INITIAL STATEMENT

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

DRAFT
LOWER BARKER HYDROELECTRIC PROJECT
PROJECT NO. 2808

APPLICATION FOR LICENSE
FOR MINOR PROJECT LESS THAN 5MW

INITIAL STATEMENT
(Pursuant to 18 CFR 4.61)

(1) KEI (Maine) Power Management, Inc. (hereinafter "Licensee" or KEI (Maine)) applies to the Federal Energy Regulatory Commission (hereinafter "FERC" or "Commission") for a subsequent license for the Lower Barker Hydroelectric Project (hereinafter "Project"), as described in the attached exhibits. The Project is currently licensed to KEI (Maine) as Project No. 2808, by Order dated February 23, 1979.

(2) The location of the Project is:

State or territory:	Maine
County:	Androscoggin
Township or nearby towns:	Auburn
Stream or other body of water:	Little Androscoggin River

(3) The exact name, business address, and telephone number of the applicant are:

KEI (Maine) Power Management, Inc.
37 Alfred Plourde Parkway, Suite 2
Lewiston, Maine 04240
Telephone: 207-621-9992

(4) The exact name, business address, and telephone number of each person authorized to act as agent for the applicant in this application are:

Lewis Loon
Operations and Maintenance Manager
37 Alfred Plourde Parkway, Suite 2
Lewiston, Maine 04240
Telephone: 207-621-9992

(5) The applicant is a citizen of the United States and is not claiming preference under section 7(a) of the Federal Power Act. See 16 U.S.C. 796.

(6) (a) The statutory or regulatory requirements of the State of Maine, in which the Project is located, which would, assuming jurisdiction and applicability, affect the Project with respect to bed and banks, and to the appropriation, diversion and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the Federal Power Act are:

Water Quality Permit from the Maine Department of Environmental Protection to ashore compliance of section 401 of the Federal Clean Water Act.

(b) The steps which the Applicant has taken, or plans to take, to comply with each of the laws cited above are:

The applicant will apply for the 401 Water Quality Certification per 18 CFR § 5.23 (b).

(7) Brief Project description:

The Lower Barker Hydroelectric Project (Project) is located in Androscoggin County in southwestern Maine. The Project is situated on the Little Androscoggin River. Located approximately 2,000 feet upstream from the confluence of the Little Androscoggin River, the Project is in the City of Auburn. Project works include a concrete dam with spillway, non-overflow stoplog and gate sections; a power canal, intake and gate house; an underground concrete penstock; a transformer and substation; and a powerhouse containing one turbine generator unit. The project boundary generally includes the dam, bypass reach, buried penstock, and the powerhouse. The Lower Barker hydroelectric Project operates as a run-of-river facility with a continuous minimum flow of 20 cfs is conveyed to the bypass reach. Inflows less than 170 cfs (minimum hydraulic capacity plus minimum flows) are passed at the dam. Flows in excess of 520 cfs (maximum hydraulic capacity plus minimum flows) are likewise spilled. The project has a total rated capacity of 1.2 MW.

(8) Lands of the United States.

The Lower Barker Hydroelectric Project (Project) is located entirely on private lands.

(9) Construction of the Project.

This is an existing Project and no new construction is planned in association with this relicensing.

ADDITIONAL GENERAL INFORMATION

(*Pursuant to 18 C.F.R. § 5.18*)

(1) Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the Project:

KEI (Maine) Power Management, Inc. (Licensee) has obtained and will maintain any proprietary rights necessary to construct, operate, or maintain the Lower Barker Hydroelectric Project (FERC No. 2808) (Project).

(2) Identify (providing names and addresses):

(i) Every county in which any part of the Project, and any Federal facilities that would be used by the Project is located:

The Project is located in Androscoggin County, Maine.

Androscoggin County Clerk
Androscoggin County
2 Turner Street
Auburn, Maine 04210

(ii) Every city, town, or similar local political subdivision:

(a) In which any part of the Project is or is to be located and any Federal facility that is or is to be used by the Project is located:

The Project is located in the State of Maine, Androscoggin County on the Little Androscoggin River in the City of Auburn, and is located entirely on private lands.

Susan Clements
Auburn City Clerk
60 Court Street
Auburn, Maine 04210

(b) That has a population of 5,000 or more people and is located within 15 miles of the existing or proposed Project dam:

The adjacent City of Lewiston has an approximate population of 36,437. City offices located at:

Kathleen Montejo
Lewiston City Clerk
27 Pine Street
Lewiston, Maine 04240

(iii) Every irrigation district, drainage district, or similar special purpose political subdivision:

There are no irrigation district, drainage district, or similar special purpose political subdivision affected by the project.

(iv) Every other political subdivision in the general area of the Project that there is reason to believe would be likely to be interested in, or affected by, the application:

There are no other political subdivision in the general area of the Project that there is reason to believe would be likely to be interested in, or affected by, the application.

(v) All Indian Tribes that may be affected by the Project.

The project boundary includes a very limited reach of the Little Androscoggin River. While the project area has been documented as historically being inhabited by the Abenaki, none of Maine's five federally recognized Indian tribes have indicated religious or cultural significance to historic properties within the project boundary. The Penobscot Indian Nation has expressed an interest in the potential cultural resources within the Project.

(3) The Applicant has, in accordance with 18 CFR § 5.18 (3)(i), made a good-faith effort to notify, by certified mail, the following entities of the filing of this application:

(a) Every property owner of record of any interest within the bounds of the Project;

(b) The entities listed in (2) above;

(c) Other governmental agencies that would likely be interested in or affected by the application.

A complete listing of appropriate agencies, tribes, local governments, non-governmental organizations, and abutting property owners to which this license application was distributed to are provided in Appendix A.

(4) In accordance with 18 CFR § 4.61 of the Commission's regulations, the following Exhibits are attached to and made a part of this application:

Exhibit A – Project Description and Description of Operations

Exhibit E – Environmental Report

Exhibit F – General Design Drawings (*provided under separate cover as CEII for security purposes*)

Exhibit G – Project Boundary Maps

Exhibit H – Description of Project Management and Need for Project Power

SUBSCRIPTION
To Be Singed in Final Application

This Application for License for the Lower Barker Hydroelectric Project, FERC No. 2808, is executed in the State of Maine, County of Androscoggin, by Signee of KEI (Maine) Power Management, Inc., (37 Alfred Plourde Parkway, Suite 2, Lewiston, Maine), who, being duly sworn, deposes and says that the contents of this application are true to the best of his knowledge or belief and that he is authorized to execute this application on behalf of KEI (Maine) Power Management, Inc. The undersigned have signed this application this __ day of _____, 2017.

KEI (Maine) Power Management, Inc.

By _____

VERIFICATION

Subscribed and sworn to before me, a Notary Public of the State of Maine this ____ day of _____, 2017.

_____
(Notary Public)

(My Commission Expires _____)/seal

CERTIFICATE OF SERVICE - TO BE SINGED IN FINAL APPLICATION

I, Andy Qua, Senior Project Manager, Kleinschmidt, hereby certify that I have this day served upon each person designated on the attached Distribution List notice of availability and/or a copy of the Lower Barker Hydroelectric Project, LLC, FERC No. 2808, Application for Final License. Dated this ____ day of _____ 2017.

By: _____
Andy Qua
Senior Project Manager
Kleinschmidt

APPENDIX A

DISTRIBUTION LIST

Federal Agencies

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EXHIBIT A

KEI (MAINE) POWER MANAGEMENT (III) LLC
LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)
DRAFT
APPLICATION FOR NEW LICENSE
FOR MINOR PROJECT LESS THAN 5MW

EXHIBIT A
PROJECT DESCRIPTION

TABLE OF CONTENTS

1.0 PROJECT LOCATION 1-1

2.0 DESCRIPTION OF PROJECT 2-1
- 2.1 PROJECT FEATURES 2-1
  - 2.1.1 EXISTING UNITS 2-1
  - 2.1.2 PROVISION FOR FUTURE UNITS 2-1
- 2.2 PROJECT OPERATION 2-1
  - 2.2.1 CURRENT PROJECT OPERATION 2-1
  - 2.2.2 PROPOSED PROJECT OPERATION 2-2
  - 2.2.3 PROPOSED ENVIRONMENTAL MEASURES 2-2
- 2.3 AVERAGE ANNUAL GENERATION 2-2
- 2.4 ESTIMATED AVERAGE HEAD 2-5
- 2.5 FLOW DATA 2-6
  - 2.5.1 HYDRAULIC CAPACITY OF THE PROJECT 2-6
  - 2.5.2 RIVER FLOW DATA 2-6
- 2.6 PROJECT STRUCTURES 2-6
  - 2.6.1 IMPOUNDMENT DATA 2-6
  - 2.6.2 DAM 2-8
  - 2.6.3 INTAKE, CANAL, AND PENSTOCK 2-10
  - 2.6.4 POWERHOUSE 2-12
  - 2.6.5 BYPASS REACH AND TAILRACE 2-14
  - 2.6.6 APPURTENANT FACILITIES AND EQUIPMENT 2-14
  - 2.6.7 PROPOSED FACILITIES 2-16
- 2.7 ESTIMATED COST OF THE PROJECT 2-16

3.0 PURPOSE OF THE PROJECT 3-1

4.0 ESTIMATED COST OF RELICENSING 4-1

5.0 VALUE OF PROJECT POWER 5-1

6.0 ESTIMATED CHANGE IN PROJECT GENERATION 6-1

7.0 UNDEPRECIATED NET INVESTMENT (BOOK VALUE) OF THE PROJECT 7-1

8.0 ESTIMATED ANNUAL COST OF THE PROJECT 8-1

9.0 SINGLE LINE DIAGRAM 9-1

10.0 PROJECT SAFETY PROGRAM 10-1

11.0 REFERENCES 11-1

LIST OF TABLES

TABLE 2-1 HISTORICAL MONTHLY GENERATION TOTALS AT THE LOWER BARKER PROJECT 2003-2013 (MWH) 2-4

TABLE 2-2 PRO-RATED DAILY AVERAGE MINIMUM, MAXIMUM, AND MONTHLY MEAN INFLOWS AT THE LOWER BARKER PROJECT (JANUARY 1985 TO DECEMBER 2013) 2-5

TABLE 2-3 LOWER BARKER PROJECT STRUCTURES 2-15

LIST OF FIGURES

FIGURE 1-1 LOWER BARKER PROJECT LOCATION MAP 1-2

LIST OF PHOTOS

PHOTO 2-1 LOWER BARKER IMPOUNDMENT 2-7

PHOTO 2-2 LOWER BARKER PROJECT 2-8

PHOTO 2-3. LOWER BARKER DAM NON-OVERFLOW WASTE GATE SECTION, SPILLWAY AND UPPER PORTION OF THE BYPASS REACH 2-9

PHOTO 2-4 LOWER BARKER DAM NON-OVERFLOW STOP-LOG SECTION 2-10

PHOTO 2-5 POWER CANAL AND GATE HOUSE 2-11

PHOTO 2-6 GATEHOUSE 2-12

PHOTO 2-7 PROJECT POWERHOUSE 2-13

PHOTO 2-8 PROJECT POWERHOUSE TAILRACE 2-14

PHOTO 10-1 PUBLIC SAFETY NOTIFICATIONS PART 12 SIGNAGE AT POWERHOUSE 10-2

PHOTO 10-2 PART 12 SIGNAGE AT TAILRACE 10-4

PHOTO 10-3 FENCING AND PART 12 SIGNAGE AT GATE HOUSE 10-5

PHOTO 10-4 BOAT BARRIER AT LOWER BARKER IMPOUNDMENT 10-6

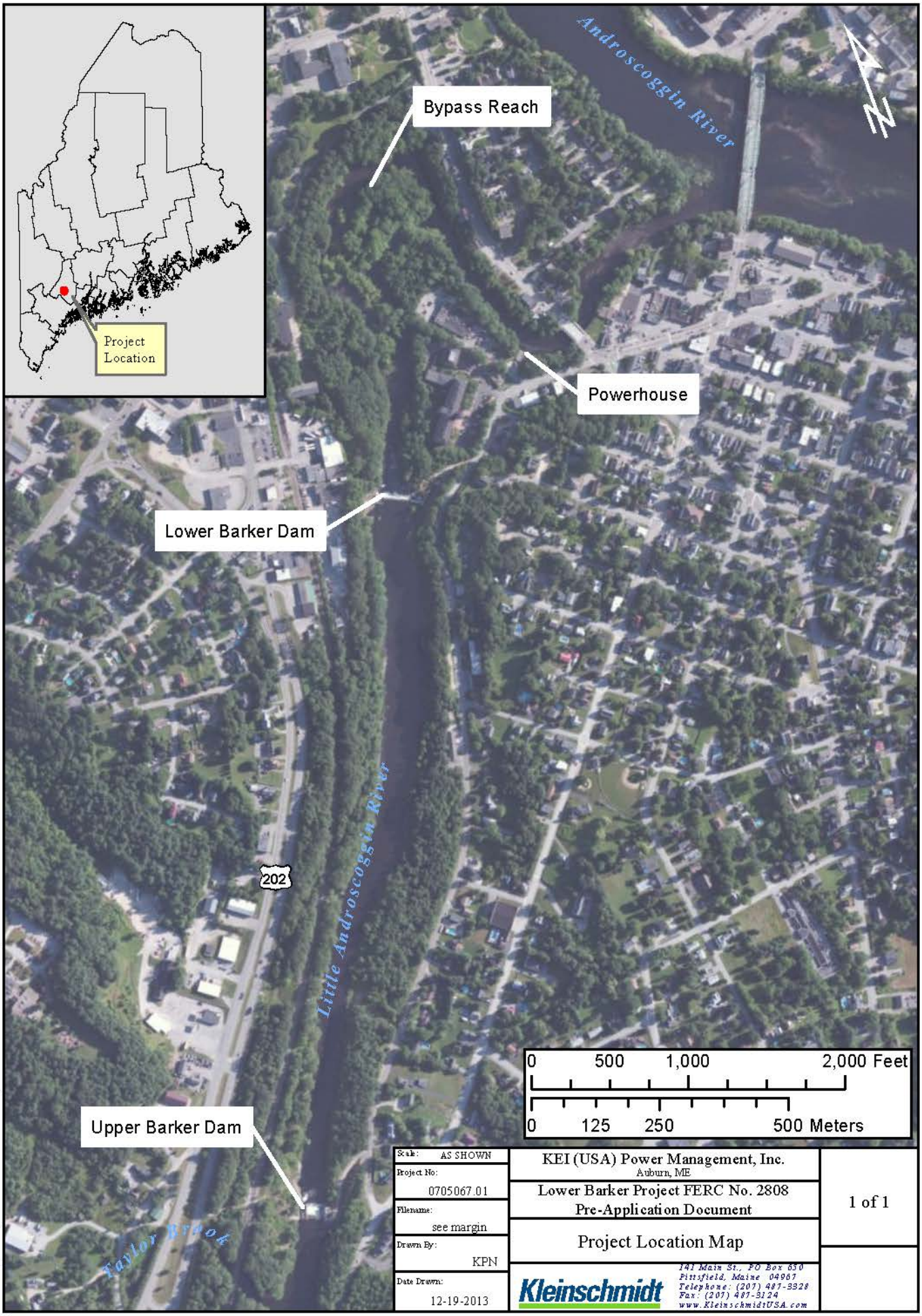
KEI (MAINE) POWER MANAGEMENT (III) LLC
LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)

APPLICATION FOR NEW LICENSE
FOR MINOR PROJECT LESS THAN 5MW

EXHIBIT A
PROJECT DESCRIPTION

1.0 PROJECT LOCATION

The Lower Barker Hydroelectric Project (Project) is located near the City of Auburn in Androscoggin County in southwestern Maine. The Project is situated on the Little Androscoggin River approximately 2,000 feet upstream of the river's confluence with the Androscoggin River (See Figure 1-1). Project works include a concrete dam with spillway, non-overflow stoplog and gate sections; a power canal, intake and gate house; an underground concrete penstock; a transformer and substation; and a powerhouse containing one turbine generator unit. The project boundary generally includes the impoundment, dam, buried penstock, and the powerhouse. The Lower Barker hydroelectric Project operates as a run-of-river facility with a continuous minimum flow of 20 cfs conveyed to the bypass reach. Inflows less than 170 cfs (minimum hydraulic capacity plus minimum flows) are passed at the dam. Flows in excess of 500 cfs (maximum hydraulic capacity plus minimum flows) are likewise spilled. The project has a total rated capacity of 1.2 MW.



Scale: AS SHOWN	KEI (USA) Power Management, Inc. Auburn, ME	1 of 1
Project No: 0705067.01	Lower Barker Project FERC No. 2808 Pre-Application Document	
Filename: see margin	Project Location Map	
Drawn By: KPN		
Date Drawn: 12-19-2013	Kleinschmidt — 141 Main St., PO Box 630, Pittsfield, Maine 04967; Telephone: (207) 487-3328; Fax: (207) 487-3124; www.KleinschmidtUSA.com	

Path: G:_Client_Data\KEI\Lower Barker_MXD\LowerBarkerBaseMap.mxd

Source:

2.0 DESCRIPTION OF PROJECT

2.1 PROJECT FEATURES

2.1.1 EXISTING UNITS

The Project powerhouse contains one turbine-generator unit with a total nameplate capacity of 1.2 MW. The unit is a 1500 mm, 1,950 hp, 305 rpm, double-regulated semi-Kaplan Allis Chalmers 5XA horizontal tube turbine. The unit turbine is connected to an IHI speed increaser then to a horizontal, 1,667 KVA Louis Allis generator with a capacity of 1,200 kW at 46 feet of head.

2.1.2 PROVISION FOR FUTURE UNITS

There are no provisions for future units at the project.

2.2 PROJECT OPERATION

2.2.1 CURRENT PROJECT OPERATION

The Project operates as a run-of-river facility with a continuous minimum flow of 20 cfs conveyed to the bypass reach. Inflows less than 170 cfs (minimum hydraulic capacity plus minimum flows) are passed at the dam. Flows in excess of over 500 cfs (maximum hydraulic capacity plus minimum flows) are likewise spilled. Because the Project is run-of-river, there is minimal available storage behind the dam.

The headpond elevation is measured by a pressure transducer in the headpond and monitored via a PLC in the powerhouse, which regulates turbine flows based on this elevation (pond level control). Turbine operation is automated and can be adjusted or shut down remotely, but startup must be done on-site. In 2007, KEI (Maine) installed a Supervisory Control and Data Acquisition (SCADA) to monitor the headpond levels of the Project and maintain compliance with run-of-river operations. The SCADA also minimizes fluctuations of the reservoir and allows the Project to be remotely started or shutoff from KEI (Maine)'s Operations and Maintenance facility in Lewiston, ME, though plant operators visit the site daily. In conjunction with the instrumentation that monitors project operation, a telephone paging system notifies project personnel of operational problems via cellular telephones; the paging system is equipped with a battery backup.

KEI (Maine) releases a minimum flow of 20 cfs to the bypassed reach. From June 1 through November 15, KEI (Maine) releases the minimum flow from the stoplog section of the dam, which also provides downstream fish passage. During the remainder of the year, KEI (Maine) releases the minimum flow from one of the fixed gates on the dam (FERC, 2011). The minimum flow was determined in consultation with agencies and was intended "to enhance fishery resources" (FERC, 1979). Furthermore, inflows outside of the hydraulic capacity of the Lower Barker Project are spilled at the dam providing additional water to the bypassed reach.

2.2.2 PROPOSED PROJECT OPERATION

KEI (Maine) proposes to increase the existing minimum flow of 20 cfs to 50 cfs to the bypassed reach. The Licensee is not proposing any additional changes to current operations.

2.2.3 PROPOSED ENVIRONMENTAL MEASURES

KEI (Maine) proposes to increase the existing minimum flow of 20 cfs to 50 cfs to the bypassed reach. Effects of this proposed change on environmental resources are discussed in Exhibit E.

KEI (Maine) is also proposing to upgrade the existing downstream fish passage system to reduce entrainment potential for outmigrating diadromous fish species. Due to site characteristics the exact configuration of a modified fishway has yet to be determined. In the fall of 2016, KEI (Maine) plans to conduct a bathymetric survey in the vicinity of the upstream end of the intake canal which will be used to develop a preliminary design for the fishway modifications. The design will be developed in consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Should the design progress sufficiently to allow for construction prior to license expiration, KEI (Maine) will consult with FERC to assess whether modifying the existing downstream fishway would require an amendment to the current license or if FERC would prefer to approve the structure as part of the new license.

No additional environmental measures are proposed at this time.

2.3 AVERAGE ANNUAL GENERATION

Based upon generation records for 2003 through 2015, the average system generation was 5,259 MWH per year. Annual generation for years 2003 through 2013 is provided in Table 2-1; generation in 2014 was 5,915.47 MWh and in 2015 was 4,224.93 MWh.

The monthly generation from 2003 through 2013 ranged from a high of 902 MWH in December 2006 to a low of 0 MWH during several months of the period of record. Table 2-1 contains historical average monthly generation at the Project for the period 2003 to 2013.

Flow for the project was calculated using data from USGS gage No. 01057000 (Little Androscoggin River near South Paris, Maine), approximately 22 miles northwest of the Lower Barker Project (Google Earth, 2013b), from 1985 to 2013. Data was prorated to the additional drainage area for the Lower Barker site. Based on this pro-rated data, the mean annual daily flow at the project is 667 cfs. A summary of pro-rated daily average flows at the Project by month from January 1985 to December 2013 is presented in Table 2-2. Inflows to the Project exceed the maximum capacity (plus minimum flow requirements) approximately 35 percent of the time, on average.

TABLE 2-1 HISTORICAL MONTHLY GENERATION TOTALS AT THE LOWER BARKER PROJECT 2003-2013 (MWH)

MONTH	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	MEAN
January	248	491	663	807	711	790	644	219	514	584	663	576
February	184	186	408	687	291	762	392	540	392	552	617	456
March	344	605	743	593	654	697	609	657	709	812	780	655
April	599	714	635	781	756	718	716	638	688	484	811	685
May	633	800	734	835	753	698	676	485	834	872	679	727
June	371	298	688	694	459	458	525	172	254	549	680	468
July	2	73	156	144	8	366	778	133	0	212	789	242
August	80	114	49	0	0	767	713	0	0	101	252	189
September	65	52	87	0	0	501	84	0	0	93	454	121
October	89	51	550	316	41	507	0	282	43	323	67	206
November	0	155	680	794	659	555	3	244	447	631	296	406
December	409	823	762	902	643	586	33	363	710	648	305	562
TOTAL ANNUAL	3,024	4,362	6,155	6,553	4,975	7,405	5,173	3,733	4,591	5,861	6,393	5,293

TABLE 2-2 PRO-RATED DAILY AVERAGE MINIMUM, MAXIMUM, AND MONTHLY MEAN INFLOWS AT THE LOWER BARKER PROJECT (JANUARY 1985 TO DECEMBER 2013)[1]

MONTH	MEAN PRO-RATED DAILY AVERAGE INFLOW (CFS)	MINIMUM PRO-RATED DAILY AVERAGE INFLOW (CFS)	MAXIMUM PRO-RATED DAILY AVERAGE INFLOW (CFS)
January	456	84	14,603
February	362	84	3,804
March	1,010	93	14,836
April	1,916	200	31,439
May	878	70	15,440
June	604	34	15,115
July	307	14	6,185
August	267	4	6,744
September	194	3	8,418
October	509	14	9,069
November	777	60	9,953
December	716	88	11,720
Annual	667	3	31,439

Source: USGS, 2012

Between 2003 and 2012, the Project generated an average annual energy output of 6,393,000 kWh at a plant factor of 49 percent, calculated as follows:

(6,393,000 kWH/year) / (1,200 kW x 8,760 hours/year) = 0.61

2.4 ESTIMATED AVERAGE HEAD

The estimated average head for the Lower Barker Project is 49 feet. This value is based upon a full pond surface elevation of 164.7 feet NAVD88 and a normal tailwater elevation of 115.6 feet NAVD88.

[1] The Auburn flow gage (USGS Gage 01058500) located near the Lower Barker Dam was discontinued in 1982. The coincident period of record for both the Auburn and South Paris (USGS Gage 01057000) gages 10-5-1972 to 10-5-1982 was selected and compared. The FDC of each set of raw data was developed, and then a proration factor of (DA Auburn Gage/DA South Paris Gage) and was calculated to multiply the South Paris FDC to match the Auburn FDC; where n is some number less than 1 used to adjust the factor, and was adjusted in order to match the prorated flow to Auburn as best as possible. The Auburn gage drainage area is smaller than the Lower Barker Dam's, so the prorated South Paris data was further prorated by (DA Lower Barker Dam/DA Auburn Gage) 0.8. Annual and monthly FDCs were developed from this final prorated data.

2.5 FLOW DATA

2.5.1 HYDRAULIC CAPACITY OF THE PROJECT

The estimated maximum hydraulic capacity of the Project generating units is approximately 500 cfs and a minimum hydraulic capacity of 150 cfs.

2.5.2 RIVER FLOW DATA

The Lower Barker Project is located on the Little Androscoggin River in southwestern Maine. The Little Androscoggin River has a total drainage area of approximately 350 square miles covering two counties (Androscoggin and Oxford) (FERC, 1996). The river is approximately 52 miles long from its headwaters to its confluence with the Androscoggin River (USGS, 2013c). Among the major lakes and tributaries in the basin are Bryant Pond, Thompson Lake, Andrews Brook, Black Brook, Cushman Stream, Meadow Brook, and Bog Brook (Maine Legislature, 1989). The Project is located approximately 2,000 feet upstream from the confluence of the Little Androscoggin River with the Androscoggin River in Androscoggin County in Auburn, Maine.

The maximum peak flow recorded during the period of record (water years 1913 to 1924 and 1931 to 2013), as measured at the USGS No. 01057000 gage upstream of the Lower Barker Project, was approximately 1190 cfs, which occurred in February, 1970. The lowest peak flow recorded during that time was approximately 9.6 cfs, which occurred in September, 1923 (USGS, 2013a and USGS, 2013b).

2.6 PROJECT STRUCTURES

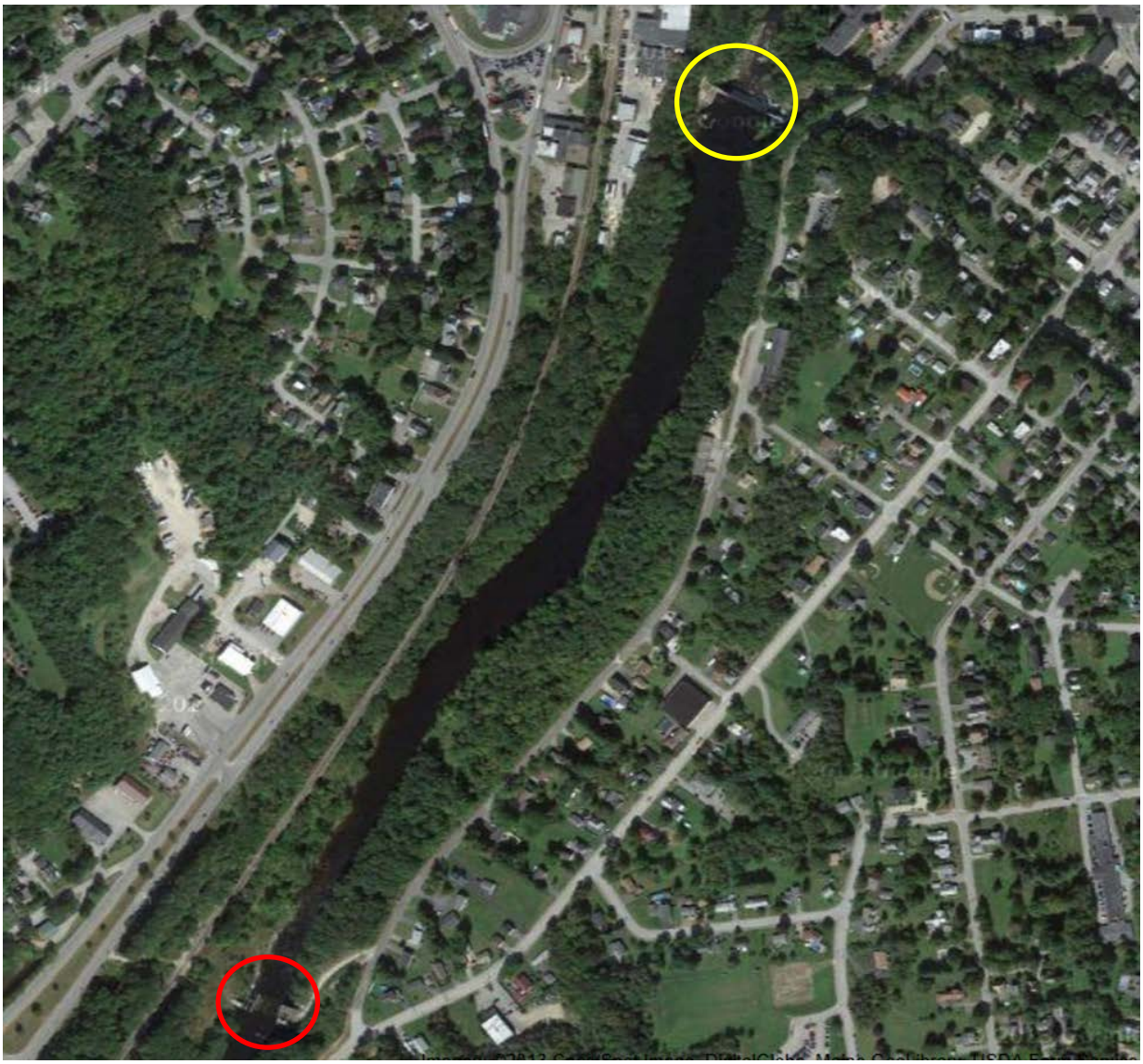
The Project consists of a concrete dam with spillway, non-overflow stoplog and gate sections; a power canal, intake and gate house; an underground concrete penstock; a transformer and substation; and a powerhouse containing one turbine generator unit. Table 2-3 provides a summary of the facilities and installed equipment.

2.6.1 IMPOUNDMENT DATA

The project reservoir is approximately 0.65 miles in length from the base of the Upper Barker Dam to the Lower Barker Dam (Photo 2-1). The impoundment is approximately 16.5 acres in surface area at the normal full pond elevation of 164.7 feet NAVD88. The impoundment has a variable depth along its approximately 3,400-foot-long reach. The Project impoundment ranges

in width from approximately 50 to 185 feet. Its maximum depth is approximately 30 feet near the dam and it is approximately 3,000 feet in length. The project reservoir holds 150 acre-feet at normal operating level (USACE, 2013) with a maximum dam storage of 210 acre-feet. Because the Project is run-of-river, there is minimal available usable storage behind the dam.

PHOTO 2-1 LOWER BARKER IMPOUNDMENT



Source: Google.com Upper Barker Dam (Red), Lower Barker Dam (Yellow)

2.6.2 DAM

The Project's dam is a concrete Ambursen slab and buttress style structure 30 feet in height and 232 feet long with a crest elevation of 163.5 feet NAVD88[2]. The dam consists of a 46-foot-long non-overflow section that has two waste gates that measure 8 feet high by 10 feet wide (invert elevation approximately 144 feet NAVD88) (Photo 2-2) along the left buttress. The dam has a 125-foot-long spillway topped by 14-inch high flashboards that result in a normal full pond water surface elevation of 164.7 feet NAVD88. The non-overflow section of the dam adjacent to the power canal is 61 feet long and has six 7-foot-wide by 5-foot-high stop-log sections (invert elevation approximately 162 feet NAVD88) and one 4-foot-wide by 5-foot-high stop-log section (invert elevation approximately 162 feet NAVD88) (Photo 2-4) with a top deck elevation of 169.6 feet NAVD88 (FERC, 1991) (Photo 2-2). The discharge capacity of the spillway is 12,600 cfs.

PHOTO 2-2 LOWER BARKER PROJECT

Source: Bing.com

[2] North American Vertical Datum of 1988

PHOTO 2-3. LOWER BARKER DAM NON-OVERFLOW WASTE GATE SECTION, SPILLWAY AND UPPER PORTION OF THE BYPASS REACH

PHOTO 2-4 LOWER BARKER DAM NON-OVERFLOW STOP-LOG SECTION

2.6.3 INTAKE, CANAL, AND PENSTOCK

The intake canal is approximately 20 feet wide and 60 feet long. The Project's gate house is approximately 35 foot long by 20 foot wide located at the end of the power canal. The intake gate house consists of a single gate, equipped with trashracks measuring approximately 18.5 feet wide by 14.5 feet high with 2-inch clear spacing. Water is then diverted into the penstock, which is concrete, measures 650-feet long[3], and is 10-feet wide by 8-feet high. The entire penstock runs underground from the headgate to the powerhouse.

[3] The current license describes the penstock as being 780 feet based on the original construction proposal, however based on field measurements, the p

PHOTO 2-5 POWER CANAL AND GATE HOUSE

PHOTO 2-6 GATEHOUSE

2.6.4 POWERHOUSE

The Project powerhouse is located approximately 2,000 feet downstream of the dam. The powerhouse, which houses a 1,200 kW turbine-generating unit, is a concrete structure that measures 50-feet long by 25-feet wide[4] (Photo 2-7). The powerhouse contains one 1500 mm, 1,950 hp, 305 rpm, double-regulated semi-Kaplan Allis Chalmers 5XA horizontal tube turbine connected to an IHI speed increaser then to a horizontal, 1,667 KVA Louis Allis generator with a capacity of 1,200 kW at 46 feet of head. The unit, manufactured in 1979, has a maximum hydraulic capacity of 500 cfs and a minimum hydraulic capacity of 150 cfs.

[4] The current license describes the powerhouse dimensions as 55-feet by 20-feet based on the original construction proposal, however based on field measurements, the powerhouse is 50-feet by 20-feet.

PHOTO 2-7 PROJECT POWERHOUSE

2.6.5 BYPASS REACH AND TAILRACE

The Project bypass reach extends from the Lower Barker dam downstream, approximately 3,000 feet and is on average approximately 100 feet wide. The tailrace is located approximately 2,000 feet downstream of the dam with an approximate width of 110 feet at the discharge area (FERC, 1979).

PHOTO 2-8 PROJECT POWERHOUSE TAILRACE

2.6.6 APPURTENANT FACILITIES AND EQUIPMENT

The project generator is connected to the distribution line via a 250-foot-long, 4.2 kV underground power line (FERC, 1991). The single line diagram for the Project is provided in Section 9.0.

TABLE 2-3 LOWER BARKER PROJECT STRUCTURES

STRUCTURES	
DAM WITH SPILLWAY	30 foot high by 232 feet long, made of concrete. The barrier is broken into three sections including 46 foot long gate section, 125 foot long concrete crest, and a 61 foot long deck.
Normal Pond elevation	164.7 feet NAVD88
Spillway	125 feet long with flashboards
NON-OVERFLOW SECTION	46 foot long with two waste gates
Waste Gate 1 (along left buttress)	8 feet high by 10 feet wide
Waste Gate 2 (along left buttress)	8 feet high by 10 feet wide
Non-overflow section (adjacent to power canal)	61 feet long with seven stop-log sections
Stop-log sections	six, 7 foot wide by 5 foot high
Stop-log sections	one, 4 foot wide by 5 feet high
Flashboards	14 inches high
POWER CANAL	60 feet long by 20 feet wide by approximately 9.6 feet deep. The canal has seven stop-log sections that lead up to the intake gate house.
INTAKE GATE HOUSE	35 foot long by 20 foot wide, single gate, to the right of the stop-log section, equipped with trashracks.
Trashracks	18.6 feet wide by 14.6 feet high with 2 inch clear spacing
PENSTOCK	650 feet long approximately 8 feet high by 10 feet wide with 6 foot by 8.5 foot, made of concrete, and runs underground to the powerhouse
POWERHOUSE	50 feet long by 25 feet wide, made of concrete, located approximately 2,000 feet downstream of the dam
Turbine unit	one 1500 mm, 1,950 hp, 305 rpm, double-regulated semi-Kaplan Allis Chalmers 5XA horizontal tube turbine
Turbine Generator	IHI speed increaser then to a horizontal, 1,667 KVA Louis Allis generator with a capacity of 1,200 kW at 46 feet of head
Generator Capacities	The unit, manufactured in 1979, has a maximum hydraulic capacity of 500 cfs and a minimum hydraulic capacity of 150 cfs.
BYPASS REACH AND TAILRACE	Extends from the Lower Barker dam downstream, approximately 3,000 feet. The tailrace is located approximately 2,000 feet downstream of the dam. With a normal tailrace elevation of 116 feet.
TRANSFORMER AND SUBSTATION	The project generator is connected to the distribution line via a 250-foot-long, 4.2 kV underground power line

2.6.7 PROPOSED FACILITIES

As noted above, is also proposing to upgrade the existing downstream fish passage system to reduce entrainment potential for outmigrating diadromous fish species, with designs to be developed in consultation with NMFS and USFWS. There are no additional changes to existing facilities proposed for the Lower Barker Project.

2.7 ESTIMATED COST OF THE PROJECT

Costs for upgrade of the downstream fish passage system have not yet been developed. No changes or additions to the existing Project structures are proposed as part of this relicensing.

3.0 PURPOSE OF THE PROJECT

The Lower Barker Hydroelectric Project is operated for the production of hydroelectric power. The power generated by this Project is integrated into KEI (Maine), and sold to Central Maine Power. Central Maine Power provides reliable high voltage electric power to over 600,000 people within the state of Maine.

4.0 ESTIMATED COST OF RELICENSING

KEI (Maine) estimates that the cost of relicensing the Lower Barker Hydroelectric Project is approximately $400,000. This cost includes both internal administrative costs and external expenses (e.g. consultant costs) over the course of the traditional licensing process (TLP).

5.0 VALUE OF PROJECT POWER

The Lower Barker Hydroelectric Project is operated in run-of-river mode and is part of KEI's (Maine) portfolio of generation supply options. Power generated from the Lower Barker Hydroelectric Project has an average value of $205,000, including Renewable Energy Credits.

6.0 ESTIMATED CHANGE IN PROJECT GENERATION

The Project will continue to operate in a run-of-river mode. However, with increasing the minimum flow from 20 cfs to 50 cfs, the higher minimum flow will reduce the amount of water available for generation; therefore, decreasing the overall production of the facility.

7.0 UNDEPRECIATED NET INVESTMENT (BOOK VALUE) OF THE PROJECT

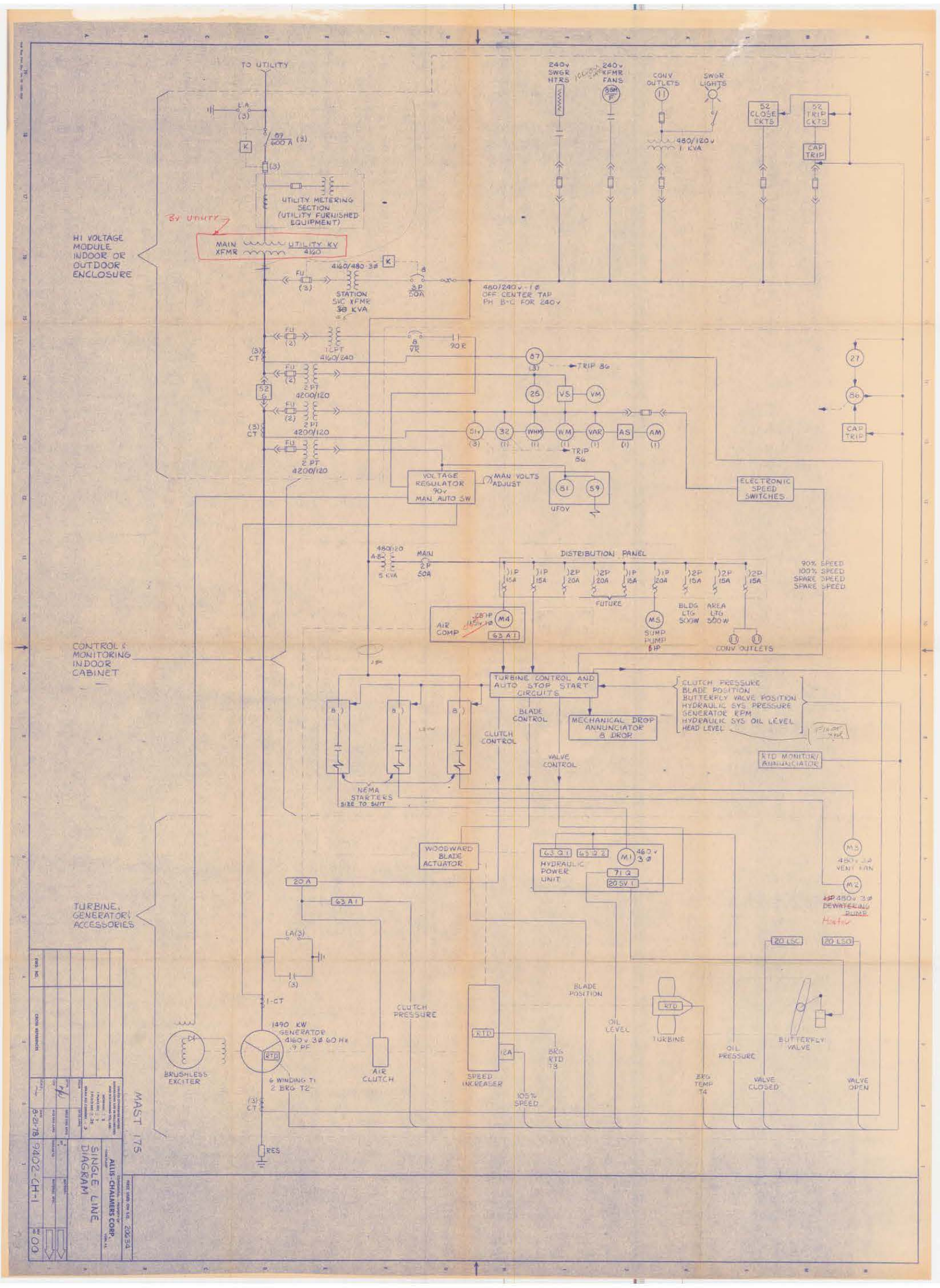
The undepreciated net investment for the Project is approximately $914,584.00 as of July 31, 2016. The annual operation and maintenance costs of running the Lower Barker Hydroelectric Project facility is $143,200.95 with the annual administrative expenses being approximately $42,073.70.

8.0 ESTIMATED ANNUAL COST OF THE PROJECT

The total annual cost to operate the project, including administrative costs, insurance, operations and maintenance, general and other expenses is as follows:

- administrative costs $42,073.70
- insurance $22,456.32
- operations and maintenance $143,200.95
- general and other expenses (Included in the above)

9.0 SINGLE LINE DIAGRAM



10.0 PROJECT SAFETY PROGRAM

The existing lower barker Hydroelectric Project is classified as a low hazard project and KEI (Maine) is exempt from filing and Emergency Action Plan with the Commission. Due to the low hazard classification of this dam, no Potential Failure Mode Analysis has been conducted at this site and therefore no Potential Failure Modes have been identified. The Dam Safety Surveillance and Monitoring Program and Report (DSSMP) defines the appropriate monitoring for the water retaining project works. The DSSMP for the Project was filed with the FERC in February 2011.

In addition, Section 10(c) of the Federal Power Act (FPA) authorizes FERC to establish regulations requiring licensees to operate and properly maintain their Projects for the protection of life, health, and property. FERC Part 12 regulations include such safety measures as signage and exclusion devices. License Article 23 requires the licensee to install and operate such signs, lights, sirens, or other safety devices to warn the public of fluctuations in flow from the project and protect the public in its recreational use of project lands and waters.

KEI (Maine) was required by FERC to file a public safety plan for the Project, which depicts the public safety devices installed at the Project and their location. The Commission approved the Public Safety Plan on January 11, 1993. KEI (Maine) maintains fences, handrails, a locked entrance gate and warning signs to protect the public from the hazards of project operations (Photo 10-1 through Photo 10-4). KEI (Maine) also seasonally installs a boat barrier before May 31 and removes the barrier by October 12 annually (Photo 10-4). According to the most recent FERC Environmental Inspection Report (issued April 8, 2011), KEI (Maine) was reported to be in compliance with its requirements with regard to public safety.

PHOTO 10-1 PUBLIC SAFETY NOTIFICATIONS PART 12 SIGNAGE AT POWERHOUSE

PHOTO 10-2 PART 12 SIGNAGE AT POWERHOUSE

PHOTO 10-2 PART 12 SIGNAGE AT TAILRACE

PHOTO 10-3 FENCING AND PART 12 SIGNAGE AT GATE HOUSE

PHOTO 10-4 BOAT BARRIER AT LOWER BARKER IMPOUNDMENT

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EXHIBIT E

KEI (MAINE) POWER MANAGEMENT (III) LLC
LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)
DRAFT
APPLICATION FOR NEW LICENSE
FOR MINOR PROJECT LESS THAN 5MW

EXHIBIT E
ENVIRONMENTAL REPORT

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 DOCUMENT ORGANIZATION 1-1
1.2 STATUTORY AND REGULATORY REQUIREMENTS 1-2
1.2.1 SECTION 401 OF THE CLEAN WATER ACT 1-2
1.2.2 ENDANGERED SPECIES ACT 1-2
1.2.3 COASTAL ZONE MANAGEMENT ACT 1-3
1.2.4 NATIONAL HISTORIC PRESERVATION ACT 1-3
1.2.5 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT 1-3

2.0 PROPOSED ACTION 2-1
2.1 PROJECT DESCRIPTION 2-1
2.1.1 EXISTING PROJECT FACILITIES 2-1
2.2 PROJECT LANDS AND WATERS 2-7
2.3 EXISTING PROJECT OPERATION 2-7
2.4 PROPOSED PROJECT FACILITIES 2-7
2.5 PROPOSED PROJECT OPERATION 2-8
2.6 PROPOSED ENVIRONMENTAL MEASURES 2-8

3.0 PRE-FILING CONSULTATION RECORD 3-1
3.1 STAKEHOLDER CONSULTATION 3-1

4.0 ENVIRONMENTAL ANALYSIS 4-1
4.1 GENERAL DESCRIPTION OF THE RIVER BASIN 4-1
4.1.1 REFERENCES 4-4
4.2 CUMULATIVE EFFECTS 4-6
4.2.1 GEOGRAPHIC SCOPE 4-6
4.2.2 TEMPORAL SCOPE 4-6
4.3 PROPOSED ACTION AND ACTION ALTERNATIVES 4-6
4.3.1 GEOLOGY AND SOILS 4-6
4.3.2 REFERENCES 4-10
4.3.3 WATER RESOURCES 4-11
4.3.4 REFERENCES 4-24
4.3.5 FISH AND AQUATIC RESOURCES 4-26
4.3.6 REFERENCES 4-46

4.3.7 TERRESTRIAL RESOURCES 4-48
4.3.8 REFERENCES 4-54
4.3.9 RARE, THREATENED, AND ENDANGERED TERRESTRIAL SPECIES 4-56
4.3.10 REFERENCES 4-61
4.3.11 RECREATION, AESTHETICS, AND LAND USE 4-63
4.3.12 VISUAL CHARACTER OF THE PROJECT VICINITY 4-81
4.3.13 NEARBY SCENIC ATTRACTIONS 4-82
4.3.14 VISUAL CHARACTER OF PROJECT LANDS AND WATERS 4-83
4.3.15 ENVIRONMENTAL EFFECTS 4-85
4.3.16 REFERENCES 4-85
4.3.17 SOCIOECONOMIC RESOURCES 4-89
4.3.18 REFERENCES 4-92
4.3.19 CULTURAL RESOURCES 4-93
4.3.20 REFERENCES 4-94
4.3.21 TRIBAL RESOURCES 4-95

5.0 ECONOMIC NALYSIS 5-1
5.1 COST OF OPERATING AND MAINTAINING THE LICENSE 5-1
5.2 COST OF PROPOSED RESOURCE PM&E MEASURES 5-1
5.3 VALUE OF POWER GENERATED BY THE PROJECT 5-1
5.4 EFFECT OF PM&E MEASURES ON VALUE OF POWER GENERATED BY THE PROJECT 5-1

6.0 CONSISTENCY WITH COMPREHENSIVE PLANS 6-1

7.0 REFERENCES 7-1

LIST OF TABLES

TABLE 3-1 DESCRIPTION AND STATUS OF INDIVIDUAL STUDIES FOR LOWER BARKER RELICENSING 3-2
TABLE 4-1 LITTLE ANDROSCOGGIN RIVER HYDRO PROJECTS 4-3
TABLE 4-2 DAILY MEAN, MINIMUM, AND MAXIMUM INFLOWS BY MONTH FOR THE LOWER BARKER PROJECT (JANUARY 1985 TO DECEMBER 2015). 4-12
TABLE 4-3 TYPICAL PERCENTAGE OF TIME BY MONTH THAT RIVER FLOW IS OUTSIDE THE HYDRAULIC CAPACITY RANGE OF THE LOWER BARKER PROJECT (150 TO 500 CFS) (JANUARY 1985 TO DECEMBER 2015) 4-12
TABLE 4-4 ESTABLISHED AND PROPOSED MAINE WATER QUALITY STANDARDS FOR SELECT PARAMETERS 4-14
TABLE 4-5 AVERAGE, MINIMUM, AND MAXIMUM WATER TEMPERATURE THROUGHOUT THE WATER COLUMN IN THE LOWER BARKER IMPOUNDMENT DURING THE LAKE TROPHIC SAMPLING, JUNE – OCTOBER, 2015 4-17
TABLE 4-6 AVERAGE, MINIMUM, AND MAXIMUM DO CONCENTRATION AND DO PERCENT SATURATION THROUGHOUT THE WATER COLUMN IN THE LOWER BARKER IMPOUNDMENT DURING THE LAKE TROPHIC SAMPLING, JUNE – OCTOBER, 2015 4-17

TABLE 4-7 WATER TEMPERATURE (°C), DO CONCENTRATION (MG/L) AND DO PERCENT SATURATION IN THE BYPASSED REACH AND TAILRACE, LOWER BARKER PROJECT, JULY 7 – SEPTEMBER 9, 2015 4-20
TABLE 4-8 MDEP WATER QUALITY MONITORING RESULTS FROM UPSTREAM OF THE LOWER BARKER PROJECT 4-21
TABLE 4-9 UPSTREAM FISH PASSAGE COUNTS AT THE BRUNSWICK HYDROELECTRIC PROJECT (1983-2016) 4-29
TABLE 4-10 ANNUAL RIVER HERRING STOCKING RECORDS FOR THE LITTLE ANDROSCOGGIN RIVER 4-30
TABLE 4-11 2015 NIGHTTIME AMERICAN EEL SURVEY RESULTS, LOWER BARKER PROJECT. 4-32
TABLE 4-12 STOCKING RECORDS FOR THE LITTLE ANDROSCOGGIN RIVER, 2013 – 2016. 4-33
TABLE 4-13 SUMMARY OF MBI 2003 ELECTROFISHING RESULTS, ANDROSCOGGIN RIVER NEAR LEWISTON-AUBURN 4-34
TABLE 4-14 COMPARISON OF TARGET AND ACTUAL FLOW RELEASES, LOWER BARKER PROJECT INSTREAM FLOW STUDY. 4-35
TABLE 4-15 HABITAT SUITABILITY, PERCENT INCREASE, AND CUMULATIVE INCREASE IN SUITABILITY IN THE LOWER BARKER PROJECT BYPASSED REACH. 4-39
TABLE 4-16 WETTED WIDTH COMPARED TO BANKFULL WIDTH, LOWER BARKER PROJECT INSTREAM FLOW STUDY. 4-40
TABLE 4-17 FRESHWATER MUSSELS KNOWN TO OCCUR IN THE LITTLE ANDROSCOGGIN RIVER..... 4-44
TABLE 4-18 INVASIVE PLANTS POTENTIALLY OCCURRING WITHIN THE PROJECT 4-49
TABLE 4-19 RARE, THREATENED, AND ENDANGERED SPECIES THAT MAY OCCUR IN THE LOWER BARKER PROJECT AREA. 4-56
TABLE 4-20 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 300 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT 4-79
TABLE 4-21 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 500 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT 4-79
TABLE 4-22 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 660 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT 4-80
TABLE 4-23 LAND USES IN ANDROSCOGGIN COUNTY 4-80
TABLE 4-24 POPULATION STATISTICS FOR AUBURN, ANDROSCOGGIN COUNTY AND MAINE. 4-89
TABLE 4-25 EMPLOYMENT STATISTICS FOR AUBURN, ANDROSCOGGIN COUNTY AND MAINE..... 4-91

LIST OF FIGURES

FIGURE 4-1 HOURLY WATER TEMPERATURE TIME SERIES IN THE TAILRACE AND BYPASSED REACH, JULY 7 – SEPTEMBER 9, 2015 4-19
FIGURE 4-2 HOURLY DO CONCENTRATION AND DO PERCENT SATURATION TIME SERIES IN THE TAILRACE AND BYPASSED REACH, JULY 7 – SEPTEMBER 9, 2015 4-20
FIGURE 4-3 HABITAT SUITABILITY CURVES FOR ATLANTIC SALMON, BROWN TROUT, AND RAINBOW TROUT, LOWER BARKER PROJECT, LITTLE ANDROSCOGGIN RIVER. ... 4-41
FIGURE 4-4 WETLANDS IN THE VICINITY OF THE PROJECT 4-51
FIGURE 4-5 RECREATION INVENTORY MAP 4-70

LIST OF PHOTOS

PHOTO 2-1 LOWER BARKER IMPOUNDMENT 2-3
PHOTO 2-2 LOWER BARKER PROJECT 2-4
PHOTO 2-3 LOWER BARKER DAM NON-OVERFLOW WASTE GATE SECTION, SPILLWAY AND UPPER PORTION OF THE BYPASS REACH 2-4
PHOTO 2-4 LOWER BARKER DAM NON-OVERFLOW STOP-LOG SECTION 2-5
PHOTO 2-5 POWER CANAL AND GATE HOUSE 2-5
PHOTO 2-6 GATEHOUSE 2-6
PHOTO 2-7 PROJECT POWERHOUSE 2-6
PHOTO 4-1 BOAT BARRIER AND INFORMAL HAND-CARRY BOAT LAUNCH LOCATED ALONG THE BARKER MILL TRAIL UPSTREAM OF THE LOWER BARKER DAM 4-71
PHOTO 4-2 REPRESENTATIVE PHOTO OF THE BARKER MILL TRAIL 4-71
PHOTO 4-3 PATH LEADING TO THE TAILRACE BELOW THE LOWER BARKER DAM 4-72
PHOTO 4-4 SULLIVAN SQUARE PARK 4-73
PHOTO 4-5 PLAYGROUND AND BENCHES IN BONNEY PARK 4-74
PHOTO 4-6 BONNEY PARK CONNECTS TO LEWISTON VIA THE RIVERWALK AND AN OLD RAILROAD BRIDGE 4-74
PHOTO 4-7 MOULTON PARK CONSISTS OF OPEN LAWN AND A SKATE PARK 4-75
PHOTO 4-8 A HAND-CARRY BOAT LAUNCH IS AVAILABLE IN LITTLE ANDY PARK 4-76
PHOTO 4-9 A SMALL PLAYGROUND, PICNIC TABLES, BENCHES, AND OPEN GRASS SPACE ARE AVAILABLE IN LITTLE ANDY PARK 4-77
PHOTO 4-10 LOWER BARKER PROJECT 4-84
PHOTO 4-11 VIEW OF LOWER BARKER DAM FROM MILL STREET DURING THE WINTER MONTHS 4-84

LIST OF APPENDICES

APPENDIX A – STUDY REPORT
APPENDIX B – FLOW DURATION CURVES

KEI (MAINE) POWER MANAGEMENT (III) LLC
LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)

APPLICATION FOR NEW LICENSE
FOR MINOR PROJECT LESS THAN 5MW

EXHIBIT E
ENVIRONMENTAL REPORT

1.0 INTRODUCTION

KEI (Maine) Power Management (III) LLC (KEI Maine) is using the Federal Energy Regulatory Commission's (FERC or Commission) Traditional Licensing Process (TLP) for the relicensing of the Lower Barker Hydroelectric Project (Project). The Licensee is filing a Draft License Application (DLA).

1.1 DOCUMENT ORGANIZATION

The format of Exhibit E generally follows the Commission's guidelines for preparing an Environmental Report (ER). The purpose of the ER format is to:

- Describe the existing and proposed project facilities, including project lands and waters;
- Describe the existing and proposed project operation and maintenance plan, to include measures for protection, mitigation, and enhancement (PME) with respect to each resource affected by the project proposal; and
- A description of steps taken by the applicant in consulting with Federal, state, and local agencies

Important issues that are addressed in this report include fishery resources, water quality, wetlands, aquatic habitat, instream flows, entrainment, state and federally protected and rare species, cultural and historical resources, tribal, and recreational access.

The Exhibit E contains the content specified by 18 CFR § 4.61 and includes the following seven sections:

Section 1 – Introduction - including purpose of action and need for power, statutory and regulatory requirements, and public review and comment

Section 2 – Proposed Action - including a description of existing and proposed project facilities, proposed project operation, and proposed protection mitigation and enhancement measures.

Section 3 – Pre-filing consultation record

Section 4 – Environmental Analysis

Section 5 – Economic Analysis

Section 6 – Consistency with Comprehensive Plans

Section 7 – References

1.2 STATUTORY AND REGULATORY REQUIREMENTS

1.2.1 SECTION 401 OF THE CLEAN WATER ACT

The Applicant is subject to Water Quality Certification under Section 401(a)(1) of the federal Clean Water Act of 1977. The Maine Department of Environmental Protection establishes numeric water-quality standards consistent with the Clean Water Act and state law under Title 38, Chapter 3.

1.2.2 ENDANGERED SPECIES ACT

Under provisions of Section 7(a)(2) of the Endangered Species Act (ESA), a federal agency that authorizes, permits, or carries out activities must consult with the United States Fish and Wildlife Service (USFWS) to ensure that its actions will not jeopardize the continued existence of any listed species. A federal agency is required to consult USFWS if an action “may affect” listed species or designated critical habitat, even if the effects are expected to be beneficial. A “may affect” determination includes actions that are “not likely to adversely affect,” as well as “likely to adversely affect” listed species. If the action is “not likely to adversely affect” listed species (i.e., the effects are beneficial, insignificant, or discountable), and the USFWS agrees with that determination, the USFWS provides concurrence in writing and no further consultation is required. If the action is “likely to adversely affect” listed species, then the federal action agency must request initiation of formal consultation. This request is made in writing to the USFWS, and must include a complete initiation package. Formal consultation concludes with the USFWS’s issuance of a biological opinion to the federal action agency.

1.2.3 COASTAL ZONE MANAGEMENT ACT

This act, administered by NOAA, provides for the management of the nation's coastal resources, including the Great Lakes. The goal is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone."

The Project is not located within a Coastal Zone and therefore is not subject to the Coastal Zone Management Act.

1.2.4 NATIONAL HISTORIC PRESERVATION ACT

The National Historic Preservation Act (NHPA) (Public Law 89-665; 16 U.S.C. 470 et seq.) is legislation intended to preserve historical and archaeological sites in the United States of America.

Cultural resources studies were completed in 2015 and additional survey are planned for the summer of 2016.

1.2.5 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This act is the primary law governing marine fisheries management in U.S. federal waters. First passed in 1976, the Magnuson-Stevens Act fosters long-term biological and economic sustainability of our nation's marine fisheries out to 200 nautical miles from shore.

The New England Fishery Management Council (NEFMC) is one of eight regional fishery management councils created by the 1976 Magnuson Fisheries Conservation and Management Act, renamed Magnuson Stevens Fisheries Conservation and Management Act in 1996, to manage living marine resources within that area. The NEFMC is responsible for the creation of management plans for fishery resources (FMPs) in Federal waters off of the New England States (which include Maine).

Critical habitat has been designated for the Atlantic salmon within the Androscoggin River.

2.0 PROPOSED ACTION

This section describes the Lower Barker Project and KEI (Maine)'s proposal for continued operation of the Lower Barker Project. This section includes a description of the project as it exists and is operated under the existing license, a description of proposed operations and measures for the new license, and an analysis of proposed operations and measures on existing resources.

2.1 PROJECT DESCRIPTION

2.1.1 EXISTING PROJECT FACILITIES

The Project operates as a run-of-river facility with a continuous flow requirement of 20 cubic feet per second (cfs). The Project's dam is a concrete Ambursen slab and buttress style structure 30 feet in height and 232 feet long with a normal full pond water surface elevation of 164.7 feet NAVD88.

The following information provides a more detailed description, of the existing project:

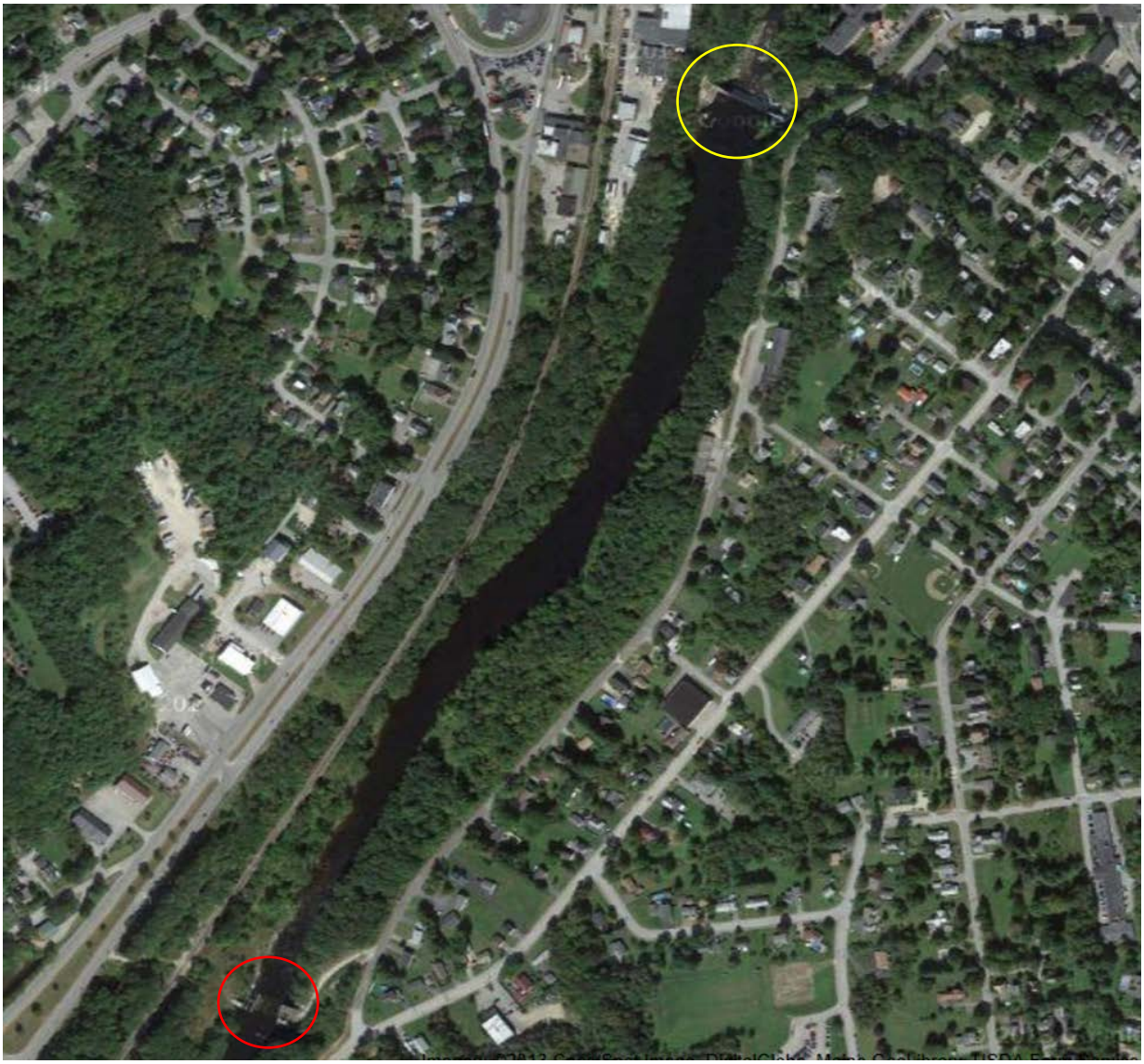
- The project reservoir is approximately 0.65 miles in length from the base of the Upper Barker Dam to the Lower Barker Dam (Photo 2-1) with a surface area of 16.5 acres and a maximum dam storage of 210 acre-feet.
- The concrete Ambursen slab and buttress-style dam consists of the following principal components (Photo 2-2):
  - A 46-foot-long non-overflow section that has two waste gates that measure 8 feet high by 10 feet wide (invert elevation approximately 144 feet NAVD88) along the left buttress (Photo 2-3).
  - A 125-foot-long spillway topped by 14-inch high flashboards that result in a normal full pond water surface elevation of 164.7 feet NAVD88.
  - The right side non-overflow section of the dam adjacent to the power canal is 61 feet long and has six 7-foot-wide by 5-foot-high stop-log sections (invert elevation approximately 162 feet NAVD88) and one 4-foot-wide by 5-foot-high stop-log section (invert elevation approximately 162 feet NAVD88) with a top deck elevation of 169.6 feet NAVD88 (FERC, 1991) (Photo 2-4).
- A 60-foot long power canal that is approximately 20 feet wide (Photo 2-5).
- A 35-foot-long by 20-foot-wide intake gate house consisting of a single gate at the end of the power canal, equipped with trashracks measuring approximately 18.6 feet wide by 14.6 feet high with 2-inch clear spacing (Photo 2-6).

- The penstock is concrete, measures 780 feet long by 8 feet in diameter and runs underground from the intake gate house to the powerhouse.

The powerhouse is a concrete structure that measures 50 feet long by 25 feet wide (Photo 2-7).

- The powerhouse contains one 1500 mm, 1,950 hp, 305 rpm, double-regulated semi-Kaplan Allis Chalmers 5XA horizontal tube turbine connected to an IHI speed increaser then to a horizontal, 1,667 KVA Louis Allis generator with a capacity of 1,200 kW at 46 feet of head. The unit, manufactured in 1979, has a maximum hydraulic capacity of 500 cfs and a minimum hydraulic capacity of 150 cfs.
- The powerhouse and tailrace are located approximately 2,000 feet downstream of the dam (FERC, 1979).
- KEI (Maine) maintains and operates a downstream fish bypass at the Lower Barker Project to facilitate the passage of juvenile and post-spawned river herring and other emigrating fish species.
- The project generator is connected to the distribution line via a 250-foot-long, 4.2 kV underground power line (FERC, 1991).
- Average annual generation for 2014 was approximately 5,915.47 MW and for 2015 was approximately 4,224.93 MH.

PHOTO 2-1 LOWER BARKER IMPOUNDMENT



Source: Google.com Upper Barker Dam (Red), Lower Barker Dam (Yellow)

PHOTO 2-2 LOWER BARKER PROJECT

Source: Bing.com

PHOTO 2-3 LOWER BARKER DAM NON-OVERFLOW WASTE GATE SECTION, SPILLWAY AND UPPER PORTION OF THE BYPASS REACH

PHOTO 2-4 LOWER BARKER DAM NON-OVERFLOW STOP-LOG SECTION

PHOTO 2-5 POWER CANAL AND GATE HOUSE

PHOTO 2-6 GATEHOUSE

PHOTO 2-7 PROJECT POWERHOUSE

2.2 PROJECT LANDS AND WATERS

The FERC project boundary for the Lower Barker Project is provided in Exhibit G. The project boundary encompasses the impoundment up to normal headpond elevation 165.6 feet NAVD88 and extends upstream to the base of the Upper Barker Dam. The project boundary encloses the dam, buried penstock, and the powerhouse. There are no Federal lands within or adjacent to the project boundary.

2.3 EXISTING PROJECT OPERATION

The Project is operated as run-of-river with no impoundment fluctuation. The headpond is maintained at an elevation slightly above the spillway crest, allowing a veil of water to overtop the dam to satisfy the 20 cfs minimum flow requirement. The Project has a maximum hydraulic capacity of 500 cfs and a minimum hydraulic capacity of 150 cfs. Inflows less than 170 cfs (minimum hydraulic capacity plus minimum flows) are passed at the dam. Flows in excess of 500 cfs (maximum hydraulic capacity plus minimum flows) are likewise spilled over the dam or passed through existing gates into the bypassed reach.

From June 1 through November 15, KEI (Maine) releases the minimum flow from the stoplog gate near the intake to the power canal, which serves as the downstream fish passage. Water and fish exiting the gate, discharge into a plunge pool, cascade down a small set of bedrock falls, and rejoin the Little Androscoggin immediately downstream of the dam. During the remainder of the year, KEI (Maine) releases the minimum flow from one of the fixed gates (FERC, 2011). This bypassed flow, determined in consultation with agencies, was intended "to enhance fishery resources" (FERC, 1979). River flow typically exceeds the maximum hydraulic capacity of the turbine 38 percent of the time and is less than the minimum capacity approximately 22 percent of the time, resulting in the provision of flows to the bypassed reach approximately 60 percent of the year, depending on the type of water year (e.g., wet, dry, normal).

2.4 PROPOSED PROJECT FACILITIES

KEI (Maine) is not proposing any new or modified project facilities as part of this relicensing.

2.5 PROPOSED PROJECT OPERATION

The Licensee is proposing to continue to operate the project as run-of-river. KEI (Maine) is proposing increase the minimum flow to the bypassed reach to 50 cfs, or inflow, whichever is less. The mechanism for releasing the minimum flow is not yet finalized. The Project will continue to provide flows through stoplog section to provide downstream fish passage from June 1 through November 15.

2.6 PROPOSED ENVIRONMENTAL MEASURES

KEI (Maine) proposes to increase the existing minimum flow of 20 cfs to 50 cfs , or inflow, whichever is less, to the bypassed reach. As discussed in Section 4.3.3 (Water Resources) this flow is expected to increase the availability of suitable aquatic habitat for target fish species (e.g., salmonids) and macroinvertebrates and will keep 75 percent or more of the bypassed reach width wet at all times.

KEI (Maine) is also proposing to upgrade the existing downstream fish passage system to reduce entrainment potential for outmigrating diadromous fish species. Due to site characteristics the exact configuration of a modified fishway has yet to be determined. In the fall of 2016, KEI (Maine) plans to conduct a bathymetric survey in the vicinity of the upstream end of the intake canal which will be used to develop a preliminary design for the fishway modifications. The design will be developed in consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Should the design progress sufficiently to allow for construction prior to license expiration, KEI (Maine) will consult with FERC to assess whether modifying the existing downstream fishway would require an amendment to the current license or if FERC would prefer to approve the structure as part of the new license. KEI (Maine) is currently consulting with fisheries agencies regarding fish passage at the Lower Barker facility.

3.0 PRE-FILING CONSULTATION RECORD

3.1 STAKEHOLDER CONSULTATION

The Notice of Intent (NOI) and PAD for the Lower Barker Project were issued to stakeholders and filed with FERC on January 31, 2014. FERC approved the use of the TLP on March 19, 2014. KEI (Maine) conducted a joint meeting and site visit on May 19, 2014. The following provides a summary of consultation correspondence over the course of the relicensing process to date, including development and filing of draft and revised study plans and reports (Appendix A) and associated agency meetings:

2014

01/31/2014	The Lower Barker NOI and PAD were filed with FERC and mailed to stakeholders.
02/14/2014	Letters inviting the Aroostook Band of Micmacs, Houlton Band of Maliseet Indians, Passamaquoddy Tribe at Pleasant Point, Passamaquoddy Tribe at Indian Township, and Penobscot Indian Nation to participate in relicensing process.
03/19/2014	FERC accepted TLP
04/30/2014	KEI (Maine) sent out joint agency meeting letter
05/19/2014	KEI (Maine) conducted joint agency meeting and site visit
05/05/2014	MEIFW comments provided on PAD
06/17/2014	MEIFW study request
07/03/2014	American Whitewater commented on PAD and study request
07/09/2014	MDMR commented on PAD
07/10/2014	NMFS commented on PAD and study request
07/16/2014	City of Auburn commented on PAD and study request
07/16/2014	MDEP commented on PAD and study request
07/18/2014	USFWS commented and study request

2015

04/23/2015	American Whitewater commented on Proposed Study Plan
05/06/2015	NOAA commented on PSP
05/06/2015	City of Auburn commented on PSP
05/06/2015	MDEP commented on PSP
05/06/2015	MEIFW commented on PSP
06/05/2015	KEI (Maine) filed a Proposed Study Plan with FERC. A list of studies and their status are provided in Table 3-1.

2016

05/10/2016	City of Auburn request for recreational flow studies in coordination with River Day
05/17/2016	KEI submitted Draft Study Report for agency review
06/10/2016	KEI provided response letter to City of Auburn

TABLE 3-1 DESCRIPTION AND STATUS OF INDIVIDUAL STUDIES FOR LOWER BARKER RELICENSING

STUDY DESCRIPTION	STATUS
Water Quality	Completed in 2015 – Section 4.3.3
Benthic Macroinvertebrates	Completed in 2015 – Section 4.3.4
Nighttime American Eels	Completed in 2015 – Section 4.3.4
Minimum Flow in the Bypassed Reach	Phase 1 completed in 2015 – Phase 2 completed in 2016 Section 4.3.3
Historic Properties*	Completed in 2015
Cultural Study*	Reconnaissance Study completed in 2015 Phase 1 study to be completed in 2016
Recreational Needs	Facility Inventory Completed in 2016 – Section 4.3.7 Whitewater Flow Evaluation planned for 2016, as seasonal flows allow

* These reports contains confidential information and are being provided to SHPO and FERC under separate cover.

4.0 ENVIRONMENTAL ANALYSIS

4.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Lower Barker project is located at river mile 0.25 on the Little Androscoggin River in the City of Auburn, within Androscoggin County, Maine. The Androscoggin River watershed extends from northeastern New Hampshire to the coast of Maine where it joins the Kennebec River to form Merrymeeting Bay. The watershed has a total drainage of 3,530 square miles (sq mi) (FERC 1996). At 164 miles long, the Androscoggin River is the third largest river in Maine. The Androscoggin River basin contains over 100 dams, 16 of which are used for hydropower generation (ENSR, 2007). Among the major streams and rivers in the basin are the Kennebago River, Rangeley River, Sabattis River, Sunday River, and the Little Androscoggin River (Maine Rivers, 2013).

The Little Androscoggin River basin, where the Project is located, is a sub-basin of the Androscoggin River watershed. The Little Androscoggin River basin, originates in Bryant Pond in Woodstock, Maine approximately 29 miles northwest of the project area (Google Earth, 2013a). The Little Androscoggin River has a total drainage area of approximately 350 sq mi covering two counties (Androscoggin and Oxford) (FERC, 1996). The river is approximately 52 miles long from its headwaters to its confluence with the Androscoggin River (USGS, 2013c). Among the major lakes and tributaries in the basin are Bryant Pond, Thompson Lake, Andrews Brook, Black Brook, Cushman Stream, Meadow Brook, and Bog Brook (Maine Legislature, 1989).The Project is located approximately 2,000 feet upstream from the confluence of the Little Androscoggin River with the Androscoggin River in Androscoggin County in Auburn, Maine.

Androscoggin County is located in southwestern Maine. The County encompasses 14 cities and towns including the second and fourth largest cities in the state, Lewiston and Auburn respectively. The Lewiston-Auburn metro area is a center for retail trade, services and manufacturing. The major topographic feature of Androscoggin County is the Androscoggin River which divides the "twin cities" of Lewiston and Auburn. The remainder of the topography is generally moderate, varying from forested hills to flat farmlands (AVCOG, 2011).

The mean annual daily flow into the Project is estimated to be 667 cubic feet per second (cfs), pro-rated from the USGS No. 01057000 (Little Androscoggin River near South Paris, Maine) on the Little Androscoggin River (USGS, 2013a), approximately 22 miles northwest of the Lower Barker Project (Google Earth, 2013b). The maximum peak flow recorded during the period of record (water years 1913 to 1924 and 1931 to 2013), as measured at the USGS No. 01057000 gage upstream of the Lower Barker Project, was approximately 1190 cfs, which occurred in February, 1970. The lowest peak flow recorded during that time was approximately 9.6 cfs, which occurred in September, 1923 (USGS, 2013a and USGS, 2013b).

Until the late 19th century, agriculture was the primary land use of the Little Androscoggin River basin. The amount of lands used for agricultural purposes peaked in 1880 before steadily declining through the end of the 20th century. Following the decline in agriculture many lands reverted to their original, forested state. Today, the majority of the basin remains forested (Ireland, 1998).

The Project lies wholly within Androscoggin County, Maine, which has a land area of approximately 468 square miles (U.S. Census, 2012a). The project vicinity is dominated by forestland, approximately 61% of the total land cover, followed by agriculture at approximately 13% of the land cover. Overall, only a small percentage of the project vicinity is developed (6.4%) (NOAA C-CAP, 2006). As such, the major land uses in Androscoggin County are forestry, agriculture and urban development, contained within 14 cities and towns, the largest of which is the Lewiston-Auburn metropolitan area where the Project is located (FERC, 1996).

The Lower Barker Project is located wholly within the city of Auburn, which is comprised of a mix of urban development and forested areas. Auburn was incorporated as a town in 1842. In the mid-1850s Auburn emerged as a "powerful and well-organized city" (Men, 1889), noted for its multitude of mills and factories (FERC, 1996). Today, many of the mills and factories are defunct and the areas of Auburn closest to the Project are zoned as general business; multi-family urban and suburban; and rural residential (Auburn, 2011).

The shoreline of the project impoundment is predominantly wooded. Project operations and maintenance are the primary activities that occur on project lands. There are no formal public

recreation facilities at the Project and access to the dam is blocked to unauthorized vehicles or pedestrians.

The Little Androscoggin River was historically home to many industrial sites that took advantage of the river as an energy source and water supply. The main types of industry developed on the Little Androscoggin River were textile and paper mills. As time progressed, large-scale factories began to leave the area and, as of today, only light industrial development and small businesses remain along the Little Androscoggin River (FERC, 1996).

There are 8 dams currently located on the Little Androscoggin River, listed in Table 4-1 in ascending order. The historical use of the river as an energy source is evident as a majority of the dams were constructed prior to 1945. Six of the dams are currently used for hydroelectric generation. Five of the dams are privately owned while the remaining three are owned by local municipalities Table 4-1) (USACE, 2013). The Little Androscoggin River is also utilized for recreational purposes; the majority of which are fishing and boating (FERC, 1996).

TABLE 4-1 LITTLE ANDROSCOGGIN RIVER HYDRO PROJECTS

PROJECT	OWNER	RESERVOIR AREA (AC)	HEIGHT OF DAM (FT)	GENERATION CAPACITY (KW)[1]
Lower Barker	KEI (Maine) Power Management (III) LLC.	150	30	1,200
Upper Barker	KEI (Maine) Power Management (III) LLC.	255	24	1,000
Hackett Mills	Hackett Mills Hydro Associates	480	8	470
Mechanic Falls/ Marcal Dam	KEI (Maine) Power Management (IV) LLC	103	15.4	1,310
Welchville	Town of Oxford	5232	16	NA
Biscoe Falls	John Crouch Jr. & Sons	126	15	50
Hicks Pond	Town of Greenwood	538	12	NA
Lake Christopher/ Bryant Pond	Town of Woodstock	8560	7	NA

Source: USACE, 2013; FERC, 1996

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4.2 CUMULATIVE EFFECTS

4.2.1 GEOGRAPHIC SCOPE

The geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of the proposed action's effect on the resources and the limits or boundaries of contributing effects from other activities within the river basin. Because the proposed action can affect resources differently, the geographic scope for each resource may vary.

4.2.2 TEMPORAL SCOPE

The temporal scope of the environmental analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on each resource that could be cumulatively affected. Based on the potential term of a new license for the Project, the temporal scope for analysis of cumulatively affected resources will look 30-50 years into the future, with focus on how reasonably foreseeable future actions affect resources. The discussion of historical information is limited to available information for the resource areas.

4.3 PROPOSED ACTION AND ACTION ALTERNATIVES

4.3.1 GEOLOGY AND SOILS

4.3.1.1 AFFECTED ENVIRONMENT

The Project is located in the Central Interior biophysical region of Maine. This area is identified by its flat to gently low rolling hills and heavily forested land. While most of the region is underlain by sedimentary and metamorphic bedrock, a sizeable granitic pluton does exist southwest of Androscoggin Lake. The northwest border of the region roughly follows the inland extent of the glacial submergence that occurred in the state, and therefore the lowlands of the lower Androscoggin valley is filled with glaciomarine clays and silts (MDIFW, 2005).

The topography of the project vicinity, Androscoggin County, is heavily forested with low, rolling hills. Androscoggin County contains 860 lakes and ponds as well as approximately 750 miles of rivers and streams (USGS, 2007). The tallest peak in Androscoggin County is Shackley Hill in town of Livermore. Shackley Hill is 11,222 feet high and is located approximately 22 miles north of the Project (Peakbagger, 2013).

Bedrock near the Project is composed primarily of stratified sedimentary, volcanic and metamorphic rocks as well as intrusive igneous rocks. Specifically, the bedrock in the vicinity of the Project includes gneiss, schist, granite, granodiorite and gabbro (MDACF, 2013)

SOILS

Maine soils were formed when the last glacier in Maine melted approximately 12,500 years ago and moved across the state in a northwest to southeasterly direction. Rock fragments and soil material were deposited as till, or as water-sorted sediments in streams, rivers, lake and the ocean. Land, depressed by the glacier, rebounded slowly, creating a complex pattern of soils derived from till, sediments, sands, and gravel (Ferwerda et. al, 1997).

Androscoggin County is composed of mainly loamy and sandy soils, formed mostly from granite, gneiss, metasandstone, schist. Additionally, some areas of Androscoggin County contain soils more clayey and loamy in nature. These soils are labeled as Skerry-Hermon-Monadnock-Colonel; Adams-Croghan-Naumburg; and Scantic-Lamoine-Buxton-Lyman (Ferwerda et. al, 1997).

Generally, the soils surrounding the dam are fine sandy loams, with some silty loams (USDA, 2013). The most common type of soil near the Project is characterized by the USDA as Made Land, which is a very gravelly sandy loam, moderately well drained, with a slope of 0 to 35 percent. The Project is also surrounded by Hartland, Scantic, Belgrade, Suffield, and Adams soils. Hartland soils are characterized as well-drained, very fine sandy loams, with slopes ranging from 0 to 25 percent. Parent material for Hartland type soils is course-silty glaciolacustrine deposits. Scantic soils are characterized as silt loam, with slopes ranging from 0 to 3 percent. Parent material for Scantic soils is fine glaciolacustrine deposits and/or fine-silty marine deposits. Belgrade soils are characterized as very fine sandy loam, with slopes ranging from 8 to 15 percent. Parent material for Belgrade soils is coarse-silty glaciolacustrine deposits. Suffield soils are characterized as silt loam, with slopes ranging from 15 to 30 percent. Parent material for Suffield soils is fine glaciolacustrine deposits. Adams soils are characterized as somewhat excessively drained, loamy sands, with slopes ranging from 0 to 30 percent. Parent material for Adams soils is sandy glaciofluvial deposits derived from crystalline rock. (USDA, 2013).

RESERVOIR SHORELINE AND STREAM BANK CONDITIONS

As discussed above, soils immediately surrounding the Project are primarily composed of moderately well drained, very gravelly sandy loam (USDA, 2013). Slopes range from 0 to 35 percent. Just upstream of the dam, soils along the shoreline are composed of Hartland very fine sandy loam, with 15 to 25 percent slopes. These soils are well drained and are typically found in lakebeds. Suffield silt loam soils are also found upstream of the dam, and are characterized as moderately well drained with slopes of 15 to 30 percent (USDA, 2013). Downstream of the dam, soils are predominantly "Made Land".

Shorelines immediately surrounding the project impoundment are heavily forested, with some localized commercial and residential areas. Slopes are generally gentle along the impoundment. Downstream of the dam, the streambank and riverbed is primarily composed of rock and sand. Shorelines are very steep in the immediate vicinity of the dam and continue to be steep along the bypassed reach to the confluence of the Little Androscoggin River with the Androscoggin River.

EROSION

According to the 2010 State Hazard Mitigation Plan, all areas in Maine are susceptible to erosion, due to farming and crop cultivation throughout the state. Erosion can also occur in the area because of hurricanes, flooding, and wildfires, among other reasons (MDDVEM, 2010).

The Natural Resources Conservation Survey has assessed the susceptibility of the soils surrounding the Project to erosion caused by water including rainfall and stormwater run-off. Factor K estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity with values ranging from 0.02 to 0.69; the larger value indicating greater susceptibility to sheet and rill erosion by water. The Factor K values for the soils surrounding the Project range from 0.17 (Adams soils) to 0.49 (Belgrade and Hartland soils), indicating a moderate susceptibility to erosion from water. However, the majority of these soils are along the impoundment, which has relatively stable elevations from run-of-river operations. Downstream of the dam, the majority of soils are very gravelly sandy loam and the bypassed reach is armored with bedrock (USDA, 2013). The shoreline surrounding the Project is also heavily forested, which aids in stabilizing the banks.

4.3.1.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

KEI (Maine) proposes to continue operating the Lower Barker Hydroelectric Project as a run-of-river facility but with a higher minimum flow of 50 cfs, or inflow, whichever is less. This minimum flow over the dam will minimize large fluctuations of flow in downstream reaches and provide stable flows. Such stability will minimize the potential for erosion within the Project boundary.

The periodic impoundment drawdowns, associated with maintenance or emergency operations may have the potential to contribute to erosion within the Project boundary, but these events occur only on a very rare basis.

Recreation facilities are not over utilized by the public within the Project boundary and the soils present along the riverbank range from moderately low to moderate erodibility. The continued use of recreation facilities is therefore not expected to have significant adverse effects on soil stability within the Project boundary. Maintenance and grading associated with recreational facilities will occur only in areas where the soil is already disturbed; these activities would not likely contribute to additional erosion.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the Project would operate in the same manner as under the previous license. The Lower Barker Hydroelectric Project would continue to operate as a run-of-river facility with a minimum flow of 20 cfs or inflow into the reservoir (whichever is less). This mode of operation will minimize large fluctuations of flow in downstream reaches and provide stable flows. Such stability minimizes the potential for erosion within the Project boundary. Periodic impoundment drawdowns associated with maintenance or emergency operations or natural flood events may have the potential to contribute to erosion within the Project boundary. These events, though, occur on very rare occasions. By continuing run-of-river operations at the Lower Barker Hydroelectric Project, Project operations are not expected to have significant adverse effects on the local soil and geology.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are those effects that may still occur after implementation of protection, mitigation, and enhancement (PME) measures. Some small amounts of erosion and sedimentation do have the potential to occur within the Project boundary if flooding events were to occur. Such events would contribute to erosion or scouring downstream of the Project. However, operation of the Project has a limited effect, if any, on geological resources and soil; therefore, additional PME measures are not warranted.

4.3.2 REFERENCES

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4.3.3 WATER RESOURCES

4.3.3.1 AFFECTED ENVIRONMENT

WATER QUANTITY

The Lower Barker Project is operated as run-of-river (i.e., inflow equals outflow) and can generate electricity at river flows ranging from 150 cfs to 500 cfs, which are the approximate minimum and maximum hydraulic capacities of the turbine. Flows that pass through the turbine are discharged into the Little Androscoggin River approximately 0.57 river miles (RM) downstream of Lower Barker dam, creating a 3,000-foot-long bypassed reach; a minimum flow of 20 cfs is conveyed to the bypassed reach to protect aquatic and fishery resources. Inflows less than 150 cfs and more than 500 cfs are spilled over the dam or passed through existing gates into the bypassed reach.

The impoundment extends upstream approximately 0.65 miles to the Upper Barker Project (FERC No. 3562) dam. The reservoir has a storage capacity of 150 acre-feet (USACE, 2013) and a volume of 210 acre-feet. The impoundment has a surface area of approximately 16.5 acres at the normal pond elevation of 164.7 feet (NAVD88). The drainage area upstream of the dam is approximately 357 square miles. According to FEMA flood maps, the depth of the impoundment in the vicinity of the dam varies from 5 to 10 feet (FEMA, 2012); immediately upstream of the dam (i.e., at or near the face of the dam), the impoundment is approximately 30 feet deep. The impoundment does not provide sufficient storage capacity for flood control (FERC, 1979).

The mean, median, minimum, and maximum monthly inflows of the Little Androscoggin River at the Lower Barker Project are estimated to be 694 cfs, 350 cfs, 3 cfs, and 32,871 cfs, respectively (Table 4-2). River flow typically exceeds the maximum hydraulic capacity of the turbine 38 percent of the time and is less than the minimum capacity approximately 22 percent of the time, resulting in the provision of flows to the bypassed reach approximately 60 percent of the year, depending on the type of water year (e.g., wet, dry, normal) (Table 4-3). KEI (Maine) is typically able to generate electricity approximately 78 percent of the year, assuming a normal water year. Appendix B provides flow duration curves for the Lower Barker Project for the period January 1985 to December 2015.

TABLE 4-2 DAILY MEAN, MINIMUM, AND MAXIMUM INFLOWS BY MONTH FOR THE LOWER BARKER PROJECT (JANUARY 1985 TO DECEMBER 2015).[1]

MONTH	MEAN INFLOW (CFS)	MEDIAN INFLOW (CFS)	MINIMUM INFLOW (CFS)	MAXIMUM INFLOW (CFS)
January	489	306	88	15,269
February	379	282	88	3,978
March	998	574	97	15,512
April	2,034	1,364	209	32,871
May	916	676	73	16,144
June	634	343	36	15,803
July	327	141	15	6,467
August	281	92	4	7,051
September	196	83	3	8,801
October	528	248	15	9,482
November	786	535	63	10,406
December	762	467	92	12,254
Annual	**694**	**350**	**3**	**32,871**

TABLE 4-3 TYPICAL PERCENTAGE OF TIME BY MONTH THAT RIVER FLOW IS OUTSIDE THE HYDRAULIC CAPACITY RANGE OF THE LOWER BARKER PROJECT (150 TO 500 CFS) (JANUARY 1985 TO DECEMBER 2015).

MONTH	PERCENT OF TIME LESS THAN 150 (CFS)	PERCENT OF TIME GREATER THAN 500 (CFS)	CUMULATIVE PERCENT
January	8%	22%	30%
February	10%	15%	25%
March	5%	55%	60%
April	0%	94%	94%
May	1%	68%	69%
June	16%	32%	48%
July	52%	16%	68%
August	61%	13%	74%
September	70%	8%	78%
October	31%	27%	58%
November	4%	54%	58%
December	2%	46%	48%
Annual	**22%**	**38%**	**60%**

[1] River flow data was obtained from USGS Gage No.01057000 (Little Androscoggin River near South Paris, Maine, approximately 22 miles northwest of the Lower Barker Project) for the time period January 1985 to December 2015, and pro-rated to account for the additional drainage area for the Lower Barker site. The drainage area at the USGS gauge is 73.5 square miles, and the drainage area at the Lower Barker dam is 357.4 square miles; therefore, the data from the gage were pro-rated by a factor of 4.9 (=357.4/73.5).

EXISTING USES OF WATER

Currently there is light industrial and small business activity along the Little Androscoggin River. The current uses of water in the vicinity of the Lower Barker Project are hydropower generation and wastewater assimilation. There are seven dams upstream of the Lower Barker Project on the Little Androscoggin River, four of which (Upper Barker, Hackett Mills, Mechanic Falls, and Biscoe Falls) are used for hydropower generation (USACE, 2013). There are no permitted water withdrawals from the impoundment for purposes other than hydropower generation.

There is one active Maine Pollutant Discharge Elimination System permit on the Little Androscoggin River (permit ME0100005), which was issued to the Auburn Sewerage District on December 28, 2005 (EPA, 2013). The permit authorizes the Auburn Sewerage District to discharge untreated sanitary waste water and storm water runoff into the Little Androscoggin River through one combined sewer overflow structure on Newbury Street and one combined sewer overflow structure on Washington Street. The Newbury Street discharge is near the tailrace of the Lower Barker Project; the Washington Street discharge is upstream of the impoundment.

INSTREAM FLOW USES

KEI (Maine) uses the Little Androscoggin River for hydroelectric generation. In addition, from June 1 through November 15, KEI (Maine) releases the minimum flow (20 cfs) from the stoplog section of the dam, which also provides downstream fish passage. During the remainder of the year, KEI (Maine) releases the minimum flow from one of the fixed gates on the dam (FERC, 2011). This minimum flow, determined in consultation with agencies, was intended "to enhance fishery resources" (FERC, 1979). Furthermore, inflows outside of the hydraulic capacity of the Lower Barker Project are spilled at the dam providing additional water to the bypassed reach.

EXISTING WATER RIGHTS

KEI (Maine) holds all of the flowage easements necessary to operate the Lower Barker Project. There is no development within the project boundary and no streams are located within the project boundary or within the vicinity of the project that are affected by headpond fluctuations or by generation releases.

WATER QUALITY

WATER QUALITY STANDARDS

Maine statute 38 MRSA §464-470 establishes the state of Maine's classification system for surface waters. The lower section of the Little Androscoggin River from South Paris, Maine, to the confluence with the Androscoggin River is a Class C waterway (Maine Legislature, 1989). The quality of Class C waters must support the designated uses of drinking water supply after treatment, fishing, agriculture, recreation in and on the water, industrial process and cooling water supply, hydroelectric power generation, and habitat for fish and other aquatic life. Discharges in Class C waterways are permitted to cause some changes to aquatic life, provided that the receiving waters remain of sufficient quality to support all species of fish indigenous to the receiving waters and to maintain the structure and function of the resident biological community (Maine Legislature 1989, 38 MRSA§465).

The state of Maine has established Class C water quality standards for dissolved oxygen (DO), iron, and chloride, and has developed draft criteria for total phosphorus, chlorophyll-a, pH, water transparency (i.e., Secchi disk depth), and aluminum (Table 4-4).

TABLE 4-4 ESTABLISHED AND PROPOSED MAINE WATER QUALITY STANDARDS FOR SELECT PARAMETERS

PARAMETER	CRITERIA	WATER CLASSIFICATION
Dissolved Oxygen	>5 mg/l or 60% saturation; 30-day average of 6.5 mg/l in salmonid spawning areas	Class C
Iron[b]	1000 µg/l or 1 mg/l	Statewide
Chloride[b]	230,000 µg/l or 230 mg/l	Statewide
Aluminum[b]	87 µg/l or 0.087 mg/l	Statewide
Total Phosphorus[c]	≤ 33 µg/l (0.033 mg/l)	Class C
Water Column Chlorophyll-a[c]	≤ 8 µg/l (0.008 mg/l)	Class C
Secchi Disk Depth[c]	≥ 2.0 m	Class C
pH[c]	6.0 – 8.5	Class C

[a]Maine Legislature 1989
[b]MDEP 2012a
[c]MDEP 2012b

At the request of the MDEP, KEI (Maine) completed lake trophic, riverine, and benthic macroinvertebrate monitoring during the late spring, summer, and fall of 2015 to assess baseline water quality. KEI (Maine) employed lake trophic, riverine, and macroinvertebrate sampling methods in accordance with MDEP's protocols (MDEP 2014a; Davies and Tsomides 2002). The goal of this study was to collect baseline water quality information and to use the information to assess whether the Little Androscoggin River in the Lower Barker Project area meets applicable water quality standards and provides for the designated uses of the waterway. The objectives of the study were to evaluate:

- effects of the impoundment on the designated use "recreation in and on the water";
- effects of the project on the designated use "habitat for fish and aquatic life";
- effects of the project on DO;
- whether the Little Androscoggin River attains Class C water quality standards at the project based on the composition of the benthic macroinvertebrate community; and
- whether the current operating regime and minimum flow requirements are maintaining the structure and function of the resident benthic macroinvertebrate community.

The complete baseline water quality and benthic macroinvertebrate study reports are provided in Appendix A.

IMPOUNDMENT WATER QUALITY

KEI (Maine) performed lake trophic sampling in the impoundment twice a month from June through October 2015, using an epilimnetic core[2] to collect measurements of total alkalinity, color, pH, chlorophyll-a, and total phosphorus. During each sampling event, KEI (Maine) also collected Secchi disk transparency measurements and water temperature and DO profiles at 1-meter intervals with a YSI 550A. All samples were collected in the afternoon between 12:15 and 16:05. The impoundment water quality sampling station was located approximately 200 feet (61 meters) upstream of the dam in approximately 13.0 feet (4 meters) of water. The water is nearly 30 feet deep immediately upstream of the dam; however, the sampling station was located upstream of the boat barrier because of safety concerns. On August 13, 2015, KEI (Maine) collected additional water samples for analysis of conductivity, dissolved organic carbon, and

[2] Small-diameter hosing used to take a sample of the water column.

dissolved metals. The main findings of the water quality monitoring in the Lower Barker impoundment are:

- Total phosphorus ranged from 0.013 to 0.031 mg/l with an average 0.021 mg/l. These levels are below the proposed state standard upper limit of 0.033 mg/l for Class C waters.
- Color ranged from 23 to 46 PCU with an average of 33.5 PCU.
- Chlorophyll-a ranged from 0.0024 to 0.0037 mg/l with an average of 0.0030 mg/l which is less than the proposed state standard upper limit of 0.008 mg/l.
- Total alkalinity ranged from 12 to 23 mg/l with an average of 18.1 mg/l indicating that the water had adequate buffering capacity.
- pH ranged from 6.5 to 7.0 with an average of 6.8. All pH values were within the recommended range of 6.0 to 8.5 for Class C waters.
- The Secchi disk transparency ranged from 1.3 to 4.1 meters with an average of 2.5 meters.
- The trophic state index for the impoundment was 40 which is categorized as mesotrophic.
- Conductivity was 135 µS/cm.
- The concentrations of iron (0.65 mg/l) and chloride (23 mg/l) were less than the established standards.
- The concentrations of dissolved metals and nutrients were (mg/l): nitrate = 0.09, sulfate = 4, calcium = 8.7, magnesium = 1.7, potassium = 1.5, silica = 4.2, sodium = 12, aluminum = <0.2, and dissolved organic carbon = 1.7.
- The water temperatures at the beginning (June) and end (October) of the monitoring period were approximately 17°C and 9°C (63°F and 49°F), respectively (Table 4-5). The highest water temperatures were observed in late July through early September (approximately 23°C to 24°C or 73°F to 75°F).
- The DO concentration was highest at the beginning and end of the monitoring period with values greater than 9 mg/l in June and greater than 10 mg/l in October (Table 4-6). DO was lower and exhibited a similar range throughout July, August, and September (approximately 8 to 9 mg/l).
- The DO percent saturation was relatively uniform throughout the entire sampling period with a range of approximately 90 percent to 104 percent (Table 4-6).
- The DO measurements exceeded the state standard for Class C waters of 5 mg/l or 60 percent saturation throughout the June to October sampling period, demonstrating that the water of the Lower Barker impoundment is well oxygenated.
- Water temperature and DO exhibited little to no variation throughout the water column.

TABLE 4-5 AVERAGE, MINIMUM, AND MAXIMUM WATER TEMPERATURE THROUGHOUT THE WATER COLUMN IN THE LOWER BARKER IMPOUNDMENT DURING THE LAKE TROPHIC SAMPLING, JUNE – OCTOBER, 2015

SAMPLE DATE	AVERAGE (°C)	MINIMUM (°C)	MAXIMUM (°C)	AVERAGE (°F)	MINIMUM (°F)	MAXIMUM (°F)
6/9	17.3	17.2	17.4	63.1	63.0	63.3
6/24	19.3	19.3	19.4	66.8	66.7	66.9
7/7	22.0	21.8	22.3	71.6	71.2	72.1
7/23	23.3	23.1	23.8	74.0	73.6	74.8
8/13	22.6	21.8	24.1	72.7	71.2	75.4
8/26	23.5	23.2	23.9	74.3	73.8	75.0
9/9	23.7	21.9	24.7	74.7	71.4	76.5
9/22	19.9	19.7	20.1	67.8	67.5	68.2
10/6	12.9	12.7	13.2	55.2	54.9	55.8
10/22	9.4	9.3	9.5	48.9	48.7	49.1

TABLE 4-6 AVERAGE, MINIMUM, AND MAXIMUM DO CONCENTRATION AND DO PERCENT SATURATION THROUGHOUT THE WATER COLUMN IN THE LOWER BARKER IMPOUNDMENT DURING THE LAKE TROPHIC SAMPLING, JUNE – OCTOBER, 2015

SAMPLE DATE	DO (MG/L)			DO (% SATURATION)		
	AVERAGE	MINIMUM	MAXIMUM	AVERAGE	MINIMUM	MAXIMUM
6/9	9.2	9.2	9.3	96.0	95.1	96.7
6/24	9.4	9.4	9.4	101.7	101.4	101.8
7/7	8.7	8.7	8.7	99.6	99.0	100.3
7/23	8.2	7.9	8.6	96.5	92.2	101.2
8/13	8.7	8.6	8.9	101.2	98.2	102.4
8/26	8.4	7.8	8.7	98.9	91.9	103.4
9/9	8.4	7.9	8.6	99.2	89.7	103.7
9/22	8.7	8.6	8.8	95.3	94.2	96.2
10/6	10.6	10.6	10.7	100.6	99.9	101.5
10/22	10.5	10.4	10.7	91.9	90.4	93.3

RIVERINE DO AND WATER TEMPERATURE

KEI (Maine) monitored DO and water temperature at two locations downstream from the dam using Onset Hobo U26-001 DO data loggers. One logger was on the river left[3] side of the bypassed reach approximately 1,250 feet (381 meters) downstream from the dam in a potential salmonid spawning area (see Section 4.3.3); the second logger was approximately 225 feet (69 meters) downstream from the powerhouse. The loggers were programmed to sample the DO

[3] All references to river left or river right are from the perspective of an observer looking downstream.

concentration at 1-hour intervals from July 7 to September 9, 2015, during the summer low flow and high temperature period. The water temperature and DO monitoring in the Lower Barker bypassed reach and tailrace demonstrated that (Table 4-7, Figure 4-1, and Figure 4-2):

- The water temperature in the bypassed reach ranged from 20.0°C (68.0°F) to 26.4°C (79.6°F) with an average of 23.1°C (73.7°F).
- The water temperature in the tailrace ranged from 17.5°C (63.5°F) to 26.4°C (79.6°F) with an average of 22.5°C (72.6°F).
- The DO concentration in the bypassed reach ranged from 6.36 to 9.37 mg/l with an average of 8.50 mg/l, and the percent saturation ranged from 75.3 to 107.7 percent with an average of 99.9 percent.
- The DO concentration in the tailrace ranged from 7.15 to 9.69 mg/l with an average of 8.32 mg/l, and the percent saturation ranged from 80.9 to 108.4 percent with an average of 96.6 percent.
- The DO measurements in the bypassed reach and tailrace exceeded the state standard for Class C waters of 5 mg/l or 60 percent saturation throughout the monitoring period.

FIGURE 4-1 HOURLY WATER TEMPERATURE TIME SERIES IN THE TAILRACE AND BYPASSED REACH, JULY 7 – SEPTEMBER 9, 2015

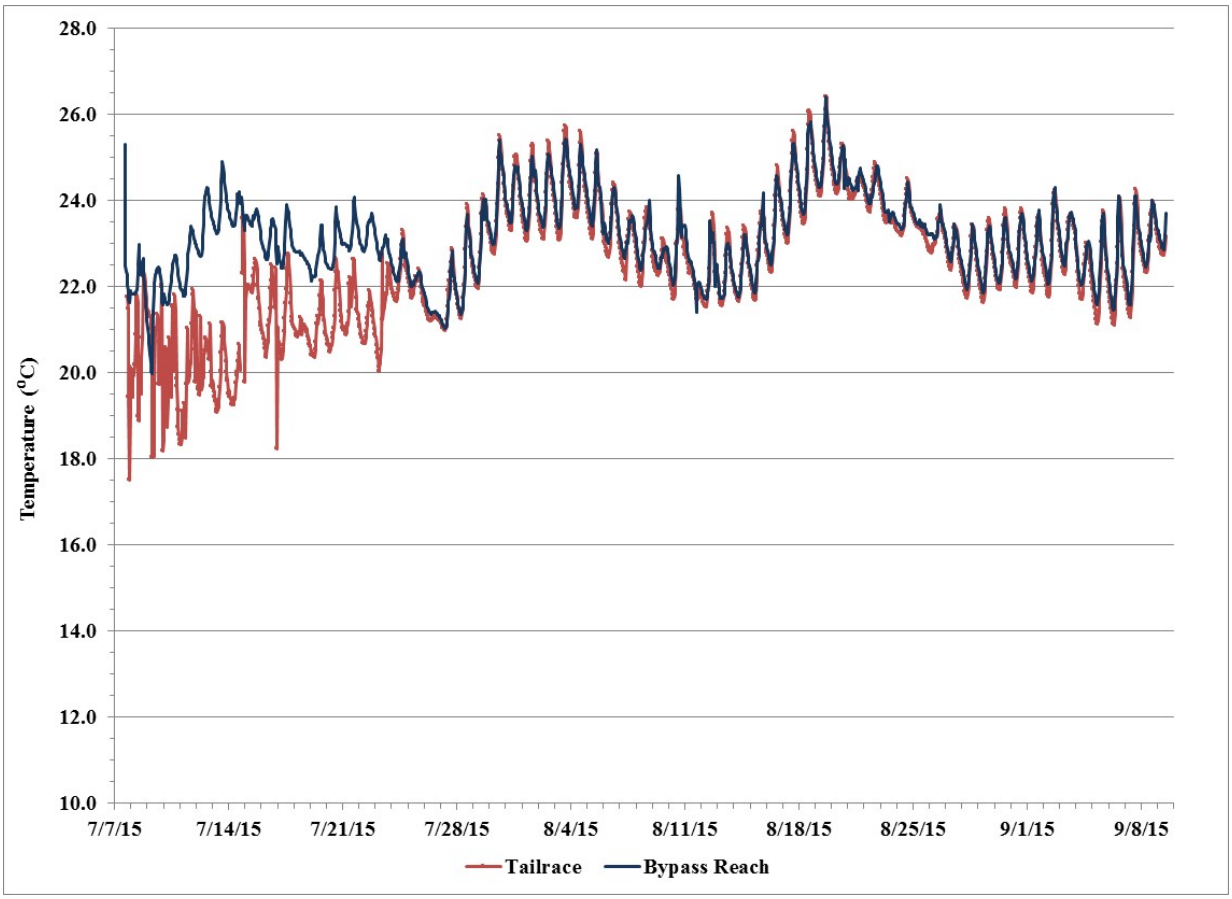

FIGURE 4-2 HOURLY DO CONCENTRATION AND DO PERCENT SATURATION TIME SERIES IN THE TAILRACE AND BYPASSED REACH, JULY 7 – SEPTEMBER 9, 2015

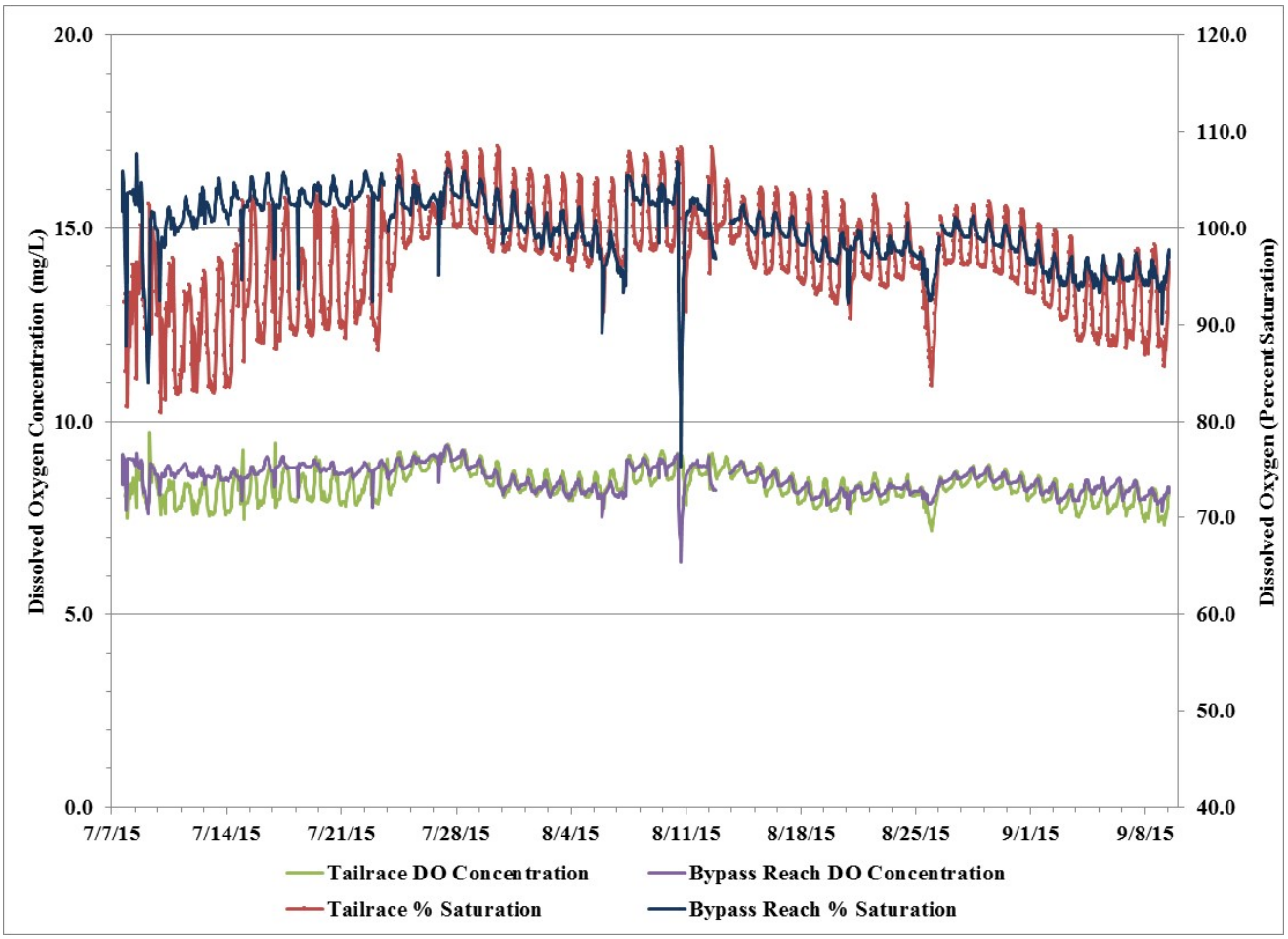

TABLE 4-7 WATER TEMPERATURE (°C), DO CONCENTRATION (MG/L) AND DO PERCENT SATURATION IN THE BYPASSED REACH AND TAILRACE, LOWER BARKER PROJECT, JULY 7 – SEPTEMBER 9, 2015

	T (°C)	T (°F)	DO CONCENTRATION (MG/L)	DO SATURATION (%)
	Bypassed Reach			
Average	23.1	73.7	8.50	99.9
Median	23.1	73.6	8.52	100.1
Minimum	20.0	68.0	6.36	75.3
Maximum	26.4	79.6	9.37	107.7
	Tailrace			
Average	22.5	72.6	8.32	96.6
Median	22.6	72.6	8.32	97.0
Minimum	17.5	63.5	7.15	80.9
Maximum	26.4	79.6	9.69	108.4

COMPARISON TO PREVIOUS WATER QUALITY DATA

MDEP collected water quality data at the confluence of the Little Androscoggin River and the Androscoggin River (approximately 0.75 river miles downstream of the Lower Barker Project) during the summer of 2010 (MDEP, 2011). The concentrations of chlorophyll-a (0.0025 to 0.0036 mg/l) and total phosphorus (0.018 to 0.022 mg/l) were within the range observed in the Lower Barker impoundment in 2015. In addition, MDEP sampled water quality in July and August 2014 and July 2015 approximately 8.3 river miles upstream of the Lower Barker dam (Table 4-8). Those results demonstrated that waters upstream of the Lower Barker Project attain Class C standards for DO, pH, and total phosphorus. The water temperature and total alkalinity values from MDEP's 2014 and 2015 sampling were consistent with KEI (Maine)'s measurements in the Lower Barker impoundment in 2015.

TABLE 4-8 MDEP WATER QUALITY MONITORING RESULTS FROM UPSTREAM OF THE LOWER BARKER PROJECT

DATE	TEMPERATURE (°C)	DO (MG/L)	pH	TOTAL PHOSPHORUS (MG/L)	TOTAL ALKALINITY (MG/L)	CONDUCTIVITY (µS/CM)
7/14/2014	25.0	7.9	7.14	–	–	83
7/22/2014	22.2	7.4	6.06	0.020	15	97
8/12/2014	22.3	8.4	6.9	0.017	–	84
7/15/2015	23.6	7.8	7.13	0.019	17	98.5

Source: MDEP Biomonitoring Unit; http://www.maine.gov/dep/water/monitoring/biomonitoring/data.htm

BENTHIC MACROINVERTEBRATES

At the request of the MDEP, KEI (Maine) monitored benthic macroinvertebrates downstream of the Lower Barker dam to assess whether waters in the project area meet Class C water quality standards and to evaluate the benthic community structure and function. Standard rock bags were installed at two sites: Site 1 was approximately 850 feet below the dam in the bypassed reach and Site 2 was approximately 1,750 feet downstream of the dam (approximately 400 feet downstream of the powerhouse). Three samplers were placed at each sample site on July 22, 2015, and were left in the river for approximately 28 days (± 4 days) to allow for invertebrate colonization.

The monitoring results demonstrated that the benthic macroinvertebrate communities downstream of the Lower Barker dam were abundant and rich in taxa. Filter-feeders represented a sizable proportion of the communities. Filter-feeding caddisflies constituted more than 34 percent of the total abundance at Site 1 and more than 57 percent at Site 2. The community structure and function found downstream of the dam, specifically the presence of stoneflies and mayflies, indicates that there has been little, if any, change in the resident biological community. Sensitive mayflies and stoneflies represented a considerable segment of the community; 13 taxa at Site 1 and 12 taxa at Site 2 represented 38 percent and 30 percent of the communities, respectively. The macroinvertebrate community downstream of the Lower Barker dam on the Little Androscoggin River attains Class C aquatic life standards and maintains the structure and function of the resident benthic macroinvertebrate community. In fact, the benthic macroinvertebrate community was representative of Class A aquatic life standards, which is the 2nd highest water class in the state of Maine; this classification was supported by MDEP's independent review of the data.

HABITAT AND AQUATIC LIFE CRITERIA

MDEP guidelines state that for the structure and function of aquatic habitat to be maintained in an impoundment and for the designated use of habitat for fish and other aquatic life to be attained, at least 75 percent of the littoral zone must remain wet at all times. KEI (Maine) operates the Lower Barker Project in a run-of-river mode, which results in infrequent adjustments to the headpond level for emergency or maintenance. As such, the littoral zone is wetted throughout the year during normal operations. KEI (Maine) proposed no studies of the impoundment littoral zone in its June 5, 2015, final study plan, which was provided to the MDEP.

MDEP guidelines also state that for structure and function to be maintained in free-flowing rivers or streams, at least 75 percent of the cross section of the river must be wet at all times. To assess the MDEP guidelines, KEI (Maine) conducted an instream flow study in 2015 and 2016 to evaluate the available aquatic habitat and wetted stream width in the bypassed reach downstream of the dam. Two transects in the bypassed reach were measured at five flows (35 cfs, 46 cfs, 108 cfs, 197 cfs, and 301 cfs) released from the dam. These flows wetted approximately 73 percent to

94 percent of the bankfull width. Detailed methods and results of the instream flow study are provided in Section 4.3.3.

4.3.3.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

KEI (Maine) is proposing to continue to operate the Lower Barker Project as run-of-river where natural inflow to the dam is equal to the outflow and there is limited water storage in the reservoir. The water quality monitoring in 2015 demonstrated that total phosphorus, chlorophyll-a, and water clarity were below the proposed state standard upper limits for Class C waters and did not indicate the presence of culturally induced algal blooms in the impoundment. Furthermore, benthic macroinvertebrate monitoring demonstrated that the bypassed reach and the reach of the Little Androscoggin River downstream of the powerhouse attain aquatic life standards and that the current minimum flow of 20 cfs maintains the structure and function of the macroinvertebrate community. Project waters upstream and downstream of the dam met or exceeded Class C standards for DO, dissolved metals, and nutrients. The 2015 studies demonstrated that under the current operating regime, the Little Androscoggin River at the Lower Barker Project meets the designated uses of “recreation in and on the water” and “habitat for fish and other aquatic life” and meets applicable water quality standards for Class C waters.

KEI (Maine) is proposing a minimum flow of 50 cfs, or inflow, whichever is less, to the bypassed reach. This flow is expected to increase the availability of suitable aquatic habitat for target fish species (e.g., salmonids) and macroinvertebrates and will keep 75 percent or more of the bypassed reach wet at all times.

As such, the proposed action is expected to affect the distribution of water downstream, increasing the water quantity, and enhancing the water quality and the designated beneficial uses of the Little Androscoggin River in the project area.

NO-ACTION ALtERNATIVE

Under the current operating plan, the Little Androscoggin River at the Lower Barker Project attains applicable water quality standards and meets the designated uses of “recreation in and on the water” and “habitat for fish and other aquatic life.” Continued run-of-river operation of the Lower Barker Project is not expected to alter the water quality of the impoundment, bypassed

reach, or tailrace and will continue to maintain the resident fish and aquatic organism community.

UNAVOIDABLE ADVERSE EFFECTS

Current operation of the Lower Barker Project does not adversely affect the water resources in the Little Androscoggin River; however, KEI (Maine) may need to temporarily alter water levels in the impoundment, bypassed reach, or tailrace for routine maintenance or repairs. This may result in short-term periods of erosion or sedimentation into the impoundment or downstream river reaches.

4.3.4 REFERENCES

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4.3.5 FISH AND AQUATIC RESOURCES

4.3.5.1 AFFECTED ENVIRONMENT

DIADROMOUS FISH SPECIES

The Little Androscoggin River, which enters the main stem Androscoggin River on its west bank just below Lewiston Falls, historically supported large runs of diadromous fish, including river herring (alewife and blueback herring), American shad, Atlantic salmon, and American eel. Two species of sturgeon (Atlantic and shortnose) occur in lower Androscoggin River, but did not occur in the Little Androscoggin River historically (ASSRT, 2007; SSSRT, 2010). Most sea-run fish ascended the Little Androscoggin up to Biscoe Falls, which is approximately 35 river miles above the confluence with the main stem Androscoggin River (MDMR, 2010). Lewiston Falls, which is 22 river miles above tidewater, is the natural upstream migration barrier on the main stem of the Androscoggin River for diadromous species, except Atlantic salmon and American eel, which are able to ascend past Lewiston Falls (MDMR, 2016*a*).

The dam built in 1807 in Brunswick at head-of-tide excluded anadromous fish from the Androscoggin River until fish passage measures were implemented in the main stem in the 1980s. In 1982, Central Maine Power Company (CMP) rebuilt the hydroelectric facility in Brunswick (FERC No. 2284), the first dam on the main stem Androscoggin River. During reconstruction, CMP built an upstream fishway with a trapping and sorting facility and a downstream passage system for diadromous and resident fish species. Upstream and downstream passage was provided at the Pejepscot Hydroelectric Project (FERC No. 4784), the second main stem dam on the Androscoggin River, in 1987, and at the Worumbo Hydroelectric Project (FERC No. 3428), the third and final main stem dam on the Androscoggin River, in 1988.

MDMR began an Anadromous Fish Restoration Program in the lower Androscoggin River in the early 1980s. The primary focus of the restoration plan has been to restore alosine species (i.e., American shad, alewives, and blueback herring) to the lower main stem and tributaries below Lewiston Falls, while increasing the restoration potential for other native species such as Atlantic salmon and American eel (MDMR, 2010). A major strategy of the restoration plan has been to trap migrating adult river herring at the Brunswick Project and transport them into upstream spawning habitat. MDMR personnel operate the Brunswick fishway from May through October each year. The majority of river herring collected in the Brunswick fishway are alewife, although

some blueback herring may ascend the fishway (MDMR, 2010). Statewide, the commercial in-river herring fishery is comprised of 97 percent alewife and 3 percent blueback herring (MDMR, 2010).

RIVER HERRING

MDMR has captured over 1,777,000 adult river herring at the Brunswick fishway and transported them into upstream habitat on the Androscoggin and Little Androscoggin rivers since 1983 (Table 4-9). The total adult river herring release target for the Androscoggin watershed is 27,358 river herring into 1,846 hectare (ha) of upstream habitat available for restoration, which is equivalent to 14.8 fish per ha (MDMR, 2010). During the past eleven years (2006-2016), the number of adults captured at the Brunswick fishway available for transport and release was greater than current management targets (Table 4-9). The numbers of adult river herring captured during this period are likely the result of improved downstream passage for post-spawn adults and juveniles (MDMR, 2010).

Lakes and ponds in the Little Androscoggin watershed upstream of the Lower Barker dam that are currently stocked by MDMR include Lower Range Pond, Marshall Pond, Pleasant Pond, and Taylor Pond (MDMR, 2010). MDMR has stocked nearly 317,000 adult river herring in the Little Androscoggin River since 1983 (Table 4-10). During recent years (i.e., 2007-2016), these habitats have typically attained or exceeded their target stocking density of 14.8 fish per hectare (ha). Other lakes and ponds historically stocked by MDMR in the Little Androscoggin River include Thompson Lake, Sabbathday Pond, Tripp Lake, Hogan Pond, and Whitney Pond (MDMR, 2010).

River herring are also passed into the main steam at the Brunswick dam, which allows them to ascend upriver to spawning habitats. The Licensee of the Worumbo Project passed 32,000 river herring in 2014 and 60,000 river herring in 2015 through the upstream fish passage system (personal communication, Brown Bear Hydro II, July 2016).

AMERICAN SHAD

MDMR supplemented the American shad population in the Androscoggin River through a hatchery rearing program using stock from the Merrimack River (Massachusetts and New Hampshire) until 2009. MDMR transported pre-spawn adult American shad to hatchery facilities

in Waldoboro, Maine, where they were artificially spawned and reared to fingerling size, then stocked below Auburn adjacent to spawning and nursery habitat. From 1999-2008, MDMR stocked over 5.5 million juvenile American shad in the lower Androscoggin River (MDMR, 2010). Since 1985, MDMR has also transferred over 7,800 pre-spawn American shad from the Merrimack, Connecticut, and Androscoggin rivers for release below Lewiston Falls. The American shad hatchery and stocking program ended in 2009 due to lack of funding (MDMR, 2010). Approximately 1,400 American shad have been passed at the Brunswick dam since operations began in 1982; 1,096 (78 percent) of the total were passed in 2016 (Table 4-9). American shad are passed into the Brunswick headpond; the fish lifts at the Pejepscot and Worumbo Projects allow for continued passage to Lewiston-Auburn (MDMR, 2010). In 2015, 18 American shad were passed at the Worumbo Project (personal communication, Brown Bear Hydro II, July 2016).

ATLANTIC SALMON

Atlantic salmon are a federally endangered species protected under the ESA.[4] Just over 800 Atlantic salmon have been passed at the Brunswick fishway since it was installed in the 1980s (Table 4-9). Only a few adult salmon return to the Androscoggin River annually; since 2000, an average of 10 adult salmon have been collected from the Brunswick fishway (Table 4-9).[5] Salmon are passed into the Brunswick headpond to allow for continued volitional upstream passage through the main stem of the Androscoggin River. The fish lifts at the Pejepscot and Worumbo Projects allow for continued passage to Lewiston-Auburn. In 2015, 0 Atlantic salmon were passed at the Worumbo Project (personal communication, Brown Bear Hydro II, July 2016). Most Atlantic salmon arriving at the Brunswick Project are believed to be strays from other river systems (personal communication, Paul Christman, MDMR).

In 2011, MDMR completed a radio-telemetry study evaluating Atlantic salmon habitat use and mainstem fish passage in the lower Androscoggin River. MDMR documented one adult Atlantic salmon and some spawning habitat in the bypassed reach below the Lower Barker dam (MDMR, 2011).

[4] Section 4.3.4 provides additional information about the listing history, critical habitat, and recovery plans for Atlantic salmon.
[5] Maximum return during that period was 44 (2011) and minimum return was 0 (2013).

TABLE 4-9 UPSTREAM FISH PASSAGE COUNTS AT THE BRUNSWICK HYDROELECTRIC PROJECT (1983-2016).

YEAR	ADULT HERRING	AMERICAN SHAD	ATLANTIC SALMON*
1983	601	0	21
1984	2,650	0	91
1985	23,895	0	21
1986	35,471	0	81
1987	63,523	0	26
1988	74,341	0	14
1989	100,895	0	19
1990	95,574	1	185
1991	77,511	0	21
1992	45,050	0	15
1993	5,202	1	44
1994	19,190	1	25
1995	32,002	3	16
1996	10,198	2	39
1997	5,540	2	1
1998	25,189	5	4
1999	8,909	87	5
2000	9,551	88	4
2001	18,196	0	5
2002^	104,520	0	2
2003^	53,732	7	3
2004^	113,686	12	12
2005	25,896	0	10
2006^	34,239	3	6
2007^	60,662	6	21
2008^	92,359	1	18
2009^	44,725	0	24
2010^	39,689	22	9
2011^	54,886	0	44
2012^	170,191	11	0
2013^	69,104	0	2
2014^	68,749	0	4
2015^	71,887	53	2
2016^	120,010 (YTD)	1,096 (YTD)	7 (YTD)
Total	**1,777,823**	**1,401**	**801**

* Approximately 85 percent of returning salmon are of hatchery origin (MDMR data files).
^ attains or exceeds stocking goals of 14.8 fish/hectare.
Source: personal communication, Mike Brown, MDMR, July 11, 2016.

TABLE 4-10 ANNUAL RIVER HERRING STOCKING RECORDS FOR THE LITTLE ANDROSCOGGIN RIVER

	STOCKING LOCATION				
YEAR	LOWER RANGE POND	MARSHALL POND	PLEASANT POND	TAYLOR POND	TOTAL RELEASE
1983	0	312	0	2,126	2,438
1984	217	499	0	2,626	3,342
1985	1,505	504	0	2,502	4,511
1986	1,364	514	0	3,846	5,724
1987	0	633	0	3,907	4,540
1988	1,768	522	0	3,672	5,962
1989	1,821	1,308	0	3,807	6,936
1990	2,085	595	0	2,261	4,941
1991	1,720	650	0	3,770	6,140
1992	1,718	600	0	3,207	5,525
1993	911	617	0	1,625	3,153
1994	1,745	593	0	4,068	6,406
1995	1,669	1,592	0	3,593	6,854
1996	1,793	689	0	3,779	6,261
1997	1,723	711	4,540	2,810	9,784
1998	1,852	930	4,572	4,336	11,690
1999	0	0	4,724	2,489	7,213
2000	1,748	612	4,517	3,801	10,678
2001	1,889	612	3,514	4,225	10,240
2002	1,595	609	4,559	1,477	8,240
2003	1,033	0	4,573	3,835	9,441
2004	1,654	612	4,743	3,731	10,740
2005	0	0	754	0	754
2006	3,999	1,629	213	3,875	9,716
2007^	3,699	1,497	3,522	7,996	16,714
2008^	2,499	1,499	7,000	4,500	15,498
2009^	1,968	1,148	6,999	4,517	14,632
2010	1,327	1,272	2,429	3,232	8,260
2011^	1,493	1,527	10,529	4,317	17,866
2012^	1,616	1,453	12,205	4,318	19,592
2013	1,552	0	4,499	0	6,051
2014^	1,506	1,117	9,500	4,080	16,203
2015^	2,186	1,496	10,494	4,555	18,731
2016^	2,481	1,499	13,614	4,496	22,090
Total	**54,136**	**27,851**	**117,500**	**117,379**	**316,866**

^ attains or exceeds stocking goals of 14.8 fish/ha.
Source: personal communication, Gail Wippelhauser and Mike Brown, MDMR.

AMERICAN EEL

In general, few American eels have been documented recently in the Androscoggin River (MBI, 2006; MDMR, 2016*b*; Miller Hydro Group, 2013; Miller Hydro Group, 2014), although it is likely they occurred in greater numbers historically. The Licensee of the Worumbo Project installs an upstream eel ladder annually to pass juvenile American eels; 17 and 131 eels were captured there during the 2012 and 2013 monitoring periods, respectively (Miller Hydro Group, 2013 and Miller Hydro Group, 2014). There are no other upstream eel passage systems on the Androscoggin River or on any of the Little Androscoggin River dams (personal communication, Gail Wippelhauser, MDMR).

At the request of MDMR, KEI (Maine) performed a series of nighttime surveys in 2015 to assess the need and potential location for an upstream eelway at the Lower Barker Project. The objectives of the study were to:

- conduct systematic nighttime surveys to identify the presence, abundance, distribution, and behavior of juvenile eels at the Lower Barker Project;
- identify areas where eels congregate or attempt to ascend wetted structures; and
- identify potential locations for an upstream eel passage system.

KEI (Maine) used binoculars and spotlights to search for juvenile eels along the downstream face of the dam and spillway, the spill gates, and the bedrock outcrops downstream of the dam. Each survey lasted 1 to 1.5 hours and took place after sunset. KEI (Maine) noted the location of congregating eels, the approximate number and size class of eels at each location, behavior patterns, and weather conditions.

KEI (Maine) performed 11 surveys and observed a total of 44 eels during the monitoring period (Table 4-11). In comparison to other river systems in Maine, the number of eels observed at the Lower Barker Project is very low. For example, over 1,000 juvenile eels were observed during similar monitoring in 2015 at the American Tissue Project on Cobbosseecontee Stream, in Gardiner, Maine (Kleinschmidt 2015). Appendix A provides the complete 2015 Nighttime American Eel Monitoring Report.

TABLE 4-11 2015 NIGHTTIME AMERICAN EEL SURVEY RESULTS, LOWER BARKER PROJECT.

DATE	NO. EELS OBSERVED	LENGTH (MM)
June 9	0	–
June 11	0	–
June 16	10	100-150 (4-6 inches)
June 18	0	–
June 25	0	–
July 7	5	3 eels 75-150 mm (3-6 inches), 1 eel 300 mm (12 inches), 1 eel 600 mm (24 inches)
July 9	0	–
July 14	24	75-150 (3-6 inches)
July 16	1	–
July 29	1	–
August 5	3	–
Total	**44**	–

FISH PASSAGE

KEI (Maine) maintains and operates a downstream fish bypass at the Lower Barker Project to facilitate the passage of juvenile and post-spawned river herring and adult American eel. KEI (Maine) provides downstream fish passage by releasing 20 cfs (also the current minimum instream flow release) through a stop-log section of the main dam on the river right[6] near the intake and small power canal. The fish bypass flow discharges directly into a large plunge pool, and then drops over a small set of bedrock falls. KEI (Maine) uses a notched weir in the plunge pool to verify that 20 cfs is released to provide fish passage. The downstream fish passage system is typically operated from June 1 through November 15 of each year, which aligns with the outmigration of juvenile and post-spawned herring as well as adult American eel.

KEI (Maine) is also proposing to upgrade the existing downstream fish passage system to reduce entrainment potential for outmigrating diadromous fish species. Due to site characteristics the exact configuration of a modified fishway has yet to be determined. In the fall of 2016, KEI (Maine) plans to conduct a bathymetric survey in the vicinity of the upstream end of the intake canal which will be used to develop a preliminary design for the fishway modifications. The design will be developed in consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Should the design progress sufficiently to allow for

[6] All references to river right and river left are from the perspective of an observer looking downstream.

construction prior to license expiration, KEI (Maine) will consult with FERC to assess whether modifying the existing downstream fishway would require an amendment to the current license or if FERC would prefer to approve the structure as part of the new license.

RESIDENT FISH AND FISHERIES MANAGEMENT

MDIFW stocked approximately 22,000 brown trout and rainbow trout in 2013 and 2014 at Mechanic Falls, Auburn, and Minot to support angling opportunities in the Little Androscoggin River (Table 4-12). The number of fish MDIFW stocked in 2015 and 2016 decreased to approximately 4,000 (Table 4-12). Within stocking areas, MDIFW manages the Little Androscoggin as a put-grow-take trout fishery (personal communication, Francis Brautigam, MDIFW). Most stocked fish are between 9 and 10 inches (MDIFW, 2016). There is currently no stocking downstream of the Lower Barker dam although MDIFW has stocked this reach historically (personal communication, Francis Brautigam, MDIFW). The MDIFW's fishery management goal for the Little Androscoggin River, including the bypassed reach associated with the Lower Barker Project, is to develop a trout fishery that persists April 1 – October 31 (MDIFW study request letter to the Commission, June 17, 2014). MDIFW does not actively manage this reach of the Little Androscoggin for brook trout, Maine's only native trout species.

TABLE 4-12 STOCKING RECORDS FOR THE LITTLE ANDROSCOGGIN RIVER, 2013 – 2016.

YEAR	RAINBOW TROUT	BROWN TROUT	TOTAL
2013	19,650	2,050	21,700
2014	20,282	2,050	22,332
2015	2,050	2,050	4,100
2016	1,804	2,250	4,054

Source: MDIFW, 2016.

The Midwest Biodiversity Institute (MBI) sampled the main stem of the Androscoggin River in 2003 near Lewiston-Auburn, 0.8 miles from the confluence with the Little Androscoggin River (MBI, 2006). MBI collected nine species via electrofishing in a 0.6-mile reach. The assemblage was dominated by smallmouth bass (Table 4-13). All species were typical of the lower reaches of Maine's large warmwater river systems. Given the proximity to the Lower Barker Project, KEI (Maine) expects a similar resident fish species assemblage to occur. According to staff from the MDIFW, no recent sampling has occurred in or near project waters (personal communication,

Francis Brautigam, MDIFW). The stakeholders requested no studies of the freshwater fish assemblage as part of the relicensing of the Lower Barker Project.

TABLE 4-13 SUMMARY OF MBI 2003 ELECTROFISHING RESULTS, ANDROSCOGGIN RIVER NEAR LEWISTON-AUBURN.

SPECIES	NO. COLLECTED	RELATIVE PERCENTAGE
Smallmouth bass	78	67.2%
White sucker	17	14.7%
Redbreast sunfish	6	5.2%
American eel	4	3.4%
Pumpkinseed sunfish	4	3.4%
Rainbow trout	2	1.7%
Spottail shiner	2	1.7%
Yellow perch	2	1.7%
Fallfish	1	0.9%
Total Catch[1]	**116**	**-**

[1] In addition to the species listed in Table 4-13, MBI also collected a single largemouth bass from the main stem at the next downstream most station in the Lewiston-Auburn area.
Source: Yoder et al. 2006.

AQUATIC HABITAT

Head pond – The impoundment has a surface area of approximately 16.5 acres at a normal full pond elevation of 164.7 feet[7]. According to FEMA flood maps, the depth of the impoundment varies from 5 to 10 feet (FEMA, 2012); however, water depth immediately upstream near the face of the dam is approximately 30 feet. The volume of the impoundment is 150 acre-feet with a maximum storage of 210 acre-feet (USACE, 2013). The width of the impoundment ranges from approximately 50 to 185 feet. KEI (Maine) operates the Lower Barker Project in a run-of-river mode (i.e., inflow to the dam matches outflow from the powerhouse). Because the Lower Barker Project is operated as in a run-of-river mode, there is minimal available storage behind the dam. KEI (Maine) maintains the headpond levels in compliance with run-of-river operations through use of a Supervisory Control and Data Acquisition (SCADA) system. The impoundment is generally riverine in character (i.e., shallow and narrow).

Bypassed Reach – Operation of the Lower Barker Project results in the diversion of water from approximately 3,000 feet of low to moderate gradient riverine habitat below the dam (i.e., the bypassed reach). KEI (Maine) proposes to provide a minimum flow of 50 cfs, or inflow,

[7] Elevation datum is NAVD88.

whichever is less, to maintain aquatic habitat in the bypassed reach during non-spill periods (i.e., at river flows less than 150 cfs or greater than 500 cfs, which is the station's operating range). The original minimum flow requirement was developed during the original licensing proceedings in the 1980s to enhance aquatic and fishery resources. FERC adopted the 20 cfs minimum flow because it was based on field observations done in collaboration with state and local interests (FERC, 1979).

At the request of the MDEP, MDIFW, and the USFWS, KEI (Maine) performed an instream flow study in 2015 and 2016 to evaluate the suitability of aquatic habitat in the bypassed reach across a range of flows released from the dam. KEI (Maine) identified three river transects with the USFWS and MDIFW during a 2015 habitat mapping survey. KEI (Maine) also established a 4th transect just upstream of the powerhouse to gage river flows released from the dam; this transect was only used for stream gaging and for measuring wetted widths. KEI (Maine) used standard hydraulic engineering calculations to determine how much to open the deep flood gates to provide the target flows for the study, which were 20, 50, 100, 175, and 300 cfs. Adjustments to the gate settings were made as needed to attain the target flow based on the stream gaging. In some instances, additional water (i.e., leaks from the dam) were included in the measurements. Table 4-14 provides a summary of the flows that were released and measured in the field.

TABLE 4-14 COMPARISON OF TARGET AND ACTUAL FLOW RELEASES, LOWER BARKER PROJECT INSTREAM FLOW STUDY.

RELEASE NO.	TARGET FLOW (CFS)	GAGED FLOW PLUS LEAKAGE (CFS)
1	20	35
2	50	46
3	100	108
4	175	197
5	300	301

As put forward in the June 5, 2015, study plan, KEI (Maine) used Atlantic salmon fry, parr, and spawning adults; adult brown trout; and adult rainbow trout to evaluate the relationship between river flow in the bypassed reach and suitable aquatic habitat. Each of these species and life stages has habitat suitability criteria (i.e., preferred water depth, water velocity, and substrate conditions), which are described in published habitat suitability index (HSI) data.

Prior to the releases of water from the dam, KEI (Maine) established temporary habitat transect lines (i.e., transects 1, 2, and 3) that ran from the river right bank to the river left bank. A marked measuring tape was attached to each line so that known "stations" could be established across transects. During each flow release from the dam, KEI (Maine) collected water depth (feet) and mean column water velocity (feet per second) data at approximately 2 to 4 foot intervals (i.e., stations) along each established transect and at distinct changes in microhabitat conditions (e.g., changes in substrate or notable differences in water depth or water velocity). Measurements of depth and velocity were taken at the same station along each transect during each flow release. KEI (Maine) also collected substrate information at each station,[8] measured the wetted stream width at each transect at each flow release, established temporary stream staff gages to confirm that each target flow stabilized prior to transect data collection, and photographed each transect at each flow release. Photographs of each transect at each flow release were taken from the same or similar vantage point.

All field data were entered into a Microsoft Excel database. Depth, velocity, and substrate data collected in the field were then compared to habitat suitability criteria of target life stages of Atlantic salmon, brown trout, and rainbow trout. KEI (Maine) used a look up function in Excel to assign a suitability ranking between 0.0 (unsuitable) to 1.0 (optimal) for each individual measurement of depth, velocity, and substrate across each transect for each species and life stage. The product of the depth, velocity, and substrate suitability ranking values was generated to arrive at a composite suitability value for each station along the transects. These composite values were then summed across each transect and for all transects cumulatively to generate a total habitat suitability value for each flow release for each species and life stage. Tabular summaries and charts were then developed showing the relationship between discharge and habitat suitability for each flow release and for each species and life stage.

Habitat suitability values for 0, 20, and 175 cfs were calculated based on the slope of the data from the five releases. The available habitat data from the five releases for each fish species and life stage were fitted with regression curves using Microsoft Excel to interpolate between known data points and to extrapolate values outside of the range of the known data. Various regression methods were tested for each set of data and equations that maximized the goodness of fit to the

[8] Substrate data were collected at each transect during the low-flow releases.

data were selected (i.e., the R^2 statistical metric) as best as possible without losing the general trend of the data (i.e., a regression equation may have provided a better R^2, but if the shape of the curve did not follow the general trend of the data it was not selected).

The MDEP has a "long-standing and rebuttable presumption" that at least 75 percent of the cross section of a river must be wetted at all times for aquatic life structure and function to be maintained in a free-flowing river or stream. Further, MDEP guidelines state that for the structure and function of aquatic habitat to be maintained in an impoundment and for the designated use of habitat for fish and other aquatic life to be attained, at least 75 percent of the littoral zone must remain wet at all times. KEI (Maine) operates the Lower Barker Project in a run-of-river mode, which results in infrequent adjustments to the headpond level for emergency or maintenance. As such, the littoral zone is wetted throughout the year during normal operations. KEI (Maine) proposed no studies of the impoundment littoral zone in its June 5, 2015, final study plan, which was provided to the MDEP.

To address MDEP's policy for the bypassed reach, KEI (Maine):

- surveyed the river bed elevation of transect 2 and transect 4;
- measured the wetted widths at transect 2 and transect 4 at each of the five flows released from the dam;
- determined the elevation of the water surface at transect 2 and transect 4 at each of the five flows released from the dam; and,
- measured the width of the river channel at its bankfull elevation at transect 2 and transect 4.

Transects 2 and 4 were selected because the geometry of the river bank was such that the bankfull elevation could be readily determined. The river right bank of transect 1 was altered by construction of a large stone retaining wall, and transect 3 traversed four separate channels; therefore, these transects were not suitable for determining the wetted width or bankfull channel elevation. KEI (Maine) estimated the channel's bankfull width visually at transect 2 and 4 using standard bankfull indicators (e.g., obvious breaks in slope topography, presence of permanent vegetation, roots). The wetted width at each release was then compared to the bankfull width to determine the percentage of the river bed that was wetted.

Because KEI (Maine) operates the Lower Barker Project as run-of-river, the Little Androscoggin River downstream of the powerhouse is not affected by operations; therefore, KEI (Maine) collected no wetted width measurements downstream of the powerhouse.

The results of the study demonstrated that the existing minimum flow (20 cfs) provides some suitable habitat throughout the reach for trout and salmon; however, habitat suitability increased for all species and life stages at higher flows released from the dam (Figure 4-3, Table 4-15). In summary:

- The existing minimum flow of 20 cfs will maintain 70 to 82 percent of available suitable aquatic habitat for Atlantic salmon fry and parr and 18 to 24 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 35 cfs provides 70 to 81 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 8.4 percent for adult salmon; and 22 to 28.5 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 46 cfs provides 82 to 90 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 20 percent for adult salmon; and 35 to 40 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 100 cfs (plus leaks) provides 96 to 100 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 61 percent for adult salmon; and 66 to 72.5 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 175 cfs provides 99 to 100 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 90.5 percent for adult salmon; and 83 to 89 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 197 cfs provides 96 to 97 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 96 percent for adult salmon; and 83 to 89 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- A flow of 301 cfs provides 89 to 91.5 percent of available suitable aquatic habitat for Atlantic salmon fry and parr; 100 percent for adult salmon; 100 percent of available suitable aquatic habitat for adult rainbow and brown trout (Table 4-15).
- All flows released from the dam provided approximately 70 to 100 percent of the available suitable habitat for Atlantic salmon fry and parr (Figure 4-3 and Table 4-15).
- Habitat suitability increased for Atlantic salmon fry and parr until the release of 100 cfs (plus leakage), after which it increased in small increments or became less suitable (Figure 4-3 and Table 4-15).
- Habitat suitability increased for Atlantic salmon spawning adults and adult brown trout until 175 cfs, after which it either remained essentially unchanged or increased at more gradual rates at the higher flows (Figure 4-3 and Table 4-15).

- Habitat suitability increased for adult rainbow trout until 175 cfs, at which point it flattened out until 197 cfs, after which additional gains in habitat suitability occurred (Figure 4-3 and Table 4-15).
- The biggest increases in habitat suitability for all five species and life stages occurred between 46 cfs and 108 (i.e., 100 cfs plus leakage) (Figure 4-3 and Table 4-15).
- Habitat suitability increased by approximately 10 percent (Atlantic salmon fry), 14 percent (Atlantic salmon parr), 33 percent for adult brown trout, 31 percent for adult rainbow trout, and 41.5 percent (spawning Atlantic salmon) between 46 and 108 cfs (Figure 4-3 and Table 4-15).

TABLE 4-15 HABITAT SUITABILITY, PERCENT INCREASE, AND CUMULATIVE INCREASE IN SUITABILITY IN THE LOWER BARKER PROJECT BYPASSED REACH.

ALL TRANSECTS SUITABLE HABITAT (COMPOSITE)								
Species/Life stage	**0 cfs***	**20 cfs***	**35 cfs**	**46 cfs**	**108 cfs**	**175 cfs***	**197 cfs**	**301 cfs**
Atlantic salmon (spawning adults)	0.0	0.0	2.2	5.3	16.3	23.9	25.3	26.4
Atlantic salmon (fry)	32.0	34.1	33.8	37.7	41.8	41.7	40.1	37.3
Atlantic salmon (parr)	31.8	35.1	35.0	40.7	47.8	50.0	48.6	45.7
Brown trout (adult)	4.0	6.6	8.0	11.1	20.3	24.9	24.9	28.0
Rainbow trout (adult)	2.0	6.1	7.6	12.1	22.9	28.8	28.9	34.8
PERCENT OF MAXIMUM SUITABILITY								
Species/Life stage	**0 cfs***	**20 cfs***	**35 cfs**	**46 cfs**	**108 cfs**	**175 cfs***	**197 cfs**	**301 cfs**
Atlantic salmon (spawning adults)	0.0%	0.0%	8.4%	20.1%	61.6%	90.5%	95.8%	100.0%
Atlantic salmon (fry)	76.6%	81.6%	80.8%	90.1%	100.0%	99.9%	96.0%	89.2%
Atlantic salmon (parr)	63.6%	70.2%	70.0%	81.5%	95.6%	100.0%	97.2%	91.5%
Brown trout (adult)	14.2%	23.6%	28.5%	39.7%	72.5%	89.1%	89.1%	100.0%
Rainbow trout (adult)	5.9%	17.6%	21.8%	34.8%	65.8%	82.8%	83.1%	100.0%
CUMULATIVE PERCENT INCREASE								
Species/Life stage	**0 cfs***	**20 cfs***	**35 cfs**	**46 cfs**	**108 cfs**	**175 cfs***	**197 cfs**	**301 cfs**
Atlantic salmon (spawning adults)	-	0.0%	8.4%	11.7%	41.5%	28.9%	5.3%	4.2%
Atlantic salmon (fry)	-	5.0%	-0.8%	9.3%	9.9%	-0.1%	-3.9%	-6.8%
Atlantic salmon (parr)	-	6.6%	-0.3%	11.5%	14.2%	4.4%	-2.8%	-5.7%
Brown trout (adult)	-	9.4%	4.9%	11.1%	32.9%	16.6%	0.0%	10.9%
Rainbow trout (adult)	-	11.7%	4.2%	13.0%	31.0%	17.1%	0.2%	16.9%

* interpolated values based on slope of curve from five flow releases in the field.

MDEP Wetted Cross Section Width – All five flows at transect 4 wetted more than 75 percent of the bankfull width (Table 4-16). Four releases (46, 108, 197, and 301) wetted more than 75 percent of the bankfull width at transect 2; the low flow release of 35 cfs wetted approximately 73 percent of the bankfull width at transect 2 (Table 4-16).

TABLE 4-16 WETTED WIDTH COMPARED TO BANKFULL WIDTH, LOWER BARKER PROJECT INSTREAM FLOW STUDY.

	FLOW RELEASE	PERCENT BANKFULL WIDTH
Transect 2	35	73.1%
	46	78.2%
	108	90.8%
	197	92.7%
	301	93.6%
Transect 4	35	77.8%
	46	77.8%
	108	83.3%
	197	88.9%
	301	92.2%

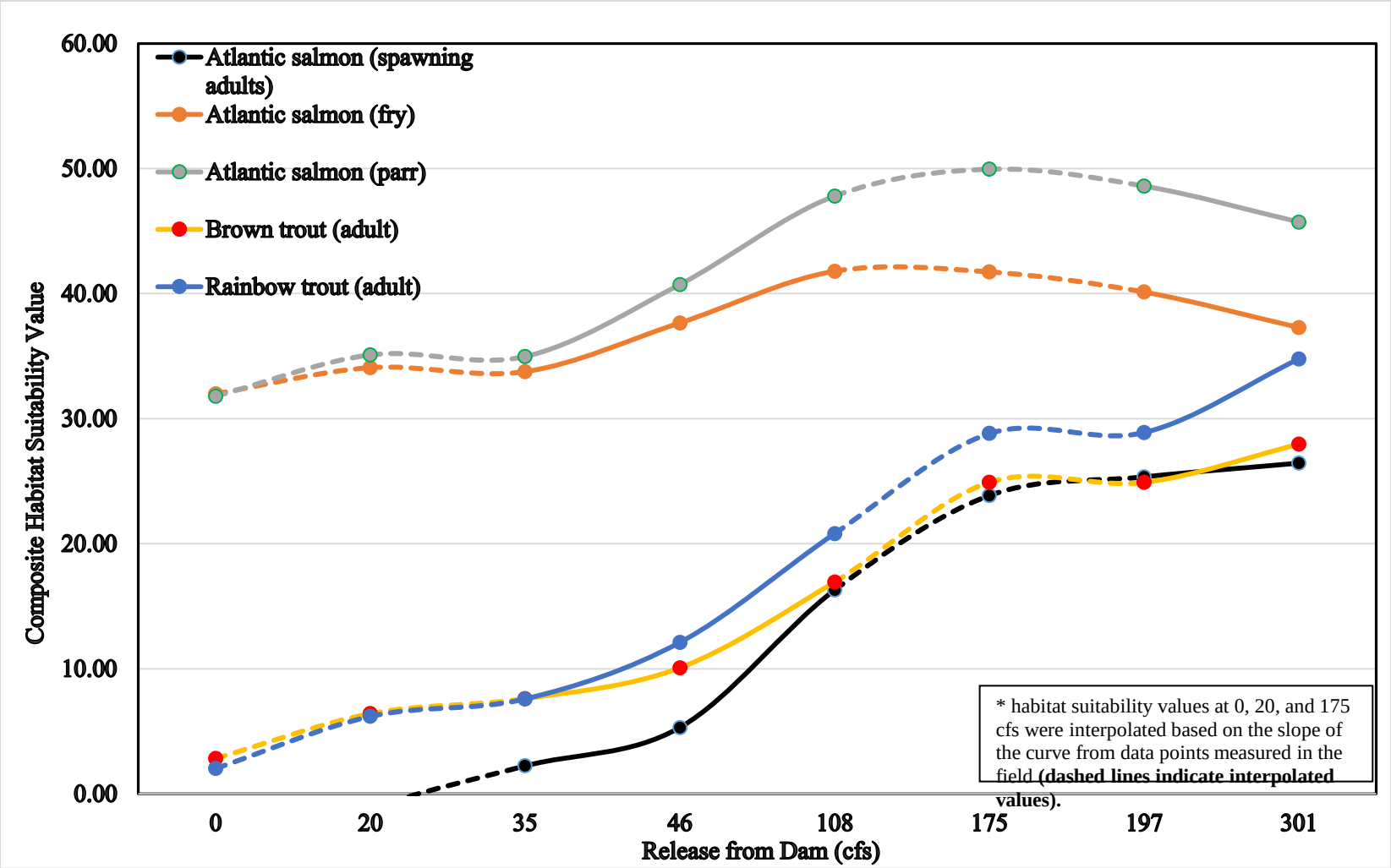

FIGURE 4-3 HABITAT SUITABILITY CURVES FOR ATLANTIC SALMON, BROWN TROUT, AND RAINBOW TROUT, LOWER BARKER PROJECT, LITTLE ANDROSCOGGIN RIVER.

The 3,000-foot river reach between the Lower Barker dam and powerhouse provides a variety of aquatic habitats for fish and other organisms. The reach also provides angling and recreational activities. Dry summer conditions typically result in low river levels in the Little Androscoggin River (i.e., summer baseflow conditions) as compared to other times of the year. Often a river channel will become narrow and confined, restricted to the deepest portions of the channel during low-flow periods, becoming recharged intermittently following precipitation. Aquatic organisms have adapted over time to summer baseflow conditions (Lang, 1999).

The results of the instream flow study demonstrate that the biggest improvements in habitat suitability in the bypassed reach for Atlantic salmon, brown trout, and rainbow trout occur up to a river flow of approximately 100 cfs (plus leakage). At higher river flows, habitat suitability does not improve, decreases slightly, or increases at a more gradual rate. River flows of approximately 40 to 45 cfs are expected to keep at least 75 percent of the bypassed reach channel wetted. A flow of 105 cfs equates to 0.3 cfs per square mile of drainage area above the dam, which has often been considered an appropriate hydrologic statistic representative of summer, baseflow conditions in unregulated rivers similar to the Little Androscoggin (Kulik 1990). The USFWS's Aquatic Base Flow (ABF) flow recommendation, which is the default recommendation in the absence of a site-specific study, for the Lower Barker Project is 176 cfs (July 14, 2014, letter from the USFWS to FERC, Comments on the Pre-Application Document and Submission of Study Requests for the Lower Barker Project). This value, which equates to approximately 0.5 cfs per square mile of drainage above the Lower Barker dam, is derived from hydrologic data from unregulated rivers in the northeast, including the Lower Androscoggin River. The August median flow statistic relied on by the USFWS is 0.28 cfs per square mile of drainage for the Lower Androscoggin River (Lang 1999), which is equivalent to approximately 100 cfs.

A minimum flow for the bypassed reach needs to take into account habitat use by target species and life stages throughout the year, the availability of water throughout the year, the varying hydrology during each bio-period of interest, and the operational constraints of the project (Bovee et al. 1998). Different species and life stages often have conflicting habitat and flow requirements. For example, adult trout and juvenile salmon have the potential to occur in the Little Androscoggin River at the same time, but each has different habitat requirements. Table 4-15 shows the timeframe that target species and life stages would be expected to occur in the

bypassed reach, if salmon restoration is successful at some point in the future and if MDIFW stocks the reach in the future in comparison to monthly median river flow in the Little Androscoggin River.[9] Atlantic salmon spawning and egg incubation would occur between November and April when river flow is relatively high as compared to the summer and fall months. Atlantic salmon fry would hatch and inhabit the reach during May and June; parr would potentially occupy the reach throughout the year, including summer months when flows are characteristically very low. The bypassed reach would likely be managed during the open water fishing season from April 1 through October 31as a put-grow-take brown and rainbow trout fishery.

Appendix A provides the complete Bypassed Reach Instream Flow Study Report.

ESSENTIAL FISH HABITAT

NMFS identifies essential fish habitat (EFH) for fish species that are commercially-managed under the Magnuson-Stevens Fishery Conservation and Management Act. EFH is defined as the "habitat necessary for managed fish species to complete their life cycle such that the fishery can be harvested sustainably." The NMFS has designated no EFH for Atlantic salmon or other diadromous fish species in the Little Androscoggin River (NMFS, 1998; NMFS, 2016).

BENTHIC MACROINVERTEBRATES

At the request of the MDEP, KEI (Maine) sampled the benthic macroinvertebrate community in the bypassed reach and downstream of the Lower Barker powerhouse in 2015. Section 4.3.3 describes the methods and results of the monitoring. The benthic macroinvertebrate communities downstream of the Lower Barker dam were moderately abundant and very rich in taxa. Filter-feeding caddisflies, sensitive mayflies, and stoneflies, which are quality forage taxa for trout and salmon and indicators of good water quality, represented a considerable segment of the community. Based on the study results, the benthic macroinvertebrate community in the bypassed reach and the Little Androscoggin River downstream of the powerhouse is representative of Class A aquatic life standards, which is the 2nd highest water class in the state of Maine; this classification was supported by MDEP's independent review of the data. Appendix A provides the complete 2015 Benthic Macroinvertebrate Report.

[9] South Paris gage prorated to the site, period of record 1985-2015.

FRESHWATER MUSSELS

There are ten native freshwater mussel species known to occur in Maine waters, of which five common species have been reported from the Little Androscoggin River (Table 4-17). The stakeholders requested no studies of the freshwater mussel community as part of the relicensing of the Lower Barker Project. Additional life history information on these five species was provided as part of the pre-application documents submitted to the Commission by KEI (Maine) on January 31, 2014.

TABLE 4-17 FRESHWATER MUSSELS KNOWN TO OCCUR IN THE LITTLE ANDROSCOGGIN RIVER.

COMMON NAME	SCIENTIFIC NAME
Eastern elliptio	*Elliptio complanata*
Eastern floater	*Pyganodon cataracta*
Eastern lampmussel	*Lampsilis radiate radiata*
Eastern pearlshell	*Margaritifera*
Triangle floater	*Alasmidonta undulata*

Source: Nedeau et al., 2000.

4.3.5.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

KEI (Maine) is proposing to continue to operate the Lower Barker Project as a run-of-river development with minimal impoundment drawdowns except during periods of maintenance or emergency operations. Proposed run-of-river (i.e., inflow matches outflow) operations will minimize the effects of operations on downstream aquatic resources and shoreline aquatic habitats. KEI (Maine) is also proposing to provide a minimum flow to the bypassed reach of 50 cfs, or inflow, whichever is less. As demonstrated by the instream flow study completed in 2015 and 2016, the provision of the proposed minimum flow to the bypassed reach is expected to increase the availability of suitable aquatic habitat in the reach for target fish species of management interest (i.e., Atlantic salmon, should they be restored to the river system, adult rainbow trout, and adult brown trout) and other aquatic organisms (e.g., freshwater mussels and aquatic invertebrates). The proposed minimum flow is also expected to keep more than 75 percent of the channel's bankfull width wetted at all times. During periods of time when river flow is less than or greater than the turbine capacity (150 and 500 cfs), KEI (Maine) will divert additional water to the bypassed reach, which is expected to maintain geomorphic processes in the small reach (e.g., movement of substrates, movement of woody debris).

The proposed minimum flow release is expected to also increase angling opportunities because the reach will contain more fishable and wadeable aquatic habitat. The new minimum flow could result in changes to MDIFW's trout stocking program, which could result in more brown and rainbow trout being stocked and an improved fishery in the bypassed reach during the open water fishing season.

KEI (Maine) is also proposing to modify the existing downstream fish passage system to reduce entrainment potential for outmigrating diadromous fish species. Due to site characteristics the exact configuration of a modified fishway has yet to be determined. In the fall of 2016, KEI (Maine) plans to conduct a bathymetric survey in the vicinity of the upstream end of the intake canal which will be used to develop a preliminary design for the fishway modifications. The design will be developed in consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Should the design progress sufficiently to allow for construction prior to license expiration, KEI (Maine) will consult with FERC to assess whether modifying the existing downstream fishway would require an amendment to the current license or if FERC would prefer to approve the structure as part of the new license.

Due to the overall low numbers of American eels in the lower Androscoggin River and as documented during 2015 eel monitoring, KEI (Maine) is proposing no upstream eel passage at this juncture.

NO-ACTION ALTERNATIVE

Existing aquatic habitat in the impoundment and bypassed reach will be maintained under the existing operating conditions (i.e., run-of river operations and a minimum flow of 20 cfs to the bypassed reach). During periods of time when river flow is less than or greater than the turbine capacity (150 and 500 cfs), additional water will be diverted to the bypassed reach, which is expected to maintain geomorphic processes in the small reach (e.g., movement of substrates, movement of woody debris). The existing minimum flow of 20 cfs will maintain 70 to 80 percent of available suitable aquatic habitat for Atlantic salmon fry and parr and 18 to 24 percent available suitable aquatic habitat for adult rainbow and brown trout in the bypassed reach. As demonstrated by the 2015 benthic macroinvertebrate monitoring, the existing minimum flow regime is expected to maintain a diverse and rich macroinvertebrate community.

UNAVOIDABLE ADVERSE EFFECTS

Operation of the Lower Barker Project may result in the entrainment or impingement of individual fish. These effects will largely to be ameliorated by the development of a new downstream fishway. The upstream movements of a small number of American eels may be delayed or blocked by the presence of the dam. Anglers in the bypassed reach may be subjected to varying flows during operational adjustments or rare outages due to maintenance. KEI (Maine) may need to temporarily alter water levels in the impoundment, bypassed reach, or tailrace for routine maintenance or repairs. This may result in short-term periods of erosion or sedimentation into the impoundment or downstream river reaches.

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4.3.7 TERRESTRIAL RESOURCES

4.3.7.1 AFFECTED ENVIRONMENT

VEGETATION

As discussed above, the Project is located in the Central Interior biophysical region of Maine, characterized by flat to gently rolling terrain. The region is a transition zone as dominant vegetation changes from a northern Appalachian forest dominated by oak, pine, and mixed hardwoods in southern Maine to a spruce-fir-northern hardwood forest in northern and eastern Maine (MDIFW, 2005).

Upland habitats that occur most frequently in the Project Vicinity include: deciduous and mixed forest; coniferous forest; grassland, agriculture and old fields; and urban and suburban areas (MDIFW, 2005). The Project itself is dominated by deciduous forest and areas of urban and suburban development.

DECIDUOUS

The entire shoreline is dominated by deciduous forest which is common to the Central Interior region. Overstory species may include white ash (*Fraxinus americana*), red maple (*Acer rurbrun*), and red oak (*Quercus rubra*). Other overstory species may include American elm, (*Ulmus americana*), American beech (*Fagus grandifolia*), or sugar maple (*Acer saccharum*). Shrub-layer vegetation is represented by species such as maple- leaved viburnum (*Viburnum acerifolium*) or saplings of American beech and maple. Herbaceous vegetation commonly found in this habitat includes bracken fern (*Pteridium aquilinum*), Canada mayflower (*Maiabthemum canadense*), wild sarsaparilla (*Aralia nudicaulis*) twinflower (*Linnaea borealis*) and trillium (*Trillium* sp.) (FERC, 1996).

URBAN/SUBURBAN

Urban and suburban areas are categorized as such when the percent cover by buildings, road and other impervious surfaces is greater than vegetative cover (MDIFW, 2005). These areas are predominantly associated with the twin cities of Lewiston and Auburn within the project vicinity. The Project is surrounded by this land cover type.

The Project provides limited wildlife habitat with a small impoundment and limited areas of forested upland within and surrounding the project boundary. The area immediately surrounding the Project consists of a narrow band of riparian forest surrounded by extensive urban and residential development, including an active railroad track along the northern shore and Mill Street along the southern shore.

There are currently 19 invasive plant species that are known to occur in Maine (MDACF, 2013) (Table 4-18). Several of the invasive plants occurring in Maine may be found at or near the Project, including garlic mustard, honeysuckle, purple loosestrife, and wood blue grass. Aquatic plants such as hydrilla and curly pond weed are not likely to occur near the Project since they prefer to grow in still or slow-flowing water, such as in a lake or pond and have not been documented to date (MDACF, 2013).

TABLE 4-18 INVASIVE PLANTS POTENTIALLY OCCURRING WITHIN THE PROJECT

SCIENTIFIC NAME	COMMON NAME
Alliaria petiolata	Garlic mustard
Berberis thunbergii	Japanese barberry
Celastrus orbiculata	Asiatic bittersweet
Cynanchum louiseae	Black swallowwort
Eleagnus umbellata	Autumn olive
Fallopia japonica	Japanese knotweed
Frangula alnus	Glossy buckthorn
Impatiens glandulifera	Himalayan balsam
Lonicera morrowii	Morrow honeysuckle
Lonicera tartarica	Tartarian honeysuckle
Lythrum salicaria	Purple loosestrife
Myriophyllum heterophyllum	Variable-leaf milfoil
Phragmites australis	Common reed
Poa nemoralis	Wood blue grass
Rhamnus cathartica	Common buckthorn
Rosa multiflora	Multiflora or Rambler rose

Source: MDACF, 2013

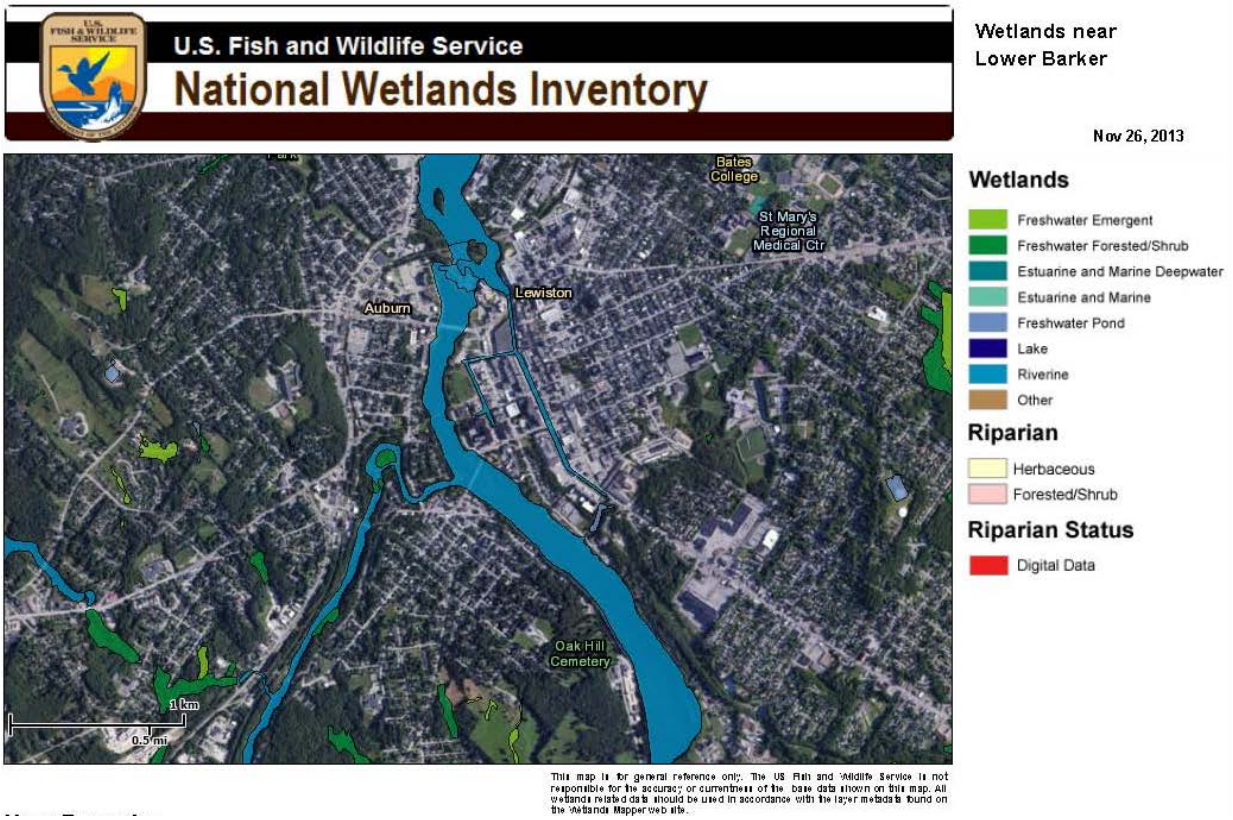
Variable leaf-milfoil is reported from the Little Androscoggin River watershed in Hogan Pond, well-above the Project (MDEP, 2013). Variable leaf-milfoil is a submerged aquatic plant with densely packed whorled leaves, and is usually found along the shorelines of lakes and ponds. Individuals can grow in water depths of up to 10-12 feet, forming dense mats near the surface. The plant produces spike-like flowers that grow above the water's surface from mid to late

summer. The species reproduces primarily by fragmentation and it can break apart easily due to wave action produced by boats or other disturbances. The introduction of a fragment can result in the infestation of an entire lake. Once introduced, it is virtually impossible to eradicate (MDEP 2013). While the variable-leaf milfoil is documented as being present in Androscoggin County and in reaches of the Little Androscoggin River, it has not been observed at the Project (MVLMP, 2013).

WETLANDS

The majority of the wetlands in the project area are classified by the National Wetlands Inventory (NWI) as R2UBH, or riverine, lower perennial, unconsolidated bottom, permanently flooded (USFWS, 2011a) (Figure 4-4). Low, slow flowing water is characteristic in these areas and the substrate consists mainly of sand and mud (USGS 2006a). Unconsolidated bottoms include wetland habitats with at least 25 percent cover of particles smaller than stones and a vegetative cover less than 30 percent. They are also characterized by a lack of large stable surfaces for plant and animal attachment (USGS, 2006b). Riverine unconsolidated bottom wetlands provide habitat for a variety of species such as the northern leopard frog, green frog, bullfrog, American toad and snapping turtles (see Section 4.3.4).

FIGURE 4-4 WETLANDS IN THE VICINITY OF THE PROJECT



Source: USFWS, 2012

Additionally, forested wetlands (PFO1C) are located adjacent to the project boundary and in close proximity to the Project (USFWS, 2012). Wetlands with this classification are defined as palustrine, forested and seasonally flooded (USFWS 2011b). These wetlands, are characterized by deciduous woody vegetation in the overstory. Common species may include green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), or silver maple (*Acer saccharinum*) among others. Shrub layer vegetation may include species such as speckled alder (*Alnus incanna*) or winterberry (*Ilex verticillata*). In general herbaceous vegetation includes species tolerant of shade and seasonal inundation such as ostrich fern (*Matteuccia struthiopteris*) or sensitive fern (*Onoclea sensibilis*). These areas are seasonally flooded so that surface water is present for extended periods especially early in the growing season (USFWS 2011b). There are 4.87 acres of PFO1C wetlands located within or adjacent to the project boundary (USFWS, 2012).

Some of the wildlife species that are commonly found in freshwater wetlands and may be found in the wetlands near the Project include: wood ducks; loons; snapping and painted turtles; dragonflies; damselflies and warblers and other songbirds (MDEP, 2013).

Riparian habitat is the specialized zone of vegetation that serves as the interface between the upland vegetation community and the riverine environment. This zone provides numerous valuable functions such as maintaining streambank stability, sediment filtration, and floodplain processes. Littoral zone habitat is the shallow water area along the perimeter of the impoundment; typically consisting of the shoreline zone located between the high and low water levels.

The banks of the Little Androscoggin River in the vicinity of the Project provide riparian and littoral habitat to a variety of species. Common plant species found in riparian areas include species such as silver maple, green ash, red maple, alder and willow (FERC, 1996). The shoreline habitats of the Little Androscoggin River, including the Project, likely provides habitat for species such as muskrat and habitat generalists such as striped skunk, eastern painted turtle, kingfisher, and osprey. Waterfowl species that may be found in the littoral zone of the Little Androscoggin River include the common goldeneye and the common merganser, as well as the American black duck, the Canada goose, the mallard, and the wood duck (MDIFW, 2005).

Shoreline habitats of the Project are limited to the immediate riparian and littoral zones and a narrow band of upland mixed forest, as discussed in Section 4.3.5. As mentioned, the riparian habitat found along the Project impoundment and bypassed reach is heavily forested, with primarily deciduous forests. The littoral zone is limited to a very narrow band given run-of-river operations.

WILDLIFE

There are approximately 60 mammalian species found in Maine, not associated with the marine environment. Due to habitat constraints within the Project (i.e., fragmentation due to urban development) large mammals such as moose, white-tailed deer, or black bear are likely to be uncommon within the Project. Large mammals that may occur are likely transient individuals and do not represent resident populations. Common mammals found with the project area and immediate vicinity are primarily habitat generalists accustomed to urban development. Common

mammals such as these include red fox, raccoon, opossum, skunk, eastern chipmunk, eastern gray squirrel, red squirrel, and the white-footed mouse. The close proximity of hardwood riparian forest and the river likely provides habitat for bat species such as the little brown myotis, silver haired bat, and big brown bat (Degraaf, 2001).

Maine provides habitat for 292 species of birds statewide. Based on habitat available within the Project common birds that may occur include. the black-caped chickadee, white-breasted nuthatch, black and white warbler, blue jay, red eyed verio, least flycatcher, and wild turkey. Raptor species that may occur within the Project are likely those that prefer hardwood dominated landscapes may include sharp shined hawk or broad winged hawk or species common to rivers and water bodies such as the osprey and bald eagle. Shorebirds may include the, solitary, upland and spotted sandpipers as well as wading birds such as the great blue heron (MDIFW, 2005).

A number of exotic wildlife species are known to occur in Maine. These include bird species such as the rock pigeon, European starling, and house sparrow, as well as mammal species such as the house mouse and Norway rat (MISN, 2013).

Based on the habitat found within and surrounding the Project, invasive insects with the potential to occur within the project area and immediate vicinity include the European fire ant, gypsy moth, and winter moth. The European fire ant has been identified in costal Kennebec County and is known to inhabit areas with urban development. Gypsy moth infestations are most prevalent in central and southern Maine and generally prefer hardwood trees (i.e., oak, aspen, and birch) for feeding. The winter moth occurs along the Maine coast, although may be more widespread and prefers to feed on hardwoods including oak, maple, ash, cherry, and apple trees (MISN, 2013).

4.3.7.2 Environmental Effects

Proposed Action

The Licensee proposes to continue to operate the Project in run-of-river mode, which minimizes any fluctuation in the impoundment, and therefore no new impacts to the terrestrial resources along the impoundment are likely. The Licensee proposes to release a continuous minimum flow of 50 cfs, or inflow, whichever is less, to the Lower Barker bypass reach.

No-Action Alternative

Any effects of flows and water levels on wildlife, wetlands and associated wildlife habitat caused by passing inflows at the Project, will continue to occur. This operating regime would continue to sustain current availability and quality of wetland habitat and the wildlife species that utilized the existing habitat.

UNAVOIDABLE ADVERSE EFFECTS

The existing quantity and quality of wetlands, wildlife, and wildlife habitat in the Project will not likely be adversely affected by normal fluctuations in water surface due to run-of-river operations. In most cases shoreline vegetation (i.e., emergent vegetation) is accustomed to occasional inundation and exposure and short-term water level changes which result from natural water level fluctuation, and there is no additional stress on shoreline vegetation; therefore, continued operation of the Project in this manner would not adversely affect shoreline emergent wetlands, the availability of wildlife habitat, or on the species utilizing it. Vegetation along the shoreline is accustomed to natural water fluctuations and are adapted to survive periods of exposure or inundation. On rare occasions, KEI (Maine) may need to temporarily alter water levels in the impoundment, bypassed reach, or tailrace for routine maintenance or repairs. Limited effects on shoreline species may include desiccation if exposure is prolonged (Cronk and Fennessy 2001; Bain and Mills 2004).

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4.3.9 RARE, THREATENED, AND ENDANGERED TERRESTRIAL SPECIES

4.3.9.1 AFFECTED ENVIRONMENT

The Licensee performed an initial assessment in 2013 for the potential occurrence of rare, threatened, and endangered species within the Lower Barker Project area by reviewing information provided by the Maine Natural Areas Program (MNAP), the MDIFW, and USFWS. As part of KEI (Maine)'s diligence, the Licensee has requested an updated official species list from the USFWS on July 20, 2016, to address additional species or changes in status of the species that were identified in 2013. Based on the new species list, the Small whorled pogonia (*Isotria medeoloides*) (SWP) has been added to the list for the Project area and the Red knot has been removed (USFWS 2016). In 2013, there were no rare botanical features documented in the Lower Barker Project area (personal communication, Don Cameron, MNAP) and the red knot (*Calidris canutus*) was considered a proposed species for listing under the ESA.

The Licensee's determination of the potential for a species to occur was based a species its known distribution in the vicinity of the Lower Barker Project. The Licensee has identified four rare, threated, or endangered species that have the potential to occur in the Lower Barker Project area (Table 4-19).

TABLE 4-19 RARE, THREATENED, AND ENDANGERED SPECIES THAT MAY OCCUR IN THE LOWER BARKER PROJECT AREA.

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS*
Fish		
Atlantic salmon	*Salmo salar*	FE
Flowering Plant		
Small whorled pogonia	*Isotria medeoloides*	FT
Mammal		
Northern long-eared bat	*Myotis septentrionalis*	FT/SE
Silver-haired bat	*Lasionycteris noctivagans*	SC

Source (USFWS 2016)

*FE (Federally Endangered), FT (Federally Threatened), SE (State Endangered), SC (Special Concern)

The USFWS has identified one fish, one flowering plant, and one mammal, as listed on the federal endangered species list (USFWS, 2016) for Androscoggin County: the Atlantic salmon (ATS), the Small whorled pogonia (SWP), and the Northern long-eared bat (NLEB), which is also listed as State Endangered under the Maine Department of Inland Fisheries and Wildlife (MDIFW). In addition, based on the available habitat and ranges of the species listed, the silver-haired bat (SHB) listed as Species of Special Concern and may also occur in the Lower Barker Project area (MDIFW, 2011).

On October 8, 2015 the Service published a not warranted finding on the petition to list the American eel (FR 80, No 195, 2015/10/08, pp 60834-60838). As a result the American eel is currently provided no protection under the ESA. Further detail can be found in Section 4.3.3.

4.3.9.2 ATLANTIC SALMON

Atlantic salmon are an anadromous fish species with a complex life history. Individuals spend the majority of their adult life in marine environments but return to freshwater rivers and streams to spawn (Fay et al. 2006). Atlantic salmon are native to the North Atlantic Ocean and have been found worldwide as far south as Portugal in the eastern Atlantic and the Connecticut and Housatonic Rivers in the western Atlantic, and north to Ungava Bay in Quebec as well as the Nastapoka River in Hudson Bay (Morin 1991). Atlantic salmon were initially listed as endangered on November 17, 2000, on eight coastal Maine watersheds by the NMFS and the USFWS (65 FR 69459). NMFS and the USFWS expanded the listing to include Atlantic salmon that inhabit large Maine rivers (Androscoggin, Kennebec, and Penobscot) that were partially or wholly excluded in the initial listing (74 FR 29344; June 19, 2009). NMFS determined that Atlantic salmon that inhabit the Gulf of Maine watersheds from the Androscoggin River eastward to the Dennys River are a distinct population segment (i.e., GOM DPS) and thus should be listed as a “species.”

Currently, the GOM DPS includes Atlantic salmon that occupy freshwater from the Androscoggin River to the Dennys River, as well as anywhere Atlantic salmon occur in the estuarine and marine environments. The historical upstream limits of the species freshwater range are primarily determined by impassable falls in the Penobscot River watershed, including Big Niagara Falls on Nesowadnehunk Stream in Township 3 Range 10, Grand Pitch Falls on

Webster Brook in Trout Brook Township, and Grand Falls on the Passadumkeag River (74 FR 29344; June 19, 2009). Additionally, conservation hatchery populations maintained by Green Lake National Fish Hatchery and Craig Brook National Fish Hatchery are included in the GOM DPS. Landlocked and commercially raised salmon are excluded from the listing (74 FR 29344; June 19, 2009).

Although ATS in the Androscoggin are part of the Merrymeeting Bay Salmon Habitat Recovery Unit (SHRU); the Little Androscoggin is not classified as critical habitat (i.e., critical to the recovery of the species) (NMFS 2009; personal communication, Jeff Murphy, NMFS, December 11, 2013). The Little Androscoggin River HUC 10 watershed does not actually include the Little Androscoggin River. This particular HUC 10 watershed includes only the Androscoggin River and its tributaries from the confluence with the Kennebec up to, but not including, the Little Androscoggin River.

A draft Recovery Plan for the Gulf of Maine DPS of Atlantic salmon was submitted for public review on March 29, 2016. The recovery plan represents a recovery strategy based on the biological and ecological needs of the species as well as current threat-term viability (USFWS and NOAA, 2016). This plan supersedes the approved 2005 plan for the DPS listed in 2000. This plan reflects a new recovery planning approach (termed the Recovery Enhancement Vision, or REV) being adopted by the USFWS. REV plans focus on the statutory elements of recovery criteria, recovery actions, and time and cost estimates (USFWS and NOAA, 2016).

4.3.9.3 SMALL WHORLED POGONIA

The MNAP maintains a list of rare, threatened, and endangered plants found within the state of Maine, which includes about 353 species (MDACF, 2013). One plant species, the Small whorled pogonia, is documented as occurring within Androscoggin County (USFWS, 2016b). The Small whorled pogonia (SWP), was federally listed as an endangered species in 1982, and reclassified as a threatened species in 1993 (USFWS, 2012).

There is no critical habitat designated for this species at this time. The USFWS prepared a recovery plan and revised that plan in 1992. The Recovery Plan describes and prioritizes actions needed to help recover the species (USFWS, 2016b).

The Small whorled pogonia produces a smooth, hollow stem from 2 to 14 inches tall and topped by 5 or 6 leaves in a circular arrangement (false whorl). One or two flowers stand in the center of the whorl of leaves. The leaves are milky-green or grayish-green, and the flower is yellowish-green with a greenish-white lip. In the northern part of the species range, plants with flowering buds emerge from the leaf litter in May and bloom in June (USFWS, 2012). Characteristics of this species' habitat include a sparse herb and shrub layer, a relatively open understory canopy, thick leaf litter on the forest floor, and gently sloping ground. Soils in which small whorled pogonia grows are generally acidic and dry during most of the growing season. Small whorled pogonia is almost always found in proximity to features that create long-persisting breaks in the forest canopy; light availability could be a limiting factor for this species (USFWS, 2012).

No other rare plant species or unique plant communities are known to occur within the Lower Barker Project area. The stakeholders requested no studies of botanical species as part of the relicensing.

4.3.9.4 BATS

The northern long-eared bat (NLEB) is listed as a federally threatened species and is listed as Endangered at the state level. The silver-haired bat is a species of special concern in the state of Maine. The NLEB was listed as threatened on April 2, 2015, with a final rule published in the Federal Register on January 14, 2016. On April 27, 2016, the USFWS determined that the designation of critical habitat for the species was not prudent; therefore, no critical habitat is established for the NLEB (USFWS, 2016a).

The northern long-eared bat feeds on invertebrates and is known to glean prey from vegetation and water surfaces. The NLEB winters in underground caves and cave like structures, but summers singly or in small colonies in cavities, under bark, or in hollows of live and dead trees typically greater than 3 in. in diameter. Suitable roosting trees also include exfoliating bark, cavities, or cracks (USFWS, 2016a). The silver-haired bat is a summer resident of Maine and inhabits clear-cuts, coniferous forest, and mixed forest. The silver-haired bat also feeds primarily on insects, often over ponds, streams, and forest clearings (DeGraaf, 2001).

Currently there is a narrow band of hardwood riparian forest along the impoundment which is fragmented by urban development. While the project falls within the range of the NLEB it is unlikely that the overwintering or summer roosting occurs with the Project, although feeding may occur over the impoundment. This is also true for the silver haired bat. Based on their known distribution, these bat species could occur in the Lower Barker Project area. The stakeholders requested no bat studies of as part of the relicensing.

4.3.9.5 MIGRATORY BIRDS

The protection of birds is regulated by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)).

Bald eagles are no longer listed under the ESA, but maintain federal protection under the Bald and Golden Eagle Protection Act. Bald eagles typically nest within 0.25 to 1 mile of large bodies of open water, such as lakes and large rivers. Eagles nest in large, super-canopy trees or snags often in late-successional forest. They prefer a nest site at the edge of the forest, near foraging areas, unobstructed views, and with little human disturbance. Most eagles forage primarily on fish, with lesser quantities of waterfowl, carrion, and small mammals. The bald eagle often winters along large interior or coastal bodies of water that remain free of ice. Except during migration, bald eagles are seldom found far from water (WVDNR 2012). The stakeholders requested no bald eagle studies of as part of the relicensing. KEI (Maine) knows of no active nests in the Lower Barker Project area.

PROPOSED ACTION

The licensee's proposal to provide a minimum flow of 50 cfs (or inflow, whichever is less) is unlikely to adversely affect the Atlantic salmon, Small whorled pogonia, Northern Long-Eared Bat, or migratory birds or their habitats. As the Project would continue to operate in run-of-river mode, water levels will continue to be similar as under current operation, and therefore would continue to sustain current availability and quality of habitat.

NO-ACTION ALTERNATIVE

Any flows and water levels caused by passing inflows at the Project will continue to occur. As discussed above, this operating regime would continue to sustain current availability and quality of wetland habitat and the wildlife species that utilized the existing habitat. The no-action alternative would also maintain existing downstream minimum flows.

UNAVOIDABLE ADVERSE EFFECTS

No unavoidable impacts to the Atlantic salmon, small whorled pogonia and northern long-eared bat, are anticipated to occur, as minimum flow, ground impact, and roosting habitat will not be affected by the proposed action (i.e., no tree clearing is proposed). Bat foraging may take place over the reservoir and along the shoreline; however, the run-of-river operation of the Project will not affect the ability of the bats to access foraging habitat or limit potential prey species (e.g., invertebrates).

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4.3.11 RECREATION, AESTHETICS, AND LAND USE

4.3.11.1 AFFECTED ENVIRONMENT

Within the Project Vicinity, there are 14 state parks, trails, campgrounds, and reserved lands (MDPPL, 2013c). Some notable parks include Androscoggin Riverlands State Park, Range Ponds State Park, and Bradbury Mountain State Park. Androscoggin Riverlands State Park, located just north of the city of Auburn in the neighboring town of Turner, approximately 7 miles from the Project, is the fifth largest park in the Maine parks system. The park includes 10 miles of hiking and biking trails as well as extensive opportunities for boating and fishing in the Androscoggin River (MDPPL, 2013a). Range Ponds State Park, located approximately 7 miles southwest of the Project in the town of Poland, provides opportunities for swimming, boating, fishing, and hunting (MDPPL, 2013b). Range Ponds State Park is the sixth most popular day use park in Maine, hosting 5.6% of all park visitors (Roper, 2006). Bradbury Mountain State Park, located approximately 13 miles southeast of the Project in the town of Pownal, is one of the first state parks established in Maine and offers various activities including camping, hiking, and cross-country skiing (MDPPL, 2013d).

4.3.11.2 REGIONAL RECREATION OPPORTUNITIES

The Project is contained within the Maine Lakes and Mountains tourism region as defined by the Maine Office of Tourism (MOT). In 2012, those visiting the Maine Lakes and Mountains region accounted for 9% of all over-night and day trips taken in Maine (MOT, 2012b). Among those visiting the region, the city of Auburn was one of the most popular destinations accounting for 18% and 19% of all day and over-night visitors respectively in 2012 (MOT, 2012a).The Maine Lakes and Mountains area is home to hundreds of glacial lakes and mountains widely known for its outdoor recreation opportunities including skiing, hiking, boating, and fishing (MOT, 2013).

Recreation activities occurring in the project vicinity are generally traditional outdoor pursuits such as fishing, hunting, hiking, camping and boating. Several municipal and state parks, as well as NGO funded conservation lands are within a short distance of the Project.

RECREATION OPPORTUNITIES IN THE PROJECT VICINITY

Within Androscoggin County, there are a number of municipal recreation areas, particularly within the urban centers for Lewiston and Auburn. Between these two cities, there are 32 municipal parks, all of which are located within an eight mile radius of the Project. These parks provide the following amenities: playgrounds; picnic areas; softball fields; hand-carry and trailered boat launches; basketball courts; swimming pool; birding and wildlife watching opportunities; disc golf; skateboarding; multi-use trails supporting hiking, cross-country skiing, and snowshoeing; and ATV and snowmobiling trails. Some parks in the vicinity of the Project are (recreation sites included in the recreation inventory are described below):

- Mount Apatite - a 325 acre park located in the city of Auburn. The park has several miles of trails and is a popular site for mineral collection (Maine Trail Finder, 2013a). Mount Apatite is approximately 3.4 miles west from the Project.
- Thorncrag Nature Sanctuary - a 372 acre wildlife preserve in the city of Lewiston, located approximately 3.5 miles northeast from the Project. The preserve has 3.5 miles of trails and is a popular site for bird and nature watching (Stanton Bird Club, 2013).
- Sherwood Forest - a 78 acre conservation area in the city of Auburn owned in partnership between the city of Auburn and the Androscoggin Land Trust (ALT), a local non-profit. Sherwood Forest has 2.4 miles of trails as well as an outdoor classroom (Maine Trail Finder, 2013b). The Forest is approximately 1 mile south from the Project.
- Garcelon Bog - a 109 acre conservation area in the city of Lewiston, approximately 2.5 miles northeast from the Project. The bog has two trails that pass through a variety of habitats and provides an area for bow hunters and outdoor education (Sun Journal, 2011b).
- Barker Mill Trail - A public walking trail that runs parallel to the Little Androscoggin River. It was refurbished in 2011, making the trail accessible for pedestrians after many years of disuse (Sun Journal, 2011a). This trail is maintained by the ALT and runs parallel to the Little Androscoggin River starting at the Lower Barker dam and continuing upstream for approximately one mile before ending at the Upper Barker dam. The trail provides fishing access to the Little Androscoggin River (ALT, 2011)
- Little Andy Park- A public boat launch located downstream of the project on the Little Androscoggin River. The hand-carry boat launch provides access to both the Little Androscoggin River and the Androscoggin River. The park includes a pull-over for loading boats, and picnic tables (ARWC, 2012) and serves as the terminus of the informal canoe portage around Lower Barker dam. The park is approximately 0.3 miles northeast from the Project
- Rodney Bonney Memorial Park - A public park in the City of Auburn, located approximately 0.4 miles northeast from the Project. The park consists of an open grassy area with several park benches. The park is part of the Lewiston-Auburn Greenways Trail

system. The park ends at a pedestrian walkway connecting the City of Auburn with the City of Lewiston located on an old railroad trestle bridge (Maine Trail Finder, 2013c).

- Moulton Park - A public park in the City of Auburn, located approximately 0.3 miles north from the Project. The park consists of an open field, and a small skate park. This park is terminus of a branch of the Lewiston-Auburn Greenways Trail system (Maine Trail Finder, 2013c).

EXISTING PROJECT RECREATION OPPORTUNITIES

Based on observations, it appears that the public is accessing the bypassed reach for angling through the Project boundary. However, there are no formal access points in the project boundary.

RECREATIONAL USE STUDY

Based upon stakeholder request, KEI (Maine) conducted a recreation use study to evaluate existing recreation facilities, use, and opportunities within the project boundary and surrounding area. The study was conducted in three phases. Phase 1 involved a literature review of existing information about river channel characteristics, hydrology, current and planned recreational opportunities, and flow data for the Little Androscoggin River. Phase 2 included a recreation facilities inventory to document all formal and informal access and facilities within the project boundary and the immediate surrounding area. Phase 2 also included a review of previous Form 80 filings. Phase 3 is intended to evaluate the suitability of the bypassed reach for on-water activities including shoreline angling, wade angling and flatwater and whitewater boating. However, the study which was planned for 2016 has yet to be conducted due to lack of sufficient inflow to provide the intended flow releases without drawing down the impoundment. KEI (Maine) is willing to provide releases in the spring of 2017 for this assessment, provided sufficient riverflow exists during a reasonable time to be in the river. Shoreline and wade angling opportunities are anticipated to be generally limited to the reach just downstream of the dam.

PHASE 1 LITERATURE REVIEW

KEI (Maine) reviewed existing information about recreation opportunities; the physical and hydrological characteristics of the Lower Barker impoundment and bypassed reach; and flow data for the Little Androscoggin River. Information on the physical characteristics and hydrology

of the project area are provided in Section 4.3.3. Below is a summary of management plans that cover recreation resources within the project vicinity.

2014-2019 Maine State Comprehensive Outdoor Recreation Plan

The Maine State Comprehensive Outdoor Recreation Plan (MSCORP) provides information on the supply and demand for outdoor recreation opportunities in Maine, assesses recreation issues, provides an implementation plan, as well as serves to qualify Maine for funding from the federal Land and Water Conservation Fund (LWCF) to acquire or develop lands for public outdoor recreation. There are no recommendations specific to the Lower Barker Project, but the recreation goals outlined in the MSCORP may be applied by governments at the state, county, or municipal levels including Androscoggin County and the cities of Lewiston and Auburn. Recreation priorities outlined in the MSCORP that may bear relevance to the Project are (MDACF, 2015):

- To connect Mainers with the health and wellness benefits of outdoor recreation;
- To support regionally connected trail systems in less developed regions to increase access and enhance economic development;
- To connect to future tourism markets through recreation interests; and
- To increase access to and awareness of local and regional recreation opportunities through effective communication and collaboration between the public, municipal, and private landowners.

City of Auburn Comprehensive Plan: 2010 Update

The City of Auburn Comprehensive Plan: 2010 Update is an update to the original City Comprehensive Plan. The update was developed to expand upon policies outlined in the original Comprehensive Plan and to create new policies to address emerging issues for the city. The 2010 Update serves as a decision-making tool for the city when addressing issues concerning natural resources, public facilities and infrastructure, historic preservation, economic and community development, housing, and recreation and open space. The plan does not specifically address recreation activities at the Lower Barker Project. Among the recreation goals of the 2010 Update that may bear relevance to the Project are (City of Auburn, 2011):

- To increase recreation and boat access to the Androscoggin River and Little Androscoggin River;

- To improve current recreational river access through trail and park maintenance;
- To increase the amount of open space in the city by collaborating with local conservation organizations including the Androscoggin Land Trust (ALT), overseers of the Lower Barker Trail, and the Lake Auburn Watershed Protection Commission (LAWPC); and
- To maintain and enhance city trails by supporting the efforts of local conservation and outdoor recreation organizations.

Western Maine Regional Open Space Policy

The Western Maine Regional Open Space Policy (WMROSP) was published by the Androscoggin Valley Council of Governments (AVCOG), a resource sharing organization for all the municipalities in Androscoggin, Franklin, and Oxford Counties. The WMROSP does not identify any specific lands for conservation, but develops policies to be used by the AVCOG, member municipalities, and State and federal agencies and directs conservation opportunities in the future. Among the goals of the ROSP that may bear relevance to the Project are (AVCOG, 2009):

- To promote open spaces as a way to improve Western Maine's "Quality of Place";
- To promote economic development which protects and conserves open spaces;
- To work with private land owners to continue the tradition of public access to private lands for outdoor recreation; and
- To conserve energy and encourage the growth of alternative energy sources including wind and hydroelectric.

2014 New Auburn Village Center Study

The New Auburn Village Center Study builds upon the 2009 New Auburn Master Plan and outlines the holistic development of New Auburn through strategic improvements to infrastructure, transportation, and open spaces (T. Y. Lin International, 2014). The study is focused on the development of approximately 38 acres in the vicinity of the Lower Barker Project and promotes the development of the economy and infrastructure of the area while leveraging the assets provided by the Androscoggin and Little Androscoggin Rivers. Specific components of the study which may be relevant to the Project are:

- To promote connectivity and open space planning to revitalize the economy of New Auburn by providing new recreation opportunities and access to the river;

- To relocate or close bridges and roads to provide access to the Androscoggin and Little Androscoggin Rivers; and
- To expand the Riverwalk by connecting the riverfront with trails and open spaces.

Androscoggin River Greenway Plan

The Greenway plan was developed through collaboration between the Androscoggin Land Trust, the City of Auburn, and the City of Lewiston to provide access (e.g., pedestrian, bike, river) and a network of trails connecting the Androscoggin River corridor with surrounding neighborhoods, businesses, and recreation opportunities (Wright-Pierce, 2013). Objectives of the plan are to maintain existing pedestrian and bicycle greenway segments and trails; to develop and improve the greenway by creating loop trails connecting with the river; to extend the Riverwalk; to improve and expand boat access to the river; and to create and improve portage routes. Specific components of the plan in the vicinity of the Lower Barker Project include developing the New Auburn Loop trail, improving on-road and off-road pedestrian and bike trails along the Little Androscoggin River, and constructing a pedestrian bridge across the Little Androscoggin River to connect the Barker Mill Trail with Moulton Park.

City of Lewiston Comprehensive Plan

The Lewiston Comprehensive Plan establishes the vision for future development and strategies for sustainable growth (City of Lewiston, 2015). The plan outlines the framework for implementing public policy, protecting natural resources, making land use decisions, and supporting public and private investments and developments. The plan does not specifically address recreation opportunities at the Lower Barker Project or the Little Androscoggin River. Objectives of the plan that may be relevant to the Project include:

- Supporting the Androscoggin Land Trust Greenway Plan and developing the Riverfront;
- Developing and restoring the canals for recreation and economic purposes;
- Maintaining, upgrading and rehabilitating existing public parks and recreation facilities through additional signage, parking, and restroom facilities;
- Expanding public access and recreation opportunities along the riverfront;
- Expanding the trail system to connect rural and urban areas; and
- Improving and creating walking, biking, and hiking trails.

Riverfront Island Master Plan

The Riverfront Island Master Plan focuses on developing Lewiston's downtown riverfront and making it an urban and commercial riverfront destination (City of Lewiston, 2012). Goals of the plan which may be relevant to the Project are:

- to continue to develop the Riverwalk by providing water access and scenic views;
- to create and improve connections between new and existing parks and the Riverfront and;
- to make the area more walkable and create a Canal Walk.

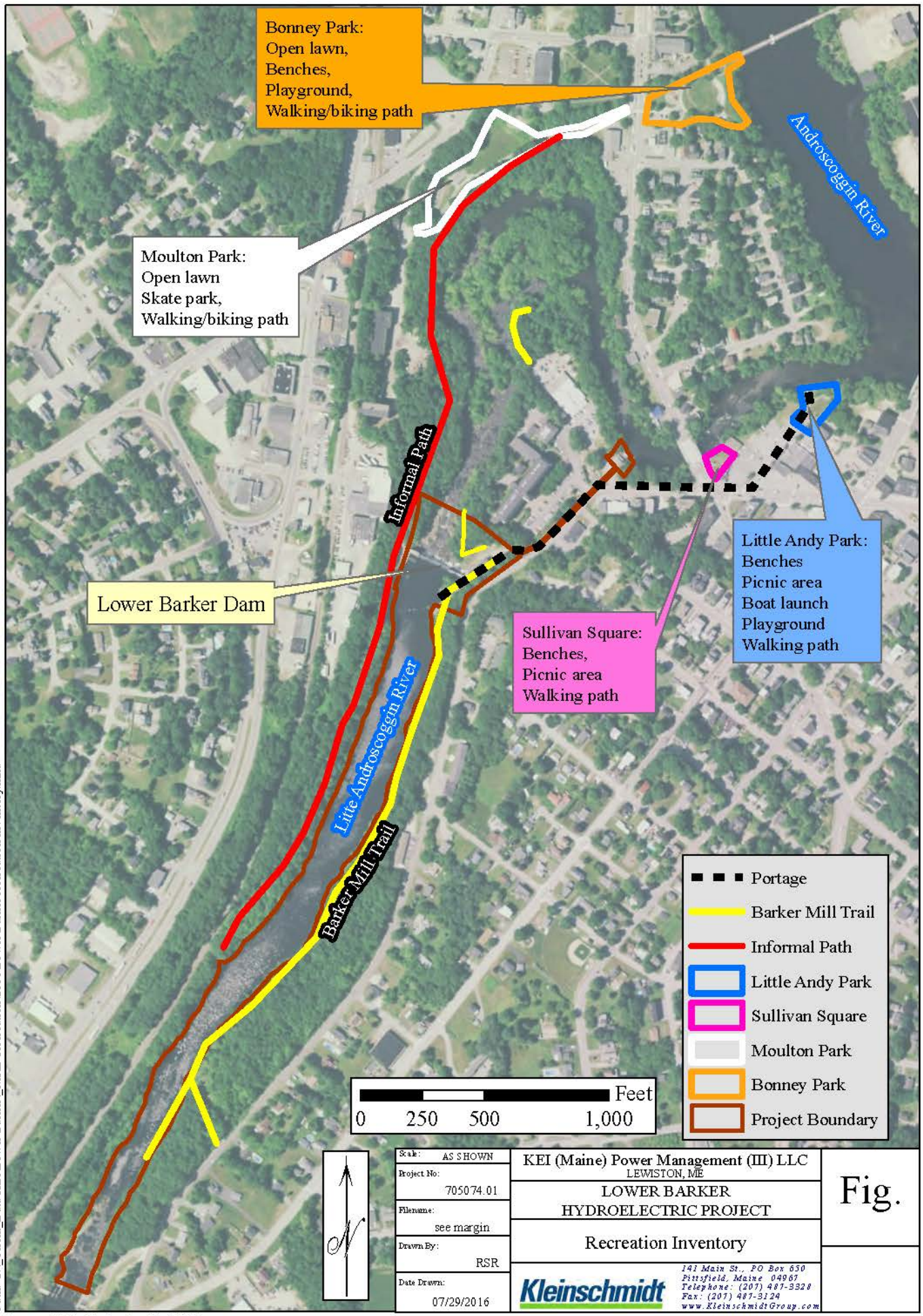
PHASE 2 RECREATION INVENTORY AND ASSESSMENT

KEI (Maine) completed an inventory of existing recreation sites and facilities within the Project boundary and in the immediate vicinity of the Lower Barker Project on July 7, 2016. KEI (Maine) collected GPS points, photographs, and noted the amenities available at each site.

KEI (Maine) permits public use of the project land and waters for recreation; however, there are no formal recreation facilities within the project boundary. KEI (Maine) has limited ownership of the lands surrounding the Project. The lands surrounding the Project structures are densely forested with a steep and rocky ravine leading down to the water. According to an Environmental Inspection Report conducted by FERC on September 15, 2009, there is "little potential for recreational opportunities" (FERC, 2011) at the project site.

Barker Mill Trail

The Barker Mill Trail runs parallel to the Little Androscoggin River beginning next to the Lower Barker dam and continuing upstream approximately 0.6 miles to the Upper Barker dam (Figure 4-5). The trail is maintained by ALT. The trail provides a walking and biking path, shoreline access to the impoundment for angling, and an informal hand-carry boat launch; an informal trail provides access to the tailwater and bypassed reach immediately downstream of the dam (Figure 4-5, Photo 4-1, Photo 4-2, and Photo 4-3). There is no formal portage route at the Project, but paddlers can traverse the dam via an informal 0.3 mile portage route (egress from the impoundment at the Barker Mill Trail to Mill Street to Second Street to ingress downstream at the Little Andy Park boat launch). KEI (Maine) seasonally implements a boat barrier in the impoundment above the dam, installing it from May 31 through October 12. The trail has two entrances, and parking is available for approximately 10 vehicles next to the dam.



Scale: AS SHOWN
Project No: 705074.01
Filename: see margin
Drawn By: RSR
Date Drawn: 07/29/2016

KEI (Maine) Power Management (III) LLC
LEWISTON, ME

LOWER BARKER
HYDROELECTRIC PROJECT

Recreation Inventory

Kleinschmidt
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www.KleinschmidtGroup.com

Fig.

Path: G:_Client_Data\KEI\Lower Barker_MXD\Recreation\2016 Lower Barker Recreation Inventory.mxd

Source: KEI, Kleinschmidt, ESRI

PHOTO 4-1 BOAT BARRIER AND INFORMAL HAND-CARRY BOAT LAUNCH LOCATED ALONG THE BARKER MILL TRAIL UPSTREAM OF THE LOWER BARKER DAM

PHOTO 4-2 REPRESENTATIVE PHOTO OF THE BARKER MILL TRAIL

PHOTO 4-3 PATH LEADING TO THE TAILRACE BELOW THE LOWER BARKER DAM

Sullivan Square

Sullivan Square is located approximately 0.2 miles downstream of the Lower Barker dam (Photo 4-4). The park contains a picnic area, benches, and a walking path (Photo 4-4). The park is accessible from South Main Street

PHOTO 4-4 SULLIVAN SQUARE PARK

Bonney Park

Bonney Park is a public park located approximately 0.4 miles northeast from the Project (Photo 4-5). The park is part of the Lewiston-Auburn Greenways Trail system. The park consists of an open grassy area for picnicking or playing sports, several park benches, a walking/biking path, and a playground (Photo 4-5). The park also contains trashcans, signage, and lighting. Bonney Park connects the City of Auburn with the City of Lewiston via the Riverwalk and a pedestrian walkway along an old railroad trestle bridge (Photo 4-6). The park is accessible from Main Street and from Moulton Park. Parking is available for approximately 6 vehicles.

PHOTO 4-5 PLAYGROUND AND BENCHES IN BONNEY PARK

PHOTO 4-6 BONNEY PARK CONNECTS TO LEWISTON VIA THE RIVERWALK AND AN OLD RAILROAD BRIDGE.

Moulton Park

Moulton Park is a public park located approximately 0.3 miles north of the Lower Barker dam (Photo 4-7). The park consists of an open field, a skate park, and a walking/biking path (Photo 4-7). The walking path connects Moulton and Bonney Parks. Access to the Little Androscoggin River is provided from an informal path connecting the park to the bypassed reach downstream of the Lower Barker dam (Photo 4-7). The park contains signage and lighting. An entrance is also located in the southwest corner of the park off of Hutchins Street.

PHOTO 4-7 MOULTON PARK CONSISTS OF OPEN LAWN AND A SKATE PARK

Little Andy Park

Little Andy Park is a public park located approximately 0.3 miles northeast of the Lower Barker dam (Photo 4-9). A hand-carry boat launch is located in the park which provides access to both the Little Androscoggin River and the Androscoggin River (Photo 4-9). The park serves as the terminus of the informal canoe portage around Lower Barker dam. Little Andy Park consists of a small playground, including a hop scotch and four square court, open lawn, picnic tables, benches, scenic view of the rivers, bike racks, a walking/biking path, signage, trash cans, and

lighting (Photo 4-9). A drop off zone is located at the entrance to the park, and parking is available for approximately 20 vehicles off of Pulsifer Street.

PHOTO 4-8 A HAND-CARRY BOAT LAUNCH IS AVAILABLE IN LITTLE ANDY PARK

PHOTO 4-9 A SMALL PLAYGROUND, PICNIC TABLES, BENCHES, AND OPEN GRASS SPACE ARE AVAILABLE IN LITTLE ANDY PARK

FORM 80 REVIEW

KEI (Maine) reviewed the recreation use results for the three previous FERC Form 80, Licensed Hydropower Development Recreation Reports completed in 2003, 2010, and 2015. In 2002, the annual total number of recreation days was estimated to be 193 between the months of April and October (Ridgewood, 2003). Monitoring for a Form 80 took place from April through October of 2010. During that time, there were 25 total visitors observed, resulting in an estimated 50 recreation days associated with the Project.

KEI (Maine) completed spot counts between April 2014 and March 2015 on a random sample of 179 days comprising 151 weekdays, 25 weekend days, and 3 holiday weekend days for the 2015 Form 80 monitoring effort. The annual total number of recreation days was estimated to be 520 with 314 recreation days in summer (April through October 2014) and 206 recreation days in winter (November 2014 through March 2015). KEI (Maine) observed people fishing, walking dogs, hiking, and sightseeing.

Also in response to stakeholder requests, KEI (Maine) intended to conduct a whitewater flow demonstration in 2016. At the time of publication insufficient inflow during the fall recreation season occurred such that target flow releases could be provided. KEI is willing to plan for releasing these flows in the spring of 2017.

WHITEWATER FLOW ANALYSIS

As indicated by current flow conditions, inflow to the project during the recreation season is limited, making it difficult to "schedule" whitewater releases without compromising KEI (Maine)'s ability to meet pond level requirements. KEI (Maine) analyzed Little Androscoggin River flow data[10] to evaluate the availability of water for three whitewater flow releases (300 cfs, 500 cfs, and 660 cfs) downstream of the Lower Barker dam, the length of time the impoundment would need to be drawn down to provide the whitewater flows, and the amount of time needed to refill the impoundment. Inflows to the project that occur infrequently (flow exceeded 25 percent of the time), on average (flow exceeded 50 percent of the time), and frequently (flow exceeded 75 percent of the time) were analyzed. In order to provide the whitewater flows, the Lower Barker impoundment would need to be drawn down during the recreation season (specifically June through September) and would require several hours to refill (Table 4-20, Table 4-21, and Table 4-22). For example, under typical flow conditions (50 percent exceedance) in July, in order to provide an outflow of 300 cfs, the water available in the impoundment would be used up within 11 hours and would require 15 hours to refill (Table 4-20). Similarly, storage would be used up in approximately 5 hours and 3.5 hours to provide flows of 500 cfs and 660 cfs, respectively (Table 4-21 and Table 4-22), and would require 15 hours to refill at both 500 cfs and 660 cfs.

[10] Flow data was obtained from USGS Gage 01057000 Little Androscoggin River near South Paris, Maine, for the time period 1/1/1985 to 12/31/2014. The monthly exceedance values were pro-rated to the drainage area of the Lower Barker dam.

TABLE 4-20 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 300 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT.

MONTH	LENGTH OF TIME FOR DRAWDOWN BEFORE AVAILABLE STORAGE IS USED (HR)*			LENGTH OF TIME TO REFILL IMPOUNDMENT (HR)*		
	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE
January	---	536.6	21.1	---	6.6	9.4
February	---	101.0	19.0	---	6.9	9.9
March	---	---	138.5	---	---	6.8
April	---	---	---	---	---	---
May	---	---	---	---	---	---
June	---	---	17.4	---	---	10.3
July	---	11.4	7.7	---	15.0	42.0
August	50.1	8.7	6.9	7.4	25.1	101.2
September	15.8	8.4	6.9	11.0	29.0	113.6
October	---	34.9	9.4	---	8.0	20.9
November	---	---	---	---	---	---
December	---	---	220.1	---	---	6.7

*--- cases where inflow is greater than outflow and no drawdown is necessary.

TABLE 4-21 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 500 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT.

MONTH	LENGTH OF TIME FOR DRAWDOWN BEFORE AVAILABLE STORAGE IS USED (HR)*			LENGTH OF TIME TO REFILL IMPOUNDMENT (HR)*		
	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE
January	42.3	8.9	6.3	4.2	6.6	9.4
February	17.9	8.3	6.1	4.8	6.9	9.9
March	---	---	8.5	---	---	6.8
April	---	---	---	---	---	---
May	---	---	38.0	---	---	4.2
June	---	11.0	6.0	---	5.8	10.3
July	10.2	5.1	4.2	6.0	15.0	42.0
August	7.7	4.5	3.9	7.4	25.1	101.2
September	5.8	4.3	3.9	11.0	29.0	113.6
October	---	7.2	4.6	---	8.0	20.9
November	---	---	9.4	---	---	6.3
December	---	42.3	8.7	---	4.2	6.7

*--- cases where inflow is greater than outflow and no drawdown is necessary.

TABLE 4-22 LENGTH OF TIME (HOUR) IMPOUNDMENT WOULD BE DRAWN DOWN TO PROVIDE A FLOW OF 660 CFS AND THE AMOUNT OF TIME (HOUR) NEEDED TO REFILL THE LOWER BARKER IMPOUNDMENT.

MONTH	LENGTH OF TIME FOR DRAWDOWN BEFORE AVAILABLE STORAGE IS USED (HR)*			LENGTH OF TIME TO REFILL IMPOUNDMENT (HR)*		
	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE	25% EXCEEDANCE	50% EXCEEDANCE	75% EXCEEDANCE
January	8.9	5.0	4.1	4.2	6.6	9.4
February	6.9	4.8	4.0	4.8	6.9	9.9
March	---	31.8	4.9	---	3.1	6.8
April	---	---	---	---	---	---
May	---	---	8.7	---	---	4.2
June	41.6	5.6	3.9	3.0	5.8	10.3
July	5.4	3.5	3.0	6.0	15.0	42.0
August	4.6	3.2	2.9	7.4	25.1	101.2
September	3.8	3.1	2.9	11.0	29.0	113.6
October	15.1	4.4	3.3	3.5	8.0	20.9
November	---	16.4	5.1	---	3.4	6.3
December	---	8.9	4.9	---	4.2	6.7

*--- cases where inflow is greater than outflow and no drawdown is necessary.

LAND USES WITHIN THE VICINITY OF THE PROJECT

The Project lies wholly within Androscoggin County, Maine, which has a land area of approximately 467 (U.S. Census, 2012a). The Project vicinity is dominated by forestland, approximately 61% of the land cover, followed by agriculture at approximately 13% of the land cover. Overall, only a small percentage of the Project Vicinity is developed (6.4%) (Table 4-23) (NOAA C-CAP, 2006).

TABLE 4-23 LAND USES IN ANDROSCOGGIN COUNTY

LAND USE	SQUARE MILES	PERCENT
Developed	31.76	6.4%
Agricultural	65.82	13.2%
Forestland	304.26	61.2%
Wetlands	43.68	8.8%
Grasslands	3.19	0.6%
Scrub/Shrub	14.48	2.9%
Barren Land	3.33	0.7%
Open Space	5.43	1.1%
Open Water	25.29	5.1%
Total	497.24	100%

Source: NOAA C-CAP, 2006.

The Lower Barker Project is located completely within the city of Auburn. Auburn has a mix of urban development and forested areas (Table 4-23). The immediate shoreline of the project impoundment is predominantly wooded but surrounded by development (Section 4.1). Land use on privately owned lands in the city, including those adjacent to the project boundary, are regulated by the Auburn Planning & Permitting department. The areas of Auburn closest to the Project are zoned as general business; multi-family urban and suburban; and rural residential (Section 4.1) (Auburn, 2011). Any development on private lands requires the appropriate permits and must adhere to the design and development standards of the Auburn Planning & Permitting department.

LAND USE AND MANAGEMENT OF PROJECT LANDS

Project operations and maintenance are the primary activities that occur on project lands. There are no formal public recreation facilities at the Project and access to the dam is blocked to unauthorized vehicles or pedestrians.

AESTHETIC RESOURCES

The Lower Barker Project is located wholly within the city of Auburn in the Lewiston Auburn metropolitan area in Androscoggin County. The project vicinity is predominantly rural, consisting of rugged forests and agricultural lands with minimal development in 14 towns and cities across the County (FERC, 1996). The largest area of urban development is the Lewiston-Auburn Metropolitan Area. The city of Auburn is mostly urban with pockets of forests in the outer edges of the city. Lands surrounding the Project are densely forested with a steep rocky gorge leading down to the project waters (FERC, 2011).

4.3.12 VISUAL CHARACTER OF THE PROJECT VICINITY

The Lower Barker Project is located within a relatively urban section of Androscoggin County. The Little Androscoggin River originates at Bryant Pond, 29 miles away from the Project, in Oxford County. The River flows southeasterly through Oxford and Androscoggin counties to its confluence with the Androscoggin River in the city of Auburn.

Approximately 70% of Androscoggin County is forested (Ireland, 1998). A majority of the forested areas in the project vicinity lie to the north and west of the Project. However, there are segments of forested lands within close vicinity of the Project.

A paved public road runs parallel to the project area, therefore making the project area visible for most public travel. The Barker Mill Trail is a walking trail developed by the ALT. This trail runs parallel to the Little Androscoggin River starting upstream of the Project at the Upper Barker dam and ending at the driveway to the Project. The Trail provides views of the project areas and facilities for pedestrians.

4.3.13 NEARBY SCENIC ATTRACTIONS

Within the project vicinity are numerous scenic attractions of local and regional importance. There are 14 state and 32 municipal parks in the project vicinity (MDPPL, 2013c). These parks offer a variety of trails which offer views of the Androscoggin River and its tributaries, and other scenic lands.

There are numerous covered bridges in the Maine Lakes and Mountains region. Most covered bridges in Maine were built between the mid-1800s and early 1900s. At its peak Maine had 120 covered bridges, today only nine remain. Six of those bridges are located in the Maine Lakes and Mountain region, they include: Babb's Bridge, Bennett Bridge, Hemlock Bridge, Lovejoy Bridge, Parsonsfield-Porter Bridge, and Sunday River Bridge (Artist's Bridge). The Sunday River Bridge is often referred to as Artist's Bridge because it is the most painted and photographed covered bridge in Maine (MLMTC, 2013).

There are four scenic byways located within the Maine Lakes and Mountains Region. The Rangeley Lakes Scenic Byway is designated a National Scenic Byway, by the U.S. Department of Transportation Federal Highway Administration. The Byway extends approximately 36 miles through western Maine and offers magnificent views of Mooselookmeguntic Lake, Sandy River, Beaver Pond, and Toothaker Island. The byway also provides opportunity for wildlife watching, and outdoor recreation (DOT FHA, 2013). Grafton Notch is a state scenic byway that extends approximately 21 miles through Grafton Notch State Park. The byway offers scenic views of Lake Umbagog, Screw Auger Falls, and Mother Walker Falls (MDOT, 2013a). Pequawket Trail

is a state scenic byway that extends approximately 60 miles and goes through westernmost section of the White Mountains National Forest on the New Hampshire border. The byway offers scenic views of Mount Washington, Hemlock Covered Bridge, and Jockey Cap Rock (MDOT, 2013b). State Route 27 is a state scenic byway that extends approximately 47 miles from the Canadian border to central Maine. The byway offers scenic views of Mount Abraham, Carabassett River, and Cathedral Pines, the largest area of old growth forest in Maine (MDOT, 2013c).

4.3.14 VISUAL CHARACTER OF PROJECT LANDS AND WATERS

The Lower Barker development has a small impoundment with a storage capacity of approximately 150 acre-feet (USACE, 2013). The project boundary encompasses the impoundment up to elevation 166.6 feet NAVD88 and extending upstream to the base of the Upper Barker Dam. The project boundary also includes the dam, buried penstock, and the powerhouse. The Lower Barker Dam is constructed of concrete and measures 30 feet high by 230 feet long. The Project has a powerhouse constructed of concrete and measuring 55 feet by 20 feet (Photo 4-10). The powerhouse and tailrace are located approximately 2,000 feet downstream of the dam (FERC, 1979). Lands adjacent to the project boundary are forested, but quickly give way to urban development.

A public road runs parallel to the project area. During winter months the project area is highly visible from this road, however the foliage fills in during fall and summer months obscuring views of the Project (Photo 4-11).

PHOTO 4-10 LOWER BARKER PROJECT

PHOTO 4-11 VIEW OF LOWER BARKER DAM FROM MILL STREET DURING THE WINTER MONTHS

Source: Google.com Street View, 2013

4.3.15 ENVIRONMENTAL EFFECTS

KEI (Maine) is not proposing to add new recreational facilities to the Project. While no formal recreation sites exist at the Project, KEI (Maine) would not restrict recreation users from crossing non-fenced Project lands to access waters for angling or other recreational facilities.

KEI (Maine)'s proposal to increase the minimum flow to 50 cfs, or inflow, whichever is less, will result in a marginal change in the downstream aesthetics of the bypassed reach during times of low flow.

The proposed action will have no effect on land use at the Project.

NO-ACTION ALTERNATIVE

The no-action alternative will have the same effect on recreation and land use as the proposed action. Under the no-action alternative, the minimum flow in the bypassed reach would continue to be 20 cfs, and therefore there would be no change to the aesthetics of the bypassed reach.

UNAVOIDABLE ADVERSE EFFECTS

KEI (Maine) may need to temporarily alter water levels in the impoundment, bypassed reach, or tailrace for routine maintenance or repairs. This may result in short-term periods of low aesthetic views and recreational use of the downstream river reaches.

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4.3.17 SOCIOECONOMIC RESOURCES

4.3.17.1 AFFECTED ENVIRONMENT

Approximately 61% of Androscoggin County, where the Project is located, is forested (NOAA C-CAP, 2006). Although forests account for approximately 90% of Maine's land use, a vast majority of those lands are privately owned and forest-related jobs account for only 2.4% of Maine's jobs and 1.1% of jobs in Androscoggin County. Manufacturing and merchant wholesaler are the largest employer in Androscoggin County, followed by retail sales and health services (U.S. Census, 2016a).

POPULATION

In 2015 an estimated 107,233people were living in Androscoggin County, making it the fifth most populated county in the state of Maine. Of those people living in Androscoggin County 22,871 were lived in the city of Auburn (Table 4-24). The City of Auburn is the fifth largest city in the state of Maine. Androscoggin County is less densely populated, with a population density of 230.2 people/mi², compared to the city of Auburn which has a population density of 388.6 people/mi². From 2010 to 2015 the population of the county declined by -0.4% and the population of Auburn decreased by -0.8%. The population changes for both Androscoggin County and Auburn were lower than the growth experienced statewide in Maine during that time (0.1%) (U.S. Census 2015a, 2015b).

TABLE 4-24 POPULATION STATISTICS FOR AUBURN, ANDROSCOGGIN COUNTY AND MAINE

	CITY OF AUBURN	ANDROSCOGGIN COUNTY	MAINE
Population			
Population (2015 estimate)	22,871	107,233	1,329,328
Population (2012)	22,972	107,609	1,329,192
Population (2010)	23,052	107,702	1,328,361
Population Growth (2000 to 2015)	-0.8	-0.4	0.1
Geography (2010)			
Land area in square mile	59.33	467.93	30,842.92
Population Density	388.6	230.2	43.1
Age (2015)			
Persons under 5 years (2015)	X	6%	4.90%
Persons under 18 years (2015)	X	21.90%	19.30%
Persons 65 years and over (2015)	X	16.40%	18.80%
Race (2015)			

	City of Auburn	Androscoggin County	Maine
Caucasian	X	92.70%	94.90%
Black or African American (2015)	X	3.80%	1.40%
American Indian and Alaska Native(2015)	X	0.4	0.7
Asian (2015)	X	0.9	1.2
Native Hawaiian and Other (2015)	X	Z	Z
Two or More Races (2015)	X	2.2	1.7
Hispanic or Latino (2015)	X	1.8	1.6

Source: U.S. Census 2015a, 2015b
X (not applicable), Z (Value greater than zero but less than half unit of measure shown)

Housing and Income

In 2014, the annual per capita personal income for Androscoggin County was $24,734, slightly below the state of Maine per capita personal income of $27,332. Between 2010 and 2014, Androscoggin County had 44,391 households and an average household size of approximately 2.35 individuals. From 2010-2014, the County had a higher percent of persons below poverty level than the state average, 15.4% and 14.1% respectively. (U.S. Census 2016a).

Auburn residents had an annual per capita income of $26,545 in 2014, comparable to the overall average for the state of Maine. The percentage of persons below poverty level in the city from 2010-2014 was larger than the poverty rate for Androscoggin County at 17.0% (U.S. Census 2016b).

Approximately 88.6% of the population of Androscoggin County had an education attainment of high school graduate or higher, while 19.9% held Bachelor's degrees or higher (U.S. Census 2016a). Approximately 89.9% of the population of Auburn had an education attainment of high school graduate or higher, while 24.9% held Bachelor's degrees or higher (U.S. Census 2016b).

Employment

Table 4-25 below provides 2010-2014 data on employment sources in the city of Auburn and Androscoggin County. In Androscoggin County the Manufacturers and retail sectors are the largest employers. The health care services and merchant sectors were also important. In July 2015, Androscoggin County was ranked 6th out of 16 counties for lowest unemployment rate at

3.9%. This is comparable to the mean unemployment rate for the state of Maine which was 4.4% (MCWRI, 2016).

In 2012, there were 63.7% of individuals in the labor force in the city of Auburn. As with the county, the Manufacturers and retail sectors provided the greatest number of jobs employing 1,840,753 of the workforce. The retail trade and manufacturing sectors were the next largest employers, accounting for approximately 305,943 jobs respectively (U.S. Census 2016b). In 2012, Auburn was ranked 7th out of 14 towns and cities in Androscoggin County for lowest unemployment rate at 7.2%. This is slightly below the county unemployment rate of 7.4% (MCWRI, 2012).

TABLE 4-25 EMPLOYMENT STATISTICS FOR AUBURN, ANDROSCOGGIN COUNTY AND MAINE

	CITY OF AUBURN	ANDROSCOGGIN COUNTY	MAINE
Civilian labor force Employment Status (2010 - 2014)			
Percent Employed	63.70%	65.60%	63.80%
Non-Farm Employment by Industry			
Accommodation and food services sales (2012)	70995	153320	2901347
Health care and social assistance (2012)	154828	947468	10297043
Manufacturer shipments (2012)	993710	1886855	16044543
Merchant wholesaler sales (2012)	151115	473945	12961262
Total retail sales (2012)	847043	1818065	21521714
Retail sales per capita (2012)	36873	16895	16192

Source: U.S. Census, 2015a, 2015b

4.3.17.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

The proposed action will have no significant effects on socioeconomics. The existing labor force will continue to work at the Project. Maintenance of recreation facilities will have a negligible impact to workload, and no new jobs are anticipated to be created. Regular inspections and maintenance of the facilities is not expected to significantly increase recreation use by commercial outfitters, and as such, it would not significantly affect socioeconomics.

NO-ACTION ALTERNATIVE

There are no anticipated effects to socioeconomics by continuing to operate the Project as it is in the existing license.

CUMULATIVE EFFECTS

The Project would cumulatively, with other hydroelectric projects in the region, result in beneficial socioeconomic effects including potential energy savings and creation of jobs.

UNAVOIDABLE ADVERSE EFFECTS

The proposed Project would result in no unavoidable adverse effects to the regional socioeconomics.

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4.3.19 CULTURAL RESOURCES

4.3.19.1 AFFECTED ENVIRONMENT

AREA OF POTENTIAL EFFECT

The Advisory Council on Historic Preservation (Advisory Council) defines an Area of Potential Effect (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. KEI (Maine) has delineated the APE for the Lower Barker Hydroelectric Project in consultation with the Maine State Historic Preservation Commission (SHPC) through the process of Study Plan Development. The APE at the Lower Barker Project is defined as all lands within the FERC Project Boundary, including the powerhouse, tailrace, headrace, dam, downstream recreation area, and extends upstream to Upper Barker Dam. No improvements or enhancements are proposed beyond this line.

CULTURAL RESOURCES

Gray & Pape, Inc. (Gray & Pape), was retained to conduct a Phase 1 Pre-Contact Period archaeological sensitivity assessment (including reconnaissance survey) for the Lower Barker Hydroelectric Project. The assessment was in compliance with Federal and State legislation and regulations concerning impacts to archaeological properties from federally-funded or permitted activities including; the national Historic Preservation Act of 1966 amended 1992 (54 USC 300101), the National Environmental Policy Act of 1969 (PL 91-990, 42 USC 4321), Executive Order 11593, 1971 (16 USC 470), Procedures for the Protection of Historic and Cultural Properties (36 CFR 800), and the Archaeological and Historic Preservation Act of 1974 (PL 93-291). Professional archaeological work in Maine is regulated by two chapters in the Code of Maine Rules: Chapters 100 and 812 (Sections 089c100 and 089c812, respectively). Archaeological site records access procedures and standards are contained in Chapter 100. The composition and functions of the Archaeological Advisory Committee, the credential requirements from persons on the Commission's approved lists of archaeologists, procedure for review of credentials, procedure for removal from approved lists, and environmental impact project guidelines and procedures are contained in Chapter 812.

Based upon the results of Gray & Pape's initial assessment, MHPC required additional field investigations in 2016. Results that are pending will be incorporated into the final license application.

Pre-historical archaeological surveys have been completed along the banks of the Androscoggin River and the Little Androscoggin River (upstream of the Project) and one historic archaeological site, the Fort Laurel Hill Native American settlement, is documented in the vicinity of the Project (City of Auburn, 2010).

4.3.19.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

The Proposed action will result in some increase in bypass flows that are not likely to affect cultural resources. Any construction related disturbance related to the fish passage improvements would occur along the access road adjacent to the power canal, which is already highly disturbed. KEI (Maine) would continue to manage the historic properties within the APE in accordance with Section 106 of the NHPA. This means that KEI (Maine) would comply with Section 106 on a case-by-case basis.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the Project would continue to operate as required by the current Project license (*i.e.*, there would be no change to the existing environment). KEI (Maine) would continue to manage the historic properties within the APE in accordance with Section 106 of the NHPA. This means that KEI (Maine) would comply with Section 106 on a case-by-case basis.

UNAVOIDABLE ADVERSE EFFECTS

KEI (Maine) has proposed no changes to the operations or the facilities of the Lower Barker Project that will have unavoidable adverse effects.

4.3.20 REFERENCES

Gray & Pape, Inc. 2016. Phase I Pre-Contact Period Archaeological Sensitivity Assessment for the Lower Barker Hydroelectric Project Relicensing, Auburn, Androscoggin County, Maine. February 24, 2016.

4.3.21 TRIBAL RESOURCES

4.3.21.1 AFFECTED ENVIRONMENT

The project area has been documented as being historically inhabited by the Abenaki but there are no tribal lands within the project boundary and there are no federal reservations in the vicinity of the Project.

The Project occupies a limited reach of the Little Androscoggin River and is operated in run-of-river mode, which more closely matches the natural hydrologic regime of the River. As such, project operations are not expected to affect any resources that may impact cultural or economic interests.

The project boundary includes a very limited reach of the Little Androscoggin River. While the project area has been documented as historically being inhabited by the Abenaki, none of Maine's five federally recognized Indian tribes have indicated religious or cultural significance to historic properties within the project boundary. The Penobscot Indian Nation on December 2, 2013, expressing an interest in the potential cultural resources of the Project (personal correspondence, Chris Sockolexis, PIN, December 2, 2013). In addition, KEI (Maine) hosted an early agency consultation meeting on December 17, 2013 to which representatives of the five federally recognized tribes were invited though none of the tribes were in attendance at the meeting.

4.3.21.2 ENVIRONMENTAL EFFECTS

PROPOSED ACTION

The proposed action will not likely negatively affect tribal resources. There are no known tribal resources in lands proposed to be removed from the Project boundary.

NO-ACTION ALTERNATIVE

Continued operation of the Project under the no-action alternative is unlikely to affect Tribal resources; the licensee would address any tribal resources, should they be discovered, on a case-by-case basis.

UNAVOIDABLE ADVERSE EFFECTS

The licensee has not identified any unavoidable adverse effects on tribal resources.

5.0 ECONOMIC NALYSIS

5.1 COST OF OPERATING AND MAINTAINING THE LICENSE

The annual operation and maintenance cost of running the Lower Barker Hydroelectric Project Facility is $143,200 and the annual Administrative Expenses as $42,073.

5.2 COST OF PROPOSED RESOURCE PM&E MEASURES

The cost of providing information will be provided in the Final License Application.

5.3 VALUE OF POWER GENERATED BY THE PROJECT

The Lower Barker Hydroelectric Project is operated in run-of-river mode and is part of KEI (Maine)'s portfolio of generation supply options. Power generated from the Lower Barker Hydroelectric Project has an average value of $207,400.

5.4 EFFECT OF PM&E MEASURES ON VALUE OF POWER GENERATED BY THE PROJECT

The Licensee is proposing to continue to operate the project as run-of-river. KEI (Maine) is proposing to increase the minimum flow to the bypassed reach to 50 cfs, or inflow, whichever is less. In addition, the Project will continue to provide flows through stoplog section to provide downstream fish passage from June 1 through November 15. No other proposed action will significantly affect the cost of operating the project. No other PM&E measures would likely significantly affect the value of power generated by the Project.

6.0 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the Federal Power Act , 16 USC § 803(a)(2)(A), requires FERC to consider the extent to which a project is consistent with Federal or State comprehensive plans for improving, developing, or conserving a waterway affected by the project. FERC Order No. 481-A, issued on April 27, 1988, established that FERC will accord FPA Section 10(a)(2)(A) comprehensive plan status to any Federal or State plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
- Specifies the standards, the data, and the methodology used; and
- Is filed with the Secretary of the Commission.

In accordance with Section 10(a) (1) of the FPA, the list of Commission approved federal and state comprehensive plans was reviewed to determine applicability to the Williams Project. The federal resource agencies, as well as the State of Maine, have prepared a number of comprehensive plans, which provide a general assessment of a variety of environmental conditions in Maine. These plans address water quality, water pollution control, wetlands, recreation, and land management issues. In addition, the State of Maine's plans include policies related to ensuring that the State's energy needs are met and supporting hydropower, a renewable and indigenous source, as a valuable portion of the energy mix.

Relevant comprehensive plans, as well as a description of the consistency of the Project as proposed with those plans are contained in Exhibit H, Section 2.8 of this application.

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APPENDIX A

STUDY REPORT

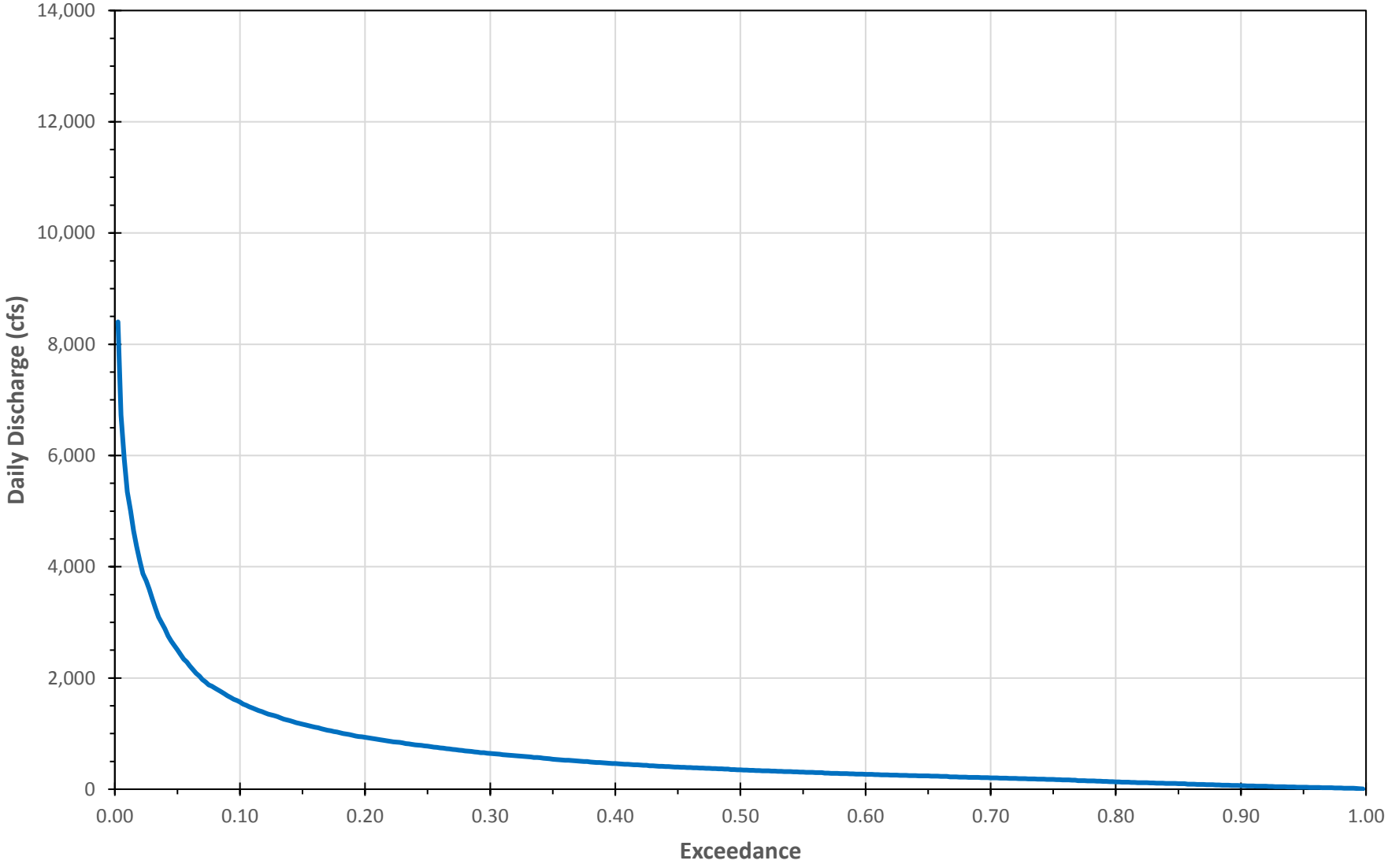
ATTACHED SEPARATELY

APPENDIX B

FLOW DURATION CURVES

Little Androscoggin River at Lower Barker Dam
Annual Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



Little Androscoggin River at Lower Barker Dam
January Flow Duration Curve

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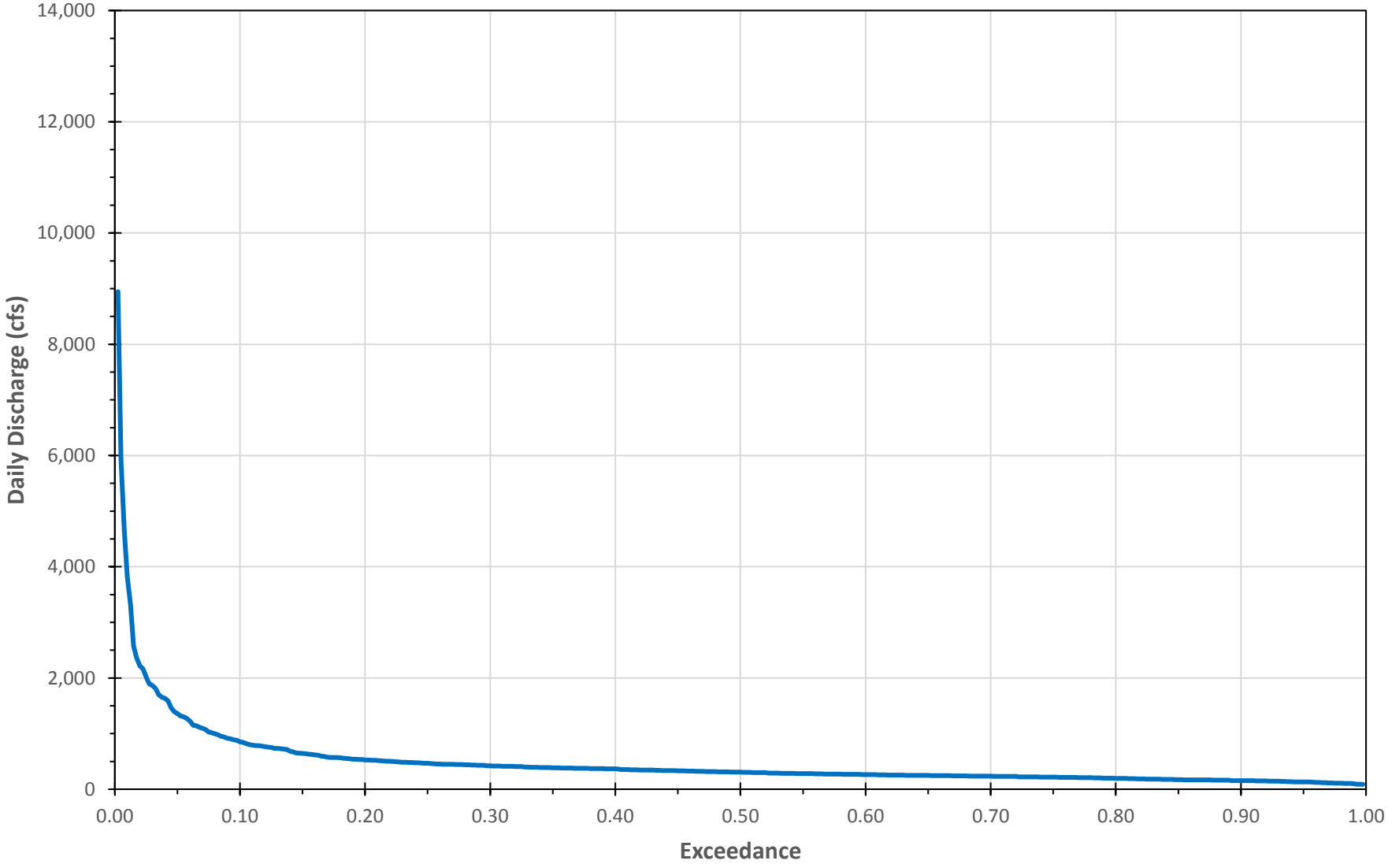
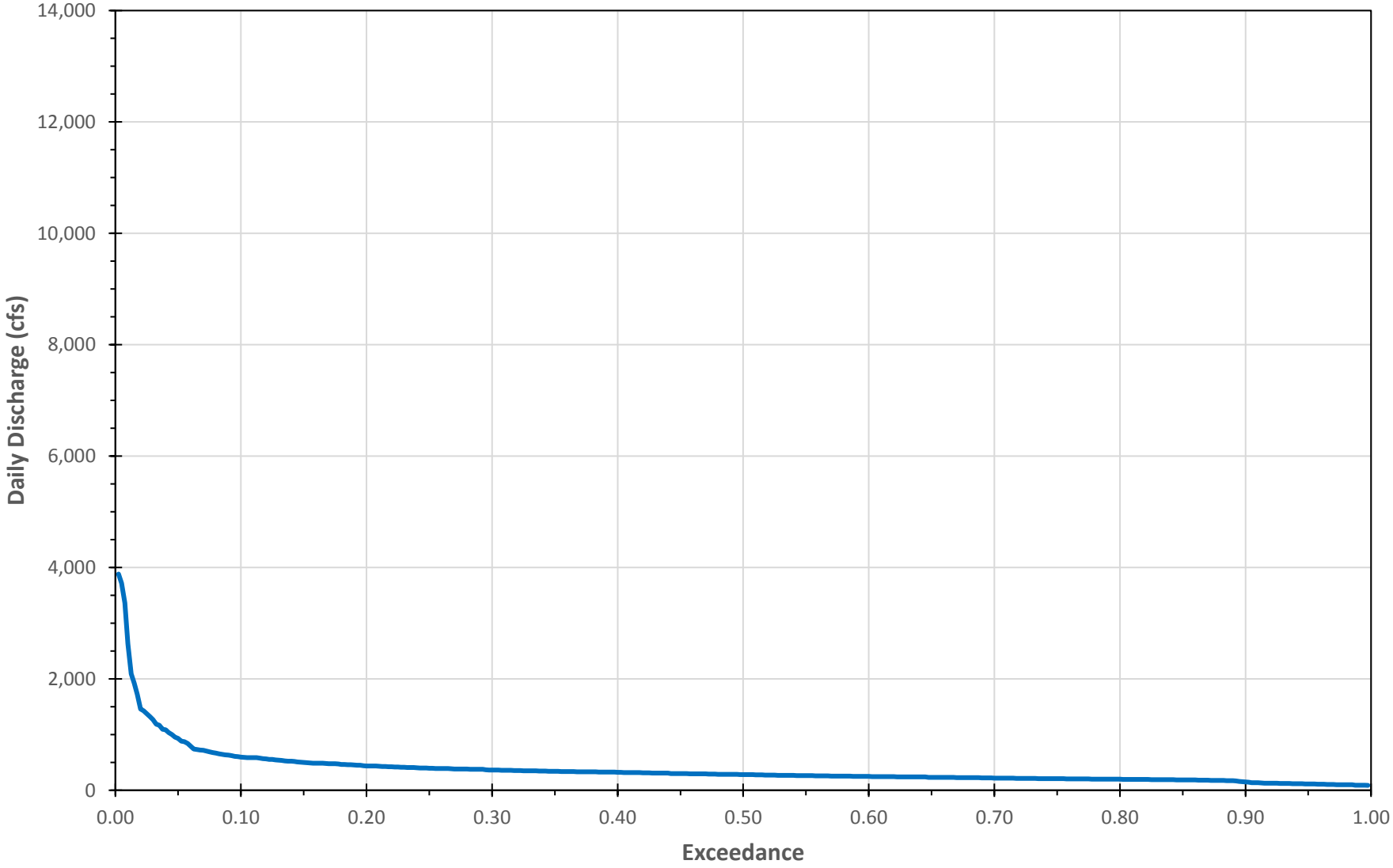


Little Androscoggin River at Lower Barker Dam
February Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



Little Androscoggin River at Lower Barker Dam
March Flow Duration Curve

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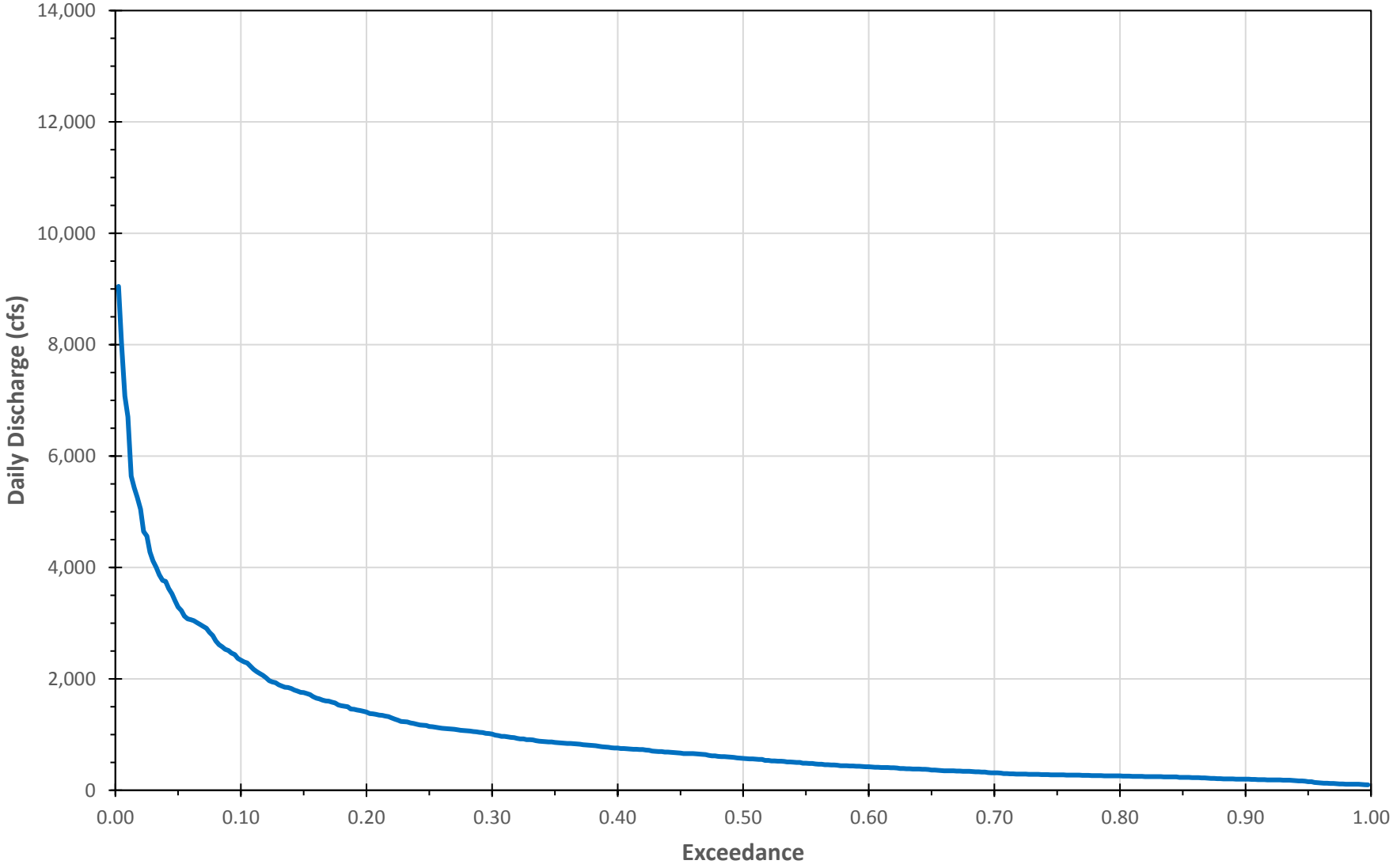

Little Androscoggin River at Lower Barker Dam
April Flow Duration Curve

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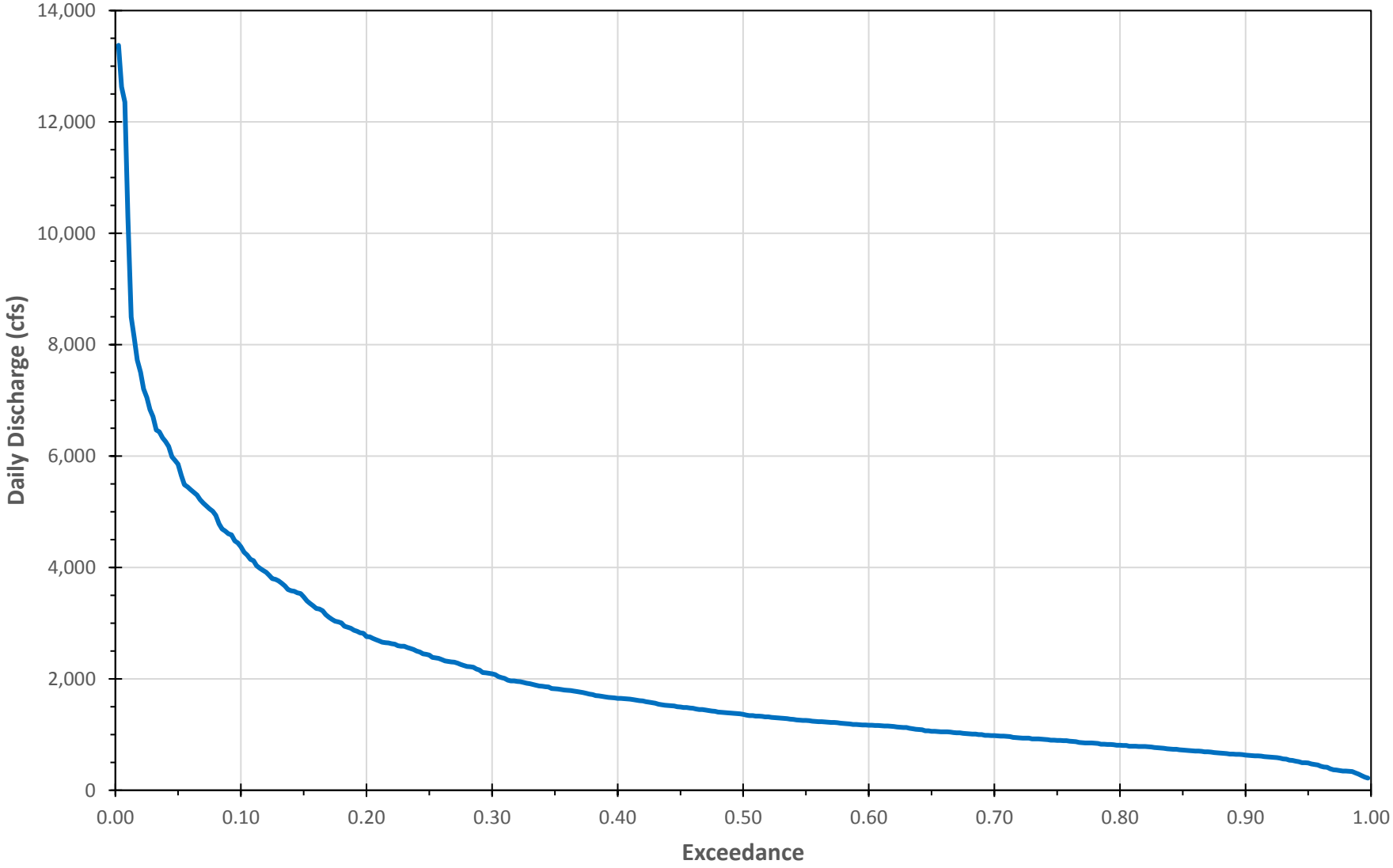
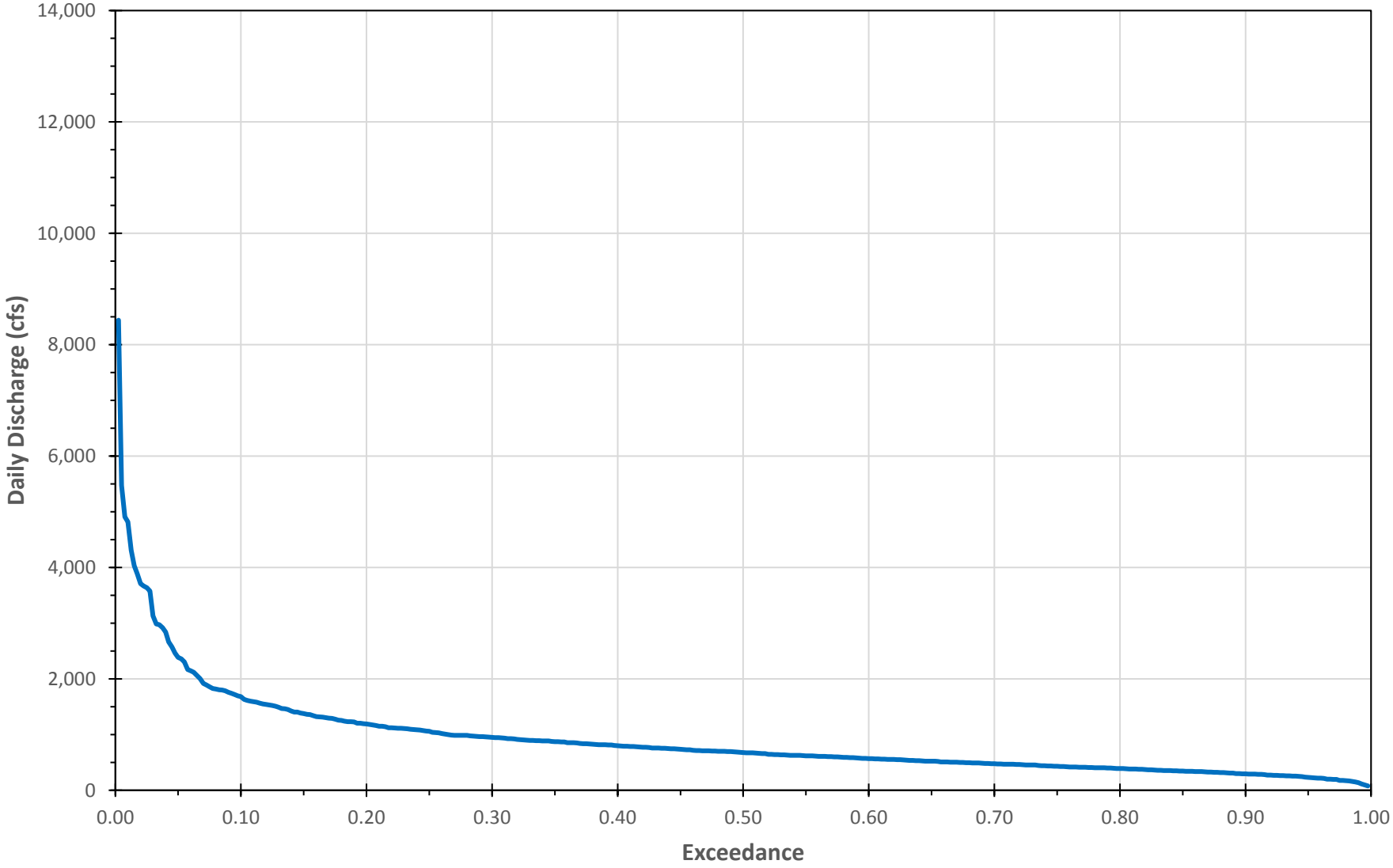


Little Androscoggin River at Lower Barker Dam
May Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



Little Androscoggin River at Lower Barker Dam
June Flow Duration Curve

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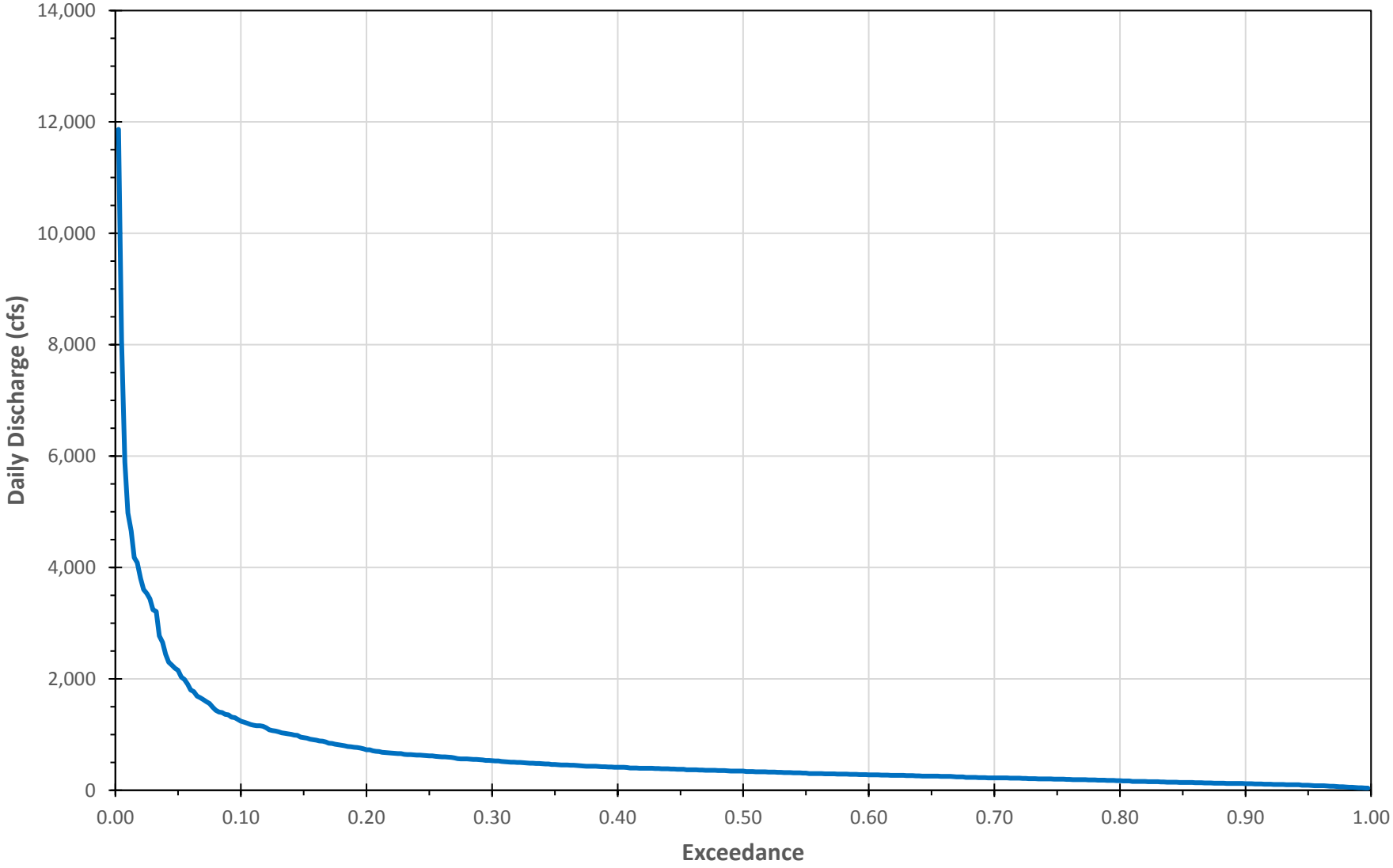
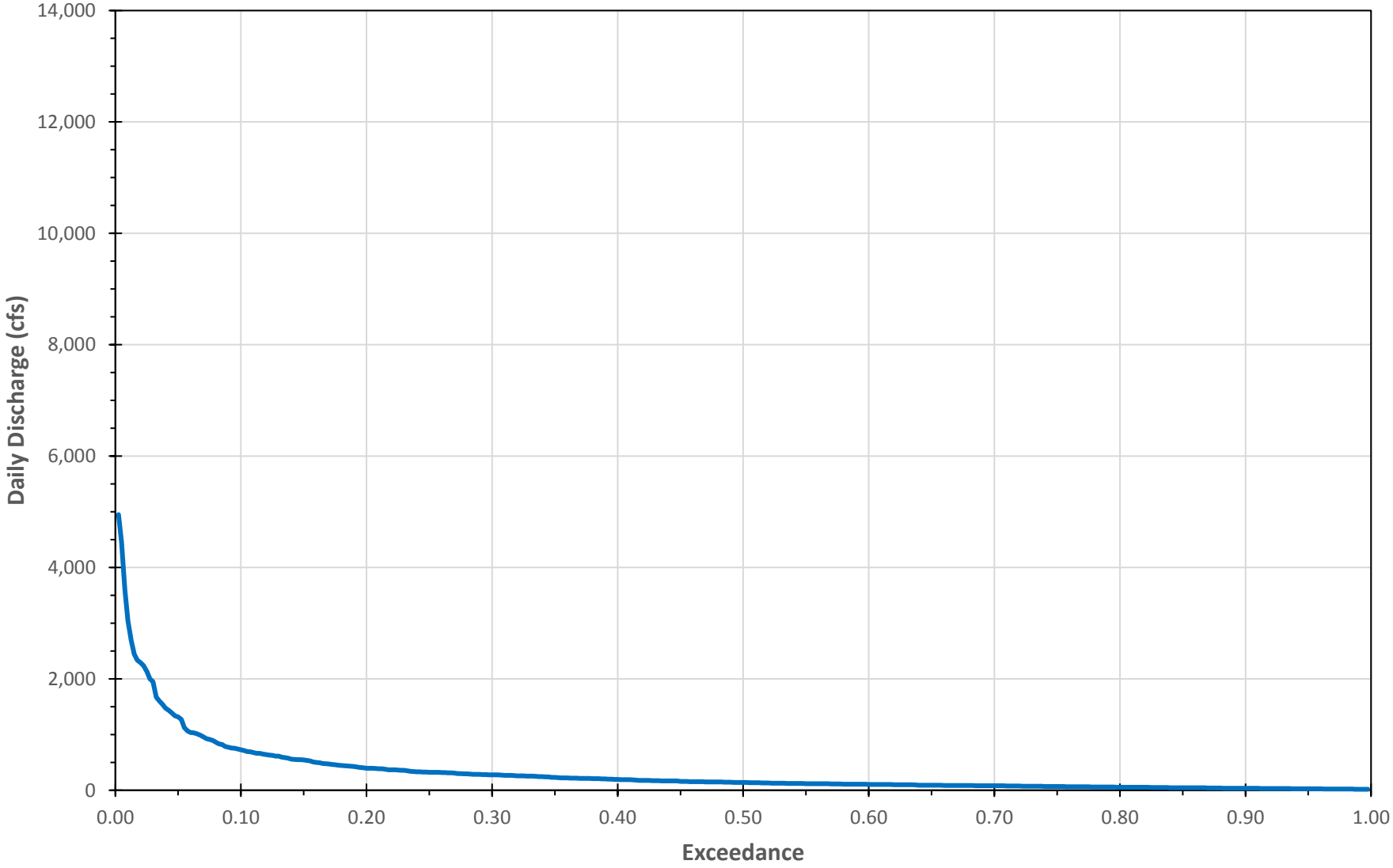


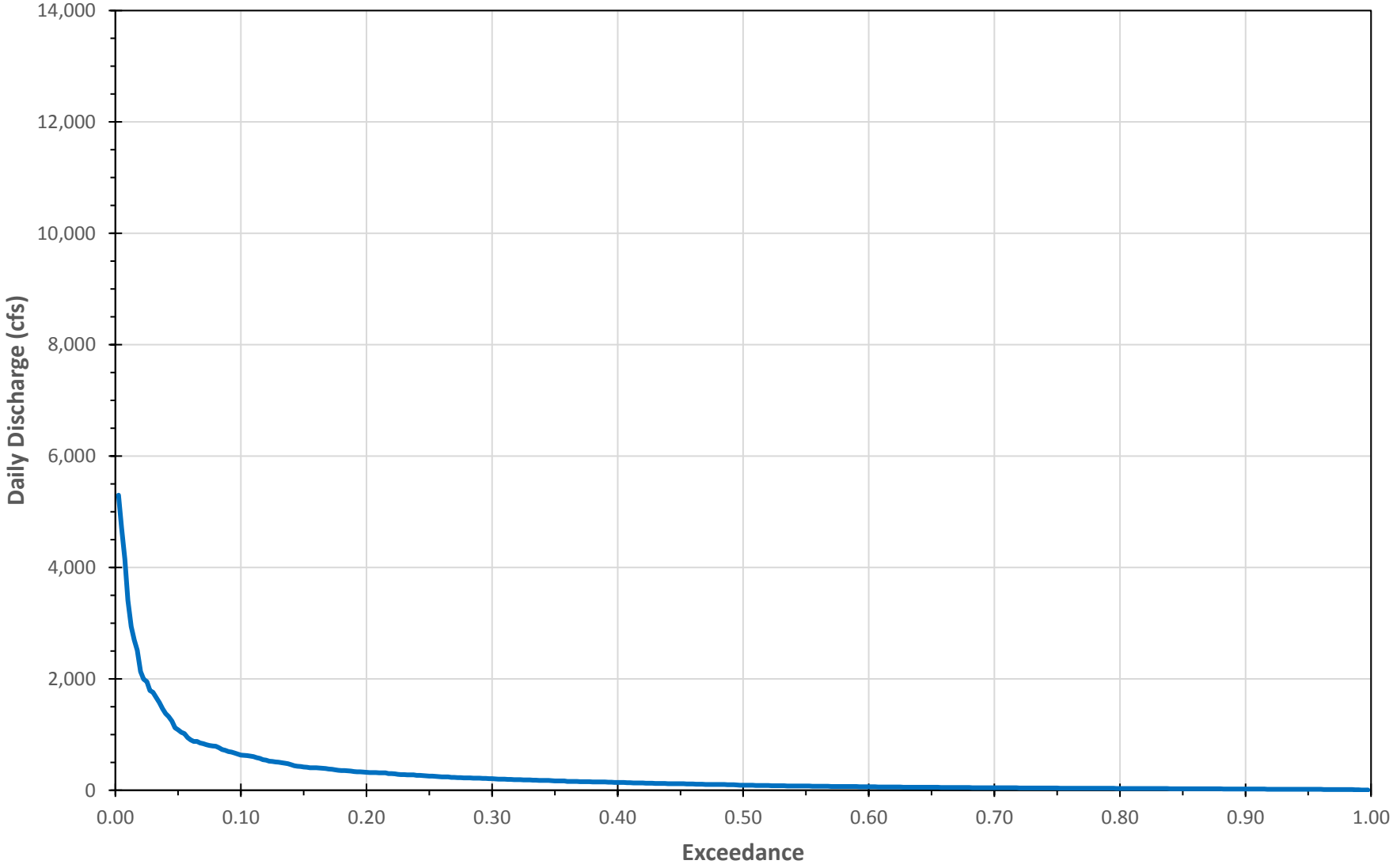
Little Androscoggin River at Lower Barker Dam
July Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



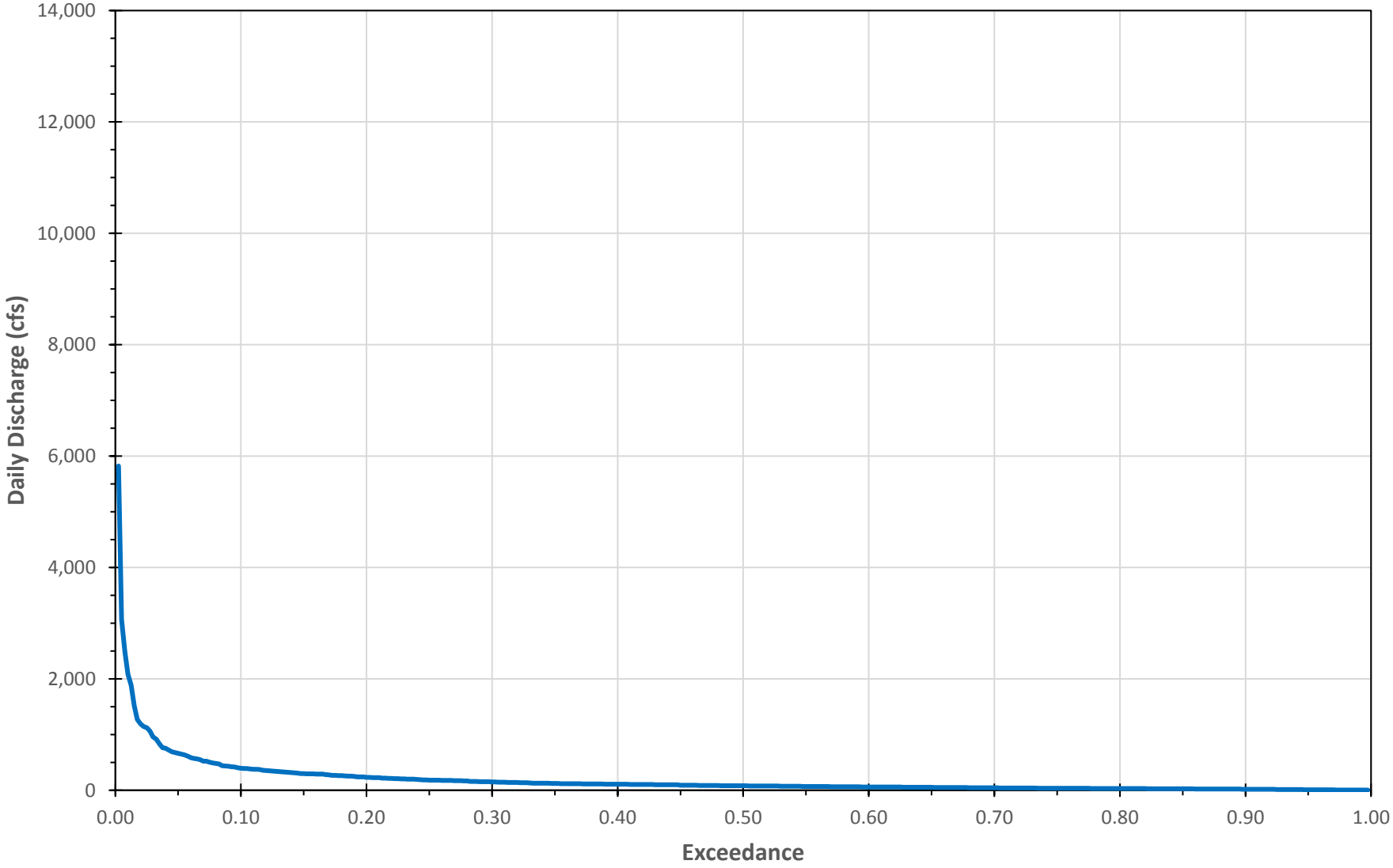
Little Androscoggin River at Lower Barker Dam
August Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



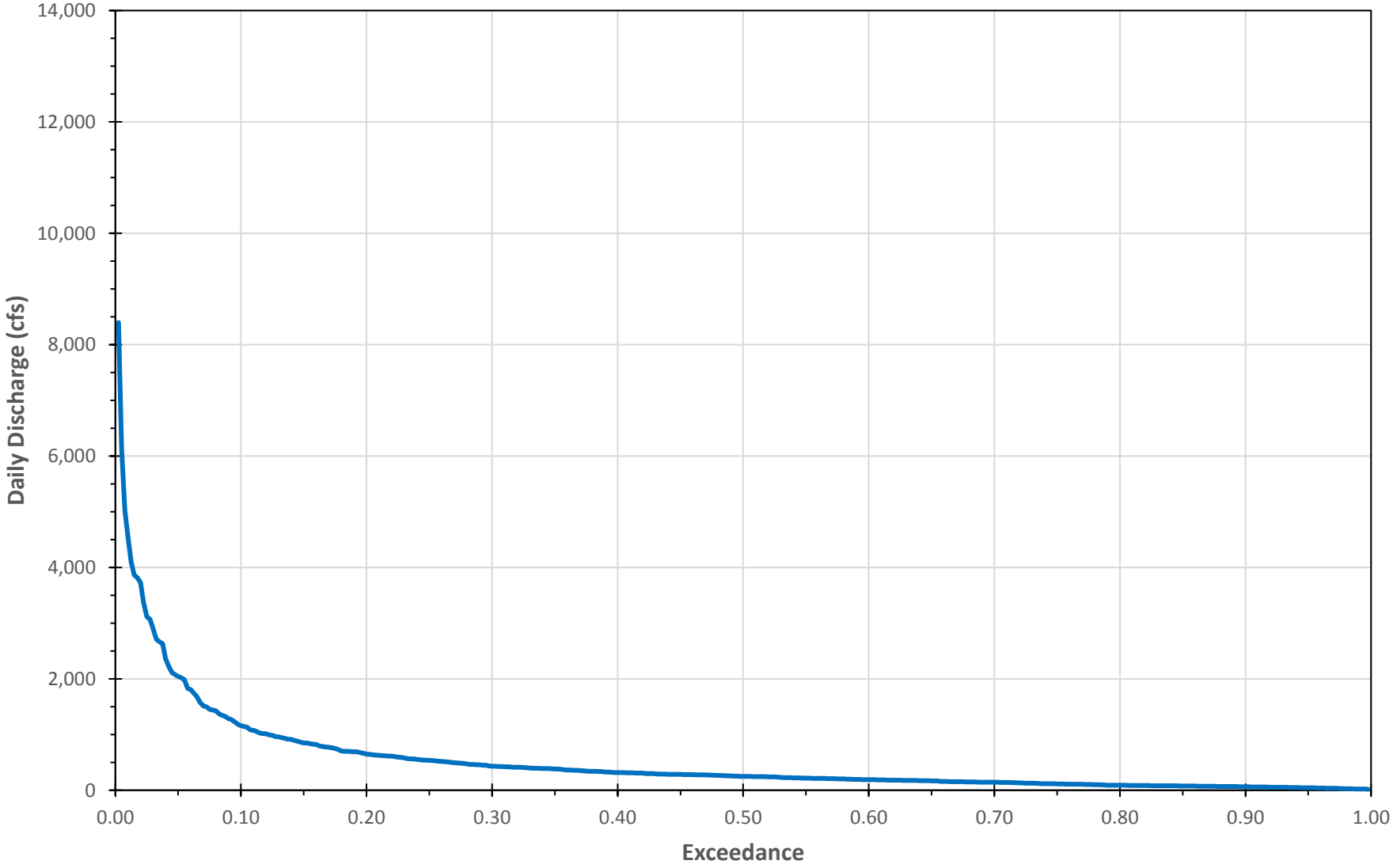
Little Androscoggin River at Lower Barker Dam
September Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



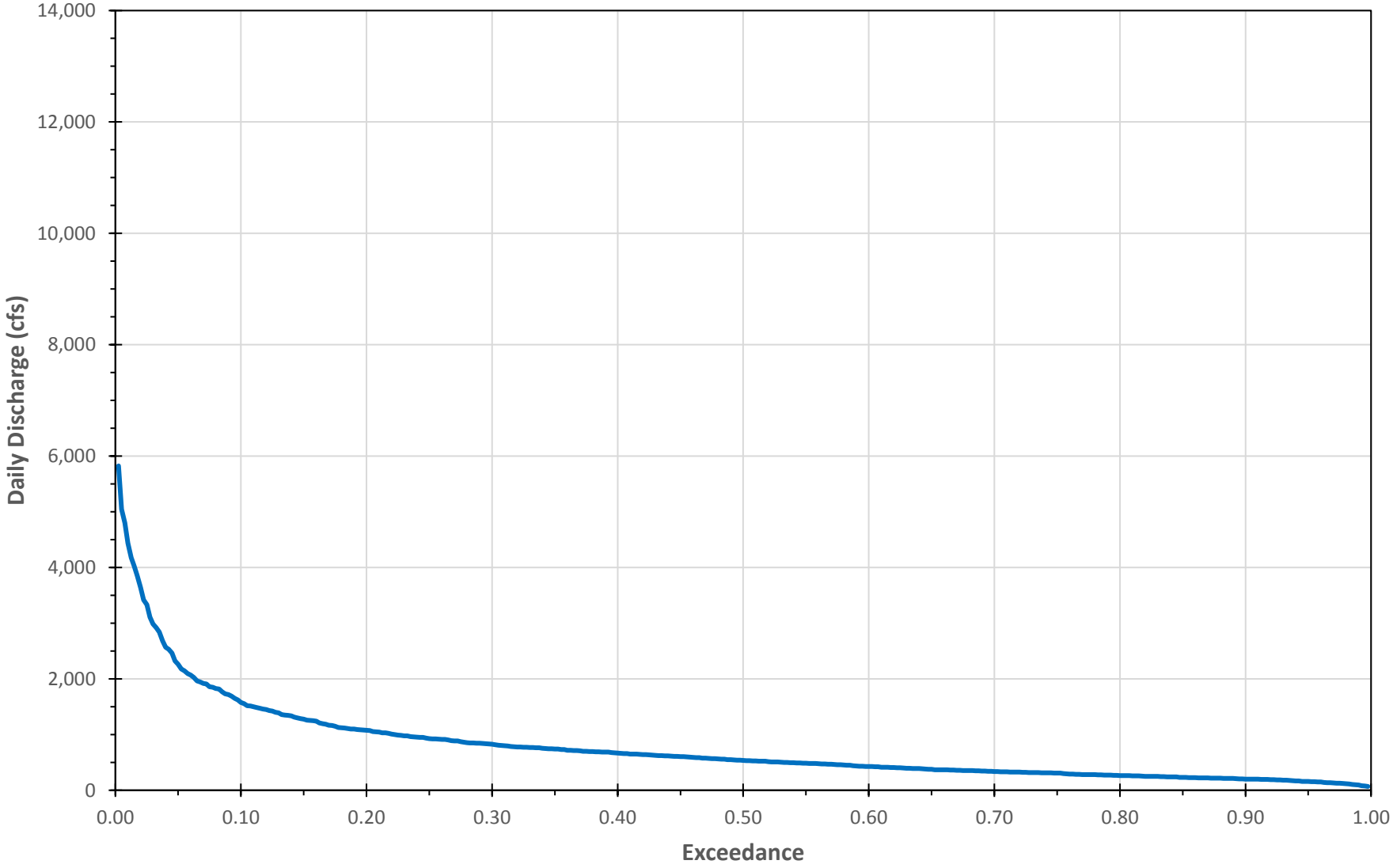
Little Androscoggin River at Lower Barker Dam
October Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



Little Androscoggin River at Lower Barker Dam
November Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015



Little Androscoggin River at Lower Barker Dam
December Flow Duration Curve

Prorated from USGS Gage No. 01057000 Little Androscoggin River near South Paris, ME, 01/01/1985 - 12/31/2015

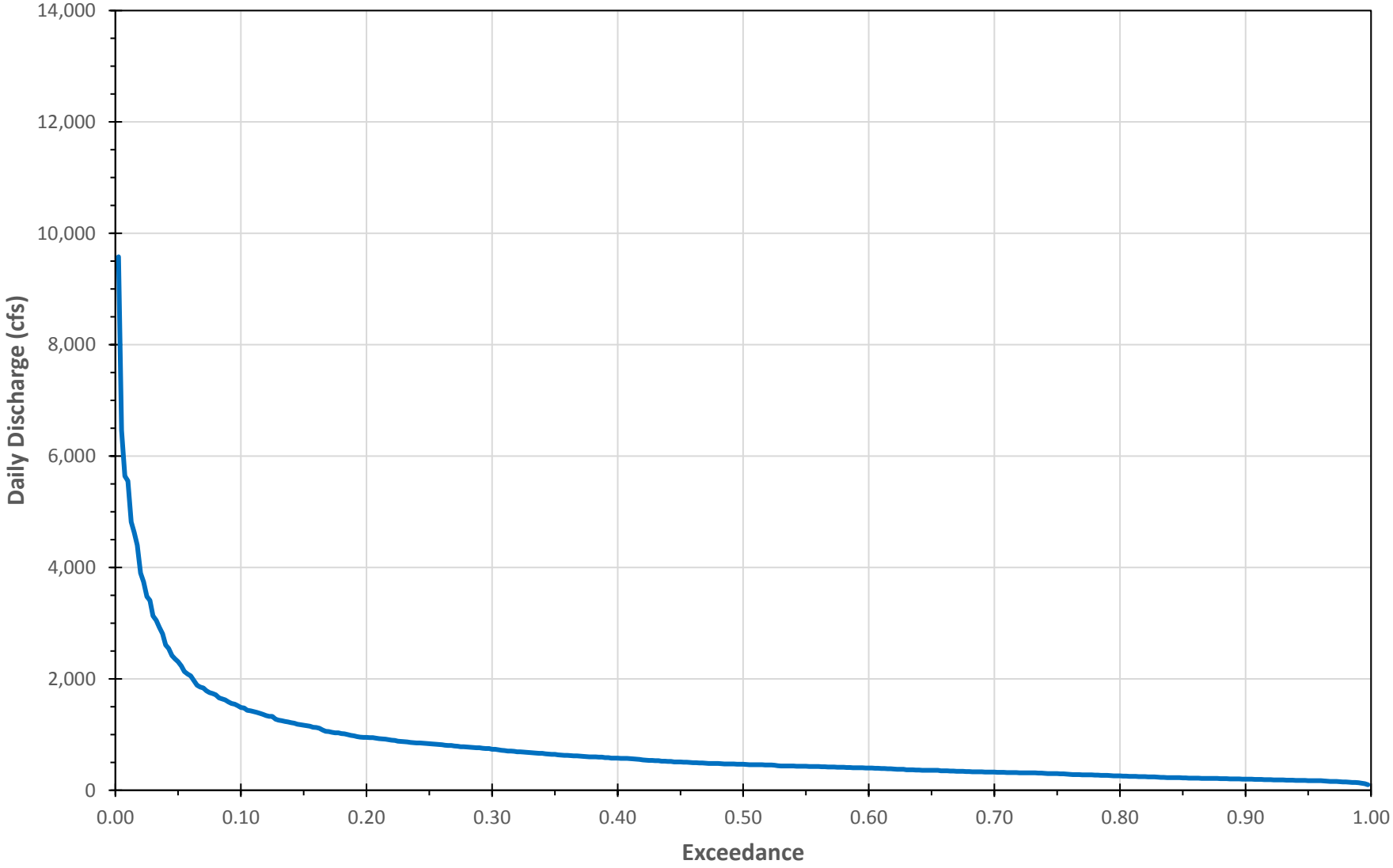


EXHIBIT F

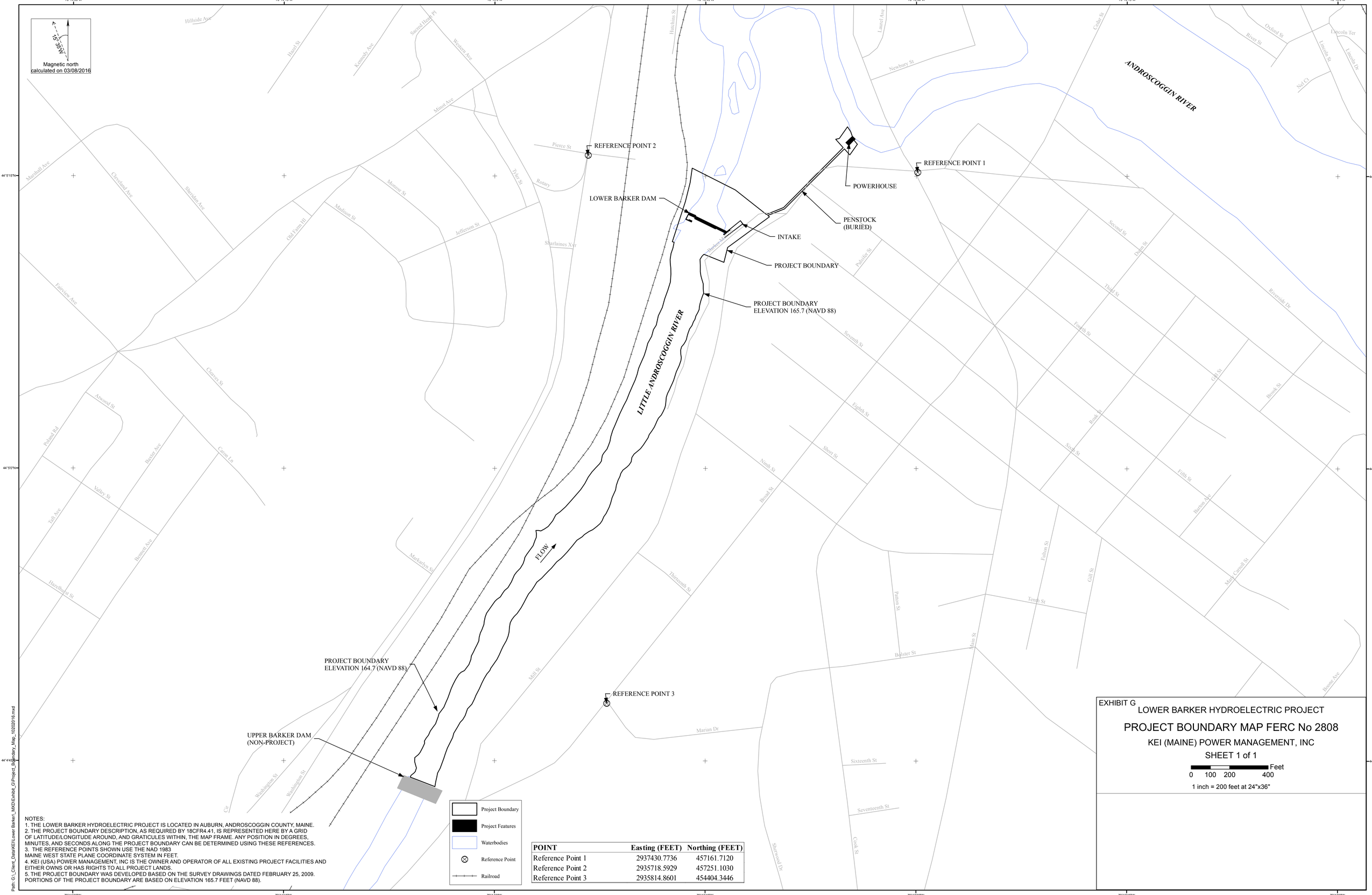
GENERAL DESIGN DRAWINGS

Contains Critical Energy Infrastructure Information
- Do Not Release –

Exhibit F drawings are provided for federal use only and are not included in the public review version of this license application. This material is considered Critical Energy Infrastructure Information (CEII) particularly with regard to proposed project structures, the incapacity or destruction of which would affect security, economic security, public health, or safety. Members of the public may obtain non-public or privileged information by submitting a Freedom of Information Act (FOIA) request. See www.ferc.gov/legal/ceii-foia.asp for more information.

EXHIBIT G

PROJECT BOUNDARY MAP



POINT	Easting (FEET)	Northing (FEET)
Reference Point 1	2937430.7736	457161.7120
Reference Point 2	2935718.5929	457251.1030
Reference Point 3	2935814.8601	454404.3446

NOTES:
1. THE LOWER BARKER HYDROELECTRIC PROJECT IS LOCATED IN AUBURN, ANDROSCOGGIN COUNTY, MAINE.
2. THE PROJECT BOUNDARY DESCRIPTION, AS REQUIRED BY 18CFR4.41, IS REPRESENTED HERE BY A GRID OF LATITUDE/LONGITUDE AROUND, AND GRATICULES WITHIN, THE MAP FRAME. ANY POSITION IN DEGREES, MINUTES, AND SECONDS ALONG THE PROJECT BOUNDARY CAN BE DETERMINED USING THESE REFERENCES.
3. THE REFERENCE POINTS SHOWN USE THE NAD 1983 MAINE WEST STATE PLANE COORDINATE SYSTEM IN FEET.
4. KEI (USA) POWER MANAGEMENT, INC IS THE OWNER AND OPERATOR OF ALL EXISTING PROJECT FACILITIES AND EITHER OWNS OR HAS RIGHTS TO ALL PROJECT LANDS.
5. THE PROJECT BOUNDARY WAS DEVELOPED BASED ON THE SURVEY DRAWINGS DATED FEBRUARY 25, 2009. PORTIONS OF THE PROJECT BOUNDARY ARE BASED ON ELEVATION 165.7 FEET (NAVD 88).

EXHIBIT G

LOWER BARKER HYDROELECTRIC PROJECT

PROJECT BOUNDARY MAP FERC No 2808

KEI (MAINE) POWER MANAGEMENT, INC

SHEET 1 of 1

0 100 200 400 Feet

1 inch = 200 feet at 24"x36"

Path: G:_Client_Data\KEI\Lower Barker_MXD\Exhibit_G\Project_Boundary_Map_10202016.mxd

EXHIBIT H

LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)
DRAFT
EXHIBIT H
DESCRIPTION OF PROJECT MANAGEMENT AND NEED FOR PROJECT POWER

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 INFORMATION TO BE SUPPLIED BY ALL APPLICANTS 2-1
- 2.1 PLANS AND ABILITY OF THE APPLICANT TO OPERATE AND MAINTAIN THE PROJECT 2-1
  - 2.1.1 PLANS TO INCREASE CAPACITY OR GENERATION 2-1
  - 2.1.2 PLANS TO COORDINATE THE OPERATION OF THE PROJECT WITH OTHER WATER RESOURCE PROJECTS 2-1
  - 2.1.3 PLANS TO COORDINATE THE OPERATION OF THE PROJECT WITH OTHER ELECTRICAL SYSTEMS 2-2
- 2.2 NEED FOR THE ELECTRICITY GENERATED BY THE PROJECT 2-2
  - 2.2.1 THE REASONABLE COSTS AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER 2-2
  - 2.2.2 INCREASE IN COSTS IF THE LICENSEE IS NOT GRANTED A LICENSE 2-2
  - 2.2.3 EFFECTS OF ALTERNATIVE SOURCES OF POWER 2-3
- 2.3 NEED, REASONABLE COST AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER 2-3
- 2.4 EFFECT OF POWER ON APPLICANT'S INDUSTRIAL FACILITY 2-3
- 2.5 NEED OF THE TRIBE FOR ELECTRICITY 2-3
- 2.6 IMPACTS ON THE OPERATIONS AND PLANNING OF THE LICENSEE'S TRANSMISSION SYSTEM OF RECEIVING OR NOT RECEIVING THE LICENSE 2-3
- 2.7 STATEMENT OF NEED FOR MODIFICATIONS TO EXISTING PROJECT FACILITIES OR OPERATIONS 2-4
- 2.8 CONSISTENCY WITH COMPREHENSIVE PLANS 2-4
  - 2.8.1 OVERVIEW 2-4
  - 2.8.2 FERC APPROVED STATE OF MAINE AND FEDERAL COMPREHENSIVE PLANS 2-4
  - 2.8.3 RELEVANT RESOURCE MANAGEMENT PLANS 2-14
- 2.9 FINANCIAL AND PERSONNEL RESOURCES 2-15
- 2.10 NOTIFICATION OF AFFECTED LANDOWNERS 2-15
- 2.11 APPLICANT'S ELECTRICITY CONSUMPTION EFFICIENTLY IMPROVEMENT PROGRAM 2-15
- 2.12 INDIAN TRIBES AFFECTED BY THE PROJECT 2-15

3.0 INFORMATION TO BE PROVIDED BY AN APPLICANT WHO IS AN EXISTING LICENSEE 3-1

3.1 MEASURES PLANNED TO INSURE SAFE MANAGEMENT, OPERATION AND MAINTENANCE OF THE PROJECT 3-1
3.2 CURRENT OPERATION OF THE PROJECT 3-1
3.3 PROJECT HISTORY 3-1
3.4 LOST GENERATION DUE TO UNSCHEDULED OUTAGES 3-2
3.5 LICENSEE'S RECORD OF COMPLIANCE 3-2
3.6 ACTIONS AFFECTING THE PUBLIC 3-2
3.7 OWNERSHIP AND OPERATING EXPENSES THAT WOULD BE REDUCED IF THE LICENSE WERE TRANSFERRED 3-2
3.8 ANNUAL FEES FOR USE OF FEDERAL OR NATIVE AMERICAN LANDS 3-2

4.0 REFERENCES 4-1

TABLE 2-1 KEI (MAINE) OWNED AND OPERATED PROJECTS IN MAINE 2-1
TABLE 2-2 LIST OF RESOURCE MANAGEMENT PLANS POTENTIALLY RELEVANT TO THE LOWER BARKER PROJECT 2-15

LOWER BARKER HYDROELECTRIC PROJECT
(FERC NO. 2808)

EXHIBIT H
DESCRIPTION OF PROJECT MANAGEMENT AND NEED FOR PROJECT POWER

KEI (MAINE) POWER MANAGEMENT (III) LLC

1.0 INTRODUCTION

The Lower Barker Hydroelectric Project (Project) is an existing, licensed 1,200 MW generating facility owned and operated by KEI (Maine) Power management (III) LLC [KEI Maine]. The project is located in Androscoggin County, Maine, approximately 3,000 feet upstream from the confluence of the Little Androscoggin River with the Androscoggin River in the city of Auburn, Maine. Project works include a concrete dam with spillway, non-overflow stoplog and gate sections; a power canal, intake and gate house; an underground concrete penstock; a transformer and substation; and a powerhouse containing one turbine generator unit. The project boundary generally includes the dam, bypass reach, buried penstock, and the powerhouse. The Lower Barker hydroelectric Project operates as a run-of-river facility with a continuous minimum flow of 20 cfs is conveyed to the bypass reach. Inflows less than 170 cfs (minimum hydraulic capacity plus minimum flows) are passed at the dam. Flows in excess of 500 cfs (maximum hydraulic capacity plus minimum flows) are likewise spilled.

2.0 INFORMATION TO BE SUPPLIED BY ALL APPLICANTS

2.1 PLANS AND ABILITY OF THE APPLICANT TO OPERATE AND MAINTAIN THE PROJECT

2.1.1 PLANS TO INCREASE CAPACITY OR GENERATION

KEI (Maine) has no plans to increase the capacity or generation of the Project.

2.1.2 PLANS TO COORDINATE THE OPERATION OF THE PROJECT WITH OTHER WATER RESOURCE PROJECTS

KEI (Maine) owns and operates fifteen operating hydroelectric projects located in Maine (Table 2-1). KEI (Maine) owns two hydroelectric dams on the Little Androscoggin River located upstream of the Lower Barker Project: Upper Barker (FERC No. 3562) and Mechanic Falls (FERC No. 11482). All KEI (Maine) dams in this system operate in a run-of-river mode, and therefore the Project operates independently of other facilities on the river.

TABLE 2-1 KEI (MAINE) OWNED AND OPERATED PROJECTS IN MAINE

PROJECT	FERC STATUS	NAME OF WATERWAY
Browns Mill	Exempted	Piscataquis River
Damariscotta	Licensed	Damariscotta Lake
Eustis	Licensed	North Branch Dead River
Gardiner	Licensed	Cobbosseecontee Stream
Greenville	Non-Jurisdictional	Wilson Stream
Lower Barker	Licensed	Little Androscoggin River
Mechanics Falls	Licensed	Little Androscoggin River
Milo	Exempted	Sebec River
Norway	Non-jurisdictional	Pennesseewassee Stream
Pittsfield	Licensed	Sebasticook River
Pumpkin Hill	Licensed	Passadumkeag River
South Berwick	Non-jurisdictional	Great Works River

PROJECT	FERC STATUS	NAME OF WATERWAY
Upper Barker	Licensed	Little Androscoggin River
New Dam	Non-jurisdictional	Mousam River
Old Falls	Non-jurisdictional	Mousam River

2.1.3 PLANS TO COORDINATE THE OPERATION OF THE PROJECT WITH OTHER ELECTRICAL SYSTEMS

Power generated by the Projects is sold to Central Maine Power (CMP), a utility delivering electricity to customers in central and southern Maine. CMP is a participant in the Independent System Operator (ISO) New England. ISO New England operates as a not-for-profit corporation that coordinates the movement of wholesale electricity, administers the wholesale market, and conducts power system planning for Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and most of Maine.

2.2 NEED FOR THE ELECTRICITY GENERATED BY THE PROJECT

2.2.1 THE REASONABLE COSTS AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER

The Lower Barker Hydroelectric Project generates renewable power where electrical output from the Project is sold to CMP. The replacement of energy and capacity provided by the Project (approximately 5,293 MWh annually) would likely be met through other sources in the ISO New England regional market. Alternative sources are likely to be fossil-fired generating units, whose fuel and other variable costs would be significantly higher than those of the Project.

2.2.2 INCREASE IN COSTS IF THE LICENSEE IS NOT GRANTED A LICENSE

If KEI (Maine) is not granted a license, this Project would cease to provide affordable, clean electricity to the CMP and to the ISO New England market. An unquantified increase in costs may occur to the Northeast electric customer if a license for continued operation of the Project was not granted.

2.2.3 EFFECTS OF ALTERNATIVE SOURCES OF POWER

2.2.3.1 EFFECTS ON LICENSEE'S CUSTOMERS

This section is not applicable to KEI (Maine) since the Licensee is a wholesale supplier.

2.2.3.2 EFFECT ON LICENSEE'S OPERATING AND LOAD CHARACTERISTICS

KEI (Maine) is an independent power producer and does not maintain a separate transmission system which could be affected by replacement or alternative power sources.

2.2.3.3 EFFECT ON COMMUNITIES SERVED BY THE PROJECT

See the discussion above in Sections 2.2.1, *The Reasonable Costs and Availability of Alternative Sources of Power*, and 2.2.2, *Increase in Costs if the Licensee is not Granted a License*, regarding the loss of the Project's generation. Because the Licensee cannot predict with any certainty the actual type or location of a potential alternative facility providing replacement power, they cannot specifically discuss potential effects on any particular community.

2.3 NEED, REASONABLE COST AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER

KEI (Maine) is an independent power producer and as such does not prepare load and capacity forecasts in reference to any group or class of customers. Rather, ISO New England provides such services.

2.4 EFFECT OF POWER ON APPLICANT'S INDUSTRIAL FACILITY

This section is note applicable as KEI (Maine) does not use electricity generated on-site for powering the Project or any other KEI (Maine) facility.

2.5 NEED OF THE TRIBE FOR ELECTRICITY

This section is not applicable as KEI (Maine) is not an Indian tribe.

2.6 IMPACTS ON THE OPERATIONS AND PLANNING OF THE LICENSEE'S TRANSMISSION SYSTEM OF RECEIVING OR NOT RECEIVING THE LICENSE

This section is not applicable as KEI (Maine) does not operate a transmission system.

2.7 STATEMENT OF NEED FOR MODIFICATIONS TO EXISTING PROJECT FACILITIES OR OPERATIONS

KEI (Maine) is proposing a 50 cfs, or inflow if less, minimum flow in the bypassed reach for protection of aquatic habitat. KEI (Maine) is also proposing to develop improvements to the existing downstream fish passage in accordance with appropriate agencies to enhance survival of downstream migrating fish.

2.8 CONSISTENCY WITH COMPREHENSIVE PLANS

2.8.1 OVERVIEW

Section 10(a)(2) of the Federal Power Act (FPA) requires the Federal Energy Regulatory Commission (FERC or Commission) to consider the extent to which a project is consistent with Commission approved federal and state comprehensive plans for improving, developing, and conserving waterways affected by the project. In accordance with Section 10(a)(1) of the FPA, the list of Commission approved federal and state comprehensive plans was reviewed to determine applicability to the Project. The federal resource agencies, as well as the State of Maine, have prepared a number of comprehensive plans, which provide a general assessment of a variety of environmental conditions in Maine. In addition, the State of Maine's plans include policies related to ensuring that the State's energy needs are met and supporting hydropower, a renewable and indigenous source, as a valuable portion of the energy mix. These plans also address water quality, water pollution control, wetlands, recreation, and land management issues. The Project's consistency with FERC-approved state and federal comprehensive plans is discussed below. Comprehensive Plans listed below have not been updated since their development unless otherwise noted. FERC currently lists 28 comprehensive plans for the State of Maine.

2.8.2 FERC APPROVED STATE OF MAINE AND FEDERAL COMPREHENSIVE PLANS

Note: Unless otherwise noted, these plans have not been updated or updates have not been submitted to FERC for approval since their development dates.

2.8.2.1 STATE OF MAINE COMPREHENSIVE PLANS

Maine State Planning Office. 1987. Maine comprehensive rivers management plan. Augusta, Maine. May 1987

In 1982, the Maine State Planning Office submitted to FERC the Maine Comprehensive Rivers Management Plan, which was comprised of two volumes and approved by FERC in October 1982. In 1987, the Maine State Planning Office (MSPO, eliminated in July 2012) submitted to FERC a three-volume update to the Comprehensive Rivers Management Plan. Volumes 1 and 2 of the Plan included the Comprehensive Hydropower Plan and Executive Department Orders and other river-related plans. Volume 3 of the Plan, included in the updated submittal in 1987, contained hydro-related core laws, Executive Orders, and other plans. In 1992 and 1993, the State of Maine produced Volumes 4 and 5 of the Comprehensive Rivers Management Plan, respectively.

State of Maine Comprehensive River Management Plan – December 1992 – Volume 4, Part I

Volume 4 of the State of Maine Comprehensive River Management Plan consists of three sections. Part I is a summary of the revised Core Hydro Laws subsequent to those contained in Volume 3 which were approved in 1987.

The revisions to the Core Hydro Laws contained in Volume 4 of the Plan that are pertinent to the Project are discussed below.

<u>Special Protection for Outstanding Rivers</u>

This law identifies river segments that are protected from further hydroelectric development in the State of Maine.

The Project is not located on an Outstanding River segment, and is therefore compliant with this plan.

<u>Hydropower Relicensing Standards</u>

These standards require that existing hydropower impoundments be managed to protect habitat and aquatic life criteria commensurate with the appropriate water quality classifications. The

standards are pertinent to the Lower Barker Project in that the project area is subject to Class A water quality standards. Maine statutes at 38 M.R.S.A. subsection 464(10) clarifies that hydropower projects with riverine impoundments must satisfy the aquatic life criteria contained in 38 M.R.S.A. subsection 465(4)(c), which states that the receiving waters shall be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.

The Lower Barker Project is consistent with the Hydropower Relicensing Standards in that operation of the project impoundment supports all species of indigenous fish and maintains the structure and function of the resident biological community (see Exhibit E, Section 4.5 for details).

State of Maine Comprehensive River Management Plan – December 1992 – Volume 4, Part II – Compilation of Executive Orders and Other Plans

Part II is a compilation of Executive Orders and other plans including Maine resource agency policy regarding hydropower. Part II of Volume 4, Implementing Plans and Orders, contains State resource agency plans and policies regarding hydropower. The following plans and orders are discussed:

State of Maine Statewide River Fisheries Management Plan, June 1982

This Plan is discussed previously under State of Maine Comprehensive Rivers Management Plan, May 1987 – Volume 1.

Lower Kennebec River Anadromous Fish Restoration Plan and Inland Fisheries Management Overview, August 1986

This Plan provides site-specific fish restoration recommendations for particular hydro facilities on the Lower Kennebec River and is not directly applicable to the Lower Barker Project.

Maine Comprehensive Hydropower Plan, July 1992

This Plan assessed the then current and future demand for hydropower in the State of Maine. Hydropower is recognized as a significant resource available for use in meeting current and

future energy needs. The Plan also considers the potential for storage facilities to be developed as generating hydro facilities.

Operation of the Lower Barker Project is consistent with this Plan as it will continue to produce reliable, efficient indigenous energy from hydropower to meet the State of Maine energy needs.

Maine State Agency Hydropower Policy Statements

These policy statements provide the basis for agency comments on hydro-project license applications.

These statements are not directly applicable to the Lower Barker Project as they set out the policy for State agencies to follow in commenting on hydro projects in general. Agency comments on the Project are addressed in the appropriate sections of Exhibit E.

Executive Order Designating the State Agencies Responsible for Water Quality Certification

This order identifies MDEP as the agency responsible for reviewing and providing water quality certification.

The Licensees will apply for water quality certification from MDEP. A date stamped receipt of delivery of the 401 Water Quality Certification Application to MDEP will be provided in Appendix E4-1. Project water quality is discussed in Exhibit E, Section 4.4.1.2.

Feasibility Study of Maine's Small Hydropower Potential

This study was performed for the MOER and examined the potential for development/expansion of hydropower development of Maine's low head dams.

This Plan is not applicable to the Lower Barker Project.

Maine Hydropower Licensing and Relicensing Status Report 1989-91

These reports update hydropower licensing and relicensing activities in the State of Maine for 1989 through 1991.

Lower Barker Project relicensing began after this report was written and is not included in this summary of licensing activities.

State of Maine Comprehensive River Management Plan – December 1992 – Volume 4, Part III – Hydropower and Relicensing Reports and Studies

This section of Volume 4 of the State of Maine Comprehensive River Management Plan described the regulations for hydropower relicensing and reported the status of Maine projects with regard to the federal relicensing process.

The studies and reports contained in Part III of the State of Maine Comprehensive River Management Plan are not pertinent to the Lower Barker Project.

Maine Atlantic Sea-Run Salmon Commission, Management of Atlantic salmon in the State of Maine: A Strategic Plan – July 1984.

This Plan lists as its objectives the maintenance of Atlantic salmon populations in rivers where they currently exist, and the restoration of Atlantic salmon populations in historical salmon rivers. The plan also identifies specific strategies to achieve the stated objectives, including fishway installation or improvement, increased hatchery capacity, and diversion of hatchery stocks once natural reproduction increases in stocked rivers.

Maine Department of Conservation, Bureau of Parks and Lands, Maine State Comprehensive Outdoor Recreation Plan (SCORP) 2014-2019.

The 2014-2019 SCORP is included in the FERC Comprehensive Plan. This Plan serves as the State's official policy document for statewide outdoor recreation planning and for acquisition and development of public outdoor recreation areas and facilities. The plan identifies outdoor recreation issues of Statewide importance based upon, but not limited to, input from the public participation program and also provides information about the demand for and supply of outdoor recreation resources and facilities in the state. The SCORP satisfies the requirements of the Land and Water Conservation Fund (LWCF) Act (P.I. 88-578) which dictates that each state have an approved SCORP available on file with the National Park Service in order to participate in the LWCF program. The SCORP contains an implementation program that identifies the State's strategies, priorities, and actions for the obligation of its LWCF apportionment. The SCORP also includes a wetlands priority component with Section 303 of the Emergency Wetlands Resources

Act of 1986. This wetland component provides information on state wetland conservation planning efforts as reflected in the Maine Wetlands Priority Conservation Plan published in 1988.

The SCORP does not contain any recommendations or assessments that are specific to the Lower Barker Project area.

Maine Department of Conservation, Maine Rivers Study-final report. August, Maine. May 1982.

Under the Energy Policy for the State of Maine, Maine rivers have been inventoried and analyzed to identify important river areas and to rank these areas according to their overall significance as unique and or multiple value natural and recreation resources. This Policy was set forth to develop a strategy for the protection of these areas.

Rivers, river segments and related tributaries identified as possessing significant natural and recreation resources values were placed in one of four significant categories (identified as A, B, C, and D).

> A List: Rivers and related corridors possessing a composite natural and recreational resource value with greater than state significance.
>
> B List: Rivers and related corridors possessing a composite natural and recreational resource value with outstanding statewide significance.
>
> C List: River and river-related corridors or specific areas possessing a composite natural and recreational resource value with state-wide significance
>
> D List: Rivers and river-related corridors or specific areas possessing natural and recreational values with regional significance.

The Lower Barker Project is not targeted by this plan.

2.8.2.2 FERC-APPROVED FEDERAL COMPREHENSIVE PLANS

Atlantic States Marine Fisheries Commission, Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon (*Acipenser oxyrhynchus oxyrhynchus*). (Report No. 31) July 1998.

Implementation of Amendment 1 is designed to result in stock recovery, with consequent ecological and economic benefits to coastal ecosystems and fishermen. Recovery of the stock should reestablish Atlantic sturgeon as a unique component of east coast rivers, estuaries and the Atlantic Ocean. Management of a restored and recovered population of Atlantic sturgeon will establish and maintain, subsequent to stock recovery in the future, fishing mortality targets and a fishery monitoring program that should: allow managed exploitation; increase market stability; stabilize commercial, and possibly recreational, landings (within the limits of environmental variability in recruitment); and reduce the risk of recruitment failure.

Although the Androscoggin River it recognized as one of the remaining rivers to have spawning occur, the Little Androscoggin is not targeted to be part of the stock recovery.

Atlantic State Marine Fisheries Commission, Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35) April 1999.

Amendment 1 to the Interstate Fishery Management Plan for Shad and River Herring was approved in April 1999. More than a decade of declines in commercial landings culminated in the development of Amendment 1 to “protect, enhance, and restore east coast migratory spawning stocks of American shad, hickory shad, and river herrings in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass”. In order to achieve this goal, the FMP requires a number of fishery independent and fishery-dependent monitoring programs as well as stocking and hatchery operations. These include, but are not limited to calculation of annual mortality rate, assessment of spawning stocks, and analysis of mixed stock contribution to ocean landings. Implementation schedules require the states to submit fishing recovery plans for approval by the Management Board by July 1,1999. In addition, the states are required to submit annual reports detailing the results of the fishery-dependent and fishery independent monitoring.

Prespawning adult American shad are stocked in the Androscoggin and Kennebec Rivers, American shad fry are being stocked in the Kennebec, Medomak, and Saco Rivers. No restoration plan has been prepared for the Little Androscoggin River. The Lower Barker project is not targeted by this plans.

Atlantic State Marine Fisheries Commission, Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.

This Addendum was prepared upon review by the Shad and River Herring Management Board, the Board concurred with the Technical Committee's report and suggested that a technical addendum be developed to address each of the components identified for correction.

As stated below, the Lower Barker project is not targeted by this addendum.

Atlantic State Marine Fisheries Commission, Technical Amendment 2 of the Interstate Fishery Management Plan for shad and river herring. Arlington, Virginia. May 2009.

This Amendment was prepared under the guidance of the Atlantic States Marine Fisheries Commission's Shad and River Herring Management Board. Technical assistance was provided by the Shad and River Herring Technical Committee, the River Herring Stock Assessment Subcommittee, and the Shad and River Herring Advisory Panel.

The Atlantic States Marine Fisheries Commission (ASMFC) developed Amendment 3 to its Interstate Fishery Management Plan (or FMP) for Shad and River Herring under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA 1993). Amendment 3 addresses only management measures for American shad. Management measures for alewife and blueback herring (collectively called river herring) are contained in Amendment 2. Shad and river herring management authority lies with the coastal states and is coordinated through the Commission.

The Lower Barker project is not targeted by this amendment.

Interstate Fishery Management Plan for American eel (Anguilla rostrata) (Report No. 36). – 2000 Atlantic States Marine Fisheries Commission. Addendum I-III

The goals of this plan are to protect and enhance the number of American eel in the inland waters of Atlantic states and to provide a sustainable fishery by preventing overharvesting of eels of any life stage. The Plan obligates Maine to instate a management plan and implement the requirements therein.

At this time the individual numbers of American eel observed at the Lower Barker Project are very low in comparison to other nearby project developments, as discussed in Exhibit E.

Atlantic Salmon Restoration in New England, Final Environmental Impact Statement 1989-2021. U.S. Fish and Wildlife Service, 1989

This document discusses the stated aim of the United States Fish and Wildlife Service (USFWS) relative to Atlantic salmon (i.e., the restoration of self-sustaining populations of Atlantic salmon by the year 2021 to several rivers).

The Lower Barker Project is not targeted by these restoration plans, including regarding the requirement for providing anadromous fish passage.

Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service (Policy)

This policy, under the auspices of the 1988 National Recreational Fisheries Policy (National Policy), encompasses the guiding principles, goals, and objectives set forth by the National Policy. The Policy defines the USFWS's stewardship role in management of the Nation's recreational fishery resources, which include not only angling, but fish watching and photographing. With the Fisheries USA, USFWS committed to accomplish three goals:

- Usability – to optimize the opportunities for people to enjoy the Nation's recreational fisheries.
- Sustainability – to ensure the future of quality and quantity of the Nation's recreational fisheries; and
- Action – to work in partnership with other Federal governmental agencies, states, tribes, conservation organizations, and the public to effectively manage the Nation's recreational fisheries.

The Licensees is proposing a minimum flow of 50 cfs, or inflow if less and to consult with agency to identify appropriate improvements to the existing downstream fish passage, which in turn will help ensure the overall healthy fishery. Exhibit E describe the existing fish resource and recreational opportunities the Project provides.

Nationwide Rivers Inventory (National Park Service, January 1982, updated 1995)

In 1981, the "Nationwide Rivers Inventory (NRI)," was completed for the New England Region. It is a survey of the nation's rivers conducted to identify segments meeting the minimum criteria for further study and/or potential inclusion into the National Wild and Scenic Rivers System (NWSRS). Once included on the NRI, a river is protected to the extent that pursuant to Section f(d) of the Wild and Scenic Rivers Act, and in accordance with a Presidential Directive and guidance in the form of "Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory," issued by the Council on Environmental Quality:

> "Each federal agency shall, as part of its normal planning and environmental review process, take care to avoid or mitigate adverse effects on Rivers identified in the Nationwide Inventory." [1]

This directive gives guidance to federal agencies on protecting the resources that cause the river to qualify for listing on the NRI.

The Project is not located on any of the river segments listed by NRI.

National Marine Fisheries Service. 1998. Final Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. December 1998.

This plans goal is to recover populations to levels of abundance at which they no longer require protection under the ESA. For each population segment, the minimum population size will be large enough to maintain genetic diversity and avoid extinction.

The Little Androscoggin is not identified with this Plan.

[1] Presidential Directive, August 2, 1979.

U.S. Fish and Wildlife Service and Canadian Wildlife Service, North American Waterfowl Management Plan – 1986

This Plan identifies waterfowl population goals and outlines the requirements of a waterfowl management and conservation program that would attain these goals. The Plan addresses 37 species of the family *Anatidae*, (i.e., ducks, geese and swans) which occur in both the United States and Canada. The Plan also discusses groups of similar species in terms of their ecological niche, distribution, abundance, breeding, population status and outlook, and causes of population declines or increases. The Plan outlines a variety of initiatives and recommendations which will enhance and protect waterfowl resources, including: financial incentives for landowners for habitat maintenance; outright purchase of significant habitat; protective zoning; private land conservation promotion; financial participation of private conservation organizations; prioritization of public land management to enhance waterfowl resources; public works planning which considers and mitigates waterfowl resource impacts; and encouragement of joint ventures between private and public groups to enhance and preserve waterfowl habitat. Specific recommendations identify areas to be preserved, bag limits, and other hunting limitations for certain species and survey activities.

The majority of initiatives and recommendations contained in this Plan are beyond the scope of the Licensee's operation of the Lower Barker Project. Continued operation of the Lower Barker Project, as proposed, will have no new effects to project wildlife or their habitats. Additionally, the Licensee's proposal to protect and maintain the fishery and botanical resources, both of which represent potential forage sources for waterfowl, are identified in Exhibit E.

2.8.3 RELEVANT RESOURCE MANAGEMENT PLANS

In addition to the qualifying Federal, state, and Tribal comprehensive waterway plans listed in Section 2.8.2, some resource agencies have developed resource management plans to help guide their actions regarding specific resources of jurisdiction. The resource management plans listed in Table 2-2 may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions.

TABLE 2-2 LIST OF RESOURCE MANAGEMENT PLANS POTENTIALLY RELEVANT TO THE LOWER BARKER PROJECT

RESOURCE	MANAGEMENT PLANS
Fisheries	Maine Department of Marine Resources (MDMR). 2010. Androscoggin River Anadromous Fish Restoration Program. March 30, 2010.
Recreation, Land Use	Androscoggin Valley Council of Governments (AVCOG). 2009. Western Maine Regional Open Space Policy. May 2009.
Land Use	City of Auburn. 2011. City of Auburn Comprehensive Plan 2010 Update. April 2011.
Land Use	City of Lewiston. 1997. Comprehensive Plan. May 1997.
Recreation, Land Use	City of Auburn. 2009. New Auburn Master Plan.

2.9 FINANCIAL AND PERSONNEL RESOURCES

KEI (Maine) has considerable experience operating not only the Lower Barker Project but also other hydroelectric projects located in the State of Maine. KEI (Maine) staff are experienced in the operation of hydroelectric projects; the majority of staff have more than 10 years of service with hydroelectric projects, and several staff have more than 15 years of service with hydroelectric plants.

Information regarding the Project's expected annual costs and value are provided in Exhibit A of this License Application.

2.10 NOTIFICATION OF AFFECTED LANDOWNERS

KEI (Maine) does not propose to expand the Project to encompass additional lands of others. Therefore, notification of adjacent landowners will not be made beyond every property owner of record of any interest in the property within the bounds of the Project per CFR 18 § 4.32 A.

2.11 APPLICANT'S ELECTRICITY CONSUMPTION EFFICIENTLY IMPROVEMENT PROGRAM

Because KEI (Maine) is an independent power producer, this section is not applicable to the Project.

2.12 INDIAN TRIBES AFFECTED BY THE PROJECT

There are no Indian tribes affected by the Project.

3.0 INFORMATION TO BE PROVIDED BY AN APPLICANT WHO IS AN EXISTING LICENSEE

3.1 MEASURES PLANNED TO INSURE SAFE MANAGEMENT, OPERATION AND MAINTENANCE OF THE PROJECT

The existing Lower Barker Hydroelectric Project is classified as a low hazard project and KEI (Maine) is exempt from filing an Emergency Action Plan with the Commission. Due to the low hazard classification of this dam, no Potential Failure Mode Analysis has been conducted at this site and therefore no Potential Failure Modes have been identified. The Dam Safety Surveillance and Monitoring Program and Report (DSSMP) defines the appropriate monitoring for the water retaining project works. The DSSMP for the Project was filed with the FERC in February 2011.

During flood conditions the dam flashboards are designed to fail when subjected to a load equivalent to two feet or more. A description of Project operations may be found within Exhibit A of this License Application.

KEI (Maine)'s regard for public safety is demonstrated by the installation of public safety devices at the Lower Barker Dam. The Commission approved the Public Safety Plan on January 11, 1993. KEI (Maine) maintains fences, handrails, a locked entrance gate and warning signs to protect the public from the hazards of project operations. KEI (Maine) also seasonally installs a boat barrier before May 31 and removes the barrier by October 12 annually. According to the most recent FERC Environmental Inspection Report (issued April 8, 2011), KEI (Maine) was reported to be in compliance with its requirements with regard to public safety.

3.2 CURRENT OPERATION OF THE PROJECT

A description of the Project operation is contained in Exhibit A of this License Application.

3.3 PROJECT HISTORY

The Little Androscoggin Water-Power Co. completed its first dam on the Little Androscoggin River in 1871. Prior to commencing construction the company purchased 121.4 hectares (ha) (300 acres [ac.]) of land from the mouth of the Little Androscoggin River out a mile on both river banks, which include in the now Project Area (Gray & Pape 2016).

Little Androscoggin Water-Power Co. started land development of the Lower Barker Dam in 1872 and by 1874 the Lower Barker dam was providing power for the textile mill. Thirty-three years after production, the existing wooden dam was replaced with concrete (Gray & Pape 2016).

3.4 LOST GENERATION DUE TO UNSCHEDULED OUTAGES

[***To be provided in the final License Application***]

3.5 LICENSEE'S RECORD OF COMPLIANCE

The Project has a good record of compliance with the terms and conditions of the existing license. A review of the Licensees' records indicates no violations of the terms and conditions of the license. In addition, the Licensee has not received any communication from the Commission indicating possible noncompliance.

3.6 ACTIONS AFFECTING THE PUBLIC

The licensee is not proposing any action that directly affects the public. Further information on public safety can be found in Section 3.1 and Exhibit A, Section 10.0.

3.7 OWNERSHIP AND OPERATING EXPENSES THAT WOULD BE REDUCED IF THE LICENSE WERE TRANSFERRED

KEI (Maine) is applying for a long-term license to continue to maintain and operate the Project. Additionally, there is no competing application to take over the Project. Because there is no proposal to transfer the Project license, this section is not applicable to the Project.

3.8 ANNUAL FEES FOR USE OF FEDERAL OR NATIVE AMERICAN LANDS

This section is not applicable to the Project since it uses no Federal or Native American lands.

4.0 REFERENCES

Federal Energy Regulatory Commission (FERC). 2015. List of Comprehensive Plans. August, 2015. [Online] URL: http://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf. Accessed June 23, 2016.

Gray & Pape, Inc. (Gray & Pape). February 2016. Phase I Pre-Contact Period Archaeological Sensitivity Assessment for the Lower Barker Hydroelectric Project Relicensing, Auburn, Androscoggin County, Maine.