
Scope of Work

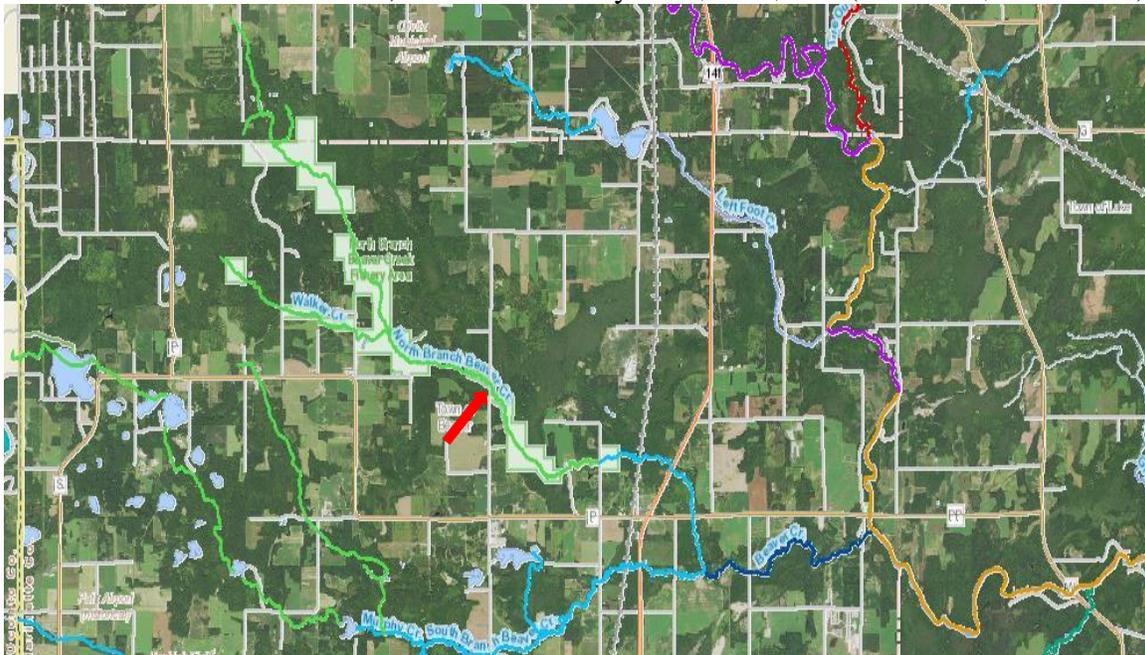
Wisconsin DNR Office of the Great Waters

Project Title: North Branch Beaver Creek Fishery Area at 25th Road: Road/Stream Crossing Enhancement

Project Applicant: Town of Beaver
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Project Location: Town of Beaver, Marinette County T31N, R20E, S18 / (45.15858 N, -88.05771 W)



Problem Statement:

The stream crossing at 25th Rd on the North Branch Beaver Creek (NBBC) is proposed for replacement in 2019 before the road is resurfaced in 2020 (Figure 5). The current structure consists of 4, 36” culverts (see photo below). The original proposal by the Town of Beaver was to install a 5th culvert to prevent overtopping of the road as well as widening the road at this crossing. Therefore, on June 13th, 2018 Wisconsin Department of Natural Resources (WDNR) fisheries staff in concert with Trout Unlimited, Department of Agriculture Trade and Consumer Protection (DATCP) engineers, and Marinette County Land Information Department staff met onsite to collect stream profile data to model an ecological design for this road/stream crossing.



Current road/stream crossing structure on the North Branch Beaver Creek at 25th Rd.

The NBBC is in southern Marinette County. It has a total stream length of 11.9 miles, with a surface area of 7.4 acres and an average width of 7 feet. In 1959, the North Branch Beaver Creek Fishery Area was created by the WDNR to conserve brook trout (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*) populations, provide stream access for anglers and improve habitat for fish and wildlife. WDNR currently owns over 1,000 acres of land surrounding the creek along with several easements. No trout have been stocked into the NBBC since 1995.

Parking areas are located on 21st Road, 25th Road, and 37th Road. Instream habitat projects are located downstream of the road crossing at 25th Road, at the road crossing on 21st Road and on Willow Creek, a tributary to the NBBC downstream of 33rd Road. In 2010, a perched culvert was replaced with a bottomless culvert at 21st Road which drastically improved stream connectivity (see photo below).



Road/stream crossing at 21st Road – replaced in 2010.

Sampling results of brook and brown trout indicate healthy populations of both species. Not only that but compared to other streams in the Northern Forest & Lakes ecoregion, the trout populations in the NBBC exhibit excellent abundance & size structure (Tables 1 & 2; Figures 1-4).

Table 1. Brook trout catch per unit effort (CPUE) and percentile (PCTL) by various length groups from 2009 through 2017 in the North Branch Beaver Creek.

Year	Average Length (in)	Length Range	Number Collected	CPUE: number of BROOK trout per mile					
				Total (PCTL)	YOY	> 5" (PCTL)	> 8" (PCTL)	> 10" (PCTL)	> 12" (PCTL)
2009	7.2	2.3 - 12.7	208	152 (40)	11	141 (60)	42 (80)	7 (80)	1 (93)
2011	8.8	2.7 - 14.0	123	90 (35)	2	88 (55)	54 (85)	24 (85)	9 (97)
2013	6.7	2.0 - 11.4	175	128 (40)	18	109 (55)	32 (75)	7 (80)	0
2015	5.9	1.8 - 11.1	163	119 (35)	34	85 (50)	18 (60)	4 (75)	0
2017	7.5	2.7 - 14.0	143	104 (35)	9	96 (50)	33 (75)	9 (85)	5 (95)

(CPUE = Catch Per Unit Effort; YOY = Young-of-year; PCTL = percentile)

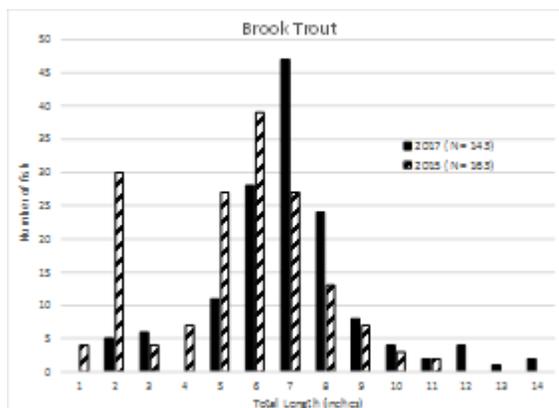


Figure 1. Length frequency of all brook trout collected in the North Branch Beaver Creek in 2015 and 2017.

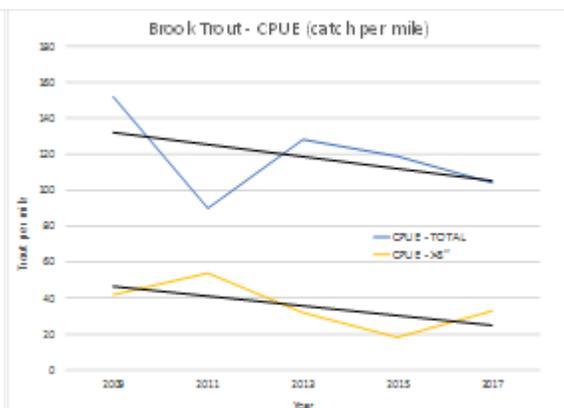


Figure 2. Total CPUE and CPUE of 8'' brook trout collected from 2009 through 2017.

Table 2. Brown trout catch per unit effort (CPUE) and percentile (PCTL) by various length groups from 2009 through 2017 in the North Branch Beaver Creek.

Year	Average Length (in)	Length Range	Number Collected	CPUE: number of BROWN trout per mile						
				Total (PCTL)	YOY	> 5" (PCTL)	> 8" (PCTL)	> 10" (PCTL)	> 12" (PCTL)	> 15" (PCTL)
2009	9.8	2.3 - 19.0	344	251 (70)	5	246 (80)	175 (97)	108 (98)	66 (98)	13 (95)
2011	11.3	3.3 - 22.9	320	234 (70)	1	232 (80)	172 (97)	133 (99)	106 (99)	49 (100)
2013	9.9	2.2 - 20.6	300	219 (70)	9	209 (80)	139 (93)	93 (96)	69 (98)	26 (98)
2015	8.8	1.8 - 20.2	310	226 (70)	31	196 (80)	117 (90)	76 (94)	61 (97)	15 (95)
2017	10.5	2.4 - 23.3	383	280 (75)	7	272 (85)	201 (98)	130 (99)	85 (99)	38 (100)

(CPUE = Catch Per Unit Effort; YOY = Young-of-year; PCTL = percentile)

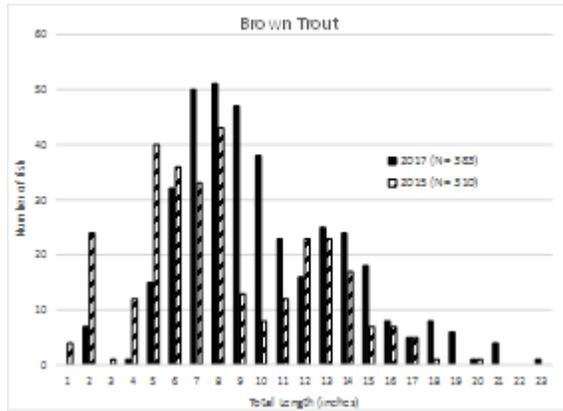


Figure 3. Length frequency of all brown trout collected in the North Branch Beaver Creek in 2015 and 2017.

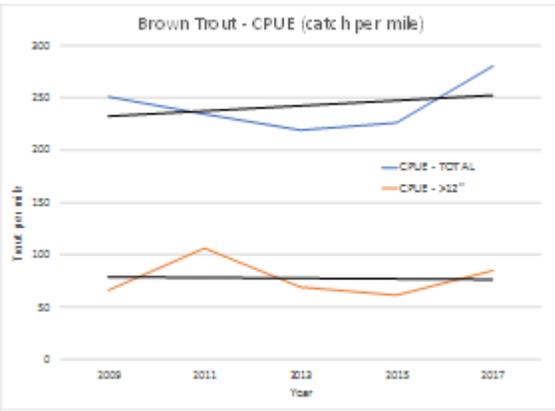


Figure 4. Total CPUE and CPUE of 12'' brown trout collected from 2009 through 2017.

Brook and brown trout populations in the NBBC are sustained through natural reproduction. Access to spawning grounds is critical if these populations are going to remain self-sustaining. The upper reaches of the NBBC and Walker Creek provide the best spawning habitat. Replacement of this road/stream crossing will ensure that trout will have access to approximately 20 miles of cold water streams; most within the North Branch Beaver Creek Fishery Area (7.5 miles upstream of 25th Rd – NBBC; 3.0 miles – Walker Creek; 13.0 miles of unnamed tributaries).

Brook and brown trout populations have been evaluated in the NBBC every other year since 2009 (odd numbered years). The current fishing regulation for the NBBC is a 3-fish daily bag limit and an 8-inch minimum length limit for brook trout and a 12-inch minimum length limit for brown trout. Future data analysis will consist of comparing the percentile catch per unit effort of brook trout greater than 8 inches and brown trout greater than 12 inches to the larger Northern Lakes and Forests ecoregion.

A study of seasonal brown trout movement on the NBBC was conducted from 1988 to 1990. Results showed that brown trout used the entire system from the upper reaches of the NBBC to the Peshtigo River throughout the year (Meyers et al., 1992). The study also indicated that brown trout occupied the Peshtigo River and Beaver Creek during winter and spring before migrating up and residing in the NBBC during the summer and fall. Therefore, installation of a road/stream crossing at 25th Road that is conducive to maintaining system connectivity, is essential to preserve the health of trout populations in the NBBC.

The current structure (4, 36'' culverts) is unable to accommodate high discharge events. As a result, water overtops the road because the culverts are undersized and sometimes clogged with debris. The Town of Beaver proposed adding a 5th culvert to accommodate higher flows however,

this will likely be inadequate. The proposed crossing design (see photo below) at this location will ensure that system connectivity is preserved while maintaining the integrity of the road by accommodating large runoff events (i.e. 100-year flood event). Additionally, a proper design will reduce the likelihood of debris accumulation on the upstream side of this crossing and allow for sufficient sediment transport downstream. The Town and its partners (WDNR, Trout Unlimited, Marinette County Land Information Department) would like to propose an ecological culvert/crossing design that will not only achieve the Town's goals (i.e. prevent road overtopping and debris accumulation, widen the road at crossing) but improve/maintain system connectivity (instream and floodplain) for aquatic organism passage and preserve the self-sustaining populations of both brook and brown trout.

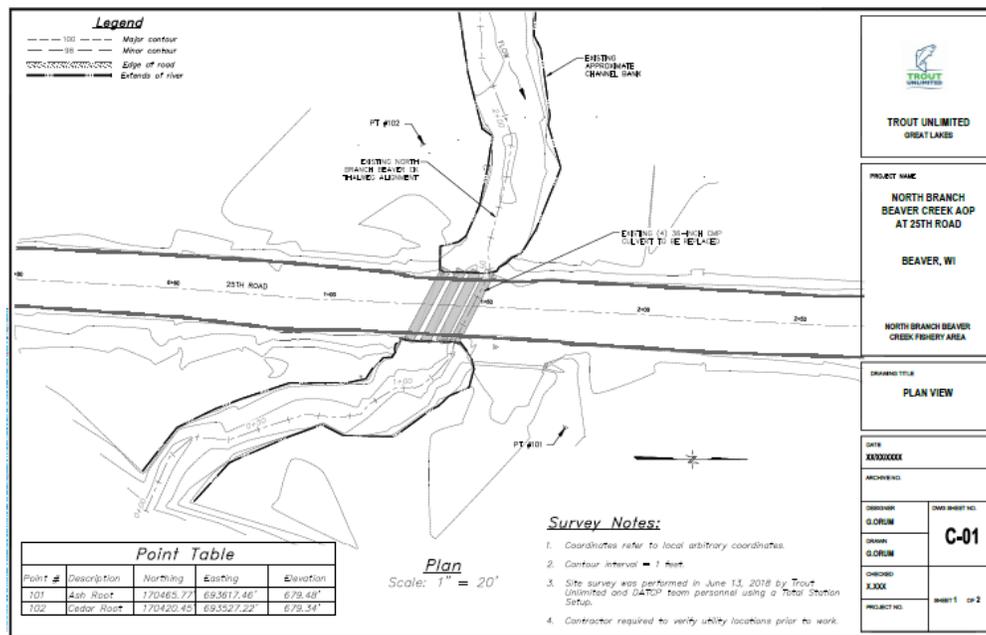
Proposed Work:

The most cost-effective alternative to 5, 36" culverts is a pre-cast concrete, open bottom structure with footer forms. The initial estimate for this option ranges from \$130,000 to \$160,000.



The proposed ecological culvert design will consist of a ConSpan bridge with poured footers and wing walls. The itemized budget for this proposed structure (below) was prepared by Trout Unlimited.

Installation of an ecological culvert/crossing design will help maintain stream connectivity at 25th Road and provide native brook trout and brown trout improved access to upstream spawning habitat. This design will dramatically improve sediment transport downstream, reduce/eliminate overtopping of the road, debris accumulation/removal during high water events and widen road/stream crossing which will improve public safety.



The figure above is a stream profile of the NBBC at 25th Road. The stream thalweg is in the right culvert and sediment has accumulated within the culverts and immediately downstream of crossing below the 3 culverts to the left. An ecological culvert design will benefit the connectivity for aquatic organism passage and of the floodplain wetland. This design will also improve sediment transport and distribution downstream while accommodating high flows, reducing maintenance, road overtopping and improve driver safety by widening the road.

Collaboration with Partners:

Town of Beaver - \$34,000

- The Town of Beaver will manage the project by securing the necessary permits, soliciting bids and coordinating construction.

WDNR – Trout Stamp - \$12,500

- WDNR fisheries staff will ensure project is constructed as designed and completed reporting requirements for all grants received for the project.
- WDNR Environmental Analysis & Review Specialist – approve structure placement under the appropriate permit/review process.

Trout Unlimited - \$5,000 to \$10,000 (to be requested)

WDNR River Protection Grant - \$50,000 (to be requested)

- In-kind match in the form of WDNR staff time supporting the project is included in the budget below as staff salary, fringe and indirect costs.
- Additional in-kind support in the form of engineering assistance will be provided to the Town of Beaver by the Department of Agriculture, Trade & Consumer Protection, but does not have a dollar value at this time. DATCP engineering staff will likely assist onsite during construction.

Timetable:

The Town of Beaver would like to begin the project as soon as funding is secured. Construction is expected to take place in 2019 and would follow the timeline below:

- March/April 2019 – solicit contractor bids
- May – select and meet with contractor

- iii. June – install erosion control measures
- iv. July – September – remove old structure / install new structure
- v. October – Final inspections
- vi. December 2019 – Final construction report
- vii. December 2020 – Stream profiles pre- & post construction status update

*Note: Timetable may be adjusted depending on securing funds for project. That is, the project may be shifted to 2020 if unable to secure funds for 2019.

Deliverables:

This project will encourage public participation through ongoing outreach efforts by WDNR. Bi-annual fish management reports (information sheets) are published online which summarize and compare current and past fisheries survey data regarding trout abundance and size structure. Highlighting this project in the context of the North Branch Beaver Creek Fishery Area will help define this stream as a destination fishery in northeast Wisconsin. This project, in conjunction with the current and future collection of applicable fisheries data, will demonstrate the importance of stream connectivity and aquatic organism passage. This site will also be used as an example for future road/stream crossing workshops and habitat tours conducted by various agencies (i.e. WDNR, Marinette County, Trout Unlimited).

The stream profile generated on June 13, 2018 (included above) summarized the current conditions of the North Branch Beaver Creek at the 25th Road crossing. We propose generating a stream profile upon completion of the project to illustrate how the stream has responded (sediment transport) to the ecological culvert/crossing design. This will be included in a separate submittal one year from when the project is completed. The final construction report detailing the project will be submitted to the Department upon completion of the project. This report will document the project in its entirety (including pre and post-construction photos).

1. Information Fact Sheets on project success for partners (anglers, Trout Unlimited, etc).
2. Final Construction Report.
3. Stream Profile Pre and Post construction status update to demonstrate stream responsiveness to new ecological culvert.

Project Budget:

Activity	OWG Request (7/1/2019 – 10/15/2019)	Match	Total
Personnel		\$2,067	\$2,067
Fringe Benefits		\$992	\$992
Equipment			
Travel			
Supplies			
Contractual	\$60,000	\$73,805	\$133,805
Construction			
Other			
Indirect Charges		\$605	\$605
Totals	\$60,000	\$77,469	\$137,469

Budget Detail:

NB Beaver Ck at 25th Road - Marinette County Compiled by: Greg Orum (Trout Unlimited)

ESTIMATE OF QUANTITIES	ITEM NO.	DESCRIPTION	PAY UNIT	EST. QTY.	UNIT PRICE	TOTAL PRICE
	1	MOBILIZATION	LUMP SUM	1	\$10,900.00	\$10,900.00
	2	SOIL EROSION & POLLUTION CONTROL	LUMP SUM	1	\$2,800.00	\$2,800.00
	3	REMOVAL AND DISPOSAL OF EXISTING STREAM CULVERT(S). DISPOSAL METHOD A, REMOVE FROM PROJECT	LUMP SUM	1	\$4,000.00	\$4,000.00
	4	UNSUITABLE EXCAVATION	CUBIC YARD	225	\$15.00	\$3,375.00
	7	STRUCTURE EXCAVATION	CUBIC YARD	225	\$12.00	\$2,700.00
	8	FOUNDATION FILL, 3/4" WASHED AGGREGATE FOUNDATION	CUBIC YARD	14	\$45.00	\$630.00
	9	DIVERSION AND DEWATERING	LUMP SUM	1	\$10,000.00	\$10,000.00
	10	SELECT GRANULAR BACKFILL	CUBIC YARD	80	\$20.00	\$1,600.00
	11	PLACED RIPRAP CLASS IV	CUBIC YARD	30	\$80.00	\$2,400.00
	12	AGGREGATE BASE, GRADING D, COMPACTION METHOD B (WITH ADDITION SHOULDER MATERIAL)	CUBIC YARD	35	\$20.00	\$700.00
	13	FURNISH AND ASSEMBLE 25'-0" SPAN x 5'-0" RISE CONSPAN WITH EXPRESS FOOTERS, HI-93	FOOT	43	\$1,800.00	\$77,400.00
	14	CAST IN PLACE CONCRETE FOOTERS	CUBIC YARD	28	\$500.00	\$14,000.00
	15	SEEDING, DRY METHOD (INCLUDING FERTILIZING)	LUMP SUM	1	\$1,000.00	\$1,000.00
	16	EROSION CONTROL MAT, TYPE ENS2 OR EQUAL	SQUARE YARD	200	\$4.00	\$800.00
	17	TEMPORARY TRAFFIC CONTROL	LUMP SUM	1	\$1,500.00	\$1,500.00
						SUBTOTAL:
					20% Contingency:	\$26,761.00
					TOTAL:	\$160,566.00

References:

Meyers, L.S., T.F. Theumler, & G.W. Kornely. 1992. Seasonal movements of brown trout in northeast Wisconsin. North American Journal of Fisheries Management 12: 433-441.