# **TECHNICAL MEMORANDUM**



То:	Maranda Nemeth, ASF; Eileen Bader-Hall, TNC Mayo Mill Dam Feasibility Study Steering Committee
From:	Michael Burke, P.E., P.Eng.
Date:	July 14, 2023
Re:	Preliminary Project Options Summary & Screening Matrix Mayo Mill Dam Feasibility Study

### 1. Introduction

This memorandum summarizes the identified preliminary project options and the associated screening matrix for the for the Mayo Mill Dam site. The options identified represent the range of potential project alternatives that could be considered in the feasibility study alternatives analysis. The intent of this preliminary summary is to facilitate selection of the short list of project alternatives (3 to 5 alternatives) to be evaluated in detail in the feasibility study report that will be completed later this year.

In the following paragraphs, the options are first described in terms of basic characteristics and constraints. The options are then characterized relative to the objectives and evaluation topics identified through project discussions to date.

## 2. Preliminary Project Options

A Summary Table of the highlights and constraints of each option is included in Table 1. The options are then contrasted against the project objectives in the Comparison Matrix in Table 2. Cartoon schematic sketches of the basic layout configurations discusses are included in the Appendix.

Several key assumptions are relevant to all of the options considered, described below.

### **Options Feasibility and Configuration**

The options have been established primarily on experience with past projects, technical literature, site characteristics, and professional judgement. Some feasibility limitations may still be uncovered through the additional detailed analysis that will be completed later this year. Additional detailed evaluation in the feasibility and alternatives analysis may result in adaptations of configurations and extents relative to the descriptions included in this memorandum.

#### Restoration of Power Generation

Two of the options assume viability of restoring power generation, yet this feasibility has not been proven to date. This will be reassessed following the energy analysis to be completed in summer 2023 and be included in the final detailed analysis.

#### Dam Repairs

The extent of dam repairs required to prepare the site to be maintained in perpetuity in a safe and stable manner, if selected, is presently unknown. This element will be reassessed following the dam condition and stability analyses to be completed in summer 2023.

### Spillway Capacity

Conventional contemporary dam safety requirements by FERC and other typical jurisdictions requires the spillway to pass the FEMA Base (100-year) Flood, without overtopping the abutments. The dam presently does not have this capacity, but will be assumed to be required to prepare the dam to be maintained in perpetuity, if selected. See also above assumption on dam repairs.

#### Target Fish Species and Population Sizes

Target fish species required to be considered and the associated population size assumptions are based on consultation with NOAA, US Fish and Wildlife Service (USFWS), Maine Department of Marine Resources (MDMR) and Maine Department of Inland Fisheries and Wildlife (MDIFW). Target fish species include Atlantic salmon, Alewife, Blueback herring, American Shad, Eastern lamprey and American eel, along with Eastern brook trout. Population sizes include 578,000 river herring (415,024 alewife, 163,139 blueback), 37,500 shad, and 1,200 Atlantic salmon.

### Fish Passage Technologies

Based on site characteristics, target fish species, and population estimates, the optimal fish passage approach would entail dam removal, while the optimal technical fish passage technology is assessed to be vertical slot fishway. Denil fishway is also considered for cost and footprint contrast, although presents species and biological capacity constraints. Nature-like fishway options are also examined below.

#### Landscape Enhancements

The options detailed below primarily focus on changes to the dam, fishway and in-river systems. As part of the larger feasibility study, it is assumed that landscape, access and public amenity enhancements will be optimized in response to the selected options for management of the dam and fishway.

 Table 1. Action options summary table. Options with bold type face advanced to preliminary screening matrix in Table 2.

#	Option	Characteristics
HP	Restore Power Generation, Retain Dam, I	Aaintain Impoundment at Current Levels, Technical Fishways
HP1	New Vertical Slot Fishway on River Left	• Repair dam, restore power generation, replace existing fishway with new vertical slot fishway and dedicated
		downstream passage chute. May require separate dedicated eel passage.
		<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>
		• Current impoundment levels are maintained (typical and flood conditions).
		• May also require new flood gates to meet spillway capacity requirements.
HP2	New Denil Fishway on River Left	• Repair dam, restore power generation, replace existing fishway with new Denil fishway and dedicated
		downstream passage chute. May require separate dedicated eel passage.
		• Meets biological capacity for near-term populations of target species, but not fully restored populations.
		• Current impoundment levels are maintained (typical and flood conditions).
		• May also require new flood gates to meet spillway capacity requirements.
F	Retain Dam, Maintain Impoundment at C	Current Levels, Technical Fishways, FERC Exemption Retired
F1	New Vertical Slot Fishway on River Left	• Repair dam, retire FERC exemption, replace existing powerhouse and fishway with new vertical slot fishway,
		dedicated downstream passage chute, and gates for supplemental attraction flow. May require separate
		dedicated eel passage.
		<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>
		<ul> <li>Current impoundment levels are maintained (typical and flood conditions).</li> </ul>
		<ul> <li>May also require extra gate capacity to meet spillway capacity requirements.</li> </ul>
F2	New Denil Fishway on River Left	• Repair dam, retire FERC exemption, replace existing powerhouse and fishway with new Denil fishway,
		dedicated downstream passage chute, and gates for supplemental attraction flow. May require separate
		dedicated eel passage.
		• Meets biological capacity for near-term populations of target species, but not fully restored populations.
		<ul> <li>Current impoundment levels are maintained (typical and flood conditions).</li> </ul>
		<ul> <li>May also require extra gate capacity to meet spillway capacity requirements.</li> </ul>
F3	New Vertical Slot Fishway on River Right	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
		relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.
F4	New Denil Fishway on River Right	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
		relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.

Table 1. Action options summary table. Options with bold type face advanced to preliminary screening matrix in Table 2.

#	Option	Characteristics
Μ	Modify Dam, Maintain Impoundment at	Current Levels, Technical Fishways, FERC Exemption Retired
M1	Create Straight Alignment for New	• Repair dam, retire FERC exemption, modify dam with a new non-overflow separation wall on river left to allow
	Vertical Slot Fishway on River Left	the fishway to extend upstream of the dam in a straight alignment.
		• Replace existing powerhouse and fishway with new vertical slot fishway, dedicated downstream passage chute,
		and gates for supplemental attraction flow. May require separate dedicated eel passage.
		<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>
		Current impoundment levels are maintained (typical and flood conditions).
		• May also require extra gate capacity to meet spillway capacity requirements.
M2	Create Straight Alignment for New Denil	• Repair dam, retire FERC exemption, modify dam with a new non-overflow separation wall on river left to allow
	Fishway on River Left	the fishway to extend upstream of the dam in a straight alignment.
		• Replace existing powerhouse and fishway with new vertical slot fishway, dedicated downstream passage chute,
		and gates for supplemental attraction flow. May require separate dedicated eel passage.
		• Meets biological capacity for near-term populations of target species, but not fully restored populations.
		Current impoundment levels are maintained (typical and flood conditions).
		• May also require extra gate capacity to meet spillway capacity requirements.
M3	Create Straight Alignment for New Vertical	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
	Slot Fishway on River Right	relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.
M4	Create Straight Alignment for New Denil	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
	Fishway on River Right	relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.
L	Modify Dam, Retain Impoundment at Lo	wer Level, Technical Fishways, FERC Exemption Retired
L1	Straight/Switchback Alignment for New	• This option is a variation of F1/M1 described above, but with additional spillway modifications to maintain
	Vertical Slot Fishway on River Left	impoundment level 4 to 5 feet lower.
		• Objectives in lowering the impoundment include increasing fish passage efficiency potential, potentially
		reduced fish passage footprint, and reducing flood water surface elevations, along with additional benefits.
L2	Straight/Switchback Alignment for New	• This option is a variation of F2/M2 described above, but with additional spillway modifications to maintain
	Denil Fishway on River Left	impoundment level 4 to 5 feet lower.
		• Objectives in lowering the impoundment include increasing fish passage efficiency potential, potentially
		reduced fish passage footprint, and reducing flood water surface elevations, along with additional benefits.
L3	Straight/Switchback Alignment for New	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
	Vertical Slot Fishway on River Right	relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.
L4	Straight/Switchback Alignment for New	• This option was considered, but not advanced to Comparison Matrix due to estimated poor fishway attraction
	Denil Fishway on River Right	relative to river planform, morphology, and prevailing currents.
		• Option is also not advantageous relative to modifications/replacement of existing facilities and property extent.

Table 1. Action options summary table. Options with bold type face advanced to preliminary screening matrix in Table 2.

#	Option	Characteristics							
N	Nature-Like Fishways, Includes Options	Which Maintain and Also Lower Impoundment Levels, FERC Exemption Retired							
N1	Lateral Bypass Channel around dam,	• This option was considered, but not advanced to Comparison Matrix due to property and physical space							
Characteristics Aways, Includes Options Which Maintain and Also T ass Channel around dam, de tew Nature-like Fishm Bypass on P		limitations for installation of a suitably large NLF bypass channel, between existing facilities and property							
		extent.							
N2	New Nature-like Fishway In-Channel	• Repair spillway, retire FERC exemption, modify dam with a new non-overflow separation wall/berm on river							
	Bypass on River Left, 3% Slope,	left to allow an NLF to extend upstream of the dam in a straight alignment.							
	Maintain Current Impoundment Level	• Replace existing powerhouse, fishway, and portion of existing spillway with new 3% NLF in-channel 'bypass'							
		channel, supplemental downstream passage chute, and gates for supplemental attraction flow.							
		<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>							
		• Current impoundment levels are maintained (typical and flood conditions).							
		May also require extra gate capacity to meet spillway capacity requirements.							
N3	New Nature-like Fishway In-Channel	• Repair spillway, retire FERC exemption, modify dam with a new non-overflow separation wall/berm on river							
	Bypass on River Right, 3% Slope,	right to allow an NLF to extend upstream of the dam in a straight alignment.							
	Maintain Current Impoundment Level	• Replace portion of existing spillway with new 3% NLF in-channel 'bypass' channel, supplemental downstream							
		passage chute, and gates for supplemental attraction flow on river right.							
		<ul> <li>Decommission existing fishway to create additional spillway capacity.</li> </ul>							
		<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>							
		<ul> <li>Current impoundment levels are maintained (typical and flood conditions).</li> </ul>							
		<ul> <li>May also require extra gate capacity to meet spillway capacity requirements.</li> </ul>							
		Powerhouse might be retained and restored/repurposed if structurally feasible and above flood level.							
N4	New Nature-like Fishway In-Channel	• This option is a variation of N2 described above, but with additional spillway modifications to maintain							
	Bypass on River Left, 2% Slope, Retain	impoundment level 4 to 5 feet lower.							
	Impoundment at Lower Level	• Objectives in lowering the impoundment include increasing fish passage efficiency potential with a flatter (2%							
	-	slope), and reducing flood water surface elevations, along with additional benefits.							
N5	New Nature-like Fishway In-Channel	• This option is a variation of N3 described above, but with additional spillway modifications to maintain							
	Bypass on River Right, 2% Slope, Retain	impoundment level 4 to 5 feet lower.							
	Impoundment at Lower Level	• Objectives in lowering the impoundment include increasing fish passage efficiency potential with a flatter (2%							
		slope), and reducing flood water surface elevations, along with additional benefits.							
		Powerhouse might be retained and restored/repurposed if structurally feasible and above flood level.							
N6	Replace Dam with Bank-to-Bank	• Retire FERC exemption, decommission and remove dam spillway and fishway structures.							
	Nature-Like Fishway, Maintain Current	• Extend 3% bank-to-bank NLF from dam location 450 to 550 feet upstream to corner where river widens.							
	Impoundment Level	<ul> <li>Meets biological capacity for restored populations of target species.</li> </ul>							
		Current typical impoundment level is maintained.							
		• Powerhouse might be retained and restored/repurposed if structurally feasible and above flood level.							

#### Table 1. Action options summary table. Options with bold type face advanced to preliminary screening matrix in Table 2.

#	Option	Characteristics
N7	Replace Dam with Bank-to-Bank	• This option is a variation of N6 described above, but reduces impoundment level 4 to 5 feet.
	Nature-Like Fishway, 2% Slope, Retain	• Objectives in lowering the impoundment include increasing fish passage efficiency potential with a flatter (2%
	Impoundment at Lower Level	slope), and reducing flood water surface elevations, along with additional benefits.
	,	• Powerhouse might be retained and restored/repurposed if structurally feasible and above flood level.
R	Dam Removal, Human-made Impoundm	ent Removed, Natural Ledge Features Exposed, FERC Exemption Retired
R1	Dam Removal	• Retire FERC exemption, decommission and remove dam spillway and fishway structures down to residual
		ledge below dam.
		Current impoundment levels are lowered (typical and flood conditions).
		• Manage sediment and stabilize exposed riparian areas with vegetation as needed.
		Meets biological capacity for restored populations of target species.
		• Powerhouse might be retained and restored/repurposed if structurally feasible.
R2	Dam Removal with Ledge Modification	• This option is a variation of R2 described above, but with potential additional ledge modifications if needed to
		ensure safe, timely, and effective fish passage.

Table 2. Evaluation	n table comparing	g project options to	identified evaluatio	on criteria.									
Option	Hydropower Generation	Impoundment Water Level	Flooding and Resiliency	Dam Structure & Facilities	Impacts to Facilities and Infrastructure	Fish Passage Effectiveness	Ecology & Water Quality	Public Access and Use	Historical & Educational Value	Community Plans & Aesthetic	Relative Construction Cost	Long-Term Life Span Costs	Key Uncertainties & Focus Factors
HP - Restore Pov	wer Generatio	n, Retain Dam, I	Maintain Impour	ndment at Curren	t Levels, Technical Fi	ishways							
HP1: New Vertical Slot Fishway on River Left	<ul> <li>Requires energy analysis</li> </ul>	• Maintain current	<ul> <li>Current: No change</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: moderate</li> <li>Attraction: may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse upgrades</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: low to moderate</li> </ul>	• Costs: high • Revenue: yes	<ul> <li>Energy development feasibility</li> <li>Extent of dam repairs</li> <li>Constructability</li> <li>Funding</li> </ul>
HP2: New Denil Fishway on River Left	<ul> <li>Requires energy analysis</li> </ul>	• Maintain current	<ul> <li>Current: No change</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: fair</li> <li>Attraction: may require augmentation</li> <li>Species: Shad and Lamprey limited</li> <li>Capacity limitation: river herring and shad</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse upgrades</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: low to moderate</li> </ul>	• Costs: high • Revenue: yes	<ul> <li>Energy development feasibility</li> <li>Extent of dam repairs</li> <li>Constructability</li> <li>Funding</li> </ul>

Table 2. Evaluation	table comparing	g project options to	identified evaluatio	on criteria.									
Option	Hydropower Generation	Impoundment Water Level	Flooding and Resiliency	Dam Structure & Facilities	Impacts to Facilities and Infrastructure	Fish Passage Effectiveness	Ecology & Water Quality	Public Access and Use	Historical & Educational Value	Community Plans & Aesthetic	Relative Construction Cost	Long-Term Life Span Costs	Key Uncertainties & Focus Factors
F - Retain Dam,	Maintain Imp	oundment at Cu	irrent Levels, Te	chnical Fishways,	FERC Exemption Ret	ired							
F1: New Vertical Slot Fishway on River Left	• Retired	• Maintain current	<ul> <li>Current: No change</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: moderate</li> <li>Attraction: may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: low to moderate</li> </ul>	• Costs: high • Revenue: no	<ul> <li>Extent of dam repairs</li> <li>Constructability</li> <li>Fish attraction</li> <li>Funding</li> </ul>
F2: New Denil Fishway on River Left	• Retired	• Maintain current	<ul> <li>Current: No change</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: fair</li> <li>Attraction: may require augmentation</li> <li>Species: Shad and Lamprey limited</li> <li>Capacity limitation: river herring and shad</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: low to moderate</li> </ul>	• Costs: high • Revenue: no	<ul> <li>Extent of dam repairs</li> <li>Constructability</li> <li>Fish attraction</li> <li>Funding</li> </ul>

Table 2. Evaluation	table comparing	g project options to	identified evaluatio	on criteria.									
Option	Hydropower	Impoundment	Flooding and	Dam Structure &	Impacts to	Fish Passage	Ecology & Water	Public Access	Historical &	Community	Relative	Long-Term	<b>Key Uncertainties</b>
	Generation	Water Level	Resiliency	Facilities	Facilities and	Effectiveness	Quality	and Use	Educational Value	Plans &	Construction	Life Span	& Focus Factors
					Infrastructure					Aesthetic	Cost	Costs	
M - Modify Dam,	Maintain Imp	oundment at C	urrent Levels, Te	chnical Fishways	, FERC Exemption Re	tired							
M1:	<ul> <li>Retired</li> </ul>	• Maintain	• Current: No	<ul> <li>Current: repair</li> </ul>	<ul> <li>Bridge: no change</li> </ul>	• Upstream effectiveness:	• Water quality: no change	• Current: no	• Historical: consistent,	• Consistent with	<ul> <li>Initial cost:</li> </ul>	• Costs: high	<ul> <li>Extent of dam</li> </ul>
Create Straight		current	change	required	<ul> <li>Hydrant: no change</li> </ul>	moderate to better	<ul> <li>Habitat restoration: no</li> </ul>	change	powerhouse removal	plans: yes	high	• Revenue: no	repairs
Alignment for			<ul> <li>Future: May</li> </ul>	• Spillway capacity:	• Sea plane: no change	<ul> <li>Attraction: may require</li> </ul>	change	• Future:	mitigation required	<ul> <li>View: no change</li> </ul>	<ul> <li>Grant</li> </ul>		<ul> <li>Design of separation</li> </ul>
New Vertical Slot			increase	no	<ul> <li>Docks: no change</li> </ul>	augmentation	<ul> <li>Non-native species:</li> </ul>	enhance, as	<ul> <li>Educational: enhance</li> </ul>		eligibility: low		wall
Fishway on River			<ul> <li>Enhancements:</li> </ul>	• O&M: required in		• Species: All	provides habitat	consistent with	interpretation		to moderate		<ul> <li>Hydraulic and</li> </ul>
Left by Extending			consider gates to	perpetuity		<ul> <li>Capacity limitation: no</li> </ul>	<ul> <li>Watershed connectivity:</li> </ul>	pond & water					sedimentation
Separation Wall			meet spillway	• O&M costs:		<ul> <li>Eel: requires dedicated</li> </ul>	sink, no change	levels					response to fishway
Upstream of Dam			capacity	substantial		facility	<ul> <li>Climate resilience: no</li> </ul>						hydraulic
						<ul> <li>Downstream: requires</li> </ul>	change						inlet/separation wall
						facility							<ul> <li>Constructability</li> </ul>
						<ul> <li>Compliance: requires</li> </ul>							<ul> <li>Fish attraction</li> </ul>
						operation							<ul> <li>Funding</li> </ul>
M2:	<ul> <li>Retired</li> </ul>	• Maintain	• Current: No	<ul> <li>Current: repair</li> </ul>	<ul> <li>Bridge: no change</li> </ul>	Upstream effectiveness:	<ul> <li>Water quality: no change</li> </ul>	• Current: no	<ul> <li>Historical: consistent,</li> </ul>	<ul> <li>Consistent with</li> </ul>	<ul> <li>Initial cost:</li> </ul>	<ul> <li>Costs: high</li> </ul>	<ul> <li>Extent of dam</li> </ul>
Create Straight		current	change	required	<ul> <li>Hydrant: no change</li> </ul>	fair to moderate	<ul> <li>Habitat restoration: no</li> </ul>	change	powerhouse removal	plans: yes	high	• Revenue: no	repairs
Alignment for			<ul> <li>Future: May</li> </ul>	• Spillway capacity:	• Sea plane: no change	<ul> <li>Attraction: may require</li> </ul>	change	• Future:	mitigation required	<ul> <li>View: no change</li> </ul>	• Grant		<ul> <li>Design of separation</li> </ul>
New Denil			increase	no	<ul> <li>Docks: no change</li> </ul>	augmentation	<ul> <li>Non-native species:</li> </ul>	enhance, as	<ul> <li>Educational: enhance</li> </ul>		eligibility: low		wall
Fishway on River			<ul> <li>Enhancements:</li> </ul>	• O&M: required in		<ul> <li>Species: Shad and</li> </ul>	provides habitat	consistent with	interpretation		to moderate		<ul> <li>Hydraulic and</li> </ul>
Left by Extending			consider gates to	perpetuity		Lamprey limited	<ul> <li>Watershed connectivity:</li> </ul>	pond & water					sedimentation
Separation Wall			meet spillway	• O&M costs:		Capacity limitation: river	sink, no change	levels					response to fishway
Upstream of Dam			capacity	substantial		herring and shad	<ul> <li>Climate resilience: no</li> </ul>						hydraulic
						<ul> <li>Eel: requires dedicated</li> </ul>	change						inlet/separation wall
						facility							<ul> <li>Constructability</li> </ul>
						<ul> <li>Downstream: requires</li> </ul>							<ul> <li>Fish attraction</li> </ul>
						facility							<ul> <li>Funding</li> </ul>
						<ul> <li>Compliance: requires</li> </ul>							
						operation							

Table 2. Evaluation	n table comparing	g project options to	o identified evaluati	on criteria.									
Option	Hydropower	Impoundment	Flooding and	Dam Structure &	Impacts to	Fish Passage	Ecology & Water	Public Access	Historical &	Community	Relative	Long-Term	<b>Key Uncertainties</b>
	Generation	Water Level	Resiliency	Facilities	Facilities and Infrastructure	Effectiveness	Quality	and Use	Educational Value	Plans & Aesthetic	Construction Cost	Life Span Costs	& Focus Factors
L - Modify Dam,	Retain Impou	ndment at Low	er Level, Technie	cal Fishways, FER(	Exemption Retired						-	_	
L1:	<ul> <li>Retired</li> </ul>	• Lowered 4 to 5	Current:	Current: repair	Bridge: no change     Hydrapt: requires	Upstream effectiveness:     moderate to better	Water quality:     incremental	Current:	Historical: consistent,     nowerbouse removal	Consistent with	<ul> <li>Initial cost:</li> </ul>	• Costs: high	• Extent of dam
Variation of F1 or M1 to Lower Impoundment Level 4 to 5 feet New Vertical Slot Fishway on River Left			<ul> <li>Future: Improved</li> <li>Enhancements: dam modifications to provide lower level and spillway capacity</li> </ul>	<ul> <li>Spillway capacity: yes</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>adaptation</li> <li>Sea plane: requires adaptation</li> <li>Docks: requires adaptation</li> </ul>	<ul> <li>Attraction: may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>improvement</li> <li>Habitat restoration: incremental improvement</li> <li>Non-native species: incremental improvement</li> <li>Watershed connectivity: incremental improvement</li> <li>Climate resilience: incremental improvement</li> </ul>	<ul> <li>Future:</li> <li>enhance, as</li> <li>consistent with</li> <li>pond &amp; water</li> <li>levels</li> </ul>	<ul> <li>powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>View: incremental change</li> </ul>	• Grant eligibility: moderate to better	• Kevenue. no	<ul> <li>Design of separation wall</li> <li>Hydraulic and sedimentation response to fishway hydraulic inlet/separation wall</li> <li>Constructability</li> <li>Fish attraction</li> <li>Optimize revegetation</li> <li>Funding</li> </ul>
L2: Variation of F2/M2 to Lower Impoundment Level 4 to 5 feet New Denil Fishway on River Left	• Retired	• Lowered 4 to 5 feet	<ul> <li>Current: Improved</li> <li>Future: Improved</li> <li>Enhancements: dam modifications to provide lower level and spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: yes</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: requires adaptation</li> <li>Sea plane: requires adaptation</li> <li>Docks: requires adaptation</li> </ul>	<ul> <li>Upstream effectiveness: moderate to better</li> <li>Attraction: may require augmentation</li> <li>Species: Shad and Lamprey limited</li> <li>Capacity limitation: river herring and shad</li> <li>Eel: requires dedicated facility</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: incremental improvement</li> <li>Habitat restoration: incremental improvement</li> <li>Non-native species: incremental improvement</li> <li>Watershed connectivity: incremental improvement</li> <li>Climate resilience: incremental</li> </ul>	<ul> <li>Current: incremental change,</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: incremental change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: moderate to better</li> </ul>	• Costs: high • Revenue: no	<ul> <li>Extent of dam repairs</li> <li>Design of separation wall</li> <li>Hydraulic and sedimentation response to fishway hydraulic inlet/separation wall</li> <li>Constructability</li> <li>Fish attraction</li> <li>Optimize revegetation</li> <li>Funding</li> </ul>

Table 2. Evaluatio	n table comparing	g project options to	o identified evaluatio	on criteria.									
Option	Hydropower	Impoundmen	t Flooding and	Dam Structure &	Impacts to	Fish Passage	Ecology & Water	Public Access	Historical &	Community	Relative	Long-Term	Key Uncertainties
	Generation	Water Level	Resiliency	Facilities	Facilities and Infrastructure	Effectiveness	Quality	and Use	Educational Value	Plans & Aesthetic	Construction Cost	Life Span Costs	& Focus Factors
N - Nature-Like	 Fishwavs. Incl	udes Options V	 Vhich Maintain ai	 nd Also Lower Imi	 poundment Levels, FI	ERC Exemption Retired	 FERC Exemption Retired	d					
N2.			- Cumanti		- Drideer ne sheree			Current n.e.		Consistent with	- Initial anaty	- Castar bish	- Eutent of dom
N2: New Nature-like Fishway (3%) In- Channel Bypass on River Left, Maintain Current Impoundment Level	• Retired	• Maintain current	<ul> <li>Current: incremental</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: moderate to better</li> <li>Attraction: better, may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: moderate to better</li> </ul>	<ul> <li>Costs: high</li> <li>Revenue: no</li> </ul>	<ul> <li>Extent of dam repairs</li> <li>Design of separation wall/berm</li> <li>Hydraulic and sedimentation response to fishway hydraulic inlet/separation wall</li> <li>Constructability</li> <li>Fish attraction</li> </ul>
N3: New Nature-like Fishway (3%) In- Channel Bypass on River Right, Maintain Current Impoundment Level	• Retired	• Maintain current	<ul> <li>Current: No change</li> <li>Future: May increase</li> <li>Enhancements: consider gates to meet spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: no</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: no change</li> <li>Sea plane: no change</li> <li>Docks: no change</li> </ul>	<ul> <li>Upstream effectiveness: moderate to better</li> <li>Attraction: better, may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: no change</li> <li>Habitat restoration: no change</li> <li>Non-native species: provides habitat</li> <li>Watershed connectivity: sink, no change</li> <li>Climate resilience: no change</li> </ul>	<ul> <li>Current: no change</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse repurpose potential</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: no change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: moderate to better</li> </ul>	• Costs: high • Revenue: no	<ul> <li>Funding</li> <li>Extent of dam repairs</li> <li>Design of separation wal/berml</li> <li>Hydraulic and sedimentation response to fishway hydraulic inlet/separation wall</li> <li>Constructability</li> <li>Fish attraction</li> </ul>
N4: New Nature-like Fishway (2%) In- Channel Bypass on River Left, Retain Impoundment at Lower Level	• Retired	• Lowered 4 to 5 feet	<ul> <li>Current: Improved</li> <li>Future: Improved</li> <li>Enhancements: dam modifications to provide lower level and spillway capacity</li> </ul>	<ul> <li>Current: repair required</li> <li>Spillway capacity: yes</li> <li>O&amp;M: required in perpetuity</li> <li>O&amp;M costs: substantial</li> </ul>	<ul> <li>Bridge: no change</li> <li>Hydrant: requires adaptation</li> <li>Sea plane: requires adaptation</li> <li>Docks: requires adaptation</li> </ul>	<ul> <li>Upstream effectiveness: moderate to better</li> <li>Attraction: better, may require augmentation</li> <li>Species: All</li> <li>Capacity limitation: no</li> <li>Downstream: requires facility</li> <li>Compliance: requires operation</li> </ul>	<ul> <li>Water quality: incremental improvement</li> <li>Habitat restoration: incremental improvement</li> <li>Non-native species: incremental improvement</li> <li>Watershed connectivity: incremental improvement</li> <li>Climate resilience: incremental improvement</li> </ul>	<ul> <li>Current: incremental change,</li> <li>Future: enhance, as consistent with pond &amp; water levels</li> </ul>	<ul> <li>Historical: consistent, powerhouse removal mitigation required</li> <li>Educational: enhance interpretation</li> </ul>	<ul> <li>Consistent with plans: yes</li> <li>View: incremental change</li> </ul>	<ul> <li>Initial cost: high</li> <li>Grant eligibility: better to good</li> </ul>	• Costs: high • Revenue: no	<ul> <li>Funding</li> <li>Extent of dam repairs</li> <li>Design of separation wall</li> <li>Hydraulic and sedimentation response to fishway hydraulic inlet/separation wall</li> <li>Constructability</li> <li>Fish attraction</li> <li>Optimize revegetation</li> <li>Funding</li> </ul>

#### Table 2. Evaluation table comparing project options to identified evaluation criteria.

Option	Hvdropower	Impoundment	Flooding and	Dam Structure &	Impacts to	Fish Passage	Ecology & Water	Public Access	Historical &	Community	Relative	Long-Term	Kev Uncertainties
	Generation	Water Level	Resiliency	Facilities	Facilities and	Effectiveness	Ouality	and Use	Educational Value	Plans &	Construction	Life Span	& Focus Factors
					Infrastructure		<b>C</b>			Aesthetic	Cost	Costs	
N5:	Retired	• Lowered 4 to 5	• Current:	• Current: repair	Bridge: no change	• Upstream effectiveness:	• Water quality:	• Current:	• Historical: consistent,	• Consistent with	Initial cost:	• Costs: high	• Extent of dam
New Nature-like		feet	Improved	required	• Hydrant: requires	moderate to better	incremental	incremental	powerhouse repurpose	plans: yes	high	• Revenue: no	repairs
Fishway (2%) In-			• Future:	• Spillway capacity:	adaptation	<ul> <li>Attraction: better, may</li> </ul>	improvement	change,	potential	• View: incremental	• Grant		<ul> <li>Design of separation</li> </ul>
Channel Bypass			Improved	yes	<ul> <li>Sea plane: requires</li> </ul>	require augmentation	<ul> <li>Habitat restoration:</li> </ul>	• Future:	<ul> <li>Educational: enhance</li> </ul>	change	eligibility:		wall
on River Right,			<ul> <li>Enhancements:</li> </ul>	• O&M: required in	adaptation	• Species: All	incremental	enhance, as	interpretation		better to good		<ul> <li>Hydraulic and</li> </ul>
Retain			dam	perpetuity	<ul> <li>Docks: requires</li> </ul>	<ul> <li>Capacity limitation: no</li> </ul>	improvement	consistent with					sedimentation
Impoundment at			modifications to	• O&M costs:	adaptation	<ul> <li>Downstream: requires</li> </ul>	<ul> <li>Non-native species:</li> </ul>	pond & water					response to fishway
Lower Level			provide lower	substantial		facility	incremental	levels					hydraulic
			level and			<ul> <li>Compliance: requires</li> </ul>	improvement						inlet/separation wall
			spillway capacity			operation	<ul> <li>Watershed connectivity:</li> </ul>						<ul> <li>Constructability</li> </ul>
							incremental						<ul> <li>Fish attraction</li> </ul>
							improvement						<ul> <li>Optimize</li> </ul>
							<ul> <li>Climate resilience:</li> </ul>						revegetation
							incremental						<ul> <li>Funding</li> </ul>
							improvement						
N6:	<ul> <li>Retired</li> </ul>	<ul> <li>Maintain</li> </ul>	<ul> <li>Current: reduced</li> </ul>	Current: removed	<ul> <li>Bridge: no change</li> </ul>	Upstream effectiveness:	<ul> <li>Water quality:</li> </ul>	• Current:	<ul> <li>Historical: consistent,</li> </ul>	<ul> <li>Consistent with</li> </ul>	<ul> <li>Initial cost:</li> </ul>	• Costs: low to	<ul> <li>Hydraulic design</li> </ul>
Bank-to-Bank		current from	from Cove DS	<ul> <li>Spillway capacity:</li> </ul>	<ul> <li>Hydrant: require</li> </ul>	better	incremental improve	incremental	powerhouse repurpose	plans: yes	high	N/A	confirmation
NLF (3%)		Cove US	• Future: May	N/A	adaptation	<ul> <li>Attraction: excellent</li> </ul>	<ul> <li>Habitat restoration:</li> </ul>	change, adapt	potential	• View: incremental	<ul> <li>Grant</li> </ul>	• Revenue: no	<ul> <li>Constructability</li> </ul>
Maintain Current			increase from	• 0&M:	• Sea plane: may	• Species: All	incremental improve	Cove DS	<ul> <li>Educational: high,</li> </ul>	change, NLF/riffle	eligibility: good		
Impoundment			Cove US	substantially	require adaptation	<ul> <li>Capacity limitation: no</li> </ul>	<ul> <li>Non-native species:</li> </ul>	• Future:	enhance interpretation	from Cove DS	to high		
Level			<ul> <li>Enhancements:</li> </ul>	reduced	• Docks: require	• Downstream: excellent	provides habitat,	enhance, as					
			none	• O&M costs:	adaptation from Cove	Compliance: not required	incremental improve	consistent with					
				substantially	DS		Watershed connectivity:	NLF, US pond &					
				reduced			sink, incremental	water levels					
							improve						
							Climate resilience:						
							incremental improve						
N7:	Retired	<ul> <li>Level reduced</li> </ul>	• Current:	Current: removed	<ul> <li>Bridge: no change</li> </ul>	• Upstream effectiveness:	• Water quality: substantial	Current:	<ul> <li>Historical: consistent.</li> </ul>	<ul> <li>Consistent with</li> </ul>	Initial cost:	• Costs: low to	Hydraulic design
Daula ta Divil		4.5 feet,	substantial	<ul> <li>Spillway capacity:</li> </ul>	• Hydrant: require	high	improve	moderate	powerhouse repurpose	plans: yes	high	N/A	confirmation
Bank-to-Bank		extends from	reduction	N/A	adaptation	Attraction: excellent	Habitat restoration:	change, adapt	potential	• View: incremental	• Grant	• Revenue: no	<ul> <li>Constructability</li> </ul>
NLF (2%),		Cove US	• Future:	• 0&M:	• Sea plane: may	• Species: All	substantial improve	to lower level	<ul> <li>Educational: high.</li> </ul>	change, NLF/riffle	eligibility: high		• Optimize
Lower			reduction	substantially	require adaptation	• Canacity limitation: no	Non-native species:	• Future:	enhance interpretation	from Cove DS			revegetation
Lovel 4 5 feet			Enhancements	reduced	Docks: require	Downstream: excellent	provides reduced habitat	enhance as					
Level 4.5 leet			none	• 0&M costs	adaptation	Compliance: not required	notable improve	consistent with					
				substantially			• Watershed connectivity:	NLF. US pond &					
				reduced			reduced sink notable	water levels					
							improve						
							Climato resilienco:						
							notable improve						

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Tuble 2. Evaluation													
Option	Hydropower	Impoundment	Flooding and	Dam Structure &	Impacts to	Fish Passage	Ecology & Water	Public Access	Historical &	Community	Relative	Long-Term	Key Uncertainties
	Generation	Water Level	Resiliency	Facilities	Facilities and	Effectiveness	Quality	and Use	<b>Educational Value</b>	Plans &	Construction	Life Span	& Focus Factors
					Infrastructure					Aesthetic	Cost	Costs	
R - Dam Removal													
R1:	Retired	<ul> <li>Level reduced,</li> </ul>	<ul> <li>Current: greatest</li> </ul>	<ul> <li>Current: removed</li> </ul>	<ul> <li>Bridge: no change</li> </ul>	<ul> <li>Upstream effectiveness:</li> </ul>	Water quality: substantial	<ul> <li>Current: adapt</li> </ul>	<ul> <li>Historical: consistent,</li> </ul>	<ul> <li>Consistent with</li> </ul>	<ul> <li>Initial cost:</li> </ul>	• Costs: N/A	<ul> <li>Sediment</li> </ul>
Dam Removal		some residual	reduction	<ul> <li>Spillway capacity:</li> </ul>	<ul> <li>Hydrant: require</li> </ul>	high	improve	to lower level	powerhouse repurpose	plans: yes	likely least cost	• Revenue: no	management
		pool may	• Future:	N/A	adaptation	<ul> <li>Attraction: excellent</li> </ul>	<ul> <li>Habitat restoration:</li> </ul>	and river flow	potential	• View: change from	• Grant		<ul> <li>Ledge manipulation</li> </ul>
		persist	reduction	• 0&M: N/A	• Sea plane: require	• Species: All	greatest improvement	• Future:	<ul> <li>Educational: high,</li> </ul>	pond to flowing	eligibility:		requirements
			• Enhancements:	• O&M costs: N/A	adaptation	Capacity limitation: no	Non-native species:	enhance. as	enhance interpretation	river	greatest		• Optimize
			none		• Docks: require	• Downstream: excellent	habitat eliminated	consistent with		-	0		revegetation
			none		adaptation	• Downstream. excenent	• Watershed connectivity:	lower level and					revegetation
					auaptation	Compliance: not required	graatast improvement	river flow					
							greatest improvement	nvernow					
							Climate resilience:						
							greatest improvement						
R2:	<ul> <li>Retired</li> </ul>	<ul> <li>Level reduced,</li> </ul>	<ul> <li>Current: greatest</li> </ul>	<ul> <li>Current: removed</li> </ul>	<ul> <li>Bridge: no change</li> </ul>	<ul> <li>Upstream effectiveness:</li> </ul>	Water quality: substantial	<ul> <li>Current: adapt</li> </ul>	<ul> <li>Historical: consistent,</li> </ul>	<ul> <li>Consistent with</li> </ul>	<ul> <li>Initial cost:</li> </ul>	• Costs: N/A	<ul> <li>Sediment</li> </ul>
Dam Removal		some residual	reduction	<ul> <li>Spillway capacity:</li> </ul>	<ul> <li>Hydrant: require</li> </ul>	highest	improve	to lower level	powerhouse repurpose	plans: yes	likely least cost	<ul> <li>Revenue: no</li> </ul>	management
with Additional		pool may	• Future:	N/A	adaptation	<ul> <li>Attraction: excellent</li> </ul>	<ul> <li>Habitat restoration:</li> </ul>	and river flow	potential	<ul> <li>View: change from</li> </ul>	• Grant		<ul> <li>Ledge manipulation</li> </ul>
Ledge		persist	reduction	• O&M: N/A	<ul> <li>Sea plane: require</li> </ul>	• Species: All	greatest improvement	• Future:	<ul> <li>Educational: high,</li> </ul>	pond to flowing	eligibility:		requirements
Modifications			<ul> <li>Enhancements:</li> </ul>	• O&M costs: N/A	adaptation	<ul> <li>Capacity limitation: no</li> </ul>	Non-native species:	enhance, as	enhance interpretation	river	greatest		<ul> <li>Optimize</li> </ul>
Mouncations			none	,	• Docks: require	• Downstream: excellent	habitat eliminated	consistent with			-		revegetation
					adaptation	Compliance: not required	• Watershed connectivity:	lower level and					
					adaptation		greatest improvement	river flow					
							Climate resilience						
							Climate resilience:						
							greatest improvement						

# 3. Appendix – Cartoon Schematic Location Sketches



Figure 1. General location sketch for options HP 1 and HP 2 (Restore Power Generation, Retain Dam, Maintain Impoundment at Current Levels, Technical Fishways). Actual configuration, orientation, scale and size will vary pending additional development.



Figure 2. General location sketch for options F 1 and F 2 (Retain Dam, Maintain Impoundment at Current Levels, Technical Fishways, FERC Exemption Retired), and L 1 and L 2 (Modify Dam, Retain Impoundment at Lower Level, Technical Fishways, FERC Exemption Retired). Actual configuration, orientation, scale and size will vary pending additional development.



Figure 3. General location sketch for options M 1 and M 2 (Modify Dam, Maintain Impoundment at Current Levels, Technical Fishways, FERC Exemption Retired), and L 1 and L 2 (Modify Dam, Retain Impoundment at Lower Level, Technical Fishways, FERC Exemption Retired). Actual configuration, orientation, scale and size will vary pending additional development.



Figure 4. General location sketch for options N 2 (New Nature-like Fishway (3%) In-Channel Bypass on River Left, Maintain Current Impoundment Level) and N 4 (New Nature-like Fishway (3%) In-Channel Bypass on River Left, Retain Impoundment at Lower Level). Actual configuration, orientation, scale and size will vary pending additional development.



Figure 5. General location sketch for options N 3 (New Nature-like Fishway (3%) In-Channel Bypass on River Right, Maintain Current Impoundment Level) and N 5 (New Nature-like Fishway (3%) In-Channel Bypass on River Right, Retain Impoundment at Lower Level). Actual configuration, orientation, scale and size will vary pending additional development.



Figure 6. General location sketch for options N 6 (Bank-to-Bank NLF (3%), Maintain Current Impoundment Level), N 7 (Bank-to-Bank NLF (2%), Lower Impoundment Level 4.5 feet), and R 1 and R 2 (Dam Removal). Actual configuration, orientation, scale and size will vary pending additional development.