives – Manual Control

(Heavy) ES-2 AC: $2,270/ac
(Medium) ES-22 AC: $1,445/ac
(Light) ES-32 AC: $600/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using small equipment (chainsaw, brush cutter, hand tools, etc.) and manual labor. The removal and or disposal of the vegetation, where planned is included in this practice. Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Brush Hog ES-3 AC: $400/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by mechanical control, using a brush hog or similar rotary cutter. The timing of the cutting will be established to promote the desired plant community. **Do not cut between April 15 and August 1**. Multiple treatments may be necessary. Woody plant control best achieved in August.

Management of Seral Stage Vegetation & Invasives – Chemical Control;
(Heavy) ES-4 AC: $400/ac
(Medium) ES-11 AC: $200/ac
(Light) ES-12 AC: $100/ac

Managing successional vegetation and/or invasive plants including perennial weeds, volunteer hardwood trees and shrubs by chemical treatment alone or combined with mechanical treatment. Follow labeled recommendations and all safety precautions provided by the manufacturer. If a license is required for application of chemicals, by a licensed applicator, license must be available before practice is implemented.

Management of Seral Stage Vegetation – Mowing ES-5 AC: $145/ac

Mowing of herbaceous vegetation in either an annual or biannual rotation. The timing of the cutting will be established to promote the desired plant community. **Do not mow between April 15 and August 1.** On cool and warm season grass fields, the removal of herbage is acceptable; allow fall regrowth to remain on the field. Winter mowing may be required depending on site conditions.

Management of Seral Stage Vegetation – Meadow Habitat Establishment: ES-6 AC: $1585/ac

Establish diversified native herbaceous vegetation by site and seedbed preparation. Control weeds if necessary, add soil amendments of lime and fertilizer according to a soil test at seeding. Lime may be required in split applications, half prior to seedbed preparation.

Warm Season Grass Establishment: ES-7 AC: $845/ac

Establish warm season grasses by site and seedbed preparation, and mechanical placement of seed with a warm season grass seeder. Control weeds if necessary. Lime in first year, fertilize in second year as needed. Grass species include; little bluestem, big bluestem, switchgrass, indiangrass, and deertongue. Partridge pea or Lupine may be used as a native legume. Seeding rate use between 8 and 12 pounds/acre of Pure Live Seed.

Cool Season Grass Establishment ES-8 AC: $480/ac

Establish cool season grasses by site and seedbed preparation, and mechanical placement of seed. Control weeds if necessary; add soil amendments of lime and fertilizer according to a soil test, incorporating into soil at seeding. Lime may be required in split application, half prior to seedbed preparation. Grass species include: timothy, creeping red fescue, orchardgrass, redtop, and white or ladino clover. Seeding rates should not be less than 16 pounds per acre. Legumes seeded at one pound per acre.