AUTOMATIC HYDROELECTRIC PLANT
c/o Kennebec Water District
PO BOX 356
Waterville, ME 04903-0356

TELEPHONE: +207-872-2763
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E-MAIL: jlacasse@prexar.com

January 26, 2012

Ms. Gail Wippelhauser
Marine Resource Scientist
Maine Department of Marine Resources
#172 State House Station
Augusta, Maine 04333

Re: Kennebec Water District's Upstream and Downstream Eel Passage Proposal as required by the Low Impact Hydropower Institute certification of the Automatic Hydroelectric Project issued May 26, 2011.

Dear Ms. Wippelhauser,

As a condition of its certification by the Low Impact Hydropower Institute, the Kennebec Water District is required to reach an agreement with the Maine Department of Marine Resources and the US Fish and Wildlife Service regarding the final design, construction, operations, and maintenance of safe, timely, and effective upstream and downstream passage for American eel at the Automatic facility along with a similar agreement executed between the owners of (a) the Union Gas facility and (b) the Messalonskee Lake outlet dam (owned by Messalonskee Stream Hydro, LLC, and the agencies for upstream and downstream passage for American eel at these two facilities as well. The Kennebec Water District and Messalonskee Stream Hydro have retained the services of Mr. Skip Zink to design and install the required facilities. As such, please find Mr. Zink's proposal for the Automatic Station below for your approval. Messalonskee Stream Hydro, LLC will be submitting a separate proposal for your review and comment in the near future.

Upstream;

As soon as water levels are at a safe level for personnel to work below the dam, night time observations will be made for a minimum of 5 nights. All observations; Weather, water levels, number of eels, location, temp and time will be recorded.

A temporary ramp will be constructed to pass both elver and yellow eels. The temporary ramp will be used to trap migrating eels to test possible permanent passage locations. Bulk weights will be taken daily, subsample counts and individual weights will be done at least once a week. The catch will be passed upstream of the hydro site.

A permanent passage design will be developed once an entrance site has been determined. This location will take into consideration where the largest amount of eels are attempting to pass, ease of access to monitor and maintain system, and location that allows passage over the widest range of environmental conditions. The proposed design will be sent to the agencies for approval as soon as possible.

Construction and installation will be done in house. Once installation is complete, efficiency testing will begin. A trap will be placed on the upstream exit to catch nightly totals of passing eels. These will be weighed, subsampled, and released the same as the temporary ramp catch is done. Passage success will be reviewed at the end of the first season with the agencies. Once approved a maintenance and operation schedule will be developed.

Downstream;

Messalonskee Stream Hydro, LLC and DMR developed a downstream program in 2010 in response to the lack of silver eels observed attempting to migrate. This involved night time observations made at the Messalonskee Lake fish rack by DMR and any silver eel activity seen by maintenance personnel. To date no silver eels have been seen. The next step is to install a trap at the fish rack to capture any eels for counts, weights, and lengths. These fish will be trucked to the Waterville boat ramp and released. The trap will be a small opening in the fish rack on the river left side approximately 1 ft. by 3 ft. throated down to 4in. by 4in. passage into a 3ft. by 3ft. by 11/2ft. holding pen. This will be checked daily.

Thank you in advance for taking the time to review this proposal and please do not hesistate to contact me should you need any additional information in order to give your approval.

Kennebec Water District
Automatic Project (M4)

By: Hydro Management Group LLC
as authorized agent
Stephen J. Hickey
Stephen J. Hickey

cc: Mr. Steven Sheprard, USFWS

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c/o Kennebec Water District
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January 26, 2012

Mr. Steven Shepard, C.F.P.
Maine Hydro Licensing Coordinator
U.S. Fish & Wildlife Service
17 Godfrey Drive, Suite 2
Orono, Maine 04473

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As a condition of its certification by the Low Impact Hydropower Institute, the Kennebec Water District is required to reach an agreement with the Maine Department of Marine Resources and the US Fish and Wildlife Service regarding the final design, construction, operations, and maintenance of safe, timely, and effective upstream and downstream passage for American eel at the Automatic facility along with a similar agreement executed between the owners of (a) the Union Gas facility and (b) the Messalonskee Lake outlet dam (owned by Messalonskee Stream Hydro, LLC, and the agencies for upstream and downstream passage for American eel at these two facilities as well. The Kennebec Water District and Messalonskee Stream Hydro have retained the services of Mr. Skip Zink to design and install the required facilities. As such, please find Mr. Zink's proposal for the Automatic Station below for your approval. Messalonskee Stream Hydro, LLC will be submitting a separate proposal for your review and comment in the near future.

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Thank you in advance for taking the time to review this proposal and please do not hesistate to contact me should you need any additional information in order to give your approval.

Kennebec Water District
Automatic Project (M4)

By: Hydro Management Group LLC
as authorized agent
Stephen J. Hickey

cc: Ms. Gail Wippelhauser, MDMR

From: Wippelhauser, Gail
Sent: Monday, July 28, 2014 12:19 PM
To: 'george zink' ; Steven_Shepard@fws.gov
Cc: Steve Hickey ; Dave Sherman
Subject: RE: M-4 Automatic Efficiency test

DMR agrees that the interim eel passage at M-4 be considered permanent passage.

Gail Wippelhauser, Ph. D.
Marine Resources Scientist
Maine Department of Marine Resources
#172 State House Station
Augusta, ME 04333
Phone: 207-624-6349 Fax: 207-624-6501
email: gail.wippelhauser@maine.gov

From: Shepard, Steven
Sent: Tuesday, July 29, 2014 2:58 PM
To: george zink
Cc: Gail Wippelhauser ; Steve Hickey ; Dave Sherman
Subject: Re: M-4 Automatic Efficiency test

The Service agrees that the tests demonstrate efficient passage through the eel passage structures and we do not object to changing the designation of these facilities from interim to permanent.

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Steven Shepard, C.F.P.
U.S. Fish & Wildlife Service
17 Godfrey Drive, Suite 2
Orono, Maine 04473
Voice: 207-866-3344 x116
Cell: 207-949-1288
steven_shepard@fws.gov
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Correspondences:

From: george zink [mailto:georgezink14@live.com]
Sent: Thursday, July 24, 2014 3:11 PM
To: Steven_Shepard@fws.gov; Wippelhauser, Gail
Cc: Steve Hickey; Dave Sherman
Subject: M-4 Automatic Efficiency test

Hello all,

The efficiency test for M-4 Automatic Hydro Site was started on July 2, 2014 with 50 eels placed on the Plinko side of the interim eel passage and 100 eels on the Enkamat side. The Enkamat side failed immediately with eels escaping under the holding trap. The Plinko side was double checked and the test was continued on that side. Eels were set on the ramp at 19:15 and the holding pen was checked at 07:15 on July 3,2014. These eels were measured and weighed with the exception of one eel that escaped the net and ended up in the head pond. The delay in completing the test on the Enkamat side was due to high water and damage to the ramp entrance. This was repaired and the Enkamat test was started at 19:30 on July 23, 2014. The holding pen was checked at 07:15 on July 24,2014 and eels measured and weighed. The result was 97 out of 100 passed up the Enkamat side and 45 out of 50 on the Plinko side. The field data sheets are attached, please review and reply if this is acceptable.
With the completion of this test, and the 2014 seasonal data to be completed, we would request that the interim eel passage at M-4 be considered permanent passage. Please feel free to send any comments or questions.

Skip Zink

M4 Automatic nighttime observations Report

To MDMR, MIF&W, USFWS, and LIHI as requested;

The M4 Automatic Hydro Site is the second dam upstream on the Messalonskee Stream system. It is located in the city of Waterville, Maine.

M4 Automatic From Downstream

The stream, above the dam, has a canal shaped appearance with steep banks.

Upstream view M4 Automatic

A similar contour below the dam occurs on the river right bank. On the river left bank, the stream widens out and although the banking is steep, the river is shallow with a slower flow. Approximately 75ft. downstream there is an old foundation that helps slow the flows and forms a pool between it and the hydro dam. The bottom is mostly ledge with some granite blocks scattered through out.

View downstream River left showing

May 24,2012 A visual sweep of the river banks was started about 8:30pm to locate upstream migrating eels The river right side has a steep bank with the current from the tailrace and spillway moving rapidly downstream without any visible eddies or pools for elvers to use. No eels were observed from here downstream for 50 yds. The river left side, also steeply banked, did have several access points to the pool where it is shallow and the current is slow with back eddies close to the shore line. There is a path that leads to the top of the old foundation where a back current that runs along the river side of the old concrete as well as flow through the structure itself can be viewed. The pool in between the hydro site and old foundation is about half as wide as the river.

The dam is separated into two sections, with the intake, tailrace, and spillway on river right and a tainer gate on the river left side. An inspection of the river right side did not reveal any eels either climbing or approaching either side of this section. The fast flows and lack of calm areas to gain a purchase or to rest in would make upstream movement difficult if not impossible for most eels.

The river left side starts to widen into the pool described earlier where the left retaining wall concrete ends and an outcropping of ledge rises above the water level. This ledge is constantly wetted by the spray coming off the apron below the tainer gate and it is the divide between fast flow and the calmer pool. It also has a shallow slope with several pockets and pools that allows easy access to elvers and eels.

As sunset passed eels started gathering on this ledge. Approximately 100 to 150 eels in the 10 to 25cm. size filled in the pools and crannies. Access to this area to net a sample was not possible. The water level over the gate was about 10 in. and no further passage upstream was observed. Air temp was 15.4°C and water temp was 17.8°C The weather was clear.

Ledge Outcropping Below Tainer Gate

May 25,2012 Observations along the river right side were made again without any changes noted. It appears to be too inhospitable for eels passage.

The unit was shut down by the operator at 8:00pm and flows over the tainer gate went from 2in. of spill to 8in. by 9:00pm. Some eels were already gathered on the ledge as per the previous night and with less spill, eels could be seen approaching from the pool area along the left bank. Overspray from the spill kept the ledge wetted and eels filled the pools and crannies as before. The sizes were the same also, mostly 10 to 25cm. in length. As flow over the gate increased, up to 8 eels in the 10 to 15cm. range climbed up to the concrete and were washed off as they attempted to pass along the wall to the gate. The rest stayed in their staging area. Air temp was 14.3°C water temp was 17.6°C Weather is clear.

May 27,2012 Eels were viewed again on the ledge outcropping as in previous nights. With only 4in. of flow over the gate, more eels are moving up to the concrete attempting to climb over tainer gate. Eels were again in the 10 to 25cm. size. Eels were not seen

anywhere else on the dam. The river level has dropped 2ft. revealing a ridge of ledge that runs from the downstream side of the outcropping to upstream of old foundation. This keeps most of the current running directly downstream and helps keep the pool area more eel friendly. They can be seen approaching the outcropping from this pool. Air temp was 15.7°C, water temp 16.3°C. A light rain has started late.

May 28,2012 Eels were again on the outcropping but not as many as last night. Only 75 to 100 eels, but more eels moving up toward the tainer gate. Flows are only 3in. over the top. Air temp was 14.6°C, water temp was 18.2°C with clear skies

June 19,2012 After heavy rains and high flows, the river is back to normal and approximately 200 eels are back staging on the outcropping again. They are still in the 10 to 25cm. size range. In preparation of installing a portable eel ramp in this area a syphon hose was set up and attempts to lure eels over several feet to the left with an artificial flow has not been successful. For whatever reason, the eels remain attracted to the ledge outcropping. The air temp was 13.5°C and water temp was 18.8°C with clear skies.

The next step will be to get the portable unit in the water and attempt to pass these eels. A ladder needs to be installed and brackets affixed to the ledge and the ramp set to capture some samples.

If there are any questions, comments, or a site visit is wanted feel free to contact me.

Skip Zink

Phone 508-274-4943

E-mail; georgezink14@live.com

2015 Rice Rips Upstream Eel passage Report

Messalonskee Stream Hydro L.L.C.

Prepared by

George Zink

Table of Contents

Introduction

Rice Rips Head Works is 1.75 Miles downstream of the outlet of Snow Pond, on Messalonskee Stream. It is located in the town of Oakland Maine. It is owned and operated by the Messalonskee Stream Hydro LLC . (MSH); 55 Union St. 4th Floor, Boston, Massachusetts.

The head works controls the water level to the bypass reach and supplies water to the penstock that runs ¾ mile to the hydro station. After 2013 observations, a site was selected to install a temporary upstream eel passage along the penstock support wall below the minimum flow control gates. It is in a place where the wall widens out in the stream and out of direct flow from the gates. There are two concrete decks above, on river right, at the entrance of the penstocks. The lower deck provided enough area for a catch barrel system and space to work up and weigh samples. Construction began on June 2nd 2014 and the ramp system was operating on June 18th. This catch system ran successfully for the 2014 season and, after consulting with the agencies, it was decided to continue the construction up to the second deck. After testing, a permanent exit pipe into the headpond would be built.

Construction was completed on June 3rd 2015 and the first eels were trapped on June 11th. Efficiency testing began on July 27th and was completed August 6th. The exit into the headpond was installed on September 3rd.

Methods

Construction

The ramp extension followed the dimensions of the lower section. Components consisting of two twelve inch aluminum trays attached to a twelve foot long by two foot wide cable tray covered with Enkamat on one side and wooden pegs in a staggered Plinko pattern on the other side. Brackets were made to attach the ramp along the wall. Three sections were connected and set at a thirty-six degree angle up to the top rail on the lower deck.

The first new section is six feet long and set at a ten degree angle. A support bracket is anchored to the deck and attached to the upstream end.

The next ramp is twelve feet long and is set at thirty-four degrees. It attaches to the supported end and rests on the concrete of the upper deck.

A ninety degree section is then attached and leveled with a support bracket. The attraction water and trap plumbing was then attached. Two catch barrels were temporarily connected for the collection of samples.

After samples and testing were completed, an exit system consisting of four inch, schedule 40, PVC piping was connected to the terminal end of the ramp to allow eels to gain access to the headpond. This piping carries eels across the minimum flow gates, down the concrete support wall, and into the water at the top of dam. The submerged pipe is angled at forty-five degrees and is fourteen feet long.

Piping across minimum flow gate

Fourteen ft. submerged exit pipe

Operations

The full length passageway was operated in the same manner as in 2014. Flows were adjusted for each side with the Enkamat side having water enough to keep the entire width of the substrate wetted to cascade evenly down the entire length. The Plinko side was set so that a steady flow also spread across the width of the ramp but with enough volume to maintain a depth of 20 to 25 millimeters at the pegs. Excess water from the spray bar was used on the exit side to wash eels down the PVC pipe into the

catch barrels, and to wash eels into the headpond via the four inch pipe.

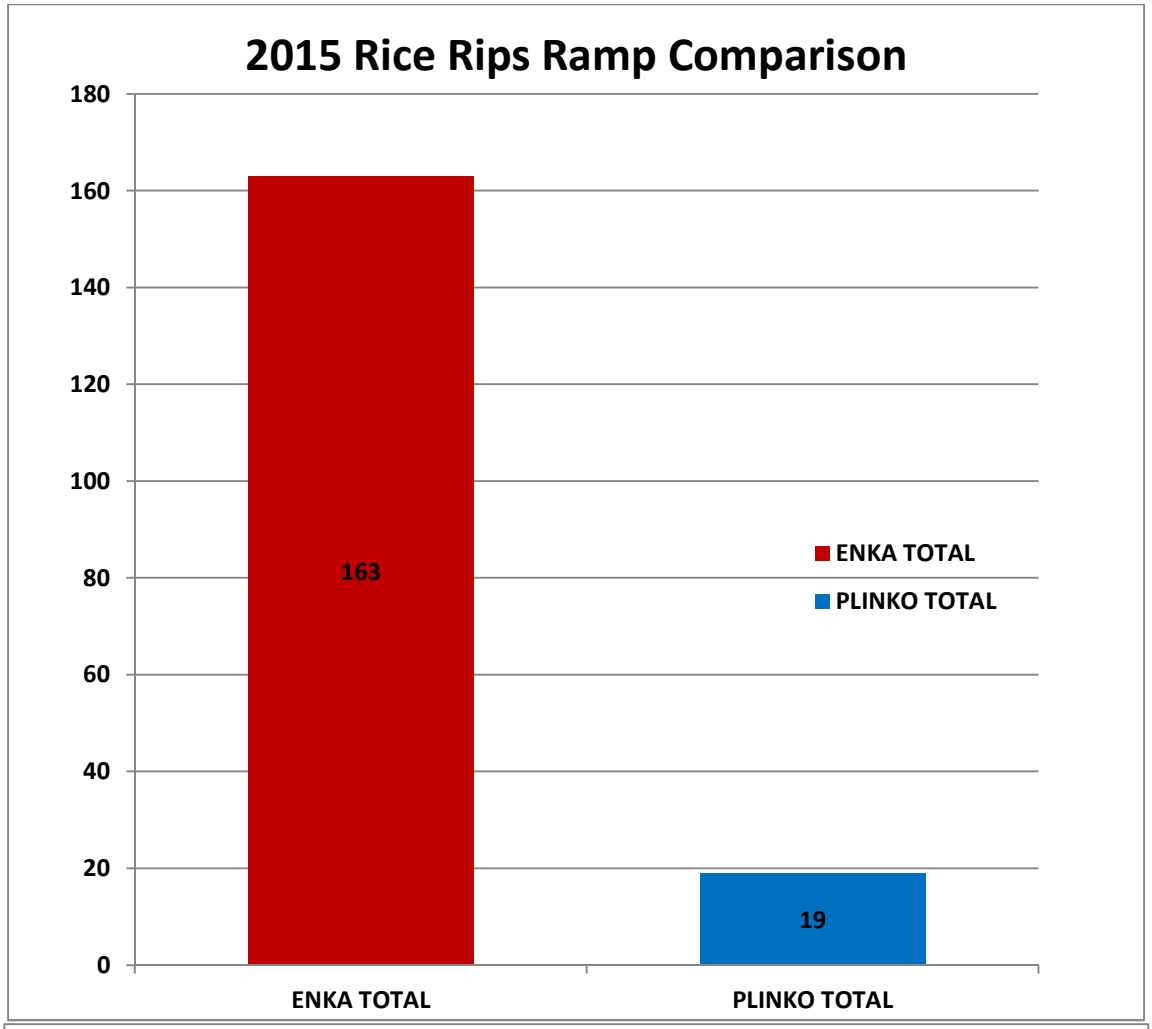
Penstock leakage was utilized as additional attraction flow at the bottom of the ramp. A curved double section of aluminum was secured across the ramp to disperse water at the entrance.

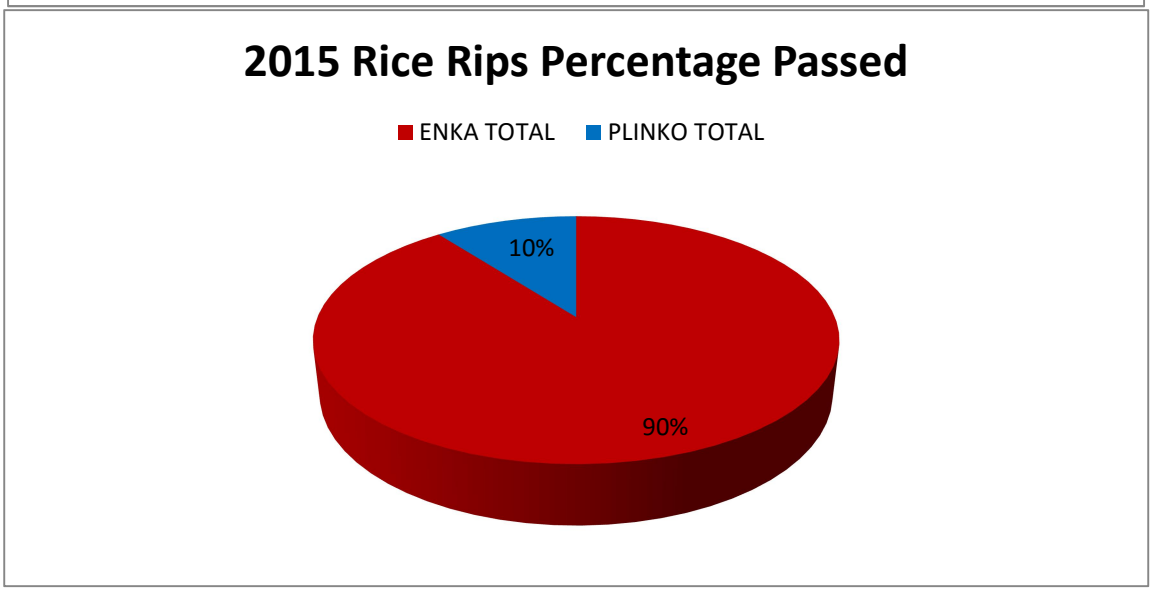
Samples were collected from June 11th until August 13th and were collected every three days on average. An efficiency test was completed on the Enkamat side on July 27th and on the Plinko side on August 4th,5th, and 6th.

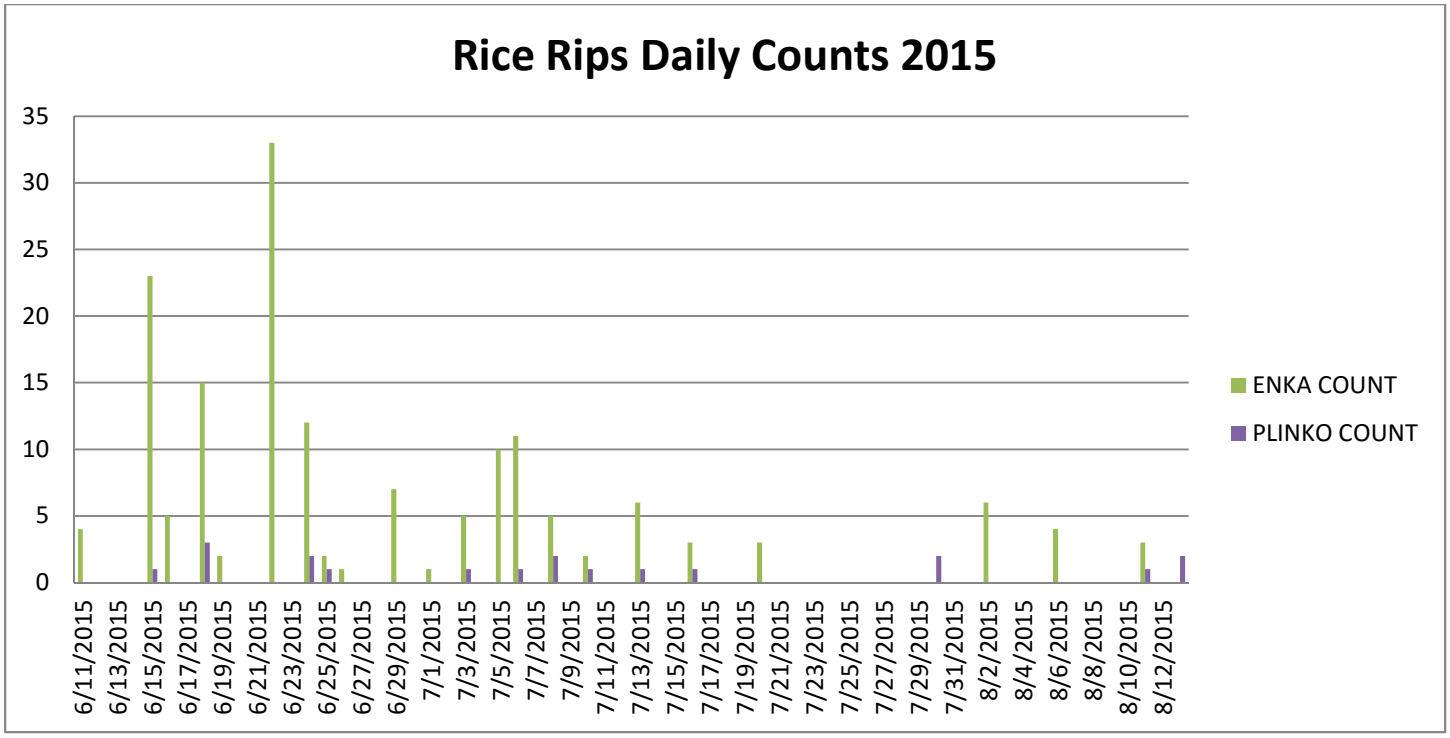
Results

The Enkamat ramp passed a total of 163 eels weighing 337.3 grams, while the Plinko ramp passed a total of 19 eels weighing 245.1 grams. The smallest eel was 9.8 centimeters in length with the largest eel being 34.8 centimeters long.

		2015 Sample and Catch Data				
DATE	ENKA CATCH (g)	PLINKO CATCH (g)	ENKA COUNT	PLINKO COUNT	SMALLEST (cm)	LARGEST (cm)
6/11/2015	12.2	0	4	0	10.7	15.1
6/15/2015	24.9	6.1	23	1	9.7	27.1
6/16/2015	10.3	0	5	0	9.8	12
6/18/2015	32.4	6.1	15	3		
6/19/2015	4.2	0	2	0	11.2	12.8
6/22/2015	19	0	33	0	11.6	14.7
6/24/2015	23.8	2.6	12	2	8.7	12.9
6/25/2015	3.9	1.7	2	1	10.1	13.6
6/26/2015	2.3	0	1	0	13.4	13.4
6/29/2015	16.9	0	7	0	10.1	16.2
7/1/2015	2.1	0	1	0	14.1	14.1
7/3/2015	13.6	1.8	5	1	10.1	15.5
7/5/2015	19.6	0	10	0	10	16
7/6/2015	29.2	4.7	11	1	11.8	16.4
7/8/2015	22.8	29.1	5	2	11.2	23.2
7/10/2015	4.8	17.6	2	1	14.6	24.1
7/13/2015	26.1	31.1	6	1	11.2	26.2
7/16/2015	8.7	20.8	3	1	11.9	25.1
7/20/2015	9.1	0	3	0	13.8	15.3
7/30/2015	0	35.7	0	2	15.3	26.6
8/2/2015	11	0	6	0	10.1	13.1
8/6/2015	8.9	0	4	0	10.5	12.8
8/11/2015	31.5	12.1	3	1	16.5	31.5
8/13/2015	0	75.7	0	2	23.1	34.8
Totals	337.3	245.1	163	19		


2015 Rice Rips Ramp Comparison
180
160
140
120
100
80
60
40
20
0
163
19
ENKA TOTAL
PLINKO TOTAL
ENKA TOTAL
PLINKO TOTAL


2015 Rice Rips Percentage Passed
ENKA TOTAL
PLINKO TOTAL
10%
90%



Discussion

The passageway was operational for a week before the first sample was collected. Throughout the sample season counts were light. Night observations were made on June 8th, 15th, and 29th to see if eels were anywhere along the dam. While eels were found scattered along the base of the dam in small numbers, no large concentrations were seen gathered or attempting to climb elsewhere.

One possible contribution to the low numbers was the construction of a bridge in Waterville over Messalonskee Stream. A barge spanning the width of the stream was in the water the entire time the passageway was being evaluated. The passageway at M4 Automatic is located just below this bridge and access was flooded out for most of the season.

Below is the email correspondence with Maine DMR in regard to their approval of the eel passage at Rice Rips being considered as permanent.

Correspondences:

From: Wippelhauser, Gail [mailto:Gail.Wippelhauser@maine.gov]
Sent: Tuesday, February 23, 2016 3:38 PM
To: 'george zink'; Steven_Shepard@fws.gov
Cc: Andrew Locke; Dave Sherman
Subject: RE: Snow Pd. report and Rice Rips Upstream Efficiency test

Hi Skip.

I reviewed the efficiency test and agree that the interim eel passage at Rice Rips be considered permanent passage. I concur with your proposal to install piping to direct eels into the head pond in place of the holding trap.

It appears that Snow Pond and Messalonskee Lake are totally or nearly devoid of eels at this time.

Gail Wippelhauser, Ph. D.
Marine Resources Scientist
Maine Department of Marine Resources
#172 State House Station
Augusta, ME 04333

Phone: 207-624-6349 Fax: 207-624-6501
email: gail.wippelhauser@maine.gov

From: george zink [mailto:georgezink14@live.com]
Sent: Wednesday, January 13, 2016 3:30 PM
To: Steven_Shepard@fws.gov; Wippelhauser, Gail
Cc: Andrew Locke; Dave Sherman
Subject: Snow Pd. report and Rice Rips Upstream Efficiency test

Happy New Year,

Please find the 2015 downstream report for Snow Pd./Messsalonskee L. attached. This season was pretty much a repeat of last year, with no eels being caught or observed. The heavy leaf invasion came in November and plugged the trap several times. Maintenance crews were looking for impinged eels on intake racks at hydro sites below the lake as an indication of eels passing but none were observed.

I have included the efficiency tests for Rice Rips upstream eel passage with a request for your review and comments in order to finish up the annual report. I had sent it In early August but with the heavy workloads and having a verbal OK, I neglected to pursue an official follow up. An e-mail reply will suffice, thank you. A final report will follow.

Thank you for your attention to this,

Skip