

**Brookfield**

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February 27, 2015

**FERC No. 2727**  
**Article 406**

The Secretary  
Federal Energy Regulatory Commission  
Mail Code: DHAC, PJ-12.3  
888 First Street, NE  
Washington, DC 20426

**Re: Ellsworth Project (FERC No. 2727); Article 406 Compliance;  
2014 Annual Report – Union River Fisheries Coordinating Committee;  
Comprehensive Fishery Management Plan for the Union River Drainage 2015 - 2017**

Dear Secretary Bose,

In accordance with the Commission's September 27, 2002 "*Order Amending License*" for the Ellsworth Project, plus the Commission's October 28, 2010 "*Order Modifying and Approving Comprehensive Fishery Management Plan*", Black Bear Hydro Partners, LLC (BBHP), licensee for the Ellsworth Project, convenes annual meetings of the Union River Fisheries Coordinating Committee (URFCC). Since 2011, BBHP has also filed an annual progress report with the Commission on URFCC activities pursuant to the *Comprehensive Fishery Management Plan for the Union River 2011-2014* (CFMP) by March 1<sup>st</sup> of each year. The October 28, 2010 Order also requires the submittal of management measures and activities (due by March 1<sup>st</sup>, 2015) proposed for the following 5-year period.

Therefore, in accordance with Article 406 and the referenced Orders, BBHP submits the attached *2014 Annual Report – Union River Fisheries Coordinating Committee* ("Annual Report"), as well as the *Comprehensive Fishery Management Plan for the Union River Drainage 2015-2017* (2015 - 2017 Plan). The 2015 – 2017 Plan intentionally covers 3 years due to the expiration of the Ellsworth Project license in December 2017.

As called for under the amended Article 406, the Annual Report outlines the activities that took place during 2014, including a summary of the URFCC's annual meeting, as well as an outline of planned activities during 2015.

Also, the URFCC's 2015-2017 Plan, along with the commitments and responsibilities therein that are incumbent upon BBHP (operating fish passage facilities, convening annual meetings, preparing reports for submittal to the Commission, etc.), will continue for the next 3 year time period, at which time the Ellsworth FERC license is scheduled to expire. The 2015-2017 Plan was developed in consultation with URFCC members (see Appendix I in the Annual Report) and includes extensive updates based on increased spawning escapement of river herring, ongoing relicensing efforts for the Ellsworth Project, the current endangered status of Atlantic salmon in the Union River, and ongoing research and stocking activities.

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Please feel free to call me at (207) 723-4341, x118 if you have any questions or comments.

Sincerely,



Kevin Bernier  
Senior Compliance Specialist

### Attachments

CC: J. Clere, R. Brochu, J. Cole, R. DeWechter, A. Zarrella, K. Murphy, J. Seyfried, B. Richter, T. Wynn, N. Stevens, F. Dunlap; BBHP  
J. Murphy, S. McDermott; NMFS  
S. Shepard, A. Bentivoglio, A. Firmenich; USFWS  
R. Spencer, C. Enterline, G. Wippelhauser; MDMR  
J. Perry, G. Burr; MDIFW  
Barb Witham, George Leinbaugh; Union River Salmon Association  
Alan Kane, Atlantic Salmon Federation  
Michelle Beal, Alan Atherton; City of Ellsworth  
Ken Cline, College of the Atlantic

Brookfield file: 2727/1

***2014 ANNUAL REPORT***  
***UNION RIVER FISHERIES COORDINATING***  
***COMMITTEE***

***February 27, 2015***

## **ACKNOWLEDGEMENTS**

This 2014 Report was prepared by Black Bear Hydro Partners, LLC (FERC licensee for the Ellsworth Project) on behalf of the Union River Fisheries Coordinating Committee (URFCC) with input from Committee members.

# **2014 ANNUAL REPORT – UNION RIVER FISHERIES COORDINATING COMMITTEE**

February 2015

## **1. BACKGROUND**

The Union River Stakeholders Group (Stakeholders), consisting of state and federal natural resource agencies including Maine Department of Marine Resources (DMR); Maine Department of Inland Fisheries and Wildlife (MDIFW); Maine Department of Marine Resources (formerly the Atlantic Salmon Commission); and the U.S. Fish and Wildlife Service (USFWS) as well as the City of Ellsworth; Black Bear Hydro Partners, LLC (BBHP, licensee for the Ellsworth Project); Maine Council of the Atlantic Salmon Federation (MC-ASF); Union Salmon Association (USA); and interested members of the public, have developed the "Comprehensive Fishery Management Plan for the Union River Drainage" (CFMP). The current CFMP covers the period 2011-2014 with the understanding that it will be reviewed and adjusted annually, i.e., this is a dynamic document that will include recommendations for future years as goals/objectives and management measures evolve. The CFMP has the following overall management goal:

*"Manage all sport and commercial fish species in the Union River for optimum habitat utilization, abundance and public benefit."*

The Stakeholders identified six subdivisions of the Union River drainage, designated as Reaches I through VI, for which specific management objectives have been developed, including the restoration of historical runs of migratory fishes (or in some cases, exclusion of migratory fish, to avoid conflicts with other species). Fish restoration continues to focus on the development of self-sustaining runs of river herring and Atlantic salmon above the first dam on the river in Ellsworth, using collection and transport into suitable habitat of returning adults, together with the stocking of hatchery reared juveniles (in the case of salmon).

As stated in the October 28, 2010 FERC Order approving the CFMP, the annual reports will be used as the basis for, "management measures and proposed activities under the Plan for the following 5-year period."

## **2. UNION RIVER FISHERIES COORDINATING COMMITTEE**

### **2015 Annual Meeting**

The annual meeting was held on February 19, 2015 at Ellsworth City Hall in Ellsworth, Maine. The agenda included a discussion of the various activities that took place during 2014, including river herring stocking/harvesting, fishway operations for Atlantic salmon, Ellsworth Project relicensing activities, and other activities of committee participants related to the CFMP (see Appendix I for an agenda and meeting summary, plus additional consultation background). The URFCC also discussed plans for 2015 during the meeting.

At last year's annual meeting, the URFCC agreed that since 2014 is the year in which it would re-evaluate the CFMP, that process should commence in the summer of 2014. Therefore, it was further agreed that each agency or URFCC member would assess the relevant section(s) of the current plan and provide it to BBHP by the beginning of August 2014. While BBHP did not receive any updates from other stakeholders at that time, BBHP provided all stakeholders with the current 2011-2014 CFMP and, as agreed at a meeting in September 2014, asked that they review the CFMP with an eye towards revisions that the URFCC should consider as they relate to fishery management activities on the Union River. DMR subsequently provided extensive revisions to the plan that were discussed at the February 2015 annual meeting.

### **3. REPORT ON 2014 ACTIVITIES UNDER THE COMPREHENSIVE FISHERIES MANAGEMENT PLAN FOR THE UNION RIVER DRAINAGE**

Stakeholders are working cooperatively through the URFCC to address a number of items in order to help reach decisions on future management of fishery resources in the Union River drainage. A summary of 2014 activities undertaken by URFCC participants that influence fisheries management in the Union River Drainage, and that in part offer information instructive towards answering these questions, is provided below:

A total of 769,635 river herring entered the Ellsworth Dam fishway and were trapped during 2014. Of those trapped, and in conformance with the CFMP and agency directions, a total of 153,360 adult alewives were transported upstream into Graham Lake and Leonard Lake during the 2014 migration season. Between May 8 and May 17, the first 100,000 alewives entering the fishway were stocked into Graham Lake. The remainder of the transported alewives were spread out over the rest of the run to ensure that the stockings represented all constituents of the run, i.e., early and late run fish. The last date fish were stocked in 2014 was June 14. All of the alewives were harvested and stocked using the same methods, i.e., lifting of the hopper, with those harvested placed directly into containers provided by lobstermen or bait dealers, while those being stocked were placed into aerated round tanks for transport upstream.

The fishway was operated for alewife stocking and harvesting from May 8 through June 14. BBHP then operated the fishway through November 4 for Atlantic salmon. Two Atlantic salmon were collected at the Ellsworth fishway during 2014. One was transported and released upstream into the West Branch of the Union River, since DMR's reading of its scales (and the fish's appearance) indicated that it was not an aquaculture raised fish. The second salmon exhibited hatchery characteristics (i.e., deformed dorsal, wearing of caudal fin edges); since DMR personnel were not reached, the fish was placed back in the river downstream of the fishway. No Atlantic salmon were captured in the fishway for the remainder of the 2014 season.

Appendix II contains a summary table that includes returns of river herring and Atlantic salmon to the Union River since 1986. The URFCC updates this table as data become available.

In addition to the activities associated with operation and maintenance of the upstream and downstream fish passage facilities at Ellsworth Dam, BBHP continued to operate the surface weir at Graham Lake to provide enhanced downstream passage of out-migrating alewives and any Atlantic salmon that might be present.

BBHP is also actively engaged in the process to relicense the Ellsworth Project, and has therefore performed a number of fisheries resource-related studies with additional studies planned for 2015 and beyond. The September 4, 2014 "Initial Study Report" provided to FERC detailed the 2014 study activities.

#### **4. OUTLINE OF PLANNED ACTIVITIES BY THE URFCC DURING 2015**

BBHP will operate the upstream fish trap at the Ellsworth Hydroelectric Project in order to transport at least 315,000 alewives to upstream lakes and ponds during the 2015 migration season (see the "*Comprehensive Fisheries Management Plan for the Union River Drainage, 2015 - 2017*" for details). In addition, BBHP will once again operate the fishway for passage of Atlantic salmon during the 2015 migration season in accordance with the DMR's "Atlantic Salmon Trap Operating and Fish Handling Protocols", currently under revision. Furthermore, in accordance with a relicensing process-related study request, BBHP will operate the upstream fishway on a daily basis from sunrise to sunset from May through October 2015 to evaluate upstream Atlantic salmon passage, and will report on the results through the relicensing process.

As detailed in the 2015 – 2017 CFMP, a number of other research activities, stocking efforts, and plans to increase accessible habitat for anadromous fish are also planned for 2015 and beyond. Some of the additional studies and reports are associated with the relicensing process for the Ellsworth Project, and it is expected that the URFCC will continue its active engagement in that process as well.

#### **5. FERC FILINGS**

A draft of this annual report was sent to URFCC members on February 12, 2015 with a request to provide additional information pertinent to respective URFCC member's activities in 2014, or on activities planned in 2015. Copies of the draft were also provided at the February 19 meeting. The report is being submitted together with the "*Comprehensive Fisheries Management Plan for the Union River Drainage, 2015 - 2017*", which was due for renewal this year. BBHP also expects to continue to convene annual meetings of the URFCC and prepare and file annual reports on behalf of the Committee. Documentation of consultation with URFCC members is contained in Appendix I.

# **APPENDIX I**

## **Agency and Stakeholder Consultation**



**Bernier, Kevin**

---

**From:** Bernier, Kevin  
**Sent:** Thursday, February 12, 2015 4:23 PM  
**To:** 'Shepard, Steven'; Jeff Murphy - NOAA Federal; Spencer, Randy; Burr, Gregory; Barb Witham; Alan Atherton; Michelle Beal Ellsworth Twm Mgr; Enterline, Claire; Wippelhauser, Gail; 'kcline@coa.edu'; Anitra Firmenich (Anitra\_Firmenich@fws.gov); Alan Kane; Sean McDermott (Sean.McDermott@noaa.gov)  
**Cc:** Cole, James; Wynn, Todd; Dunlap, Frank; Stevens, Nate  
**Subject:** RE: Union River annual meeting  
**Attachments:** 20150212 Union River Comprehensive Fisheries Management Plan 2015-2017 Draft1 Feb 11 2015.docx; 20150212 2014 UR FCC ANNUAL REPORT.docx; 201502121611.pdf

The Union River annual fisheries meeting has been scheduled for February 19<sup>th</sup> at 9:30 a.m. At Randy Spencer's suggestion, I have moved the meeting to Ellsworth City Hall and reserved their conference room (from 9:30 to 1:00). I will also send out an Outlook invite for your calendars.

Since the existing "Comprehensive Fishery Management Plan for the Union River Drainage 2011 – 2014" is due for renewal this year, Black Bear Hydro Partners, LLC (licensee for the Ellsworth Project) had requested input on the Plan last summer. DMR has subsequently taken the initiative to update the plan for the remainder of the current Ellsworth FERC license (which expires in December 2017). Attached is a draft of the Union River Fisheries Management Plan for the 2015 – 2017 period that incorporates DMR's input; please consider this draft for discussion at the February 19 meeting.

Also, please find the enclosed copy of the "2014 ANNUAL REPORT – UNION RIVER FISHERIES COORDINATING COMMITTEE, February 2015 (draft)" (Draft Report). In preparation for finalizing the Draft Report, please provide any comments or additional information from work performed during 2014 and/or planned for 2015. The report is a work in progress, but it can be used as a template for the February 19 meeting. The attached .pdf also needs to be updated and will comprise Appendix II in the report.

If you are unable to join us, please forward any information or comments on the enclosed annual report or Plan to me by February 24<sup>th</sup>, as I need to file these documents with FERC by the end of February.

In the meantime, please don't hesitate to contact me at (207) 723-4341, x118, or by e-mail at Kevin.Bernier@brookfieldrenewable.com with any questions. I look forward to meeting everybody on the 19<sup>th</sup>.

**Kevin Bernier**  
Senior Compliance Specialist

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## Brookfield

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Union River Fisheries Coordinating Committee  
Annual Meeting, February 19, 2015  
9:30 – 12:30  
Ellsworth City Hall

Agenda

Introductions

2014 Activities:

- River Herring Stocking/Harvesting
- Fishway Operations for Atlantic Salmon
- Relicensing Studies
- Other 2014 URFCC Activities

2015 Activities:

- River Herring Stocking/Harvesting
- Fishway Operations for Atlantic Salmon
- Relicensing Studies
- Species Protection Plan
- Downstream Fish Passage Mortality
- Evaluate Upstream Fish Passage Potential at Natural Falls
- Potential ESA Listing of American Eels
- 2015 – 2017 Comprehensive Fisheries Management Plan
- Other 2015 URFCC Activities

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- Species Protection Plan
- Downstream Fish Passage Mortality
- Evaluate Upstream Fish Passage Potential at Natural Falls
- Potential ESA Listing of American Eels
- 2015 – 2017 Comprehensive Fisheries Management Plan
- Other 2015 URFCC Activities

## Attendees

Kevin Bernier, Todd Wynn, Nate Stevens (Black Bear Hydro Partners, LLC, "BBHP")  
Colby Brochs, Ernie Atkinson, Randy Spencer (Maine Department of Marine Resources, "DMR")  
Steve Shepard (U.S. Fish and Wildlife Service)  
Mark Whiting, George Leinbaugh, Al Eggleston, Barbara Witham (Union River Salmon Association)  
Alan Kane (Atlantic Salmon Federation)  
Ken Cline (College of the Atlantic; Sierra Club)  
Rick Welch (City of Ellsworth)

## Meeting Summary

*Brookfield introductions* – since BBHP, licensee for the Ellsworth Project, recently became an affiliate of Brookfield Renewable Energy Group (January 2014), introductions were made to Brookfield team members with new responsibilities for managing the Ellsworth Project, and for addressing the Project's FERC license compliance and relicensing activities (Todd Wynn, Vice President, Northeast Operations; Kevin Bernier, Senior Compliance Specialist; Nate Stevens, Project Manager).

*Background* – Randy Spencer provided background for the meeting, indicating that the URFCC was established pursuant to Article 406 of the Ellsworth Project license. Since this license (and the current Article 406) expire in December 2017, Randy indicated that the revised Comprehensive Fisheries Management Plan (CFMP) under review would only cover the 2015 – 2017 period. However, he was hopeful that the URFCC could continue to meet and provide cooperative and productive input for Union River fisheries management issues after license expiration. Steve Shepard explained the city of Ellsworth's river herring harvesting rights on the river, and the need to truck a portion of the run upriver for natural reproduction and to sustain the run.

*2014 river herring stocking/harvesting* – Rick Welch said that 2014 provided a good run of river herring on the Union River, which started in late April. Approximately 150,000 river herring were trucked upriver, and about 5,000 bushels of herring were harvested for lobster bait. Similar to previous years, Randy indicated that age testing of the run showed a continued smaller percentage of repeat spawners compared to other rivers. He said this was likely related to in-river mortality, including the harvesting activities, hydro operations, and natural factors such as high predation by fish and bird predators.

*2014 upstream fishway operations for Atlantic salmon* – Kevin reported that two Atlantic salmon were captured in the fish trap in 2014; one appeared to be a wild fish and was trucked upriver, while the other fish was released below the dam as it appeared to be hatchery in origin.

*2014 Ellsworth Project relicensing studies* – Kevin provided a summary of the fisheries-related relicensing studies performed in 2014, including: Fish Community Study; American Eel Upstream Passage Study; Downstream Fish Passage Study; and Upstream Fish Passage Study. He said that the downstream passage study was a "desktop" evaluation, which estimated survival of downstream migrating fish to be between 75% (adult eels) and 98% (Atlantic salmon smolts; juvenile river herring). Kevin also explained that an "Instream Flow and Union River Tributary Access Study" was performed, but he did not have the results. Alan Kane said that tributary access was a perfect example of how the stakeholders could work together with the agencies and BBHP to improve Union River fisheries. As follow-up to the upstream eel study, Steve said that USFWS would likely be requesting upstream eel passage at the Ellsworth Project. Randy said that eels are co-managed by DMR (salt water) and the Maine Department of Inland Fisheries and Wildlife (fresh water).

*2015 river herring stocking/harvesting* – Randy said that for the first time, the revised CFMP for the 2015 – 2017 time period contains recommendations to truck enough river herring to upstream spawning areas in order to meet long term stocking goals (minimum of 315,000 river herring stocked, which approaches the 35 fish/acre spawning escapement goal). BBHP is responsible for this trucking, plus the transport of any Atlantic salmon to upriver areas. The river herring stocking strategy (transporting fish upriver every week-end throughout the run) ensures that the upriver spawning escapement is representative of the river herring run. In addition to Graham and Leonard Lakes, a number of new water bodies in the Union River drainage will be stocked beginning in 2015. Weekly and cumulative data on the fish runs will continue to be provided to DMR, who will be responsible for fish sampling.

Alan Kane said it was important to increase the spawning escapement in order to make progress towards the historical river herring runs that the river is capable of. Rick felt that the entire run would have to be trucked upriver in some years (with no harvesting) to meet the 315,000 fish goal. Randy agreed that fewer herring may be available for harvesting in the short term, but this management strategy will result in larger river herring runs 4 – 5 years down the road and a larger surplus of fish available for harvest in the long term. DMR has the authority to shut down harvesting if management goals are not being met.

*2015 relicensing studies* – Kevin provided a summary of upcoming relicensing studies (downstream Atlantic salmon smolt and eel studies; upstream fish passage and project decommissioning study; upstream Atlantic salmon passage study). Kevin and Randy explained that the smolt study may have to be delayed until 2016 due to timing and handling permits, and the eel study is dependent on obtaining study fish. Alan expressed concern over potential delayed mortality of fish passing the Ellsworth Project. Mark Whiting stated that sensor tags should be considered on "dummy" fish to evaluate the conditions real fish encounter when passing downstream past the Project. Kevin replied that upcoming field studies would be developed through agency consultation to address fish passage questions and concerns.

*2015 downstream fishway operations* – Steve said that more information is needed on the adequacy of the downstream fishway, especially in light of last fall's fish kill below Ellsworth Dam. He said that proper operation of the downstream fishway's pump and modification of the downstream fish flume are needed. Steve also suggested that nighttime spilling of water should be considered to accommodate downstream migrants (due to the Project's peaking type operation). Rick said that adult post-spawning alewives move downstream during full moon periods, so that is when operation changes should be considered.

*2015 upstream fish trap operations* – Randy explained that the upstream trap would be operated down to dusk in 2015 from May through October, unless water temperatures exceed 23° C. The trap does not need to be operated at night due to minimal salmon (and overall fish) movement. The study is intended to address questions/concerns over whether upstream passage of Atlantic salmon is impeded at Ellsworth Dam when the trap is operated less frequently. He suggested that salmon be transported separately from the alewives, but DMR's trap protocols (currently under revision) will address this. Steve said that attraction of Atlantic salmon to the fish trap appears to be good, even during the river herring run. Randy expressed concern over the behavior of salmon amongst thousands of alewives. Rick said that salmon enter the trap without issue during the river herring run.

*2015 Atlantic salmon stocking* – assuming that Atlantic salmon fry can be obtained from the hatchery, they will continue to be stocked upstream of the Ellsworth Project in the West Branch of the Union River. Barb Witham said that fry stocking efforts have occurred since 1992, and subsequent electrofishing surveys have indicated good survival of these fish.

*2015 – 2017 CFMP* – Randy reviewed the proposed CFMP to cover the 2015 – 2017 time period, including research activities, stocking efforts, relicensing studies, fish trap operations, and efforts to increase the amount of accessible habitat to anadromous fish. The CFMP also covers BBHP's follow-up actions to last fall's fish kill below the dam.

**Bernier, Kevin**

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**From:** ALAN KANE <chubbakane@gmail.com>  
**Sent:** Monday, February 23, 2015 11:12 AM  
**To:** Bernier, Kevin  
**Cc:** Randy Spencer; Dwayne Shaw; Andrew Goode; John Burrows; Barbara Witham  
**Subject:** Union Plan

Kevin,

Glad to meet you at the the Union Meeting. Some good information was shared, as well as concerns about the fish passage. As you are aware, this river has been severely compromised since the construction of the dam. The plan Randy outlined is a good start in rectifying the conditions that have existed for far too long. I was glad to see how Brookfield was receptive to changing these conditions as we move forward. The fisheries can be much more valuable economically as well as ecologically to the community. Hopefully we can keep moving this forward to restore the river to the vitality we have not witnessed for a long time. I appreciate your facilitating us meeting and making this progress. It is refreshing to have Brookfield work towards these goals and improve this watershed for not just the community, but for the aquatic life necessary to restore it to its former health. It will be good for all parties involved.

Keep smiling,  
Alan "Chubba" Kane

**Bernier, Kevin**

---

**From:** George L <gline8295@gmail.com>  
**Sent:** Tuesday, February 24, 2015 10:35 PM  
**To:** Bernier, Kevin  
**Subject:** Union River Comprehensive Fisheries Management Plan

Kevin, I see the Comprehensive Fisheries Management Plan as a first step in the restoration of the historic alewives runs on the Union River. This will be a great opportunity for Brookfield, the various agencies and NGO's to strive for the completion of the goals set forth in the management plan and beyond.

Sincerely,  
George Leinbaugh

207-461-9350

**Bernier, Kevin**

---

**From:** Barb Witham <bwitham@roadrunner.com>  
**Sent:** Tuesday, February 24, 2015 4:55 PM  
**To:** Bernier, Kevin  
**Cc:** 'ALAN KANE'; 'George L'; 'Spencer, Randy'  
**Subject:** Comprehensive Union River Management Plan for '15-'17

Dear Kevin,

I thought the meeting to discuss the Comprehensive Management Plan for the Union River was a good one.

I think this plan is going in the right direction and may need some course correction as we continue into the coming years of the plan, but it is a good starting point.

I was happy to see the increased escapement for alewives, and I look forward to increasing that amount of escapement as the run increases and as additional acreage of habitat is identified. I am concerned that we seem to be having only one year class of alewives returning to the river. There is a definite need to look into the cause of the limited repeat spawners coming back to the river.

I look forward to seeing the final plan.

Barbara Witham, Secretary,, Union Salmon Association and President, Friends of Green Lake National Fish Hatchery.



## **APPENDIX II**

### **Returns of River Herring and Atlantic salmon to the Union River**

**River Herring and Atlantic Salmon Returns to the Union River  
Ellsworth Dam Fish Trap, 1986 – 2014**

<b>Year</b>	<b>River Herring</b>	<b>Atlantic Salmon</b>
1986	1,038,920	62
1987	473,840	58
1988	526,911	45
1989	559,676	26
1990	368,400	21
1991	192,720	8
1992	390,210	0
1993	111,139	0
1994	117,158	0
1995	183,634	0
1996	301,253	68
1997	279,145	8
1998	441,923	14
1999	277,425	72
2000	389,610	8
2001	446,850	2
2002	666,967	5
2003	326,497	1
2004	193,523	2
2005	195,277	4
2006	693,360	0
2007	227,070	0
2008	515,160	0
2009	452,250	0
2010	450,090	0
2011	415,125	0
2012	1,219,927	3*
2013	709,097	1
2014	769,635	2

\* All three salmon captured in 2012 were suspected aquaculture escapees

**COMPREHENSIVE FISHERIES MANAGEMENT PLAN**

**FOR THE UNION RIVER DRAINAGE**

2015 – 2017

Prepared by:

Union River Fisheries Coordinating Committee

February 27, 2015

## ACKNOWLEDGMENTS

The Union River Stakeholder Group consists of state and federal fishery agencies, including Maine Department of Marine Resources; Maine Department of Inland Fisheries and Wildlife; and the U.S. Fish and Wildlife Service; as well as the City of Ellsworth; Black Bear Hydro Partners, LLC; Maine Council of the Atlantic Salmon Federation; Union Salmon Association; and interested members of the public.

## Contents

Executive Summary .....4

1.0 Introduction and Background .....6

2.0 Description of the Drainage .....8

    2.1 Water Quality .....8

3.0 Fishery Resources .....9

    3.1 Status of Diadromous Fish Populations .....10

    3.2 Status of Resident Fish Populations .....15

4.0 Fisheries Management Recommendations 2015-2017 .....16

    4.1 Research Initiatives 2015-2017 .....17

    4.2 River Herring Management Objectives 2015-2017 .....18

    4.3 Atlantic Salmon Management Objectives 2015-2017 .....22

    4.4 American Shad Management Objectives 2015-2017 .....24

    4.5 Rainbow Smelt Management Objectives 2015-2017 .....25

    4.6 Striped Bass Management Objectives 2015-2017 .....25

    4.7 American Eel Management Objectives 2015-2017 .....25

5.0 Long Term Fisheries Management Goals and Objectives by River Reach .....26

6.0 Additional fisheries management and planning issues to be addressed in 2015 – 2017 .....28

    6.1 Resident Fish .....29

7.0 Literature Cited .....35

## Executive Summary

The Union River Fisheries Coordinating Committee (URFCC) consists of state and federal natural resource agencies including the Maine Department of Marine Resources (DMR, now merged with the former Atlantic Salmon Commission, ASC); Maine Department of Inland Fisheries and Wildlife (IFW); the U.S. Fish and Wildlife Service (USFWS); and other interested parties: Black Bear Hydro Partners, LLC (BBHP, licensee of the Ellsworth Project); the City of Ellsworth; Maine Council of the Atlantic Salmon Federation (MC-ASF); Union Salmon Association (USA); along with interested members of the public, who have worked together to develop a comprehensive fishery management plan (CFMP) for the Union River drainage in Maine. The URFCC has revised/rewritten the plan on a five-year cycle and has met annually to review results and develop interim modifications as needed. This planning process is required under the current Federal Energy Regulatory Commission (FERC) license issued for the Ellsworth Hydroelectric Project (FERC Project No. 2727), which expires in 2017. This revised 2015-2017 plan replaces the 2011-2014 plan and is in effect from its acceptance in 2015 until the current FERC license expires in 2017. The form and function of the URFCC is structured to comply with current FERC license requirements, as it is uncertain what form those requirements will take when FERC issues a new license for the project after the current license expires.

### Fisheries Management Goal Statement:

*"Manage all sport and commercial fish species in the Union River in an ecologically responsible manner to optimize habitat utilization, fish abundance, and public benefit."*

The Union River supports a variety of resident and migratory fish species. Principal resident sportfish include: landlocked Atlantic salmon *Salmo salar*, brook trout *Salvelinus fontinalis*, lake trout *Salvelinus namaycush*, brown trout *Salmo trutta*, splake (brook-lake trout hybrid), landlocked arctic char, aka blueback trout and Sunapee trout *Salvelinus alpinus spp.*, smallmouth bass *Micropterus dolomieu*, chain pickerel *Esox niger*, and white perch *Monroe americana*. Populations of resident fish are maintained through natural reproduction and stocking.

Migratory fish species include: American shad *Alosa sapidissima*, striped bass *Monroe saxatilis*, rainbow smelt *Osmerus mordax*, blueback herring *Alosa aestivalis* and alewife *Alosa pseudoharengus* (the latter two species collectively known as river herring), Atlantic sturgeon *Acipenser oxyrinchus* Atlantic tomcod *Microgadus tomcod*, American eel *Anguilla rostrata*, sea lamprey *Petromyzon marinus*, and endangered populations of sea-run Atlantic salmon. Dams constructed in the late 1700's and early 1800's contributed to the disappearance of runs of migratory fish in the Union River, and blockages on the main stem of the river and at outlets of lakes and ponds elsewhere in the drainage continue to prevent full access for some species to historical habitat.

Baum (1982) reported that historically the Union River was stocked with juvenile steelhead trout *Oncorhynchus mykiss* (1903, 1919); coho, aka silver salmon *Oncorhynchus kisutch* (1904); pink, aka humpback salmon *Oncorhynchus gorbuscha* (1906, 1915, 1916); chinook, aka king salmon *Oncorhynchus tshawytscha* (1938); and chum salmon *Oncorhynchus keta* (1938); but no fish passage was in place at Union River dams, and there is no record of any adult returns from these stockings. State fishery agencies (IFW, ASC) surveyed the Union River in 1960 to evaluate habitat quantity and suitability for fisheries management. Based on results of that survey, stocking the Union River with Atlantic salmon smolts and adult river herring (alewives and blueback herring) was initiated in 1971-72.

A fish trapping facility was built in the tailrace of the Ellsworth Dam in 1974 to allow for the capture and transport of returning adult fish. Annual runs have exceeded 1,000,000 alewives and approached 300 salmon, but salmon runs have been much lower since the 1980's in the Union River (and elsewhere). The fish trap at the Ellsworth Dam continues to serve as the interim upstream fish passage facility and is also used for commercial harvest of river herring under a cooperative management agreement with the DMR and the City of Ellsworth.

The URFCC have identified six subdivisions of the Union River drainage, designated as Reach I through VI, for which specific management objectives have been developed, including the restoration of historical runs of migratory fishes. Diadromous fish restoration during 2015-2017 will continue to focus on developing self-sustaining runs of river herring and Atlantic salmon in the Union River and assessing upstream and downstream fish passage facilities pursuant to the strategies contained in this document.

During the period covered by the 2015-2017 CFMP, the focus areas will include:

- Acquisition of the information necessary to evaluate the existing fish passage facilities (upstream and downstream) at the Ellsworth Project in terms of specific and overall impacts on the success and survival of migratory fish species, including Atlantic salmon and American eels. Field studies have or will include: upstream passage for Atlantic salmon and American eels; downstream passage for American eel adults and Atlantic salmon smolts; physical studies of velocity fields at project intakes and bypass to assess their influence on migratory route selection, and fish passage survival. Based on analysis of these data, recommendations will be developed, if necessary, for the physical structures and operational measures necessary to provide safe, effective, and timely fish passage at the Project.
- Downstream mortality of adult American eels and juvenile river herring was documented below the Ellsworth Dam in the fall of 2014. Prior to the 2015 migratory season, BBHP will prepare and distribute a detailed description of the operational and physical measures that will be implemented in 2015 in order to address downstream fish passage mortality and ensure safe and effective fish passage is provided during all flow conditions that may occur at the Ellsworth Project. Any future measures will be considered based on the results of the studies noted above.
- Manage river herring escapement (numbers of fish passed upstream) in the Union River in compliance with the Maine law (Title 12, Part 9, Chapter 605, Article 5, sections §6131), Marine Resource regulation (Chapter 30 – river herring), statewide management goals, and existing protocols. The *minimum* river herring spawning escapement target will increase from 150,000 to the long standing goal of 315,000 *minimum* escapement in 2015. An increase in the annual river herring runs to two million fish is anticipated 4-5 years after the 2015 escapement increase is implemented.
- Fisheries agencies will conduct field studies to evaluate upstream fish passage potential at natural falls located in the East Branch Union River and Beech Hill Stream.

The URFCC will continue to review and oversee the fish passage measures at the Ellsworth Project until this plan expires in 2017.

Fisheries management and planning activities for the Union River are in a dynamic state due to Ellsworth Project relicensing and the associated studies and actions, development of a *Species Protection Plan* (SPP) to protect endangered Atlantic salmon in the project area, and a proposal to list American eels under the Endangered Species Act (ESA). In recognition of those activities, the URFCC intends that this *Comprehensive Fishery Management Plan for the Union River Drainage, 2015 - 2017* will serve as a baseline management document with the potential for significant modifications in response to study outcomes, implementation of the *Species Protection Plan*, and FERC relicensing.

## 1.0 Introduction and Background

In 1997, a group of agencies and interested parties (Union River Stakeholders Group) signed an agreement for the purpose of addressing interim and long-term fisheries management in the Union River drainage, including fish passage provisions at the Ellsworth Hydroelectric Project. The Stakeholders adopted the following Mission Statement:

*"It is the goal of the Union River Stakeholders Group to achieve timely and effective restoration and/or management of populations of resident and self-sustaining diadromous fish in the Union River watershed, consistent with a comprehensive fishery management plan, and in a manner that balances the interests of the public, regulatory agencies, and the licensee of the Ellsworth Hydroelectric Project."*

The Stakeholders (now known as the URFCC) agreed that they would develop a comprehensive, biologically based plan in order to support future decisions on fishery management in the Union River, including a commitment to install permanent fish passage facilities at the Ellsworth Project. It was further agreed that the CFMP would identify agency goals and objectives for diadromous and resident fish populations in the Union River drainage, and would describe the various tasks and responsibilities related to the restoration and management of those resources, including stocking, habitat assessment, population monitoring, and fish passage. It was the Stakeholders' expressed intent that the CFMP serve as the basis for decisions on developing and implementing long-term, permanent fish passage measures at the Ellsworth Project.

This CFMP contains a brief description of the drainage and its fishery resources, a description of the current status of diadromous and resident fish populations in the watershed, and an identification of management goals and objectives. The CFMP also recommends measures/activities to be implemented by the URFCC members during the period 2015-2017. Finally, the CFMP provides several assessment criteria that the URFCC may find useful in developing long-term recommendations for fish passage measures for the Ellsworth Project.

In compliance with *Article 406* of the Ellsworth Project license, BBHP will submit this CFMP containing a fish passage plan for FERC approval. The commitments and responsibilities therein regarding fish passage assessment and operation are incumbent upon BBHP pending identification and implementation of any applicable alternative measures found necessary to improve fish passage at the Ellsworth Hydroelectric Project.

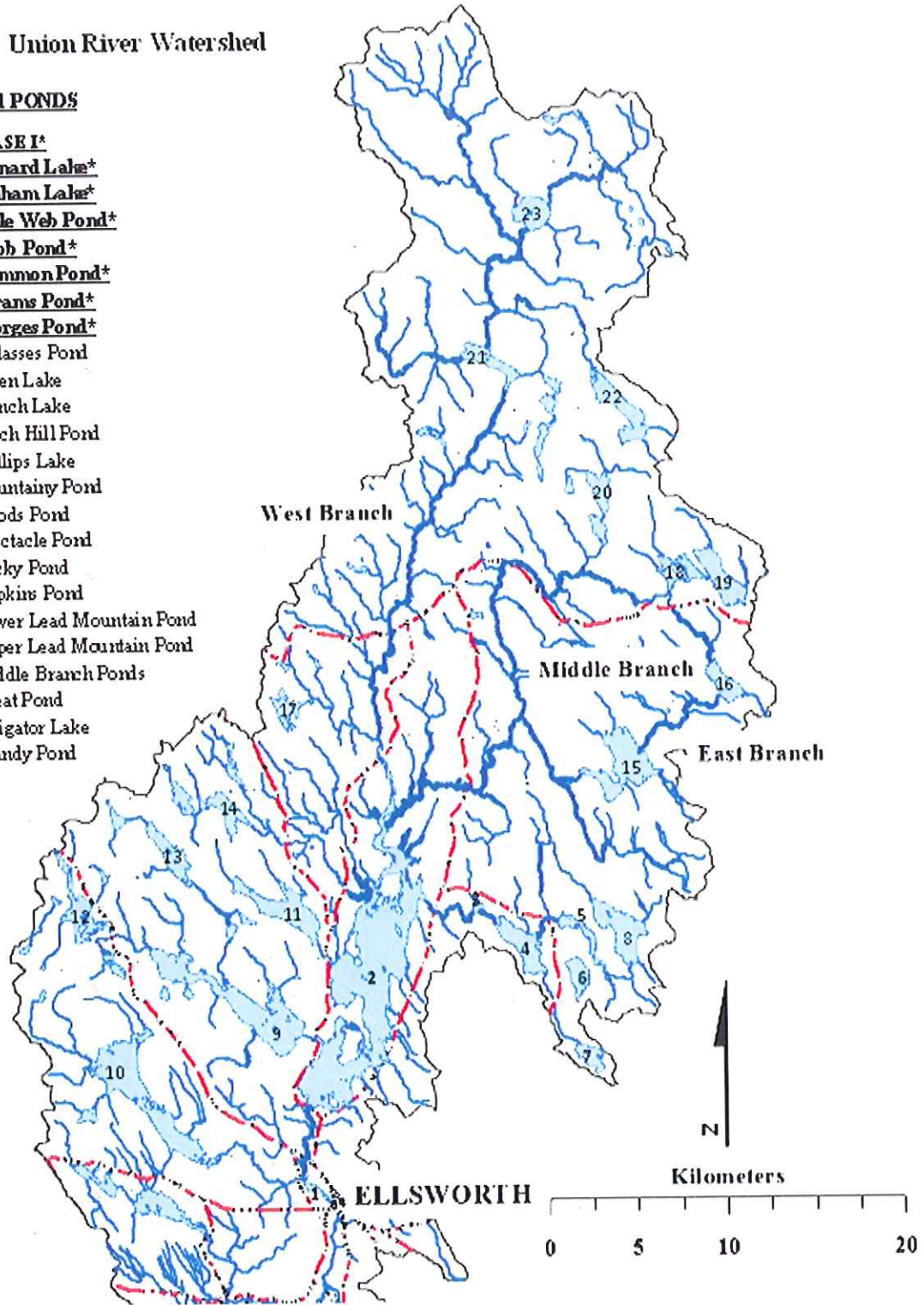


Figure 1. Union River Watershed

**LAKE and PONDS**

**PHASE I\***

- (1) Leonard Lake\*
- (2) Graham Lake\*
- (3) Little Web Pond\*
- (4) Webb Pond\*
- (5) Scanmon Pond\*
- (6) Abrans Pond\*
- (7) Georges Pond\*
- (8) Molasses Pond
- (9) Green Lake
- (10) Branch Lake
- (11) Beech Hill Pond
- (12) Phillips Lake
- (13) Mountainy Pond
- (14) Floods Pond
- (15) Spectacle Pond
- (16) Rocky Pond
- (17) Hopkins Pond
- (18) Lower Lead Mountain Pond
- (19) Upper Lead Mountain Pond
- (20) Middle Branch Ponds
- (21) Great Pond
- (22) Alligator Lake
- (23) Brandy Pond



## 2.0 Description of the Drainage

The Union River watershed occupies approximately 500 square miles in Hancock and Penobscot Counties, and is Maine's 19th largest river (Baum 1982). The drainage is almost entirely forested and is sparsely populated. The river has a very short (5 km) estuary that extends from Union River Bay inland to the Ellsworth Dam in downtown Ellsworth, Maine.

The headwaters of the Union River consist of three principal tributaries (East, West, and Middle Branches). The West Branch is the largest (175 mi<sup>2</sup>), followed by the East (150 mi<sup>2</sup>) and Middle (45 mi<sup>2</sup>) Branches. There are 81 lakes and ponds and approximately 484 miles of streams within the watershed (Figure 1.). A prominent feature on the main stem of the river is BBHP's Ellsworth Hydroelectric Project, which consists of two impoundments (Leonard Lake: 90 acres; Graham Lake: 7,865 acres), and has a generating capacity of 8.9 megawatts.

### 2.1 Water Quality

Water quality throughout the basin is considered to be moderate (Class B) to high (Class A), and is for the most part suitable for fishing, swimming, and recreational uses. According to the State of Maine's Water Classification Program (38 M.R.S.A. Sections 464-470), which is administered by the Maine Department of Environmental Protection (MDEP), the Union River is classified as follows:

- Main stem and tributaries from the outlet of Graham Lake to tidewater - Class B
- Outlet of Green Lake - Class B
- All other Union River tributaries - Class A

In order to assure water quality and to protect fishery resources in the lower river, *Article 401* of the Ellsworth Hydroelectric Project FERC license contains minimum flow criteria. Specifically, the Article requires that a minimum of 250 cubic feet per second (cfs) be maintained through the Ellsworth Dam and the Graham Lake Dam each year from 1 May- 30 June; and 105 (cfs) be maintained from 1 July through 30 April of the following year.

### 3.0 Fishery Resources

The Union River supports a variety of resident and migratory fish species (Appendix X). Principal resident sportfish include landlocked Atlantic salmon, brook trout, lake trout, brown trout, splake, smallmouth bass, chain pickerel, and white perch. Green Lake, which is located in the Union River drainage, was one of only four lakes in Maine containing original populations of landlocked Atlantic salmon. Another unique occurrence within the basin is the presence of silver charr populations (formerly known as Sunapee or blueback trout) in Floods Pond and Green Lake. Populations of resident fish are maintained through natural reproduction and stocking (see Sec. 4.0 of this plan).

Migratory fishes present in the Union River include: sea-run Atlantic salmon, American shad, striped bass, rainbow smelt, blueback herring and alewife (collectively referred to as river herring), sea lamprey, and tomcod, which ascend into freshwater to spawn (anadromous species), plus American eel, which grow to maturity in freshwater, but return to the sea to reproduce (catadromous species). Anadromous and catadromous species are collectively termed diadromous fish. Runs of anadromous fish were once common in the Union River (Havey 1961), but were extirpated in the late 1700's and early 1800's, presumably by construction of dams without fishways, water pollution, over harvest, and other factors.

A fish trapping facility was constructed in the tailrace of the 65-foot high Ellsworth dam in 1974 with public and private funds to provide upstream fish passage and to collect adult Atlantic salmon for hatchery broodstock. Sea-run salmon captured in the Penobscot River were then the only source of hatchery broodstock, and a backup broodstock source was considered an essential safety measure (Baum 1982). The smolt stocking and broodstock collection program was discontinued on the Union River in 1991 due to low adult returns and budget shortfalls. The trap has since been used as an upstream fish passage system (trap and truck) for all diadromous fish and as a harvest platform for commercial alewife fisherman.

The trap was initially operated by the USFWS with the assistance of DMR to collect salmon, but the Ellsworth Project licensee assumed responsibility for trap operations and upstream transport of fish in 2000. The City of Ellsworth, as holders of the alewife harvest rights, had previously been responsible for transporting alewives upstream. In order to facilitate upstream transportation of alewives that are trapped at the Ellsworth fishway, the licensee purchased two fiberglass tanks. With two tank trucks in the rotation, fish can be trapped and loaded while the other tank truck was en route upriver.

An active fishery for juvenile American eels (elvers) exists in tidal portions of the river downstream of the Ellsworth Dam. Although the dam lacks an eel fishway, some juvenile eels are able to gain access to upstream habitats by ascending the wetted surface of dams (none are collected in the trapping facility). Aggregations of juvenile eels attempting to move upstream over the Ellsworth and Graham Lake Dams were observed during several night time surveys conducted in 2014, but their passage success rate is unknown.

Resident and migratory fish stocks are an important public resource in the Union River drainage, and provide a variety of recreational and commercial fishing opportunities. The fishery resources in the drainage are also a critical component in ecological food webs, serving both as predators and prey for other species including ospreys, bald eagles, otters, and marine species.

### 3.1 Status of Diadromous Fish Populations

#### *3.1.1 River herring (alewives and blueback herring)*

Efforts to restore river herring populations to the Union River drainage began in 1972 when startup broodstock were trapped in the nearby Orland River and trucked to the Union River for release into Graham Lake. Upon completion of the fish trapping facility below Ellsworth Dam in 1974, fish returning to the Union River could be collected in the trap and transported upstream of the dam. Under a cooperative agreement with DMR, the City of Ellsworth was granted the commercial fishing rights for river herring on the river. The annual commercial harvest has ranged from five thousand to over one million fish, and it is an important source of bait as river herring are in high demand by local lobster fishermen.

Annual upstream escapement of river herring spawners ranged from 600 to 150,000 fish from 1973-2014. The goal of the river herring restoration program has been a harvest of 2,000,000 adult alewives, plus a *minimum* spawning escapement of 315,000 fish. The spawning escapement goal is roughly equivalent to 15% of the projected run, and is based on the DMR's management of alewife populations in other Maine rivers.

Leonard Lake and Graham Lake have been the principal stocking locations for river herring in the Union River drainage and contain much of the potential spawning habitat. However, many other lakes are within the historic range of river herring and will support alewife production. Natural lakes and ponds, including Branch Lake and Green Lake, which in all likelihood contained historical populations of alewives (due to the absence of natural barriers below these waters) are now inaccessible to alewives due to the existence of outlet dams and are being managed for resident species.

A remnant stock of blueback herring exists in the Union River based on DMR sampling of the commercial harvest. Unlike alewives, blueback herring spawn in free-flowing rivers and streams rather than in lakes and ponds. The peak spawning period for blueback herring is slightly later (mid to late June) than that of alewives.

Based on DMR scale sample analysis, most river herring in the Union River are first time age-4 or age-3 spawners (85-95% collectively, DMR 2008-2013 data, unpublished). River herring are typically recruited to the spawning run at age-4, and to a lesser degree at age-3. They can live up to 9 years, but more typically 6-7 years. Most river herring do not die after they spawn and may return to spawn every year until death. The age distribution and proportion of these repeat spawners varies greatly between years and rivers. Analysis of scale samples taken from the Union River population show that repeat spawners account for only 7% of that run, compared to higher percentages at other Maine locations (12% for the Flanders Stream run, 15% for the Somesville run, 19% for the Patten Stream run, and 20% for the Grist Mill Stream run). Because post spawners from all these rivers enter a common ocean environment, the two-three fold difference in survival observed for Union River spawners points to higher in-river mortality. Since all of these runs are harvested (except the Somesville and Patten Stream runs), other sources of in-river mortality may be a limiting factor in the low proportion of repeat spawners in the Union River. Potential sources of elevated mortality within the Union River (e.g. predator abundance, disease, dam related mortality) should be investigated and mitigated where possible.

### 3.1.2 Atlantic salmon

The Atlantic salmon restoration program for the Union River was initiated in 1971 with the stocking of Atlantic salmon smolts. Marine survival was high for that cohort, and large numbers of salmon returned in 1973. There was no fish passage available for returning salmon and, to the delight of anglers, salmon milled around below the dam and the rod catch that year was a record 75 salmon. Construction of the fish trapping facility below the Ellsworth Dam was completed the following year (1974). Because the Union River salmon population had been extirpated, stocking hatchery smolts was necessary to generate adult returns for the broodstock collection program. Due to the lack of downstream fish passage at Ellsworth Dam at the time, all smolts were stocked in the tailrace adjacent to the fish trap. Although smolt to adult salmon returns rates were often lower for the Union River than in the Penobscot River, annual runs exceeding 200 salmon were observed at the Union River during the 1970-80's (Table 3.1.2.1). The cause of the relatively low smolt to adult return rates in the Union River was never confirmed, but it was speculated that stocking smolts in tidal water below the dam diminished freshwater imprinting and reduced homing of salmon back to the Union River as adults. Moving the stocking location upriver to enhance imprinting was considered, but ultimately discarded over concerns that downstream smolt mortality at the Ellsworth Dam would be excessive and result in even fewer adult returns than stocking below the dam.

Marine survival and abundance of Atlantic salmon throughout the Gulf of Maine decreased sharply after the 1980's for unknown reasons. Consequently, salmon populations in the Union River and elsewhere continue to be augmented with hatchery reared fish to compensate for inadequate natural spawning. Large numbers of Atlantic salmon smolts were stocked in the Union River from 1971-1990, but smolt stocking was discontinued due to low adult return rates, budget shortfalls, and shifting program priorities. Parr were experimentally stocked in the West Branch Union River from 1993-1999, but few adult returns were produced (Table 3.1.2.1), so parr stocking was also discontinued. The Union River Salmon Association (USA) built and operated a small Atlantic salmon fry hatchery on the Union River from 2000-2006. Their hatchery was intended to serve as the primary source of salmon fry for stocking the Union River. The USFWS shipped eyed eggs to the USA hatchery, but high mortality of eggs and fry (later traced to the USA hatchery's source of water) could not be resolved, and few salmon fry were stocked in the Union River from 2000 to 2006 (table 3.1.2.2).

Lack of stocking or natural spawning for several years have resulted in a near absence of sea-run salmon returns since 2003 (Table 3.1.2.1). Salmon runs have increased slightly in the past few years, but remain critically low. The USA determined that it was not feasible to operate their hatchery without a suitable water supply, so as an alternative, it entered into a cooperative agreement with the USFWS's Green Lake National Fish Hatchery (GLNFH) in 2007. The USFWS agreed to provide USA with approximately 25,000 unfed fry per year for stocking the Union River in exchange for volunteer labor at the hatchery.

In 2011, 282 surplus hatchery broodstock from the USFWS were released to spawn in the West Branch of the Union River. During follow-up redd counts, DMR documented over 200 salmon redds distributed throughout the West Branch habitat. Because that habitat was occupied by naturally spawned fry and parr, no hatchery fry were stocked in the Union River from 2012-2013. Fry stocking by the USA resumed in 2014 and will continue through the life of this plan, pending availability of eggs and fry.

Table 3.1.2.1 Union River Atlantic Salmon Rod & Trap Catch 1973-2014.  
Sea-Run salmon

	Aquaculture	Sea-Run salmon			Total
		Hatchery	Wild	SR total	
1973	0	75	0	75	75
1974	0	20	0	20	20
1975	0	79	0	79	79
1976	0	248	0	248	248
1977	0	244	0	244	244
1978	0	157	0	157	157
1979	0	45	0	45	45
1980	0	240	0	240	240
1981	0	295	0	295	295
1982	0	156	0	156	156
1983	0	144	4	148	148
1984	0	40	0	40	40
1985	0	82	0	82	82
1986	0	67	0	67	67
1987	unknown	63	0	63	63
1988	unknown	45	2	47	47
1989	unknown	30	0	30	30
1990	unknown	21	0	21	21
1991	unknown	2	6	8	8
1992	unknown	4	0	4	4
1993	unknown	0	0	0	0
1994					
1995					
1996	68	0	1	1	69
1997	unknown	8	0	8	8
1998	unknown	13	0	13	13
1999	63	6	3	9	72
2000	3	2	0	2	5
2001	2	0	0	0	2
2002	6	5	0	5	11
2003	0	1	0	1	1
2004	0	1	1	2	2
2005	4	0	0	0	4
2006	0	0	0	0	0
2007	0	0	0	0	0
2008	0	0	0	0	0
2009	0	0	0	0	0
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	2	0	0	0	2
2013	0	0	1	1	1
2014	0	1	1	2	2

Table 3.1.2.2. Union River Atlantic salmon stocking history 1970-2014.

Year	Fry	0+Parr	1Parr	Smolt	Adult
1970-1974	0	0	0	65,700	
1975	0	0	0	31,300	
1976	0	0	0	33,600	
1977	0	0	0	35,500	
1978	0	0	0	31,900	
1979	0	0	0	42,800	
1980	0	0	0	30,600	
1981	0	0	0	29,400	
1982	0	0	0	32,400	
1983	0	0	0	41,600	
1984	0	0	0	50,200	
1985	7,000	0	0	45,800	
1986	7,000	0	0	48,400	
1987	7,000	0	0	40,100	
1988	0	0	0	30,600	
1989	0	0	0	20,400	
1990	0	0	0	20,400	
1991	0	0	0	0	
1992	0	0	0	0	
1993	60,000	111,700	0	0	
1994	0	0	0	0	
1995	0	54,800	0	0	
1996	0	53,500	0	0	
1997	12,000	69,300	0	0	
1998	165,000	0	0	0	
1999	165,000	82,100	0	0	
2000	0	0	0	0	
2001	2,000	0	0	0	
2002	5,000	0	0	0	
2003	3,000	0	0	0	
2004	3,000	0	0	0	
2005	2,000	0	0	0	
2006	2,000	0	0	0	
2007	22,000	0	0	0	
2008	23,000	0	0	0	
2009	28,000	0	0	0	
2010	19,000	0	0	0	
2011	19,000	0	0	0	282
2012	Natural recruitment from 282 adult spawners stocked in September, 2011 – no fry stocking				
2013	Natural recruitment from 282 adult spawners stocked in September, 2011 – no fry stocking				
2014	23,000	0	0	0	

Commercial Atlantic salmon aquaculture sea-cage sites were established along the Maine coast during the 1980's, and salmon escaping from those sea-cages began to appear at fishway traps shortly thereafter (Table 3.1.2.1). The DMR determined through scale sample analyses that 68 of the 72 salmon captured at the Union River trap in 1999 had escaped from nearby aquaculture net pens (after a major sea-cage breach that year). That sea-cage complex, located in Blue Hill Bay, was abandoned by the owner (Eric Swanson) a few years later, and the number of aquaculture fish captured in the Union River decreased immediately (Table 3.1.2.1).

Most of the Atlantic salmon habitat (67 %) in the Union River is located in the West Branch according to habitat surveys conducted in the late 1950's (Havey 1961; Baum 1982) and 2001 (DMR/USFWS). The main stem of the river and tributaries (above Ellsworth Dam) account for 16% of the Union River salmon habitat, with the balance occurring in the East Branch (13%) and Middle Branch (3%). The Union River has the potential to support self-sustaining runs of 250-750 Atlantic salmon based on the amount of juvenile salmon rearing habitat available, a potential production of 3.0 smolts/100m<sup>2</sup> of habitat, and a smolt to adult return rate of 1 - 3% (Baum 1997). Additional production of adult salmon could result from fish spawning in three minor tributaries below the Ellsworth Dam (Meadow Stream, Patten Stream, and Card Brook).

Prompted by severe declines in salmon runs and the identification of genetically distinct salmon stocks in Maine rivers, the USFWS and NMFS co-listed the Gulf of Maine Distinct Population Segment (GoMDPS) of Atlantic Salmon as endangered under the federal ESA in December 2000. The GoMDPS of Atlantic salmon includes all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site, northward to the mouth of the St. Croix River. The Union River is encompassed within the GoMDPS and is designated as critical salmon habitat under the ESA.

### *3.1.3 American shad*

A residual population of American shad together with strays from other river systems are likely present in the Union River estuary below the Ellsworth Dam. Shad have been observed incidentally in the commercial river herring harvest, by anglers, and historically by agency personnel tending the trap. Due to the lack of a viable source of broodstock, shad are not currently stocked in the Union River. When resources become available, shad restoration will focus on the historically accessible main stem and tributary habitat located above and below the Ellsworth Dam.

### *3.1.4 Striped bass*

Striped bass (stripers) use the Union River estuary for foraging for alewives, shad, and eels during the spring, summer, and fall, but they are not known to spawn there. Striped bass migrating north from southern spawning populations, including the Hudson River, Delaware River, and the Chesapeake Bay region, are believed to be the source of stripers observed in the Union River. Striped bass have been a popular sportfish in the Union River, but angling opportunity has declined since 2007 due to a regional decline in striped bass abundance.



### *3.1.5 Rainbow smelt*

Rainbow smelt occur in the Union River estuary below Ellsworth Dam and spawn in the main stem of the Union River above the head of tide. They support a small recreational fishery, which is limited to harvest by hook and line or dip net (two-quart daily limit from March 15 to June 30). Anadromous rainbow smelt typically migrate a short distance into rivers and streams during their annual spawning migrations, as they cannot negotiate rapids or other significant natural barriers. It is unknown how far smelt migrated upstream in the Union River prior to the existence of the dams in Ellsworth.

### *3.1.6 Atlantic sturgeon*

Atlantic sturgeon have been observed in the Union River below the Ellsworth Dam, according to state fishery personnel. The status of the population of Atlantic sturgeon, and the closely related shortnose sturgeon, which may also occur in the river, is unknown at this time. It is currently unlawful for any person to take, catch, possess or destroy any shortnose or Atlantic sturgeon from the coastal waters of Maine.

### *3.1.7 Tomcod*

Tomcod are present in the Union River estuary, although little is known about their present distribution and abundance. The species is important ecologically in predator-prey relationships, and may provide limited sport fishing opportunities.

### *3.1.8 American eel*

American eels are present in the Union River estuary and in inland waters above the Ellsworth and Graham Lake Dams (as documented by netting and stream electrofishing). Juvenile eels, known as elvers, are harvested commercially below the Ellsworth Dam and have accounted for 6-10% of the annual statewide harvest since 2007. Although elvers have the ability to ascend the wetted surface of some barriers, their passage above Ellsworth is likely restricted due to the height of the dam structures (Ellsworth Dam - 65 ft.; Graham Lake Dam - 25 ft.). In 2014, BBHP conducted seven night time surveys (June-August) at the Ellsworth and Graham Lake Dams to investigate juvenile eel abundance and to identify areas where eels congregated around these dams during their upstream migration. Many young eels (5-12 cm long) were observed ascending wetted ledge or dam surfaces. Those data are being analyzed cooperatively with fisheries agencies to determine what measures are needed to ensure adequate upstream passage for eels. Results of that analysis are expected in 2015.

## 3.2 Status of Resident Fish Populations

The Union River drainage supports important recreational sport fisheries for landlocked Atlantic salmon, brook trout, togue (lake trout), brown trout, splake (lake trout - brook trout hybrid), smallmouth bass, and chain pickerel. Minor sport fisheries exist in certain waters for yellow perch, rainbow smelt, and hornpout (brown bullhead). Some waters are fished commercially for baitfish, such as golden shiners, common shiners, white suckers, and dace. IFW manages these fisheries largely through two strategies:

- maintaining wild populations of salmonids, primarily by use of restrictive harvest regulations;
- stocking hatchery-reared fish in suitable habitats.

The drainage is especially noteworthy because it provides a wide diversity of angling experiences. In addition to selecting the species they wish to fish for, anglers can, in numerous cases, choose whether they want to catch a lot of small fish or a few fish, but have a chance at a trophy. Some waters are very popular, attracting thousands of angler days of use each year.

Important landlocked salmon waters include Alligator Lake, Green Lake, and Lower Patten Pond. Popular brook trout waters include Long Pond, Hatcase Pond, Halfmile Pond, West Branch of the Union River, Middle Branch of the Union River, and numerous brooks and streams, which contain wild brook trout populations. Productive lake trout waters include Beech Hill Pond, Branch Lake, Green Lake, and Hopkins Pond. Green Lake produces a good fishery for 5-7 lb. togue in most years, and Beech Hill Pond occasionally yields a 10-15 lb. lunker togue. King Pond, Georges Pond, and Spectacle Pond support stocked brown trout fisheries. Splake can be caught in Lower Springy Pond. Some of the better bass waters include Graham Lake, Green Lake, Branch Lake, and Georges Pond. Trophy smallmouths are caught from Great Pond, Webb Pond, Abrams Pond, and Georges Pond. Good white perch angling exists at Graham Lake, Georges Pond, Webb Pond, and Spectacle Pond. Productive pickerel waters include Graham Lake, Spectacle Pond, Lower Patten Pond, and Green Lake. There is no angling allowed for landlocked arctic char in Floods Pond (closed to all fishing) and Green Lake (dwarf population).

#### **4.0 Fisheries Management Recommendations 2015-2017**

There are three overarching external factors currently influencing the development of fisheries management strategies for the Union River in 2015-2017:

- 1) The FERC relicensing process for BBHP's Ellsworth hydroelectric project on the Union River (the current license expires in 2017). FERC has reviewed the *Initial Study Report* (ISR) submitted by BBHP in 2014 and determined that BBHP should conduct additional studies/analysis to support their license application.
- 2) The development of an SPP for endangered populations of Atlantic salmon in the Union River. An SPP is a prerequisite for a "take permit" issued by NMFS, which could authorize BBHP to incur incidental take (including mortality) of Atlantic salmon in conjunction with operation of the Ellsworth Project, including monitoring studies and trapping operations. The SPP is intended to ensure that the project will be operated in a mutually agreeable manner that minimizes risk to salmon and their habitat. BBHP is currently (2015) developing an SPP for the Union River in consultation with NMFS.
- 3) The consideration of a petition to list American eels under the ESA. The USFWS is currently reviewing a petition filed by the *Center for Endangered Species Act Reliability* (CESAR) to list the American eel as a protected species under the ESA. Results of this eel status review could significantly impact eel management strategies and requirements in the Union River. By court order, USFWS must present results of the status review for public comment no later than September 2015.

The SPP, eel status review, and relicensing studies have a direct bearing on fisheries management recommendations for the life of this plan (2015-2017). Thus, by necessity, this plan will be dynamic and adaptable as new data become available to inform the planning process.

#### 4.1 Research Initiatives 2015-2017

Pursuant to the FERC relicensing application for the Ellsworth Hydroelectric Project, BBHP submitted a *Study Plan* and an *Initial Study Report* (ISR) in 2014 detailing results of studies requested by FERC in their *Study Plan Determination* (SPD). The FERC, in a *Letter of Determination* dated December 30, 2014 (FERC 2014), determined that modification of existing studies and the addition of new studies would be required. Those studies will be developed and conducted in 2015 and 2016. In addition to these relicensing studies, Table 4.1.1 summarizes research initiatives planned for the Union River for the 2015 – 2017 period:

Table 4.1.1. Summary of Research Initiatives for the Union River, 2015-2017.

Study	Requested by	Study Type	Year	Study Lead and Objective
1	FERC, NMFS	Tributary Connectivity Field Study	2015	<u>BBHP</u> - Provide additional information on how tributary connectivity in Graham Lake changes at different water surface elevations.
2	FERC, NMFS, DMR	Upstream Passage Desktop Study Passage Alternatives	2015	<u>BBHP</u> - Identify upstream fish passage alternatives and costs for Ellsworth and Graham Lake Dams, including an alternative of project decommissioning.
3	FERC, DSF, NMFS, DMR	Atlantic Salmon Field Study Upstream Passage Trap Operation	2015	<u>BBHP</u> - Expand upstream trap operation for Atlantic salmon to 7-days/week 1May-31October. Tend trap at 3-hr. intervals sunrise to sunset. Conduct observations of presence of salmon and overall effectiveness of trap and operations.
4	FERC	Downstream passage operations	2015	<u>BBHP</u> - Prepare and implement modifications to the maintenance and operations procedures for the existing downstream fish passage system to correct deficiencies identified during 2014 operations.
5	FERC, NMFS, DMR, USFWS	Atlantic Salmon Field Study Downstream Passage	2016	<u>BBHP</u> - Develop and conduct field studies using Atlantic salmon smolts to assess downstream passage survival to better inform the 2014 desktop analysis.
6	FERC, USFWS, NMFS, DMR, DSF	American Eel Field Study Downstream Passage	2015	<u>BBHP</u> - Develop and conduct field studies using tagged adult eels to assess their downstream passage at Ellsworth and Graham Lake Dams.

7	FERC,NMFS	Intake Water Velocity Field Study	2015	<u>BBHP</u> - Collect water velocity field data at intake surfaces and downstream bypass entrances at the Ellsworth Dam to better inform the 2014 desktop analysis.
8	LLPOA	Fishway Potential Desktop Study Lower Lead Mtn. Pond	2015--	<u>LLPOA</u> - Lower Lead Pond Lake Owners Association. Proposed dam replacement with new fishway (first ever) to provide fish passage into Lower Lead Mountain Pond.
9	DMR, IFW	Diadromous Fish Field Study Passage at Natural Falls	2015	<u>DMR, IFW</u> - Evaluate fish passage potential for diadromous species at natural falls and other obstructions in the East Branch, Union River, and Beech Hill Stream. Assess these data relative to historic species distribution and management strategies.
10	DMR, USFWS	Water Temperature Field Study Habitat Suitability	2015-2017	<u>DMR</u> - Establish five water temperature index sites in 2015 in the Union River watershed to monitor water temperature and assess habitat suitability for fish species.

*Results for above studies will be described in detail in BBHP study reports in 2015 and 2016, and summarized in annual URFCC reports.*

#### 4.2 River Herring Management Objectives 2015-2017

In 2009, the Atlantic States Marine Fisheries Commission (ASMFC), of which Maine is a member, passed Amendment II to the Interstate Fisheries Management Plan (IFMP) for American Shad and River Herring (ASMFC 2009). As part of this IFMP, Maine and all member states agreed to close all river herring fisheries (commercial and recreational) by 2012, except where the fishery could be documented as sustainable. Sustainable river herring fisheries are defined as those that can support a commercial and/or recreational fishery in addition to maintaining an adequate level of escapement to sustain stock reproduction and recruitment. Any state wishing to allow fishing of specific runs submitted plans to the ASMFC for approval. No run may be harvested if it has not been approved by the ASMFC.

In late 2011, Maine submitted sustainable fishery management plans for 19 river herring runs, including the Union River run. Runs were defined as sustainable that met certain criteria, including minimum escapement targets and biological metric standards. The escapement sustainability target (established in 1984) for most commercial fisheries is 35 fish per surface acre of spawning habitat. The Ellsworth harvest was a notable exception from this target and was only allowed a lower escapement target since Amendment II was adopted after the Union River Management Plan was already in place. Other rivers have a fishery closure requirement of 3 days per week to meet their sustainable fishery management plans.

Many fisheries are also required to maintain continuous escapement to ensure the spawning population is composed of multiple age classes and the escapement goal is reached, even if there is a small run or high flows prevent escapement during the normal weekly closure. Exceptions to these rules are granted when a large portion of the minimum escapement is passed before harvest commences. For example, the harvest at Damariscotta Mills is permitted a 2 day closure because there is continuous upstream passage (escapement) around the harvest, and because no harvest is allowed during the first week of the run each year. Because of these measures, less than 40% of the run is harvested each year, while greater than 60% of the run reaches the spawning grounds successfully.

The number of lakes managed for alewife production in the Union River drainage will increase from two to seven lakes in 2015 (subject to accessibility by the stocking truck), with a coincident increase in spawning escapement from 150,000 to 315,000 river herring (Table 4.2.1). The previous spawning escapement (150,000 river herring) was approximately ½ the target escapement of 35 fish/acre and inadequate to populate the accessible habitat and achieve restoration goals. All seven lakes are within the historic range of alewives, but only Graham and Leonard Lakes have received alewife re-introductions to date. The calculated spawning escapement for the seven lakes is 357,151 alewives based on 35 fish/acre and a harvest of 2 million river herring (Table 4.2.1).

The annual run of blueback herring should be monitored, with the intent of increasing the numbers of late running fish to a target rate of 35 adults per surface acre of accessible riverine habitat. In addition to river specific management measures, the blueback herring stock will be managed in accordance with the mandatory compliance requirements of Amendment II to the IFMP for American Shad and River Herring (ASMFC 2009).

Table 4.2.1 River herring production, escapement goals, and 2015 minimum escapement targets for the Union River, Maine.

Water body	Surface acres	Riv.Herring Production	Escapement goal (35/acre)	2015 Target escapement
<u>Phase I Lakes</u>				
Leonard Lake	118	27,683	4,123	<b>3,636</b>
Graham Lake	7,865	1,848,275	275,275	<b>242,787</b>
L. Webb Pond	77	18,095	2,695	<b>2,377</b>
Webb Pond	915	215,025	32,025	<b>28,245</b>
Abrams Pond	423	99,405	14,805	<b>13,058</b>
Scammon Pond	427 <sup>1</sup>	100,228	14,928	<b>13,166</b>
Georges Pond	380	89,300	13,300	<b>11,730</b>
Phase I total	10,204	2,398,011	357,151	<b>315,000</b> <sup>2</sup>
Harvestable surplus		2,040,860		
Union River (late season blueback herring)				<b>1,600</b> <sup>3</sup>

Phase II Lakes

list here

list here

list here

<sup>1</sup> Scammon Pond acreage estimated from GIS.

<sup>2</sup> 315,000 target for 2015 is 31 fish/acre and does not include late run blueback herring.

<sup>3</sup> Blueback herring trapped after 10 June and released above Ellsworth Dam.

The long standing *minimum* escapement goal for river herring in the Union River (315,000 fish) will be the management target for 2015-2017. That is below the 35 fish/acre goal (357,151 fish), but is instituted for the short term to reduce the immediate impact on businesses dependent on the alewife harvest while the run is rebuilding. Alewife escapement will be passed upstream annually, using the following guidelines:

- The first 150,000 alewives captured will be trucked upstream and released into Graham Lake prior to any commercial harvest.
- For the remainder of the run, the entire daily trap catch *may* be harvested Monday-Friday (5 days/week) except as noted below. On Saturday and Sunday (2 days/week), 100% of the river herring trap catch will be transported upstream and released in the numbers and locations indicated in Table 4.2.1 (subject to accessibility by the stocking truck). The order in which the Phase I Lakes are stocked is at the discretion of the trap operator and based on fish abundance and trucking logistics. All Phase I Lakes will be stocked at *goal* (357,151 fish total) escapement (not the minimum target) before any Phase II lakes are stocked (Table 4.2.1).

- All river herring that are trapped must be afforded upstream passage (unless harvested). From Monday through Friday, all river herring that are trapped but not selected for harvest will be transported upriver and released. Weekly and cumulative escapement data must be reported weekly to the DMR.
- In season adjustments. If a poor river herring run is projected from the cumulative catch data, and it becomes evident that the 2 day/week escapement window will be inadequate to achieve the minimum escapement target of 315,000 fish, DMR has the authority to suspend harvest operations and require that all available river herring are passed upstream until the minimum escapement goal is reached.
- Biological sampling of both the harvested run and the river herring passed upstream will be performed weekly from the first week that fish are passed upstream to the last week of the run (25 fish per week of harvested fish, and 25 fish per week of trucked fish). Sampling will include total length, sex, and a scale sample from each fish. DMR will provide sampling supplies and will be available to assist in sample collection and data recording if requested by the harvester and truck operator. Sampling both the fish passed upstream and the harvest will show if the age and repeat spawning proportions differ between these two groups.
- After June 10, transport and stock 1,600 river herring immediately above the Ellsworth Dam. In order to enhance and expand the small population of blueback herring that presently occurs below the Ellsworth Dam, a portion of the late run of river herring (that which occurs after June 10, and includes the bulk of upstream migrating blueback herring) should be collected at the trap and moved to upstream spawning habitat.
- Restrictions regarding locations and other details will follow those outlined in the "Operational Schedule and Handling Protocol - Union River Trap" (Protocol). 2015-2017.

BBHP is responsible for operating the upstream fish passage facility and providing the necessary resources (labor, equipment, etc.) required to meet the escapement schedule and recommendations prescribed in this plan.

Based on FERC review of the events surrounding the documented fish kills (juvenile river herring and adult eel mortalities) at Ellsworth Dam in the fall of 2014, FERC has determined that BBHP was in violation of license Article 406 by not operating the downstream fish passage facility in such a way that the needs of migrating fish were addressed. BBHP will conduct a thorough analysis of the downstream bypass, pumps, auxiliary cooling water system, and operational protocols at the Ellsworth Dam to understand and correct operational and physical factors that potentially led to the fish mortalities. On or before 31 March, 2015, BBHP will prepare and distribute a detailed description of the operational and physical measures that will be implemented in 2015 to address downstream mortality and ensure that safe and efficient fish passage is provided at the Ellsworth Project. Results of that analysis should be incorporated into a daily checklist for plant operators (similar to that in place at West Enfield) to ensure that operation of the plant, fish bypass systems, and auxiliary pumps is optimized and responsive to daily and seasonal changes in discharge, headpond elevation, and fish abundance.

#### 4.3 Atlantic Salmon Management Objectives 2015-2017

The management objectives for Atlantic salmon in the Union River (and elsewhere) are to restore self-sustaining runs, restore recreational angling opportunities, and increase public awareness and involvement in attaining program goals. For the period 2015-2017, Atlantic salmon management activities on the Union River will focus on evaluation of upstream and downstream fish passage facilities, interpretation/application of study results, increasing accessible habitat, and stocking:

- Atlantic salmon upstream passage studies. The Ellsworth Dam upstream trap and truck schedule will be expanded significantly in 2015 to evaluate upstream passage opportunity for adult Atlantic salmon (FERC, 2014). The initiation date for annual fishway and trapping operations for Atlantic salmon will be advanced to include the entire month of May (open 1 May- close 31 October). Based on salmon run timing observed elsewhere, a portion of the Union River salmon run likely occurs in early May prior to the initiation of (intermittent) daily trap operations for alewives in mid-late May. The fishway and trap operation schedule will increase in 2015 from the previous 3-days/week schedule to a 7-days/week schedule. Daily hours of operation will extend from sunrise to sunset, with trap tending at 3 hour intervals.
- Upstream trap operation - nighttime trap tending. Operation of the upstream fishway and trap at night is not recommended for 2015-2017 (FERC, DMR). Salmon behavior data from other fishways indicate minimal upstream movement at night by adult Atlantic salmon. If the manually operated fishway and trap are replaced by an automated/volitional fish passage system at Ellsworth Dam, then a 24 hours/day schedule should be considered.
- Upstream trap operation – water temperature threshold. The fishway and trap will not be operated when river water temperature equals or exceeds DMR's safe handling threshold of 23°C for Atlantic salmon (FERC, DMR). The previous practice of operating the Union River trap above the safe handling/trucking threshold (from 23-25°C) for the sole purpose of data collection will be discontinued to eliminate the fish health risk associated with handling endangered salmon at high river temperatures. The impact of elevated water temperature on fish passage opportunity at the Ellsworth Dam will be assessed as part of the overall upstream fish passage assessment. DMR's Atlantic salmon trapping and handling protocols for the Union River are currently being revised and will be attached to this plan once finalized.



- Upstream trap operation – authorized personnel. Only persons successfully completing a DMR training course in safe Atlantic salmon handling techniques will be authorized to handle (touch, net, move, disturb, transport, etc.) adult Atlantic salmon at the Ellsworth trap. The course will be provided to the BBHP trap tenders by the DMR and will include hands-on experience with live salmon at the Milford Dam trap facility on the Penobscot River. The course will also include training in the identification of aquaculture escapee suspects. Any fish identified as a potential aquaculture escapee after thorough examination by the trap operator will be inspected (and euthanized if necessary) by a DMR marine scientist. Only DMR is authorized to euthanize aquaculture escapees. Otherwise, BBHP is responsible for processing all salmon captured at the Ellsworth Dam and transporting them to the West Branch of the Union River or other locations approved by the DMR. DMR suggests that modifications to the trap structure be considered to improve the ability to access, inspect, and safely handle trapped salmon.
- Downstream passage –Atlantic salmon smolts. FERC (2014) recommends that BBHP develop and conduct field studies using Atlantic salmon smolts to assess downstream passage survival at the Graham Lake and Ellsworth Dams and submit a study plan by March 2015. The 2014 desktop analysis prepared by BBHP (as part of the FERC approved *Study Plan*) used downstream survival data from other dams to estimate potential survival at the Ellsworth Dam. FERC and state and federal fisheries agencies agreed that much of the data used for the 2014 desktop analysis may not be representative of conditions at Ellsworth Dam due to significant differences in the design and configuration of those dams that could affect smolt survival. FERC determined that field studies investigating the survival of smolts passing the Ellsworth Project would be required to adequately assess project impacts on Atlantic salmon.
- New fishway construction – Lower Lead Mountain Pond proposal. As owner of the dam, the Lower Lead (Mountain) Pond Owners Association (LLPOA) is seeking to rebuild the 80 year old dam on the primary outlet (Salvage Brook) of Lower Lead Mountain Pond. Because Salvage Brook and Lead Mountain Ponds are part of the East Branch Union River, which is designated as critical habitat for endangered Atlantic salmon, any dam modification or re-construction would require fish passage provisions to meet USFWS permitting criteria. The previous dam owner was issued a “notice of violation” (NOV) for unauthorized repairs to the dam, and the NOV was transferred to the LLPOA when they purchased the dam. Kleinschmidt Associates has prepared an assessment of alternative solutions for First Wind, LLC, ranging from dam removal to replacement, including the following background information: *“The previous NOV was then transferred by LURC to the LLPOA on May 21, 2012 and, as a result, the association must now rehabilitate the dam in compliance with regulatory agency requirements. First Wind LLC is exploring the LLMP dam rehabilitation project as part of a community outreach and future tangible benefit requirement for a potential wind energy development.”* In addition to benefitting Atlantic salmon, construction of a fishway at Lower Lead Mountain Pond may benefit other diadromous species, including river herring if they have unobstructed access to the East Branch Union River (see below). The project will commence pending acquisition of funding and the required permits, which are in progress.

- Fish Passage at Natural Falls. DMR and IFW will evaluate fish passage potential for diadromous species at natural falls and other obstructions in the East Branch Union River and Beech Hill Stream. A 15 foot high natural waterfall exists on the East Branch Union River near where it enters Graham Lake (just East of Route 179). This falls may obstruct the passage of species of concern (e.g. river herring). The historic range and management of those species in the East and Middle Branches of Union River would be dependent on their ability to pass the falls. A multiagency team of biologists, including alosine specialists, will inspect the falls and develop a consensus opinion regarding species-specific upstream passage potential at the falls. The team will also inspect Beech Hill Stream to offer a second opinion about passage potential at a large falls on that stream which was deemed “probably impassable to alewives” during a previous site visit by another team.
- Habitat assessment – water temperature. Time series water temperature data are lacking for critical salmon habitat in the Union River. A minimum of five index stations to monitor water temperature will be established in 2015. Water temperature data loggers recording at 1 hour intervals will be deployed at these sites continuously for a minimum of three years. These data will be used to assess habitat suitability for cold water species within the Union River and be added to the Gulf of Maine DPS water temperature database for regional analysis.
- Atlantic salmon stocking recommendations – fry lifestage. Continue to stock the West Branch Union River above ME Route 9 with a minimum of 25,000 Atlantic salmon fry annually. Fry will originate from Penobscot strain broodstock captive-spawned by the USFWS. The USA will stock the fry with the assistance of the USFWS. Stocking success will be evaluated through juvenile salmon abundance surveys (electrofishing) pending DMR staff availability.
- Atlantic salmon stocking recommendations – adult life stage. In 2015, DMR and Cooke Aquaculture, Inc. will develop a proposal for a cooperative sea-cage rearing program. The concept is to release sea-cage reared adult salmon into Maine rivers, including the Union River, to generate natural spawning and wild smolt production. The proposed source of smolts for the sea-cages is Penobscot strain smolts produced from sea-run broodstock by the USFWS at the GLNFH. This proposal is still in the concept phase and will require development, review, and approval from the DMR, USFWS, and Atlantic Salmon Framework.

#### 4.4 American Shad Management Objectives 2015-2017

DMR plans to focus its shad restoration efforts on rivers other than the Union during the period 2015-2017, including the Kennebec, Androscoggin, Saco, Penobscot, and St. Croix. There is also no convenient source of broodstock for the Union that would support an active shad stocking program. Until such resources become available, management of shad in the Union River will be accomplished using measures implemented for other diadromous species, including the provision of interim and permanent fish passage and continuation of instream flows at the Ellsworth Project. Any actions taken by the DMR regarding shad management in the Union River will be consistent with the mandatory compliance requirements of the IFMP for American Shad and River Herring. The following existing regulations on American shad should be continued:

- it is unlawful to fish for or take American shad from the coastal waters of the state by any method other than hook and line; and
- It is unlawful for any person to fish for or possess more than two American shad per day taken from the coastal waters of the state.

#### 4.5 Rainbow Smelt Management Objectives 2015-2017

Rainbow smelt will continue to be managed in the Union River in accordance with statewide regulations governing recreational and commercial harvest. These regulations include a restriction to a two-quart daily limit between March 15 and June 15, taken only by hook and line or hand-held dip net. The current minimum flow requirement at the Ellsworth Project will also help provide a relatively stable environment for successful smelt spawning, egg incubation, and fry development.

#### 4.6 Striped Bass Management Objectives 2015-2017

Striped bass will be managed in the Union River according to the mandatory compliance requirements of the IFMP for Striped Bass (Atlantic States Marine Fisheries Commission). Under this regional Atlantic coast plan, minimum sizes, creel limits and fishing seasons are established in concert with regulations imposed by other states to help assure maintenance of an adequate spawning stock. The following existing regulations apply for striped bass fishing in the Union River:

- There is no closed season for striped bass fishing in the Union River.
- Gear is restricted to hook and line only; consult regulations for hook and bait restrictions.
- It is unlawful to use a gaff to land a striped bass.
- A person may take and possess one striped bass per day; total length must be between 20 and 26 inches (inclusive) or 40 inches or greater.
- It is illegal to sell striped bass taken from the waters of Maine.

#### 4.7 American Eel Management Objectives 2015-2017

The USFWS is currently reviewing a petition to list the American eel as a protected species under the ESA. Results of this eel status review will be completed by September 2015, and the outcome of that review may significantly impact eel management strategies and requirements in the Union River. If the American eel is listed under the ESA, management actions will be guided by an approved recovery plan, which the USFWS will develop with input from conservation interests and the public. In the interim, eels will be managed in the Union River according to the American Eel (*Anguilla rostrata*) Species Management Plan (Joint DMR and IFW Committee 1996) and the Atlantic States Marine Fisheries Commission November, 1999 "Fishery Management Plan for American Eel" (or more recent updates as they are available).

This includes the regulation of the existing commercial elver fishery that presently takes place below the Ellsworth Dam. It is the objective of the DMR to restore eels to their natural abundance in all waters of the Union River drainage. This will require adequate upstream and downstream eel passage at the Ellsworth Project, which are currently being evaluated.

- Downstream passage studies. FERC (2014) has recommended that BBHP conduct a field study to assess downstream passage route selection and associated rates of survival for adult eels at the Graham Lake and Ellsworth Dams. BBHP will develop and submit a study plan addressing the study requirement in 2015.
- On or before 31 March, 2015, BBHP will prepare and distribute a detailed description of the operational and physical measures that will be implemented in 2015 to address downstream mortality of eels and other fish in order to ensure that safe and efficient fish passage is provided at the Ellsworth Project.
- Continue to regulate the elver harvest based on best available science.

## **5.0 Long Term Fisheries Management Goals and Objectives by River Reach**

The URFCC has also established long term goals for managing fishery resources in the Union River drainage, and have identified specific objectives for six subdivisions of the watershed, designated as Reach I through VI (Figure 1).

### **Goal:**

Manage all sport and commercial fish species in the Union River for optimum habitat utilization, abundance and public benefit.

### **Objectives by Reach:**

**Reach I: Mouth of the river to Ellsworth Dam; includes Upper and Lower Patten Pond and Patten Stream, and Meadow Brook in Surry, which flow into Union River Bay, and Card Brook, which joins the river in Ellsworth.**

1. Manage Reach I as a migratory pathway for Atlantic salmon, American shad, river herring, and American eels.
2. Manage river herring, American shad, American eel, and striped bass in accordance with the Atlantic States Marine Fisheries Commission's Interstate Fisheries Management Plans for these species.
3. Manage Reach I for sustained production of resident and diadromous (anadromous and catadromous) species consistent with habitat capabilities.

**Reach II: Ellsworth Dam to Graham Lake Dam, including Branch Lake sub-drainage.**

1. Manage Reach II (main stem) as a migratory pathway for Atlantic salmon, American shad, river herring, and American eels.
2. Manage Branch Lake for wild lake trout, brown trout, landlocked salmon, and smallmouth bass.
3. Manage Reach II (main stem and Branch Lake Stream) for sustained production of brook trout, Atlantic salmon, American shad, river herring, and American eels consistent with habitat capabilities.
4. Promote existing and potential recreational fisheries for resident species.
5. Continue to restrict commercial bait fish harvest in selected waters.

**Reach III: Graham Lake Dam to confluence of West and East Branch of the Union River and tributaries.**

1. Manage Reach III as a migratory pathway for Atlantic salmon, American shad, river herring, and American eels.
2. Manage Green Lake, Beech Hill Pond, Floods Pond, and Burnt Pond for existing resident species, including landlocked arctic char, landlocked Atlantic salmon, lake trout, and smallmouth bass.
3. Manage Graham Lake and Webb Pond sub-drainage for existing resident species, including smallmouth bass, white perch and pickerel, and sea-run alewives and eels consistent with habitat capabilities.
4. Promote existing and potential recreational fisheries for resident species.
5. Continue to restrict commercial bait harvest in selected waters.
6. Protect Green Lake National Fish Hatchery water supply from introductions of non-endemic/emergency fish pathogens.

**Reach IV: West Branch of the Union River.**

1. Manage Reach IV as a migratory pathway for Atlantic salmon, American shad, river herring, and American eels.
2. Manage Reach IV for sustained production of wild brook trout, Atlantic salmon, American shad, river herring, American eels, and other resident species consistent with habitat capabilities.
3. Promote existing and potential recreational fisheries for resident species.
4. Continue to restrict commercial bait fish harvest in selected waters.

**Reach V: Middle Branch of the Union River.**

1. Manage Reach V for sustained production of wild brook trout, eels, and other resident species consistent with habitat capabilities.
2. Promote existing and potential recreational fisheries for resident species.
3. Continue to restrict commercial bait fish harvest in selected waters.

**Reach VI: East Branch of the Union River.**

1. Manage Reach VI as a migratory pathway for Atlantic salmon and American eels.
2. Manage Reach VI for sustained production of wild brook trout, Atlantic salmon, eels, and other resident species consistent with habitat capabilities.
3. Promote existing and potential recreational fisheries for resident species.
4. Continue to restrict commercial bait fish harvest in selected waters.

**6.0 Additional fisheries management and planning issues to be addressed in 2015 - 2017**

- The Green Lake Dam lacks a fishway and prevents anadromous fish from entering Green Lake. The URFCC recommends in this and previous plans that Green Lake be excluded from alewife stocking in order to avoid the risk of exposing the GLNFH source water supply (Green Lake) to fish that may carry harmful pathogens. Modification of that recommendation is not contemplated; however, the supporting rationale has not been well described in the CFMP to date. The specific fish health risks and their magnitude should be discussed/presented relative to water treatment capabilities at the hatchery, angler introduced baitfish, stocked game fish, and other pathogen sources (e.g. migratory eels, which ascend the face of the dam and enter the lake). That discussion may identify/highlight additional factors central to fisheries management strategies in Green Lake.
- The URFCC recommends in this and previous plans that certain waters be excluded from alewife stocking based on concerns for the potential impact on smelt populations, an important forage species for game fish in those waters. Modification of that recommendation is not contemplated; however, the supporting rationale has not been well described in the CFMP to date. A literature review and discussion of smelt - alewife interactions would benefit the planning process and support management recommendations of those species in the Union River watershed.
- Review the relative suitability of river specific Atlantic salmon broodstocks within the GoMDPS for use in the Union River. Prequalification of potential stocks that are determined to be genetically suitable for use in the Union River will provide an opportunity to capitalize on those resources should unexpected surpluses be made available on short notice.

## 6.1 Resident Fish

### **Reach I**

No specific management recommendations for resident fisheries management in this reach, which is mostly salt water and tidal.

### **Reach II**

Branch Lake:

Maintain fisheries for wild lake trout, landlocked salmon, brown trout, and smallmouth bass

Maintain the special high minimum length (20-in) for wild brown trout to help adults reach spawning size before being subjected to angler harvest

Maintain water quality and biological integrity of all tributaries (Brown trout have been collected in five tributaries to the lake; Winkumpaugh Brook, which is the principal brown trout spawning tributary, warrants the highest level of protection; maintain brown trout spawning habitat through control of beaver population);

Maintain verbal agreement with the Ellsworth Water Co. to attempt to maintain the lake level throughout the winter, at or above the level existing on October 15 in order to protect spawning lake trout;

### **Reach III**

Green Lake:

Continue to stock 600-800 SY landlocked salmon in most years, and 2,000 SY lake trout every other year or every third year.

Maintain water quality and biological integrity of Great Brook and Jellison Hill Brook (these tributaries produce numerous wild salmon, which typically account for 25 - 40% of the overall salmon catch in Green Lake);

Hatcase Pond:

Maintain principal sport fisheries for wild brook trout and smallmouth bass using the following measures:

Continue to apply the following special regulation: daily bag limit on trout: 2 fish; minimum length limit: 12 in., but only one may exceed 14 in.

No taking of baitfish during the closed angling season.

**Beech Hill Pond:**

Maintain special lake trout regulation encouraging more harvest of the overly abundant small- medium size wild lake trout; maintain no size or bag limit on bass as this population stems from an illegal introduction

Continue to periodically stock low numbers of SY salmon

**Floods Pond:**

Continue to manage exclusively for silver charr (formerly Sunapee trout); no stocking of any species (public access restricted).

**Burnt Pond:**

Continue to manage exclusively for wild brook trout; no stocking of any species (public access restricted).

**Lower Springy Pond:**

Maintain principal sport fisheries for splake (brook trout - lake trout hybrid), wild landlocked salmon, white perch, and chain pickerel using the following measures:

Stock 200 SY splake each year;

Maintain the following regulation: minimum length on trout: 12 in.; daily bag limit on trout: 2 fish, but only 1 may exceed 14 in.

**Graham Lake:**

Maintain smallmouth bass PSD in a range from 50-65 and RSD in a range from 8-12.

**Molasses Pond:**

Maintain principal sport fisheries for salmon, brown trout, and white perch using the following measures:

Stock 150 SY salmon and 300 fall yearling (FY) brown trout in most years.

**Georges Pond:**

Maintain principal sport fisheries for brown trout, smallmouth bass, and white perch using the following measures:

Stock 300 FY brown trout in most years.

Continue to manage for trophy-sized (>18 in.) smallmouth bass using the special regulation: minimum length: 18 in.; daily bag limit: 1 fish;



**Abrams and Webb Ponds:**

Maintain principal sport fisheries for smallmouth bass and white perch using the following measures:

Continue to manage for trophy-sized smallmouth bass using the special regulation:  
minimum length: 18 in.; daily bag limit: 1 fish;

No stocking of any other species.

**Reach IV****West Branch Union River:**

Maintain principal sport fisheries for wild brook trout and brown trout. The following general regulations should be maintained for the West Branch of the Union River (as well as for all riverine portions of the main stem, Middle Branch and East Branch):

Minimum legal length limit on brook trout and brown trout: 6 in.

Daily bag limit: 5 fish in the aggregate, not to include more than 2 brown trout or 5 brook trout; and

Rivers, brooks and streams are restricted to artificial lures only, with a total daily bag limit for salmon, trout, and togue of 1 fish from Aug. 16 - Sept. 30.

**Alligator Lake:**

Maintain special regulations on both landlocked salmon and brook trout to provide fisheries for larger than average size fish.

Stock about 200-225 SY landlocked salmon in most years.

**Hopkins Pond:**

Maintain special regulations for lake trout and brook trout  
Stock about 3,000 fall fingerling brook trout in most years; consider initiating a limited salmon stocking program.

**Halfmile Pond (in Amherst):**

Maintain principal sport fishery for wild brook trout using the following measures:

Continue the following special regulation: daily bag limit: 2 fish; minimum length: 10 in. but only one may exceed 12 in.

No stocking.

Partridge Pond and Ducktail Pond:

Maintain special restrictive harvest regulations to support a fishery for larger than average size brook trout

Annually fly stock 250 wild-strain brook trout into Ducktail P. and 300 wild-strain brook trout into Partridge P.

Long Pond:

Maintain special restrictive harvest regulations to provide a fishery for larger than average size brook trout

Maintain closure to the taking of bait in the closed angling season

Stock about 1,300 SY brook trout annually

King Pond:

Maintain special restrictive harvest regulations to provide fisheries for larger than average size brown trout and brook trout

Stock about 150 SY brown trout annually

Maintain closure to the taking of bait in the closed angling season

Rift Pond:

Maintain the special 18 inch minimum length on wild brook trout to help manage for trophy brook trout

No stocking

Maintain closure to the taking of bait in the closed angling season

Great Pond:

Maintain principal sport fisheries for stocked brown trout, smallmouth bass, pickerel, and yellow perch using the following measures:

Continue to stock about 350 FY brown trout annually;

Maintain the following trophy-sized smallmouth bass regulation: minimum length on bass: 18 in.; daily bag limit on bass: 1 fish.

**Reach V**

Middle Branch of the Union River:

Maintain the principal sport fishery for wild brook trout (presently one of the finest in the region), and to a lesser degree, for wild brown trout; continue consultation between IFW and DMR on the stocking of Atlantic salmon fry.

Halfmile Pond:

Maintain the principal sport fisheries for wild lake trout and wild brook trout using the following measures:

Continue the following special regulation designed to produce fish of larger than average size: minimum length limit for lake trout: 20 in.; daily bag limit on brook trout: 2 fish; minimum length limit for brook trout: 12 in. but only one may exceed 14 in.;

No stocking;

Closed to the taking of bait during the closed angling season.

Upper Middle Branch Pond:

Maintain principal sport fisheries for wild salmon, white perch, and chain pickerel using the following measures:

Retain the closure on ice fishing to help protect the salmon population from over-exploitation by anglers.

**Reach VI**

East Branch of the Union River:

Maintain principal sport fishery for wild brook trout, and to a lesser degree, for wild brown trout.

Spectacle Pond:

Maintain principal sport fisheries for stocked brown trout, white perch, chain pickerel, and rainbow smelt using the following measures:

Continue to stock about 800 FY brown trout each year.

Continue to permit dipping of smelt in the main tributary (i.e., the East Branch) during the spring.

Upper Lead Mountain Pond:

Maintain principal sport fisheries for stocked brown trout, white perch, chain pickerel, and rainbow smelt using the following measures:

Continue to stock about 500 FY brown trout annually.

Continue to permit dipping of smelt in one tributary.

Lower and Middle Lead Mountain Pond:

Maintain principal sport fisheries for stocked brown trout, white perch and chain pickerel

Stock approximately 300 FY brown trout annually

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20150227 Ellsworth P-2727 2014 Annual Report.PDF.....1