

North Branch Wiscoy Creek Habitat Enhancement Project 2011-2012



Scott Cornett

NYS DEC

Region 9 – Allegany, NY

Greg McKurth

Wyoming County Soil and Water Conservation District

Warsaw, NY

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Background

The North Branch of Wiscoy Creek (hereafter referred to as the N. Branch) has some of the best water quality for supporting wild brown trout in Western New York State. This four mile long stream is not stocked - has not been for at least 50 years - and supports a population of wild brown trout. NYS DEC purchased the first public fishing rights easements (PFR) on the stream (0.3 miles) in 1993 and then added another 0.6 miles in 2009. Water temperature monitoring in 2006 found stream temperatures never exceeded 70 degrees and normally were in the upper 50's or low 60's. This stream, averaging 20 feet in width, is very fertile and capable of supporting high densities of trout. Due to historic land use practices (removal of the mature forest and grazing of livestock), much of the stream's riparian areas are dominated by sedges and alder. This has lead to long areas of stream that are wide, shallow, lacking in adult brown trout habitat and very difficult for anglers to utilize (Figure 1). Canopy trees are rare in the riparian zone, thus the stream was mostly devoid of large woody debris, vital to creating and maintaining quality adult trout habitat. Surveys done in 2006 and in 2009 found that in the PFR areas with typical, poor adult trout habitat, yearling and older brown trout abundance ranged from 237 fish/mile to 1,015 fish/mile. Larger wild brown trout (>12") occurred in very low abundance (13-15 fish/mile). In a section of the N. Branch on private property, where the landowner had done extensive habitat enhancement, the adult brown trout abundance ranged from 3,450 fish/mile to 6,475 fish/mile, with 475-975 fish/mile being >12". This enhanced habitat section had the same water quality and volume as the sections supporting far

fewer adult trout. Based on the ability of the stream to support far more adult trout than it was in the PFR areas, a basic project design was submitted for funding from a Great Lakes Basin Fish Habitat Partnership grant in 2010. With the successful grant award, final planning for the enhancement project was carried out in early 2011.

Project Partners

This project would not have been possible without a large group of partners, each providing unique skills and resources. The following State, Federal and NGO's participated in the project; Western NY Chapter of Trout Unlimited (TU), U.S. Fish and Wildlife Service (USFWS), New York State Departments of Environmental Conservation (DEC) and Department of Transportation, Wyoming County Soil and Water Conservation District (SWCD), Wyoming County Highway Department, Wyoming County Fairgrounds Association, the Elm Research Institute and Finger Lakes-Lake Ontario Water Protection Alliance. Several other individuals from the local community also donated time and materials to the project. Importantly, the landowner of this section of the N. Branch, Mr. Donald Smith, allowed us access through his property to accomplish the project.

Project Objectives

Studies have shown the link between both pool depth and the amount of in-stream shelter (undercut banks or large woody debris) to the

abundance of adult wild brown trout. This project's objectives were to increase pool depths to at least two feet, greatly increase the amount of linear bank cover and restore the stream's riparian area to a forested condition. In order to both provide future shade and large woody debris, appropriate riparian trees species were planted throughout the project area. This project was unusual in the fact that most trout habitat enhancement is done in conjunction with projects designed primarily to control bank erosion or reconnect a stream to its flood plain. The N. Branch was not suffering from eroding banks or a disconnection from its flood plain. However, due to historic pasturing of livestock and the subsequent development of a monoculture of alder along the banks, an over-wide, shallow stream channel with a complete lack of large woody debris has occurred for decades. In spite of the stream displaying channel "stability" - the goal of many projects - the stream lacked habitat to support adult trout and provide good angling. Our project was designed to add to the stream's overall function, now and into the future.

Project Area

The project area was located in south-central Wyoming County (Figure 2) and was 2,100 feet in length. We chose nine sites to use LUNKER structures (Figure 3). These sites were areas where pools already existed, generally on bends in the stream. Sites varied from 16 to 104 feet in length, consisting of 2 to 13 LUNKERS at each site.

Tree Planting

In May 2011 and May 2012, staff from USFWS, DEC and volunteers from TU planted 1,600 shade trees along the length of the project. The six species of trees we planted were; silver maple, red maple, sycamore, American elm, balsam fir and tamarack. Most trees were protected by staked tubes from browsing by the abundant deer population (Figure 4). In the spring of 2013, we plan to incorporate black willow live stakes to further increase tree diversity in the project. Trees were provided for the project by the DEC Saratoga tree nursery and also by the Elm Research Institute.

Site Preparation

Most of the areas chosen for habitat enhancement with LUNKERS were lined with a moderate to dense growth of alder. In May and June 2011, prior to project construction, the alder was cut and stumps were treated with herbicide to prevent sprouting. Additionally, the project site contained areas beginning to support non-native, invasive honeysuckle and multi-flora rose. This vegetation was also cut and treated with herbicide.

Pre-project Fish and Habitat Sampling

In the spring of 2010, USFWS staff conducted a longitudinal profile of the stream to determine slope, stream depths and percentage pool. Thirty one "pools" were identified in the profile, with an average maximum depth of 1.2 feet (range 0.1 -2.1 feet). DEC staff measured stream and bank-full widths in the project area.

In July 2010 and June 2011, DEC, USFWS and angler volunteers conducted fish population sampling using electrofishing. Sampling was done on the entire 2,100 foot habitat enhancement section (seven-300 foot sites) as well as one additional site on the N. Branch and one site on nearby Trout Brook to serve as “control sites”. As expected, we found a fairly high abundance of yearling and older trout (1,183-1,809 fish/mile), with most being yearlings. However, we found very few of those fish (13-15 fish/mile) greater than 12 inches.

Permitting, Structure Design and Construction

Stream disturbance and wetland permits for the project were obtained from DEC along with a Nationwide Permit (#27) obtained from the U.S. Army Corps of Engineers.

The structure chosen to create bank cover for adult trout was the “LUNKER”, with which we created artificial undercut banks. Following discussion with Jeff Hasting, director of the TU Driftless Area Restoration effort and David Derrick of the US Army Corps of Engineers, “LUNKER” structures were determined to be appropriate for use in the N. Branch due to its low gradient (0.4%), stable year-round flows and well functioning flood plain.

LUNKERS have been used extensively and successfully over the long term in trout stream habitat enhancement and restoration in the upper mid-western U.S. However, they have not, to our knowledge, been utilized in small trout

stream enhancement in Western NY. Construction design for the LUNKERS (Figure 5) came from the TU Driftless Area Restoration effort manual.

LUNKERS are a wooden crib type structure eight feet in length, 30 inches deep and one foot high. The 57 structures used in the project were built in two days (total - approximately 40 man-days) in a large building at the Wyoming County Fairgrounds (Figure 6) and were then transported to the project site. LUNKERS were made of wet, rough-cut 2”x8” hemlock boards obtained from a local Amish sawmill. Each LUNKER used 117 board feet of lumber, cost about \$70.00 in materials to build and weighed over 500 lbs. A crew of 4-5 persons - once they had some experience - could build each one in about 15-20 minutes. We used 20D common nails to hold the LUNKERS together. We found some problems with LUNKERS coming apart when they were moved with heavy machinery. In the future we would recommend using heavy decking screws instead of nails. Holes for 6-foot sections of $\frac{3}{4}$ ” rebar were drilled at the time of construction.

Project Construction

In-stream habitat work with the LUNKERS was completed during a two week period (10 work days) in July 2011. We hired one machinery operator and rented a medium excavator and a six cubic yard front loader. Construction at each site began with the excavator deepening the section where the LUNKERS were to go to approximately two foot of water depth. Calculations had previously been made on how much to narrow and deepen the stream at each site in order

to maintain a similar cross sectional flow area. Once the site had been prepared, the excavator was used to place the LUNKERS in the stream. Then agency staff and TU volunteers maneuvered them into final placement (Figure 7) and secured each LUNKER with four pieces of rebar which had to be driven by hand (Figure 8). Our hopes of driving the rebar with the excavator did not work out, as the rebar bent too easily. We would highly recommend in future projects that hydraulic sign post drivers be utilized for the rebar driving.

Once the LUNKERS were all in place at a site, we hand-placed large stone on the front of the LUNKER to the height of the point bar on the opposite bank (approximately bank-full level) (Figure 9). Stone used for the project came from a local gravel pit and consisted of large, over-sized (10"-20" diameter) stone used on the front of the LUNKER and 4"-8" stone used for fill behind the LUNKER. Next, the LUNKERS were topped by stream bed material previously excavated and finally by 4"-6" of topsoil to serve as a growing medium to develop a sod layer (Figure 10). Additionally at each site, 2-4 logs (Figure 11) were installed on the point bar to help ensure that at high flows, adequate flow would pass through the LUNKERS to prevent the build-up of sediment in the LUNKERS. At sites where it was appropriate, 8 to 16 foot larch logs, anchored with rebar, were used as tie-backs at the upstream and downstream ends of the LUNKERS to prevent any chance of the stream eroding behind the structures.

Following site construction, the area on top of each LUNKER and constructed flood plain behind each LUNKER was

hand seeded with a 50-50 mix of perennial and annual rye as well as a commercial wet meadow seed mix. This area was then covered with erosion control blanket in case flows reached the flood plain prior to establishment of herbaceous cover (Figure 12). At the end of each construction week, a hydroseeder, owned and operated by Wyoming County was used to seed and mulch all remaining disturbed areas of the project (Figure 13). In spite of very hot, dry weather, we were able to establish an adequate layer of rye on the floodplain within two weeks of project completion (Figures 14) and a dense layer within 10 weeks (Figure 15). A total of 456 feet of LUNKERS were installed (22% of the project length) at the nine sites. At one site (Figures 16 and 17); a cross log spanning the stream channel and designed to concentrate stream flow on one bank was used in conjunction with four LUNKERS.

Utilization of extra materials

Due to changes to the exact design during construction, we had a number of larch logs and hemlock boards left over following project construction. In September and October 2011, agency staff and TU volunteers installed double log cover structures (secured with rebar and 4" blocks under each end) and board cover structures (secured in a similar fashion) (Figure 18). This provided an additional 260 linear feet of in-stream shelter for young-of year and adult trout, bringing the total in-stream shelter installed in the project to 34% of the 2,100 foot project length.

Project Cost

This project was completed utilizing the \$38,720 grant from the Great Lakes Basin Fish Habitat Partnership. Additionally, with the extensive cooperation of project partners, \$67,798 of in-kind service and materials were incorporated, bringing the project total to \$106,518. Appendix I shows the breakdown of project costs into categories of supplies and materials, contracted labor and machinery as well as agency and volunteer labor and donated materials, supplies and equipment. The Western NY Chapter of Trout Unlimited volunteer efforts were especially critical to the project's completion. Altogether, Chapter volunteers donated 1,115 hours of their time (valued at \$24,300) to the project.

Post Project Monitoring

USFWS staff completed post-project stream profile monitoring in the spring of 2012. This profile showed that pools in areas that received LUNKER structures deepened to an average maximum water depth of 2.0 feet. DEC surveys showed areas that received LUNKERS also narrowed substantially. Pools have maintained or slightly increased their depth from construction through summer, 2012. Substantial changes have not occurred in widths/depths of areas within the project that did not receive the LUNKER structures. This was anticipated.

The first year of post-project fish sampling was completed in July 2012 and showed very encouraging results (Figure 19). Compared with the two years of pre-project fish sampling, the abundance of

larger wild brown trout increased substantially in the habitat enhancement section. For all adult (yearling and older) wild brown trout, densities varied significantly at both the control sites and the habitat enhancement section of the N. Branch from 2010-2012. Densities of brown trout >10", >12" and brown trout biomass declined from 2010-2012 at the two control sites. However, densities of brown trout >10", >12", >14", as well as brown trout biomass increased substantially in the habitat enhancement section from 2010 to 2012 (Table 1). Likely, most of the larger fish moved into the habitat enhancement section, rather than growing to a large size in only one season. It is expected that in future years we will see further increases in both overall adult trout density and density of larger wild brown trout in the habitat enhancement section as the trout population fully occupies the enhanced habitat.

A further indication of how effective the LUNKER structures were as habitat for yearling and older trout in general and larger trout in particular can be seen in Table 2. Of the 609 total yearling and older trout in the 2,100 foot long habitat enhancement section, 442 (73%) were found in the four – 300 foot sections with LUNKERS and only 27% in the three – 300 foot sections without LUNKERS. Even more impressive, 97 of the 99 fish >10" and all of the fish >12" and >14" were in the sections with LUNKERS.

The increased abundance of larger adult trout does not appear to have negatively affected reproduction in the habitat enhancement section, as we found substantially more young-of-year

(YOY) trout in the habitat section of the N. Branch in 2012 than in 2010 (*Sampling in 2011 was done too early in the summer to effectively estimate YOY densities*). Substantially higher numbers of YOY were also found in the control sites than in 2010, thus it appears that the greater number of YOY in the habitat enhancement section was not due to more large, spawning size trout in that section. The largest brown trout captured in the habitat enhancement section in 2012 was 18.0" (Figure 20), while in 2010 it was 15.7". In 2011, the largest brown trout was only 13.9". Reports from anglers using the habitat enhancement section since project completion indicate the fishing has improved dramatically already (Figure 21).

Future Monitoring and Project

Durability

We plan continued monitoring of the N. Branch's trout population for at least three more seasons to evaluate the effects the project will have on increasing both the overall adult trout abundance and the abundance of larger wild brown trout. We will also continue to monitor and evaluate the LUNKER structures themselves and how they affect stream channel form and function. We will monitor the survival and growth of the 1,600 planted shade trees and we also plan to incorporate black willow live stakes into the project area beginning in spring 2013.

With the N. Branch's stable stream flow and the LUNKERS being completely submerged in water, it is expected the structures will function for many decades. This will allow a riparian forest canopy to develop and for large woody debris to

begin providing in-stream trout habitat as the LUNKER structures eventually begin to deteriorate.

For further information on this project, please contact Scott Cornett at sccor-net@gw.dec.state.ny.us or 716-372-0645.

Acknowledgments

We would like to acknowledge the following persons who contributed to this project. In some cases it was physical labor. In others it was donating materials or machinery and their time operating it. Finally, in some cases the assistance was in the form of helpful information and comments on the project plan. Thanks go to; Donald Smith Jr, Chuck Godfrey – TU project coordinator, Tom Piwowar, Debbie, Marie, Ethan and Audrey Godfrey, Jim Stachowski, Dave Labiak, Jim Budney, Joe and Kevin Morgan, Gene Romanynshyn, Bill, Owen and Alex Jedlicka, Al Rosinski, Tony Vecio, Gary Coons, Leigh Cornett, Tom Hromowyk, Tom, Sidney and Sierra Olszowy, Jeff Baker, George Welch, Dave and Greta Unetich, Don Kwiatkowski, Bill Koerner, Russ Shefrin, Craig Cox, Joe Evans, Larry Sformo, Alex Wilson, Norm Ameis, Chuck and Sean Campbell, Gary Kottke, Jim Pomeroy, Tom Stamboulis, Dave Tooke, Ben Hershberger, Earnest Nissley, NYSDOT - Rochester Region, Ray Li, Marie Schrecengost, Gian Dodici, Scott Sanders, Tra Wilcox, Liz Miglore, Karolyn Lock, Justin Schoff, Jim Zanett, Tobias Widger, Rob Roth Jr, Eric Stratton, Justin Brewer, Amanda Wagner, Mike Ermer, Ashleigh Read, Paul Fuhrmann, David Derrick, Jeff Hastings, The Elm Research Institute and Don Krohn.



Figure 1. Dense alder along N. Branch.

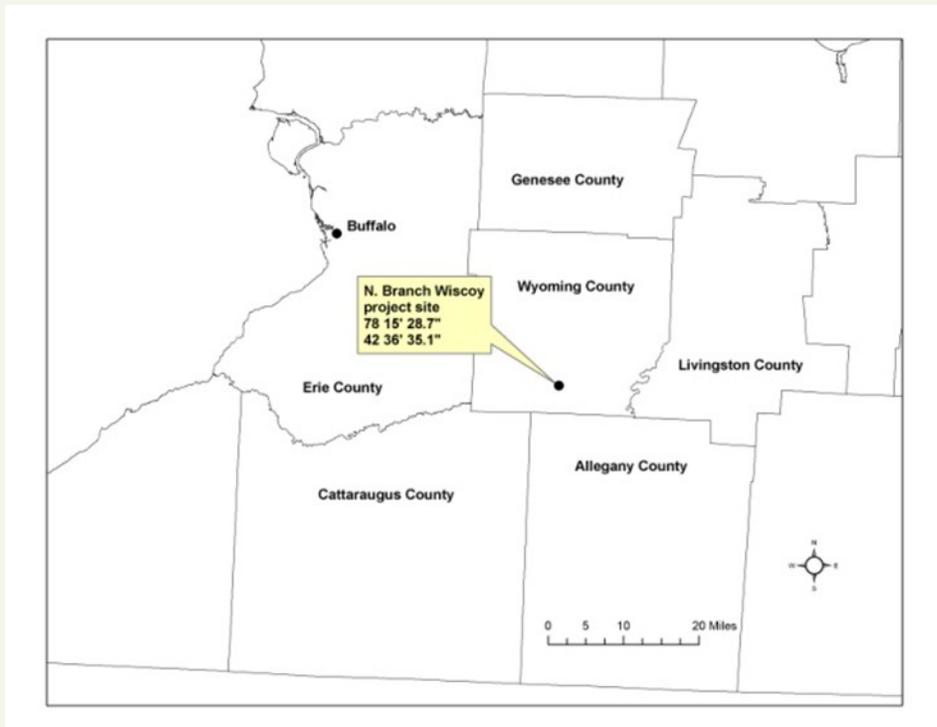


Figure 2. N. Branch Project location

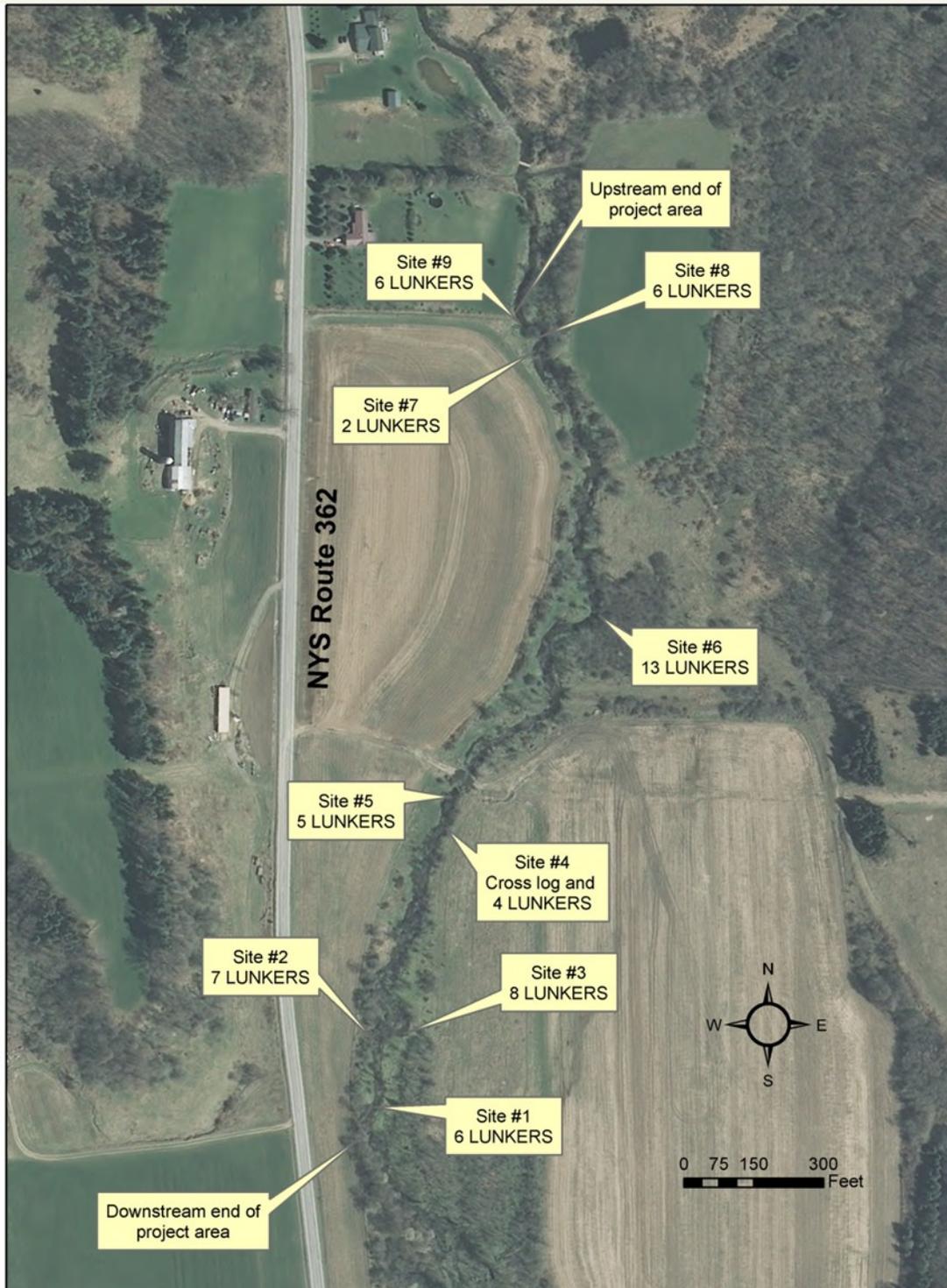


Figure 3. Location of N. Branch habitat structure sites.



Figure 4. Silver Maple in tree shelter on N. Branch.

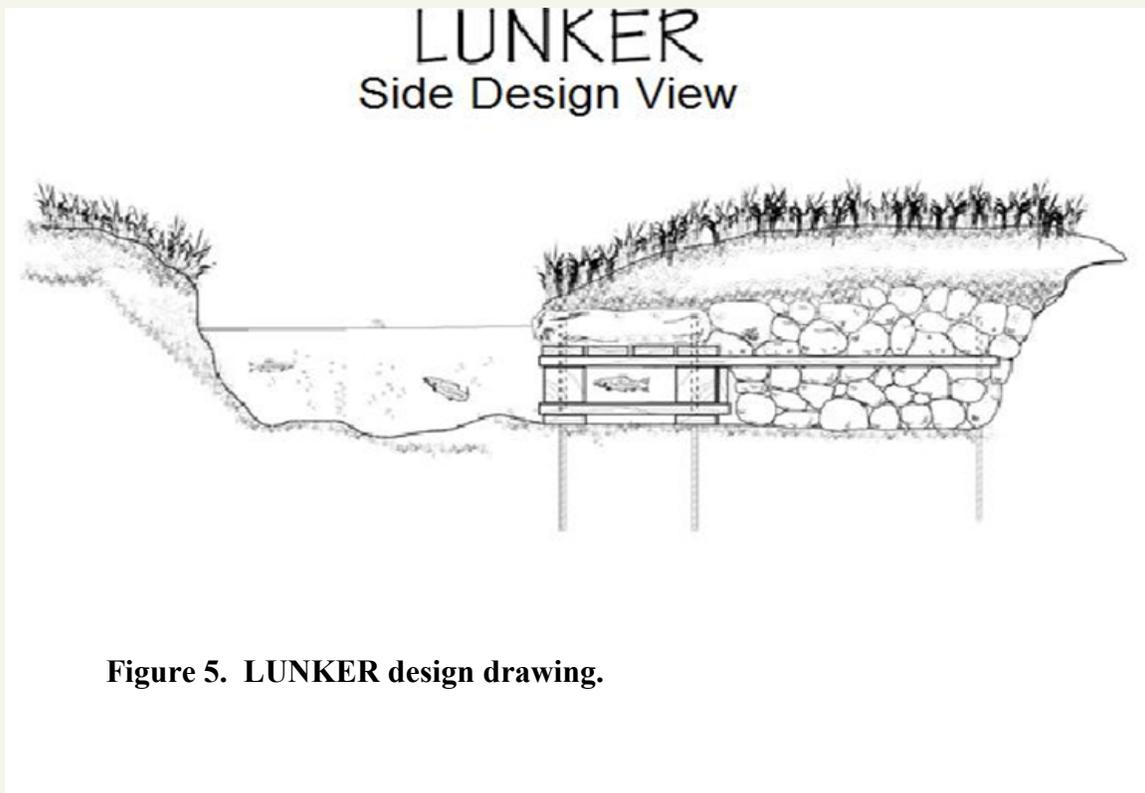


Figure 5. LUNKER design drawing.



Figure 6. LUNKER construction at Wyoming County Fairgrounds by WNYTU volunteers.



Figure 7. Excavator and volunteers placing LUNKERS at Site #6.



Figure 8. Hand driving rebar through a LUNKER.



Figure 9. Hand placing heavy stone on LUNKERS.



Figure 10. Back filling the LUNKERS.



Figure 11. Installing a point bar log.



Figure 12. Erosion control blanket installed on LUNKERS.



Figure 13. Wyoming Co. Highway Dept. hydroseeding and mulching.



Figure 14. Rye grass growth 2 weeks post-construction.



Figure 15. Rye grass growth 10 weeks post-construction.



Figure 16. Partially constructed cross log with LUNKERS at Site #4.



Figure 17. Completed cross log with LUNKERS at Site #4.



Figure 18. Cover logs installed on N. Branch.



Figure 19. Electrofishing to evaluate trout population on the N. Branch.



Figure 20. 18 inch wild brown trout captured in electrofishing, 2012.



Figure 21. Wild brown trout angled from a LUNKER in October, 2011.

Table 1. Wild brown trout densities (adult #/mile, #/mile >10", #/mile >12", #/mile >14" and biomass (lbs/acre) in N. Branch Wiscoy habitat enhancement area and control sites on N. Branch Wiscoy Creek (Village of Bliss) and Trout Brook (Hardy's), 2010-2012

Trout Brook	Site	BT #/mile	#/mile >10"	#/mile >12"	#/mile >14"	Lbs/acre
2010	Hardy's Control site	852	170	68	11	86
2011	Hardy's Control site	1,091	125	45	11	68
2012	Hardy's Control site	830	114	34	11	72
N. Branch Wiscoy						
2010	Village of Bliss - Control site	1,690	286	71	0	167
2011	Village of Bliss - Control site	1,429	298	95	0	135
2012	Village of Bliss - Control site	1,250	286	36	0	145
N. Branch Wiscoy						
2010	Habitat Enhancement Section	1,183	90	15	3	63
2011	Habitat Enhancement Section	1,809	121	13	0	86
2012	Habitat Enhancement Section	1,530	251	58	18	130

Table 2. Comparison of the numbers of yearling and older (adult) wild brown trout (# adults, # >10", # >12" and # >14" in each 300 foot section sampled within the habitat enhancement section on N. Branch Wiscoy Creek in 2012.

Section	LUNKERS?	Feet of LUNKERS in site	#adult BT	# >10"	# >12"	# >14"
2100' -1800'	Y	168'	115	32	6	2
1800' -1500'	N	0	62	0	0	0
1500' -1200'	Y	72'	121	23	5	1
1200' -900'	N	0	36	1	0	0
900' - 600'	Y	104'	106	24	7	2
600'-300'	N	0	69	1	0	0
300'- 0'	Y	112'	100	18	5	2
Total - 2100'		456'	609	99	23	7

Appendix I. Breakdown of N. Branch Wiscoy Creek habitat enhancement project costs.

Category	Item	Grant Dollars	In-Kind	Total Cost
Supplies and materials	500 - 6"x1.5"x1.5" tree stakes	\$ 285.00		\$ 285.00
	500 tree shelters & herbicide	\$ 2,865.00		\$ 2,865.00
	Tree shelter shipping cost	\$ 137.48		\$ 137.48
	Hemlock Lumber for LUNKERS	\$ 3,714.00		\$ 3,714.00
	Additional tree stakes	\$ 34.20		\$ 34.20
	(2)18" - 3/4 inch drill bits & extension.	\$ 106.95		\$ 106.95
	Nails for LUNKERS	\$ 450.00		\$ 450.00
	3/4 inch rebar	\$ 1,320.84		\$ 1,320.84
	10" x 1" x 1" stakes	\$ 54.75		\$ 54.75
	Seed mix	\$ 123.60		\$ 123.60
	Seed mix	\$ 86.00		\$ 86.00
	18" - 1inch Drill Bit	\$ 38.87		\$ 38.87
	Logs for tie backs	\$ 1,760.00		\$ 1,760.00
	Jute Netting	\$ 485.00		\$ 485.00
	18" - 7/8 inch Drill Bit	\$ 36.71		\$ 36.71
	Seed mix	\$ 86.00		\$ 86.00
	Seed mix	\$ 128.11		\$ 128.11
Rebar Driving Pipe	\$ 55.00		\$ 55.00	
81.15 Tons of Topsoil	\$ 852.08		\$ 852.08	
281.2 Tons of Stone	\$ 3,374.28		\$ 3,374.28	
2 Pair of Chest Waders	\$ 234.93		\$ 234.93	
Additional 6"x1.5"x1.5" tree stakes	\$ 245.10		\$ 245.10	
Additional Tree shelters	\$ 1,281.10		\$ 1,281.10	
Contracted labor	Front-end Loader Rental	\$ 5,350.00		\$ 5,350.00
	Excavator & Operator	\$ 14,240.00		\$ 14,240.00
	Reimbursement for Trucking	\$ 200.00		\$ 200.00
Agency and volunteer labor	Admin. & Technical Services from SWCD	\$ 1,175.00	\$ 2,700.39	\$ 4,003.50
	DEC Biologist & Technician Labor		\$ 32,900.00	\$ 32,900.00
Agency and volunteer materials & supplies	Volunteer WNYTU Labor		\$ 24,300.00	\$ 24,300.00
	Hydroseeding from FL-LOWPA		\$ 555.69	\$ 555.69
	Re-Bar from FL-LOWPA		\$ 271.77	\$ 271.77
	1500 Trees from DEC Nursery		\$ 4,000.00	\$ 4,000.00
	Equipment from DEC		\$ 525.00	\$ 525.00
	Equipment & Materials from WNYTU		\$ 2,545.00	\$ 2,545.00
Totals		\$ 38,720.00	\$ 67,797.85	\$ 106,517.85

North Branch of the Wiscoy Creek Trout Habitat Restoration Project

Landowner:

Donald Smith, Orchard Park, NY

Agencies:

Wyoming County SWCD

NYS DEC Region 9 Bureau of Fisheries

U.S. Fish & Wildlife Service

WNY Chapter of Trout Unlimited

Wyoming County Fair Association

Contractor:

D&H Excavating, Arcade, NY

Vendors & Other Participants:

Earnest Nissley, Bliss, NY

Forest Suppliers, Jackson, Miss

Phillip Bros. Supply, Buffalo, NY

Herschberger Construction, Gainesville, NY

Upstate Re-Bar, Lancaster, NY

Ernst Conservation Seeds, Meadville, PA.

Reisdorf Bros., Inc., North Java, NY

E.J. Prescott, Inc., Corfu, NY

Five Corners Repair, Bliss, NY

Worth W. Smith, Co., Olean, NY

Robert Baehr, Fillmore, NY

Lanny Clark, Fillmore, NY