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June 8, 2023

U.S. Environmental Protection Agency, Region 1 ATTN: George Papadopoulos, HYDROGP Coordinator 5 Post Office Square – Mailcode 06-1 Boston, MA 02109-3912

Email: <u>Hydro.GeneralPermit@epa.gov</u>

Subject: Notice of Intent (NOI) Applications for Coverage under the EPA Region 1 Hydroelectric Generating Facilities General Permit (Hydro GP) for Facilities in New Hampshire

Dear Mr. Papadopoulos:

On behalf of the following FERC licensees, please see the attached NOI applications for the following facilities located along the Androscoggin River in New Hampshire:

#### Great Lakes Hydro America, LLC

- Cascade Hydro NPDES Permit No. NHG360010
- Cross Hydro NPDES Permit No. NHG360009
- Gorham Hydro NPDES Permit No. NHG360011
- Riverside Hydro NPDES Permit No. NHG0008
- Sawmill Hydro NPDES Permit No. NHG360007
- Shelburne Hydro NPDES Permit No. NHG0012

#### Errol Hydroelectric Company, LLC

• Errol Hydro – NPDES Permit No. NHG360016

#### Pontook Operating LP

• Pontook Hydro – NPDES Permit No. NHG36006

Per Section 6.7 of the 2023 Hydro GP, copies of these NOI applications were also provided to the New Hampshire Department of Environmental Services (NHDES).

Should questions arise or additional information be desired, please do not hesitate to contact me at 207.829.5016.

Sincerely,

SEVEE & MAHER ENGINEERS, INC.

Philip H. Gerhardt, P.E. Principal/Senior Environmental Engineer

cc: Hayley Franz (Hayley.Franz@des.nh.gov), Theresa Ptak (Teresa.Ptak@des.nh.gov), NHDES

# Request for General Permit Authorization to Discharge Wastewater Notice of Intent (NOI) to be covered by Hydroelectric Generating Facilities General Permit (HYDROGP) No. MAG360000 or NHG360000

Indicate Applicable General Permit for Discharge(s):

### ■ NHG360000

#### **A. Facility Information**

1. Facility Location	Name: Riverside Hydro		
	Street: 380 Main Street		
	City: Berlin	State: New Hampshire	
	Zip: 03570	SIC Code: 4911	
	Latitude: 44º 28' 21.91" N	Longitude: 71° 10' 30.96" W	
	Type of Business: Hydroelectric Generating Facility		
2. Facility Mailing Address (if different from Location)	Street: 972 Main Street		
	City: Berlin	State: New Hampshire	
	Zip: 03570		
3. Facility Owner	Name: Great Lakes Hydro America LLC	Email: Patrick.McDonough@brookfieldrenewable.com	
	Street: 972 Main Street	Telephone: 207-376-7063	

	City: Berlin	State: New Ham	pshire	
	Contact Person: Patrick McDonough	Zip: 03570		
4. Facility Operator (if different from above)	Name:	Email:		
	Street:	Telephone	2:	
	City:	State:		
	Zip:			
5. Current Permit Status	Has prior HYDROGP coverage been granted discharge(s) listed in the NOI?	for the	Yes	🗆 No
	Permit number (if yes): NHG360008			
	Is the facility covered under an Individual Per	mit?	□ Yes	No
	Is there a pending NPDES application of file v for the discharge(s)?	with EPA	□ Yes	No
	Date of Submittal (if yes):	Pern	nit Number (if	known):
	Attach a topographic map indicating the location the facility and outfall(s) to the receiving water		Map .	Attached
	Number of turbines: 2			
	Combined turbine discharge (installed capacity) at:		nm capacity? m capacity?	1,910 ${ m cfs}$ 900 (estimated) ${ m cfs}$
	Is this facility operated as a pump storage proj	ect?	□ Yes	No No

# **B. Discharge Information**

	e of Receiving Water(s):		Freshwater	□ Marine
Androso	coggin River			
2. Wate	body classification: $\Box$ Class A	Class B Class SA	Class SB	
	s the receiving water is listed in the State's In 03(d))?	tegrated List of Waters (i.e., CWA Section	Yes	□ No
iı	The applicant answered yes to B.3, has the applicant answered yes to B.3, has the applicated, any pollutants indicated, and whether adicated pollutants in a separate attachment to	5	Yes	🗆 No
10	ttach a line drawing or flow schematic show ocation of intake(s), operations contributing to ecciving water(s).	0 0 0	Line Drawi	ing Attached
n		harging effluent from the following categories and charge type. See Parts 1.1 through 1.5 (for MA) or scharge type.		
	Equipment-related cooling water	Outfalls: 20-A - This outfall discharges NCCW and water collected in the turbine sumps	70,000 g	gpd
	Equipment and floor drain water	Outfalls:	£	gpd
	Maintenance-related water	Outfalls: 20-B - This outfall is utilized during dewatered inspections only (every 3-5 years)	Intermittent §	gpd
	Facility maintenance-related water during flood/high water events	Outfalls:	£	gpd
	Equipment-related backwash strainer water	Outfalls:	Ę	gpd

alternative pH effluent li	ove, provide the following information (attach addition mits. See Parts 1.7.1. and 2.7.1 of the permit for addition formation and protocol to request alternative pH efflo	
Outfall No. 20-A	Latitude: 44º 28' 21.91" N	Longitude: 71° 10' 30.96" W
	Discharge is: ■ Continuous □ Inte	ermittent 🗆 Seasonal
	Maximum Daily Flow 0.07 MGD	Average Monthly Flow0.07 MGD
	Maximum Daily Temperature 50.1 °F	Average Monthly Temperature44.9 °F
	Maximum Daily Oil & Grease<5 mg/L	Average Monthly Oil & Grease<5 mg/L
	Maximum Monthly pH 6.70 s.u.	Minimum Monthly pH 6.67 s.u.
	Alternative pH limits requested? ■Yes □ No	State approval attached? ■ Yes □ No
Outfall No. 20-B	Latitude: 44º 28' 21.91" N	Longitude: 71° 10' 30.96" W
	Discharge is:  Continuous  Inte	ermittent 🗆 Seasonal
	Maximum Daily Flow Intermittent MGD	Average Monthly Flow Intermittent MGD
	Maximum Daily Temperature N/A °F	Average Monthly Temperature N/A °F
	Maximum Daily Oil & Grease N/A mg/L	Average Monthly Oil & Grease N/A mg/L
	Maximum Monthly pH N/A s.u.	Minimum Monthly pH N/A s.u.
	Alternative pH limits requested? ■Yes □ No	State approval attached? ■ Yes □ No

Outfall No.	Latitude:	Longitude:
	Discharge is:  Continuous  Inte	rmittent 🗆 Seasonal
	Maximum Daily Flow MGD	Average Monthly Flow MGD
	Maximum Daily Temperature °F	Average Monthly Temperature °F
	Maximum Daily Oil & Grease mg/L	Average Monthly Oil & Grease mg/L
	Maximum Monthly pH s.u.	Minimum Monthly pH s.u.
	Alternative pH limits requested? $\Box$ Yes $\Box$ No	State approval attached? $\Box$ Yes $\Box$ No

# C. Best Technology Available for Cooling Water Intake Structures

Facilities that checked "equipment-related cooling" as one of the disc requirements.	harges in Part B. of this NOI are subject to the fo	ollowing	
<ol> <li>Does the facility intake water for cooling purposes subject to the BTA Requirements at Part 4 of the HYDROGP?</li> <li>If yes, indicate which technology employed to comply with the general</li> </ol>	If no, skip to Part D of this NOI. BTA requirements at Part 4.2.b of the HYDROGP:	Please see the documentatior Option 4	
<ul> <li>An existing technology (e.g., a physical or behavioral barrier, sp downstream passage that minimizes exposure to the CWIS. Has the demonstrate that the downstream fish passage effectively transport becoming impinged or entrained at the cooling water intake?</li> <li>Yes No</li> </ul>	e applicant attached a narrative description of the	e barrier to	
□An effective intake velocity at the point of cooling water withdraws penstock (for intakes located within the penstock), not to exceed 0.5 f with this intake velocity through observation of live fish in the intake minimum bypass flow? □ Yes □ No	fps. Has the applicant attached a demonstration o	of compliance	

For cooling water withdrawn directly from the source waterbody ( <i>i.e.</i> , not from within the penstock), a physical scree barrier technology with a mesh size no greater than $\frac{1}{2}$ -inch that minimizes the potential for adult and juvenile fish to be entropy of in the CWIS	
entrapped in the CWIS.	
Has the applicant attached a description of the technology? $\Box$ Yes $\Box$ No If the mesh size of the screen is greater than $\frac{1}{2}$ -inch has the applicant demonstrated that the calculated intake velocity is	a loss than
$0.5$ fps based on the screen dimensions, maximum intake volume, and source water 7Q10 low flow? $\Box$ Yes $\Box$ $\Omega$	
3. If the answer to question C.1 is yes, in addition to complying with one of the criteria above, the applicant must submit the	
information:	lonowing
Maximum daily volume of cooling water withdrawn during previous five (5) years:70,000 gpd	
Maximum monthly average volume of cooling water withdrawn during the previous five (5) years: 70,000 gpd	
Waxinium monting average volume of cooling water withdrawn during the previous rive (3) years. 70,000 gpd	
	70,000 gpd
Maximum daily and average monthly volume of water used for another process before or after being used for cooling:	1
Max: 0 gpd Avg:	0 gpd
Has the applicant attached a narrative description explaining how cooling water is reused?  Yes No	
Volume of total intake water withdrawn and used in facility as a percentage of:	These values are based
	on a range of 60% - 80%
	of installed turbine
Source water annual mean flow ( <i>e.g.</i> , available from USGS, MassDEP, or NHDES): 1925 cfs	capacity
Source water 7-day mean low flow with 10-year recurrence interval (7Q10): 758 cfs	
Volume of total intake water withdrawn and used in facility as a percentage of:	
Source water mean annual flow 0.006% or 0.12 cfs	
Source water 7Q10 flow 0.014% or 0.11 cfs	

D. Chemical Additives			
1. Does the facility use or plan to use non-toxic chemicals for pH adjustment?	🗆 Yes 🔳 No		
2. Does the facility use or plan to use chemicals for anti-freeze purposes?	🗆 Yes 🔳 No		
3. If the answer to D.2 is yes, provide the following for EACH chemical additive used for anti-freeze:			
Chemical Name and Manufacturer:			
Maximum Dosage Concentration Used:Average Dosage Concentration Used:			
Maximum Concentration in Discharge: Average Concentration in Discharge:			
mg/L mg/L			
Material Safety Data Sheet (MSDS) or other toxicity documentation for each chemical attached?  Yes No			

**E. Endangered Species Act Certification** Appendix 2 to the HYDROGP explains the certification requirements related to threatened and endangered species and designated critical habitat. Indicate under which criteria the discharge is eligible for coverage under the HYDROGP:

1.	ESA eligibility for	<b>Criterion A</b> : No endangered or threatened species or critical habitat are in proximity to the
	species under jurisdiction of USFWS	discharges or related activities or come in contact with the "action area." See Appendix 2, Part B for
		documentation requirements. Documentation attached? $\Box$ Yes $\Box$ No
		<b>Criterion B</b> : Formal or informal consultation with the USFWS under Section 7 of the ESA
		resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by USFWS on
		a finding that the discharges and related activities are "not likely to adversely affect" listed species or
		critical habitat. Has the operator completed consultation with USFWS and attached documentation?
		🗆 Yes 🔳 No
		If no, is consultation underway? 📕 Yes 🛛 No
		Criterion C: Using the best scientific and commercial data available, the effect of the discharges
		and related activities on listed species and designated critical habitat have been evaluated. Based on
		those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the

		discharges and related activities will have "no effect" on any federally threatened or endangered species or designated critical habitat under the jurisdiction of the USFWS. Has the applicant attached documentation of the "no effect" finding? $\Box$ Yes $\Box$ No
2.	ESA eligibility for species under jurisdiction of NMFS	Is the facility located on: the Connecticut River between the Massachusetts/Connecticut state line and Turners Falls, MA; the Taunton River; the Merrimack River between Lawrence, MA and the Atlantic Ocean; the Piscataqua River including the Salmon Falls and Cocheco Rivers; or a marine water?         □       Yes       No         If yes, was the applicant authorized to discharge from the facility under the 2009 HYDROGP?       No
		If the discharge is to one of the named rivers above or to a marine water <i>and</i> the facility was not previously covered under the 2009 HYDROGP, has there been any previous formal or informal consultation with NMFS?  Yes No Documentation of consultation attached?  Yes No

# F. National Historic Properties Act Eligibility

1.	Indio	cate under which criterion the discharge(s) is eligible for covered under the HYDROGP:
		Criterion A: No historic properties are present.
		Criterion B: Historic properties are present. The discharges and related activities do not have the potential to impact
		historic properties.
		Criterion C: Historic properties are present. The discharges and related activities have the potential to impact or adversely
		impact historic properties.
2.	Has	the applicant attached supporting documentation for NHPA eligibility described in Appendix 3, Part C of the HYDROGP?
		Yes 🗆 No

3.	Does supporting documentation include a written agreement from the State Historic Preservation Officer, Tribal Historic Preservation
	Officer, or other tribal representative that outlines measures the operation will carry out to mitigate or prevent any adverse
	effects on historic properties? 🗌 Yes 📕 No

#### **G.** Supplemental Information

Please provide any supplemental information, including antidegradation review information applicable to new or increased	
discharges. Attach any certifications required by the HYDROGP. Supplemental information attached? 🗖 Yes 🛛 No	

#### **H. Signature Requirements**

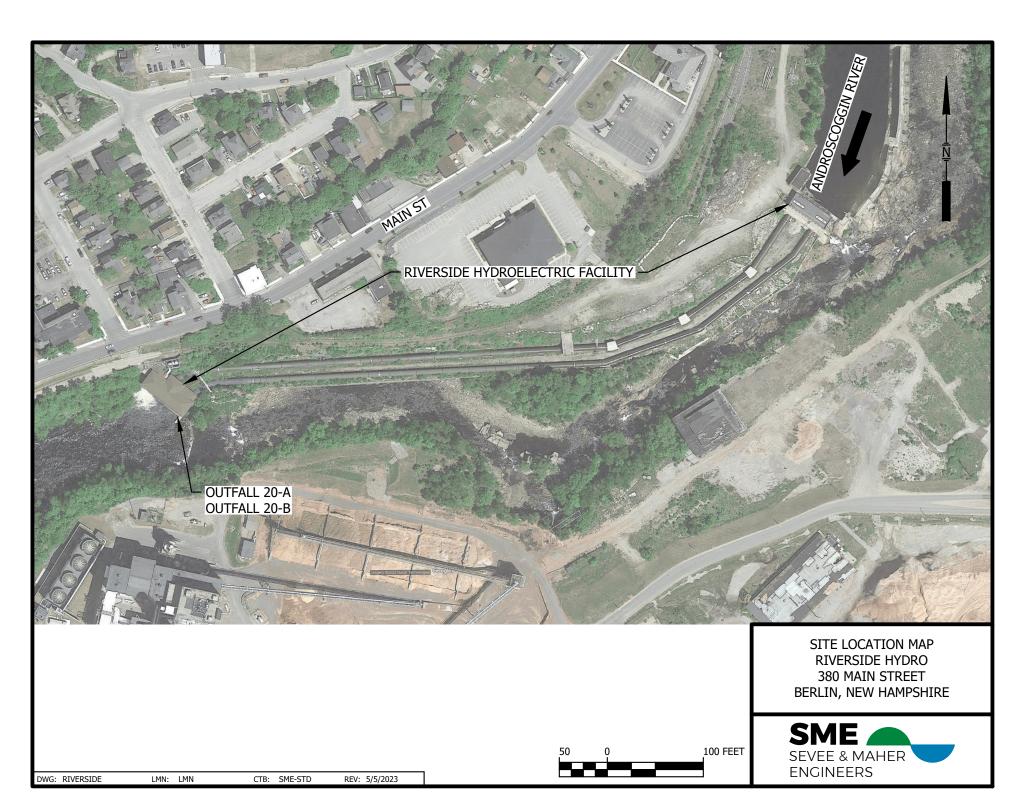
1.	The NOI must be signed by the operator in accordance with the signatory requirements of 40 C.F.R. § 122.22, including the following
	certification:

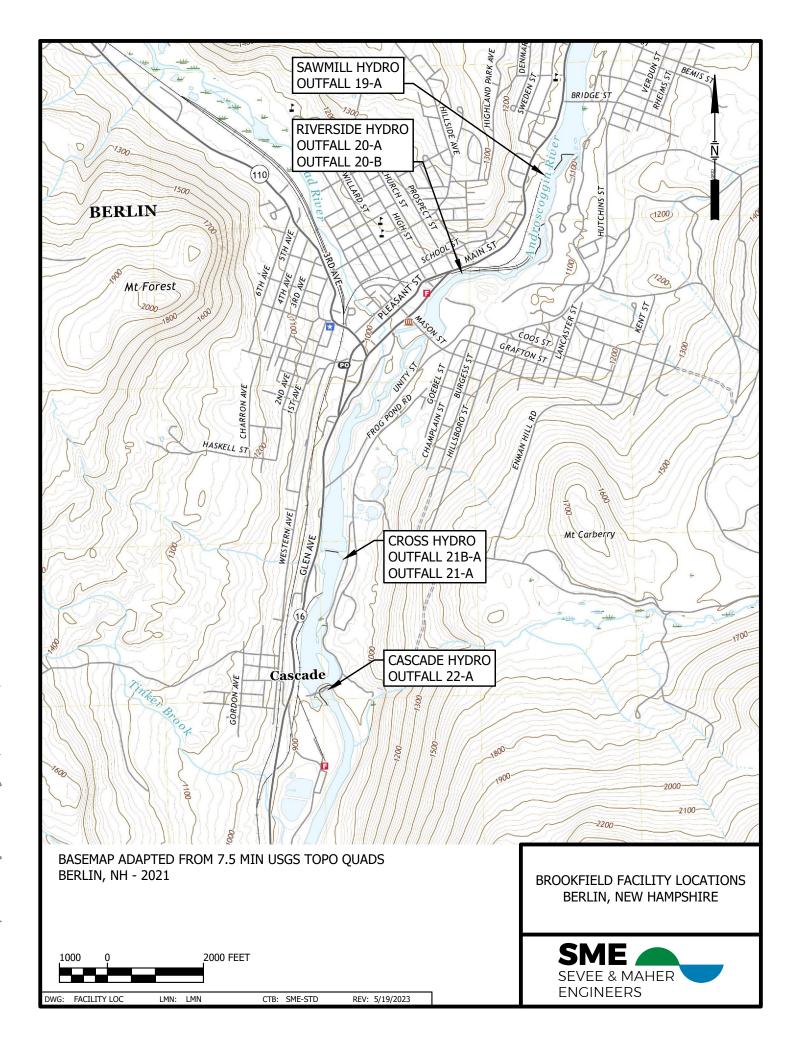
I certify under penalty of law that no chemical additives are used in the discharges to be authorized under this General Permit except for those used for pH adjustment or anti-freeze purposes and that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

2. Notification provided to the appropriate State, including a copy of this NOI, if required?	Yes 🗆 No
Signature: Stephen Michaud (50794) Digitally signed by Stephen Michaud (50794) Date: 2023.06.08 10:06:03 -04'00'	Date:
Print Name and Title: Steve Michaud, Director of Operations	

SITE AND FACILITY LOCATION MAPS

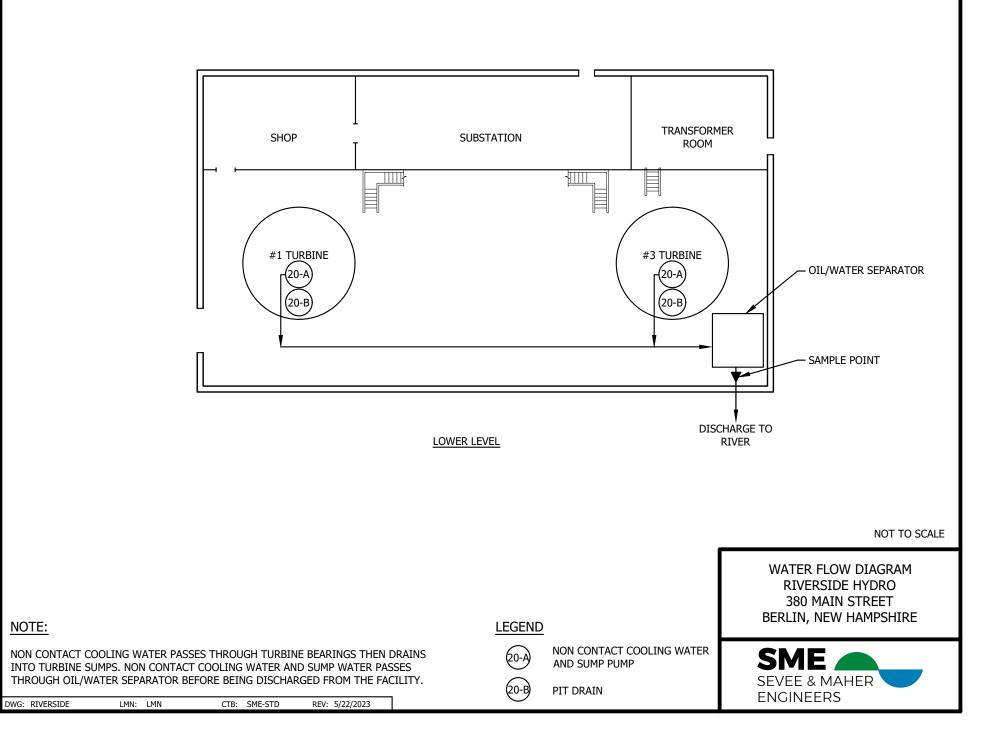






SITE DIAGRAMS





# NEW HAMPSHIRE INTEGRATED LIST OF WATERS AND IMPAIRMENTS



# Watershed 305(b) Assessment Summary Report:

# Assessment Cycle: 2020/2022

HUC 12: 010400010605

HUC 12 Name: Milan Tributaries

(Locator map on next page only applies to this HUC12)

Good	Meets water quality standards/thresholds by a relatively large margin.
Marginal	Meets water quality standards/thresholds but only marginally.
Likely Good	Limited data available, however, the data that is available suggests that the parameter is Potentially Attaining Standards (PAS).
No Current Data	Insufficient information to make an assessment decision.
Likely Bad	Limited data available, however, the data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.
Poor	Not meeting water quality standards/thresholds. The impairment is marginal.
Severe	Not meeting water quality standards/thresholds. The impairment is more severe and causes poor water quality.



Assessment Unit ID	Map Label	Assessment Unit Name	Aquatic Life	Fish Consump.	Swimming	Boating
NHIMP400010605-01	I*01	Androscoggin River - D. C. Power Dam		4A-M	4B-M	3-ND
NHIMP400010605-02	I*02	Androscoggin River - Riverside Dam	3-ND	4A-M	4B-M	3-ND
NHIMP400010605-03	I*03	Androscoggin River - Smith Dam	3-ND	4A-M	4B-M	3-ND
NHIMP400010605-04	I*04	Berlin Reservoir	3-ND	4A-M	3-ND	3-ND
NHLAK400010605-01	L*01	Unnamed Pond	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-01	R*01	Leavitt Stream - Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-02	R*02	Androscoggin River	5-M	4A-M	3-ND	3-ND
NHRIV400010605-03	R*03	Androscoggin River	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-04	R*04	North Branch Horne Brook - Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-05	R*05	South Branch Horne Brook - Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-06	R*06	Horne Brook - Red Brook	3-ND	4A-M	3-ND	3-ND
NHRIV400010605-07	R*07	Bean Brook - Unnamed Brook	3-ND	4A-M	3-ND	3-ND

R*08	Bean Brook	3-ND	4A-M	3-ND	3-ND
R*09	Androscoggin River	3-PAS	4A-M	3-ND	3-ND
R*10	Androscoggin River	3-PAS	4A-M	4B-M	3-ND
R*11	Androscoggin River	3-PAS	5-P	4B-M	3-ND
R*12	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*13	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*14	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*15	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*16	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*17	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*18	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*19	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*20	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*21	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*22	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*23	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*24	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*25	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*26	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*27	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
R*28	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
	R*09 R*10 R*11 R*12 R*13 R*13 R*14 R*15 R*16 R*17 R*18 R*19 R*20 R*21 R*22 R*22 R*23 R*23 R*24 R*25 R*26 R*27	R*09Androscoggin RiverR*10Androscoggin RiverR*11Androscoggin RiverR*11Androscoggin RiverR*12Unnamed BrookR*13Unnamed BrookR*14Unnamed BrookR*15Unnamed BrookR*16Unnamed BrookR*17Unnamed BrookR*18Unnamed BrookR*19Unnamed BrookR*20Unnamed BrookR*21Unnamed BrookR*22Unnamed BrookR*23Unnamed BrookR*24Unnamed BrookR*25Unnamed BrookR*26Unnamed BrookR*27Unnamed Brook	R*09Androscoggin River3-PASR*10Androscoggin River3-PASR*11Androscoggin River3-PASR*11Androscoggin River3-PASR*12Unnamed Brook3-NDR*13Unnamed Brook3-NDR*14Unnamed Brook3-NDR*15Unnamed Brook3-NDR*16Unnamed Brook3-NDR*17Unnamed Brook3-NDR*18Unnamed Brook3-NDR*19Unnamed Brook3-NDR*20Unnamed Brook3-NDR*21Unnamed Brook3-NDR*22Unnamed Brook3-NDR*23Unnamed Brook3-NDR*24Unnamed Brook3-NDR*25Unnamed Brook3-NDR*24Unnamed Brook3-NDR*25Unnamed Brook3-NDR*26Unnamed Brook3-NDR*27Unnamed Brook3-ND	R*09Androscoggin River3-PAS4A-MR*10Androscoggin River3-PAS4A-MR*11Androscoggin River3-PAS5-PR*12Unnamed Brook3-ND4A-MR*13Unnamed Brook3-ND4A-MR*14Unnamed Brook3-ND4A-MR*15Unnamed Brook3-ND4A-MR*16Unnamed Brook3-ND4A-MR*17Unnamed Brook3-ND4A-MR*18Unnamed Brook3-ND4A-MR*19Unnamed Brook3-ND4A-MR*12Unnamed Brook3-ND4A-MR*13Unnamed Brook3-ND4A-MR*14Unnamed Brook3-ND4A-MR*15Unnamed Brook3-ND4A-MR*16Unnamed Brook3-ND4A-MR*17Unnamed Brook3-ND4A-MR*18Unnamed Brook3-ND4A-MR*19Unnamed Brook3-ND4A-MR*20Unnamed Brook3-ND4A-MR*21Unnamed Brook3-ND4A-MR*22Unnamed Brook3-ND4A-MR*23Unnamed Brook3-ND4A-MR*24Unnamed Brook3-ND4A-MR*25Unnamed Brook3-ND4A-MR*26Unnamed Brook3-ND4A-MR*27Unnamed Brook3-ND4A-M	R*09Androscoggin River3-PAS4A-M3-NDR*10Androscoggin River3-PAS4A-M4B-MR*11Androscoggin River3-PAS5-P4B-MR*12Unnamed Brook3-ND4A-M3-NDR*13Unnamed Brook3-ND4A-M3-NDR*14Unnamed Brook3-ND4A-M3-NDR*15Unnamed Brook3-ND4A-M3-NDR*16Unnamed Brook3-ND4A-M3-NDR*17Unnamed Brook3-ND4A-M3-NDR*18Unnamed Brook3-ND4A-M3-NDR*19Unnamed Brook3-ND4A-M3-NDR*19Unnamed Brook3-ND4A-M3-NDR*20Unnamed Brook3-ND4A-M3-NDR*21Unnamed Brook3-ND4A-M3-NDR*22Unnamed Brook3-ND4A-M3-NDR*23Unnamed Brook3-ND4A-M3-NDR*24Unnamed Brook3-ND4A-M3-NDR*25Unnamed Brook3-ND4A-M3-NDR*24Unnamed Brook3-ND4A-M3-NDR*25Unnamed Brook3-ND4A-M3-NDR*25Unnamed Brook3-ND4A-M3-NDR*26Unnamed Brook3-ND4A-M3-NDR*27Unnamed Brook3-ND4A-M3-ND

#### Assessment Unit ID: NHIMP400010605-02 Assessment Unit Name: Androscoggin River -Riverside Dam

Town(s) Primary Town is Listed First: Berlin

Size: 7 ACRES Assessment Unit Category: 4B-M Beach: N 2020/2022, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

**Designated Use Description** Desig. Use Parameter Name Parameter TMDL Parameter Last Last Category Threatened Sample Priority Exceed Category (Y/N) Chlorophyll-a N/A Aquatic Life Integrity 3-ND Ν NLV 3-ND Dissolved oxygen saturation Ν 3-ND Oxygen, Dissolved Ν 3-ND рΗ Ν 3-ND Fish Consumption 4A-M Dioxin (including 2,3,7,8-TCDD) Ν 4B-M Dioxin (including 2,3,7,8-TCDD) Ν 4B-M **MERCURY - FISH CONSUMPTION** Ν 4A-M ADVISORY Potential Drinking Water Supply 2-G **Primary Contact Recreation** 4B-M Escherichia coli Ν SSO 4B-M Ν Secondary Contact Recreation 3-ND Escherichia coli 3-ND Wildlife 3-ND

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality	Meets water quality	Limited data available. The	Insufficient information	Limited data available The	Not meeting water quality	Not meeting water
standards/thresholds by	standards/thresholds but	data that is available	to make an assessment	data that is available	standards/thresholds. The	quality
a relatively large	only marginally.	suggests that the	decision.	suggests that the	impairment is marginal.	standards/thresholds
margin.		parameter is Potentially		parameter is Potentially		The impairment is more
		Attaining Standards (PAS)		Not Supporting (PNS)		severe and causes poor
				water quality standards.		water quality.

#### Assessment Unit ID: NHIMP400010605-03 Assessment Unit Name: Androscoggin River -

Smith Dam

Town(s) Primary Town is Listed First: Berlin

Size: 8 ACRES Assessment Unit Category: 4B-M Beach: N 2020/2022, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	3-ND	ALKALINITY, CARBONATE AS CACO3	N	1990	1990	3-ND	
		ALUMINUM	N	2005	2005	3-ND	
		AMMONIA (TOTAL)	N	1990	N/A	3-ND	
		ARSENIC	N	1990	N/A	3-ND	
		CADMIUM	N	1990	N/A	3-ND	
		CHLORIDE	N	1998	N/A	3-ND	
		COPPER	N	2005	2005	3-ND	
		Chlorophyll-a	N	1990	NLV	3-ND	
		DISSOLVED OXYGEN SATURATION	N	1998	N/A	3-ND	
		IRON	N	1990	N/A	3-ND	
		LEAD	N	2005	2005	3-ND	
		NICKEL	N	2005	1990	3-ND	
		OXYGEN, DISSOLVED	N	1998	N/A	3-ND	
		РН	N	1998	N/A	3-ND	
		SELENIUM	N	1990	N/A	3-ND	
		TURBIDITY	N	1990	N/A	3-ND	

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality	Meets water quality	Limited data available. The	Insufficient information	Limited data available The	Not meeting water quality	Not meeting water
standards/thresholds by	standards/thresholds but	data that is available	to make an assessment	data that is available	standards/thresholds. The	quality
a relatively large	only marginally.	suggests that the	decision.	suggests that the	impairment is marginal.	standards/thresholds
margin.		parameter is Potentially		parameter is Potentially		The impairment is more
		Attaining Standards (PAS)		Not Supporting (PNS)		severe and causes poor
				water quality standards.		water quality.

Aquatic Life Integrity	3-ND	ZINC	N	2005	2005	3-ND	
Fish Consumption	4A-M	ARSENIC	N	1990	N/A	3-ND	
		COPPER	N	2005	N/A	3-ND	
		Dioxin (including 2,3,7,8-TCDD)	N			4B-M	
		Dioxin (including 2,3,7,8-TCDD)	N			4B-M	
		MANGANESE	N	1990	N/A	3-ND	
		MERCURY - FISH CONSUMPTION ADVISORY	N			4A-M	
		NICKEL	N	2005	N/A	3-ND	
		SELENIUM	N	1990	N/A	3-ND	
		ZINC	N	2005	N/A	3-ND	
Potential Drinking Water Supply	2-G	ARSENIC	N	1990	N/A	3-ND	
		COPPER	N	2005	N/A	3-ND	
		ESCHERICHIA COLI	N	1998	1998	3-ND	
		FECAL COLIFORM	N	1990	1990	3-ND	
		IRON	N	1990	N/A	3-ND	
		MANGANESE	N	1990	N/A	3-ND	
		NICKEL	N	2005	N/A	3-ND	
		SELENIUM	N	1990	N/A	3-ND	
		SULFATES	N	1990	N/A	3-ND	
		ZINC	N	2005	N/A	3-ND	
Primary Contact Recreation	4B-M	CHLOROPHYLL-A	N	1990	N/A	3-ND	
		ESCHERICHIA COLI	N	1998	1990	4B-M	

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality	Meets water quality	Limited data available. The	Insufficient information	Limited data available The	Not meeting water quality	Not meeting water
standards/thresholds by	standards/thresholds but	data that is available	to make an assessment	data that is available	standards/thresholds. The	quality
a relatively large	only marginally.	suggests that the	decision.	suggests that the	impairment is marginal.	standards/thresholds
margin.		parameter is Potentially		parameter is Potentially		The impairment is more
		Attaining Standards (PAS)		Not Supporting (PNS)		severe and causes poor
				water quality standards.		water quality.

Secondary Contact Recreation	3-ND	ESCHERICHIA COLI	Ν	1998	N/A	3-ND	
Wildlife	3-ND						

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality	Meets water quality	Limited data available. The	Insufficient information	Limited data available The	Not meeting water quality	Not meeting water
standards/thresholds by	standards/thresholds but	data that is available	to make an assessment	data that is available	standards/thresholds. The	quality
a relatively large	only marginally.	suggests that the	decision.	suggests that the	impairment is marginal.	standards/thresholds
margin.		parameter is Potentially		parameter is Potentially		The impairment is more
		Attaining Standards (PAS)		Not Supporting (PNS)		severe and causes poor
				water quality standards.		water quality.

PH LIMIT ADJUSTMENT REQUEST





4 Blanchard Road, P.O. Box 85A Cumberland, ME 04021 Tel: 207.829.5016 • Fax: 207.829.5692 info@smemaine.com smemaine.com

June 8, 2023

U.S. Environmental Protection Agency, Region 1 ATTN: George Papadopoulos, HYDROGP Coordinator 5 Post Office Square – Mailcode 06-1 Boston, MA 02109-3912

Email: <u>Hydro.GeneralPermit@epa.gov</u>

Subject: Riverside Hydroelectric Facility – pH Limit Adjustment Request

Dear Mr. Papadopoulos:

As required within Section B.7 of the Hydroelectric Generating Facilities General Permit (Hydro GP) notice of intent (NOI), the Riverside Hydroelectric Facility is providing this written request to adjust the current pH limit range of 6.5 standard units (s.u). to 8.0 s.u. to an alternative pH limit range of 6.0 s.u. to 8.0 s.u. The New Hampshire Department of Environmental Services (NHDES) has provided a signed letter supporting the adjustment of the pH limit range at the facility to the requested alternative value (see Attachment 1).

Should questions arise or additional information be desired, please do not hesitate to contact me at 207.829.5016.

Sincerely,

SEVEE & MAHER ENGINEERS, INC.

Philip H. Gerhardt, P.E. Principal/Senior Environmental Engineer

Attachments: 1. NHDES pH Limit Adjustment Approval Letter

# **ATTACHMENT 1**

NHDES PH LIMIT ADJUSTMENT APPROVAL LETTER





The State of New Hampshire **Department of Environmental Services** 

**Robert R. Scott, Commissioner** 



September 4, 2018

Mr. Kyle Murphy, Compliance Specialist Brookfield Renewable Great Lakes Hydro America, LLC 972 Main Street Berlin, NH 03570

Subject: Brookfield Renewable NPDES/State Surface Water Discharge Permit No. NHG360006, NHG360008, NHG360009, NHG360010, NHG360011, NHG360016 pH Limit Adjustment

Dear Mr. Murphy:

The Department of Environmental Services (DES) assisted Brookfield Renewable with a pH study to evaluate the potential for a pH range adjustment at six of their NPDES permitted sites: Pontook Hydro (NHG360006), Riverside Hydro (NHG360008), Cross Power Hydro (NHG360009), Cascade Hydro (NHG360010), Gorham Hydro (NHG360011), and Errol Hydro (NHG360016), per their request in a letter dated June 29, 2018. The pH range adjustment was requested for the facilities' upcoming NPDES permit renewals. The pH study was conducted with the help of DES on June 7, 2018 and July 31, 2018 and included data and backup quality assurance information for measurements made on the Androscoggin River.

After reviewing the results of the pH study, DES supports adjusting the permit limit range for pH from 6.5 to 8.0 standard units (s.u.) to 6.0 to 8.0 s.u. in the upcoming NPDES/State Surface Water Discharge Permit renewals for the above referenced facilities. This original signed letter should be submitted to EPA-New England with a written request to include the pH limit range of 6.0 to 8.0 s.u. as an attachment to the Notice of Intent (NOI) for each facility.

Adjustment of the permitted pH range is subject to change by EPA-New England or DES with new information or changing conditions related to either the facility or the receiving water (Androscoggin River). Please note that a permit limits adjustment will be valid only for the duration of the reissued NPDES permit.

If you have any questions relative to this letter, please call me at (603) 271-6637.

Sincerely

Stergios K. Spanos, P.E., Supervisor Permits and Compliance Section Wastewater Engineering Bureau

cc. Georgé Papadopoulos, EPA-NE Tracy Wood, P.E., DES-WEB

> www.des.nh.gov 29 Hazen Drive • PO Box 95 • Concord, NH 03302-0095 (603) 271-3908 • Fax: 271-4128 • TDD Access: Relay NH 1-800-735-2964

# DESCRIPTION OF BTA TECHNOLOGY FOR MINIMIZATION OF IMPINGEMENT MORTALITY





4 Blanchard Road, P.O. Box 85A Cumberland, ME 04021 Tel: 207.829.5016 • Fax: 207.829.5692 info@smemaine.com smemaine.com

June 8, 2023

U.S. Environmental Protection Agency, Region 1 ATTN: George Papadopoulos, HYDROGP Coordinator 5 Post Office Square – Mailcode 06-1 Boston, MA 02109-3912

Email: <u>Hydro.GeneralPermit@epa.gov</u>

Subject: Riverside Hydroelectric Facility – Description of BTA Technology for Minimization of Impingement Mortality

Dear Mr. Papadopoulos:

As requested within Section C.2 of the Hydroelectric Generating Facilities General Permit (Hydro GP) notice of intent (NOI), the Riverside Hydroelectric Facility is providing this description of the technology employed to comply with the general BTA requirements of Part 4.2.b of the Hydro GP. The Riverside facility utilizes two 11-foot-diameter penstocks to deliver water from the Androscoggin River to the two generating turbines. Cooling water is withdrawn from the penstocks through two 4-inch-diameter pipes prior to the water passing through the turbines. Measured water flow data through these penstocks is unavailable; therefore, a calculative approach utilizing the Hazen-Williams Equation was used to determine the volume of water passing through the penstocks and the percentage of cooling water withdrawn for the Riverside facility. Calculations and assumptions are included in Attachment 1.

The facility has calculated that approximately 0.002 percent of the water passing through the penstock to Turbine #3 and approximately 0.005 percent of the water passing through the penstock to Turbine #1 is withdrawn for the Riverside cooling system. As noted in the NOI form, the water withdrawn from the penstocks for use as cooling water is approximately 0.006 percent of the installed turbine capacity, and 0.006 percent of the source water 2022 mean annual flow.

In June 2021, Kleinschmidt Associates performed an entrainment and impingement risk study for several resident fish species near the Riverside facility. The report states that burst speeds for resident fish species are greater than the maximum approach velocity within the intake area near the facility. The report concludes that the overall effect of the facility's operations on resident fish species is expected to be minimal and risk of entrainment is low.

The facility believes it has demonstrated that impingement mortality has been minimized due to the unlikelihood of fish entrainment through the penstocks and the minimal amount of cooling water withdrawn from the penstocks; therefore, the facility should remain eligible for coverage under the Hydro GP in accordance with Option 4 within Section C.2.

Should questions arise or additional information be desired, please do not hesitate to contact me at 207.829.5016.

Sincerely,

SEVEE & MAHER ENGINEERS, INC.

H.Suba

Philip H. Gerhardt, P.E. Principal/Senior Environmental Engineer

Attachments: 1. Percentage of Cooling Water Withdrawn Calculations

- 2. Penstock Photographs and Orcas<sup>™</sup> Measurement Data
- 3. 2021 Kleinschmidt Desktop Entrainment Report

# **ATTACHMENT 1**

# PERCENTAGE OF COOLING WATER WITHDRAWN CALCULATIONS



#### Hazen-Williams Equation for Velocity of Water in Gravity Flow

$$v = k \ x \ C \ x \ R^{0.63} \ x \ S^{0.54}$$

v = Fluid velocity C = Roughness coefficientR = Hydraulic radius of the pipe S = Slope of the energy linek = Conversion factor (1.318 for imperial system)

The following assumptions were applied in order to utilize the Hazen-Williams Equation: there are no booster pumps in the pipeline (gravity-fed system only), the piping system is completely full of water, the flow throughout the piping system is turbulent, and the water temperature is in the range of 40 - 75 °F.

#### C - Roughness Coefficient Selection

Based on information provided by Brookfield Personnel, it was determined that the two penstocks are constructed of spiral-riveted steel – this corresponds to a roughness coefficient of 100.

#### *S* – *Slope of the Energy Line*

The distance and change in elevation from the inlet of the penstocks to the inlet of the cooling water intake structure was utilized to calculate the slope of the energy line. Through the use of aerial imagery and analysis of topographic maps, it was determined that the distance is approximately 1,450 feet (ft) and the change in elevation is approximately 20 ft. Thus,

$$S = \frac{20\,ft}{1,450\,ft} = 0.014$$

#### *R – Hydraulic Radius of the Pipe*

Based on photographs provided by the Riverside facility and interviews with Brookfield personnel, the external diameter of each penstock is approximately 11 ft.

$$R = \frac{Area \ of \ Pipe}{Perimeter \ of \ Pipe} = \frac{\pi * \ (Radius \ of \ Pipe)^2}{2 * \pi \ (Radius \ of \ Pipe)} = \frac{\pi * (5.5 \ ft)^2}{2 * \pi \ (5.5 \ ft)} = 2.75 \ ft$$

v – Fluid Velocity

$$v = k \ x \ C \ x \ R^{0.63} \ x \ S^{0.54} = 1.318 \ x \ 100 \ x \ (2.75 \ ft)^{0.63} \ x \ (0.014)^{0.54} = 24.86 \frac{ft}{s}$$

The flow rate of the water passing through each penstock is therefore estimated to be 24.86 ft/s

The estimated velocity and pipe diameter are then used to calculate the volume of water passing through each penstock:

Volumetric Flow = Area of Pipe \* Fluid Velocity = 
$$\pi$$
 \* (5.5 ft)<sup>2</sup> x 24.86  $\frac{ft}{s}$  = 2,363  $\frac{ft^3}{s}$   
1  $\frac{ft^3}{s}$  = 448 gallons per minute (GPM)  
Volume = 2,363  $\frac{ft^3}{s}$  = 1,058,411 GPM

The volume of water passing through each of the penstocks is estimated to be 1,058,411 GPM

#### Volume of Water Withdrawn for Cooling vs. Volume of Water Passing Through the Penstocks

To determine the average cooling water withdrawal requirements, the Riverside facility measured water flow velocity utilizing an Orcas<sup>™</sup> Ultrasonic Flowmeter. The water flow volume was measured at two locations near the intakes of the cooling water system (one location for each penstock).

The volume of water required for the cooling of Turbine #1 was measured to be approximately 51 GPM and the volume of water required for the cooling of Turbine #3 was measured to be approximately 24 GPM.

#### Percentage of Cooling Water Withdrawn from the Penstocks

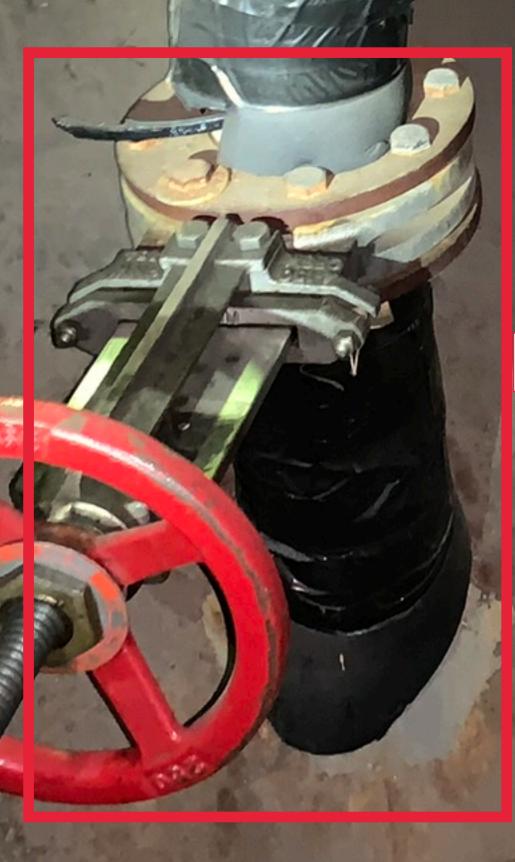
 $\begin{array}{l} Percentage \ for \ Turbine \ \#1 = \displaystyle \frac{Volume \ Withdrawn \ for \ Cooling}{Volume \ within \ the \ Penstock} \ x \ 100 = \displaystyle \frac{51 \ GPM}{1,058,411 \ GPM} x \ 100 \\ = \ 0.005\% \end{array}$   $Percentage \ for \ Turbine \ \#3 = \displaystyle \frac{Volume \ Withdrawn \ for \ Cooling}{Volume \ within \ the \ Penstock} \ x \ 100 = \displaystyle \frac{24 \ GPM}{1,058,411 \ GPM} x \ 100 \\ = \ 0.002\% \end{array}$ 

It is estimated that 0.005% and 0.002% of the water flowing through the penstocks leading to Turbine #1 and Turbine #3, respectively, is withdrawn for cooling at the Riverside facility.

# **ATTACHMENT 2**

# PENSTOCK PHOTOGRAPHS AND ORCAS<sup>™</sup> MEASUREMENT DATA





COOLING WATER INTAKE CONNECTION FOR TURBINE #1





induct         Unit           sumple number         1           inclusion         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1         1           1         1         1           1         1         1         1           1         1         1         1         1           1         1         1         1         1         1           1         1         1         1         1         1         1           1         1         1         1         1         1         1         1	site name:	Riverside cooling water	unit 1				
symple numi2abstrike (wink is media [main]flow acting [main]flow acting [main]main [main]main]main [main]main [main]mai	date/time:	2/20/2023 9:35					
ample number         description         Town the qualaxity.         Town the qualaxity.         Town of qualaxity.           1         2/0/0/23 843         0.00.02         5.0.282         47.4985         1.1318 good           2         2/0/0/23 843         0.00.02         5.0.283         445.716         1.1318 good           2         2/0/0/23 843         0.00.07         50.3373         457.217         1.1338 good           2         2/0/0/23 846         0.00.07         50.3373         457.217         1.1338 good           7         2/0/0/23 856         0.00.13         50.4648         44.1376         1.1338 good           9         2/0/0/23 856         0.00.13         50.4648         44.1376         1.1338 good           11         2/0/0/23 856         0.00.21         50.562         477.03.81         1.1388 good           12         2/0/0/23 856         0.00.21         50.562         477.03.81         1.1388 good           13         2/0/0/23 856         0.00.21         50.562         477.03.81         1.1388 good           14         2/0/0/23 856         0.00.21         50.562         477.358         1.1488 good           14         2/0/0/23 856         0.00.23         50.7774         41.1318 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
1         22/20/203 935         0.0002         50.2823         47.2889         1.1318 good           3         22/20/203 845         0.0002         50.3117         456.3824         1.1315 good           4         22/20/203 845         0.0007         50.3171         456.3824         1.1315 good           5         22/20/203 846         0.0011         50.4048         444.1374         1.1315 good           6         22/20/203 946         0.0011         50.4684         446.1376         1.1355 good           7         22/20/203 946         0.0011         50.4682         447.3833         1.1352 good           10         22/20/203 946         0.0012         50.5628         470.5525         1.1342 good           11         22/20/203 946         0.0022         50.5628         477.653         1.1419 good           12         22/20/203 946         0.0023         50.5628         477.653         1.1419 good           12         22/20/203 946         0.0033         50.7777         481.1538         1.442 good           13         22/20/203 946         0.0033         50.7777         481.1548         1.443 good           14         22/20/203 946         0.0033         50.877         487.1441							
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7       Z/Z/Z22 9:36       0.0013       50.4681       465.865       1.1358 pecd         9       Z/Z/Z22 9:36       0.0019       50.4581       467.8333       1.1358 pecd         11       2./Z/Z22 9:36       0.0019       50.5278       469.2672       1.1354 pecd         12       2./Z/Z22 9:36       0.0023       50.5527       472.633       1.1352 pecd         13       2./Z/Z22 9:36       0.0023       50.5527       472.633       1.1354 pecd         14       2./Z/ZZ2 9:36       0.0023       50.552       472.633       1.144 pecd         15       2./Z/ZZ2 9:36       0.0033       50.781       472.633       1.145 pecd         15       2./Z/ZZ2 9:36       0.0033       50.781       472.633       1.145 pecd         16       2./Z/ZZ2 9:36       0.0034       50.887       489.199       1.1455 pecd         17       2./Z/ZZ2 9:36       0.0043       50.887       489.199       1.1458 pecd         16       2./Z/ZZ2 9:36       0.0045       50.887       489.199       1.1458 pecd         17       2./Z/ZZ2 9:36       0.0045       50.887       489.199       1.1458 pecd         17       2./Z/ZZ2 9:36       0.0045       50.8947       499							-
8         21/0/022 9.36         0.0017         50.489         465.899         1.1355 god           10         21/0/022 9.36         0.0017         50.578         460.2872         1.1382 god           11         21/0/022 9.36         0.0023         50.563         474.033         1.1382 god           12         21/0/022 9.36         0.0023         50.563         474.033         1.1382 god           14         21/0/023 9.36         0.0027         50.682         474.043         1.1382 god           15         21/0/023 9.36         0.0027         50.682         474.043         1.141 god           16         21/0/023 9.36         0.0031         50.787         479.6443         1.143 god           16         21/0/023 9.36         0.0034         50.887         493.0813         1.143 god           17         21/0/023 9.36         0.0044         50.887         493.1313         1.1455 god           21         21/0/023 9.36         0.0047         50.9897         493.011         1.1475 god           22         21/0/023 9.36         0.0047         50.9807         493.011         1.1475 god           23         21/0/023 9.36         0.0047         50.9807         493.011         1.1474 god							-
9       21/21/222 9:36       0.0019       50.4889       477.833       1.1354 god         11       21/21/222 9:36       0.0023       50.552       472.638       1.1352 god         13       21/21/223 9:36       0.0023       50.5652       472.638       1.1352 god         14       21/21/223 9:36       0.0027       50.6783       472.638       1.1352 god         15       21/21/223 9:36       0.0023       50.6727       477.4343       1.1452 god         17       21/21/223 9:36       0.0033       50.777       48.1138       1.1452 god         18       21/21/223 9:36       0.0033       50.7877       48.1138       1.1452 god         19       21/21/223 9:36       0.0043       50.887       495.019       1.1452 god         21       21/21/223 9:36       0.0044       50.887       495.019       1.1454 god         22       21/21/223 9:36       0.0045       50.887       495.019       1.1443 god         23       21/21/223 9:36       0.0045       50.987       495.019       1.1442 god         24       21/21/223 9:36       0.0053       51.042       496.6479       1.1443 god         25       21/21/223 9:36       0.0057       50.9824							-
10       1/2/10/2023 936       0.0019       90.378       449.272       1.1382 good         12       2/2/0/2023 936       0.0023       50.562       472.438       1.1382 good         14       2/2/0/2023 936       0.0023       50.562       477.4335       1.1382 good         16       7/0/0023 936       0.0023       50.6893       477.4335       1.141 good         16       7/0/0023 936       0.0033       50.727       479.4241       1.141 good         18       7/0/0023 936       0.0033       50.727       479.4241       1.141 good         18       7/0/0023 936       0.0033       50.737       479.2441       1.141 good         19       7/0/0023 936       0.0043       50.887       447.3245       1.143 good         12       7/0/0023 936       0.0043       50.887       493.011       1.1476 good         12       7/0/0023 936       0.0047       50.889       493.011       1.1476 good         12       7/0/0023 936       0.0047       50.8980       493.011       1.1476 good         12       7/0/0023 936       0.0047       50.8980       493.011       1.1476 good         13       7/0/0023 936       0.0047       50.8980       493.0							•
11       2/20/2023 936       0.0021       50.566       4/72.638       1.1382 good         13       2/20/2023 936       0.0025       50.5663       4/73.238       1.1388 good         14       2/20/2023 936       0.0027       50.6829       4/72.638       1.1418 good         15       2/20/2023 936       0.0031       50.777       441.1158       1.1428 good         17       2/20/2023 936       0.0033       50.7877       448.1158       1.1428 good         18       2/20/2023 936       0.0037       50.8080       448.2388       1.1448 good         18       2/20/2023 936       0.0041       50.8822       407.924       1.1448 good         11       2/20/2023 936       0.0041       50.8822       407.924       1.1448 good         12       2/20/2023 936       0.0047       50.9807       49.81051       1.1448 good         12       2/20/2023 936       0.0057       50.9847       1.1448 good         12							-
12       2/20/2023 936       0.0023       50.5653       474.232       1.1382 good         14       2/20/2023 936       0.0027       50.6823       477.335       1.144 good         15       2/20/2023 936       0.0023       50.7777       481.1154       1.1425 good         16       2/20/2023 936       0.0033       50.7777       481.1154       1.1425 good         18       2/20/2023 936       0.0037       50.8996       484.5335       1.1437 good         20       2/20/2023 936       0.0037       50.8966       484.5335       1.1438 good         21       2/20/2023 936       0.0041       50.8967       489.6199       1.1448 good         21       2/20/2023 936       0.0043       50.8967       493.8171       1.1448 good         22       2/20/2023 936       0.0044       50.8967       493.8171       1.1448 good         24       2/20/2023 936       0.00451       51.0862       494.8479       1.1448 good         24       2/20/203 936       0.0057       50.9947       50.8943       1.1447 good         27       2/20/203 937       0.0151       50.9947       50.8943       1.1447 good         27       2/20/203 937       0.0159       50.99425<							•
13       2/20/2023 936       0.0027       50.6863       474.2325       1.1358 good         15       2/20/2023 936       0.0029       50.6899       477.7335       1.1419 good         17       2/20/2023 936       0.0033       50.7777       4451.1158       1.1425 good         18       2/20/2023 936       0.0035       50.7787       4451.1158       1.1425 good         19       2/20/2023 936       0.0037       50.8096       446.5358       1.1439 good         21       2/20/2023 936       0.0043       50.8375       493.1373       1.1445 good         22       2/20/2023 936       0.0044       50.8375       493.1317       1.1448 good         23       2/20/2023 936       0.0045       50.9357       493.1317       1.1448 good         24       2/20/2023 936       0.0045       50.9357       493.1651       1.1478 good         25       2/20/2023 936       0.0053       51.0061       493.651       1.1478 good         27       2/20/2023 936       0.0059       50.9937       50.9847       1.1488 good         27       2/20/2023 936       0.0053       50.9915       50.9415       1.1474 good         27       2/20/2023 936       0.0059       50.							-
15       2/20//023 9:36       0:00:29       50.6899       477.335       1.141 grod         17       2/20//023 9:36       0:00:33       50.7377       481.158       1.1422 good         19       2/20//023 9:36       0:00:37       50.8096       484.5384       1.1423 good         21       2/20//023 9:36       0:00:37       50.8096       484.5384       1.1433 good         21       2/20//023 9:36       0:00:44       50.837       491.5173       1.1445 good         22       2/20//023 9:36       0:00:45       50.937       491.3173       1.1475 good         22       2/20//023 9:36       0:00:45       50.937       491.3173       1.1478 good         23       2/20//023 9:36       0:00:55       50.9317       493.665       1.143 good         24       2/20//023 9:36       0:00:55       50.9317       493.665       1.142 good         24       2/20//023 9:36       0:00:55       50.9317       50.8947       1.147 good         21       2/20//023 9:36       0:01:05       50.9317       50.16842       1.147 good         21       2/20//023 9:36       0:01:05       50.9317       51.1624       1.147 good         21       2/20//023 9:37       0:01:13	13	2/20/2023 9:36	0:00:25	50.5663	474.3235		
16       2/20/2023936       0.0033       50.7273       479.4241       1.1419 good         18       2/20/2023936       0.0033       50.7811       482.8085       1.1432 good         19       2/20/2023936       0.0039       50.8186       486.2365       1.1434 good         20       2/20/2023936       0.0043       50.8876       489.6199       1.1434 good         21       2/20/2023936       0.0044       50.8377       49.1373       1.1465 good         21       2/20/2023936       0.0047       50.9809       493.0511       1.1476 good         24       2/20/2023936       0.0053       51.0142       496.4679       1.1488 good         26       2/20/2023936       0.0055       50.9325       50.3841       1.1477 good         21       2/20/2023936       0.0059       50.9295       50.8434       1.1478 good         21       2/20/2023936       0.0103       50.9295       50.8434       1.1478 good         22       2/20/2023937       0.0113       50.9295       50.85843       1.1478 good         21       2/20/2023937       0.0113       50.9295       50.85843       1.1478 good         21       2/20/2023937       0.0113       50.9295	14	2/20/2023 9:36	0:00:27	50.6282	476.0443	1.1396	good
17       2/20/2023-936       0.00.33       50.787       481.158       1.1425 good         19       2/20/2023-936       0.00.37       50.8096       484.358       1.1437 good         10       2/20/2023-936       0.00.41       50.8362       487.974       1.1438 good         21       2/20/2023-936       0.00.44       50.8377       481.153       1.1475 good         22       2/20/2023-936       0.00.45       50.9357       491.3173       1.1476 good         23       2/20/2023-936       0.00.45       50.9357       491.3173       1.1476 good         25       2/20/2023-936       0.00.51       51.0461       498.1685       1.1439 good         26       2/20/2023-936       0.00.57       50.9377       493.6757       1.1478 good         27       2/20/2023-936       0.00.57       50.9372       50.4884       1.1474 good         27       2/20/2023-936       0.01.01       50.9275       50.4884       1.1474 good         27       2/20/2023-937       0.01.05       50.8883       508.177       1.1455 good         27       2/20/2023-937       0.01.07       50.9375       50.4884       1.1474 good         27       2/20/2023-937       0.01.01 <t< td=""><td>15</td><td>2/20/2023 9:36</td><td>0:00:29</td><td>50.6899</td><td>477.7335</td><td>1.141</td><td>good</td></t<>	15	2/20/2023 9:36	0:00:29	50.6899	477.7335	1.141	good
18       2/20//023 9:36       0.0033       50.809       445.2085       1.1432 good         20       2/20//023 9:36       0.0033       50.809       446.236       1.1434 good         21       2/20//023 9:36       0.0043       50.818       489.6199       1.1455 good         21       2/20//023 9:36       0.0047       50.809       493.0511       1.1465 good         24       2/20//023 9:36       0.0047       50.809       493.0511       1.1476 good         26       2/20//023 9:36       0.0053       51.0462       496.4679       1.148 good         26       2/20//023 9:36       0.0053       50.9375       499.8679       1.1474 good         27       2/20//023 9:36       0.0057       50.9325       50.841       1.1474 good         27       2/20//023 9:36       0.0103       50.9255       50.8434       1.1474 good         27       2/20//023 9:37       0.0107       50.9323       50.1002       1.1454 good         27       2/20//023 9:37       0.0113       50.9255       50.66814       1.1426 good         27       2/20//023 9:37       0.0127       51.3633       1.1473 good       1.445 good         27       2/20//023 9:37       0.0123 <t< td=""><td>16</td><td>2/20/2023 9:36</td><td>0:00:31</td><td>50.7273</td><td>479.4241</td><td>1.1419</td><td>good</td></t<>	16	2/20/2023 9:36	0:00:31	50.7273	479.4241	1.1419	good
19       2/20/203 9-36       0.00.37       50.806       484.5388       1.1437 good         21       2/20/203 9-36       0.00.41       50.8362       487.924       1.1443 good         22       2/20/203 9-36       0.00.43       50.837       496.6199       1.1455 good         23       2/20/2023 9-36       0.00.47       50.809       493.611       1.1455 good         24       2/20/2023 9-36       0.00.47       50.809       493.611       1.1475 good         25       2/20/2023 9-36       0.00.53       51.0081       498.479       1.1481 good         27       2/20/2023 9-36       0.00.57       50.9847       50.5842       1.1472 good         28       2/20/2023 9-36       0.00.57       50.9847       50.5842       1.1472 good         29       2/20/2023 9-36       0.01.05       50.9872       50.4883       1.1474 good         31       2/20/2023 9-37       0.01.07       50.832       510.1092       1.1474 good         32       2/20/2023 9-37       0.01.13       50.979       51.8079       1.1474 good         32       2/20/2023 9-37       0.01.13       50.9879       51.81231       1.1474 good         33       2/20/2023 9-37       0.01.15	17	2/20/2023 9:36	0:00:33	50.7577	481.1158	1.1425	good
20       2/20/2023 9:36       0.00.39       50.8186       486.2296       1.1438 good         21       2/20/2023 9:36       0.00.43       50.887       480.6199       1.1455 good         21       2/20/2023 9:36       0.00.47       50.987       493.0511       1.1475 good         22       2/20/2023 9:36       0.00.47       50.9809       493.0511       1.1475 good         25       2/20/2023 9:36       0.00.51       51.0402       496.4079       1.1483 good         26       2/20/2023 9:36       0.00.55       50.9715       499.8679       1.1474 good         27       2/20/2023 9:36       0.00.57       50.9847       51.5802       1.1474 good         27       2/20/2023 9:36       0.00.57       50.9915       499.8679       1.1474 good         27       2/20/2023 9:36       0.01.01       50.9725       50.6614       1.1474 good         31       2/20/2023 9:37       0.01.05       50.8883       508.377       1.1474 good         32       2/20/2023 9:37       0.01.11       50.9719       51.8079       1.1474 good         32       2/20/2023 9:37       0.01.13       50.9842       515.233       1.1475 good         34       2/20/2023 9:37       0.01.2					482.8085		-
1       2/20/2023 9:36       0.0041       50.8362       447.924       1.1443 good         2       2/20/2023 9:36       0.0045       50.9357       401.3173       1.1455 good         2       2/20/2023 9:36       0.0049       51.0443       494.7505       1.1493 good         25       2/20/2023 9:36       0.0051       51.0462       496.4679       1.149 good         26       2/20/2023 9:36       0.0055       50.91715       499.8679       1.1474 good         28       2/20/2023 9:36       0.0059       50.9252       503.2841       1.1474 good         30       2/20/2023 9:36       0.0101       50.9255       503.2841       1.1474 good         31       2/20/2023 9:37       0.01107       50.9323       51.0162       1.1475 good         32       2/20/2023 9:37       0.01107       50.9323       51.0162       1.1475 good         34       2/20/2023 9:37       0.01107       50.9323       51.0162       1.1475 good         35       2/20/2023 9:37       0.0111       50.9753       51.5233       1.1475 good         37       2/20/2023 9:37       0.0113       50.9864       51.69205       1.4465 good         36       2/20/2023 9:37       0.0113					484.5358		•
2       2/20/2023 9:96       0.0043       50.887       449.6199       1.1455 good         2       2/20/2023 9:36       0.0047       50.9809       433.0511       1.1476 good         2       2/20/2023 9:36       0.0047       50.9809       433.0511       1.1476 good         2       2/20/2023 9:36       0.0051       51.0462       496.4679       1.1474 good         2       2/20/2023 9:36       0.0055       50.9715       499.8679       1.1474 good         3       2/20/2023 9:36       0.0057       50.9925       50.32841       1.1474 good         3       2/20/2023 9:36       0.0101       50.9725       50.32841       1.1474 good         31       2/20/2023 9:37       0.0105       50.8883       508.3177       1.1474 good         33       2/20/2023 9:37       0.0110       50.9719       511.8079       1.1474 good         34       2/20/2023 9:37       0.0110       50.9719       511.8079       1.1475 good         34       2/20/2023 9:37       0.0113       50.9883       50.3177       1.1475 good         35       2/20/2023 9:37       0.0113       50.9875       5.13233       1.1477 good         36       2/20/2023 9:37       0.0113 <t5< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>•</td></t5<>							•
2       2/20/2023936       000.45       50.937       491.3171       1.1465       podd         2       2/20/2023936       000.49       51.0143       494.750       1.1482       god         2       2/20/2023936       000.53       51.0081       498.655       1.1482       god         2       2/20/2023936       000.53       50.9715       499.8679       1.1447       god         30       2/20/2023936       000.59       50.9925       503.2841       1.1477       god         31       2/20/2023936       001.03       50.9295       506.6814       1.1448       god         32       2/20/2023937       001.07       50.9323       510.1092       1.1467       god         34       2/20/2023937       001.07       50.9323       510.1092       1.1468       god         35       2/20/2023937       001.11       50.9773       513.5233       1.1475       god         35       2/20/2023937       001.13       50.9814       516.2015       1.1476       god         36       2/20/2023937       001.15       50.9814       516.2015       1.1475       god         37       2/20/2023937       001.15       50.9814       516.2							-
2       2/20/2023936       00047       50.9809       493.0511       1.1475 god         2       2/20/2023936       00051       51.0462       496.4679       1.1482 god         27       2/20/2023936       00055       50.9715       498.4679       1.1424 god         29       2/20/2023936       00057       50.9847       50.5842       1.1474 god         29       2/20/2023936       00105       50.9725       50.6814       1.1474 god         31       2/20/2023936       00105       50.8883       508.377       1.1455 god         32       2/20/2023937       00107       50.9323       501.092       1.1447 god         33       2/20/2023937       00113       50.9739       51.8273       1.1475 god         34       2/20/2023937       00113       50.9814       51.6205       1.1475 god         35       2/20/2023937       00113       50.9814       51.6203       1.1475 god         37       2/20/2023937       00113       50.9814       51.6203       1.1475 god         36       2/20/2023937       00112       51.6213       1.1485 god         41       2/20/2023937       00113       50.9814       51.8233       1.1485 god							-
25       2/20/2023 936       000.49       51.0143       494.7505       1.1438       pod         26       2/20/2023 936       000.53       51.0081       498.4659       1.1442       good         28       2/20/2023 936       000.55       50.9715       499.8679       1.1447       good         30       2/20/2023 936       000.59       50.9225       50.3244       1.1474       good         31       2/20/2023 936       00103       50.9275       506.6814       1.1468       good         32       2/20/2023 936       00103       50.9295       506.6814       1.1474       good         33       2/20/2023 937       00107       50.9323       510.1092       1.1443       good         34       2/20/2023 937       00117       50.9323       511.5233       1.1475       good         35       2/20/2023 937       00117       51.0674       512.213       1.1476       good         39       2/20/2023 937       00117       51.0674       522.0439       1.1485       good         41       2/20/2023 937       00112       51.0674       522.0439       1.1485       good         42       2/20/2023 937       00112       51.0671 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>							-
26         2/0/0239-36         0.0051         51.0462         496.679         1.149 good           28         2/0/0239-36         0.0055         50.9715         499.679         1.1474 good           29         2/0/0239-36         0.0057         50.9847         501.5842         1.1477 good           31         2/0/0239-36         0.0101         50.9725         503.2841         1.1474 good           31         2/0/0239-36         0.0103         50.9275         506.6614         1.1442 good           33         2/0/0239-37         0.0107         50.9323         510.1092         1.1455 good           34         2/0/0239-37         0.0113         50.9623         513.5233         1.1474 good           35         2/0/0239-37         0.0117         51.0324         516.3205         1.1474 good           37         2/0/0239-37         0.0117         51.0373         513.5233         1.1475 good           38         2/0/0239-37         0.0121         51.0679         52.0439         1.485 good           41         2/0/0239-37         0.0123         51.0679         52.0439         1.485 good           42         2/0/0239-37         0.0123         51.0671         52.34545         1.486 good <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>							-
27       7/0/0239-36       000:53       51.0081       498.655       1.1432 pod         28       2/0/0239-36       000:57       50.9947       501.5842       1.1477 god         30       2/0/0239-36       000:59       50.9925       503.481       1.1474 god         31       2/0/0239-36       001:03       50.9255       506.681       1.1444 god         32       2/0/0239-37       001:07       50.9323       510.1022       1.1474 god         34       2/0/0239-37       001:07       50.9323       511.002       1.1445 god         34       2/0/0239-37       001:11       50.9719       511.8079       1.1475 god         36       2/0/0239-37       001:15       50.9814       516.9205       1.1475 god         38       2/0/0239-37       001:17       51.0323       51.4859       1.1485 god         41       2/0/0239-37       001:12       51.0679       52.2439       1.1495 god         42       2/0/0239-37       001:25       51.0373       52.4469       1.1485 god         43       2/0/0239-37       001:25       51.0373       52.2439       1.1495 god         44       2/0/0239-37       001:25       51.0373       52.2439       1.							•
28       7/0/023 9:36       0:00:55       50.9947       501.5842       1.1474 pod         29       2/0/023 9:36       0:00:57       50.9947       501.5842       1.1474 god         31       2/0/023 9:36       0:01:01       50.9725       50.9324       1.1474 god         32       2/0/023 9:36       0:01:05       50.8883       506.6814       1.1444 god         33       2/0/023 9:37       0:01:07       50.9323       510.1022       1.1455 god         34       2/0/023 9:37       0:01:10       50.9713       513.5233       1.1474 god         35       2/0/023 9:37       0:01:13       50.9682       515.2213       1.1474 god         38       2/0/023 9:37       0:01:15       50.9814       516.0396       1.1485 god         38       2/0/023 9:37       0:01:17       51.0238       518.6396       1.1485 god         40       2/0/023 9:37       0:01:27       51.0271       52.0459       1.1485 god         41       2/0/023 9:37       0:01:27       51.0271       52.4459       1.1485 god         42       2/0/023 9:37       0:01:27       51.0271       52.4459       1.1485 god         43       2/0/023 9:37       0:01:27       51.0261							-
29       2/20/203 9:36       0.00.57       50.9847       501.5842       1.1477       pod         31       2/20/203 9:36       0.01.01       50.972       504.9834       1.1474       pod         32       2/20/203 9:36       0.01.03       50.9925       506.6814       1.1446       god         34       2/20/203 9:37       0.01.07       50.9323       510.1092       1.1447       god         34       2/20/203 9:37       0.01.07       50.9323       510.1092       1.1447       god         36       2/20/203 9:37       0.01.11       50.9773       513.5233       1.1475       god         36       2/20/203 9:37       0.01.15       50.9884       516.9205       1.1474       god         37       2/20/203 9:37       0.01.17       51.0238       516.9205       1.1475       god         39       2/20/203 9:37       0.01.23       51.0679       52.2439       1.1485       god         41       2/20/203 9:37       0.01.23       51.0679       52.2439       1.1485       god         43       2/20/203 9:37       0.01.25       51.0373       52.4469       1.1485       god         44       2/20/2023 9:37       0.01.26       5							-
30       2/20/2023 93:6       0.00:59       50.9925       503.4923       1.1474       pod         31       2/20/2023 93:6       0.01:01       50.9295       506.6814       1.1464       god         33       2/20/2023 93:6       0.01:05       50.9823       500.1092       1.1464       god         33       2/20/2023 93:7       0.01:07       50.9823       510.1092       1.1464       god         35       2/20/2023 93:7       0.01:07       50.9719       511.8079       1.1474       god         36       2/20/2023 93:7       0.01:13       50.9682       515.2213       1.1475       god         38       2/20/2023 93:7       0.01:17       51.0674       520.4315       1.1485       god         40       2/20/2023 93:7       0.01:23       51.0674       522.4315       1.1485       god         41       2/20/2023 93:7       0.01:25       51.0673       522.4315       1.1485       god         42       2/20/2023 93:7       0.01:25       51.0457       523.7466       1.1484       god         43       2/20/2023 93:7       0.01:25       51.0313       50.8812       1.1475       god         44       2/20/2023 93:7       0.01:36 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>							-
1       2/20/2023 9:36       001:01       50.927       506.8843       1.1474       pood         3       2/20/2023 9:36       001:05       50.8883       508.377       1.1455       good         3       2/20/2023 9:37       001:07       50.9323       510.1092       1.1455       good         3       2/20/2023 9:37       001:01       50.9713       511.8079       1.1474       good         3       2/20/2023 9:37       001:11       50.9773       511.8273       1.1475       good         3       2/20/2023 9:37       001:15       50.9814       516.9205       1.1476       good         3       2/20/2023 9:37       001:17       51.0228       51.8221       1.1485       good         4       2/20/2023 9:37       001:23       51.0679       522.0439       1.1495       good         4       2/20/2023 9:37       001:25       51.0373       524.469       1.1486       good         4       2/20/2023 9:37       001:27       51.0012       52.8822       1.1476       good         4       2/20/2023 9:37       001:38       50.9671       53.9804       1.1476       good         4       2/20/2023 9:37       001:38       50.96							-
32       2/20/2039:36       001:03       50.8295       506.6314       1.1464 good         33       2/20/2039:37       001:07       50.8383       506.6314       1.1465 good         35       2/20/2039:37       001:07       50.93719       511.8079       1.1474 good         36       2/20/2039:37       001:11       50.9719       511.8079       1.1475 good         37       2/20/2039:37       001:12       50.9814       516.9205       1.1475 good         38       2/20/2039:37       001:12       51.0674       520.3415       1.1485 good         40       2/20/2039:37       001:23       51.0674       522.0439       1.1485 good         41       2/20/2039:37       001:23       51.0674       523.7456       1.1495 good         42       2/20/2039:37       001:23       51.0457       523.7456       1.1485 good         43       2/20/2039:37       001:25       51.0373       522.4639       1.1486 good         44       2/20/2039:37       001:33       50.9807       532.813       1.1476 good         45       2/20/2039:37       001:34       50.9817       533.7119       1.1466 good         47       2/20/2039:37       001:36       50.9807							-
34       1/20/2023 9:37       001:07       50.9323       510.1092       1.1454 good         35       2/20/2023 9:37       001:11       50.9719       51.35233       1.1475 good         37       2/20/2023 9:37       001:13       50.9682       515.2213       1.1475 good         38       2/20/2023 9:37       001:17       51.038       516.6396       1.1485 good         39       2/20/2023 9:37       001:11       51.0674       52.0439       1.1495 good         40       2/20/2023 9:37       001:21       51.0674       52.0439       1.1495 good         41       2/20/2023 9:37       001:27       51.0614       52.0439       1.1495 good         42       2/20/2023 9:37       001:27       51.0261       527.1819       1.1486 good         43       2/20/2023 9:37       001:31       50.9807       53.2813       1.1477 good         44       2/20/2023 9:37       001:38       50.9807       53.2813       1.1478 good         45       2/20/2023 9:37       001:38       50.9807       53.2813       1.1475 good         47       2/20/2023 9:37       001:38       50.9471       53.741       1.1468 good         48       2/20/2023 9:37       001:48 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td></t<>							-
35       2/20/203 9:37       0:01:09       50.9719       511.8079       1.1474 pood         36       2/20/203 9:37       0:01:11       50.9682       515.2213       1.1473 good         38       2/20/203 9:37       0:01:15       50.9814       516.9205       1.1475 good         39       2/20/203 9:37       0:01:17       51.0238       516.6926       1.1495 good         41       2/20/203 9:37       0:01:23       51.0679       522.0439       1.1495 good         41       2/20/203 9:37       0:01:23       51.0475       523.7456       1.1495 good         42       2/20/203 9:37       0:01:25       51.0373       525.4669       1.1488 good         43       2/20/203 9:37       0:01:25       51.0373       528.2822       1.1488 good         44       2/20/203 9:37       0:01:31       50.9881       530.5819       1.1477 good         47       2/20/203 9:37       0:01:36       50.9607       532.2813       1.1476 good         47       2/20/203 9:37       0:01:36       50.9671       53.93.9804       1.1473 good         48       2/20/202 9:37       0:01:42       50.333       53.1191       1.1466 good         50       2/20/202 9:37       0:01:42	33	2/20/2023 9:36	0:01:05	50.8883	508.377	1.1455	good
36       2/20/2023 9:37       0.01:11       50.9773       513.5233       1.1475 good         37       2/20/2023 9:37       0.01:13       50.9662       515.2213       1.1473 good         38       2/20/2023 9:37       0.01:17       51.0238       518.6396       1.1485 good         40       2/20/2023 9:37       0.01:17       51.0278       518.6396       1.1485 good         41       2/20/2023 9:37       0.01:21       51.0679       522.0439       1.1495 good         42       2/20/2023 9:37       0.01:23       51.0457       523.7456       1.148 good         43       2/20/2023 9:37       0.01:27       51.0261       527.1819       1.1486 good         44       2/20/2023 9:37       0.01:31       50.98671       533.9804       1.148 good         45       2/20/2023 9:37       0.01:38       50.9671       533.9804       1.1487 good         47       2/20/2023 9:37       0.01:38       50.9471       533.9804       1.1467 good         48       2/20/2023 9:37       0.01:40       50.9471       533.9804       1.1467 good         51       2/20/2023 9:37       0.01:42       50.9339       539.1081       1.1467 good         52       2/20/2023 9:37	34	2/20/2023 9:37	0:01:07	50.9323	510.1092	1.1465	good
37       2/20/203 9:37       0.01:13       50.9682       515.2213       1.1473 good         38       2/20/203 9:37       0.01:15       50.9814       516.9205       1.1476 good         40       2/20/2023 9:37       0.01:19       51.0674       520.3415       1.1485 good         41       2/20/2023 9:37       0.01:21       51.0679       522.0439       1.1495 good         42       2/20/2023 9:37       0.01:25       51.0373       525.4469       1.1488 good         43       2/20/2023 9:37       0.01:27       51.021       527.1819       1.1486 good         44       2/20/2023 9:37       0.01:27       51.0012       528.8822       1.148 good         45       2/20/2023 9:37       0.01:31       50.9807       532.2813       1.1477 good         46       2/20/2023 9:37       0.01:36       50.9671       533.9804       1.1473 good         49       2/20/2023 9:37       0.01:42       50.9393       539.1081       1.1466 good         51       2/20/2023 9:37       0.01:42       50.9393       539.1081       1.1467 good         52       2/20/2023 9:37       0.01:42       50.9393       539.1081       1.1465 good         52       2/20/2023 9:37       0.0	35	2/20/2023 9:37	0:01:09	50.9719	511.8079	1.1474	good
38       2/20/2023 9:37       0:01:15       50.9814       516.9205       1.1476       god         39       2/20/2023 9:37       0:01:17       51.0238       518.6396       1.1485       god         41       2/20/2023 9:37       0:01:12       51.0674       522.0439       1.1495       god         42       2/20/2023 9:37       0:01:23       51.0679       522.0439       1.1488       god         43       2/20/2023 9:37       0:01:27       51.0261       527.1819       1.1486       god         44       2/20/2023 9:37       0:01:29       51.0012       528.882       1.1477       god         45       2/20/2023 9:37       0:01:33       50.9807       532.2813       1.1476       good         47       2/20/2023 9:37       0:01:36       50.9671       533.9804       1.1473       god         48       2/20/2023 9:37       0:01:36       50.9476       537.411       1.1465       god         50       2/20/2023 9:37       0:01:40       50.9421       537.41       1.1465       god         51       2/20/2023 9:37       0:01:40       50.9335       540.8058       1.1465       god         52       2/20/2023 9:37       0:01:40							-
39       2/20/2023 9:37       0:01:17       51.0238       518.6396       1.1485 good         40       2/20/2023 9:37       0:01:19       51.0674       522.0439       1.1495 good         41       2/20/2023 9:37       0:01:23       51.0679       522.0439       1.1495 good         42       2/20/2023 9:37       0:01:25       51.0373       525.4469       1.1488 good         43       2/20/2023 9:37       0:01:27       51.0261       527.1819       1.1486 good         44       2/20/2023 9:37       0:01:31       50.9861       530.5819       1.1477 good         45       2/20/2023 9:37       0:01:33       50.9807       532.2813       1.1476 good         47       2/20/2023 9:37       0:01:36       50.9671       533.9804       1.1475 good         48       2/20/2023 9:37       0:01:42       50.3936       535.7119       1.1466 good         50       2/20/2023 9:37       0:01:42       50.3936       544.0255       1.1475 good         51       2/20/2023 9:37       0:01:44       50.9336       544.2505       1.1475 good         51       2/20/2023 9:37       0:01:45       50.3376       542.5038       1.1465 good         52       2/20/2023 9:37 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td></td<>							-
40       2/20/2023 9:37       0:01:19       51.0674       520.3415       1.1495 good         41       2/20/2023 9:37       0:01:21       51.0679       522.0439       1.1495 good         42       2/20/2023 9:37       0:01:25       51.0373       525.4469       1.1488 good         43       2/20/2023 9:37       0:01:27       51.0261       527.1819       1.1486 good         44       2/20/2023 9:37       0:01:31       50.9881       530.5819       1.1477 good         46       2/20/2023 9:37       0:01:33       50.9807       532.813       1.1476 good         47       2/20/2023 9:37       0:01:33       50.9807       533.9804       1.1473 good         49       2/20/2023 9:37       0:01:38       50.9476       535.7119       1.1466 good         51       2/20/2023 9:37       0:01:40       50.9336       540.8058       1.1467 good         52       2/20/2023 9:37       0:01:44       50.9336       540.8058       1.1466 good         52       2/20/2023 9:37       0:01:45       50.9379       545.9346       1.1466 good         53       2/20/2023 9:37       0:01:45       50.9379       545.9346       1.1466 good         54       2/20/2023 9:37							•
412/20/2023 9:370:01:2151.0679522.04391.1495 godd422/20/2023 9:370:01:2351.0457523.74561.149 godd432/20/2023 9:370:01:2751.0261527.18191.1486 godd442/20/2023 9:370:01:2951.0012528.88221.148 godd452/20/2023 9:370:01:3150.9801530.58191.1477 godd472/20/2023 9:370:01:3350.9807532.28131.1476 godd482/20/2023 9:370:01:3650.9671533.98041.1473 godd492/20/2023 9:370:01:4250.9393539.10811.1466 godd502/20/2023 9:370:01:4250.9393539.10811.1465 godd512/20/2023 9:370:01:4250.9393539.10811.1465 godd522/20/2023 9:370:01:4250.9393539.10811.1465 godd532/20/2023 9:370:01:4450.9336544.80581.1465 godd542/20/2023 9:370:01:5050.9379545.93461.1464 godd552/20/2023 9:370:01:5250.8379545.93461.1464 godd562/20/2023 9:370:01:5250.8379545.93461.1454 godd572/20/2023 9:370:01:5450.8356549.32611.1434 godd582/20/2023 9:370:01:5650.7663551.01961.1434 godd592/20/2023 9:370:01:5650.7663551.01961.1434 godd612/20/							•
42       2/20/2023 9:37       0:01:23       51.0457       523.7456       1.149 god         43       2/20/2023 9:37       0:01:25       51.0373       525.4469       1.1488 god         44       2/20/2023 9:37       0:01:29       51.0012       528.8822       1.148 god         45       2/20/2023 9:37       0:01:31       50.9881       530.5819       1.1477 god         47       2/20/2023 9:37       0:01:36       50.9607       532.2813       1.1446 god         48       2/20/2023 9:37       0:01:38       50.9671       533.9804       1.1473 god         49       2/20/2023 9:37       0:01:48       50.9476       535.7119       1.1466 god         50       2/20/2023 9:37       0:01:42       50.9393       539.1081       1.1467 god         51       2/20/2023 9:37       0:01:42       50.9336       544.2355       1.1472 god         52       2/20/2023 9:37       0:01:44       50.9338       544.2355       1.1472 god         53       2/20/2023 9:37       0:01:48       50.9638       544.2355       1.1472 god         54       2/20/2023 9:37       0:01:56       50.9376       551.0196       1.1448 god         56       2/20/2023 9:37       0:01:56							-
432/20/2023 9:370:01:2551.0373525.44691.1488 god442/20/2023 9:370:01:2751.0261527.18191.1486 god452/20/2023 9:370:01:2350.9881530.58191.1477 god472/20/2023 9:370:01:3350.9807532.28131.1476 god482/20/2023 9:370:01:3850.9671533.98041.1473 god492/20/2023 9:370:01:3850.9476535.7191.1466 god502/20/2023 9:370:01:4250.9393539.10811.1465 god512/20/2023 9:370:01:4250.9393539.10811.1465 god522/20/2023 9:370:01:4450.9326540.80581.1465 god532/20/2023 9:370:01:4650.9429542.50381.1465 god532/20/2023 9:370:01:4850.9638544.23551.1472 god542/20/2023 9:370:01:5250.8832547.63121.1445 god552/20/2023 9:370:01:5450.8356549.32611.1443 god562/20/2023 9:370:01:5650.7645552.74591.1427 god602/20/2023 9:370:01:5650.7645552.74591.1427 god612/20/2023 9:370:02:0050.7491554.43771.1428 god622/20/2023 9:370:02:0050.7351556.1451.1427 god632/20/2023 9:370:02:0050.7351556.4451.1417 god642/20/2023 9:380							-
44       2/20/2023 9:37       0:01:27       51.0261       527.1819       1.1486 good         45       2/20/2023 9:37       0:01:29       51.0012       528.8822       1.148 good         46       2/20/2023 9:37       0:01:31       50.9801       530.5819       1.1476 good         47       2/20/2023 9:37       0:01:36       50.9671       533.9804       1.1473 good         48       2/20/2023 9:37       0:01:42       50.9476       535.7119       1.1466 good         50       2/20/2023 9:37       0:01:42       50.9393       539.1081       1.1466 good         51       2/20/2023 9:37       0:01:44       50.9336       540.8058       1.1465 good         52       2/20/2023 9:37       0:01:44       50.9336       540.8058       1.1465 good         53       2/20/2023 9:37       0:01:42       50.9393       543.81.1467 good       54         54       2/20/2023 9:37       0:01:50       50.9379       545.9346       1.1466 good         55       2/20/2023 9:37       0:01:52       50.8832       547.6312       1.1443 good         57       2/20/2023 9:37       0:01:56       50.7963       551.0196       1.1434 good         58       2/20/2023 9:37       0							•
45       2/20/2023 9:37       0:01:29       51.0012       528.8822       1.148 good         46       2/20/2023 9:37       0:01:31       50.9881       530.5819       1.1477 good         47       2/20/2023 9:37       0:01:33       50.9807       532.2813       1.1476 good         48       2/20/2023 9:37       0:01:36       50.9671       533.9804       1.1473 good         49       2/20/2023 9:37       0:01:40       50.9421       537.41       1.1466 good         51       2/20/2023 9:37       0:01:42       50.9336       540.8058       1.1465 good         52       2/20/2023 9:37       0:01:44       50.9336       540.8058       1.1465 good         53       2/20/2023 9:37       0:01:46       50.9429       542.5038       1.1472 good         54       2/20/2023 9:37       0:01:50       50.9379       543.2355       1.1472 good         55       2/20/2023 9:37       0:01:52       50.832       547.6312       1.1454 good         55       2/20/2023 9:37       0:01:54       50.8356       549.3261       1.1434 good         56       2/20/2023 9:37       0:01:54       50.8356       549.3261       1.1434 good         59       2/20/2023 9:37       0:0							0
462/20/2023 9:370:01:3150.9881530.58191.1477 god472/20/2023 9:370:01:3350.9807532.28131.1476 god482/20/2023 9:370:01:3650.9671533.98041.1473 god492/20/2023 9:370:01:3850.9476535.71191.1468 god502/20/2023 9:370:01:4250.9393539.10811.1467 god512/20/2023 9:370:01:4250.9393539.10811.1466 god522/20/2023 9:370:01:4250.9393540.80581.1465 god532/20/2023 9:370:01:4250.9393541.80581.1467 god542/20/2023 9:370:01:4850.9638544.23551.1472 god542/20/2023 9:370:01:5050.9379545.93461.1466 god562/20/2023 9:370:01:5250.8832547.63121.1434 god572/20/2023 9:370:01:5650.7963551.01961.1434 god582/20/2023 9:370:01:5850.7645552.74591.1427 god602/20/2023 9:370:02:0250.7391556.1451.1423 god612/20/2023 9:370:02:0450.7193557.83581.1417 god622/20/2023 9:380:02:0750.7202559.52631.1417 god632/20/2023 9:380:02:1050.7349564.78411.1422 god642/20/2023 9:380:02:1050.7349564.78411.1422 god652/20/2023 9:38 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td></td<>							-
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522/20/2023 9:370:01:4450.9336540.80581.1465good532/20/2023 9:370:01:4650.9429542.50381.1467good542/20/2023 9:370:01:4850.9638544.23551.1472good552/20/2023 9:370:01:5050.9379545.93461.1466good562/20/2023 9:370:01:5250.8832547.63121.1454good572/20/2023 9:370:01:5650.7963551.01961.1443good582/20/2023 9:370:01:5850.7453552.74591.1427good592/20/2023 9:370:02:0050.7491554.43771.1423good602/20/2023 9:370:02:0250.7351556.1451.142good612/20/2023 9:370:02:0450.7193557.83581.1417good622/20/2023 9:370:02:0450.7193557.83581.1417good632/20/2023 9:370:02:0750.7202559.52631.1417good642/20/2023 9:380:02:1050.724563.07951.1418good652/20/2023 9:380:02:1250.7349564.78411.142good662/20/2023 9:380:02:1450.7655566.4761.1427good672/20/2023 9:380:02:1650.8568.1691.1435good			0:01:40	50.9421			-
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56       2/20/2023 9:37       0:01:52       50.8832       547.6312       1.1454 good         57       2/20/2023 9:37       0:01:54       50.8356       549.3261       1.1443 good         58       2/20/2023 9:37       0:01:56       50.7963       551.0196       1.1424 good         59       2/20/2023 9:37       0:01:58       50.7645       552.7459       1.1423 good         60       2/20/2023 9:37       0:02:00       50.7351       556.145       1.142 good         61       2/20/2023 9:37       0:02:02       50.7351       556.145       1.142 good         62       2/20/2023 9:37       0:02:04       50.7193       557.8358       1.1417 good         63       2/20/2023 9:38       0:02:07       50.7202       559.5263       1.1417 good         64       2/20/2023 9:38       0:02:10       50.724       563.0795       1.1418 good         65       2/20/2023 9:38       0:02:12       50.7349       564.7841       1.142 good         66       2/20/2023 9:38       0:02:14       50.7655       566.476       1.142 good         67       2/20/2023 9:38       0:02:16       50.8       568.169       1.1435 good							-
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58       2/20/2023 9:37       0:01:56       50.7963       551.0196       1.1434 good         59       2/20/2023 9:37       0:01:58       50.7645       552.7459       1.1427 good         60       2/20/2023 9:37       0:02:00       50.7491       554.4377       1.1423 good         61       2/20/2023 9:37       0:02:02       50.7351       556.145       1.142 good         62       2/20/2023 9:37       0:02:04       50.7193       557.8358       1.1417 good         63       2/20/2023 9:38       0:02:07       50.7202       559.5263       1.1418 good         64       2/20/2023 9:38       0:02:10       50.724       563.0795       1.1418 good         65       2/20/2023 9:38       0:02:12       50.7349       564.7841       1.142 good         66       2/20/2023 9:38       0:02:14       50.7655       566.476       1.1427 good         67       2/20/2023 9:38       0:02:16       50.8       568.169       1.1435 good							•
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65       2/20/2023 9:38       0:02:12       50.7349       564.7841       1.142 good         66       2/20/2023 9:38       0:02:14       50.7655       566.476       1.1427 good         67       2/20/2023 9:38       0:02:16       50.8       568.169       1.1435 good							-
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68 2/20/2023 9:38 0:02:18 0 569.0339 0 bad	67	2/20/2023 9:38	0:02:16	50.8	568.169	1.1435	good
	68	2/20/2023 9:38	0:02:18	0	569.0339	0	bad

69	2/20/2023 9:38	0:02:21	0	569.0339	0 bad
70	2/20/2023 9:38	0:02:23	0	569.0339	0 bad
71	2/20/2023 9:38	0:02:25	0	569.0339	0 bad
72	2/20/2023 9:38	0:02:27	49.6268	569.861	1.1171 good
73	2/20/2023 9:38	0:02:29	49.6268	571.5152	1.1171 good
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74	2/20/2023 9:38	0:02:31	49.1834	573.1621	1.1071 good
75	2/20/2023 9:38	0:02:33	49.6745	574.8478	1.1182 good
76	2/20/2023 9:38	0:02:35	49.9178	576.511	1.1236 good
77	2/20/2023 9:38	0:02:37	49.9588	578.1761	1.1246 good
					-
78	2/20/2023 9:38	0:02:39	50.1419	579.8457	1.1287 good
79	2/20/2023 9:38	0:02:46	0	581.5207	0 bad
80	2/20/2023 9:38	0:02:51	0	581.5207	0 bad
81	2/20/2023 9:38	0:02:54	0	581.5207	0 bad
82	2/20/2023 9:38	0:02:56	0	581.5207	0 bad
83	2/20/2023 9:38	0:02:58	50.2928	581.5207	1.1321 good
84	2/20/2023 9:38	0:03:00	50.2796	583.2123	1.1318 good
85	2/20/2023 9:38	0:03:02	50.6982	584.8983	1.1412 good
					-
86	2/20/2023 9:38	0:03:04	51.1207	586.5998	1.1507 good
87	2/20/2023 9:38	0:03:06	51.2584	588.3076	1.1538 good
88	2/20/2023 9:39	0:03:08	50.9282	590.0112	1.1464 good
89	2/20/2023 9:39	0:03:10	50.531	591.7321	1.1374 good
					-
90	2/20/2023 9:39	0:03:12	50.6847	593.4171	1.1409 good
91	2/20/2023 9:39	0:03:14	51.0133	595.1153	1.1483 good
92	2/20/2023 9:39	0:03:16	51.1254	596.8197	1.1508 good
93	2/20/2023 9:39	0:03:18	50.8173	598.5141	1.1439 good
					0
94	2/20/2023 9:39	0:03:20	50.7803	600.2409	1.1431 good
95	2/20/2023 9:39	0:03:22	51.0582	601.9404	1.1493 good
96	2/20/2023 9:39	0:03:24	51.3105	603.6488	1.155 good
97	2/20/2023 9:39	0:03:26	51.3732	605.3616	1.1564 good
					-
98	2/20/2023 9:39	0:03:28	51.1169	607.0674	1.1506 good
99	2/20/2023 9:39	0:03:30	51.0063	608.8022	1.1481 good
100	2/20/2023 9:39	0:03:32	50.8804	610.4991	1.1453 good
101	2/20/2023 9:39	0:03:34	50.7751	612.1925	1.1429 good
102	2/20/2023 9:39	0:03:36	50.6958	613.8829	1.1411 good
					-
103	2/20/2023 9:39	0:03:38	50.642	615.5715	1.1399 good
104	2/20/2023 9:39	0:03:40	50.6797	617.2951	1.1408 good
105	2/20/2023 9:39	0:03:42	50.6706	618.9838	1.1406 good
106	2/20/2023 9:39	0:03:44	50.6585	620.6728	1.1403 good
107	2/20/2023 9:39	0:03:46	50.6308	622.3606	1.1397 good
					-
108	2/20/2023 9:39	0:03:48	50.5401	624.046	1.1376 good
109	2/20/2023 9:39	0:03:50	50.5208	625.7629	1.1372 good
110	2/20/2023 9:39	0:03:52	50.5472	627.4476	1.1378 good
111	2/20/2023 9:39	0:03:54	50.595	629.1337	1.1389 good
112	2/20/2023 9:39	0:03:56	50.6214	630.821	1.1395 good
					-
113	2/20/2023 9:39	0:03:58	50.6146	632.5084	1.1393 good
114	2/20/2023 9:39	0:04:00	50.6005	634.2288	1.139 good
115	2/20/2023 9:39	0:04:02	50.6152	635.9161	1.1393 good
116	2/20/2023 9:39	0:04:04	50.6087	637.62	1.1392 good
117	2/20/2023 9:39	0:04:06	50.6466	639.3072	1.14 good
118	2/20/2023 9:40	0:04:08	50.6582	640.9957	1.1403 good
119	2/20/2023 9:40	0:04:10	50.6649	642.7022	1.1405 good
120	2/20/2023 9:40	0:04:12	50.6676	644.3911	1.1405 good
121	2/20/2023 9:40	0:04:14	50.658	646.0799	1.1403 good
					•
122	2/20/2023 9:40	0:04:16	50.6454	647.769	1.14 good
123	2/20/2023 9:40	0:04:18	50.6439	649.4562	1.14 good
124	2/20/2023 9:40	0:04:20	50.6509	651.1775	1.1401 good
125	2/20/2023 9:40	0:04:22	50.6553	652.8651	1.1402 good
					-
126	2/20/2023 9:40	0:04:24	50.699	654.5554	1.1412 good
127	2/20/2023 9:40	0:04:26	50.7679	656.247	1.1428 good
128	2/20/2023 9:40	0:04:28	50.8174	657.9405	1.1439 good
129	2/20/2023 9:40	0:04:30	50.8546	659.7074	1.1447 good
130	2/20/2023 9:40	0:04:32	50.8816	661.4033	1.1453 good
					-
131	2/20/2023 9:40	0:04:34	50.8965	663.1167	1.1457 good
132	2/20/2023 9:40	0:04:36	50.9131	664.8128	1.146 good
133	2/20/2023 9:40	0:04:38	50.9409	666.5106	1.1467 good
134	2/20/2023 9:40	0:04:40	50.9707	668.2272	1.1473 good
135	2/20/2023 9:40	0:04:42	51.0003	669.927	1.148 good
					-
136	2/20/2023 9:40	0:04:44	51.0149	671.6274	1.1483 good
137	2/20/2023 9:40	0:04:48	51.021	673.328	1.1485 good
138	2/20/2023 9:40	0:04:50	51.0214	676.9812	1.1485 good
139	2/20/2023 9:40	0:04:52	51.0505	678.6818	1.1491 good
140	2/20/2023 9:40	0:04:54	51.0643	680.3837	1.1494 good
					•
141	2/20/2023 9:40	0:04:56	51.0919	682.1028	1.1501 good

142	2/20/2023 9:40	0:04:58	51.1243	683.8066	1.1508 good
143	2/20/2023 9:40	0:05:00	51.1503	685.5285	1.1514 good
144	2/20/2023 9:40	0:05:03	0	685.5285	0 bad
145	2/20/2023 9:40	0:05:06	0	685.5285	0 bad
146	2/20/2023 9:41	0:05:08	0	685.5285	0 bad
147	2/20/2023 9:41	0:05:10	52.1201	685.5285	1.1732 good
148	2/20/2023 9:41	0:05:12	51.5886	687.2727	1.1612 good
149	2/20/2023 9:41	0:05:14	50.9967	688.9782	1.1479 good
150	2/20/2023 9:41	0:05:16	51.2628	690.683	1.1539 good
151	2/20/2023 9:41	0:05:18	51.5774	692.4003	1.161 good

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sympleme12/20203110900002370115312300002270003110700002376105313500142/20203110700002376115513150031952/20203110700002376115513150031962/20203110700012376115513150031962/20203110700013237611551350031962/2020311070001323761156113003597000132376115611430035982/202031107000132380115713900359132/202031107000132381117718900359142/202031107000132381117718900359152/202031107000132381217717900359162/202031107000142381117718900359162/202031107000142381117718900359172/202031107000142381117718900359182/202031107000142381117718900359192/202031107000142381117718900359192/20203110700014238111771890359192/20203110700014238111771890359192/20203110700014238111571970359192/20203110700014238171571970359 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							
isingerunter         dist/isingerund in         time declamor/inite flow volume (jablics)         time vectorie (jablics)         time vectorie (jablics)         time vectorie (jablics)         time vectorie (jablics)           2         2/2020231107         0.000         2.3719         1.50.3444         0.0333         good           4         2/2020231107         0.0010         2.3746         1.50.3341         0.0333         good           7         2/2020231107         0.0012         2.3766         1.56.3231         0.0333         good           7         2/2020231107         0.0012         2.3768         1.56.3231         0.0335         good           8         2/2020231107         0.0013         2.3784         1.57.378         0.0355         good           1         2/2020231107         0.0013         2.3784         1.57.378         0.0355         good           1         2/2020231107         0.003         2.3781         1.57.378         0.0356         good           1         2/2020231107         0.004         2.3801         1.57.356         0.034         good           1         2/2020231107         0.004         2.3801         1.57.356         0.034         good           2         2/2020	•						
1         22/20231107         0.000         22/202           3         22/20231107         0.004         22/774         1554.124         0.553 god           4         22/20231107         0.004         22/774         1554.1351         0.0353 god           5         22/20221107         0.0046         23/752         1554.2051         0.0354 god           6         22/20231107         0.0116         23/752         1557.2051         0.0554 god           7         22/20231107         0.0116         23/752         1557.1122         0.0554 god           10         22/20231107         0.0118         23/802         1.0557.996         0.0559 god           11         22/202031107         0.0018         23/802         1.0577.974         0.0559 god           12         22/202031107         0.0038         23/802         1.157.974         0.0559 god           13         22/202031107         0.0038         23/802         1.157.974         0.0559 god           14         22/202031107         0.0048         23/812         1.57.974         0.0556 god           15         22/202031107         0.0046         23/812         1.57.974         0.5356 god           15         22/202031107				flow rate (gallons/min	flow volume (gallons)	flow velocity (ft/sec)	measurement quality (good/bad)
3       27/20/23 1107       0.00.04       23.7784       156.1191       0.332 god         5       27/20/23 1107       0.00.01       23.756       156.7211       0.349 god         7       27/20/23 1107       0.01.11       27.772       156.3153       0.335 god         7       27/20/23 1107       0.01.14       27.778       155.3151       0.335 god         10       27/20/23 1107       0.01.14       23.7786       155.79141       0.335 god         11       27/20/23 1107       0.01.26       23.8074       155.7914       0.335 god         12       27/20/23 1107       0.02.6       23.8011       157.19862       0.335 god         13       27/20/23 1107       0.03.81       23.83121       157.5786       0.336 god         14       27/20/23 1107       0.03.84       23.83121       157.5786       0.336 god         17       27/20/23 1107       0.03.84       23.83121       157.5786       0.336 god         18       27/20/23 1107       0.03.84       23.83121       157.5786       0.336 god         19       27/20/23 1107       0.03.64       23.83121       157.5786       0.336 god         19       27/20/23 1107       0.04.64       23.83121							
4       47/07/023 1107       0.00.06       23.761       156.3515       0.1349 ged         7       7/07/023 1107       0.00.10       23.762       156.5155       0.1349 ged         8       27/07/023 1107       0.00.11       23.762       156.5155       0.1349 ged         8       27/07/03 1107       0.00.14       23.784       150.1131       0.3536 ged         10       27/07/03 1107       0.00.24       23.801       157.1394       0.3537 ged         11       27/07/03 1107       0.00.24       23.801       157.9982       0.3535 ged         13       27/07/03 1107       0.00.32       23.7884       157.7788       0.3538 ged         13       27/07/03 1107       0.00.32       23.8111       157.95784       0.358 ged         14       27/07/03 1107       0.00.42       23.8111       157.95784       0.358 ged         15       27/07/03 1107       0.00.42       23.8124       157.95784       0.358 ged         15       27/07/03 1107       0.00.42       23.8124       157.95784       0.358 ged         16       27/07/03 1107       0.00.42       23.8124       157.95784       0.358 ged         17       27/07/03.1107       0.00.42       23.8124 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>•</th>							•
5       27/07/0311107       00.0010       23.7540       1565.3515       0.3541 gred         7       27/07/0311107       00.012       23.7708       1565.3018       0.3541 gred         3       27/07/0311107       00.014       23.7918       1567.9141       0.3548 gred         3       27/07/0311107       00.014       23.9918       1567.9141       0.3558 gred         11       27/07/0311107       00.026       23.8001       1557.9160       0.3557 gred         12       27/07/0311107       00.036       23.8001       157.91560       0.3558 gred         14       27/07/031107       00.036       23.8121       175.7288       0.358 gred         13       27/07/031107       00.036       23.8121       175.7586       0.358 gred         14       27/07/031107       00.044       23.8121       157.5748       0.354 gred         13       27/07/031107       00.046       23.8014       157.9151       0.535 gred         14       27/07/031107       0.00.54       23.8015       157.9151       0.535 gred         14       27/07/031107       0.00.54       23.8015       155.7576       0.535 gred         15       27/07/031107       0.00.54       23.801 <th></th> <th></th> <th>0:00:04</th> <th>23.7794</th> <th>1563.1391</th> <th>0.5353</th> <th>good</th>			0:00:04	23.7794	1563.1391	0.5353	good
6       27/07/023 1107       000.10       23.702       1565.5155       0.538 god         8       27/07/023 1107       000.14       23.785       1557.1132       0.535 god         10       27/07/023 1107       000.14       23.8074       1565.7011       0.535 god         11       27/07/023 1107       000.12       23.8074       1565.7011       0.535 god         13       27/07/023 1107       000.24       23.8011       157.1572       0.535 god         13       27/07/023 1107       000.36       23.8111       157.4568       0.535 god         15       27/07/023 1107       000.36       23.8112       157.5784       0.536 god         16       27/07/023 1107       000.36       23.8121       157.5784       0.536 god         17       27/07/023 1107       000.44       23.824       157.5784       0.536 god         19       17/07/023 1107       000.44       23.804       157.5184       0.536 god         21       27/07/023 1107       000.54       23.793       158.5147       0.536 god         22       27/07/023 1107       000.54       23.793       158.5147       0.535 god         23       27/07/023 1107       000.54       23.793							-
7         1/0/023 1107         00:014         23.708         1565.308         0.331 god           8         2/20/023 1107         00:014         23.7986         1557.9141         0.535 god           11         2/20/023 1107         00:014         23.8081         1567.9141         0.535 god           12         2/20/023 1107         00:024         23.8081         1590.1041         0.535 god           13         2/20/023 1107         00:030         23.7984         1757.7984         0.535 god           14         2/20/023 1107         00:036         23.8211         157.5156         0.536 god           16         2/20/023 1107         00:036         23.8212         157.5156         0.536 god           18         2/20/023 1107         00:044         23.8121         157.5156         0.536 god           18         2/20/023 1107         00:044         23.8124         157.5166         0.536 god           19         2/20/023 1107         00:044         23.815         157.8164         0.535 god           19         2/20/023 1107         00:052         23.798         158.5478         0.535 god           12         2/20/023 1107         00:054         23.8027         158.9344         0.535 g							-
8       22/02/023107       0.0014       23.786       1557.1312       0.555 god         10       22/02/023107       0.0018       23.8774       1558.7714       0.555 god         11       22/02/023107       0.0024       23.8061       1559.1043       0.555 god         12       22/02/023107       0.0028       23.8061       1571.888.2       0.555 god         12       22/02/0231107       0.0034       23.8121       1574.556       0.0358 god         13       22/02/0231107       0.0036       23.8121       1575.576       0.554 god         14       22/02/023107       0.0038       23.812       1575.576       0.558 god         15       22/02/023107       0.0044       23.821       1575.576       0.558 god         15       22/02/023107       0.0044       23.824       1575.576       0.558 god         16       22/02/023107       0.0044       23.802       1583.199.400       0.556 god         16       22/02/023107       0.0055       23.802       1583.199.400       0.556 god         17       22/02/023107       0.0054       23.798       1583.192       0.555 god         16       22/02/023107       0.0055       23.802       1583.192<							-
9         22/02/0231107         00016         23.2956         1557.9141         0.5359 good           11         22/02/0231107         00024         23.8061         1559.1043         0.5357 good           13         22/02/0231107         00026         23.8061         1572.778         0.3355 good           14         22/02/0231107         00026         23.7884         1572.778         0.3556 good           15         22/02/0231107         00038         23.8111         1574.5788         0.556 good           16         22/02/0231107         00038         23.8121         1575.5786         0.556 good           17         22/02/0231107         00044         23.8134         1578.579         0.338 good           22/02/0231107         00044         23.8164         1578.579         0.538 good           22/02/0231107         00046         23.8174         1559.1511         0.535 good           22/02/0231107         00050         23.793         1581.478         0.5358 good           22/02/0231107         00054         23.796         1581.514         0.555 good           22/02/0231107         00054         23.796         1581.478         0.555 good           22/02/0231107         00054 <t2< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th></t2<>							-
10       220/02/031107       00024       238074       1558,1043       0.559 good         12       220/02/031107       00028       23.8061       1571,952       0.5355 good         14       220/02/031107       00028       23.8061       1571,952       0.5355 good         14       220/02/031107       00034       23.811       1573,5724       0.5356 good         16       220/02/031107       00034       23.8121       1575,1596       0.536 good         18       220/02/031107       00044       23.8121       1576,1596       0.536 good         19       220/02/031107       00044       23.8131       1576,1596       0.538 good         20       220/02/031107       00044       23.8136       1579,3571       0.535 good         21       220/02/031107       00046       23.8071       159,3676       0.538 good         22       220/02/031107       00050       23.8032       1581,3426       0.5356 good         22       220/02/031107       00056       23.8012       1583,345       0.5358 good         23       220/02/031107       00056       23.8012       1583,345       0.5358 good         24       220/02/031107       00056       23.8024							-
12       22.00/20331107       00028       23.804       1573.5724       0.5355 good         14       22.00/2031107       00030       23.7984       1573.5724       0.5355 good         16       22.00/2031107       00034       23.8111       1573.5724       0.5354 good         16       22.00/2031107       00034       23.8121       1575.1596       0.5364 good         18       22.00/2021107       00048       23.8122       1575.7548       0.5354 good         20       22.00/2021107       00044       23.8124       1573.5731       0.536 good         21       22.00/2021107       00044       23.8124       1573.5731       0.536 good         21       22.00/2021107       00044       23.8137       1580.576       0.535 good         22       22.00/2021107       00056       23.802       1583.142       0.535 good         22       22.00/20231107       00056       23.8024       1585.33       0.5355 good         23       22.00/20231107       00056       23.8024       1583.142       0.5357 good         24       22.00/20231107       00056       23.8024       1585.33       0.5355 good         24       22.00/20231108       001102       23.787 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>-</th>							-
13       2/20/203       1107       0.0030       23.7984       1573.5724       0.5356 good         15       2/20/203       1107       0.0032       23.811       1574.5754       0.5366 good         17       2/20/203       1107       0.0034       23.811       1575.556       0.5366 good         19       2/20/203       1107       0.0034       23.8312       1575.556       0.5368 good         19       2/20/203       1107       0.0042       23.8134       1575.556       0.5358 good         21       2/20/203       1107       0.0042       23.8124       1575.556       0.5358 good         21       2/20/203       1107       0.0042       23.8124       1573.557       0.5358 good         23       2/20/203       1107       0.0042       23.8124       1573.557       0.5358 good         24       2/20/203       1107       0.0054       23.9094       1381.541       0.5358 good         25       2/20/203       1107       0.0056       23.7994       1383.945       0.5358 good         26       2/20/203       1107       0.0056       23.813       1587.156       0.5358 good         27       2/20/2023       1108       0.0110	11	2/20/2023 11:07	0:00:24	23.8061	1569.1043	0.5359	good
14       22/07/023 1107       0.00.32       22.981       1574.3658       0.0356       pood         15       22/07/023 1107       0.00.34       23.8512       1575.5754       0.5364       pood         18       22/07/023 1107       0.00.36       23.8312       1575.5756       0.5358       good         18       22/07/023 1107       0.00.40       23.8313       1573.5756       0.5358       good         20       22/07/023 1107       0.00.44       23.8134       1573.5576       0.5358       good         21       22/07/023 1107       0.00.46       23.8126       1579.59607       0.5358       good         22       22/07/023 1107       0.00.52       23.9733       1581.5478       0.5358       good         24       22/02/023 1107       0.00.56       23.9734       1581.5478       0.5358       good         25       22/02/023 1107       0.00.56       23.8024       1583.4124       0.5358       good         28       22/02/023 1107       0.00.56       23.8024       1583.543       0.5358       good         28       22/02/023 1107       0.00.56       23.8024       1583.543       0.5358       good         28       22/02/023 1107							-
15       22/07/023 1107       0.0034       23.821       1575.156       0.536 good         17       22/07/023 1107       0.0038       23.8312       1575.756       0.5364 good         19       22/07/023 1107       0.0042       23.8314       1575.7566       0.5364 good         19       22/07/023 1107       0.0042       23.8314       1575.7566       0.5356 good         21       27/07/023 1107       0.0044       23.804       1579.5677       0.5356 good         22       27/07/023 1107       0.0054       23.8137       1580.5786       0.5355 good         23       27/07/023 1107       0.0056       23.8017       1581.5478       0.5355 good         24       27/07/023 1107       0.0056       23.8012       1581.5478       0.5355 good         27       27/07/023 1107       0.0056       23.8012       1584.578       0.5355 good         27       27/07/023 1107       0.0058       23.8012       1584.578       0.5355 good         27/07/023 1107       0.0102       23.7893       1585.537       0.5355 good         27/07/023 1108       0.0110       23.802       1587.517       0.5355 good         3       27/07/023 1108       0.0110       23.802       15							-
16       22/07/023       1107       0.0034       23.8312       1375.9754       0.5364 good         18       22/07/023       0.0036       23.8312       1375.9754       0.5364 good         19       22/07/023       0.0044       23.8314       1578.3575       0.5356 good         20       22/07/023       0.0044       23.834       1578.3575       0.5358 good         21       22/07/023       0.0044       23.816       1579.351       0.5358 good         21       22/07/023       0.0046       23.8176       0.5358 good         22       22/07/023       0.0048       23.807       1581.5478       0.5358 good         24       22/07/023       0.0052       23.9733       1581.5478       0.5358 good         28       22/02/023       0.0056       23.9738       1582.346       0.5358 good         28       22/02/023       0.0056       23.9739       1585.216       0.5358 good         30       22/02/023       1.007       0.0056       23.9739       1585.216       0.5358 good         31       22/02/023       1.057       0.0056       23.9739       1585.136       0.3358 good         31       22/02/023       1.168       0.0114							-
1)       2/20/2023 11.07       0.00.36       23.83.12       137.79.97.49       0.53.64       podd         19       2/20/2023 11.07       0.00.40       23.82.34       1377.55.65       0.53.65       podd         21       2/20/2023 11.07       0.00.44       23.80.64       1379.15.11       0.55.59       godd         21       2/20/2023 11.07       0.00.64       23.81.26       157.97.56.6       0.55.55       godd         23       2/20/2023 11.07       0.00.64       23.81.26       158.57.46       0.55.55       godd         24       2/20/2023 11.07       0.00.55       23.79.33       158.1.57.46       0.55.55       godd         25       2/20/2023 11.07       0.00.56       23.80.91       158.5.35       0.55.55       godd         26       2/20/2023 11.07       0.00.56       23.80.91       158.5.35       0.55.55       godd         27       2/20/2023 11.07       0.00.56       23.80.91       158.5.35       0.55.55       godd         27       2/20/2023 11.07       0.00.56       23.80.91       158.5.35       0.55.55       godd         2       2/20/2023 11.07       0.00.56       23.80.91       158.5.35       0.55.55       godd <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th></td<>							-
18       7/0/023 1107       0.00.40       23.823       157.598       0.536 god         20       7/0/023 1107       0.00.42       23.818       157.5357       0.536 god         21       7/0/023 1107       0.00.44       23.804       157.5157       0.538 god         21       7/0/023 1107       0.00.44       23.804       157.9507       0.536 god         21       7/0/023 1107       0.00.51       23.7933       158.15478       0.535 god         21       7/0/023 1107       0.00.54       23.7998       158.51342       0.558 god         22       7/0/023 1107       0.00.54       23.8034       158.1342       0.558 god         22       7/0/023 1107       0.00.56       23.8012       158.5136       0.558 god         23       7/0/023 1107       0.00.56       23.8012       158.1322       0.553 god         24       7/0/023 1108       0.01.10       23.8024       158.1324       0.558 god         23       7/0/023 1108       0.01.10       23.802       158.1327       0.558 god         24       7/0/023 1108       0.01.12       23.803       159.1099       0.5358 god         24       7/0/023 1108       0.01.12       23.802       158.1578							-
20         7/2/02031107         0.00.4         23.818         157.9579         0.0358           21         7/2/02031107         0.00.46         23.816         157.9507         0.0358         podd           21         7/2/02031107         0.00.64         23.817         1580.7546         0.5358         podd           24         7/2/02031107         0.0051         23.7933         1581.5478         0.5358         podd           25         7/2/02031107         0.0054         23.7978         1585.3434         0.5585         podd           27         7/2/02031107         0.0056         23.8014         1584.7366         0.5585         godd           27         7/2/02031107         0.0056         23.8012         1587.1357         0.5585         godd           27         7/2/02031108         0.0110         23.8024         1587.1327         0.5585         godd           27         7/2/02031108         0.01110         23.8024         1587.1327         0.5585         godd           27         7/2/02031108         0.0112         23.8031         1595.093         0.5585         godd           27         7/2/02031108         0.0112         23.8031         1595.00535         0.5585							-
21       2/20/203 11:07       0.00.44       23 8064       1579.5151       0.536 god         23       2/20/203 11:07       0.00.48       23 8037       1580.746       0.5356 god         24       2/20/203 11:07       0.00.52       23.793       1581.547       0.5556 god         25       2/20/203 11:07       0.00.56       23.8012       1583.9436       0.5558 god         27       2/20/203 11:07       0.00.56       23.8012       1583.9435       0.5558 god         28       2/20/203 11:07       0.0100       23.789       1585.53       0.5558 god         29       2/20/203 11:08       0.01104       23.789       1587.513       0.5558 god         30       2/20/203 11:08       0.0110       23.805       1587.155       0.5551 god         31       2/20/203 11:08       0.0110       23.805       1587.159       0.5359 god         32       2/20/203 11:08       0.0116       23.805       1591.909       0.5359 god         34       2/20/203 11:08       0.0116       23.805       1591.909       0.5359 god         35       2/20/203 11:08       0.0112       23.805       1591.909       0.5359 god         36       2/20/2023 11:08       0.0112       2	19	2/20/2023 11:07	0:00:40	23.8234	1577.5636	0.5363	good
22         2/20/2023 11:07         000-46         23.8126         1579.9667         0.536 pod           24         2/20/2023 11:07         000-50         23.7933         1581.5478         0.5356 pod           26         2/20/2023 11:07         000-54         23.7993         1583.1342         0.5356 pod           26         2/20/2023 11:07         000-56         23.8074         1584.7366         0.5358 pod           27         2/20/2023 11:07         000-58         23.8074         1584.7366         0.5358 pod           30         2/20/2023 11:07         0010         23.7897         1556.5229         0.5354 pod           31         2/20/2023 11:08         0.0110         23.8075         1587.1156         0.5357 pod           31         2/20/2023 11:08         0.0110         23.8075         1587.1156         0.5358 pod           32         2/20/2023 11:08         0.01110         23.8075         1588.7194         0.5358 pod           33         2/20/203 11:08         0.0112         23.8085         1591.909         0.5357 pod           34         2/20/203 11:08         0.0112         23.8085         1591.909         0.5357 pod           35         2/20/203 11:08         0.0112         23.8085			0:00:42	23.8138	1578.3579	0.536	good
23       2/20/2023 11:07       00:04/8       23.8037       1580.746       0.558 god         25       2/20/2023 11:07       00:052       23.793       1582.3406       0.5556 god         26       2/20/2023 11:07       00:056       23.8012       1583.9435       0.5558 god         27       2/20/2023 11:07       00:058       23.8012       1583.9435       0.5358 god         28       2/20/2023 11:07       00:058       23.7837       1586.322       0.5358 god         30       2/20/2023 11:08       00:102       23.7837       1586.322       0.5358 god         31       2/20/2023 11:08       00:106       23.8024       1587.9257       0.5361 god         31       2/20/2023 11:08       00:110       23.802       1589.5128       0.5358 god         32       2/20/2023 11:08       00:114       23.7969       1591.096       0.5357 god         32       2/20/2023 11:08       00:116       23.8023       1591.096       0.5358 god         33       2/20/2023 11:08       00:116       23.8023       1591.096       0.5357 god         34       2/20/2023 11:08       00:126       23.8031       1596.2064       0.5368 god         34       2/20/2023 11:08       00:126							-
24         2/20/2023 11:07         00:05:0         2.3.793         1521.5478         0.5356 pod           26         2/20/2033 11:07         00:05:4         2.3.798         1583.1342         0.5357 pod           27         2/20/2033 11:07         00:05:8         2.3.8034         1584.7365         0.5357 pod           28         2/20/2023 11:07         00:05         2.3.8034         1584.7365         0.5358 pod           30         2/20/2023 11:08         0.01:02         2.3.787         1586.5229         0.5354 pod           31         2/20/2023 11:08         0.01:04         2.3.787         1586.7157         0.5364 pod           33         2/20/2023 11:08         0.01:08         2.3.8055         1588.7159         0.5358 pod           34         2/20/2023 11:08         0.01:12         2.3.7893         1590.506         0.5358 pod           35         2/20/2023 11:08         0.01:14         2.3.7893         1590.506         0.5358 pod           37         2/20/2023 11:08         0.01:12         2.3.808         1591.909         0.5357 god           37         2/20/2023 11:08         0.01:12         2.3.808         1591.909         0.5357 god           37         2/20/2023 11:08         0.01:12 <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th></td<>							-
25       2/20/2023 11:07       00:052       23.793       1582.3406       0.5356 good         27       2/20/2023 11:07       00:056       23.8012       1583.9435       0.5358 good         28       2/20/2023 11:07       00:00       23.7899       1585.533       0.5355 good         29       2/20/2023 11:08       00:102       23.789       1586.5223       0.5355 good         30       2/20/2023 11:08       00:106       23.8173       1587.1356       0.5355 good         31       2/20/2023 11:08       00:106       23.8102       0.5555 good         32       2/20/2023 11:08       00:114       23.802       1589.5129       0.5555 good         34       2/20/2023 11:08       00:116       23.802       1599.109       0.5555 good         35       2/20/2023 11:08       00:116       23.802       1599.029       0.5556 good         35       2/20/2023 11:08       00:126       23.8131       1595.5056       0.5566 good         36       2/20/2023 11:08       00:126       23.8331       1595.5057       0.5566 good         41       2/20/2023 11:08       00:126       23.8331       1595.5057       0.5566 good         42       2/20/2023 11:08       00:126 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th></t<>							-
26       2/20//023 11:07       000:54       23.7988       1583.1342       0.5358 good         28       2/20/023 11:07       000:58       23.8034       1584.7366       0.5358 good         29       2/20/023 11:07       000:00       23.7897       1586.5229       0.5354 good         31       2/20/023 11:08       001:04       23.7877       1586.5229       0.5355 good         32       2/20/023 11:08       001:06       23.8173       1587.5257       0.556 good         33       2/20/023 11:08       001:10       23.805       1588.7194       0.5558 good         34       2/20/023 11:08       001:16       23.805       1599.1099       0.5555 good         35       2/20/023 11:08       001:16       23.8018       1591.098       0.5357 good         37       2/20/023 11:08       001:12       23.8038       1591.908       0.5356 good         41       2/20/023 11:08       001:12       23.8038       1591.908       0.5366 good         42       2/20/023 11:08       001:12       23.8038       1591.908       0.5366 good         43       2/20/023 11:08       001:12       23.8038       1595.6928       0.5366 good         42       2/20/023 11:08       001:1							-
28       1/20/2023 11:07       0010:08       23.8034       1584.756       0.3585 good         29       1/20/2023 11:08       001:02       23.7837       1586.532       0.5355 good         31       2/20/2023 11:08       001:04       23.7837       1587.155       0.3357 good         32       2/20/2023 11:08       001:06       23.8095       1588.7124       0.3358 good         33       2/20/2023 11:08       001:12       23.8095       1588.7129       0.3358 good         34       2/20/2023 11:08       001:14       23.7969       1591.099       0.3557 good         37       2/20/2023 11:08       001:16       23.8058       1591.099       0.3557 good         38       2/20/2023 11:08       001:12       23.8038       1592.7022       0.3548 good         38       2/20/2023 11:08       001:26       23.8038       1591.099       0.3557 good         39       2/20/2023 11:08       001:28       23.8038       1594.2976       0.5365 good         41       2/20/203 11:08       001:28       23.8038       1595.9061       0.5355 good         42       2/20/203 11:08       001:32       23.8046       1599.7933       0.5355 good         42       2/20/203 11:08							-
29       1/20/2023 11:07       001:00       23.7893       1585.523       0.0355       pod         31       2/20/2023 11:08       001:04       23.789       1586.322       0.5355       god         32       2/20/2023 11:08       001:06       23.8173       1587.9257       0.5361       god         32       2/20/2023 11:08       001:10       23.8025       1598.7194       0.5355       god         34       2/20/2023 11:08       001:14       23.7969       1590.306       0.5355       god         35       2/20/2023 11:08       001:14       23.8028       1591.908       0.5355       god         36       2/20/2023 11:08       001:18       23.817       1592.702       0.5366       god         37       2/20/2023 11:08       001:12       23.8383       1594.2976       0.5366       god         40       2/20/2023 11:08       001:24       23.8425       1595.9081       0.5364       god         41       2/20/2023 11:08       001:26       23.8331       1594.2976       0.5366       god         42       2/20/2023 11:08       001:26       23.8303       1594.2976       0.5365       god         43       2/20/2023 11:08       001:	27				1583.9435		-
30       2/20/2023 11:08       001:02       23.7837       1566.3229       0.5354       pool         31       2/20/2023 11:08       001:06       23.8173       1557.9257       0.5361       godd         33       2/20/2023 11:08       001:01       23.8025       1588.7124       0.5355       godd         34       2/20/2023 11:08       001:12       23.8025       1589.5129       0.5355       good         35       2/20/2023 11:08       001:14       23.7969       1591.099       0.5357       good         36       2/20/2023 11:08       001:16       23.8058       1591.099       0.5357       good         37       2/20/2023 11:08       001:12       23.8281       1593.5035       0.5364       good         38       2/20/2023 11:08       001:22       23.8281       1595.9028       0.5367       good         40       2/20/2023 11:08       001:26       23.8331       1595.9028       0.5364       good         42       2/20/2023 11:08       001:32       23.8046       1595.9028       0.5355       good         43       2/20/2023 11:08       001:34       23.7724       1599.0781       0.5355       good         44       2/20/2023 11:08 <th>28</th> <th>3 2/20/2023 11:07</th> <th>0:00:58</th> <th>23.8034</th> <th>1584.7366</th> <th>0.5358</th> <th>good</th>	28	3 2/20/2023 11:07	0:00:58	23.8034	1584.7366	0.5358	good
31       2/20/203 11:08       0:01:04       23.788       1587.156       0.5357       good         32       2/20/203 11:08       0:01:08       23.8095       1588.7134       0.5359 good         34       2/20/203 11:08       0:01:10       23.8095       1588.5129       0.5355 good         35       2/20/203 11:08       0:01:14       23.7993       1590.306       0.5355 good         35       2/20/203 11:08       0:01:16       23.8058       1591.909       0.5357 good         38       2/20/203 11:08       0:01:16       23.8028       1591.905       0.5356 good         38       2/20/203 11:08       0:01:26       23.8331       1594.2076       0.5366 good         40       2/20/203 11:08       0:01:26       23.8331       1595.601       0.5366 good         41       2/20/203 11:08       0:01:26       23.8331       1596.601       0.5368 good         42       2/20/203 11:08       0:01:26       23.8331       1596.601       0.5358 good         43       2/20/203 11:08       0:01:36       23.7794       1599.0781       0.5355 good         44       2/20/203 11:08       0:01:46       23.7795       1600.6719       0.5358 good         51       2/20/203 1							-
32       2/20/2023 11:08       0.01:06       23.8173       1587.7927       0.5361 grod         33       2/20/2023 11:08       0.01:01       23.8025       1558.7134       0.5355 grod         35       2/20/2023 11:08       0.01:12       23.7939       1590.306       0.5355 grod         36       2/20/2023 11:08       0.01:16       23.8025       1591.099       0.5357 grod         37       2/20/203 11:08       0.01:16       23.8028       1591.093       0.5357 grod         38       2/20/203 11:08       0.01:20       23.8281       1595.0935       0.5366 grod         40       2/20/203 11:08       0.01:24       23.8425       1595.0922       0.5367 grod         41       2/20/203 11:08       0.01:26       23.8303       1596.6901       0.5364 grod         42       2/20/203 11:08       0.01:30       23.8204       1599.0781       0.5355 grod         43       2/20/203 11:08       0.01:38       23.7795       1600.6419       0.5356 grod         44       2/20/203 11:08       0.01:38       23.7795       1600.6419       0.5355 grod         45       2/20/203 11:08       0.01:38       23.7795       1600.6419       0.5355 grod         46       2/20/203 11:08 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>-</th>							-
33       2/D/2023 11:08       0:01:00       23.8095       1588.7194       0.5359 good         34       2/D/2023 11:08       0:01:12       23.7893       1590.306       0.5355 good         36       2/D/2023 11:08       0:01:14       23.7969       1591.099       0.5355 good         37       2/Z0/2023 11:08       0:01:16       23.8058       1591.908       0.5355 good         38       2/D/2023 11:08       0:01:20       23.8281       1593.505       0.5366 good         40       2/Z0/2023 11:08       0:01:26       23.8393       1594.2976       0.5366 good         41       2/D/2023 11:08       0:01:26       23.8303       1595.8961       0.5366 good         42       2/Z0/2023 11:08       0:01:26       23.8303       1596.4901       0.5366 good         43       2/Z0/2023 11:08       0:01:32       23.8046       1597.4921       0.5366 good         44       2/Z0/2023 11:08       0:01:36       23.7724       1598.2853       0.5358 good         45       2/Z0/2023 11:08       0:01:36       23.7724       1598.2853       0.5358 good         46       2/Z0/2023 11:08       0:01:36       23.7724       1598.2853       0.5358 good         51       2/Z0/2023 11:0							-
34       2/0/2023 11:08       0.01:12       23.7893       1590.306       0.5355 good         35       2/0/2023 11:08       0.01:14       23.7893       1591.099       0.5357 good         37       2/20/2023 11:08       0.01:16       23.8058       1591.099       0.5355 good         38       2/20/2023 11:08       0.01:18       23.817       1592.7022       0.5364 good         40       2/20/2023 11:08       0.01:24       23.8333       1595.50228       0.5367 good         41       2/20/2023 11:08       0.01:26       23.8331       1595.50228       0.5365 good         42       2/20/2023 11:08       0.01:28       23.8303       1596.6901       0.5362 good         43       2/20/2023 11:08       0.01:30       23.8208       1597.4921       0.5362 good         44       2/20/203 11:08       0.01:34       23.7884       1599.0781       0.5355 good         45       2/20/2023 11:08       0.01:34       23.7889       1601.4648       0.5355 good         46       2/20/2023 11:08       0.01:42       23.8034       1602.4528       0.535 good         50       2/20/2023 11:08       0.01:42       23.8034       1603.651       0.535 good         51       2/20/2023 11:							-
35       2/20/2023 11:08       0:01:14       23.7893       1590.306       0.5335 good         36       2/20/2023 11:08       0:01:16       23.8058       1591.909       0.5357 good         38       2/20/2023 11:08       0:01:18       23.817       1593.5035       0.5364 good         40       2/20/2023 11:08       0:01:20       23.8281       1593.5035       0.5364 good         41       2/20/2023 11:08       0:01:22       23.8393       1594.2976       0.5365 good         43       2/20/2023 11:08       0:01:26       23.8311       1595.8961       0.5365 good         43       2/20/2023 11:08       0:01:30       23.8208       1597.4921       0.5355 good         44       2/20/2023 11:08       0:01:36       23.7724       1599.8793       0.5355 good         45       2/20/2023 11:08       0:01:36       23.7724       1599.8793       0.5355 good         47       2/20/2023 11:08       0:01:40       23.7879       1601.6464       0.5355 good         48       2/20/2023 11:08       0:01:40       23.7879       1601.4645       0.5352 good         50       2/20/2023 11:08       0:01:40       23.8104       1603.861       0.5352 good         51       2/20/2023							-
37       2/20/203 11:08       001:16       23.8058       1591.908       0.5359 good         38       2/20/203 11:08       001:120       23.8281       1593.5052       0.5364 good         40       2/20/203 11:08       0.01:22       23.8393       1594.2976       0.5366 good         41       2/20/203 11:08       0.01:26       23.8393       1595.0928       0.5367 good         43       2/20/203 11:08       0.01:26       23.8313       1595.8961       0.5362 good         43       2/20/203 11:08       0.01:32       23.8046       1598.2853       0.5358 good         44       2/20/203 11:08       0.01:32       23.8046       1598.2853       0.5358 good         45       2/20/203 11:08       0.01:38       23.7784       1599.0781       0.5355 good         46       2/20/203 11:08       0.01:42       23.8034       1601.4648       0.5355 good         47       2/20/203 11:08       0.01:42       23.804       1601.4648       0.5355 good         51       2/20/203 11:08       0.01:42       23.804       1602.552       0.5358 good         52       2/20/203 11:08       0.01:42       23.804       1602.552       0.5352 good         53       2/20/203 11:08							-
38       2/20/203 11:08       0:01:18       23.817       1592.7022       0.5361 good         39       2/20/2023 11:08       0:01:20       23.8281       1593.5035       0.5364 good         41       2/20/2023 11:08       0:01:22       23.8393       1594.2976       0.5365 good         42       2/20/2023 11:08       0:01:24       23.8425       1595.0928       0.5365 good         43       2/20/2023 11:08       0:01:28       23.8303       1596.6901       0.5364 good         44       2/20/2023 11:08       0:01:30       23.8208       1599.4793       0.5355 good         45       2/20/2023 11:08       0:01:34       23.7884       1599.0781       0.5355 good         47       2/20/2023 11:08       0:01:34       23.7884       1599.8793       0.5351 good         48       2/20/2023 11:08       0:01:40       23.7889       1601.4648       0.3555 good         51       2/20/2023 11:08       0:01:42       23.8034       1602.2582       0.5358 good         52       2/20/2023 11:08       0:01:42       23.8041       1603.0521       0.5362 good         52       2/20/2023 11:08       0:01:42       23.8043       1602.455       0.5355 good         53       2/20/202	36	5 2/20/2023 11:08	0:01:14	23.7969	1591.099	0.5357	good
39       2/20/203 11:08       0:01:20       23.8281       1593.5035       0.5364 good         40       2/20/203 11:08       0:01:22       23.8393       1594.2976       0.5365 good         41       2/20/203 11:08       0:01:26       23.8313       1595.8961       0.5365 good         42       2/20/202 11:08       0:01:28       23.8033       1596.6901       0.5364 good         43       2/20/202 11:08       0:01:32       23.8046       1597.4921       0.5365 good         44       2/20/203 11:08       0:01:32       23.8046       1599.8793       0.5351 good         45       2/20/203 11:08       0:01:34       23.7724       1599.8793       0.5351 good         47       2/20/203 11:08       0:01:42       23.8043       1602.4582       0.538 good         48       2/20/203 11:08       0:01:42       23.8034       1602.582       0.538 good         50       2/20/203 11:08       0:01:42       23.8034       1602.582       0.538 good         51       2/20/203 11:08       0:01:42       23.8034       1602.582       0.535 good         52       2/20/203 11:08       0:01:42       23.8034       1602.484       0.5355 good         52       2/20/203 11:08							
40       2/20/2023 11:08       0:01:22       23.8393       1594.2976       0.5366 good         41       2/20/2023 11:08       0:01:24       23.8425       1595.0228       0.5367 good         43       2/20/2023 11:08       0:01:26       23.8313       1596.6901       0.5365 good         44       2/20/2023 11:08       0:01:30       23.8208       1597.4921       0.5362 good         44       2/20/2023 11:08       0:01:32       23.8046       1598.2853       0.5355 good         47       2/20/2023 11:08       0:01:36       23.7724       1599.0781       0.5355 good         47       2/20/2023 11:08       0:01:36       23.7724       1599.0781       0.5355 good         48       2/20/2023 11:08       0:01:42       23.8034       1600.6719       0.5353 good         50       2/20/2023 11:08       0:01:42       23.8034       1602.521       0.5358 good         51       2/20/2023 11:08       0:01:42       23.8034       1603.861       0.5355 good         52       2/20/2023 11:08       0:01:42       23.8034       1603.251       0.5358 good         53       2/20/2023 11:08       0:01:52       23.7766       1606.3244       0.5352 good         54       2/20/202							-
41       2/20/2023 11:08       0:01:24       23.8425       1595.0928       0.5367 good         42       2/20/2023 11:08       0:01:26       23.8331       1595.8961       0.5365 good         43       2/20/2023 11:08       0:01:32       23.8303       1596.6901       0.5362 good         44       2/20/2023 11:08       0:01:32       23.8046       1598.2853       0.5358 good         45       2/20/2023 11:08       0:01:34       23.7884       1599.0781       0.5355 good         47       2/20/2023 11:08       0:01:36       23.7724       1599.8793       0.5351 good         48       2/20/2023 11:08       0:01:40       23.7889       1601.4648       0.5355 good         49       2/20/2023 11:08       0:01:42       23.8034       1602.582       0.5358 good         51       2/20/2023 11:08       0:01:44       23.8034       1603.861       0.5362 good         52       2/20/2023 11:08       0:01:46       23.8104       1603.861       0.5355 good         53       2/20/2023 11:08       0:01:52       23.7795       1606.4274       0.5355 good         54       2/20/2023 11:08       0:01:57       23.7534       1607.821       0.5349 good         55       2/20/2023							-
42       2/20/2023 11:08       0:01:26       23.8331       1595.8961       0.5365 good         43       2/20/2023 11:08       0:01:32       23.8303       1596.6901       0.5364 good         44       2/20/2023 11:08       0:01:32       23.8046       1598.2853       0.5358 good         45       2/20/2023 11:08       0:01:34       23.7884       1599.0781       0.5355 good         47       2/20/2023 11:08       0:01:38       23.7724       1599.8793       0.5351 good         48       2/20/2023 11:08       0:01:40       23.7884       1601.4648       0.5355 good         50       2/20/2023 11:08       0:01:44       23.8034       1602.2582       0.5358 good         51       2/20/2023 11:08       0:01:44       23.8034       1603.861       0.536 good         51       2/20/2023 11:08       0:01:44       23.804       1603.861       0.535 good         52       2/20/2023 11:08       0:01:50       23.7795       1604.6545       0.5355 good         53       2/20/2023 11:08       0:01:57       23.7745       1607.032       0.5349 good         54       2/20/2023 11:08       0:01:57       23.7545       1607.032       0.5347 good         55       2/20/2023 11							-
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46       2/20/2023 11:08       0:01:34       23.7884       1599.0781       0.5355 good         47       2/20/2023 11:08       0:01:36       23.7724       1599.8793       0.5351 good         48       2/20/2023 11:08       0:01:38       23.7795       1600.6719       0.5355 good         50       2/20/2023 11:08       0:01:40       23.7889       1601.4648       0.5355 good         51       2/20/2023 11:08       0:01:42       23.8034       1602.2582       0.5358 good         52       2/20/2023 11:08       0:01:44       23.8205       1603.0521       0.5365 good         52       2/20/2023 11:08       0:01:48       23.7899       1604.6545       0.5355 good         54       2/20/2023 11:08       0:01:50       23.7798       1604.6545       0.5355 good         55       2/20/2023 11:08       0:01:57       23.7645       1607.032       0.5349 good         55       2/20/2023 11:08       0:01:57       23.7545       1607.421       0.5347 good         58       2/20/2023 11:08       0:01:57       23.7645       1607.421       0.5347 good         59       2/20/2023 11:09       0:02:01       23.7657       1610.157       0.535 good         61       2/20/2023					1597.4921	0.5362	good
47       2/20/2023 11:08       0:01:36       23.7724       1599.8793       0.5351 good         48       2/20/2023 11:08       0:01:38       23.7795       1600.6719       0.5353 good         49       2/20/2023 11:08       0:01:40       23.7889       1601.4648       0.5355 good         50       2/20/2023 11:08       0:01:42       23.8034       1602.2582       0.5382 good         51       2/20/2023 11:08       0:01:44       23.8205       1603.0521       0.5362 good         53       2/20/2023 11:08       0:01:46       23.8104       1603.861       0.5355 good         54       2/20/2023 11:08       0:01:50       23.7798       1604.6545       0.5355 good         54       2/20/2023 11:08       0:01:52       23.7798       1605.4471       0.5352 good         55       2/20/2023 11:08       0:01:52       23.7764       1607.302       0.5347 good         56       2/20/2023 11:08       0:01:57       23.7534       1607.401       0.5347 good         58       2/20/2023 11:08       0:01:59       23.7645       1607.8401       0.5347 good         59       2/20/2023 11:09       0:02:07       23.7544       1610.075       0.535 good         61       2/20/2023							-
48       2/20/2023 11:08       0:01:38       23.7795       1600.6719       0.5353 good         49       2/20/2023 11:08       0:01:40       23.7889       1601.4648       0.5355 good         50       2/20/2023 11:08       0:01:42       23.8034       1602.2582       0.5358 good         51       2/20/2023 11:08       0:01:46       23.8034       1603.0521       0.5362 good         52       2/20/2023 11:08       0:01:46       23.8104       1603.861       0.5355 good         53       2/20/2023 11:08       0:01:50       23.7796       1604.6545       0.5352 good         54       2/20/2023 11:08       0:01:52       23.7766       1605.2344       0.5349 good         55       2/20/2023 11:08       0:01:57       23.7545       1607.032       0.5349 good         57       2/20/2023 11:08       0:01:59       23.7545       1607.8401       0.5347 good         58       2/20/2023 11:08       0:01:59       23.7545       1609.4236       0.5347 good         58       2/20/2023 11:08       0:02:05       23.7684       1611.0075       0.538 good         60       2/20/2023 11:09       0:02:07       23.7506       1611.8152       0.5346 good         61       2/20/202							-
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56       2/20/2023 11:08       0:01:54       23.7645       1607.032       0.5349 good         57       2/20/2023 11:08       0:01:57       23.7534       1607.8401       0.5347 good         58       2/20/2023 11:08       0:01:59       23.7494       1608.6318       0.5346 good         59       2/20/2023 11:08       0:02:01       23.7554       1609.4236       0.5347 good         60       2/20/2023 11:09       0:02:03       23.7657       1610.2157       0.535 good         61       2/20/2023 11:09       0:02:07       23.7506       1611.0075       0.535 good         62       2/20/2023 11:09       0:02:09       23.7334       1612.6065       0.5342 good         63       2/20/2023 11:09       0:02:11       23.717       1613.3969       0.5339 good         64       2/20/2023 11:09       0:02:13       23.7083       1614.1875       0.5337 good         65       2/20/2023 11:09       0:02:15       23.707       1614.9777       0.5336 good         66       2/20/2023 11:09       0:02:17       23.7124       1615.7836       0.5338 good         67       2/20/2023 11:09       0:02:19       23.7177       1616.5741       0.5339 good         68       2/20/2023							-
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70 2/20/2023 11:09 0:02:27 23.7203 1619.8364 0.5339 good							-
	70	) 2/20/2023 11:09	0:02:27	23.7203	1619.8364	0.5339	good

71	2/20/2023 11:09	0:02:29	23.7248	1620.6267	0.534 good
72	2/20/2023 11:09	0:02:31	23.7345	1621.4174	0.5343 good
					-
73	2/20/2023 11:09	0:02:33	23.7399	1622.2091	0.5344 good
74	2/20/2023 11:09	0:02:35	23.7501	1623.0008	0.5346 good
75	2/20/2023 11:09	0:02:37	23.7558	1623.8136	0.5347 good
76	2/20/2023 11:09	0:02:39	23.7787	1624.6064	0.5353 good
					-
77	2/20/2023 11:09	0:02:41	23.7999	1625.3996	0.5357 good
78	2/20/2023 11:09	0:02:43	23.8183	1626.193	0.5361 good
79	2/20/2023 11:09	0:02:45	23.8353	1626.9878	0.5365 good
80	2/20/2023 11:09	0:02:47	23.851	1627.7985	0.5369 good
					-
81	2/20/2023 11:09	0:02:49	23.847	1628.5935	0.5368 good
82	2/20/2023 11:09	0:02:51	23.8406	1629.3958	0.5366 good
83	2/20/2023 11:09	0:02:53	23.8293	1630.1898	0.5364 good
84	2/20/2023 11:09	0:02:55	23.8185	1630.9835	0.5361 good
					-
85	2/20/2023 11:09	0:02:57	23.8021	1631.7858	0.5358 good
86	2/20/2023 11:09	0:02:59	23.786	1632.5787	0.5354 good
87	2/20/2023 11:09	0:03:01	23.7894	1633.3791	0.5355 good
88	2/20/2023 11:10	0:03:03	23.8061	1634.1725	0.5359 good
89	2/20/2023 11:10	0:03:05	23.8265	1634.9666	0.5363 good
90	2/20/2023 11:10	0:03:07	23.8327	1635.7689	0.5365 good
91	2/20/2023 11:10	0:03:09	23.8256	1636.5635	0.5363 good
92	2/20/2023 11:10	0:03:11	23.8136	1637.3574	0.536 good
93	2/20/2023 11:10		23.8015		0.5358 good
		0:03:13		1638.1509	-
94	2/20/2023 11:10	0:03:15	23.7864	1638.9439	0.5354 good
95	2/20/2023 11:10	0:03:17	23.7902	1639.7527	0.5355 good
96	2/20/2023 11:10	0:03:19	23.7938	1640.5454	0.5356 good
97	2/20/2023 11:10	0:03:21	23.7995	1641.3391	0.5357 good
98	2/20/2023 11:10	0:03:23	23.8002	1642.1325	0.5357 good
99	2/20/2023 11:10	0:03:25	23.7935	1642.9252	0.5356 good
100	2/20/2023 11:10	0:03:27	23.7869	1643.734	0.5354 good
101	2/20/2023 11:10	0:03:29	23.7895	1644.5266	0.5355 good
					-
102	2/20/2023 11:10	0:03:31	23.7624	1645.3189	0.5349 good
103	2/20/2023 11:10	0:03:33	23.7412	1646.1109	0.5344 good
104	2/20/2023 11:10	0:03:35	23.7351	1646.9021	0.5343 good
105	2/20/2023 11:10	0:03:37	23.7282	1647.7085	0.5341 good
					-
106	2/20/2023 11:10	0:03:39	23.723	1648.4997	0.534 good
107	2/20/2023 11:10	0:03:41	23.7342	1649.2903	0.5342 good
108	2/20/2023 11:10	0:03:43	23.7451	1650.0821	0.5345 good
109	2/20/2023 11:10	0:03:45	23.7357	1650.8734	0.5343 good
					-
110	2/20/2023 11:10	0:03:47	23.7066	1651.6798	0.5336 good
111	2/20/2023 11:10	0:03:49	23.6776	1652.4688	0.533 good
112	2/20/2023 11:10	0:03:51	23.6807	1653.2659	0.533 good
113	2/20/2023 11:10	0:03:53	23.6935	1654.0556	0.5333 good
114	2/20/2023 11:10	0:03:55	23.694	1654.8454	0.5333 good
					-
115	2/20/2023 11:10	0:03:57	23.6945	1655.6436	0.5334 good
116	2/20/2023 11:10	0:03:59	23.7225	1656.4337	0.534 good
117	2/20/2023 11:10	0:04:01	23.7499	1657.233	0.5346 good
118	2/20/2023 11:11	0:04:03	23.7736	1658.0253	0.5351 good
119	2/20/2023 11:11	0:04:05	23.7852	1658.8182	0.5354 good
					-
120	2/20/2023 11:11	0:04:07	23.7943	1659.6192	0.5356 good
121	2/20/2023 11:11	0:04:09	23.7908	1660.4125	0.5355 good
122	2/20/2023 11:11	0:04:11	23.7938	1661.2133	0.5356 good
123	2/20/2023 11:11	0:04:13	23.8175	1662.007	0.5361 good
			23.8409	1662.8015	-
124	2/20/2023 11:11	0:04:15			0.5367 good
125	2/20/2023 11:11	0:04:17	23.8671	1663.6048	0.5372 good
126	2/20/2023 11:11	0:04:19	23.8992	1664.4008	0.538 good
127	2/20/2023 11:11	0:04:25	23.9198	1664.7999	0.5384 good
128	2/20/2023 11:11	0:04:28	23.9407	1667.7286	0.5389 good
					-
129	2/20/2023 11:11	0:04:30	23.9687	1668.5275	0.5395 good
130	2/20/2023 11:11	0:04:32	23.9574	1669.3261	0.5393 good
131	2/20/2023 11:11	0:04:34	23.9381	1670.1669	0.5388 good
132	2/20/2023 11:11	0:04:36	23.9268	1670.9649	0.5386 good
133	2/20/2023 11:11				0.5385 good
		0:04:38	23.9208	1671.7624	-
134	2/20/2023 11:11	0:04:40	23.9232	1672.5594	0.5385 good
135	2/20/2023 11:11	0:04:42	23.9262	1673.3574	0.5386 good
136	2/20/2023 11:11	0:04:44	23.9159	1674.171	0.5383 good
137	2/20/2023 11:11	0:04:46	23.9071	1674.968	0.5381 good
					-
138	2/20/2023 11:11	0:04:48	23.8988	1675.7647	0.538 good
139	2/20/2023 11:11	0:04:50	23.8914	1676.5608	0.5378 good
140	2/20/2023 11:11	0:04:52	23.8651	1677.3565	0.5372 good
141	2/20/2023 11:11	0:04:54	23.8449	1678.1673	0.5367 good
					-
142	2/20/2023 11:11	0:04:56	23.8415	1678.9616	0.5367 good
143	2/20/2023 11:11	0:04:58	23.8307	1679.756	0.5364 good
144	2/20/2023 11:11	0:05:00	23.8338	1680.551	0.5365 good
145	2/20/2023 11:12	0:05:02	23.8207	1681.3447	0.5362 good
					0

146	2/20/2023 11:12	0:05:04	23.8084	1682.1547	0.5359 good
147	2/20/2023 11:12	0:05:06	23.8087	1683.0607	0.5359 good
148	2/20/2023 11:12	0:05:08	23.8163	1683.854	0.5361 good
149	2/20/2023 11:12	0:05:10	23.8235	1684.6485	0.5363 good
150	2/20/2023 11:12	0:05:12	23.8268	1685.4427	0.5363 good
151	2/20/2023 11:12	0:05:14	23.8215	1686.2364	0.5362 good

#### **ATTACHMENT 3**

2021 KLEINSCHMIDT DESKTOP ENTRAINMENT REPORT



## **Desktop Entrainment Report**

**GLHA NH Projects** 

Sawmill (FERC No. 2422)

**Riverside (FERC No. 2423)** 

**Cross Power (FERC No. 2326)** 

Cascade (FERC No. 2327)

Upper Gorham (FERC No. 2311)

## Shelburne (FERC No. 2300)

Prepared for:

## **Great Lakes Hydro America, LLC**

Prepared by:



Pittsfield, Maine www.KleinschmidtGroup.com

June 2021

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Appendix A Results of Turbine Blade Strike – Sawmill Project

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### **1.0 INTRODUCTION**

Great Lakes Hydro America, LLC (GLHA), an affiliate of Brookfield Renewable Partners L.P., completed a desktop study to assess the potential risk of entrainment and impingement of resident fish species at the Sawmill, Riverside, Cross, Cascade, Gorham, and Shelburne hydroelectric projects (GLHA NH Projects). All six hydropower projects are on the Upper Androscoggin River near Gorham and Berlin, New Hampshire, in an 11-mile-long, high-gradient reach of the river that supports hydropower generation at eight stations. As described in the Revised Study Plan, the objectives of the study included:

- Describing the configuration of the intake areas at the six hydroelectric projects, including forebay characteristics, size of the intakes, trash rack spacing, extent of coverage of the intakes, approach velocities, and the influence of trash rack debris and cleaning protocols.
- Assessing entrainment risk and impingement risk of stocked salmonids (e.g., brown trout and rainbow trout) and the four most abundant resident fish species known to occur in the study area: fallfish, smallmouth bass, white sucker, and longnose dace (migratory species such as Atlantic salmon and river herring do not occur in the upper Androscoggin River).

## 2.0 METHODS

GLHA evaluated entrainment risk, impingement risk, and the potential for turbine passage survival of juvenile and adult lifestages of stocked trout, fallfish, smallmouth bass, white sucker, and longnose dace. This combination of species and lifestages represents a range of game species, nongame species, and native species that may be affected by project operations.

**Physical Characteristics of the Hydro Projects** – GLHA reviewed features of each hydropower project that are applicable to fish entrainment and impingement including:

- Trash rack configuration (e.g., surface area of rack system and clear spacing of trash rack bars).
- Water use through the turbines (e.g., cfs used for generation).
- Approach velocity (feet per second; fps) in front of the trash racks.
- Debris accumulation and handling.
- Turbine characteristics (e.g., power output, turbine type and orientation, revolutions per minute, and head).

**Biological Characteristics and Aquatic Habitat** – GLHA reviewed relevant biological characteristics of the target species that influences their susceptibility to entrainment and impingement and aquatic habitat in the project area, including:

- Applicable life history information for each species (e.g., length, body width, and burst swim speed for juvenile and adult lifestages).
- Habitat preferences and an assessment of aquatic habitats near the project intakes.
- Propensity to migrate (i.e., requirements for obligatory downstream migration).
- Applicable species- or family-specific turbine survival data.

**Analysis of Impingement and Entrainment Risk** – For the purpose of this assessment, entrainment and impingement risk for juveniles and adults of each target species is categorized or ranked as high, moderately high, moderate, moderately low, or low according to swim speed (i.e., ability to avoid or resist intake velocities that could result in involuntary entrainment or impingement), body size (likelihood of passing through

trash racks), habitat preference or availability of habitat near the intake area, and the proclivity to move (i.e., migratory requirements).

Fish impingement may occur when a fish is involuntarily trapped on the trash racks. The risk of impingement is a function of fish size and swim speed. Impingement risk was assessed by determining the size of fish that is precluded from being entrained by the trash racks. A conservative measure of this is the interorbital skull width, which can be derived from species-specific ratios of body length to skull width (Smith, 1985). Because the skull is non-compressible, a skull width exceeding the trash rack clear spacing will prevent the fish from becoming entrained. However, fish excluded by the trash rack bars from the turbine may be impinged, if the swim speed is less than the intake velocity at the trash racks. A large fish with a swim speed less than the intake velocity was classified as at high risk of impingement; by contrast, a large fish with a swim speed faster than the intake velocity was classified as a low risk. Burst fish swim speed information was collected from a literature review of published and unpublished information. In instances where information on swim speeds was not readily available, burst swim speed estimates were derived using the following equation developed by the U.S. Fish and Wildlife Service (USFWS):

# Burst Swimming Speed (ft/s) = (Fish length (ft) x 3 body lengths per second $(ft/s)^*(2)^1$

Turbine passage survival estimates were made for those species and lifestages that were found to be at risk (i.e., could physically fit through the trash racks and with swim speeds less that calculated approach velocities). Turbine passage survival estimates were derived from past studies described in the Electric Power Research Institute's (EPRI) database for hydropower projects using sites similar to GLHA NH's hydroelectric facilities. In addition, the USFWS' Turbine Blade Strike Analysis model (Towler and Pica 2018) was used to assess turbine passage survival for those species or lifestages classified as at risk (i.e., in instances where swim speeds were less than calculated approach velocities).

<sup>&</sup>lt;sup>1</sup> USFWS, 1989.

## 3.0 **RESULTS**

#### 3.1 Biological Characteristics and Aquatic Habitat near Intakes

#### 3.1.1 Fish Species

#### 3.1.1.1 Fallfish

The fallfish is one of the most common fish species in the state of New Hampshire (NHDFG 2021). They are found in a wide array of freshwater habitats, but are abundant in rivers and streams that have a mix of rocky and gravel substrates. Spawning occurs in areas with rocky substrates, as male fallfish build nest mounds with pebbles (NHDFG 2021). They are typically found in run and pool habitats in rivers and streams, and in littoral habitats in lakes and ponds. Fallfish are the largest minnow species native to eastern North American, and can grow in excess of 17 inches, although a more common adult size in the northeast is 8 inches (NJDFW 2021).

Based on body width calculations from Smith (1985), an 8-inch-long fallfish would have an interorbital width (i.e., the distance between the eyes as measured across the head and roughly equivalent to skull width) of approximately 0.8 inches. Existing swim speed information for fallfish is limited, but a conservative estimate of burst swimming speed was calculated based on guidance from the USFWS. Burst swim speeds would vary from 2.0 fps for a 4-inch-long fallfish to 6.0 fps for a 12-inch-long fallfish; an 8-inch-long fallfish would be expected to have a burst swim speed of 4.0 fps.

#### 3.1.1.2 Smallmouth Bass

Smallmouth bass typically inhabit rocky areas in lakes, and pool or run habitats with gravel, cobble, or bedrock in rivers and streams. The species is typically found in cool, clear water and often seeks out cover in the form of logs, rocky outcroppings, or manmade structures such as rip-rap. When present in streams, smallmouth bass are often found in areas with relatively swift currents (ADW 2021). In lakes and ponds, or slow moving reaches of rivers, smallmouth bass are often found along rocky shorelines and littoral transition zones. Smallmouth bass can grow as long as 27 inches, but a more common adult size range is 12 to 16 inches (USFWS 2021). Based on body width calculations from Smith (1985), a 14-inch-long smallmouth bass would have an interorbital width of approximately 1.4 inches, and a 20-inch-long smallmouth bass would

have an interorbital width of approximately 2 inches. Adult smallmouth bass of multiple size classes have documented sustained swim speeds of approximately 3.25 fps (Bell 1991). Based on calculations that suggest a burst speed as approximately two times sustained speed (USFWS 2019), a 14-inch-long smallmouth bass would be expected to have a burst speed of 7.0 fps. A 4-inch-long smallmouth bass would be expected to have a burst speed of 2.0 fps, and an 8-inch-long smallmouth would be expected to have a burst speed of 4.0 fps.

#### 3.1.1.3 White Sucker

White suckers use a wide range of habitats, and are tolerant of pollution, high turbidity levels, and low dissolved oxygen levels. They are found in lakes and rivers across multiple stream gradients and variable water velocities. As habitat generalists, white suckers can be found in areas with dense weeds, or in bedrock and other rocky substrates with minimal vegetation. Adult white suckers generally grow to lengths between 10 and 20 inches (IDNR 2021). Based on body width calculations from Smith (1985), a 14-inch-long white sucker would have an interorbital width of approximately 2 inches and a 20-inch-long white sucker would have an interorbital width of approximately 3 inches. A 12-inch-long white sucker has a burst speed of 6.0 fps based on USFWS swim speed parameters (USFWS 1989; USFWS 2019). Longnose sucker, a similar species that shares habitats with white sucker in parts of their range, have documented burst speeds of approximately 6 fps at lengths of approximately 10 inches (Bell 1991). Smaller individuals (6-inches-long) would have burst speeds of 3.0 fps.

#### 3.1.1.4 Longnose Dace

Longnose dace are the most widely distributed minnow species in North America, and are found in all major watersheds in New Hampshire. Although they can be found in slow moving water and lake habitats, the preferred habitat for longnose dace is swift flowing riffles. The species is most often found in riffles with boulder, cobble, and gravel substrates, as their streamlined morphology allows them the ability to maintain position on the bottom in fast flows. Longnose dace can get as long as 7 inches, but a more common adult length is approximately 4 inches (USGS 2004). A 4-inch-long longnose dace swim speeds are not readily available in existing literature, but USFWS body size and swim speed parameters suggest that a 4-inch-long longnose dace has a burst speed of

2.0 fps. Given that longnose dace occurs in fast-flowing riverine waters, no additional analysis of entrainment and impingement risk for this species was completed as risk of entrainment and impingement is very low at hydropower intakes in impounded waters.

#### 3.1.1.5 Stocked Trout

The NHFGD stocks the upper Androscoggin River annually with catchable-sized (e.g., 8 to 10-inch-long) brook trout, rainbow trout, and brown trout. As such they have the potential to encounter project features and become entrained. Most trout stocking locations are more than 10 miles upriver from the Berlin area; NHDFG has not stocked trout between Berlin and Shelburne, New Hampshire, since 2003 because of fish consumption advisories (personal communication, Jesse Wechsler, Kleinschmidt, with Diane Timmons, NHDFG June 28, 2019). Of the three species of salmonids that are stocked in the Androscoggin River, brook trout are the least tolerant to turbidity and increased water temperature. Brown trout are the most ubiquitous species, and can be found in a wide array of habitats. All three species prefer cool, clean water. Preferred habitats in creeks and rivers include slower, deeper areas downstream of riffles. Riffle habitats with current breaks can also be used as foraging habitat for all three species. In general, adults are well adapted to deeper water habitats, while young fish often use swift water habitats (WIDNR 2019). There are some differences in average and maximum length, but all three species have similar body morphology. A 12-inch-long brown trout, rainbow trout, or brook trout would have an interorbital width of 0.9 inches (Smith 1985). A 10-inch-long trout has a burst swim speed of 5 fps based on USFWS parameters. An 8-inch-long trout has a burst speed of approximately 4.0 fps.

#### 3.1.2 Fish Habitat in the Project Area

#### 3.1.2.1 Sawmill Project

The Sawmill intake area contains no structural fish habitat such as aquatic plant beds, rocky substrates, gravel, or woody debris. The shoreline on the river right side<sup>2</sup> of the intake area is steep, disturbed from urban development, and provides limited habitat or structure (Photo 3.1). The river left shoreline near the intake is composed of steel and concrete associated with the dam or large gate structures (Photo 3.1 and Photo 3.2). Because there is no fish habitat other than open water near the intake and no migratory

<sup>&</sup>lt;sup>2</sup> From the perspective of an observer looking downstream.

fish species, it is expected that few fish inhabit the area permanently. There is no habitat for stocked salmonids in the Sawmill impoundment near the intakes.

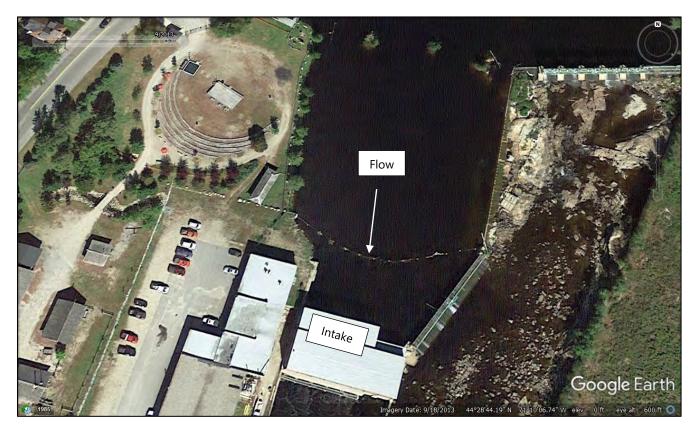


Photo 3.1 Sawmill Intake and Forebay Area, Upper Androscoggin River.

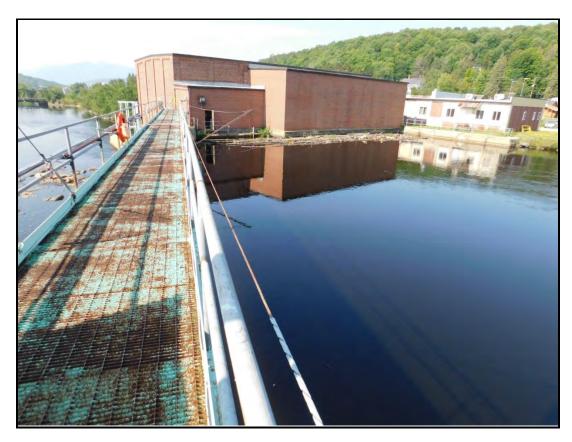


Photo 3.2 Sawmill Intake and Forebay Area, Upper Androscoggin River.

#### 3.1.2.2 Riverside Project

The Riverside intake area includes some rocky shoreline habitat and overhanging vegetation on the river right that provides aquatic habitat. As such, white sucker, smallmouth bass, and fallfish may use this area. The river left shoreline near the intake is composed of steel and concrete associated with the dam or large gate structures (Photo 3.3 and Photo 3.4). Given that the Riverside Project intake areas is situated immediately downstream of the Sawmill Project and there is limited or no spawning or nursery habitat, it is unlikely that the Riverside impoundment supports large populations of fish. There is no habitat for stocked salmonids in the Riverside impoundment near the intakes.

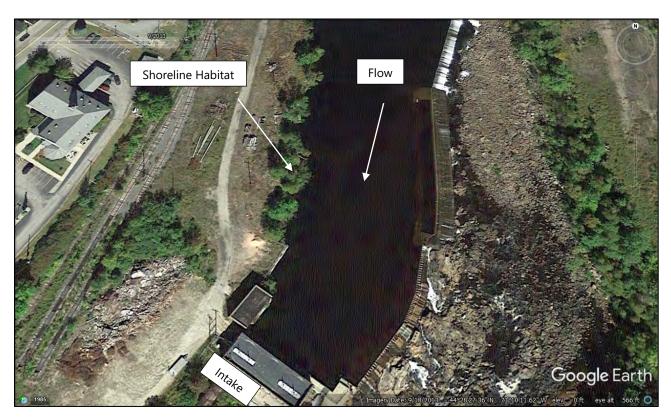


Photo 3.3 Riverside Intake and Forebay Area, Upper Androscoggin River.



Photo 3.4 Riverside Intake and Forebay Area, Upper Androscoggin River.

#### 3.1.2.3 Cross Project

The Cross intake area includes some sandy, vegetated shoreline on the river left that provides habitat for juvenile fish and other aquatic species (Photo 3.5and Photo 3.6). As such, white suckers, smallmouth bass, and fallfish may inhabit this area. There is no habitat for stocked salmonids in the Cross impoundment near the intakes.



Photo 3.5 Cross Intake and Forebay Area, Upper Androscoggin River.



Photo 3.6 Cross Intake and Forebay Area, Upper Androscoggin River.

#### 3.1.2.4 Cascade Project

The intake to the Cascade Project is a constructed power canal surrounded by mill buildings and the superstructure of the dam (Photo 3.7 and Photo 3.8). Because there is no fish habitat near the intake and no migratory fish species in the Upper Androscoggin River, it is expected that few fish inhabit the area permanently. There is no habitat for stocked salmonids in the Cascade impoundment near the intakes.

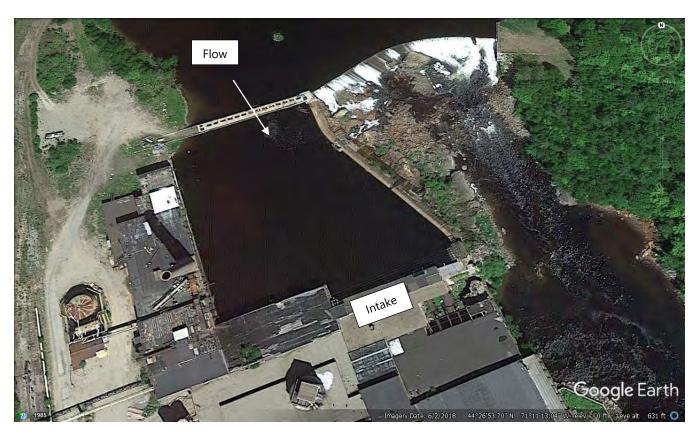


Photo 3.7 Cascade Intake and Forebay Area, Upper Androscoggin River.

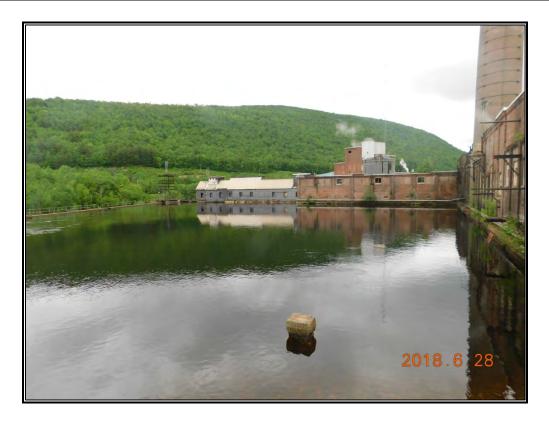


Photo 3.8 Cascade Intake and Forebay Area, Upper Androscoggin River.

#### 3.1.2.5 Gorham Project

The intake to the Gorham Project is a lined, constructed power canal that is approximately 3,350-feet long. There are some shoreline features in the canal that provide habitat for fish like rip-rap boulders and aquatic vegetation beds (Photo 3.9 and Photo 3.10). As such, white suckers, smallmouth bass, and fallfish may inhabit this area. There is no habitat for stocked salmonids at the Gorham Project near the intakes.

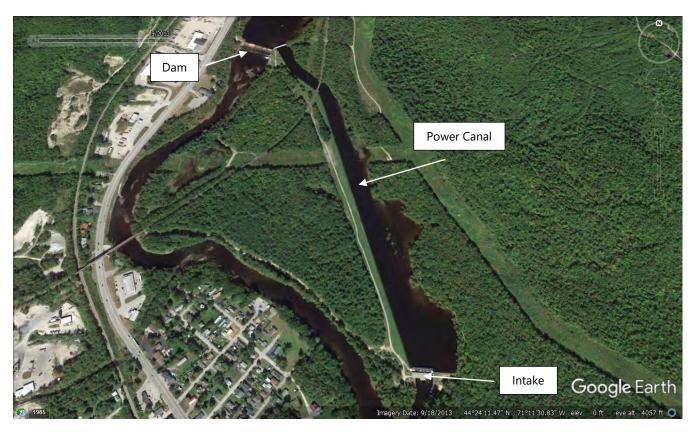


Photo 3.9 Gorham Intake and Forebay Area, Upper Androscoggin River.



Photo 3.10 Gorham Project Power Canal, Upper Androscoggin River.

#### 3.1.2.6 Shelburne Project

There are some shoreline features near the intake at the Shelburne Project that provide habitat for fish such as shoreline vegetation, rip-rap, and instream cover (Photo 3.11 and Photo 3.12). As such, resident species such as suckers, smallmouth bass, and fallfish may use this area. There is no salmonid habitat near the intake; therefore, the risk of entrainment for stocked salmonids is low.



Photo 3.11 Shelburne Project Intake Area, Upper Androscoggin River.

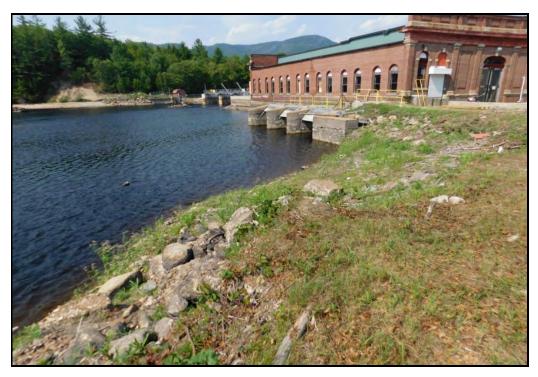


Photo 3.12 Shelburne Project Intake Area, Upper Androscoggin River.

#### 3.2 Risk of Impingement and Entrainment

#### 3.2.1 Sawmill Project

The Sawmill Project has four horizontal propeller turbines (i.e., similar to Kaplan turbines). The total hydraulic capacity of the station is 2,484 cfs with a maximum generation of 3.34 megawatts (MW). Each turbine's trash rack has a surface area of 241 square feet (14-ft X 17.2-ft) for a total rack area of 963.2 square feet. Full depth, vertical trash rack bars are spaced at 3 inches. Relevant turbine and site characteristics are provided in Table 3.1.

Characteristic	Sawmill Project Unit 1	Sawmill Project Unit 2	Sawmill Project Unit 3	Sawmill Project Unit 4
Turbine Orientation	Horizontal	Horizontal	Horizontal	Horizontal
	Fixed	Fixed	Fixed	Adjustable
Turbine Type (e.g., Kaplan/Francis)	Blade Prop	Blade Prop	Blade Prop	Blade Prop
Rated Power (MW)	0.8	0.87	0.8	0.87
Turbine Rated Max Flow (cfs)	590	652	590	652
Head (feet)		1	7.2	
Turbine RPM	200	200	200	200
Runner Diameter (feet)	6.6	6.6	6.6	6.6
Number of Blades or Buckets	4	4	4	4
Description of Debris Management/Removal Hydraulic Rake				
Gross Dimensions of Trash Rack (square feet)	241	241	241	241
Calculated Approach Velocity (fps)	2.5	2.7	2.5	2.7
Clear (Open) Spacing Between Trash Rack Bars		3 in	ches	

 Table 3.1
 Characteristics of the Sawmill Project

The Sawmill Project is characterized by a large power canal and limited to no habitat in the forebay and intake area other than open water. Trash rack spacing is wide enough for adult smallmouth bass, white sucker, and fallfish to become entrained. Maximum intake velocities are approximately 2.7 fps when operating at the full hydraulic capacity of 2,484 cfs. Burst speeds of adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 2.7 fps, which means fish can swim away from the intake area to avoid entrainment. However, small juvenile lifestages of fallfish, smallmouth bass, and white sucker (e.g., 4-inch-long fish) have burst speeds of approximately 2.0 fps. Therefore, there is a moderately low risk of entrainment for young, juvenile smallmouth bass, fallfish, and white sucker if in the forebay area. Impingement is unlikely because of the wide rack spacing and low approach velocities.

Entrainment studies have been conducted at projects with horizontal Kaplan turbines, similar to those at the Sawmill Project. Specifically, the Townsend and Wilder hydroelectric projects have similar characteristics to the Sawmill Project, with head less than 50 feet and horizontal Kaplan or fixed blade turbines. Small, juvenile fish (e.g., 3 to 5 inches long) had survival estimates ranging from 96 to 100 percent during those studies. Additionally, other projects where entrainment survival has been studied have documented survival rates of at least 95 percent for juvenile lifestages (i.e., less than 5 inches total length) (EPRI 1997). Similarly, survival estimates for small (3 to 5 inches long), juvenile fish through the Sawmill turbines was predicted to be above 95 percent based on the USFWS's turbine blade strike model results (Appendix A provides the Turbine Blade Strike Analysis (TBSA) results for the Sawmill Project).

Based on the lack of habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, non-migratory life cycles, and high survival of juvenile fish through similar turbines, the overall effect of project operations on resident fish species is expected to be minimal and risk of entrainment is considered moderately low. Trash raking is done with a hydraulic rack rake; it is expected this has no influence on impingement and entrainment of fish.

#### 3.2.2 Riverside

The Riverside Project has two vertical Francis turbines. The total hydraulic capacity of the station is 1,880 cfs with a maximum generation of 7.9 MW. Each turbine's trash rack has a surface area of 528 square feet (24-ft X 22-ft) for a total rack area of 1,056 square feet. Full depth, vertical trash rack bars are spaced at 2.5 inches. Relevant turbine and site characteristics are provided in Table 3.2.

Characteristic	Riverside Unit 1	Riverside Unit 2	
Turbine Orientation	Vertical	Vertical	
Turbine Type (e.g., Kaplan/Francis)	Francis	Francis	
Rated Power (MW)	3.8	4.1	
Turbine Rated Max Flow (cfs)	910	970	
Head (feet)	65.8		
Turbine RPM	200	200	
Description of Debris Management/Removal	Hydraulic Rake		

Table 3.2	Characteristics of the Riverside Project

Gross Dimensions of Trash Rack (square feet)	528	528
Calculated Approach Velocity (fps)	1.7	1.8
Clear (Open) Spacing Between Trash Rack Bars	Bars 2.5 inches	

The Riverside Project has a limited amount of habitat in the forebay and intake area consisting of some rocky shoreline habitat and overhanging vegetation. Trash rack spacing is wide enough for most adult smallmouth bass, white sucker, and fallfish to pass through; however, maximum intake velocities range from 1.7 to 1.8 fps when operating at the full hydraulic capacity of 1,880 cfs. Burst speeds for juvenile and adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 1.8 fps, which means fish can swim away from the intake area to avoid entrainment. Impingement is unlikely because of the wide rack spacing and low approach velocities. Based on the limited amount of aquatic habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, and non-migratory life cycles in the Upper Androscoggin River, the overall effect of project operations on resident fish species is expected to be minimal and risk of entrainment is low. Trash raking is done with a hydraulic rack rake; it is expected this has no influence on impingement and entrainment of fish.

#### 3.2.3 Cross

The Cross Project has five horizontal propeller turbines (i.e., similar to Kaplan turbines). The total hydraulic capacity of the station is 2,890 cfs with a maximum generation of 3.67 MW. Each turbine's trash rack has a surface area of 422 square feet (22 ft X 19.2 ft) for a total rack area of 2,112 square feet. Full depth, vertical trash rack bars are spaced at 3 inches. Relevant turbine and site characteristics are provided in Table 3.3.

Characteristic	Cross Unit 1	Cross Unit 2	Cross Unit 3	Cross Unit 4	Cross Unit 5	
Turbine Orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	
Turbine Type (e.g., Kaplan/Francis)	Propeller	Propeller	Propeller	Propeller	Propeller	
Rated Power (MW)	0.7	0.7	0.7	0.7	0.87	
Turbine Rated Max Flow (cfs)	550	600	550	550	640	
Head (feet)		20				
Turbine RPM	225	225	225	200	240	
Number of Blades or Buckets	4	4	4	4	4	
Gross Dimensions of Trash Rack (square feet)	422	422	422	422	422	
Calculated Approach Velocity (fps)	1.3	1.4	1.3	1.3	1.5	
Description of Debris Management/Removal	Hand Rake					
Clear (Open) Spacing Between Trash Rack Bars	3 inches					

#### Table 3.3Characteristics of the Cross Project

The Cross Project has a limited amount of habitat in the forebay and intake area consisting of some shoreline mud flats and aquatic vegetation beds. Trash rack spacing is wide enough for most adult smallmouth bass, white sucker, and fallfish to pass through; however, maximum intake velocities range from 1.3 to 1.5 fps when operating at the full hydraulic capacity of 1,880 cfs. Burst speeds for juvenile and adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 1.5 fps, which means fish can swim away from the intake area to avoid entrainment. Impingement is unlikely because of the wide rack spacing and low approach velocities. Based on the limited amount of aquatic habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, and non-migratory life cycles in the Upper Androscoggin River, the overall effect of project operations on resident fish species is expected to be minimal and risk of entrainment is low. Trash raking is done manually; it is expected this has no influence on impingement and entrainment of fish.

#### 3.2.4 Cascade

The Cascade Project has three vertical Francis turbines. The total hydraulic capacity of the station is 2,950 cfs with a maximum generation of 7.92 MW. The trash rack has a surface area of approximately 2,250 square feet. Full depth, vertical trash rack bars are spaced at 2.5 inches. Relevant turbine and site characteristics are provided in Table 3.4.

	Cascade	Cascade	Cascade
Characteristics	Unit 1	Unit 2	Unit 3
Turbine Orientation	Vertical	Vertical	Vertical
Turbine Type (e.g., Kaplan/Francis)	Francis	Francis	Francis
Rated Power (MW)	2.5	2.5	2.92
Turbine Rated Max Flow (cfs)	950	950	1050
Head (feet)		47	
Turbine RPM	150	150	150
Gross Dimensions of Trash Rack (square feet)	2,250		
Calculated Approach Velocity (fps)	1.3		
Description of Debris Management/Removal	Hand Rake		
Clear (Open) Spacing Between Trash Rack Bars		2.5 inches	
Total Hydraulic Capacity (cfs)	2,950		

Table 3.4Characteristics of the Cascade Project

The Cascade Project is characterized by a forebay and intake area with no aquatic habitat other than open water. Trash rack spacing is wide enough for adult smallmouth bass, white sucker, and fallfish to pass through. Maximum intake velocities are approximately 1.3 fps when operating at the full hydraulic capacity of 2,250 cfs. Burst speeds for adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 1.3 fps, which means fish can swim away from the intake area to avoid entrainment. Based on the lack of habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, non-migratory life cycles, and high survival of juvenile fish through similar turbines, the overall effect of project operations on resident fish species is expected to be minimal and risk of entrainment is low. Trash raking is done manually; it is expected this has no influence on impingement and entrainment of fish.

#### 3.2.5 Gorham Project

The Gorham Project has four horizontal Francis turbines. The total hydraulic capacity of the station is 2,200 cfs with a maximum generation of 4.8 MW. Each turbine's trash rack has a surface area of 416 square feet (20.8-ft X 20.0-ft) for a total rack area of 1,664 square feet. Full depth, vertical trash rack bars are spaced at 3.125 inches. Relevant turbine and site characteristics are provided in Table 3.5.

Characteristics	Gorham Unit 1	Gorham Unit 2	Gorham Unit 3	Gorham Unit 4
Turbine Orientation	Horizontal	Horizontal	Horizontal	Horizontal
Turbine Type (e.g., Kaplan/Francis)	Francis	Francis	Francis	Francis
Rated Power (MW)	1.2	1.2	1.2	1.2
Turbine Rated Max Flow (cfs)	550	550	550	550
Head (feet)	30			
Turbine RPM	164	164	164	164
Description of Debris Management/Removal	Hand Rake			
Gross Dimensions of Trash Rack (square feet)	416	416	416	416
Calculated Approach Velocity (fps)	1.3	1.3	1.3	1.3
Clear (Open) Spacing Between Trash Rack Bars	3.125 inches			

 Table 3.5
 Characteristics of the Gorham Project

The Gorham Project has some shoreline features in the lined canal near the intake that provide limited habitat for fish such as rip-rap boulders and small areas of aquatic vegetation. Trash rack spacing is wide enough for most adult smallmouth bass, white sucker, and fallfish to pass through; however, maximum intake velocities are 1.3 fps when

operating at the full hydraulic capacity of 2,200 cfs. Burst speeds for juvenile and adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 1.3 fps, which means they can swim away from the intake area to avoid entrainment. Impingement is unlikely because of the wide rack spacing and low approach velocities. Based on the limited amount of aquatic habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, and non-migratory life cycles in the Upper Androscoggin River, the overall effect of project operations on resident fish species is expected to be minimal and the risk of entrainment is low. Trash raking is done manually; it is expected this has no influence on impingement and entrainment of fish.

#### 3.2.6 Shelburne

The Shelburne Project has two vertical Francis turbines and one vertical Kaplan turbine. The total hydraulic capacity of the station is 3,400 cfs with a maximum generation of 3.72 MW. Individual turbine trash rack surface area ranges from 624 square feet (24-ft x 26-ft for unit 1 and unit 2) to 1,056 square feet (24-ft x 44-ft for unit 3). Relevant turbine and site characteristics are provided in Table 3.6. Full depth, vertical trash rack bars are spaced at 3 inches.

	Shelburne	Shelburne	Shelburne
Characteristics	Unit 1	Unit 2	Unit 3
Turbine Orientation	Vertical	Vertical	Vertical
Turbine Type (e.g., Kaplan/Francis)	Francis	Francis	Kaplan
Rated Power (MW)	0.96	0.96	1.8
Turbine Rated Max Flow (cfs)	800	800	1800
Head (feet)	16.5		
Turbine RPM	90	90	90
Description of Debris Management/Removal	Hydraulic Rake		
Gross Dimensions of Trash Rack (square feet)	624	624	1,056
Calculated Approach Velocity (fps)	1.3	1.3	1.7
Clear (Open) Spacing Between Trash Rack Bars	3 inches		
Total Hydraulic Capacity (cfs)	3,400		

 Table 3.6
 Characteristics of the Shelburne Project

The Shelburne Project has some shoreline features near the intake that may provide intermittent habitat for fish such as rip-rap boulders and aquatic vegetation beds. Trash rack spacing is wide enough for most adult smallmouth bass, white sucker, and fallfish to pass through; however, maximum intake velocities range from 1.3 to 1.7 fps when

operating at the full hydraulic capacity of 3,400 cfs. Burst speeds for juvenile and adult fallfish, smallmouth bass, and white sucker are greater than the maximum approach velocity of 1.7 fps, which means they can swim away from the intake area to avoid entrainment. Impingement is unlikely because of the wide rack spacing and low approach velocities. Based on the limited amount of aquatic habitat in the forebay and intake area, low velocities in front of the trash racks, wide trash rack bars, and non-migratory life cycles in the Upper Androscoggin River, the overall effect of project operations on resident fish species is expected to be minimal and the risk of entrainment is low. Trash raking is done with a hydraulic rack rake; it is expected this has no influence on impingement and entrainment of fish.

## 4.0 SUMMARY

The risk of impingement and entrainment of fish at GLHA's six hydropower projects on the upper Androscoggin River is low. This is a result of several factors including:

- The limited amount of aquatic habitat near the intake areas, which reduces the likelihood that fish will encounter the intake areas.
- The industrial nature and developmental history of the Project area, which has resulted in limited fisheries management in the 11-mile-long reach of the Androscoggin River between the Sawmill Project and the Shelburne Project.
- Low water velocities in front of the intake racks (e.g., less than 2 fps at all sites other than Sawmill as further described below) and the ability of fish to swim away from the racks.
- The presence of full depth, vertical bar racks, which exclude large fish from the turbines.
- The absence of migratory fish that require downstream passage and are therefore more at risk of entrainment as compared to resident fish species found at these projects; the natural range of migratory, anadromous fish does not extend to the upper Androscoggin River.

As mentioned above, while the risk of impingent and entrainment is moderately low at the Sawmill Project, small, resident fish (e.g., less than 5-inches-long) that may encounter the intake area have the potential to become entrained because approach velocities are expected to be greater than 2.5 fps at full generation. However, given the characteristics of the Sawmill Project (e.g., low head, few turbine blades), survival of small, juvenile fish is expected to be high (95 to 96 percent) based on results of the turbine blade strike model analysis and previous studies completed at similar hydropower projects. Survival rates of 95 percent or higher have been documented for entrained fish with lengths of 3 to 5 inches at multiple generating stations where entrainment mortality has been studied (EPRI 1997).

GLHA is proposing no changes to operations at any of the GLHA NH projects; therefore, the risk of entrainment or impingement is expected to remain low during the term of a new license.

#### 5.0 **REFERENCES**

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### **APPENDIX A**

### TURBINE BLADE STRIKE ANALYSIS RESULTS FOR THE SAWMILL PROJECT

### Summary of Turbine Blade Strike Analyses

Sawmill Project

Summary	Run Name	.N1000-L5-S95	.N1000-L5-S96	.N1000-L5-S96(2)	.N1000-L5-S96(3)	.N1000-L5-S96(4)
	Number of Fish	1000	1000	1000	1000	1000
	Length, Avg. (inch)	5	5	5	5	5
	Length, SD	1	1	1	1	1
	Turbine Strikes	49	42	43	42	44
	Bypass Failures	0	0	0	0	0
	Fish Passed	951	958	957	958	956
Route Types	Francis	0	0	0	0	0
	Kaplan	1	1	1	1	1
	propeller	0	0	0	0	0
	bypass	0	0	0	0	0
	Rt. 1	Kaplan	Kaplan	Kaplan	Kaplan	Kaplan
Mortalities	Rt. 1	49	42	43	42	44
Selection Prob.	Rt. 1	100.0%	100.0%	100.0%	100.0%	100.0%
Avg. Strike Prob.	Rt. 1	4.6%	4.6%	4.6%	4.6%	4.7%
Mean Fish Length	Rt. 1	5.0	5.0	5.0	5.0	5.1
Survival Estimate		95.1%	95.8%	95.7%	95.8%	95.6%

### **NOI ATTACHMENT 6**

**USFWS ESA CERTIFICATION LETTERS** 





### United States Department of the Interior

FISH AND WILDLIFE SERVICE New England Ecological Services Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5094 Phone: (603) 223-2541 Fax: (603) 223-0104



In Reply Refer To: March Project Code: 2023-0059266 Project Name: Riverside Hydroelectric Facility Endangered Species Act Certification

# Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

*Updated* 3/8/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

### About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

#### Endangered Species Act Project Review

Please visit the **"New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

March 23, 2023

species and prepare and submit a project review package if necessary:

#### https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

**\*NOTE\*** Please <u>do not</u> use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

**Northern Long-eared Bat** - (Updated 3/8/2023) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule will go into effect on **March 31, 2023**. After that date, the current 4(d) rule for NLEB will be invalid, and the 4(d) determination key will no longer be available. New compliance tools will be available in March 2023, and information will be posted in this section on our website and on the northern long-eared bat species page, so please check this site often for updates.

Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project may result in incidental take of NLEB after the new listing goes into effect, this will need to be addressed in an updated consultation that includes an Incidental Take Statement. Many of these situations will be addressed through the new compliance tools. If your project may require re-initiation of consultation, please wait for information on the new tools to appear on this site or contact our office for additional guidance.

#### Additional Info About Section 7 of the Act

Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

#### https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

**Candidate species** that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

#### **Migratory Birds**

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. 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)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

Official Species List

## **OFFICIAL SPECIES LIST**

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

#### **New England Ecological Services Field Office** 70 Commercial Street, Suite 300

Concord, NH 03301-5094 (603) 223-2541

### **PROJECT SUMMARY**

Project Code:	2023-0059266
Project Name:	Riverside Hydroelectric Facility Endangered Species Act Certification
Project Type:	Power Gen - Hydropower - FERC
Project Description:	The Riverside Hydroelectric Facility is required to undergo an endangered
	species act certification as part of the notice of intent (NOI) renewal
	associated with the 2023 NPDES General Permit for Hydroelectric
	Generating Facilities (NHG360000).

### **Project Location:**

The approximate location of the project can be viewed in Google Maps: <u>https://</u>www.google.com/maps/@44.473883099999995,-71.1698243071273,14z



Counties: Coos County, New Hampshire

### **ENDANGERED SPECIES ACT SPECIES**

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. <u>NOAA Fisheries</u>, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### MAMMALS

NAME	STATUS
Canada Lynx Lynx canadensis Population: Wherever Found in Contiguous U.S. There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <u>https://ecos.fws.gov/ecp/species/3652</u>	Threatened
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/9045</u>	Threatened
NAME	STATUS
Monarch Butterfly Danaus plexippus No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/9743</u>	Candidate

### **CRITICAL HABITATS**

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

### **IPAC USER CONTACT INFORMATION**

Agency: Sevee & Maher Engineers, Inc.

- Name: Anthony Pais
- Address: 4 Blanchard Road
- City: Cumberland
- State: ME
- Zip: 04021
- Email aep@smemaine.com
- Phone: 2078295016



### United States Department of the Interior

FISH AND WILDLIFE SERVICE New England Ecological Services Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5094 Phone: (603) 223-2541 Fax: (603) 223-0104



In Reply Refer To: March 2 Project code: 2023-0059266 Project Name: Riverside Hydroelectric Facility Endangered Species Act Certification IPaC Record Locator: 979-124385837

Federal Nexus: yes Federal Action Agency (if applicable): Environmental Protection Agency

Subject: Technical assistance for 'Riverside Hydroelectric Facility Endangered Species Act Certification'

Dear Anthony Pais:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 30, 2023, for "Riverside Hydroelectric Facility Endangered Species Act Certification" (here forward, Project). This project has been assigned Project Code 2023-0059266 and all future correspondence should clearly reference this number.

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. Failure to accurately represent or implement the Project as detailed in IPaC or the Northeast Determination Key (Dkey), invalidates this letter. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative effect(s)), to a federally listed species or designated critical habitat.

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17). Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no further consultation with, or concurrence from, the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal

March 30, 2023

consultation is required (except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect (NLAA)" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13]).

The IPaC results indicated the following species is (are) potentially present in your project area and, based on your responses to the Service's Northeast DKey, you determined the proposed Project will have the following effect determinations:

Species	Listing Status	Determination
Canada Lynx ( <i>Lynx canadensis</i> )	Threatened	NLAA

#### Conclusion

<u>Coordination with the Service is not complete</u>. The project has a federal nexus (e.g., funds, permits); however, you are not the federal action agency. Therefore, the ESA consultation status is incomplete and no project activities on any portion of the parcel should occur until consultation between the Service and the Federal action agency (or designated non-federal representative), is completed. Section 7 consultation is not complete until the federal action agency submits a determination of effects, and the Service concurs with the federal action agency's determination. Please provide this technical assistance letter to the lead federal action agency or its designated non-federal representative with a request for its review.

As the federal agency deems appropriate, they should submit their determination of effects to the appropriate Ecological Services Field Office. The lead federal action agency or designated non-federal representative can log into IPaC system using their agency email account and click "Search by record locator" to find this Project using 979-124385837.

In addition to the species listed above, the following species and/or critical habitats may also occur in your project area and are not covered by this conclusion:

- Monarch Butterfly Danaus plexippus Candidate
- Northern Long-eared Bat Myotis septentrionalis Threatened

To complete consultation for species that have reached a "May Affect" determination and/or species may occur in your project area and are not covered by this conclusion, please visit the "New England Field Office Endangered Species Project Review and Consultation" website for step-by-step instructions on how to consider effects on these listed species and/or critical habitats, avoid and minimize potential adverse effects, and prepare and submit a project review package if necessary: https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the species identified above. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or

3

amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project implements any changes which are final or commits additional resources.

Please Note: If the Action may impact bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) by the prospective permittee may be required. Please contact the Migratory Birds Permit Office, (413) 253-8643, or PermitsR5MB@fws.gov, with any questions regarding potential impacts to Eagles.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference the Project Code associated with this Project.

#### **Action Description**

You provided to IPaC the following name and description for the subject Action.

#### 1. Name

Riverside Hydroelectric Facility Endangered Species Act Certification

#### 2. Description

The following description was provided for the project 'Riverside Hydroelectric Facility Endangered Species Act Certification':

The Riverside Hydroelectric Facility is required to undergo an endangered species act certification as part of the notice of intent (NOI) renewal associated with the 2023 NPDES General Permit for Hydroelectric Generating Facilities (NHG360000).

The approximate location of the project can be viewed in Google Maps: <u>https://www.google.com/maps/@44.473883099999995,-71.1698243071273,14z</u>



### **QUALIFICATION INTERVIEW**

- 1. As a representative of this project, do you agree that all items submitted represent the complete scope of the project details and you will answer questions truthfully? *Yes*
- 2. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed species?

**Note:** This question could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered, or proposed species.

No

3. Is the action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

Yes

4. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) the lead agency for this project?

No

5. Are you including in this analysis all impacts to federally listed species that may result from the entirety of the project (not just the activities under federal jurisdiction)?

**Note:** If there are project activities that will impact listed species that are considered to be outside of the jurisdiction of the federal action agency submitting this key, contact your local Ecological Services Field Office to determine whether it is appropriate to use this key. If your Ecological Services Field Office agrees that impacts to listed species that are outside the federal action agency's jurisdiction will be addressed through a separate process, you can answer yes to this question and continue through the key.

Yes

6. Are you the lead federal action agency or designated non-federal representative requesting concurrence on behalf of the lead Federal Action Agency?

No

- 7. Will the proposed project involve the use of herbicide? *No*
- 8. Are there any caves or anthropogenic features suitable for hibernating or roosting bats within the area expected to be impacted by the project?

No

9. Does any component of the project associated with this action include structures that may pose a collision risk to birds or bats (e.g., wind turbines, communication towers, transmission lines, any type of towers with or without guy wires)?

**Note**For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.). *Yes* 

10. Will the proposed project result in permanent changes to water quantity in a stream or temporary changes that would be sufficient to result in impacts to listed species?

For example, will the proposed project include any activities that would alter stream flow, such as water withdrawal, hydropower energy production, impoundments, intake structures, diversion structures, and/or turbines? Projects that include temporary and limited water reductions that will not displace listed species or appreciably change water availability for listed species (e.g. listed species will experience no changes to feeding, breeding or sheltering) can answer "No". Note: This question refers only to the amount of water present in a stream, other water quality factors, including sedimentation and turbidity, will be addressed in following questions.

Yes

11. Will the proposed project affect wetlands?

This includes, for example, project activities within wetlands, project activities within 300 feet of wetlands that may have impacts on wetlands, water withdrawals and/or discharge of contaminants (even with a NPDES).

No

12. Will the proposed project activities (including upland project activities) occur within 0.5 miles of the water's edge of a stream or tributary of a stream where listed species may be present?

Yes

13. Will the proposed project directly affect a streambed (below ordinary high water mark (OHWM)) of the stream or tributary?

No

14. Will the proposed project bore underneath (directional bore or horizontal directional drill) a stream?

No

15. Will the proposed project involve a new point source discharge into a stream or change an existing point source discharge (e.g., outfalls; leachate ponds)?

No

16. Will the proposed project involve the removal of excess sediment or debris, dredging or instream gravel mining?

No

17. Will the proposed project involve the creation of a new water-borne contaminant source?

**Note** New water-borne contaminant sources occur through improper storage, usage, or creation of chemicals. For example: leachate ponds and pits containing chemicals that are not NSF/ANSI 60 compliant have contaminated waterways. Sedimentation will be addressed in a separate question.

No

18. Will the proposed project involve perennial stream loss that would require an individual permit under 404 of the Clean Water Act?

No

19. Will the proposed project involve blasting?

No

20. Will the proposed project include activities that could result in an increase to recreational fishing or potentially affect fish movement temporarily or permanently (including fish stocking, harvesting, or creation of barriers to fish passage)?

Yes

21. Will the proposed project involve earth moving that could cause erosion and sedimentation, and/or contamination along a stream?

**Note**Answer "Yes" to this question if erosion and sediment control measures will be used to protect the stream. *No* 

22. Will the proposed project involve vegetation removal within 200 feet of a perennial stream bank?

No

23. Will erosion and sedimentation control Best Management Practices (BMPs) associated with applicable state and/or Federal permits, be applied to the project? If BMPs have been provided by and/or coordinated with and approved by the appropriate Ecological Services Field Office, answer "Yes" to this question.

No

- 24. [Semantic] Does the project intersect the Virginia big-eared bat critical habitat? **Automatically answered** *No*
- 25. [Semantic] Does the project intersect the Indiana bat critical habitat?Automatically answeredNo

26. [Hidden Semantic] Does the project intersect the Canada lynx AOI?

Automatically answered Yes 27. Will the project involve trapping, poisoning, or broadcasting disease control agents for wild animals (e.g. animal damage control, controlling or managing furbearer wildlife, capturing animals for research projects, rabies baits)?

No

- 28. Will the project be enclosed by fencing that could unintentionally trap lynx (e.g. wind and solar development, waste treatment settling ponds, impervious fencing along roads)? *No*
- 29. Is this a road or highway project? *No*
- 30. Is the project in a non-forested habitat (fields, towns and urban areas, agricultural fields) and of a nature that will not result in take of lynx?

Yes

- 31. [Semantic] Does the project intersect the candy darter critical habitat? **Automatically answered** *No*
- 32. [Semantic] Does the project intersect the diamond darter critical habitat?Automatically answeredNo
- 33. [Semantic] Does the project intersect the Big Sandy crayfish critical habitat? Automatically answered

No

34. [Hidden Semantic] Does the project intersect the Guyandotte River crayfish critical habitat?

Automatically answered No

35. Do you have any other documents that you want to include with this submission? *No* 

### **PROJECT QUESTIONNAIRE**

- 1. Approximately how many acres of trees would the proposed project remove? *0*
- 2. Approximately how many total acres of disturbance are within the disturbance/ construction limits of the proposed project?

10

3. Briefly describe the habitat within the construction/disturbance limits of the project site. *The project involves a hydroelectric facility, including a dam and powerhouse, located on the Androscoggin River.* 

### **IPAC USER CONTACT INFORMATION**

Agency:Sevee & Maher Engineers, Inc.Name:Anthony PaisAddress:4 Blanchard RoadCity:CumberlandState:MEZip:04021Emailaep@smemaine.comPhone:2078295016

### LEAD AGENCY CONTACT INFORMATION

Lead Agency: Environmental Protection Agency

Name: George Papadopoulos

Email: papadopoulos.george@ep.gov

Phone: 6179181579



### United States Department of the Interior

FISH AND WILDLIFE SERVICE New England Ecological Services Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5094 Phone: (603) 223-2541 Fax: (603) 223-0104



In Reply Refer To: March Project code: 2023-0059266 Project Name: Riverside Hydroelectric Facility Endangered Species Act Certification IPaC Record Locator: 979-124387050

Federal Nexus: yes Federal Action Agency (if applicable): Environmental Protection Agency

# Subject: Record of project representative's no effect determination for 'Riverside Hydroelectric Facility Endangered Species Act Certification'

Dear Anthony Pais:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 30, 2023, for 'Riverside Hydroelectric Facility Endangered Species Act Certification' (here forward, Project). This project has been assigned Project Code 2023-0059266 and all future correspondence should clearly reference this number. **Please carefully review this letter.** 

### **Ensuring Accurate Determinations When Using IPaC**

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter.

### **Determination for the Northern Long-Eared Bat**

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action

March 30, 2023

and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

#### Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Canada Lynx Lynx canadensis Threatened
- Monarch Butterfly Danaus plexippus Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

#### **Next Steps**

Based upon your IPaC submission, your project has reached the determination of "No Effect" on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2023-0059266 associated with this Project.

#### **Action Description**

You provided to IPaC the following name and description for the subject Action.

#### 1. Name

Riverside Hydroelectric Facility Endangered Species Act Certification

#### 2. Description

The following description was provided for the project 'Riverside Hydroelectric Facility Endangered Species Act Certification':

The Riverside Hydroelectric Facility is required to undergo an endangered species act certification as part of the notice of intent (NOI) renewal associated with the 2023 NPDES General Permit for Hydroelectric Generating Facilities (NHG360000).

The approximate location of the project can be viewed in Google Maps: <u>https://www.google.com/maps/@44.473883099999995,-71.1698243071273,14z</u>



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## **DETERMINATION KEY RESULT**

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

### **QUALIFICATION INTERVIEW**

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

**Note:** Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

 Do you have post-white nose syndrome occurrence data that indicates that northern longeared bats (NLEB) present in the action area? Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed acoustic detections.

No

3. Does any component of the action involve construction or operation of wind turbines?

**Note:** For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.). *No* 

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

Yes

5. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

No

6. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

**Note:** This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

No

7. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

Yes

8. Have you determined that your proposed action will have no effect on the northern longeared bat? Remember to consider the <u>effects of any activities</u> that would not occur but for the proposed action.

If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer "No" below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project's action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a "no effect" determination for the northern long-eared bat.

**Note:** Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer "No" and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: <a href="https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions">https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions</a>

Yes

### **PROJECT QUESTIONNAIRE**

Will all project activities by completed by April 1, 2024?

No

### **IPAC USER CONTACT INFORMATION**

Agency:Sevee & Maher Engineers, Inc.Name:Anthony PaisAddress:4 Blanchard RoadCity:CumberlandState:MEZip:04021Emailaep@smemaine.comPhone:2078295016

### LEAD AGENCY CONTACT INFORMATION

Lead Agency: Environmental Protection Agency

Name: George Papadopoulos

Email: papadopoulos.george@ep.gov

Phone: 6179181579

### **NOI ATTACHMENT 7**

NATIONAL REGISTER OF HISTORIC PLACES REVIEW





4 Blanchard Road, P.O. Box 85A Cumberland, ME 04021 Tel: 207.829.5016 • Fax: 207.829.5692 info@smemaine.com smemaine.com

June 8, 2023

U.S. Environmental Protection Agency, Region 1 ATTN: George Papadopoulos, HYDROGP Coordinator 5 Post Office Square – Mailcode 06-1 Boston, MA 02109-3912

Email: Hydro.GeneralPermit@epa.gov

Subject: Riverside Hydroelectric Facility – National Register of Historic Places Review

Dear Mr. Papadopoulos:

As requested within Section F of the Hydroelectric Generating Facilities General Permit (Hydro GP) notice of intent (NOI), Sevee & Maher Engineers, Inc. (SME) has completed a review of the National Register of Historic Places near the Riverside Hydroelectric facility located at 380 Main Street in Berlin, NH on behalf of Brookfield Renewable Great Lakes Hydro America, LLC. As a result of this review, it was determined that there was one historic property present within the vicinity of the Riverside facility: St. Anne Church (Property ID 79000197). While St. Anne Church is within 500 feet of the facility, all discharges and related activities from the facility are unlikely to impact this historic property. Additionally, there are no planned construction or demolition projects at the facility that could reasonably impact the St. Anne Church; therefore, the facility should remain eligible for coverage under the Hydro GP in accordance with Criterion B.

Should questions arise or additional information be desired, please do not hesitate to contact me at 207.829.5016.

Sincerely,

SEVEE & MAHER ENGINEERS, INC.

Philip H. Gerhardt, P.E. Principal/Senior Environmental Engineer

Attachments: 1. National Register of Historic Places Overhead

### **ATTACHMENT 1**

NATIONAL REGISTER OF HISTORIC PLACES OVERHEAD



# National Register of Historic Places

Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. ...

National Park Service U.S. Department of the Interior

