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## Salmon Kill Enhancement and Restoration Project

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### Annual Report Natural Resource Damages – U.S. Fish and Wildlife Service

Final Report March 31, 2017

*Agreement #F11C0034; Modified (March 2014)*

Period of agreement: July 2011 - December 2016

Dates covered by this report: June 2016-December 2016

#### Grantee

Trout Unlimited, Inc.

Tracy Brown, Northeastern Restoration Coordinator

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#### Agreement and Funding Background

In 2012 an agreement between the U.S. Department of the Interior, Fish and Wildlife Service (Service) and Trout Unlimited was entered into under the authority of the natural resource damage provisions of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. 9601 et seq.) and the Fish and Wildlife Act of 1956 (16 U.S.C. Section 742a - 742j; not including 742 d-1).

The objective of this Agreement is to restore and enhance the riparian corridor and in-stream habitat along 1.8 miles of Salmon Kill Creek in Salisbury, CT using funds from the natural resource damage settlement for the Housatonic River Basin. This restoration is intended to compensate for natural resources injured as a result of polychlorinated biphenyls (PCBs) released from the General Electric Company facility in Pittsfield, Massachusetts. Restoration is undertaken in accordance with the provisions of a Consent Decree entered in the United States District Court for the District of Massachusetts, Western Division on October 27, 2000 regarding the matter of United States of America, State of Connecticut, Commonwealth of Massachusetts v. General Electric Company, Civil Action Nos. 99-30225-MAP, 99-30226-MAP, and 99-30227-MAP.

Under the Consent Decree, the General Electric Company paid \$7,750,000 to compensate for natural resource injuries in Connecticut. The Natural Resource Trustee SubCouncil for the Geographic Region of Connecticut ("Trustee SubCouncil for Connecticut") was established to administer these funds toward natural resource restoration projects, in accordance with the Memorandum of Agreement Among the Commonwealth of Massachusetts Executive Office of Environmental Affairs; the State of Connecticut, Department of Environmental Protection; the United States Department of the Interior; and the National Oceanic and Atmospheric Administration Concerning Natural Resource Damages in the Matter of United States, et al. v. General Electric Company, Civil Action Nos. 99-30225-MAP; 99-30226-MAP; and 99-30227-MAP (D. Mass.) ("Trustee MOA") that became effective on January 30, 2002.

Under the Final Natural Resources Restoration Plan, Environmental Assessment, and Environmental Impact Evaluation for Connecticut, Issued: July 2009, the Trustee SubCouncil for Connecticut committed to providing up to \$617,260 to restore and enhance riparian and in-stream habitat along Salmon Kill Creek (Trout Unlimited Salmon Kill Restoration and Enhancement Project). The Service, on behalf of the Trustee SubCouncil for Connecticut, is facilitating the implementation of the project.

## **FINAL PROJECT REPORT**

### **PROJECT OBJECTIVE**

To rehabilitate, enhance and restore streambanks, riparian buffers and in-stream aquatic habitat on priority sites along Salmon Kill Creek in Salisbury, CT. The original project objective has been expanded to include the assessment of 5.6 miles of the Salmon Kill the watershed to determine priority locations for the rehabilitation, enhancement and restoration activities.

### **PROJECT GOALS**

- To improve habitat for coldwater fisheries in the Salmon Kill watershed.
- To engage landowners and the local community in restoration assessment and implementation activities.
- To develop a strategy for continued restoration and enhancement activities in the watershed.

### **PHASE I DESCRIPTION OF WORK**

**All Phase I Tasks have been complete.**

#### **Tasks:**

1. Perform surveys and evaluations to establish baseline conditions for 5.6 miles of Salmon Kill. This will include data collection to evaluate state endangered species, invasive species, stream geomorphology, stream flows, benthic macroinvertebrate populations, fish populations, water temperature, turbidity and other habitat features.
2. Utilize baseline data to design appropriate riparian and in-stream habitat restoration projects for the Salmon Kill Creek. This will include consideration of endangered species data to minimize risks to these species.
3. Develop property agreements with all affected landowners, including access stipulations for design, construction and post construction monitoring activities as well as long term maintenance requirements. Obtain all necessary landowner permission prior to initiating restoration activities on specific parcels.
4. Acquire all required regulatory approvals.
5. Initiate habitat enhancement along and within the Salmon Kill Creek by installing instream structures and grade controls, removing non-native invasive vegetation and planting native trees and shrubs, and stabilizing stream banks by installing root wads and cattle exclusionary fencing.

### **PHASE II DESCRIPTION OF WORK**

**All Phase II Tasks have been complete.**

#### **Tasks:**

1. Continue to implement habitat enhancement along and within the Salmon Kill Creek by installing in-stream structures and grade controls, removing non-native invasive vegetation and planting native trees and shrubs, and stabilizing stream banks by installing root wads and cattle exclusionary fencing.
2. Implement public outreach to increase public awareness about the river restoration project

and the importance of healthy river systems. This shall include press releases to local and area newspapers, updates to the TU website, and possibly signs (or informational kiosks) at restored habitat locations.

3. Conduct 5 years of post-restoration monitoring of the properties; this shall include invasive species inventories, stream temperature monitoring, benthic macroinvertebrate surveys, evaluations of channel embeddedness, turbidity and habitat assessments, and electro-fishing efforts to determine fish population density and diversity.

## **PROGRESS MADE**

### **Construction**

During the contract period from 2012-2016 in-stream large wood structures were installed at the seven highest priority work areas all of the sites are located on private property and before and after photos are included in order of construction in the Photo History section of the report.

Planting activities have taken place at all seven construction sites and three additional planting areas along the river. Planting occurred in 2014, 2015 and 2016, engaging a variety of groups in plantings activities: Hotchkiss High School, Housatonic Valley High School, Sharon Center School, community members, and Housatonic Valley Association team. Fence has been installed in large planting pods around a majority of plants to improve survival.

### **Outreach**

The project has been featured a number of times in the local newspaper and on the TU website. In addition, TU has presented annually at the local Salisbury Land Trust Watershed Summit. Examples of press from the project include:

<http://www.tu.org/blog-posts/tu-works-with-ct-high-school-students?gid=22163>

<http://www.tu.org/tu-projects/salmon-kill-project>

<http://www.nbcconnecticut.com/on-air/as-seen-on/261876821.html>

### **Monitoring**

The Salmon Kill Monitoring Plan is included in Appendix A of this report. Monitoring data collection took place as part of the initial assessment and prior to any restoration activities and included: photo monitoring, visual assessment, temperature monitoring and plant survival monitoring. Photo monitoring, plant survival and temperature monitoring has taken place annually. Visual and geomorphic assessment post-restoration monitoring will take place in summer 2017. A final monitoring report will be complete in fall 2017 once all post restoration data collection is complete and analyzed.

Photomonitoring has taken place on the Salmon Kill since 2015. Results from the photo monitoring include before and after photos at the constructions sites and are summarized in the Photo History section of the report.

Temperature monitoring has taken place on the Salmon Kill since 2012. Initially, the temperature loggers were installed throughout the drainage to get an understanding of the temperature gradients in the watershed. These initial results show elevated summer temperatures on the mainstem Salmon Kill. Once the work areas were determined, where possible the temperature loggers were moved to these locations the year prior to restoration and then reinstalled at the work area following restoration in order to evaluate any temperature changes from in-stream structure placements.

Deer and beaver browse are potential threats to plant survival on the Salmon Kill. Plant survival monitoring has taken place annually since 2015. Survival results vary between sites. Our highest survival rate of over 90% is located on the site planted in 2014. The plants were installed in the fall at a site not destined for in stream construction. The plants were larger stock and were excluded from potential threats immediately upon planting. There was a delay in installation of exclusion fencing on the 2015 sites and survival rates were reduced. Follow up monitoring will take place in 2017.

Fish survey has occurred annually since 2014. CT Department of Environmental Quality has conducted the surveys. Results from the survey will be included in the 2017 final monitoring report.

**TABLE 1: SUMMARY OF RESULTS TO DATE**

<b>Summary</b>	<b>Final Results</b>
# of Sties Complete in 2014	1 Planting
# of Sites Complete in 2015 (Work Area 2, 7 and 24)	3 Wood; 2 Planting
# Sites Complete in 2016 (Work Area 16, 17, 18, 19)	4 Wood; 3 Planting
# Treatments	14
Total Number of Plants	1416
Volunteer Hours	1155
# Student Groups/Partners	9
# Interns	8

PHOTO HISTORY

Site 2 Roughened Log Toe



July 2015 Before Construction



June 2016



September 2015 After Construction and Plantings



June 2016



September 2015 Construction Crew Cabling Logs



September 2015 Hotchkiss Student Planting Site



July 2015 Before Construction



September 2015 After Construction and Planting



September 2015 After Planting During High Flows



June 2016

Site 2 Log Jam and Thermal Pool



July 2015 Before Construction



June 2016



September 2015 Thermal Pool



June 2016

Site 2 Log Jam and Large Substrate



August 2015 Before Construction



September 2015 After Construction of Log Jam and Large Substrate Installation



September 2015 Log Jam After Construction



June 2016

Site 2 included the installation of 200 feet of roughened log toe, the installation of 1 engineered log jam, the installation of a thermal pool and large substrate. Following excavation the site was planted by local high school students (Photo TU 2015 and 2016).

Site 7 Roughened Log Toe



August 2015 Before Construction



June 2016



August 2015 Before Construction



June 2016

Site 7 included the installation of 180 feet of roughened log toe. Local high school students helped plant the site following construction (Photo TU 2015 and 2016).

Site 24 Log Jam and Large Substrate



August 2015 Before Construction



September 2016 After Construction During High Flow

Site 24 included the installation of engineered log jam, large substrate and plantings (Photo TU 2015 and 2016).

Site 16 Roughened Log Toe and Large Substrate



July 2016 Following Installation



July 2016 During Construction

Site 16 included the installation of roughened log toe and large substrate (Photo TU 2016).

Site 17 Roughened Log Toe



July 2016 During Construction



August 2016 After Construction

Site 17 included the installation of roughened log toe and plantings (Photo TU 2016).

Site 18 Thermal Pool



July 2016 After Construction



September 2016 Hotchkiss Students After Planting

Site 18 included the installation of thermal pool (Photo TU 2016).

Site 19 Roughened Log Toe, Individual Trees and Large Substrate



July 2016 During Construction



July 2016 During Construction



July 2016 Log Toe After Installation



July 2016 Individual Trees After Installation



July 2016 Large Substrate After Installation



September 2016 After Green Up



July 2016 Almost Finished



Before and After Restoration



July 2016 Before and After Restoration



July 2016 Before and After Restoration

Site 19 included the installation of roughened log toe, individual trees and large substrate (Photo TU 2016).



Students from Housatonic Valley Regional High School observe fish Sampling at Site 2 after restoration; brook trout pictured (TU Photo 2015).



Students learn about data collection (TU Photo 2105).



Fish sampling at site 2 prior to restoration (TU Photo 2014).



Housatonic Valley Regional High School Students observe fish sampling at site 19 after restoration (TU Photo 2016).



21" wild brown trout captured during sampling at site 19 after restoration (TU Photo 2016).



The Salmon Kill Restoration Project has been an excellent backdrop for place-based learning opportunities for local schools. Kindergarten through high school students have participated in educational and planting activities at the work areas. (TU Photo 2014-2016)

**TABLE 1: PROJECT FINANCIALS**

Description of Task	% Complete	Budget to Date	Spent to date	In-Kind Contributions	Notes
<b>Project Planning and Management (includes salary, benefits and overhead costs)</b>	<b>100%</b>	<b>\$264,261</b>	<b>\$265,943</b>	<b>\$41,501</b>	<b>1,2</b>
<b>Task 1: Perform surveys and evaluations to establish baseline conditions</b>					
<i>Monitoring Plan Development</i>					
<i>Initiate baseline data collection</i>					
<i>Site visits and photo monitoring</i>					
<i>Data gathering and review</i>					
<i>Watershed planning</i>					
<b>Task 2: Develop property agreements with all affected landowners</b>					
<i>Landowner Communications</i>					
<i>Landowner Meetings</i>					
<i>Access Agreements</i>					
<b>Task 3: Acquire all required regulatory approvals.</b>					
<i>Permits acquired</i>					
<b>Task 4: Public Outreach</b>					
<i>Community and student engagement in restoration activities</i>					
<b>Task 5: Project Monitoring</b>					
<i>Temperature , water quality, fish and habitat surveys, plant survival and canopy cover</i>					
<b>Project Design Development</b>	<b>100%</b>	<b>\$42,000</b>	<b>\$45,649</b>	<b>\$0.00</b>	<b>3</b>
<b>Task 6: Utilize baseline data to design appropriate riparian and instream habitat restoration projects</b>					
<i>Geomorphic and habitat assessment</i>					
<i>Restoration prioritization and treatment evaluation</i>					

<i>Conceptual Design and Map</i>					
<i>Final Design</i>					
Description of Task	% Complete	Budget to Date	Spent to date	In-Kind Contributions	Notes
<b>Project Implementation</b>	<b>98%</b>	<b>\$310,999</b>	<b>\$305,669</b>	<b>\$4,040.28</b>	
<b>Task 7: Habitat enhancement</b>					
<i>Construction</i>					
<i>Stabilization</i>					
<i>Riparian planting</i>					
<i>Invasive weed control</i>					
<i>Fence installation</i>					
<b>Total Project</b>	<b>100%</b>	<b>\$617,260</b>	<b>\$617,260</b>	<b>\$45,542</b>	<b>4</b>

### Project Budget Notes

1. This table was modified to include the total project budget based on revised Cooperative Agreement (March 2014). The budget revision reflects tasks outlined in the Coop Agreement between USFWS and TU that are performed by TU staff. The task costs include salary, benefits and overhead for time spent by staff working on project planning and management.
2. In-kind contributions were generated from TU intern hours spent collecting data for the project, time spent by community partners and landowners reviewing project design, and time spent by students planting. A grant from the John T. And Jane A. Wiederhold foundation funded our work with the Housatonic Valley High School students monitoring and outreach project. A multi-year private donation contributed to outreach activities with Hotchkiss students.
3. The project assessment and design scope has increased from 1.8 to 5.6 miles of the main stem Salmon Kill in order to ensure that we are spending the funds in priority locations. By expanding our scope to include the assessment and design of 5.6 miles of the creek, we are able to work with 10-12 landowners to improve habitat on the Salmon Kill. Ecologically, it will ensure that we are evaluating geomorphic processes and trout habitat on a more appropriate scale.
4. Costs to date are through December 2016 and all contract requirements are 100% complete. Additional funds will be needed to complete all 24 project sites. TU continues to fundraise for implementation and outreach opportunities on the Salmon Kill.