Androscoggin River Watershed Council
PO Box 1541
Bethel, ME 04217

November 30, 2012

Scott Craig, Certified Fisheries Professional
Project Leader/Fishery Biologist
Maine Fishery Resources Office
306 Hatchery Road
East Orland, ME 04431

Hi Scott,

Here's the final report for our project: ***"Enhancing Connectivity in the Androscoggin River, ME, a NFHAP Project for EBTJV Intact Sub-Watersheds"***, grant **# F10AP00263** (formerly #53371-A-G002).

I will send the site designs on a CD under separate cover. At this time, we are making last minute adjustments to the final design for the site at Cat Alley Brook, a tributary of the Bear River.) This has been a very successful project, and I thank EBTJV for providing grant funding. Please let me know if you require additional information.

Happy holidays!

Sincerely,

Jeff Stern, Project Director
Androscoggin River Watershed Council

Eastern Brook Trout Joint Venture
Completed Project Report Form

Project Title: Enhancing connectivity in the Androscoggin River, ME, NFHAP Project for EBTJV intact sub-watersheds. (Project #F10AP00263)

- **Location:** Newry, Grafton Township, and Riley Township, ME
- **Lat / Long Coordinates:** Bear River Grange: 19T 0357630, 4927734; "Central point" in project area: 19T 03527708, 4928579
- **Sponsor:** Androscoggin River Watershed Council (ARWC)
- **Completion Date:** December 31, 2012
- **Partners involved:** U.S. Fish & Wildlife Service, Maine Department of Inland Fisheries & Wildlife, Town of Newry, Maine Department of Conservation – Bureau of Parks & Lands, Androscoggin Valley Council of Governments, private landowners and volunteers
- **Final Funding:**
  Total Project Cost: $171,970
  NFHAP Funding Through EBTJV: 27,200
  Total Federal Contributions: 27,200
  Total Non-Federal Contributions: 144,770
- **Action strategy implemented in the project (according to EBTJV range wide, regional, or state level habitat strategies).** The project addressed Objective 1 in the EBTJV *Roadmap to Restoration*, which is to "Maintain the current number of intact watersheds." Both sub-watersheds in this project are listed as intact and have EBTJV's highest priority rating. By enhancing habitat connectivity – improving fish passage through the lower Bear River and assessing barriers – this project has helped maintain the intact status of these watersheds. The *Roadmap* discusses challenges in the EBTJV Northern Region. Erosion control and habitat improvement at the Bear River Grange site addressed the challenge of "Sedimentation and high water temperature caused by land use changes". Prior to restoration, the Bear River Grange site was overwidened and shallow, with a lack of cover. The banks were eroding severely. These conditions limited brook trout passage (Bonney 2006). The solution implemented was to install rock vanes, debris jams, and vegetative plantings; these methods have been shown to be effective at narrowing and deepening river channels, stabilizing banks, adding cover for fish, and lowering water temperature. This project met four Management Priorities contained in the *Roadmap* for the Northern Region. These are: improve water quality, build partnerships, protect intact populations, and reduce habitat fragmentation. State-level EBTJV habitat objectives that were met by this project include: Habitat Protection 2.1, Strategy 2: "Identify barriers to fish passage and re-establish habitat connectivity where possible" and 2.5,

Strategy 1: "...protect or restore streambank stability, eliminate erosion and sedimentation concerns, maintain shading and thermal regimes..." Further, our project met several Outreach objectives, including 3.1, Strategy 2: "Encourage volunteer and school group participation in assessment and monitoring programs", and 3.2, Strategy 1: "Inform the public and encourage interest and participation in addressing environmental issues." Finally, our project met the goal of the Maine Wildlife Action Plan to restore degraded stream habitat.

- **Priority score of the sub-watershed where the project took place.** Both the Sunday River and Bear River Watersheds (which are sub-watersheds of the Androscoggin River) have priority ratings of 1.66, and the brook trout status is "intact" for each.

- **Describe any additional species of greatest concern or the state wildlife action plan listed habitat conservation goal (s) supported by the project.** Historically, the Androscoggin River Watershed provided spawning and nursery habitat for sea-run Atlantic salmon. The Maine Department of Marine Services stocks Atlantic salmon fry and smolts in tributaries to the Androscoggin, and small numbers of adults return to the river annually. Recently, the Androscoggin River from the sea up to Rumford Falls was designated as critical habitat for Atlantic salmon. Habitat restoration for brook trout, and erosion control, will also benefit current and future spawning and nursery habitat for anadromous Atlantic salmon.

- **Description: project objective(s):** There were four objectives for this project, as follows: 1) Improve fish passage through an over-widened and eroding reach of the lower Bear River (the "Bear River Grange" site); 2) Conduct an on-the-ground assessment of barriers to fish passage throughout the Sunday River and Bear River sub-watersheds; 3) Develop designs for fixing three additional priority sites, as determined by ARWC, Maine IF&W, and U.S.F.W.S., found in the assessment; and 4) Apply for funding to fix priority sites. All four objectives have been met. (A CD WITH THE DESIGNS WILL BE SENT SEPARATELY.)

- **Methods used:** In order to make improvements at the Bear River Grange site (objective #1), an excavator was used to install eight rock vanes that extended from the bank into the river. These vanes (also called "deflectors") point upstream, and reroute flows away from the vulnerable bank. They also improve aquatic habitat by creating pools, causing the river to narrow, and diversifying habitat conditions and velocities. The vanes were keyed into the bank and sloped down to the river so they will be effective at varying water levels. The steep bank was graded to a gentler slope in places. The toe of the bank was further stabilized by adding 15 debris jams ("bar buddies") between the rock vanes. These trees were anchored to boulders or "anchor" trees that were sunk into the stream bed by cable. The debris jams offer additional bank protection and provide cover for fish. Finally the formerly bare bank was seeded with fast-growing winter rye, and then planted with seedling white pine. (ARWC plans additional tree plantings on the bank in 2013.) Work was completed in August 2010. Permits to do this work were

previously obtained from the Maine Department of Environmental Protection, U.S. Army Corps of Engineers, and Town of Newry – floodplain and shoreland zoning, and an archeological review was conducted. Close to ¼ mile of river was improved. In 2011, for objective #2, volunteers were recruited, trained by Alex Abbott and divided into teams. The larger study area (94 mi^2 in the Sunday River and Bear River sub-watersheds) was divided into survey "sectors" and each team was assigned a sector with ARWC overseeing the effort. Later in summer and fall, ARWC conducted follow-up field work, and then entered data into the IF&W/U.S.F.W.S. statewide database. For objective #3, ARWC in 2011-12 consulted with private and public engineers, various state agencies, fluvial geomorphologists, and fisheries experts to develop restoration designs for three priority sites that were identified in the barrier assessment. For objective #4, in August 2012, ARWC partnered with the Androscoggin Valley Soil & Water Conservation District to submit a grant proposal to EBTJV that would, in part, fix the highest priority barrier identified in the 2011 assessment – a remnant log driving dam on the mainstem of the Sunday River in Riley Township – and provide funding for additional restoration in the Sunday River and Bear River Watersheds – gaining landowner permission, permitting, etc.

- **Project outcomes: Describe outcomes and whether or not the objectives were met. If not why? What lessons were learned?** Outcomes include habitat restoration and erosion control in nearly ¼ mile of the lower Bear River, barrier assessment in 94 mi^2 of the Sunday River and Bear River sub-watersheds, design for fish passage improvements at three high priority barrier sites identified in the barrier assessment, and applying for additional funds to continue restoration work in the Sunday River and Bear River sub-watersheds. All objectives have been met, although we do not know at this time whether we have obtained funding from EBTJV for objective #4. Improvements made at the Bear River Grange utilized techniques that are new to Maine (although they have a long and successful track record elsewhere in the United States for improving trout habitat and controlling erosion). In Maine, rip-rap has typically been used to control severe bank erosion. However, a growing body of research indicates rip-rap merely kicks erosion problems downstream to the next bend in the river, is unstable, does not improve habitat, and warms the water. On the other hand, rock vanes and debris jams can be thought of as a more natural approach to restoring streams and controlling erosion and improving habitat than rip-rap. As such, the restoration work at Bear River Grange can serve as a model for other similar problems throughout Maine and northern New England. ARWC has already conducted "tours" of Bear River Grange for agencies including the U.S.D.A. Natural Resources Conservation Service and the Maine Division of Marine Resources to learn more about this approach, and more are anticipated in the future.

- **What is the Brook trout population response to the project outcome?**

Based on a long line of results from other sites around the country, the work done at the Bear River Grange site is likely to increase the brook trout population and improve

fish passage through a reach of river that was formerly a barrier. Specific responses of the brook trout population at the site are unknown at this time. However, frequent site visits and photo-documentation suggest it is working to improve habitat in the ways already mentioned in this report (controlling bank erosion, narrowing the river, increasing cover, diversifying the flow regime). ARWC possesses baseline data from a fish inventory, surveying and bank stability studies that were conducted at Bear River Grange prior to construction. If funding becomes available, we can go back and do follow-up studies. Through this grant, a plan has been developed to remove the remnants of a log driving dam on the Sunday River in 2013, which will open an estimated 4 miles of mainstem and headwater tributaries to brook trout movement, migration and colonization. Plans have also been developed to remediate additional priority fish passage barriers in the Sunday River and Bear River sub-watersheds, as well, and ARWC will pursue landowner agreements and permitting as needed to put the plans into place. Implementation of all these plans to remediate barriers is expected to enhance brook trout populations.

- **If applicable, what is the number of stream miles and or acres of brook trout habitat improved through protection, restoration or enhancement?**

A Protected: N/A
B. Restored/Enhanced: ¼ mile

- **If applicable what is the number of stream miles and or lake/pond acres of brook trout habitat gained access to as a result of removing a fish barrier. Include the # of fish barriers removed?** Poor habitat at the Bear River Grange site was a "barrier" because it prevented BKT movement and migration from the lower to upper Bear River. Therefore, ¼ stream mile of stream mile has been gained through this project, and one "barrier" has been removed.

- **If applicable, what is the number of stream miles and or lake or pond acres of brook trout habitat with sediment, phosphorous, or nitrogen inputs that were rehabilitated to within 25% of natural or other desired levels such as numeric state water quality criteria?** Sediment erosion in the ¼ mile stretch of river at the Bear River Grange site went from an estimated 891 tons/year prior to construction, and highly unstable banks (Town of Newry, Maine DEP application, 2009; Bonney 2006) to close to 0 after construction, and the banks post-construction are much more stable. It is assumed this is now within 25% of natural for sediment, and, because phosphorus "hitch hikes" on soil particles that are exported from the terrestrial to the aquatic environment, it is further assumed there has been a corresponding drop in phosphorus export, as well. Reduction of nitrogen is unknown, although the former hay field at Bear River Grange has not been used for crop production or fertilized for many years, perhaps even decades.

*******Please include before and after photos of the project with a photo release form and appropriate credit line for the photos.*********

July 6, 2010, Bear River Grange, prior to construction. View upstream. Photograph by Jeff Stern, Androscoggin River Watershed Council.

October 18, 2010, Bear River Grange, after construction. Photograph by Jeff Stern, Androscoggin River Watershed Council.

July 12, 2011, Site #D 1028. The remains of a log driving dam on the mainstem of the Sunday River in Riley Township, Maine, photograph by Jeff Stern, Androscoggin River Watershed Council. This was the number 1 priority site for removal after the barrier assessment was conducted in the Sunday River and Bear River sub-watersheds. Removal will open an estimated four miles of the upper Sunday River and headwater tributaries to brook trout movement, migration and colonization. The Watershed Council is working with the Maine Department of Inland Fisheries & Wildlife, and the Maine Bureau of Parks & Lands, to remove this barrier, hopefully in 2013. An application has been submitted to the Eastern Brook Trout Joint Venture for a grant to provide funding for removal.

U.S. Fish & Wildlife Service

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Special Agreement Instructions (purchase information, usage restrictions, etc.):

Product Description (image number, subject, horizontal/vertical, location, title, etc.): 3 photographs: 1) Bear River Grange "before", view upstream July 6, 2010, horizontal, BearRiverGrange070610 001; 2) Bear River Grange, "after", view upstream, October 18, 2010, horizontal, BearRiverGrange101810 002; 3) Leg driving down, Riley Township, view upstream, July 12, 2011, horizontal, Sector 7D 1028 07.12.11 upstream face 1928.

Name: Jeff Stern, Androscoggin River Watershed Council

Address: P.O. Box 1541, Bethel, ME 04217

Phone: 207-627-3126

Signature: Jeff Stern Date: 11/26/12

FWS Form 3-2259 10/03

Summary of Sunday and Bear River Stream-Road Crossing Inventory.

In total, 119 locations were surveyed from May 7 to October 28, 2011. Ninety-seven sites were located in the Sunday River (82%) and 22 in the Bear River (18%) watershed.

Locations surveyed included 42 bridges (35%), 42 culverts (35%), 1 failed culvert (1%), 28 Fords- *no structure but active crossing* (24%) and 6 sites had no crossing- *non active road* (5%). See Table 1.

Table 1. Survey counts by crossing type.

Crossing Type	Count	%
Bridge	42	35%
Single Culvert	30	25%
Multiple Culverts	12	10%
Failed Culvert	1	1%
Ford	28	24%
No Crossing	6	5%
Grand Total	119	

Fish Barriers were determined to be present at 40 locations with 17 sites being labeled as Potential Barriers. See Table 2 and Figure 1.

Table 2. Summary of database by barrier class and structure type.

Structure Type	Barrier	Potential Barrier	No Barrier	No Crossing	Grand Total
Bridge	2	3	37		42
Single Culvert	20	7	3		30
Multiple Culverts	1				1
Failed Culvert	7	5	10	6	28
Ford	10	2			12
No Crossing				6	6
Grand Total	**40**	**17**	**50**	**12**	**119**

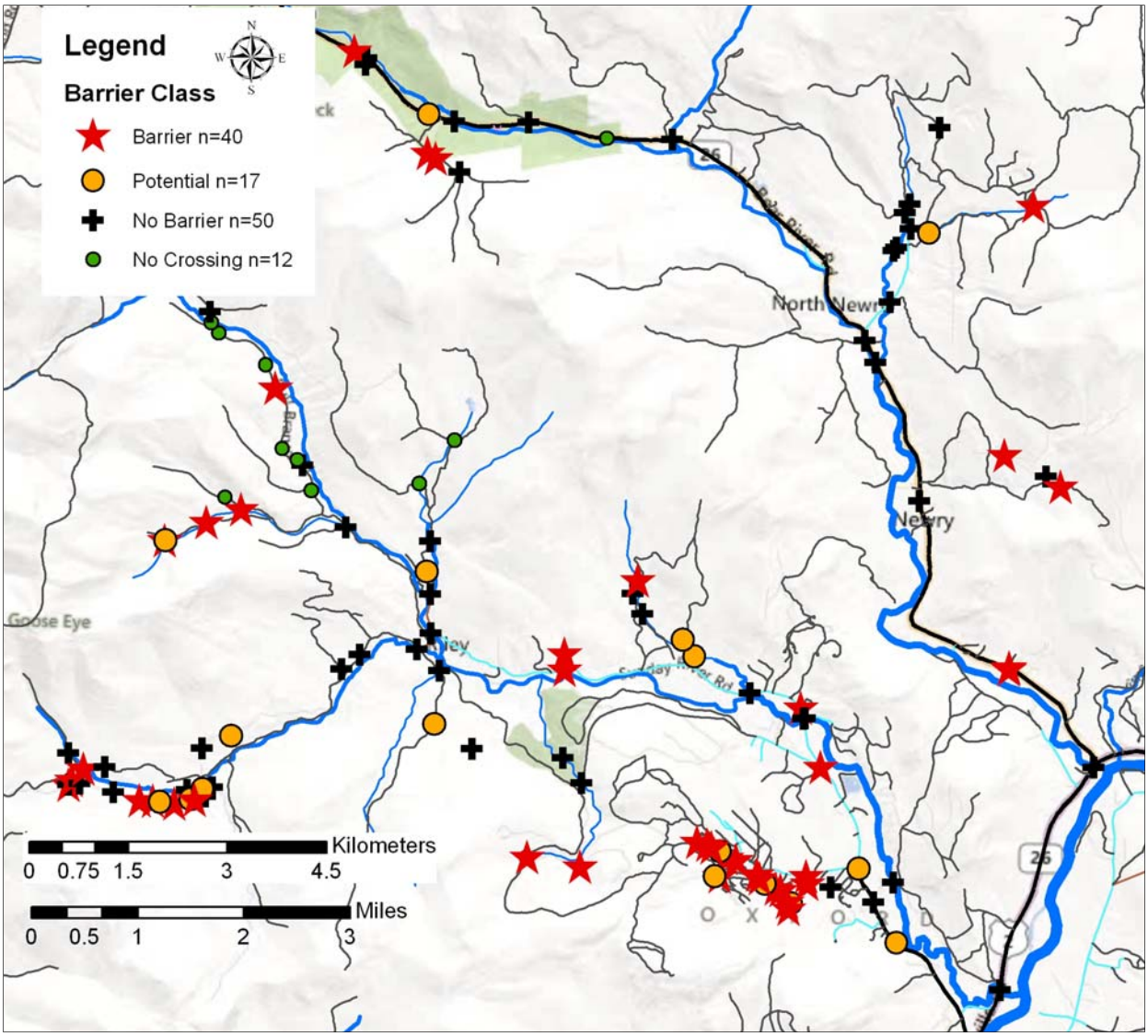


Figure 1. Map showing barrier class for 119 sample locations in the Sunday and Bear River.

Table 3 summarizes site data by addressing four "Aquatic Connectivity" issues pertaining to problems associated with the Inlet, Outlet, Substrate and Slope. The dataset identifies six locations that violate all four "Aquatic Connectivity" parameters with 18 (3 issues), 14 (2 Issues) and 16 (1 Issue).

Table 3. Number of Aquatic Connectivity issues violated by each Structure Type.

Structure Type	No Connectivity Issues	1 Issue	2 Issues	3 Issues	4 Issues		Grand Total
Bridge	37	5					42
Single Culvert	2	3	8	13	4		30
Multiple Culverts		1					1
Failed Culvert	20	7			1		28
Ford			6	5	1		12
No Crossing	6						6
Grand Total	**65**	**16**	**14**	**18**	**6**		**119**

Basic site data including location coordinates are provided in Table 4.

The complete barrier survey data (GIS format) is available from The Androscoggin River Watershed Council (Jeff Stern), USFWS Maine Fishery Resources Office (Scott Craig) and USFWS Gulf of Maine Coastal Program (Jed Wright).

Table 4. Site location (UTM zone 19N) and summary of survey data by Barrier Class and four "Aquatic Connectivity" issues.
Note: Site ID is a unique identifier in the GIS database.

Site ID	Basic Structure Type	Barrier Class	Outlet Span (ft)	UTM East	UTM North	**Inlet Issues**	**Outlet Issues**	**Substrate Issues**	**Slope Issues**	**Number of Connectivity Issues**
90	Multiple Culverts	Barrier	8.0	352,771	4,925,795	Y	Y	Y	Y	4
49	Ford	Barrier	2.4	342,345	4,927,284	Y	Y	Y	Y	4
32	Culvert	Barrier	1.2	353,180	4,925,438	Y	Y	Y	Y	4
64	Culvert	Barrier	0.9	344,212	4,926,989	Y	Y	Y	Y	4
16	Culvert	Barrier	0.9	347,736	4,936,772	Y	Y	Y	Y	4
17	Culvert	Barrier	0.6	347,858	4,936,689	Y	Y	Y	Y	4
91	Multiple Culverts	Barrier	8.0	352,723	4,925,848		Y	Y	Y	3
97	Culvert	Barrier	7.0	351,972	4,926,308		Y	Y	Y	3
96	Culvert	Barrier	6.5	352,035	4,926,263		Y	Y	Y	3
92	Multiple Culverts	Barrier	5.0	352,163	4,925,825		Y	Y	Y	3
93	Multiple Culverts	Barrier	5.0	352,407	4,926,073		Y	Y	Y	3
94	Culvert	Barrier	5.0	352,262	4,926,099		Y	Y	Y	3
103	Culvert	Barrier	5.0	351,824	4,926,343		Y	Y	Y	3
105	Culvert	Barrier	4.0	350,046	4,925,973		Y	Y	Y	3
86	Culvert	Potential	2.4	355,333	4,935,559	Y		Y	Y	3
110	Multiple Culverts	Barrier	2.3	353,472	4,925,825	Y	Y	Y		3
113	Culvert	Barrier	2.1	349,809	4,928,956		Y	Y	Y	3
79	Multiple Culverts	Barrier	1.9	356,910	4,935,970		Y	Y	Y	3
85	Culvert	Barrier	1.2	357,322	4,931,721	Y	Y	Y		3
83	Culvert	Barrier	1.3	356,547	4,928,986	Y	Y		Y	3
98	Culvert	Barrier	1.2	353,392	4,928,382		Y	Y	Y	3
84	Culvert	Barrier	0.7	356,473	4,932,203	Y	Y	Y		3
26	Culvert	Barrier	0.6	343,574	4,926,968		Y	Y	Y	3
25	Culvert	Barrier	0.5	343,905	4,926,925	Y	Y	Y		3
89	Multiple Culverts	Potential	8.0	352,849	4,925,708			Y	Y	2

Site ID	Basic Structure Type	Barrier Class	Outlet Span (ft)	UTM East	UTM North	**Inlet Issues**	**Outlet Issues**	**Substrate Issues**	**Slope Issues**	**Number of Connectivity Issues**
88	Multiple Culverts	Barrier	8.0	353,013	4,925,641		Y	Y		2
104	Culvert	Potential	7.0	352,084	4,925,831			Y	Y	2
95	Culvert	Potential	6.0	352,167	4,926,201			Y	Y	2
4	Culvert	Barrier	4.6	346,630	4,938,319		Y	Y		2
106	Multiple Culverts	Barrier	4.0	349,243	4,926,116		Y	Y		2
87	Multiple Culverts	Barrier	2.3	353,082	4,925,620		Y	Y		2
38	Culvert	No Barrier	2.0	346,879	4,938,149			Y	Y	2
14	Culvert	Barrier	1.5	353,694	4,927,478	Y		Y		2
112	Culvert	Barrier	1.2	353,487	4,925,718		Y	Y		2
39	Culvert	Potential	1.3	344,756	4,927,952	Y			Y	2
15	Multiple Culverts	Potential	1.3	353,234	4,925,414	Y		Y		2
111	Multiple Culverts	Barrier	1.1	353,204	4,925,336	Y	Y			2
12	Culvert	Potential	0.7	354,839	4,924,815	Y			Y	2
53	Ford	No Barrier	6.7	342,299	4,927,690			Y		1
59	Bridge	Potential	6.3	343,683	4,926,955	Y				1
43	Bridge	Potential	6.1	344,148	4,926,997	Y				1
27	Bridge	Barrier	5.9	343,377	4,926,979	Y				1
54	Ford	Barrier	5.1	342,525	4,927,455		Y			1
117	Bridge	Barrier	3.9	350,922	4,930,301		Y			1
45	Ford	Barrier	3.4	342,301	4,927,209	Y				1
1	Culvert	No Barrier	2.8	346,820	4,938,203			Y		1
22	Bridge	Potential	2.3	347,721	4,930,436	Y				1
2	Culvert	Potential	1.8	347,753	4,937,360			Y		1
78	Culvert	Barrier	1.5	356,542	4,928,960		Y			1
21	Ford	Barrier	1.4	343,753	4,930,910		Y			1
69	Ford	Barrier	1.1	344,390	4,931,190		Y			1
35	Ford	Barrier	1.0	345,435	4,933,220	Y				1

Site ID	Basic Structure Type	Barrier Class	Outlet Span (ft)	UTM East	UTM North	**Inlet Issues**	**Outlet Issues**	**Substrate Issues**	**Slope Issues**	**Number of Connectivity Issues**
67	Ford	Barrier	1.0	344,917	4,931,379		Y			1
119	Failed Culvert	Barrier		349,810	4,929,196	Y	N/A			1
107	Culvert	No Barrier	18.0	350,071	4,927,240					0
23	Ford	No Barrier	9.4	347,776	4,930,894					0
109	Bridge	No Barrier	8.4	353,845	4,925,656					0
99	Ford	Potential	5.9	351,781	4,929,153					0
62	Ford	No Barrier	4.4	355,044	4,935,995					0
81	Ford	No Barrier	4.3	354,796	4,935,289					0
50	Ford	Potential	4.3	347,840	4,928,125			N/A		0
58	Ford	No Barrier	4.2	344,447	4,934,371					0
33	Ford	No Barrier	4.0	345,844	4,932,048					0
46	Ford	No Barrier	4.0	342,301	4,927,209					0
65	Ford	No Barrier	3.9	346,439	4,928,961					0
57	Ford	No Crossing	3.4	344,460	4,934,210					0
55	Ford	No Barrier	3.2	342,853	4,927,477					0
56	Ford	No Crossing	3.2	345,975	4,931,666					0
52	Ford	No Barrier	3.2	342,466	4,927,232					0
61	Ford	No Crossing	3.0	345,539	4,932,293					0
34	Ford	No Crossing	2.9	345,762	4,932,129					0
63	Ford	Potential	1.9	344,333	4,927,149					0
11	Ford	No Crossing	1.7	344,575	4,934,047					0
108	Culvert	Potential	1.5	354,269	4,925,944			N/A		0
10	Ford	No Crossing	1.3	345,283	4,933,568					0
70	Ford	Potential	1.3	343,762	4,930,910					0
100	Ford	Potential		351,601	4,929,406					0
3	Bridge	No Barrier		348,229	4,936,485		N/A		N/A	0
5	Bridge	No Barrier		349,268	4,937,236		N/A		N/A	0

Site ID	Basic Structure Type	Barrier Class	Outlet Span (ft)	UTM East	UTM North	**Inlet Issues**	**Outlet Issues**	**Substrate Issues**	**Slope Issues**	**Number of Connectivity Issues**
6	Bridge	No Barrier		348,148	4,937,250		N/A		N/A	0
7	No Crossing	No Crossing		350,451	4,936,996		N/A		N/A	0
8	No Crossing	No Crossing		345,690	4,938,806		N/A		N/A	0
9	Bridge	No Barrier		345,599	4,939,355		N/A		N/A	0
13	Bridge	No Barrier		356,409	4,924,101		N/A		N/A	0
18	Bridge	No Barrier		354,359	4,933,933		N/A		N/A	0
19	Bridge	No Barrier		357,824	4,927,475		N/A		N/A	0
20	Bridge	No Barrier		354,521	4,933,602		N/A		N/A	0
24	Bridge	No Barrier		357,105	4,931,874		N/A		N/A	0
28	Bridge	No Barrier		347,789	4,929,503		N/A		N/A	0
29	Bridge	No Barrier		346,500	4,931,109		N/A		N/A	0
30	Bridge	No Barrier		347,578	4,929,263		N/A		N/A	0
31	Bridge	No Barrier		346,711	4,929,179		N/A		N/A	0
36	Bridge	No Barrier		349,789	4,927,616		N/A		N/A	0
37	Bridge	No Barrier		354,493	4,925,432		N/A		N/A	0
40	Bridge	No Barrier		342,978	4,927,101		N/A		N/A	0
41	Bridge	No Barrier		344,477	4,927,170		N/A		N/A	0
42	Bridge	No Barrier		344,095	4,927,131		N/A		N/A	0
44	Bridge	No Barrier		344,372	4,927,033		N/A		N/A	0
47	Bridge	No Barrier		344,326	4,927,759		N/A		N/A	0
48	Bridge	No Barrier		347,916	4,928,939		N/A		N/A	0
51	Bridge	No Barrier		348,413	4,927,752		N/A		N/A	0
60	No Crossing	No Crossing		349,240	4,926,115		N/A		N/A	0
66	Bridge	No Barrier		347,782	4,930,094		N/A		N/A	0
68	No Crossing	No Crossing		344,669	4,931,559		N/A		N/A	0
71	No Crossing	No Crossing		347,606	4,931,771		N/A		N/A	0
72	No Crossing	No Crossing		348,141	4,932,426		N/A		N/A	0

Site ID	Basic Structure Type	Barrier Class	Outlet Span (ft)	UTM East	UTM North	**Inlet Issues**	**Outlet Issues**	**Substrate Issues**	**Slope Issues**	**Number of Connectivity Issues**
73	Bridge	No Barrier		351,447	4,936,980		N/A		N/A	0
74	Bridge	No Barrier		354,971	4,935,864		N/A		N/A	0
75	Bridge	No Barrier		355,057	4,935,623		N/A		N/A	0
76	Bridge	No Barrier		354,740	4,934,513		N/A		N/A	0
77	Bridge	No Barrier		355,187	4,931,502		N/A		N/A	0
80	Bridge	No Barrier		355,497	4,937,156		N/A		N/A	0
82	Bridge	No Barrier		354,838	4,935,341		N/A		N/A	0
101	Bridge	No Barrier		353,453	4,928,215		N/A		N/A	0
102	Bridge	No Barrier		354,788	4,925,728		N/A		N/A	0
114	Bridge	No Barrier		352,620	4,928,594		N/A		N/A	0
115	Bridge	No Barrier		353,449	4,928,227		N/A		N/A	0
116	Bridge	No Barrier		350,851	4,930,101		N/A		N/A	0
118	Bridge	No Barrier		350,991	4,929,797		N/A		N/A	0

Androscoggin River Watershed Council
PO Box 1541
Bethel, ME 04217

December 6, 2012

Project: Enhancing Connectivity in the Androscoggin River, ME, a NFHAP Project for EBTJV Intact Sub-Watersheds

Grant #: F10AP00263 (formerly #53371-A-G002)

Hi Scott,

Here is a disk with the three fish passage restoration designs as required by the grant. These are three of the highest priority barriers that we found during the assessment in the Sunday River and Bear River sub-watersheds that was conducted in 2011. The three sites are:

1) Cat Alley Brook, a tributary of the Bear River, in Newry @ the Route 26 crossing;
2) Barker Brook, a tributary of the Sunday River, in Newry, behind Chairlift 11 at the Sunday River Ski Area;
3) The mainstem of the Sunday River in Riley Township @ the site of a remnant log driving dam.

A few notes about the contents of the CD. There are two items related to Cat Alley Brook; one is the engineering design and the other is a narrative about what needs to be done to improve fish passage. Both items begin with "SKMBT" on the CD.

The one item for the Barker Brook design on the CD, created by the engineer at the Sunday River Ski Co., is titled "Lift 11 Arch Culvert 2-15-12". This design was prepared before you and I visited the site this summer.

Finally, there are 5 entries relating to the remnant log driving dam on the mainstem of the Sunday River in Riley Township. The four "Rock Weir" and "Weir" entries are from John Field, a fluvial geomorphologist and owner of Field Geology Services. John visited the site and came up with a design similar to work he has done on Nash Stream in New Hampshire.

However, when I presented this concept to IF&W, DOC, and Alex Abbott, it was decided to go with a grip hoist instead of in-stream structures. The evolution of this idea can be seen in the chain of emails in the Word document titled "Log Driving Dam D1028".

Please call or email if you have questions.

Sincerely,

Jeff Stern, Project Manager
Androscoggin River Watershed Council

Cat Alley Brook – Route 26 Box Culvert Renovation

The site is located on Route 26 in Newry, Maine approximately 1.25 miles northerly of its intersection with Route 2 and approximately 870 feet upstream from the mouth of Cat Alley Brook where it enters the Bear River. The site consists of two features that impair trout and other aquatic *animal* passage. It appears that Route 26 was relocated at least three decades ago. At the time a new concrete box culvert was installed to carry the road over Cat Alley Brook. Just upstream (northerly) of the current road crossing, there is a deteriorated 36" corrugated, round metal culvert that has literally become part of the easterly stream banking. Two actions are needed to provide adequate passage: renovation of the box culvert and removal of the old metal culvert.

Box Culvert: The box culvert has a smooth concrete bottom and a perched outlet that is approximately one foot above the stream bed. The stream drops away from the outlet at a moderate slope. Several changes are necessary to provide for fish passage. The design provided is meant to provide passage at the average low flow condition of the brook. The renovations include:

1. Construct a berm inside the culvert to create a smaller channel for low flow conditions. The width of channel is sized to approximate the size of the typical stream channel section which the brook follows during low flow conditions.
2. Place a series of artificial stones in the newly created channel to create small eddies to enable fish to rest behind them on their journey through the culvert. Ideally, the bottom of the newly created channel could be resurfaced with a layer of 3 inch minus stone embedded in a layer of concrete in order to simulate a more natural streambed. However, this would be quite expensive to properly anchor and could reduce the hydraulic capacity of the culvert significantly. It would also create a larger drop at the outlet that would have to be overcome.
3. Install a series of weirs below the box culvert to create small openings for water flow and pond water behind them. The stream would be stepped down (as it flows towards the Bear River) through a series of openings that create drops of no more than 4 to 5 inches. Openings should be approximately one foot wide. In order to maintain hydraulic capacity and as natural a setting as possible, the weirs are constructed of large boulders (2 to 3 feet in diameter) filled around by a combination of crushed stone having a D50 of 12 inches and crushed 4 inch minus gravel. The first row of boulders should not have an elevation that is more than 8" above the floor of the box culvert. The boulders would be anchored together with a system of galvanized steel chain that would be attached to the box culvert and a series of 8"x8"x6' pressure treated posts sunk into the stream bank on both sides of the boulder weirs. The chain would be fastened to the boulders in

accordance with the engineer's instructions. Posts would be embedded 4 feet into the stream banking several feet from the natural stream channel at normal high water flows.

4. Place three to four boulders of the same size on the westerly side of the upstream entrance to the box culvert. Currently, the brook channel is meandering to the west as shown on the attached sketch of the site. Eventually, the stream will cause significant erosion to the westerly side of the box culvert inlet. Placing a few boulders in the stream channel at this point will slow down the direct impact of the stream on the banking and thus slow the erosion. Rip rapping the area is not recommended.

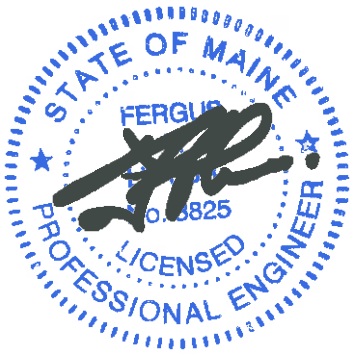
Old Road Crossing/Metal Culvert: It is recommended that the culvert be removed. The culvert has a perched outlet that is approximately 30 inches above the stream bed. It appears at low flows, that much of the stream flow flows into the old culvert, thus reducing the amount of flow in the natural stream channel and making fish passage difficult. In addition, the culvert is located such that it diverts higher stream flows to the westerly bank of the stream and therefore exacerbates meander and the erosion on the westerly side of the box culvert inlet.

The metal culvert can be removed from the westerly banking of the stream by reaching across the stream with an excavator. The work should be done to create minimal disturbance of the easterly stream bank into which the culvert is embedded. Installation of approximately 18 inches of crushed stone having a D50 of 18 inches along the toe of the banking where the culvert is removed will stabilize the toe of the banking until a more natural stabilization occurs from vegetation working its way down the banking. Installation of a well anchored erosion mat behind the stone and covering the newly exposed soil is recommended.

It is recommended that the westerly banking, now an open field down to the stream bank, have a planting of appropriate trees for a distance of 25' back from the top of the stream bank. It is also recommended that the erosion of the road shoulder and banking that is occurring at the outlet end of the box culvert be repaired by placing a small berm at the far edge of the shoulder and diverting the road runoff to a more gently sloping banking on the southerly side of the stream.

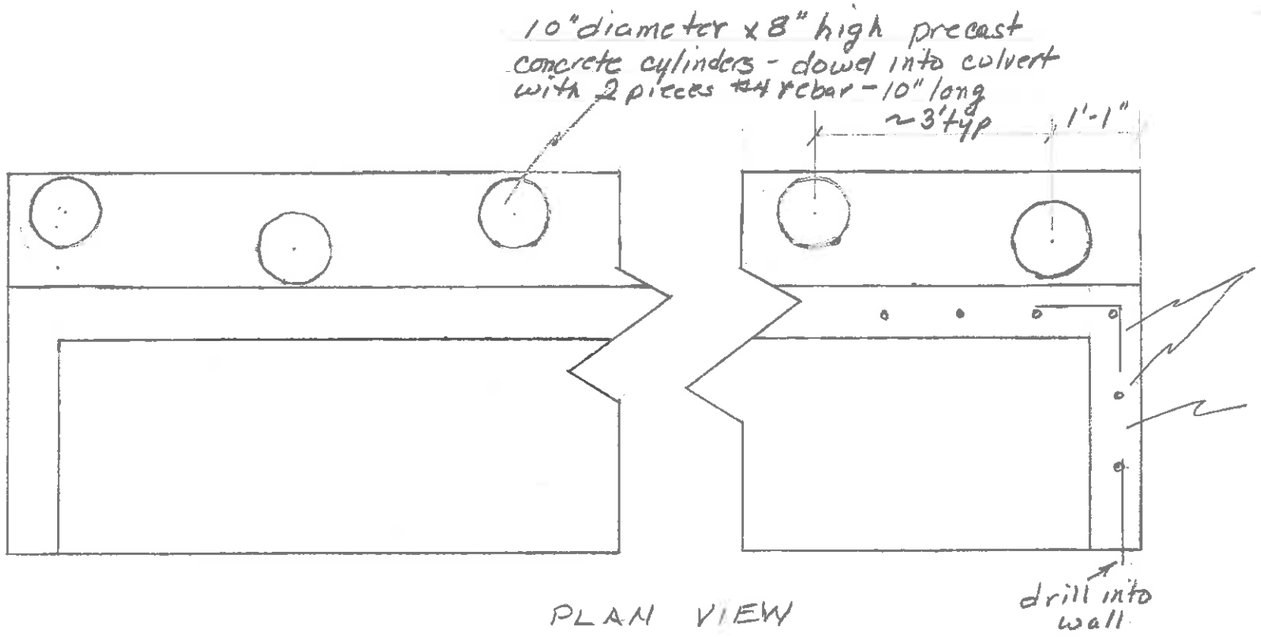
Drawings are not for construction at this time. Construction work shall be done under the supervision of a fluvial geomorphologist or qualified licensed professional engineer.

Prepared by Fergus P. Lea, P.E.
#3825

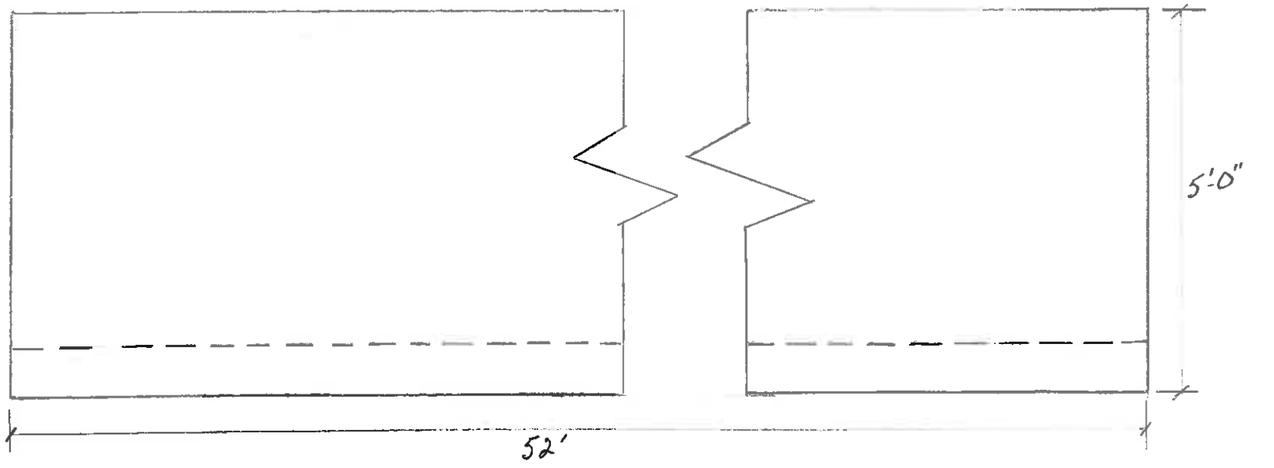


CAT ALLEY BIZOOK CULVERT MODIFICATION

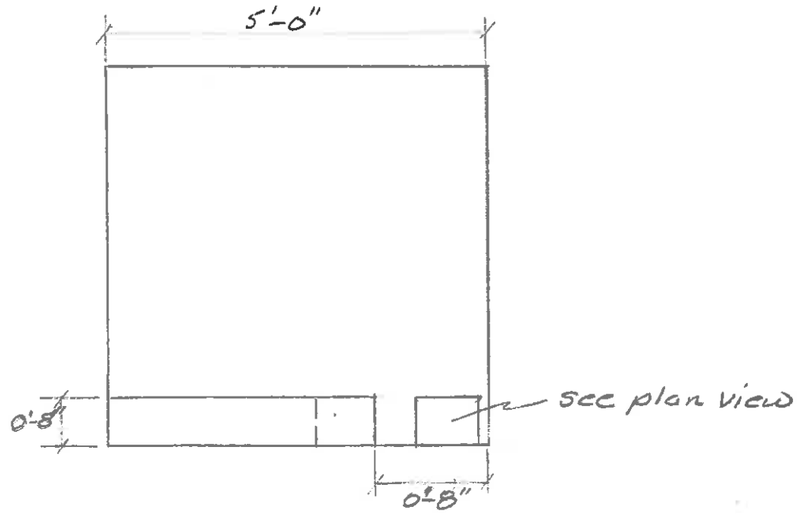
drawn by: Fergus P. Lee, Jr. P.E.
date: 11/8/2012
drawing no. 1 of 2
scale: 1/2" = 1'



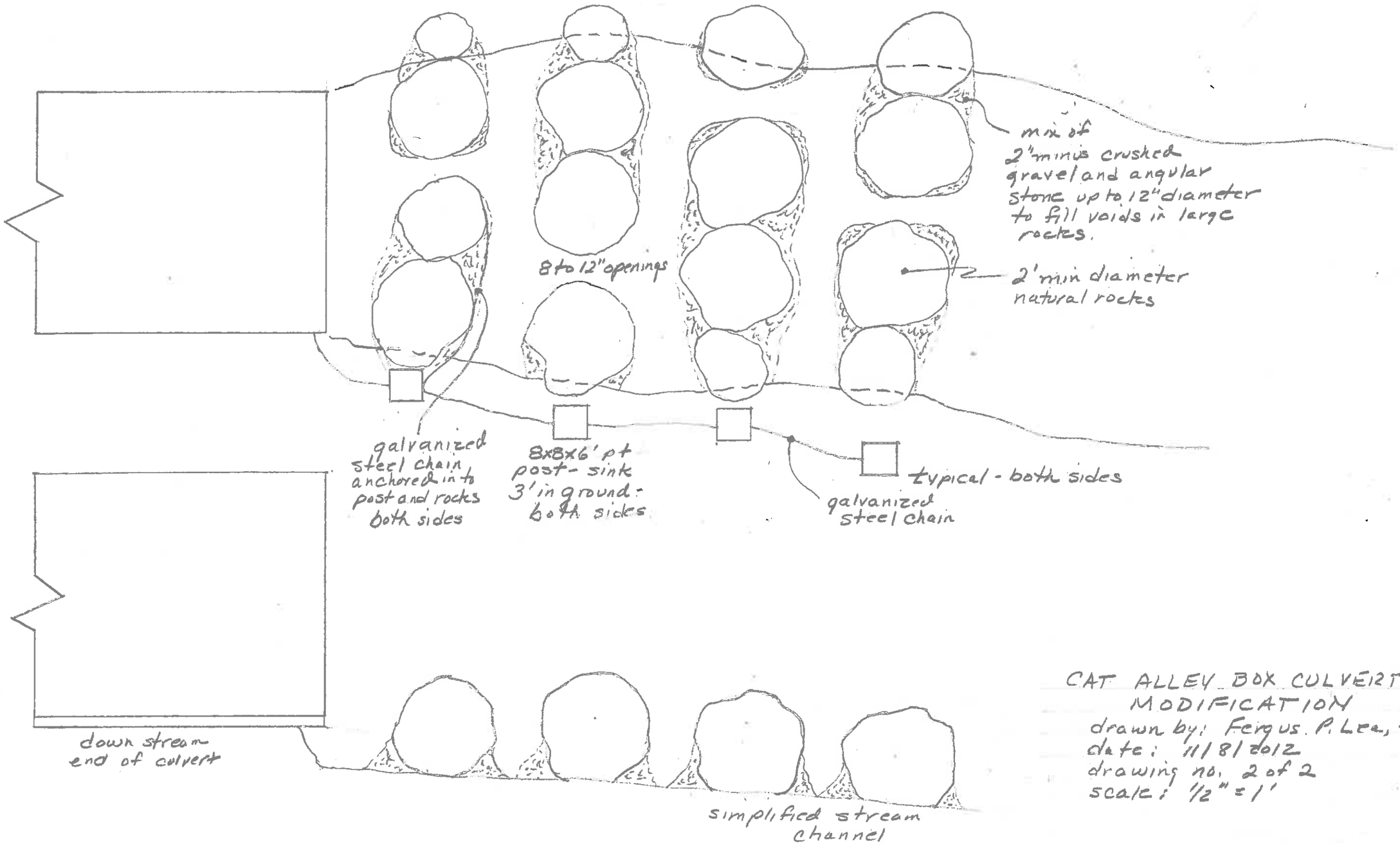
PLAN VIEW



ELEVATION VIEW

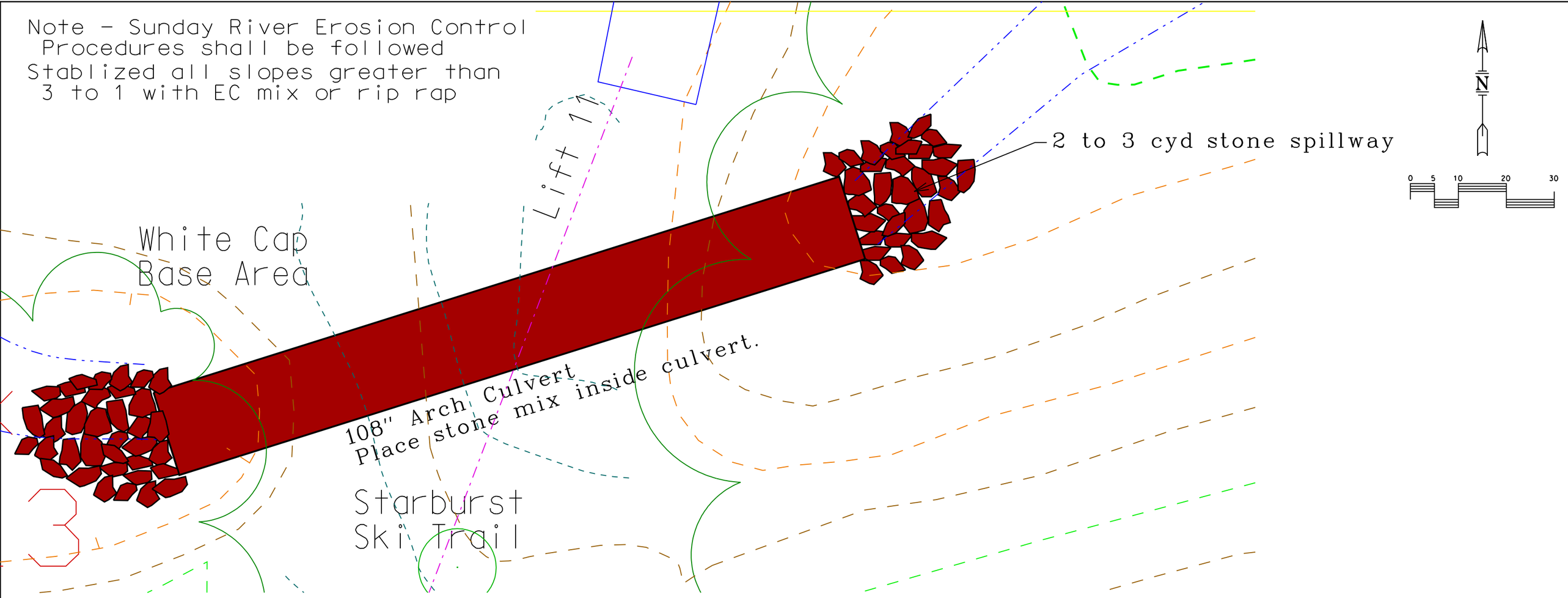


END VIEW



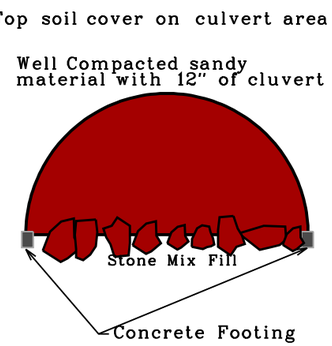
CAT ALLEY BOX CULVERT MODIFICATION
drawn by: Fergus P. Lee, Jr. PE
date: 11/8/2012
drawing no. 2 of 2
scale: 1/2" = 1'

Note - Sunday River Erosion Control
Procedures shall be followed
Stablized all slopes greater than
3 to 1 with EC mix or rip rap



Culvert Stone Mix

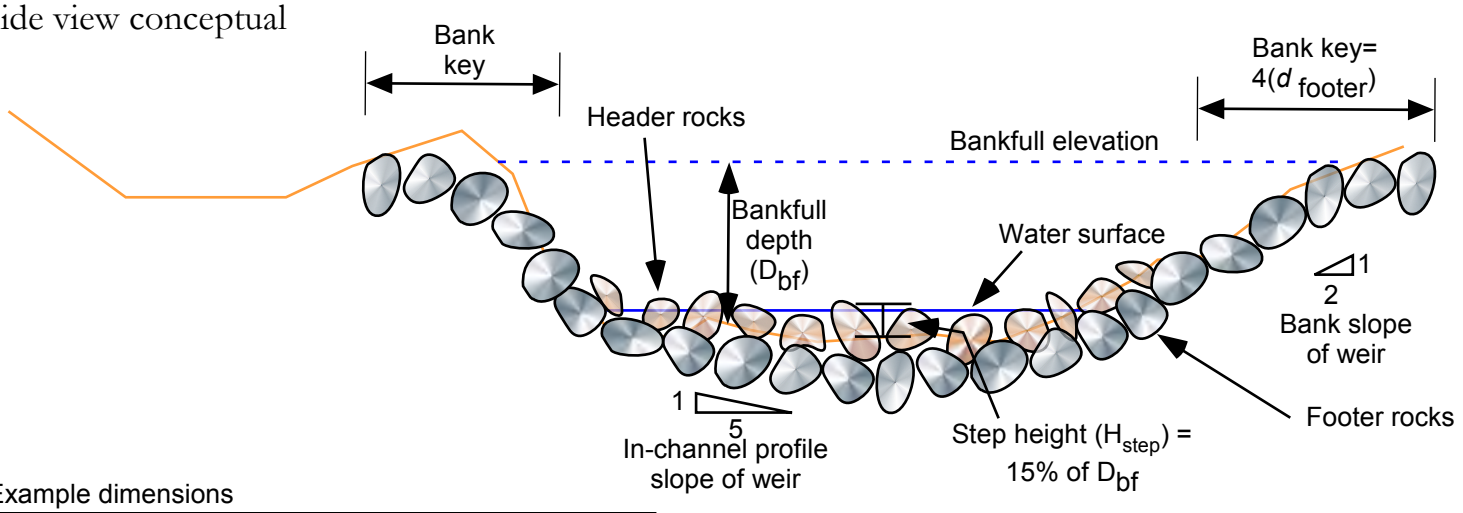
Stone Size	Quanity by Volume
1 cyd	50%
12"	25%
6"	15%
〉6"	10 %



Culvert Xsection

SUNDAY RIVER SKIWAY CORP	
Lift 11 Culverts	
Temporary Stabilization	
COMPILED BY: Eng.Dept	DATE: November 11, 2010
SCALE: 1" = 20'	DRAWING NO.
	REV NO.

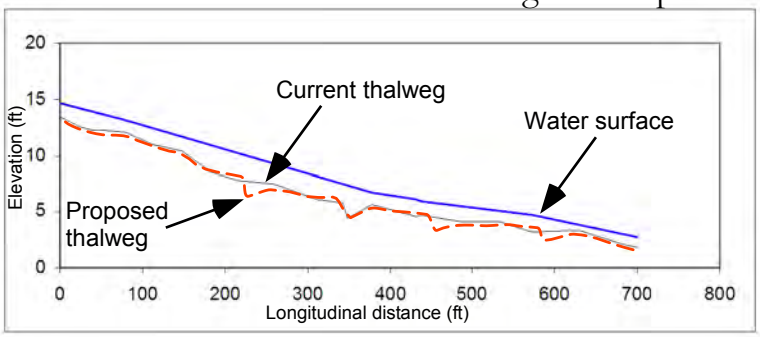
Side view conceptual



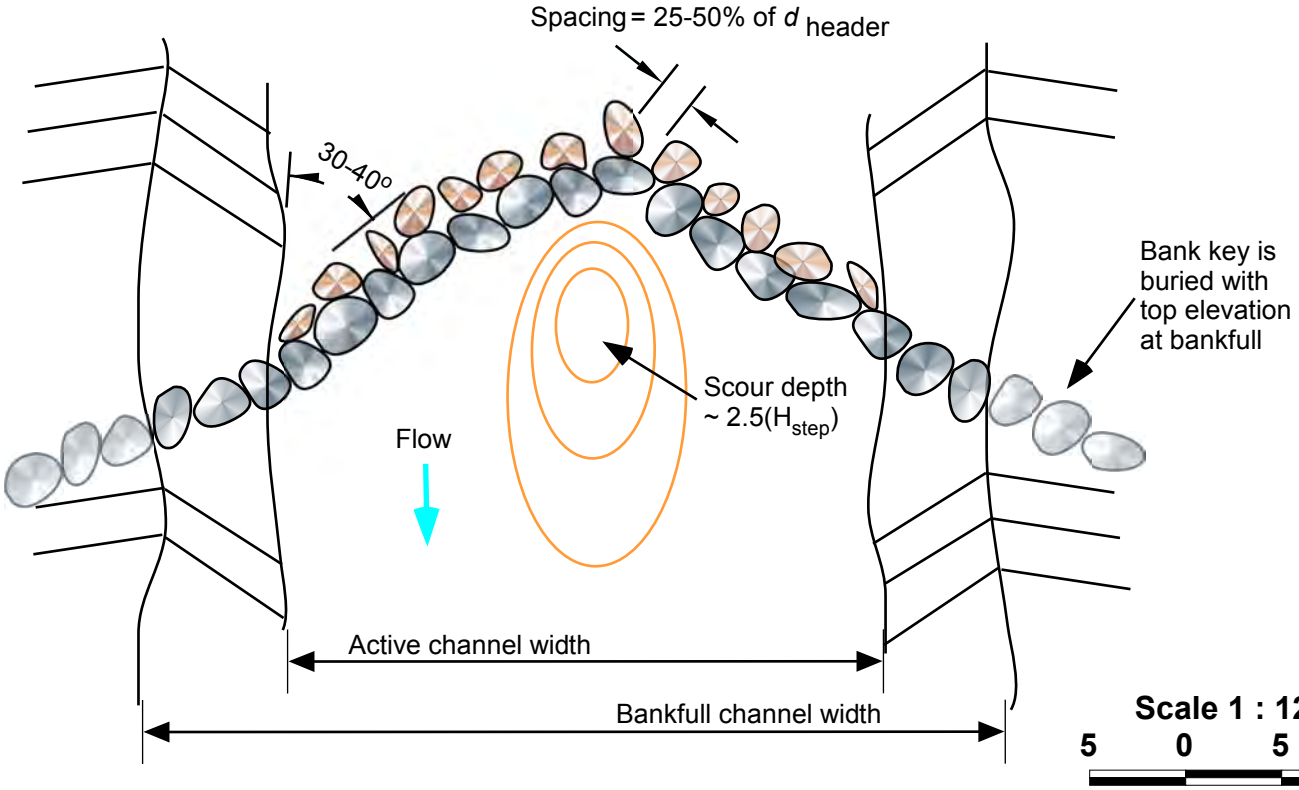
Example dimensions

Channel width (ft)	D_{bf} (ft)	d_{footer} (ft)	Step height (ft)	Bank key (ft)	Scour depth (ft)	Excavation per weir (cyds)
40	2	3	0.3	12	0.8	50
40	3	3.5	0.5	14	1.1	70
50	3	3.5	0.5	14	1.1	85
50	4	4	0.6	16	1.5	115
60	4	4	0.6	16	1.5	134
60	5	4.5	0.8	18	1.9	174

Longitudinal profile



Plan view conceptual



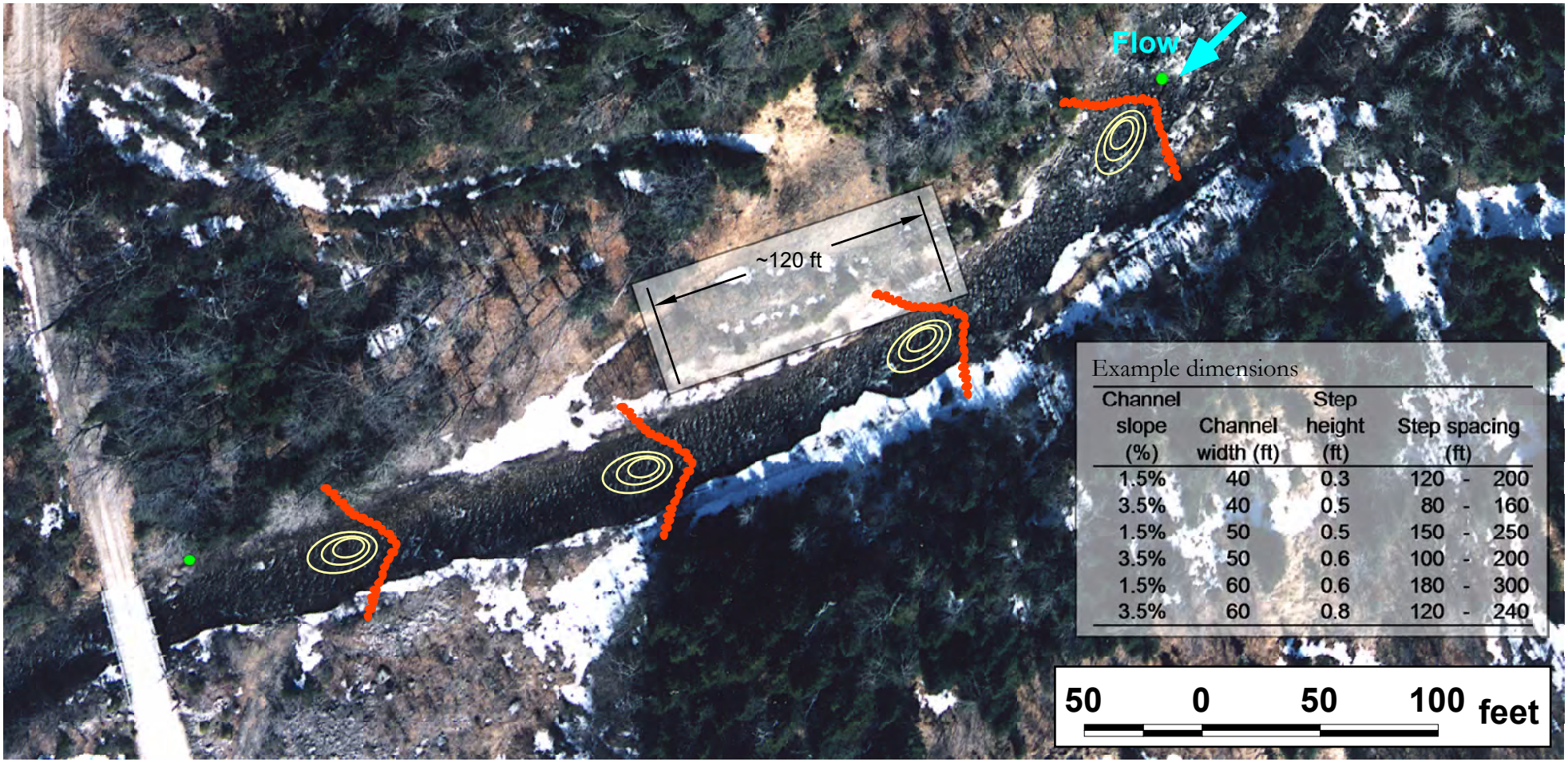
Scale 1 : 120

5 0 5 10 feet

Treatment: Porous rock weirs

Field Geology Services
Fluvial Geomorphology

Nash Stream Restoration



Treatment: Porous rock weirs

Porous rock weirs are low-profile, channel-spanning rock structures in a 'V' or 'U' shape oriented upstream. Porous rock weirs have openings for fish passage and to allow for natural deformation. Porous rock weirs redirect flow to the center of the channel, create scour pools, and may produce some backwater upstream of the structure. In Nash Stream, porous rock weirs shall be used for confined reaches that are not expected to have significant lateral channel change. The design for porous rock weirs incorporates traditional design specifications for rock weirs (Natural Resources Conservation Service, 2000) and information on the natural form of step-pool channels (Knighton, 1998).

Example photo

Rock Weir Nash Stream

Rock Weir Sunday River

From: Boucher, Dave (Dave.Boucher@maine.gov)
Sent: Mon 10/31/11 10:10 AM
To: Jeff Stern (sternjm@hotmail.com); Wiley, Joe (Joe.Wiley@maine.gov); alexoabbott@hotmail.com; Smith, Peter D. (Peter.D.Smith@maine.gov); Haslam, Bill (Bill.Haslam@maine.gov); Ferg Lea (flea@avcog.org)
Cc: Seiders, Dwayne J (Dwayne.J.Seiders@maine.gov); Langevin, Todd (Todd.D.Langevin@maine.gov); Taylor, Ron (Ron.Taylor@maine.gov)

Jeff:

I agree we should examine the sediment load issue, but I can't imagine this would be a show-stopper. Regarding funding, I'll inquire with our Engineering staff about their availability. With a long enough lead time they may be able to schedule this. My staff could assist for a day or two, and we could probably rustle up a few volunteers. Permitting should be straightforward because the project would likely qualify as a "Fishery Management" activity under the LURC rules. That simply requires a short letter from me that describes project need/benefits to fisheries resources, etc. We've done several of these…

Dave

From: Jeff Stern [mailto:sternjm@hotmail.com]
Sent: Thursday, October 27, 2011 3:59 PM
To: Wiley, Joe; alexoabbott@hotmail.com; Boucher, Dave; Smith, Peter D.; Haslam, Bill; Ferg Lea
Cc: Seiders, Dwayne J; Bourque, Peter
Subject: RE: Weirs

Hi all,

There seems to be consensus emerging to remove the dam by hand and not build in-stream structures. There is a huge amount of sediment (gravel, cobbles, boulders, etc.) piled up behind the dam. With removal of the dam, I wonder if there will be deleterious effects from sediment washing downstream. I wouldn't expect impacts to occur more than a mile downstream, but who knows. I think it'd be prudent to go out there before removal to figure out where sediment would most likely settle and assess whether roads or trails may be affected.

Not trying to make work for myself or others...but I do know that rivers sometimes respond in unexpected ways...

I also have other questions. Who will pay for this? Can the State do so, since it's on the Mahoosuc Unit? What about permitting? I've written permits for river projects in organized towns, but not in unorganized territories, so I'm not sure what's involved here.

- Jeff

Subject: RE: Weirs

Date: Mon, 24 Oct 2011 09:02:51 -0400
From: Joe.Wiley@maine.gov
To: alexoabbott@hotmail.com; Dave.Boucher@maine.gov; sternjm@hotmail.com; Peter.D.Smith@maine.gov; Bill.Haslam@maine.gov; flea@avcog.org
CC: Dwayne.J.Seiders@maine.gov; Peter.Bourque@maine.gov

I agree with Dave Boucher that removal of the existing structure remnants by hand is a better option.

Joe Wiley
Certified Wildlife Biologist
Joseph E. Wiley III
Maine Dept. Inland Fisheries and Wildlife
Office- Bureau of Parks and Lands
22 SHS (Harlow Building)
Augusta, ME 04333-0022
P 207 287-4921
Fax 207 287- 6170
E joe.wiley@maine.gov
Cell- no way!

From: Alex Abbott [mailto:alexoabbott@hotmail.com]
Sent: Thursday, October 13, 2011 3:45 PM
To: Boucher, Dave; Jeff Stern; Smith, Peter D.; Wiley, Joe; Haslam, Bill; flea@avcog.org
Cc: Seiders, Dwayne J; Bourque, Peter
Subject: RE: Weirs

All,
Upon review of the photos Jeff sent, I agree with Dave that we should be able to use a grip hoist and cable with a few judicious saw cuts, preferrably at low water, to remove that dam with no need for additional structures or heavy equipment (unless you count humping in the 30-pound grip hoist, 20-pound block, 40-pound cable and assorted hand tools!).

Alex
****

Alex Abbott
c/o Gulf of Maine Coastal Program,
U.S. Fish and Wildlife Service
4R Fundy Road
Falmouth, ME 04105
Telephone: 207-781-8364 Ext. 21
Facsimile: 207-781-8369
Email: alexoabbott@hotmail.com

Subject: RE: Weirs
Date: Thu, 13 Oct 2011 15:06:12 -0400
From: Dave.Boucher@maine.gov
To: sternjm@hotmail.com; Peter.D.Smith@maine.gov; Joe.Wiley@maine.gov; Bill.Haslam@maine.gov; alexoabbott@hotmail.com; flea@avcog.org
CC: Dwayne.J.Seiders@maine.gov; Peter.Bourque@maine.gov

Hi Jeff:
I advocate for removal of the dam remnants, rather than installing instream structures of any kind. With some careful planning, you could probably remove it entirely with hand tools during a low flow period. You wouldn't even need to construct or reconstruct a road to the site – perhaps just grub out a trail wide enough for an ATV? Any existing or anticipated funding for this site should be reallocated to the other migration impediments identified in your watershed surveys.

Jason and I would be happy to look at the site later this fall or next summer.

Dave

From: Jeff Stern [mailto:sternjm@hotmail.com]
Sent: Thursday, October 13, 2011 1:11 PM
To: Smith, Peter D.; Wiley, Joe; Haslam, Bill; Boucher, Dave; alexoabbott@hotmail.com; Ferg Lea
Subject: FW: Weirs

Hi all,
Here's an update on the log driving dam on the main stem of the Sunday River in Riley Township. By way of a quick refresher, the Androscoggin River Watershed Council (ARWC) this summer conducted an inventory of barriers to fish passage (blocked and damaged culverts, dams, bridges, etc.) in the Sunday River and Bear River tributaries. I coordinated the inventory and it appears to me this old log driving dam is the highest priority barrier that we found. (IF&W made note of this dam in its 1998 survey and judged it to be a seasonal barrier to fish movement.) At the time we measured it in mid-July, it created about a 37" drop. It is located on the Mahoosuc Unit.

About two months ago, I sent Bill a copy of a 2003 design that was done to address this site. This design - which was produced by fluvial geomorphologist John Parrish of Canada - called for the installation of a tiered, rocky ramp structure to step the river down from the dam to its downriver level. However, I have since been told this type of ramp is a maintenance problem and is of questionable effectiveness in enhancing fish passage.

So...I went back to the drawing board. A few weeks ago, I took Jay Milot, owner of Caribou Springs Watershed Solutions, and fluvial geomorphologist John Field of Field Geology Services to look at the site and see if they could come up with alternative ideas. I've worked with both Jay Milot and John Field on numerous river restoration/habitat enhancement/bank stabilization projects in recent years. They both do excellent work and every project I've done with them has performed well, had the desired outcomes, and held up to storm events like Tropical Storm Irene.

When we were at the site, Jay and John discussed installing a series of "porous rock weirs" to step the river down from the top of the dam. John subsequently sent me design specs and photos on similar weir designs he did on Nash Stream in New Hampshire. Please notice that the way the weirs are designed, they create a series of deep scour pools on their downstream sides. Jay and John also talked about the possibility of removing all or part of the dam structure in conjunction with installing the weirs.

There had to have been a road to this dam at one time, but I haven't been able to find any trace of one. Access to the site could be a major problem (although its not very far off the Sunday River Road, about a mile after you cross Twin Bridges). Then, of course, there's the issue of how to pay for it. I realize we are in a grim economic period right now, but I wonder if BP&L, IF&W, DOC, USFWS or anyone else has money for this sort of thing. Is this project something your agencies would be interested in pursuing? ARWC can provide assistance in permitting, applying for grants and project coordination.

I'd be interested to hear your thoughts about this, as well as any ideas you may have about proceeding forward from this point.

- Jeff

> Date: Sun, 25 Sep 2011 21:31:28 -0400
> Subject: Weirs
> From: jfield@field-geology.com
> To: sternjm@hotmail.com
>
> Attached are photos and specs for V-shaped rock weirs. The photo from Nash
> Stream shows how I like to use wood to provide extra support for the
> boulders.
>
> Thanks,
>
> John
>
> --
> John Field, PhD
> Field Geology Services
> P.O. Box 985
> Farmington, ME 04938
> 207-491-9541
> jfield@field-geology.com
> www.field-geology.com

Publicity

1) January 4, 2012: Article in ARWC e-newsletter that has a mailing list of several hundred;
2) January 30, 2012: Article in the Lewiston Sun Journal;
3) November 14, 2012: Presentation at the annual "Watershed Roundtable" in Augusta, ME, sponsored by the Maine Department of Environmental Protection. About 25 people in attendance.

(Copies of the first 2 items are attached to this report)

Androscoggin River Watershed Council

Mission: To continuously improve environmental quality and promote healthy and prosperous communities in the Androscoggin River Watershed.

Join Our Mailing List

Forward to a Friend

Dear Jeff Stern,

Happy New Year! 2011 was a great year for us and we hope you can say the same. Read up on all progress we've made on improving and promoting the Androscoggin watershed, and some very exciting news for what 2012 has in store for us!

In 2011, the Androscoggin River Watershed Council...

1.) Completely re-launched www.androscoggin-riverwatershed.org, giving us a fresh new look, making it easier to register for the Source to the Sea Trek, post photos, keep you up-to-date on our habitat restoration projects, connect to our Facebook page, learn about the Androscoggin River Trail, make a secure donation, and much more!

2.) Brought hundreds of paddlers old and new to the Androscoggin on the 20th Annual Source to the Sea Trek...look for 2012 Trek news soon!

3.) Accomplished several milestones in our brook trout habitat restoration work in the Mahoosucs...read below for more info.

4.) Revived our water quality monitoring program in NH...check below for more information on results and volunteering in 2012.

5.) Contributed to a report that landed the Androscoggin corridor on a list of priorities for funding at the Federal level...catch up on this breaking news in this Lewiston Sun Journal article and stay tuned for what should be a very exciting year!

Donate now to keep our work going in 2012!

Make A Donation

Inventory Nears Completion, Stage Set to Remove Barriers to Brook Trout Movement

In 2011, ARWC and the U.S. Fish & Wildlife Service teamed up to survey culverts, bridges, dams and fords at perennial stream crossings in the Sunday River and Bear River Watersheds. The inventory is funded by a grant from the Eastern Brook Trout Joint Venture, a public-private partnership that seeks to restore and protect brook trout habitat from Georgia to Maine.

Maine boasts the most intact native brook trout habitat of any eastern state. The Mahoosuc Mountain Range which spawns the Sunday and Bear Rivers - both major tributaries of the Androscoggin River - hosts a number of high quality trout streams, including the main stems of each river. But even here, brook trout habitat has been fragmented from land use practices like road building, timber harvesting and development.

This project is part of a larger statewide effort to inventory barriers to diadromous fish such as Atlantic salmon and alewives, and native freshwater fish such as brook trout. On May 7, 2011, 13 people met in Bethel for a training session. Intrepid volunteers then spent the summer and fall collecting data. Survey crews recorded the dimensions of crossing structures, and made assessments of factors such as water depth, velocity and substrate compared with those in the natural stream channel. They documented specific problems that limit fish movement, such as culverts that are perched above the stream, that may be blocked by sediment and debris, or rusted out.

Data has been collected at nearly 140 perennial stream crossings and is currently being entered in a spreadsheet. Information will help ARWC, towns, state agencies, and landowners prioritize sites for remediation.

Already, ARWC is working with state agencies to remove the remains of an old log driving dam on the main stem of the Sunday River in Riley Township that creates a significant barrier to fish passage. This work is expected to be completed in the summer or fall of 2012. ARWC will seek additional funding to fix other problem sites, as well.

ARWC Revives Water Quality Monitoring Program

After several years of inactivity, ARWC's water quality monitoring program partnered with the New Hampshire Volunteer River Monitoring Project (VRAP) to gather data in 2011.

From June through October, the Council tested water quality at five locations in northern New Hampshire: Below Pontook Reservoir in Dummer; Chandler Brook Farm, Milan; Railroad Trestle Bridge, Gorham; Reflection Pond, Shelburne; and Meadow Road Bridge, Shelburne. Volunteers and ARWC staff visited sites twice a month to test dissolved oxygen, turbidity, pH, specific conductance, and water temperature.

Testing in 2011 found the river to be in good shape, with pH, dissolved oxygen and turbidity generally landing within a healthy range. Significant storm events in late summer and fall, beginning with Tropical Storm Irene, tended to elevate turbidity and depress dissolved oxygen toward the end of the sampling season.

ARWC's water quality monitoring program got its start in the mid-2000s; sites were sampled on both sides of the Maine-New Hampshire border. But by the summers of 2009 and 2010, the program ran out of steam and no sampling was conducted. In 2011, ARWC focused on the New Hampshire side because, through VRAP, the state uses volunteer-generated water quality data to assess the health of rivers. The State of Maine, on the other hand, is reluctant to utilize volunteer-derived data.

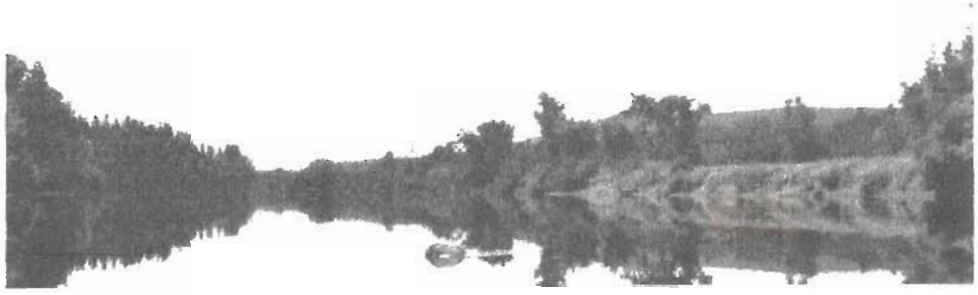
Nevertheless, ARWC, in 2012, hopes to reinstate sampling points from Bethel to Rumford, Maine, as well as expand its volunteer pool in northern New Hampshire. We want to establish a consistent, comprehensive water quality monitoring network on the river, and its major tributaries, in both states that will establish a baseline of existing conditions, from which we eventually will be able to identify trends.

For example, let's say dissolved oxygen (DO) suddenly drops at a test site where baseline data showed consistently high readings. Healthy DO is necessary for trout to survive, and low DO often indicates pollution. In such a case, ARWC could work with the appropriate landowner(s) to identify the problem and, hopefully, remediate it.

Water testing volunteers wanted!

ARWC is looking for volunteers to help broaden the scope our water quality monitoring program. Sampling is easy and doesn't take a lot of time, a few hours twice a month from June to October is usually all that's required. We'll teach you how to use the testing meters and fill out the datasheets. This is a great way to experience the beauty of the Androscoggin River and contribute to its stewardship! To learn more, call Jeff Stern at 207-583-2723 or email him at [redacted]. When emailing, please write "ARWC water quality" on the subject line.

Androscoggin River Watershed Council
[redacted]



MONDAY, JANUARY 30, 2012
Lewiston Sun Journal

SUBMITTED PHOTOS

Officials from Maine agencies plan to remove this old log-driving dam remnant from the Sunday River in Riley Township this summer after it was identified last year as a significant barrier to brook trout movement.

Looking out for trout

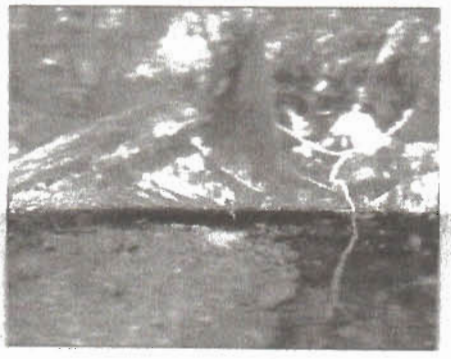
Barriers in Bear River and Sunday River watersheds are being evaluated.

BY TERRY KARKOS
Staff Writer

NEWRY — Work is under way to rehabilitate barriers to brook trout passage at high-priority sites in the Bear and Sunday river watersheds in Newry and Riley Township.

The Sunday River and Bear River watersheds support important populations of wild brook trout.

Last summer, the Androscoggin River Watershed Council surveyed all of the culverts, bridges, dams and forts at perennial stream crossings in both wa-



During an Androscoggin River Watershed Council inventory of barriers to brook trout passage conducted in July 2011, a volunteer surveyor documents a severely damaged and washed-out culvert that blocks brook trout movement in Simons Brook, a tributary of the Sunday River.

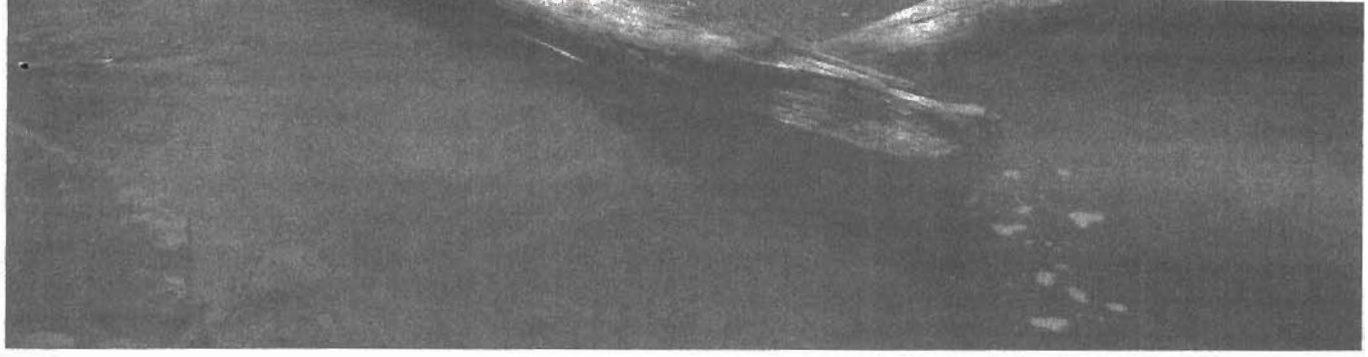
other salmonids, but I don't know how high is too high for brook trout to jump," Stern said.

He said that about 48 percent of the culverts were perched, 30 percent were partially or fully blocked, and 16 percent were deformed (crushed or otherwise mangled). Only 6 percent of the culverts were in good shape, in that they weren't perched, deformed or blocked.

At one priority site for restoration on Barker Brook, Stern and Joe Aloisio of Sunday River Ski Resort are designing a fish passage improvement project.

"There are two large culverts here that are 'perched' way above the stream behind White Cap Base by a chair lift," Stern said. "I believe the ski run is called Tempest Trail."

He's also got Ferg Lea at the Androscoggin Valley Council of Governments



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The Sunday River and Bear River watersheds support important populations of wild brook trout.

Last summer, the Androscoggin River Watershed Council surveyed all of the culverts, bridges, dams and fords at perennial stream crossings in both watersheds from headwater brooks downstream to their confluence with the Androscoggin River.

In all, 140 sites were inventoried across a 94-square-mile area, ARWC Project Manager Jeff Stern said Friday by email.

"Damaged road crossing structures can restrict fish migration and negatively affect stream health," he said.

In the Sunday River Watershed, the remnants of old log-driving dams were found to restrict brook trout passage in several places.

One such site on the Sunday River's main stem on state land in the Mahoosuc Unit in Riley Township presents a significant barrier to fish movement, Stern said.

He contacted officials with the Maine Department of Inland Fisheries and Wildlife, the Maine Bureau of Parks and Lands, and the U.S. Fish and Wildlife Service about it. All agreed the dam must be removed, he said.

Stern said he also had John Field and Jay Milot, his partners on recent river restoration work, take a look. Field created a plan to do partial removal and step down the river from the top height of the dam to downstream river level using a series of in-stream rock weirs.

During an Androscoggin River Watershed Council inventory of barriers to brook trout passage conducted in July 2011, a volunteer surveyor documents a severely damaged and washed-out culvert that blocks brook trout movement in Simons Brook, a tributary of the Sunday River.

However, the state agencies want to avoid structures and plan to remove the dam this summer using hand tools, he said.

In upper areas of the watersheds — especially in the upper Sunday River — volunteer ARWC surveyors found numerous crossing sites where either a bridge or culvert had been removed from old logging roads and skidder trails.

"Many of these sites are now used as fords by off-roaders and have serious erosion," Stern said.

Additionally, Tropical Storm Irene destroyed at least one bridge in Riley Township of which he's aware.

A common problem with culverts was that the outlet was perched, meaning there's a drop down to the water level from the culvert end.

"This could affect brook trout, because they are not great leapers like other salmonids, but I don't know how high is too high for brook trout to jump," Stern said.

He said that about 48 percent of the culverts were perched, 30 percent were partially or fully blocked, and 16 percent were deformed (crushed or otherwise mangled). Only 6 percent of the culverts were in good shape, in that they weren't perched, deformed or blocked.

At one priority site for restoration on Barker Brook, Stern and Joe Aloisio of Sunday River Ski Resort are designing a fish passage improvement project.

"There are two large culverts here that are 'perched' way above the stream behind White Cap Base by a chair lift," Stern said. "I believe the ski run is called Tempest Trail."

He's also got Ferg Lea at the Androscoggin Valley Council of Governments in Auburn working on an engineering design to improve fish passage at an unnamed tributary of the Bear River that he refers to as "Cat Alley Brook."

"It looks like a nice little trout stream, but the combination of the cement box culvert under Route 26 and a blown-out culvert just upstream have damaged the brook, and I don't think it is passable for trout," Stern said.

"This summer, I plan to apply for another grant from the Eastern Brook Trout Joint Venture to get money to fix these priority sites."

Last summer's work was funded by the EBTJV, a public/private effort to protect and restore brookie habitat from Georgia to Maine.

It is part of a larger statewide effort to inventory barriers to diadromous fish, such as Atlantic salmon and alewives, and native freshwater fish like brook trout.

The ARWC is working with additional landowners, land managers and businesses to improve fish passage at other priority sites documented in the inventory, as well.

tkarkos@sunjournal.com

FEDERAL FINANCIAL REPORT

(Follow form instructions)

1. Federal Agency and Organizational Element to Which Report is Submitted	2. Federal Grant or Other Identifying Number Assigned by Federal Agency (To report multiple grants, use FFR Attachment)	Page of pages
U.S. Fish & Wildlife Service	F10AP00263 (formerly 53371-A-G002)	1 1

3. Recipient Organization (Name and complete address including Zip code)

Androscoggin River Watershed Council, c/o AVCOG, 125 Manley Road, Auburn, ME 04210

4a. DUNS Number	4b. EIN	5. Recipient Account Number or Identifying Number (To report multiple grants, use FFR Attachment)	6. Report Type	7. Basis of Accounting
789792947	20-4449646	N/A	☐ Quarterly ☐ Semi-Annual ☐ Annual ☑ Final	☐ Cash ☑ Accrual

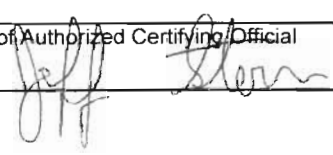
8. Project/Grant Period (Month, Day, Year)		9. Reporting Period End Date (Month, Day, Year)
From: 6/30/11	To: 12/31/12	12/31/12

10. **Transactions**	Cumulative
(Use lines a-c for single or multiple grant reporting)	
Federal Cash (To report multiple grants, also use FFR Attachment):	
a. Cash Receipts	22,500
b. Cash Disbursements	22,500
c. Cash on Hand (line a minus b)	0
(Use lines d-o for single grant reporting)	
Federal Expenditures and Unobligated Balance:	
d. Total Federal funds authorized	27,200
e. Federal share of expenditures	22,500
f. Federal share of unliquidated obligations	4,700
g. Total Federal share (sum of lines e and f)	27,200
h. Unobligated balance of Federal funds (line d minus g)	0
Recipient Share:	
i. Total recipient share required	144,770
j. Recipient share of expenditures	144,770
k. Remaining recipient share to be provided (line i minus j)	0
Program Income:	
l. Total Federal program income earned	
m. Program income expended in accordance with the deduction alternative	
n. Program income expended in accordance with the addition alternative	
o. Unexpended program income (line l minus line m or line n)	

11. Indirect Expense	a. Type	b. Rate	c. Period From	Period To	d. Base	e. Amount Charged	f. Federal Share
				g. Totals:	0	0	0

12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation:

13. Certification: By signing this report, I certify to the best of my knowledge and belief that the report is true, complete, and accurate, and the expenditures, disbursements and cash receipts are for the purposes and intent set forth in the award documents. I am aware that any false, fictitious, or fraudulent information may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)

a. Typed or Printed Name and Title of Authorized Certifying Official	c. Telephone (Area code, number, and extension)
Jeff Stern, Project Director	207-627-3126
	d. Email Address
	sternjm@hotmail.com
b. Signature of Authorized Certifying Official	e. Date Report Submitted (Month, Day, Year)
	12/31/12
	14. Agency use only:

Standard Form 425 - Revised 6/28/2010
OMB Approval Number: 0348-0061
Expiration Date: 10/31/2011