Eklutna Fish & Wildlife Program
Anchorage Assembly Worksession

July 14, 2023

McMillen

Agenda

- Study Results
- Alternatives Analysis
- Next Steps

Study Results

Phase 1 Engineering

1. Instream Flow Measures
2. Upstream Fish Passage Measures
3. Downstream Fish Passage Measures
4. Peak Flow Measures
5. Instream Flow Improvements
6. Physical Habitat Improvements
7. Infrastructural Improvements
8. Replacement Dam

- Dam Release Modifications
- Siphon Bypass
- AWWU Portal Valve Release
- AWWU Pipeline Release
- Bypass Tunnel Release

- Gravity Flow Fish Ladder
- Variable Exit Fish Ladder
- Pumped Supply and Slide Fish Ladder
- Trap and Haul

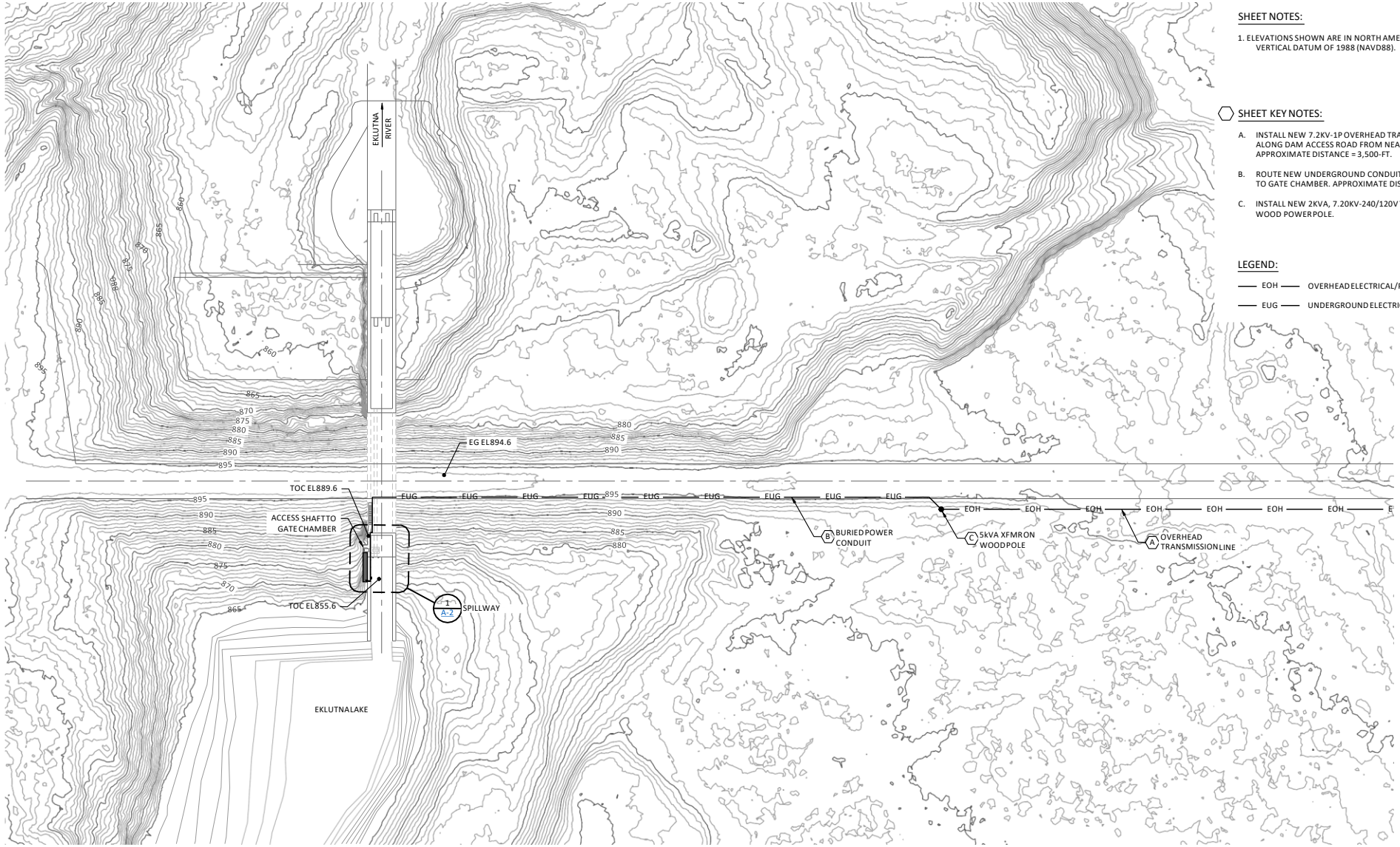
- Dam Spill
- Floating Surface Collector

- Uncontrolled Spill
- Tainter Gate Spill
- Fixed Wheel Gate Spill

Phase 1 Engineering

1. Instream Flow Measures
2. Upstream Fish Passage Measures
3. Downstream Fish Passage Measures
4. Peak Flow Measures
5. Instream Flow Improvements
6. Physical Habitat Improvements
7. Infrastructural Improvements
8. Replacement Dam

- Lach Q'Atnu Re-Route
- Dam Outlet Excavation
- Physical Habitat Manipulation
- AWWU Maintenance Bridges
- Lakeside Trail Improvements



SITE PLAN
SCALE: 1"= 40'

0' 40' 80'

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A. INSTALL NEW 7.2KV-1P OVERHEAD TRANSMISSION LINE ALONG DAM ACCESS ROAD FROM NEAREST POI. APPROXIMATE DISTANCE = 3,500-FT.

B. ROUTE NEW UNDERGROUND CONDUIT FROM POWER POLE TO GATE CHAMBER. APPROXIMATE DISTANCE = 600-FT.

C. INSTALL NEW 2KVA, 7.20KV-240/120V TRANSFORMER ON WOOD POWER POLE.

LEGEND:

EOH — OVERHEAD ELECTRICAL/POWER

EUG — UNDERGROUND ELECTRICAL

REV

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT
ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - INSTREAM FLOW
DAM RELEASE MODIFICATIONS
SITE PLAN

DESIGNED S.ELLENSON
DRAWN R.GUERRERO
CHECKED J.BOAG
PROJECTDATE 12/23/22

DRAWING
A-1

JOB NO: 000000

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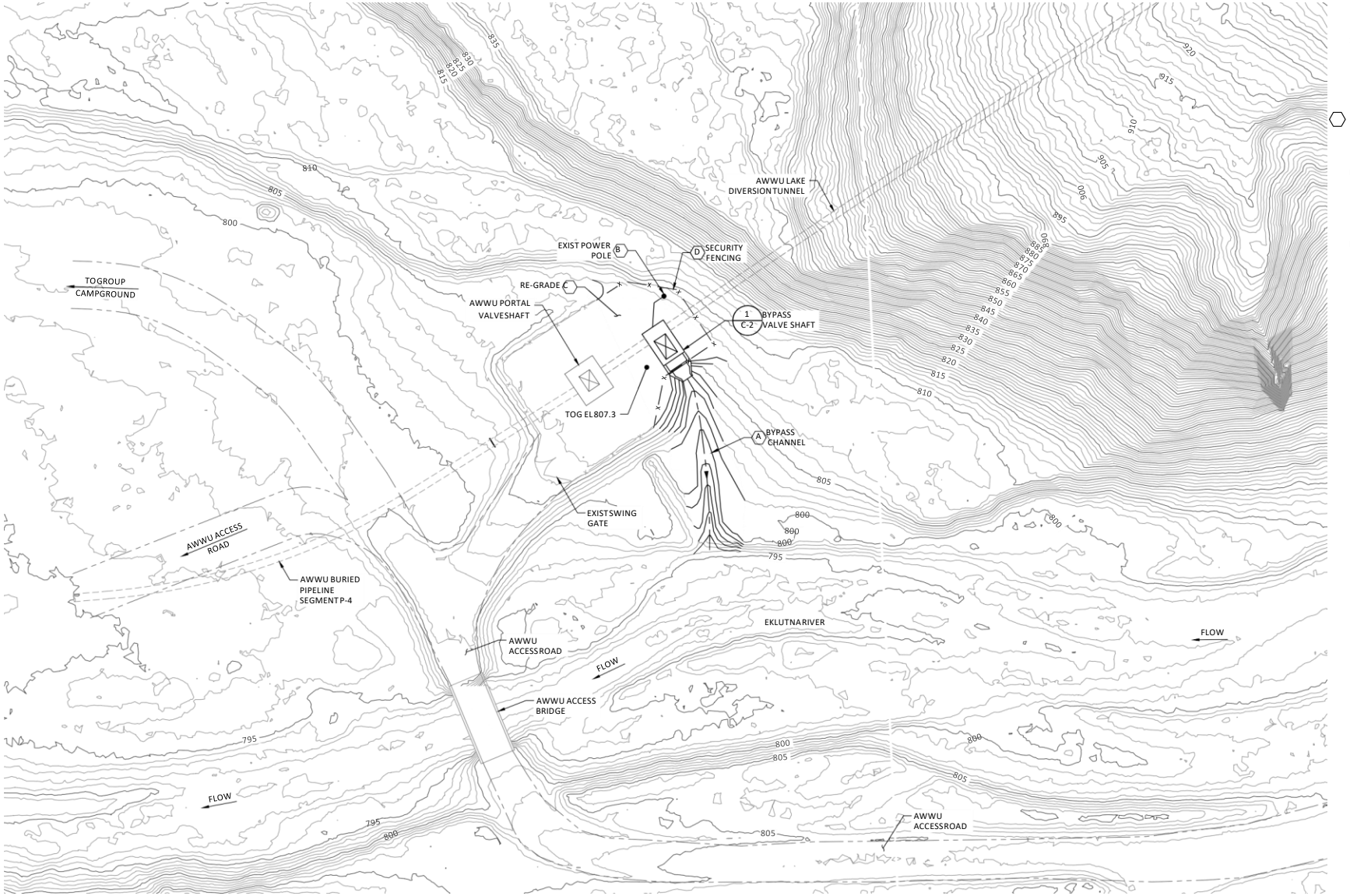

SITE PLAN
SCALE: 1"= 30'

0' 30' 60'

N

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A EXCAVATE NEW TRAPEZOIDAL BYPASS CHANNEL FROM BYPASS VALVE WET WELL TO EKLUTNA RIVER.

B TAP NEW 240V-3P FEEDER OFF EXISTING 7.2 KV TRANSMISSION LINE.

C FOLLOWING EXCAVATION FOR BYPASS VALVE SHAFT, RE-GRADE PAD TO ELEVATION 807.3 FT IN VICINITY OF BYPASS VALVE STRUCTURE.

D EXTEND SECURITY FENCING AROUND PERIMETER OF NEW STRUCTURE.

REV

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

MdMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT
ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - INSTREAM FLOW
AWWU PORTAL VALVE RELEASE
SITE PLAN

DESIGNED S.ELLENSON
DRAWN R.GUERRERO
CHECKED J.BOAG
PROJECTDATE 12/23/22

DRAWING
C-1

JOB NO: 000000

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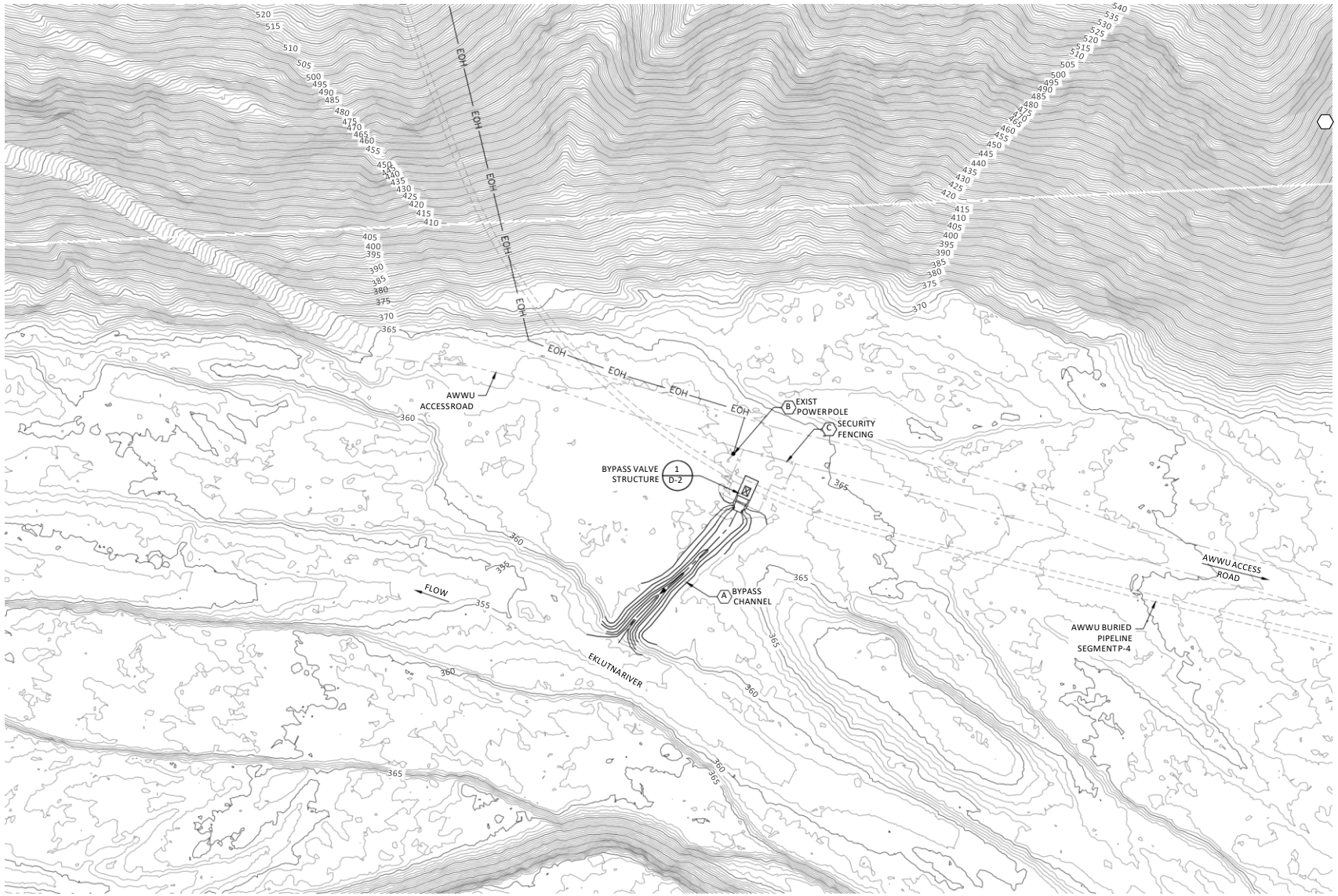

SITE PLAN
SCALE: 1"= 40'

0' 40' 80'

N

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A EXCAVATE NEW TRAPEZOIDAL BYPASS CHANNEL FROM BYPASS VALVE WET WELL TO EKLUTNA RIVER.

B. INSTALL NEW 7.2KV-3P OVERHEAD TRANSMISSION LINE ALONG AWWU ACCESS ROAD FROM NEAREST POI. APPROXIMATE DISTANCE = 2,000-FT.

C. CONSTRUCT SECURITY FENCING AROUND PERIMETER OF NEW STRUCTURE.

REV

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT
ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - INSTREAM FLOW
AWWU PIPELINE RELEASE
SITE PLAN

DESIGNED S.ELLENSON
DRAWN R.GUERRERO
CHECKED J.BOAG
PROJECTDATE 12/23/22

DRAWING
D-1

JOB NO: 000000

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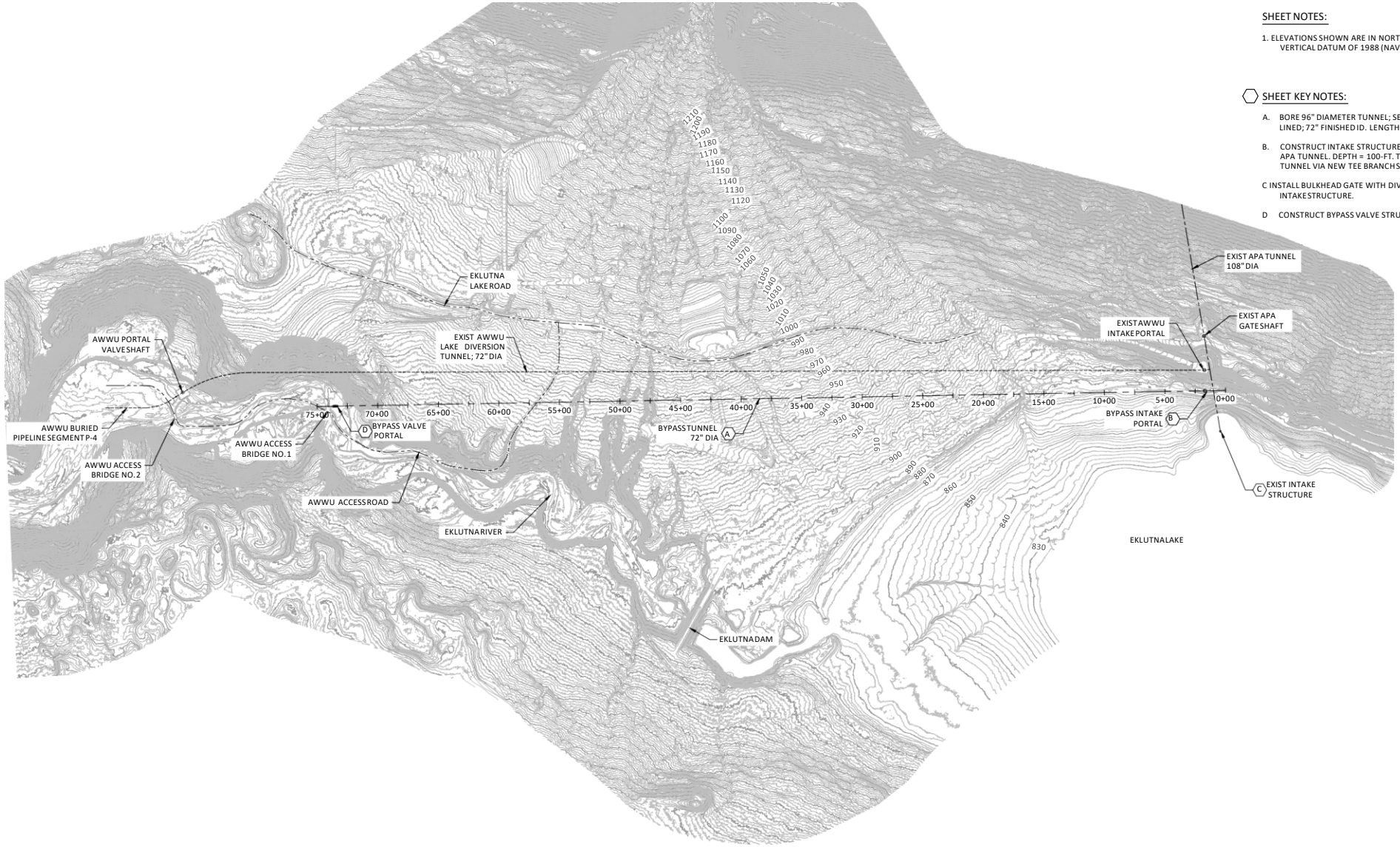

SITE PLAN
SCALE: 1"= 400'

0' 400' 800'

N

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A. BORE 96" DIAMETER TUNNEL; SEGMENTALLY CONCRETE LINED; 72" FINISHED ID. LENGTH = 7,200-FT.

B. CONSTRUCT INTAKE STRUCTURE ADJACENT TO EXISTING APA TUNNEL. DEPTH = 100-FT. TAP INTO EXISTING TUNNEL VIA NEW TEE BRANCH SEGMENT.

C INSTALL BULKHEAD GATE WITH DIVERS IN EXISTING INTAKE STRUCTURE.

D CONSTRUCT BYPASS VALVE STRUCTURE. DEPTH = 30-FT.

REV

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT
ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - INSTREAM FLOW
BYPASS TUNNEL RELEASE
SITE PLAN

DESIGNED S.ELLENSON
DRAWN R.GUERRERO
CHECKED J.BOAG
PROJECT DATE 12/23/22

DRAWING
E-1

JOB NO: 000000

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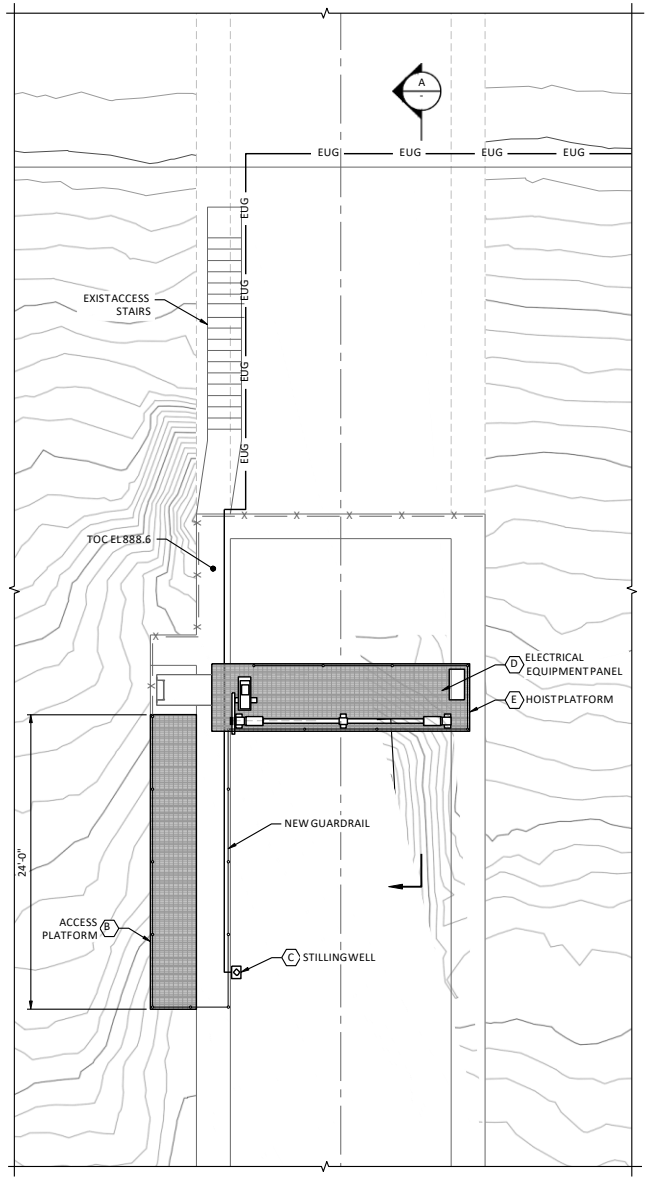
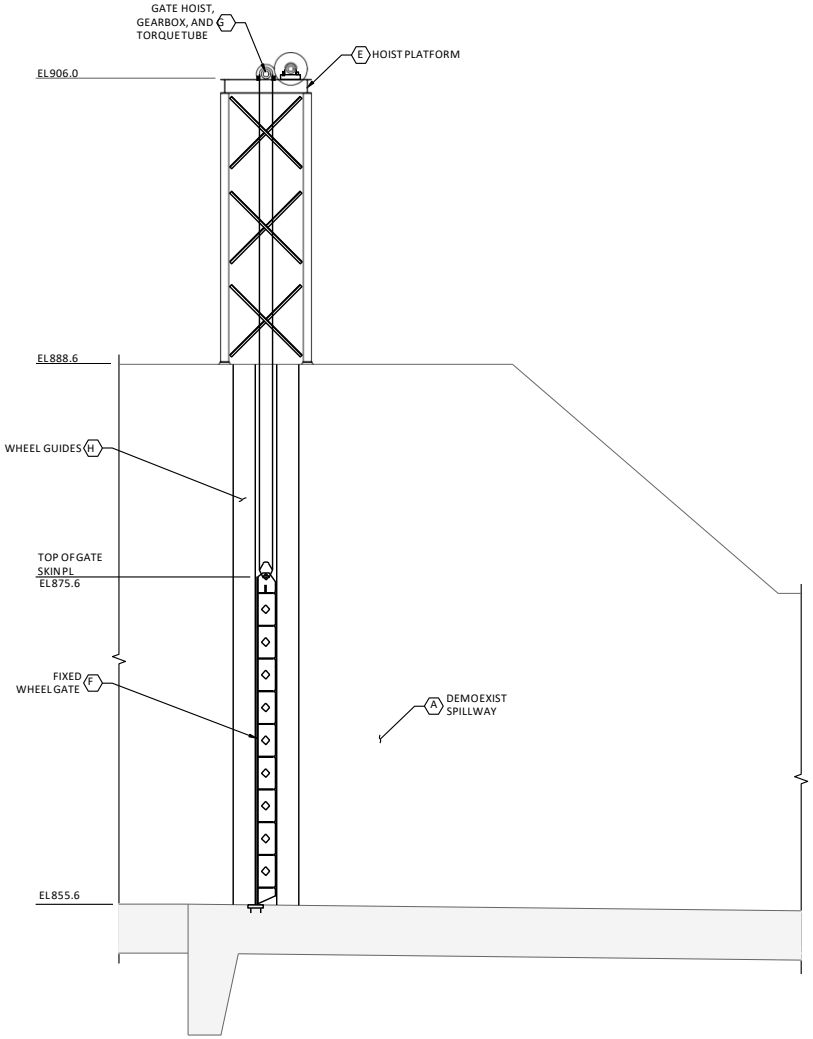


SPILLWAY DETAIL

SCALE: 3/16"=1'-0"

1 I-1



SECTION

SCALE: 1/4"=1'-0"

A

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A DEMOLISH EXISTING CONCRETE SPILLWAY, GATE CHAMBER, AND OUTLET GATE TO EXISTING SPILLWAY SLAB EL. 855.6.

B. INSTALL O&M ACCESS PLATFORM ON SPILLWAY TRAINING WALL.

C. INSTALL STILLING WELL WITH SUBMERSIBLE PRESSURE TRANSDUCER.

D. INSTALL ELECTRICAL EQUIPMENT AND CONTROLS PANEL.

E INSTALL O&M HOIST PLATFORM ABOVE SPILLWAY.

F INSTALL 16-FT WIDE X 20-FT TALL FIXED WHEEL GATE WITHIN THE EXISTING SPILLWAY STRUCTURE. INSTALL SEALING SURFACE ON LIP OF EXISTING SPILLWAY CREST.

G. INSTALL HOIST, GEAR REDUCER, TORQUE TUBE, AND BEARINGS ON HOIST PLATFORM.

H. MODIFY EXISTING SPILLWAY TRAINING WALLS. INCLUDE NEW WHEEL GUIDE BLOCKOUTS FOR FIXED WHEEL GATE.

REV	DATE	BY	DESCRIPTION
A	12/23/22	SPE	CONCEPTUAL DESIGN

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT

ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - PEAK FLOW
SPILLWAY MODIFICATIONS - FIXED WHEEL GATE EL 855.6
SECTIONS AND DETAILS

DESIGNED S. ELLENSON

DRAWN R. GUERRERO

CHECKED J. BOAG

PROJECT DATE 12/23/22

DRAWING I-2

JOB NO: 000000

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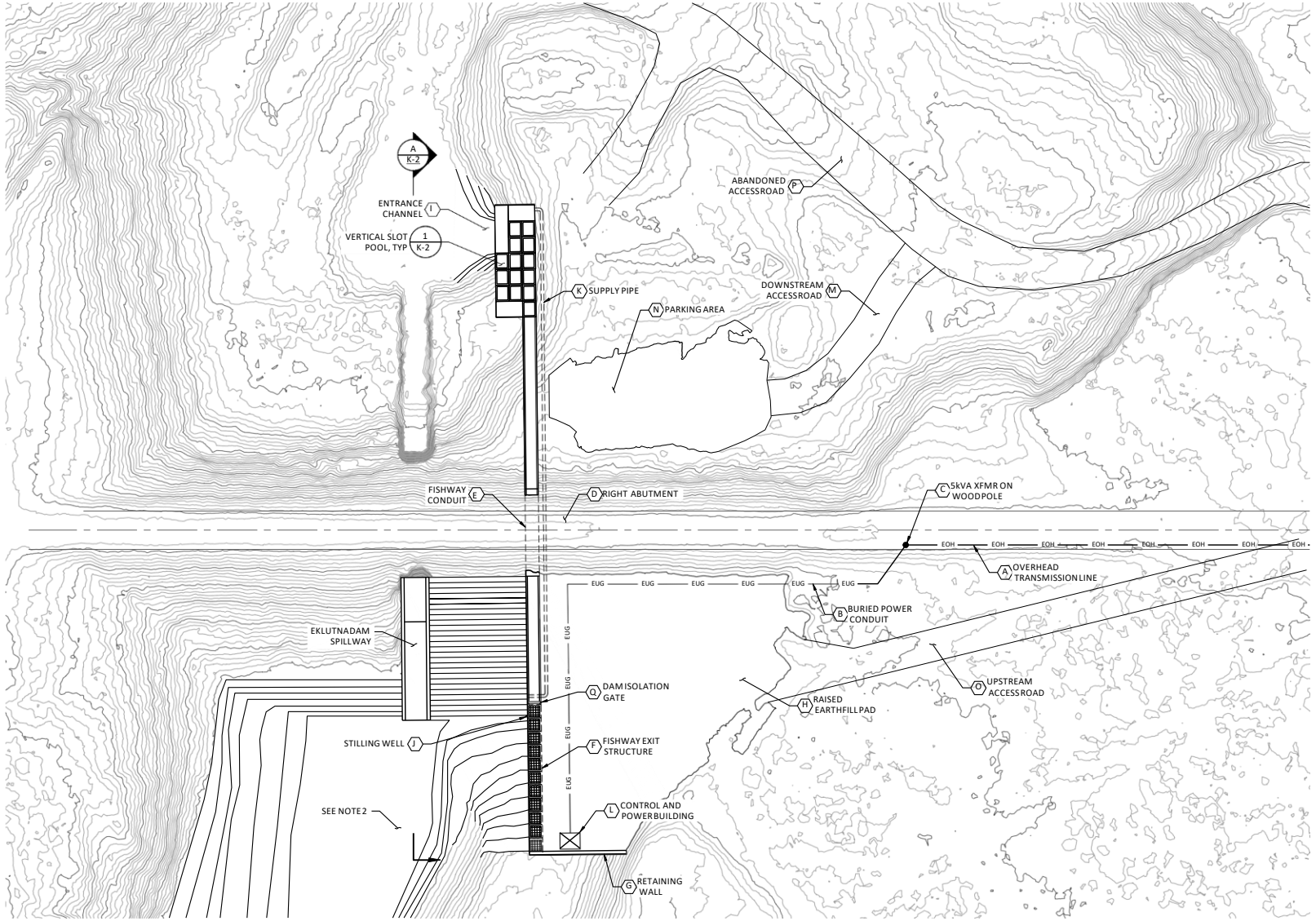

SITE PLAN
SCALE: 1"= 40'

0' 40' 80'

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. POND BATHYMETRIC PROFILE IS UNKNOWN, TOPOGRAPHY ESTIMATED BASED ON AS BUILT DRAWINGS OF DAM AND FIELD DATA.

SHEET KEY NOTES:

A INSTALL NEW 7.2KV-3P OVERHEAD TRANSMISSION LINE ALONG DAM ACCESS ROAD FROM NEAREST POI. APPROXIMATE DISTANCE = 3,500-FT.

B ROUTE NEW UNDERGROUND CONDUIT FROM POWER POLE TO CONTROL ENCLOSURE. APPROXIMATE DISTANCE = 500-FT.

C INSTALL NEW 5KVA, 7.20KV-240/120V TRANSFORMER ON WOOD POWER POLE.

D. EXCAVATE RIGHT ABUTMENT OF EXISTING DAM TO ELEVATION 859.0.

E. CONSTRUCT NEW CONCRETE FISHWAY THROUGH DAM SECTION.

D. CONSTRUCT NEW GATED EXIT CHANNEL.

E. CONSTRUCT RETAINING WALL TO ELEVATION 888.6.

F. CONSTRUCT NEW RAISED EARTHFILL PAD TO EL. 888.6 ADJACENT TO NEW FISHWAY.

G. EXCAVATE NEW CHANNEL WITHIN EXISTING PLUNGE POOL TO FISHWAY ENTRANCE POOL.

H. INSTALL NEW STILLING WELL WITH REDUNDANT PRESSURE TRANSDUCERS UPSTREAM OF FISHWAY STRUCTURE..

K INSTALL NEW 24" SUPPLY PIPE TO ENTRANCE POOL. L

CONSTRUCT NEW CONTROL AND POWER BUILDING.

M CONSTRUCT NEW ACCESS ROAD TO DOWNSTREAM TOE OF DAM.

N CONSTRUCT NEW PARKING AND EQUIPMENT PAD AT DOWNSTREAM TOE OF DAM.

O CONSTRUCT NEW ACCESS ROAD TO FISHWAY EXIT STRUCTURE.

P. REGRADE, REPAIR, AND IMPROVE EXISTING ABANDONED ACCESS ROAD DOWNSTREAM OF DAM RIGHT ABUTMENT.

Q. INSTALL DAM ISOLATION BULKHEAD GATE AT DOWNSTREAM EXTENT OF EXIT STRUCTURE.

LEGEND:

EOH — OVERHEAD ELECTRICAL/POWER

EUG — UNDERGROUND ELECTRICAL

Path: C:\Vault20\Chugach Electric\Eklutna Feasibility Study\K-1.dwg Plot date: Dec 15, 2022 03:54pm CAD User: Guerrero/Robert

WARNING
0 1/2 1
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McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

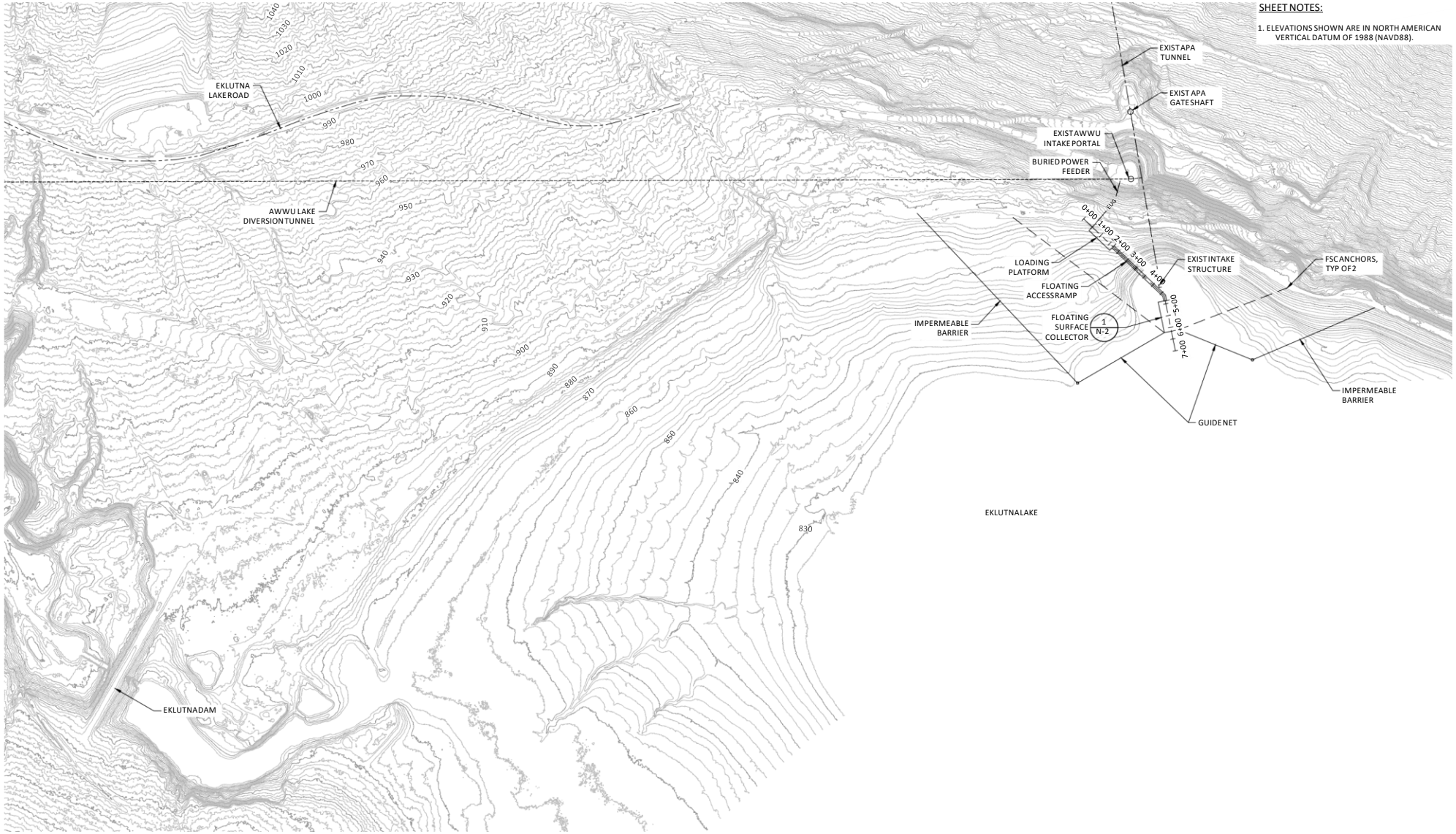
EKLUTNA FISH & WILDLIFE PROJECT
ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - FISH PASSAGE
VARIABLE EXIT FISH LADDER
SITE PLAN

DESIGNED S. ELLENSON
DRAWN R.GUERRERO
CHECKED J.BOAG
PROJECT DATE 12/23/22

DRAWING
K-1

JOB NO: 000000



SITE PLAN

SCALE: 1"= 200'

0" 200' 400'

N

REV	DESCRIPTION	DATE	BY

WARNING

0 1/2 1

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McMILLEN JACOBS ASSOCIATES

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT

ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - FISH PASSAGE
FLOATING SURFACE COLLECTOR
SITE PLAN

DESIGNED S.ELLENSON

DRAWN R.GUERRERO

CHECKED J.BOAG

PROJECTDATE 12/23/22

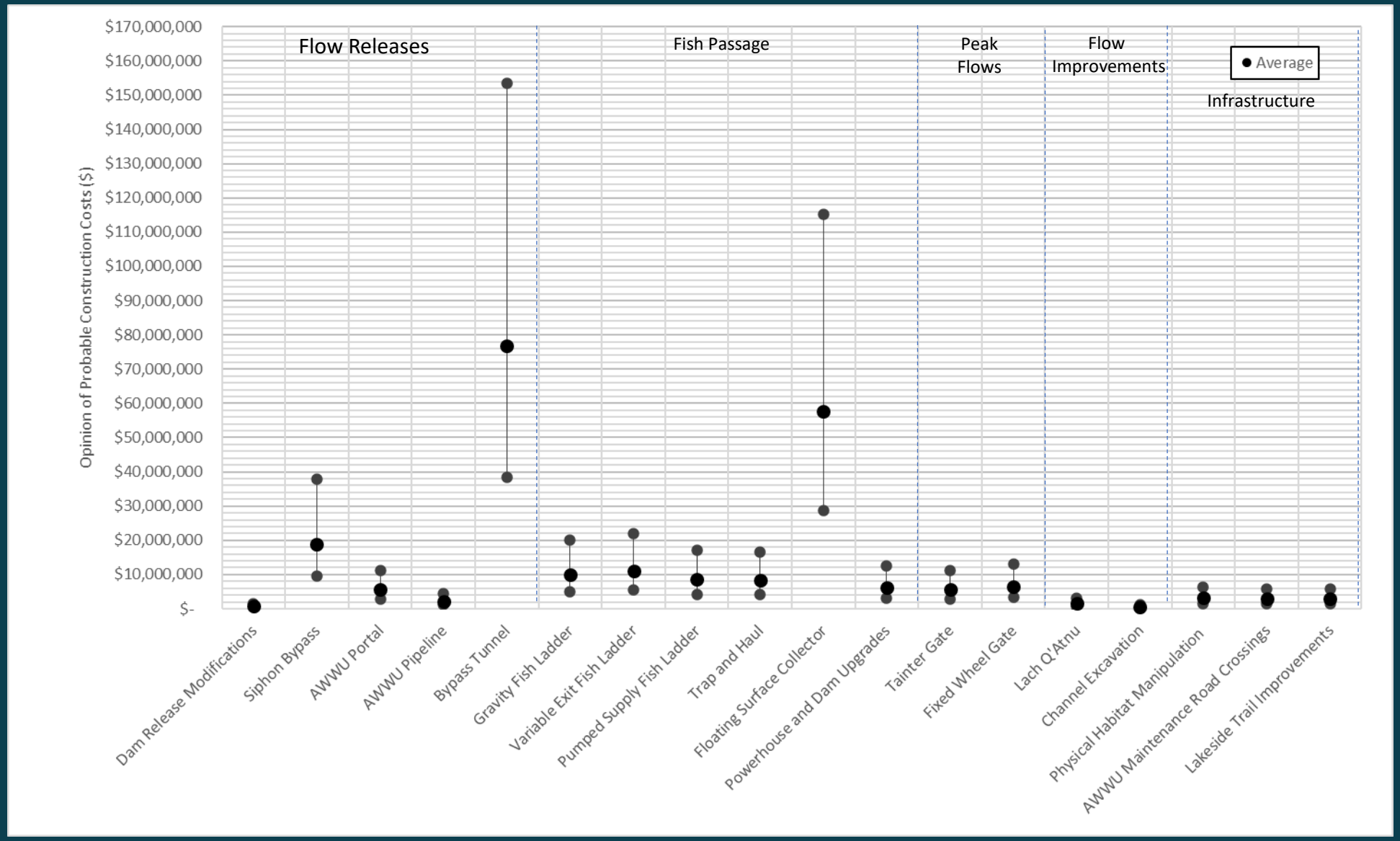
DRAWING

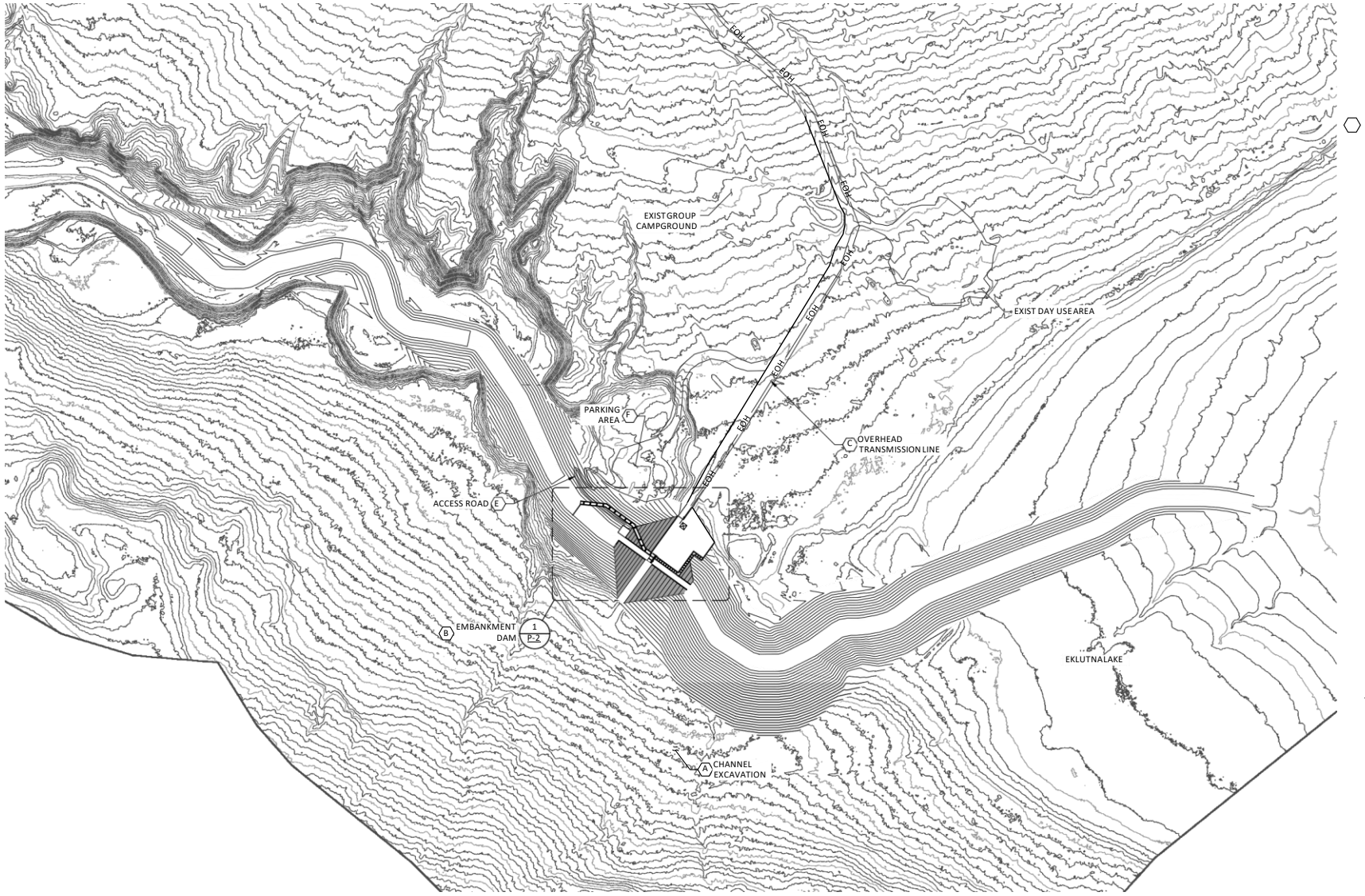
N-1

JOB NO: 000000

Path: C:\Vault20\Chugach Electric\Eklutna Feasibility Study\N-1.dwg Plot date: Dec 15, 2022 03:54pm CAD User: Guerrero\Robert

Class 5 Opinion of Probable Construction Costs





SITE PLAN

SCALE: 1"=200'

0' 200' 400'

N

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A EXCAVATE CHANNEL THROUGH RESERVOIR OUTLET AND EXISTING EKLUTNA DAM TO EL. 838.6 MSL.
APPROXIMATE LENGTH = 5,200-FT.
APPROXIMATE IN-SITU VOLUME = 550,000 CY.

B CONSTRUCT NEW EARTHFILL EMBANKMENT DAM.
HEIGHT = 56-FT
APPROXIMATE VOLUME = 82,000 CY

C INSTALL NEW 7.2 KV - 3P OVERHEAD TRANSMISSION LINE ALONG DAM ACCESS ROAD FROM NEAREST POI.
APPROXIMATE DISTANCE = 3,500-FT.

D REGRADE, REPAIR AND IMPROVE EXISTING ABANDONED ACCESS ROAD DOWNSTREAM OF DAM RIGHT ABUTMENT.

E CONSTRUCT NEW ACCESS ROAD TO DOWNSTREAM TOE OF DAM.

F CONSTRUCT NEW PARKING AREA DOWNSTREAM OF DAM RIGHT ABUTMENT.

LEGEND:

EOH OVERHEAD ELECTRICAL/POWER

REV	DATE	BY	DESCRIPTION
B	05/12/23	SPE	ADDED FISH PASSAGE ALTERNATIVE
A	05/12/23	SPE	CONCEPTUAL DESIGN

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

McMillen

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT

ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - FISH PASSAGE
REPLACEMENT DAM ALTERNATIVE
SITE PLAN

DESIGNED S. ELLENSON

DRAWN R.GUERRERO

CHECKED J.BOAG

PROJECT DATE 05/12/23

DRAWING

P-1

JOB NO: 0000000

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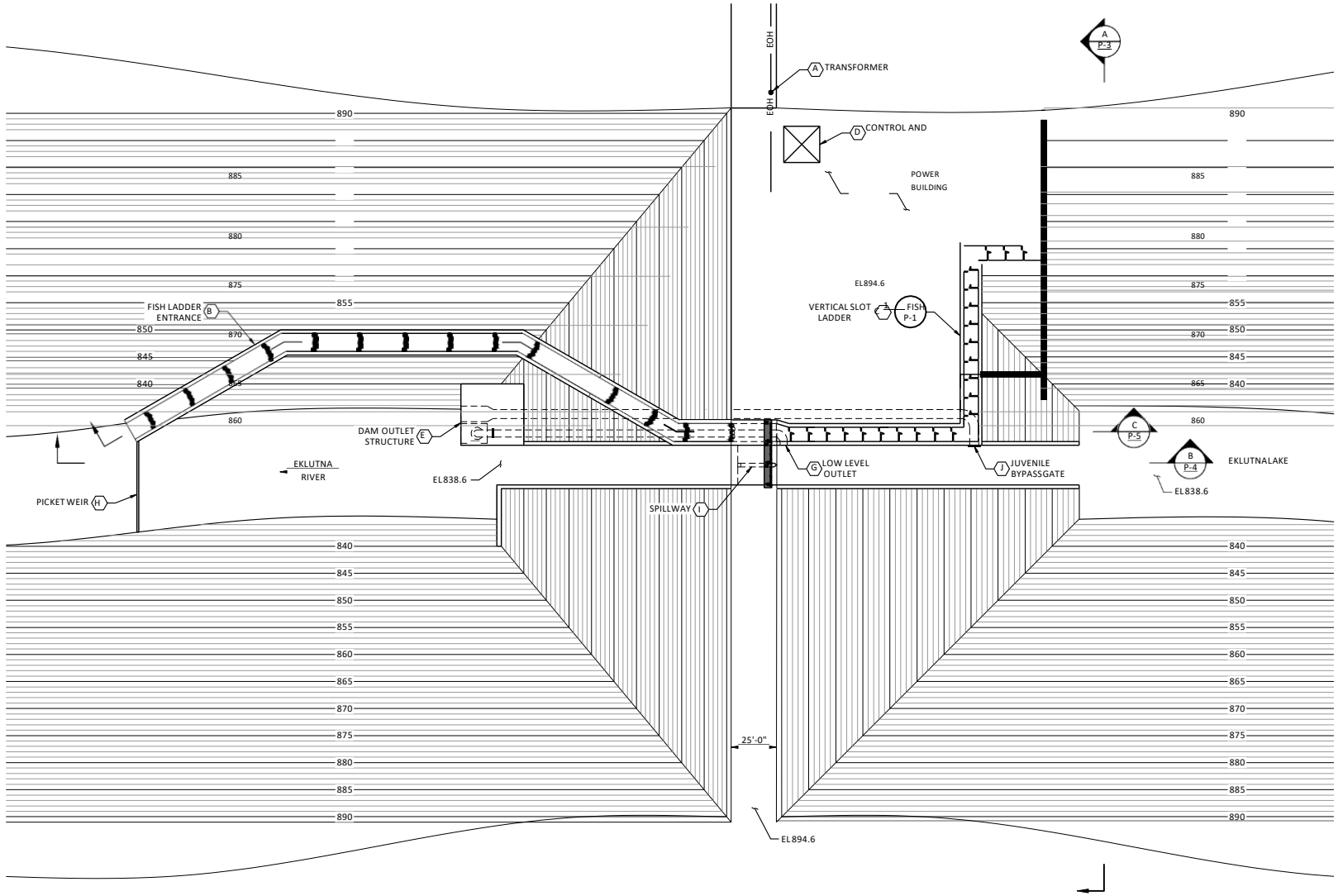

EKLUTNA EMBANKMENT DAM

SCALE: 1"=30'

0" 30" 60"

1 P-1

SHEET NOTES:

1. ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SHEET KEY NOTES:

A. INSTALL 7.2kV - 240/120V TRANSFORMER ON WOOD POWER POLE

B. CONSTRUCT STEP-POOL ROCK RAMP FISHWAY FOR ENTRANCE TO RESERVOIR.

C. CONSTRUCT VERTICAL SLOT FISH LADDER WITH VARIABLE POOL GATED EXITS ON UPSTREAM FACE OF DAM.

D. CONSTRUCT CONTROL AND POWER BUILDING. 20-FT X 20-FT. E

CONSTRUCT CONTROL AND POWER BUILDING. 20-FT X 20-FT.

F INSTALL 5-FT SQUARE CONCRETE CONDUIT THROUGH BASE OF DAM WITH FLOW CONTROL GATE AT INTAKE

G INSTALL 48" DIA STEEL PIPE THROUGH BASE OF DAM WITH SCREENED INTAKE.

H CONSTRUCT AUTOMATED PICKET WEIR ACROSS RIVER CHANNEL ADJACENT TO FISH LADDER ENTRANCE.

I CONSTRUCT TWO BAY OVERFLOW SPILLWAY WITH (2X) 10-FT X 16-FT FIXED WHEEL GATES.

LEGEND:

EOH — OVERHEAD ELECTRICAL/POWER

EUG — UNDERGROUND ELECTRICAL

REV	DATE	BY	DESCRIPTION
B	05/12/23	SPE	ADDED FISH PASSAGE ALTERNATIVE
A	05/12/23	SPE	CONCEPTUAL DESIGN

WARNING

0 1/2 1

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McMillen

CHUGACH POWERING ALASKA'S FUTURE

EKLUTNA FISH & WILDLIFE PROJECT

ENGINEERING FEASIBILITY STUDY

PME ALTERNATIVES ANALYSIS - FISH PASSAGE REPLACEMENT DAM ALTERNATIVE SECTIONS AND DETAILS 1

DESIGNED S. ELLENSON

DRAWN R.GUERRERO

CHECKED J.BOAG

PROJECT DATE 05/12/23

DRAWING

P-2

JOB NO: 0600000

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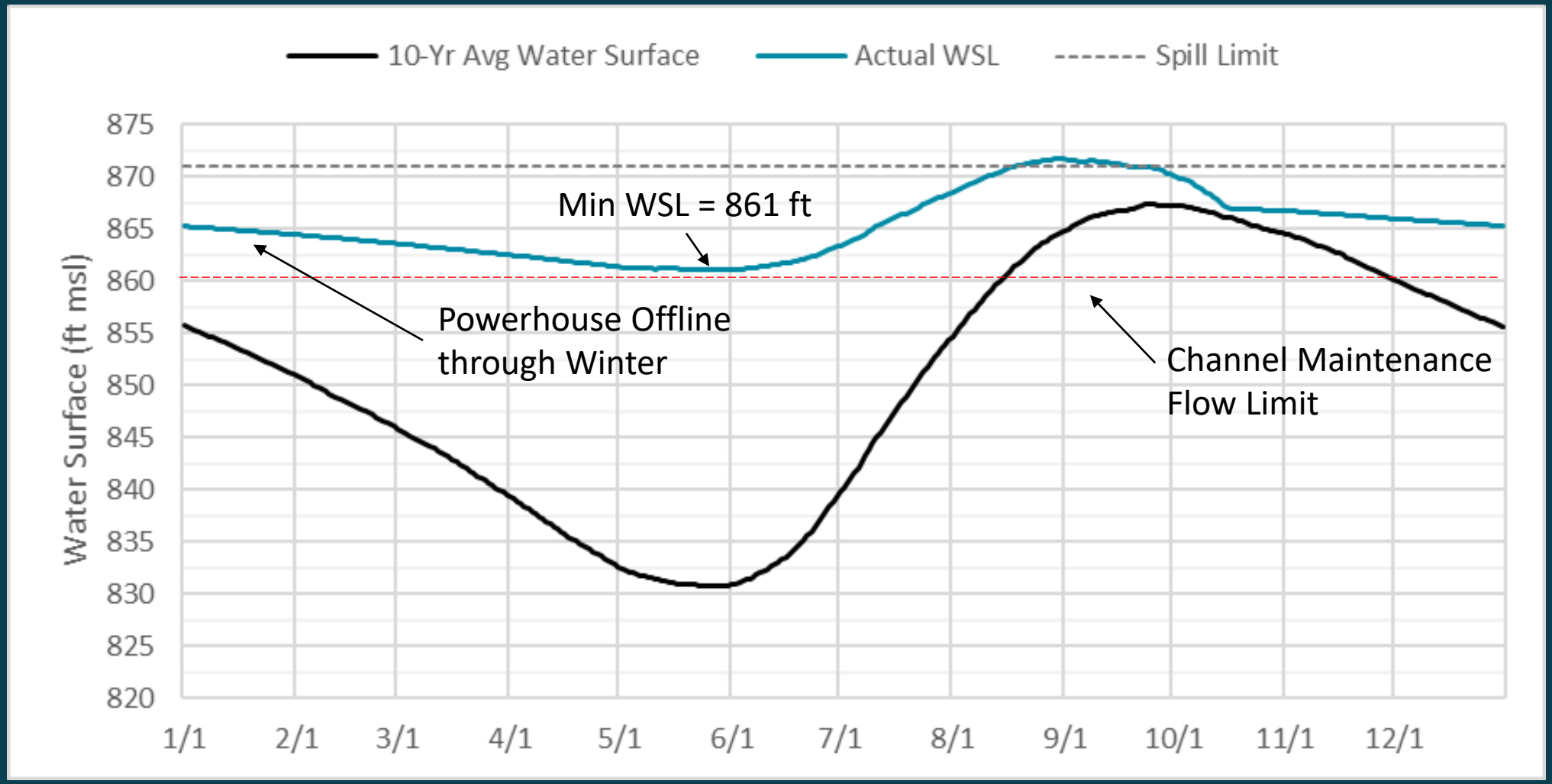
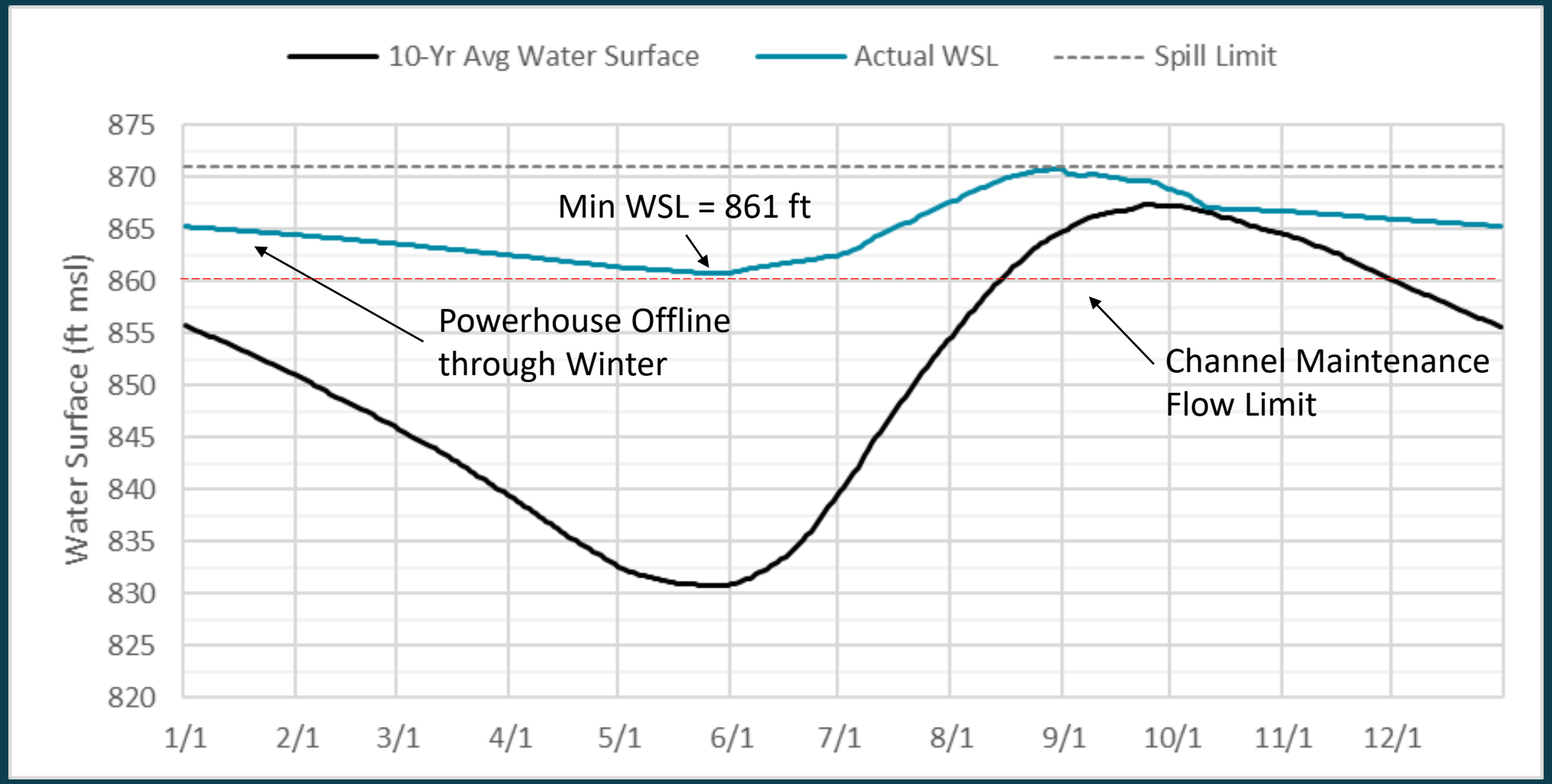
Class 5 OPCC – Replacement Dam

- Indirect Costs (Mobilization / General Requirements)
  - $16M
- Site Construction / Access Roads
  - $1M
- Channel Excavation – Haul
  - $40M
- Dam Construction w/ Fishway
  - $20M
- Electrical/Transmission
  - $3M
- Overhead, Profit, & Bonds
  - $13M
- Contingency
  - $23M
- Construction Price
  - **$115M ($60M - $227M)**

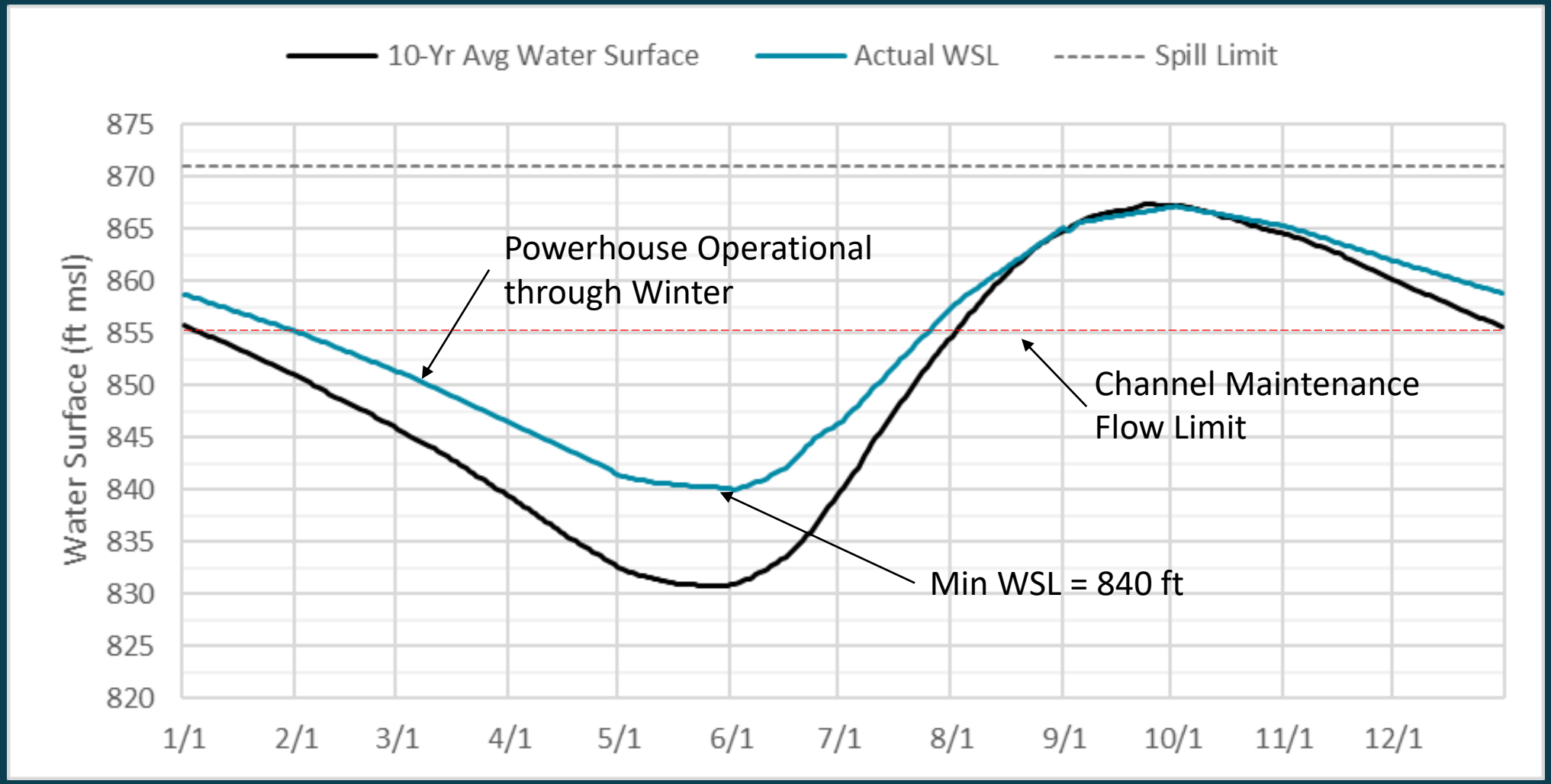
Existing Dam Release w/ No Fish Passage



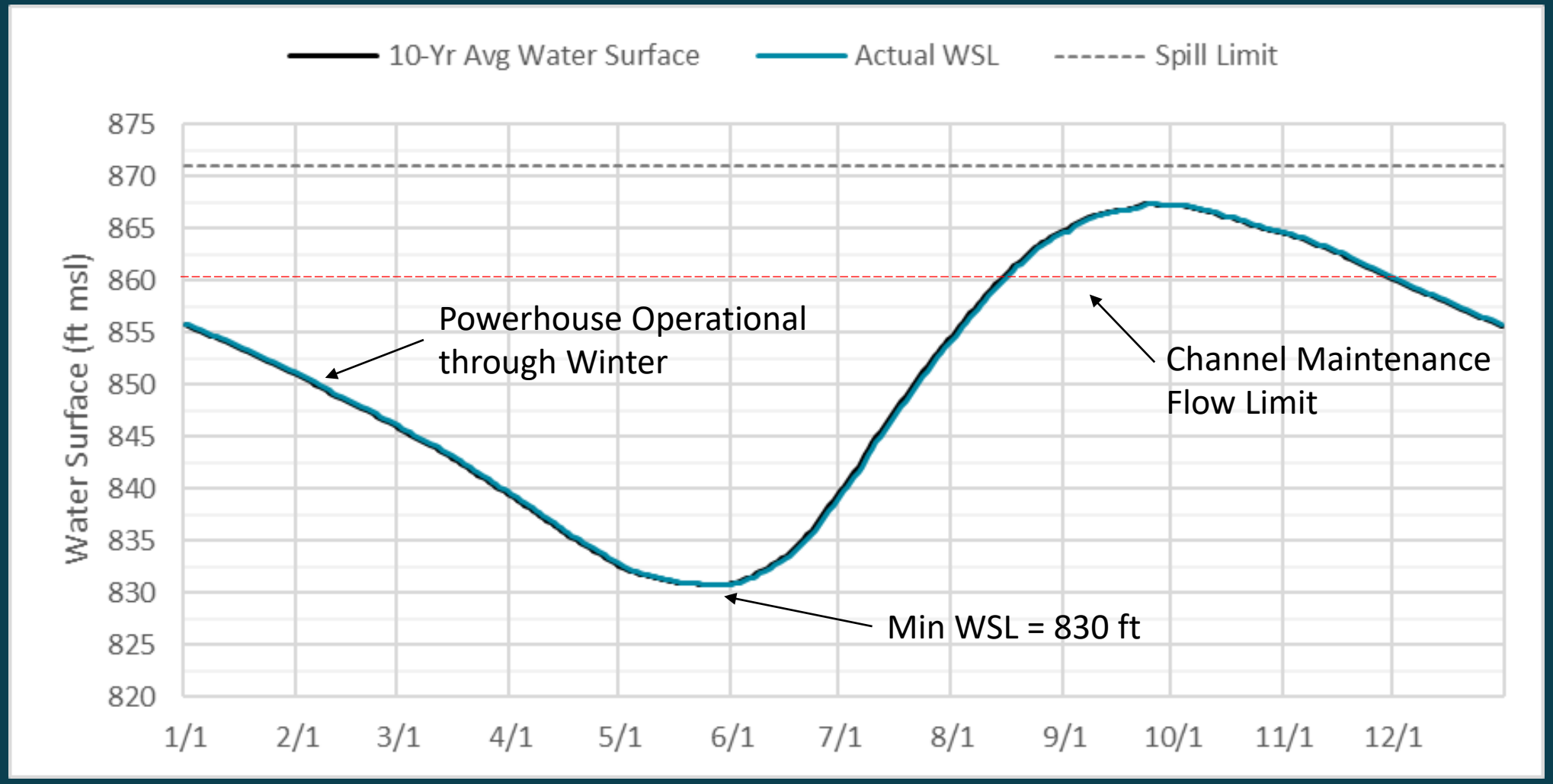
Existing Dam Release w/ Variable Exit Fishway



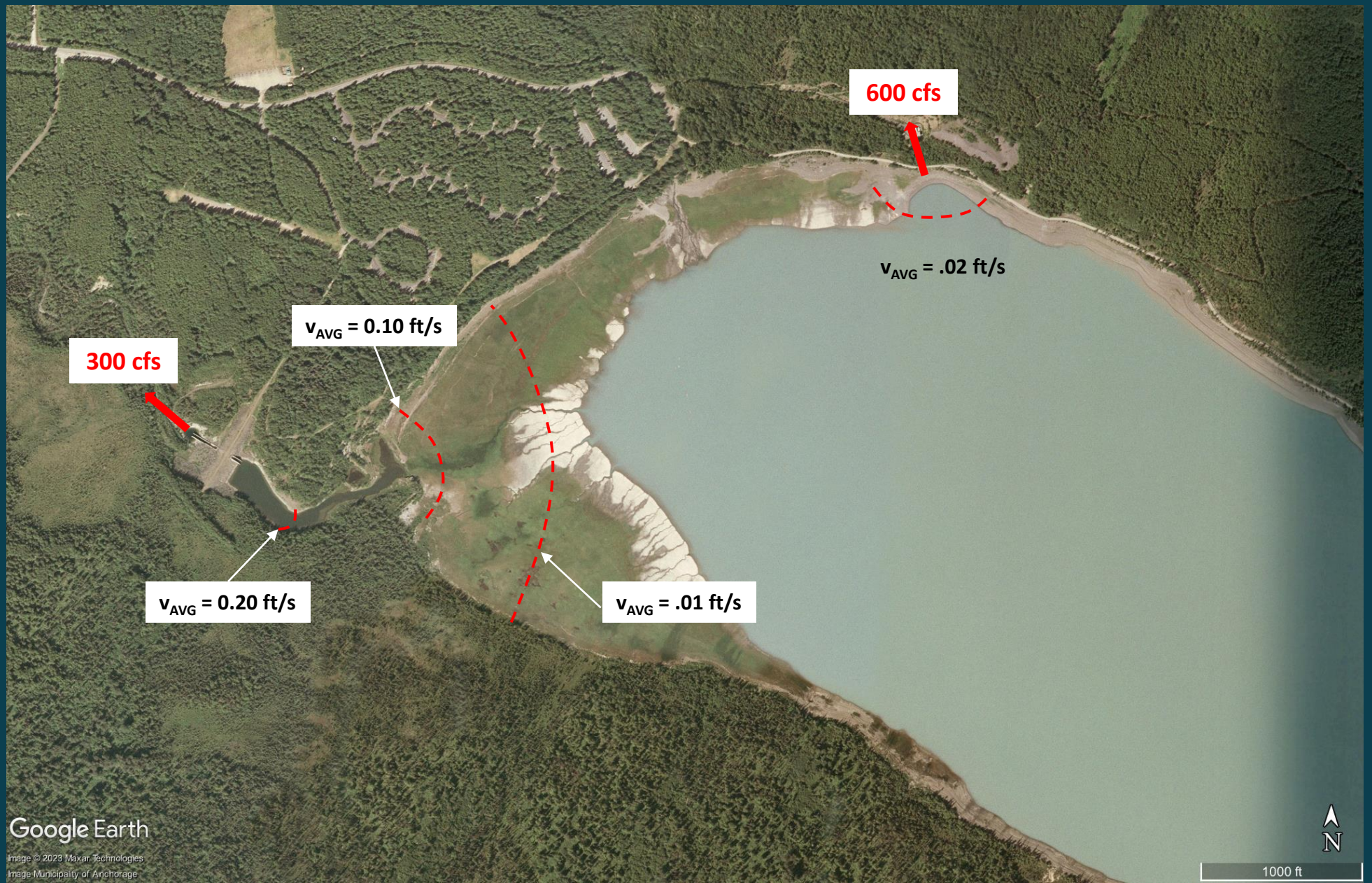
Replacement Dam



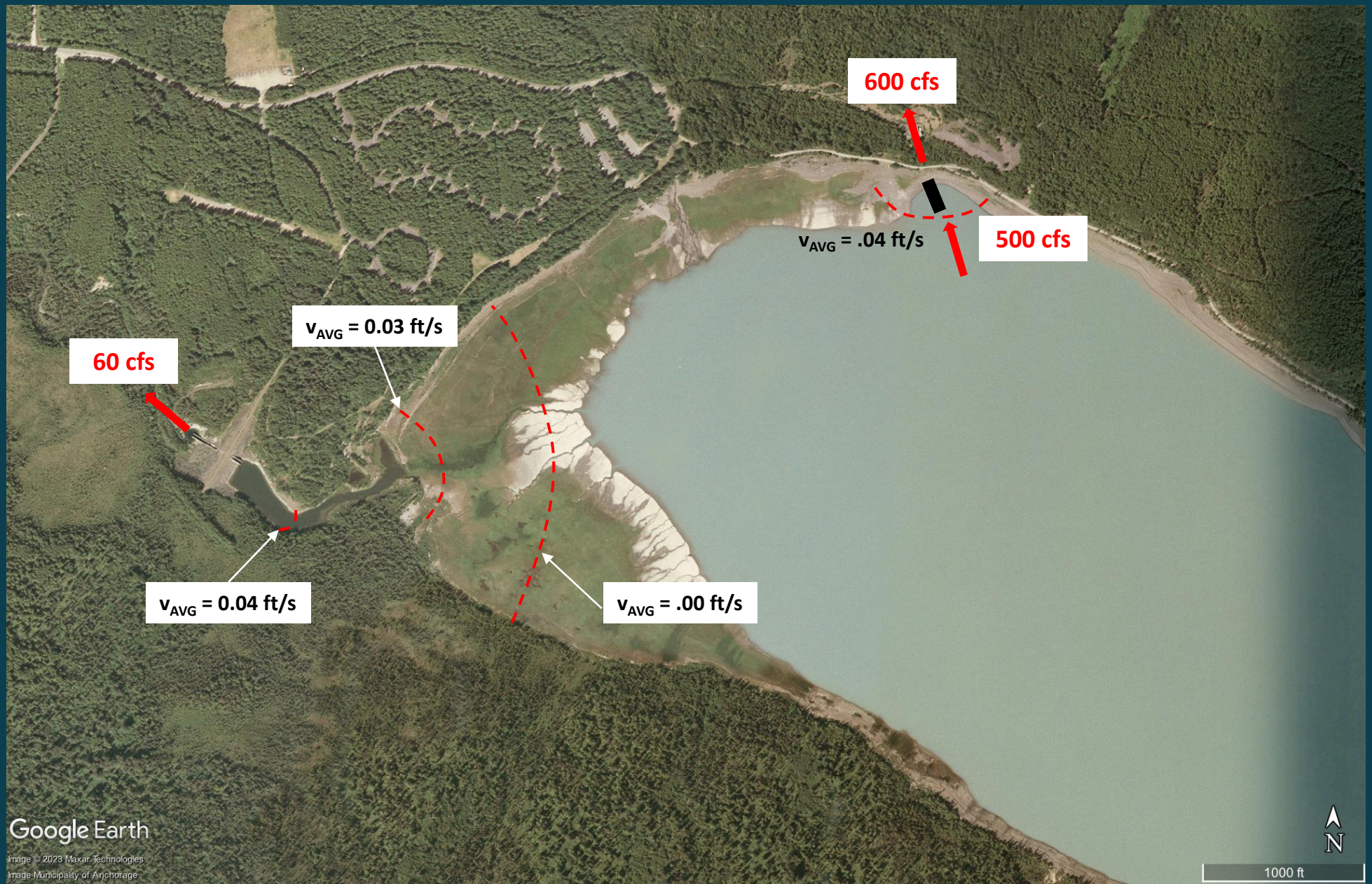
AWWU Portal/Pipeline & Bypass Tunnel



Downstream Fish Passage – Dam Release



Downstream Fish Passage – Floating Surface Collector



Winter Flow Analysis

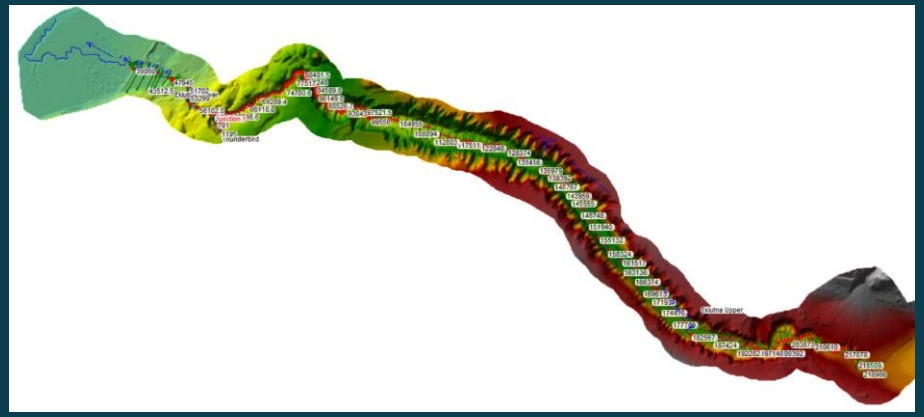
Criteria

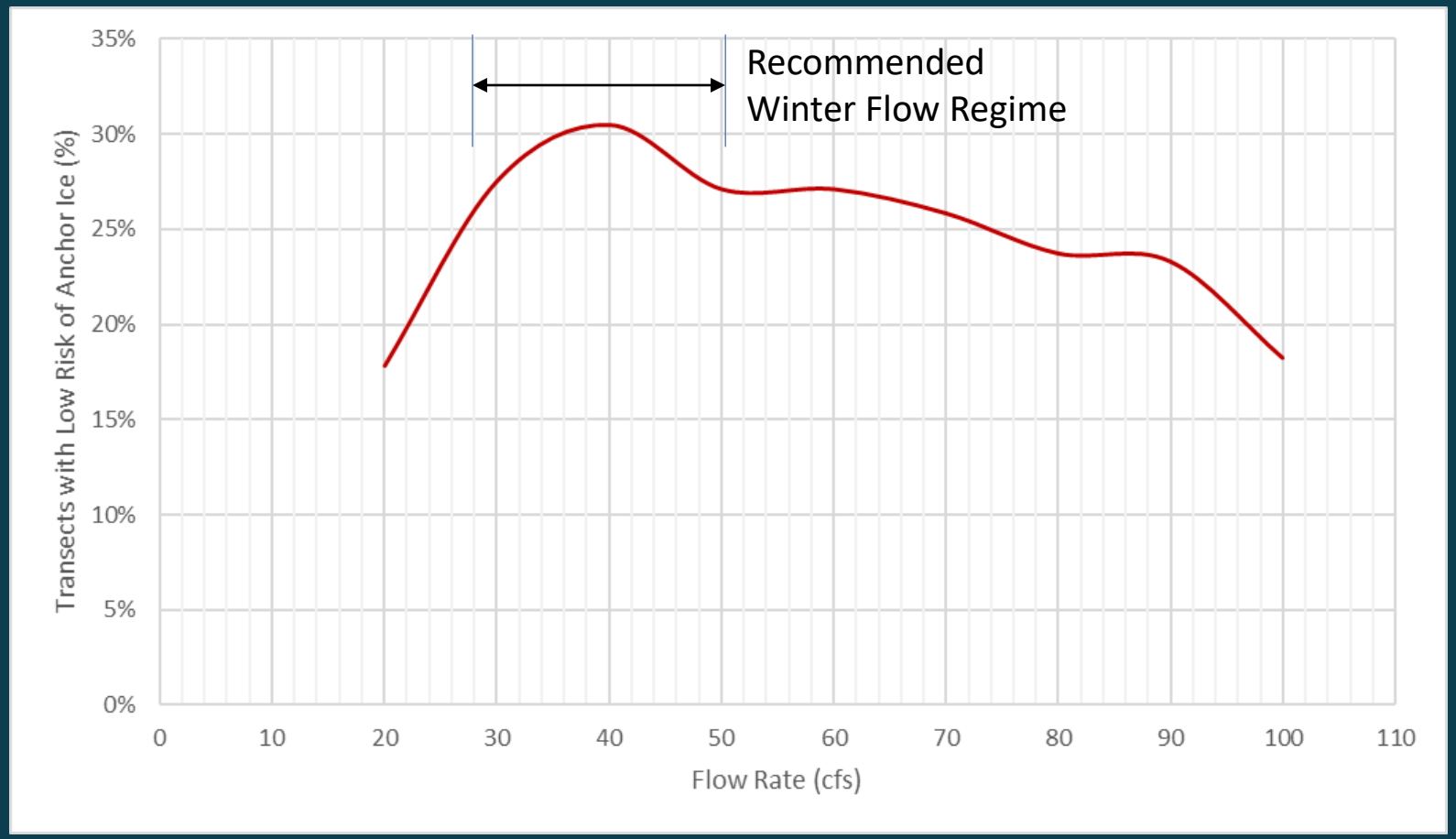
Using 1D River Model (236 Transects):

Determine Number of Transects with:

$$v < 2.0\ ft/s$$

$$d \geq 15"$$

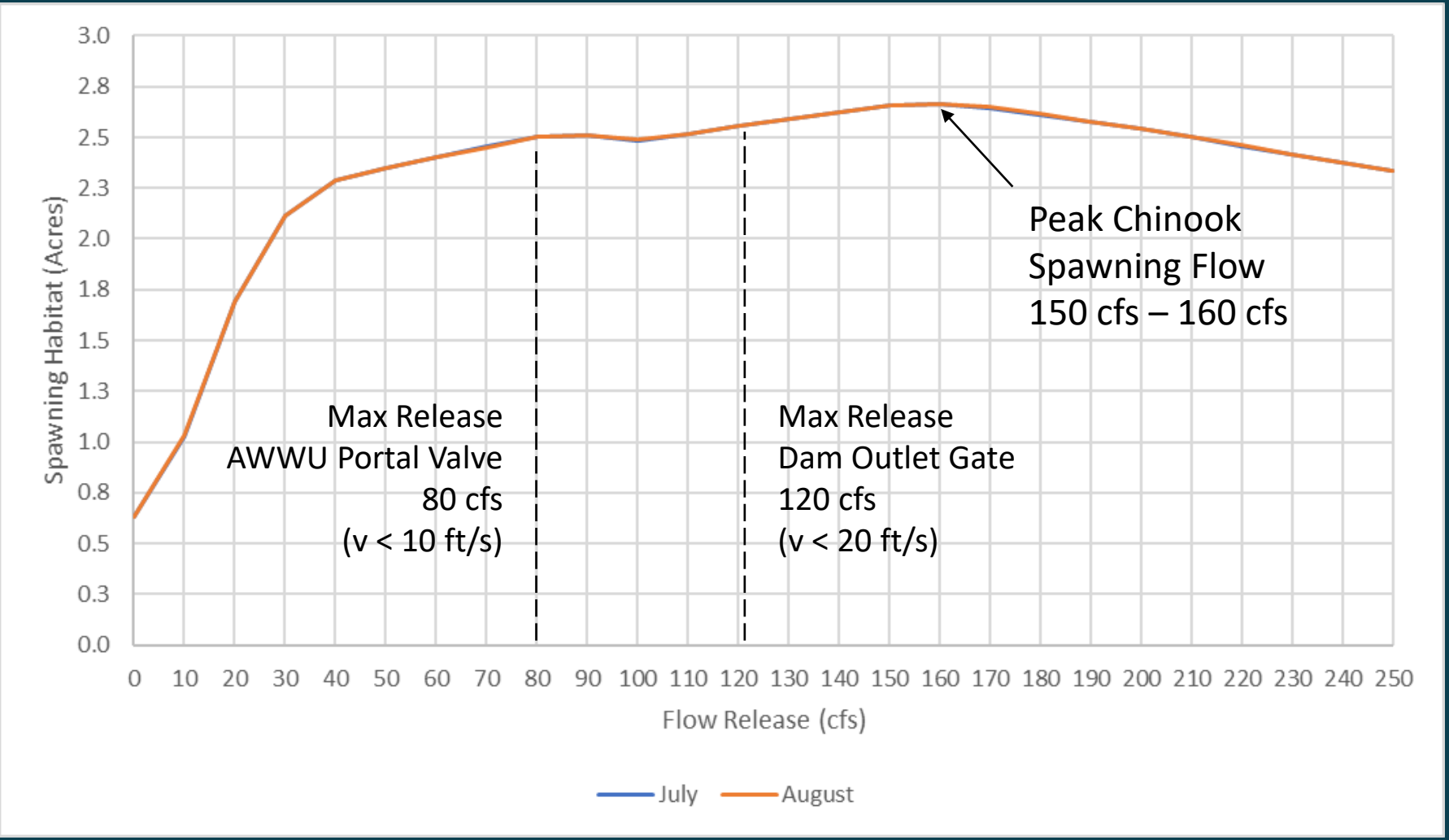




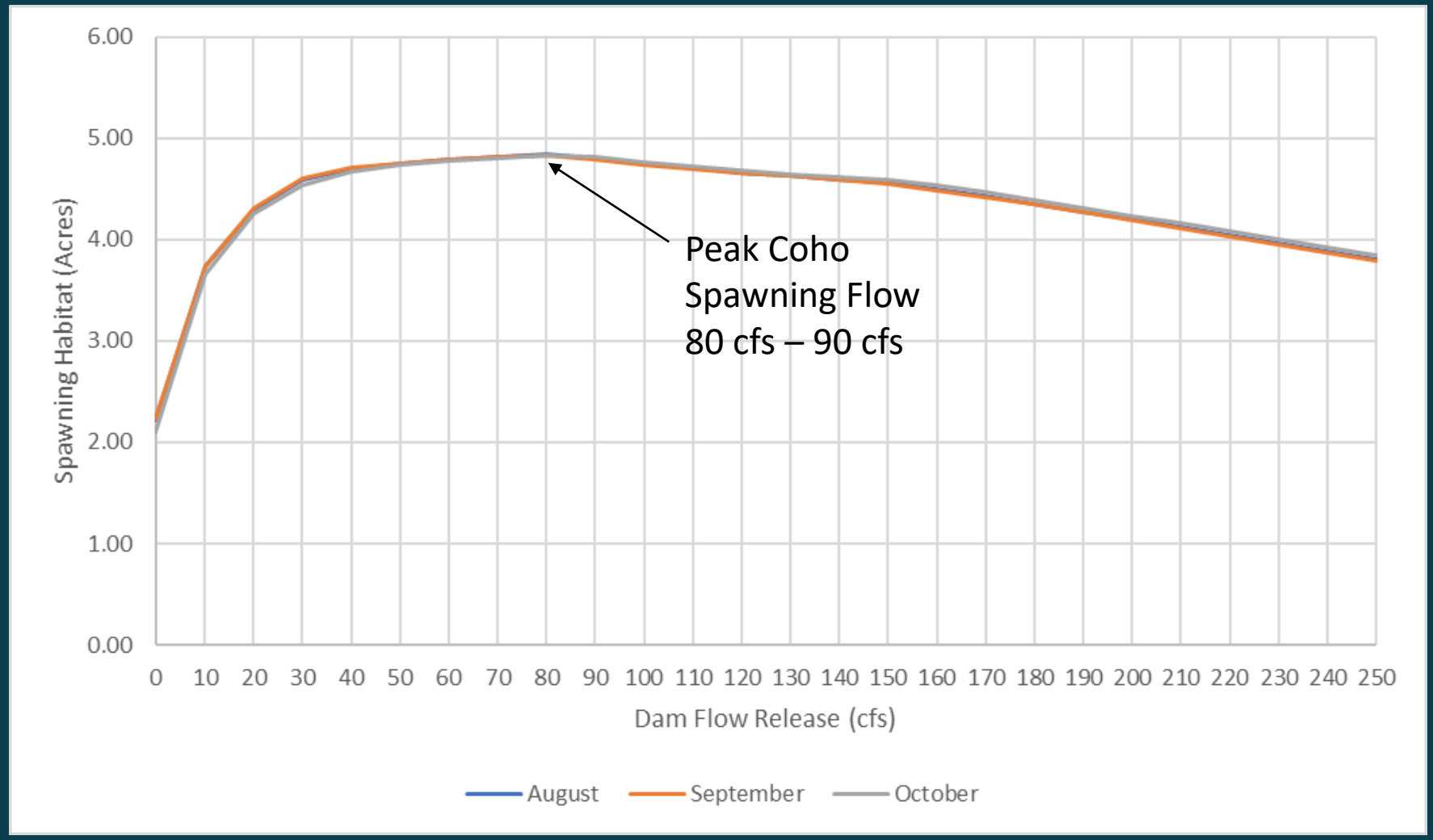
Passage Barrier Analysis

	Site A	Site B	Site C	Site D	Site E
Minimum passage Q (cfs)	40.0	50.0	8.8	40.0	40.0
Velocity at critical transect (ft/s)	8.35	6.25	4.71	4.340	3.76
Depth at critical transect (ft)	0.62	0.57	0.69	0.600	0.43
Froude at critical transect	1.90	1.50	1.00	0.990	1.01
Potential barrier average slope (ft/ft)	0.16	0.14	0.087	0.068	0.12
Passage barrier type	Depth	Depth	Depth	Depth	Depth

Instream Flow Study – Chinook Spawning Habitat



Instream Flow Study – Coho Spawning Habitat

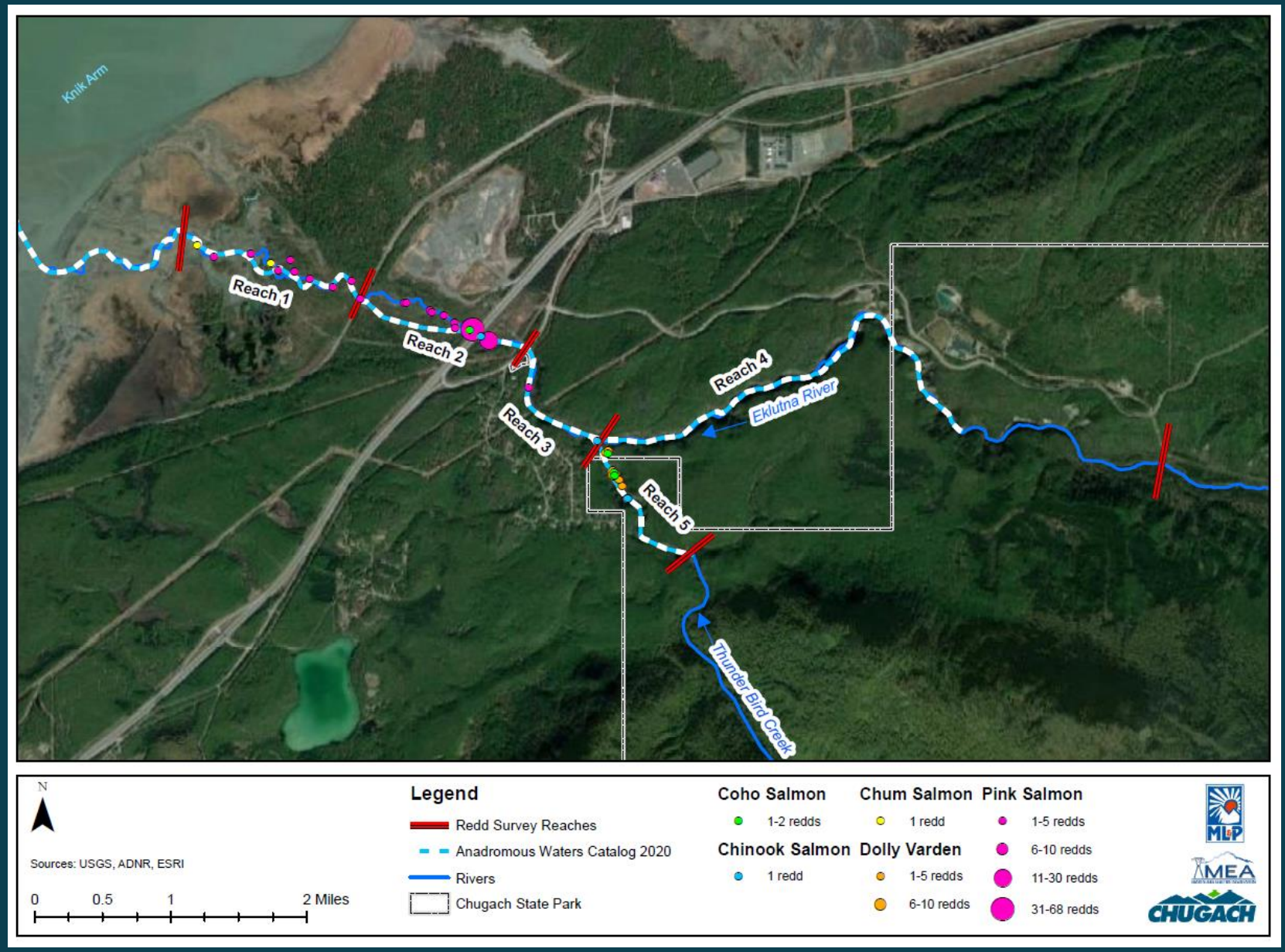


Adult Salmon Counts

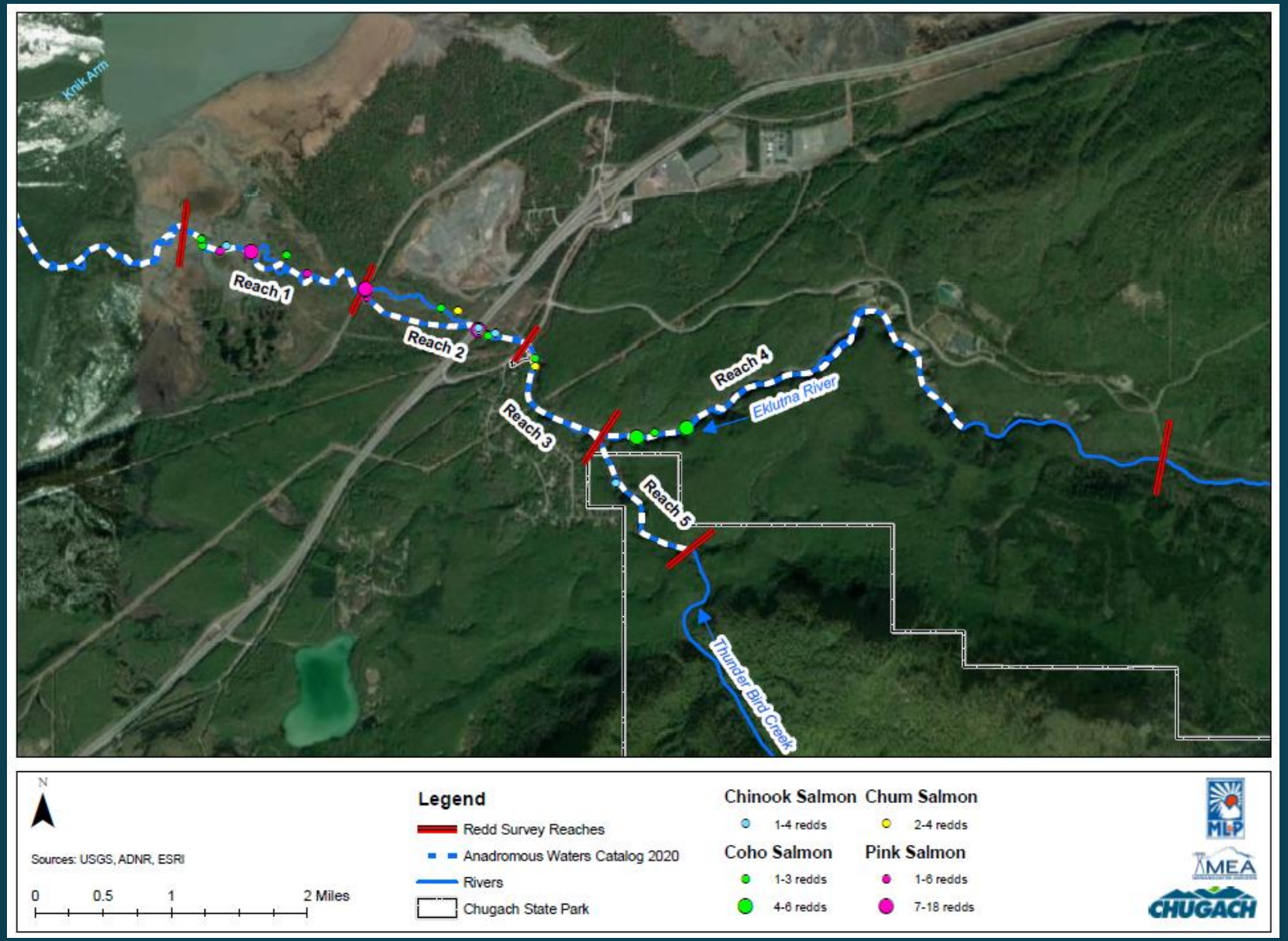
2021					2022				
Date	Chinook	Coho	Chum	Pink	Date	Chinook	Coho	Chum	Pink
7/9/2021	0	0	0	0	7/8/2022	0	0	0	0
7/16/2021	0	0	0	0	7/16/2022	1	0	0	0
7/22/2021	7	0	0	0	7/25/2022	0	0	0	0
7/31/2021	9	0	0	17	8/1/2022	0	0	0	27
8/6/2021	2	0	0	61	8/8/2022	0	0	0	0
8/11/2021	0	0	0	65	8/15/2022	1	0	0	19
8/20/2021	0	0	3	120	8/22/2022	4	2	0	16
8/26/2021	0	0	1	13	8/29/2022[B]		-	-	-
9/3/2021	1	3	1	1	9/6/2022	0	4	4	0
9/11/2021	0	4	0	-	9/13/2022	0	3	2	0
9/18/2021[A]	0	3	0	-	9/19/2022[B]	-	-	-	-
9/23/2021[A]	0	0	0	0	9/26/2022	0	1	0	0
9/29/2021	0	2	0	0	10/3/2022	0	0	0	0
10/5/2021	0	0	0	0	10/11/2022[B]	-	-	-	-
10/14/2021	0	2	0	0	10/17/2022	0	6	0	0
10/22/2028	0	0	0	0	10/24/2022	0	2	0	0
Total Fish	19	14	5	277	Total Fish	6	18	6	62

Notes: A) Only Thunderbird surveyed due to study flow releases; B) Dangerous conditions due to rainfall/ flooding

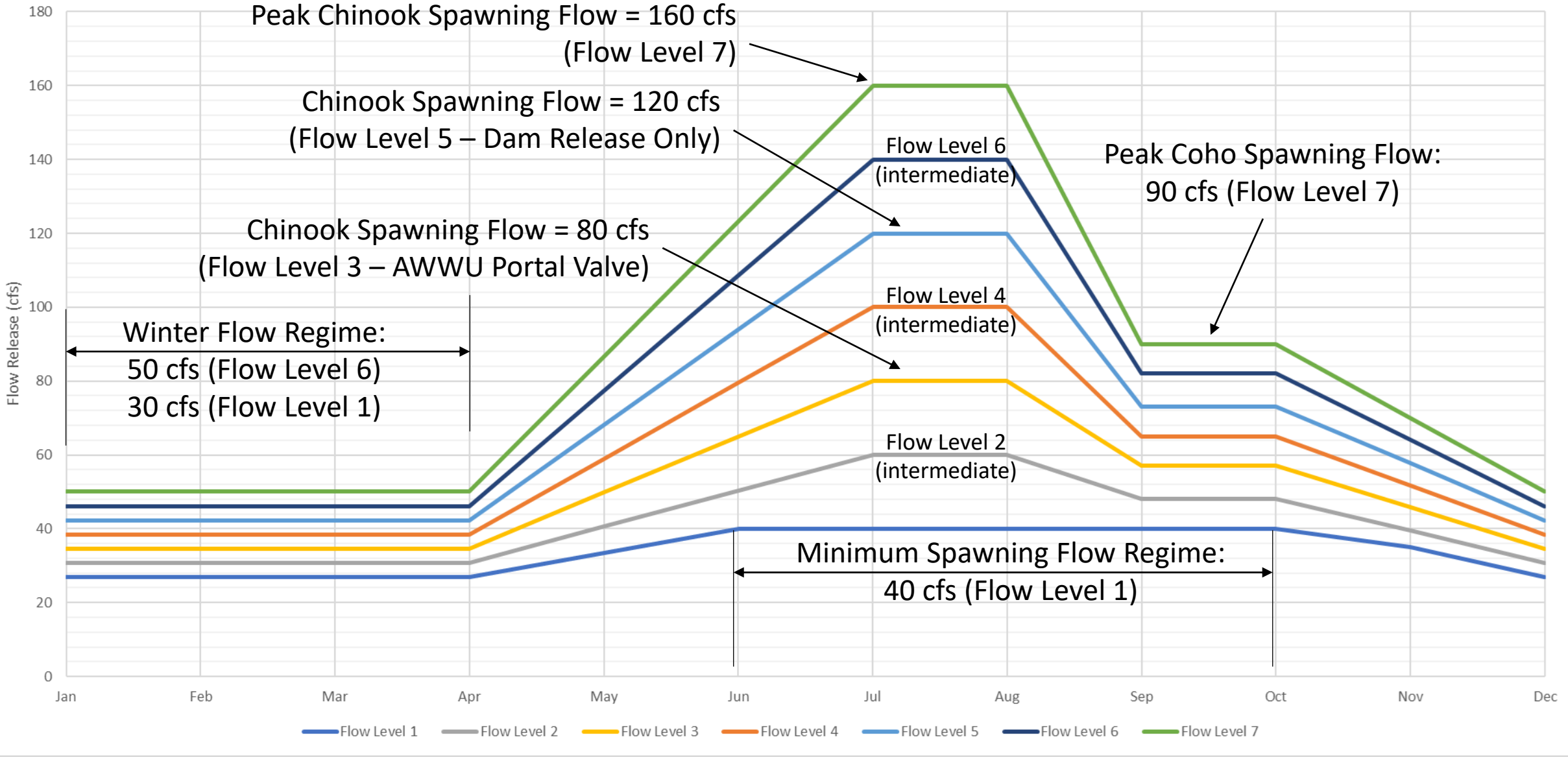
Spawning Distribution in 2021



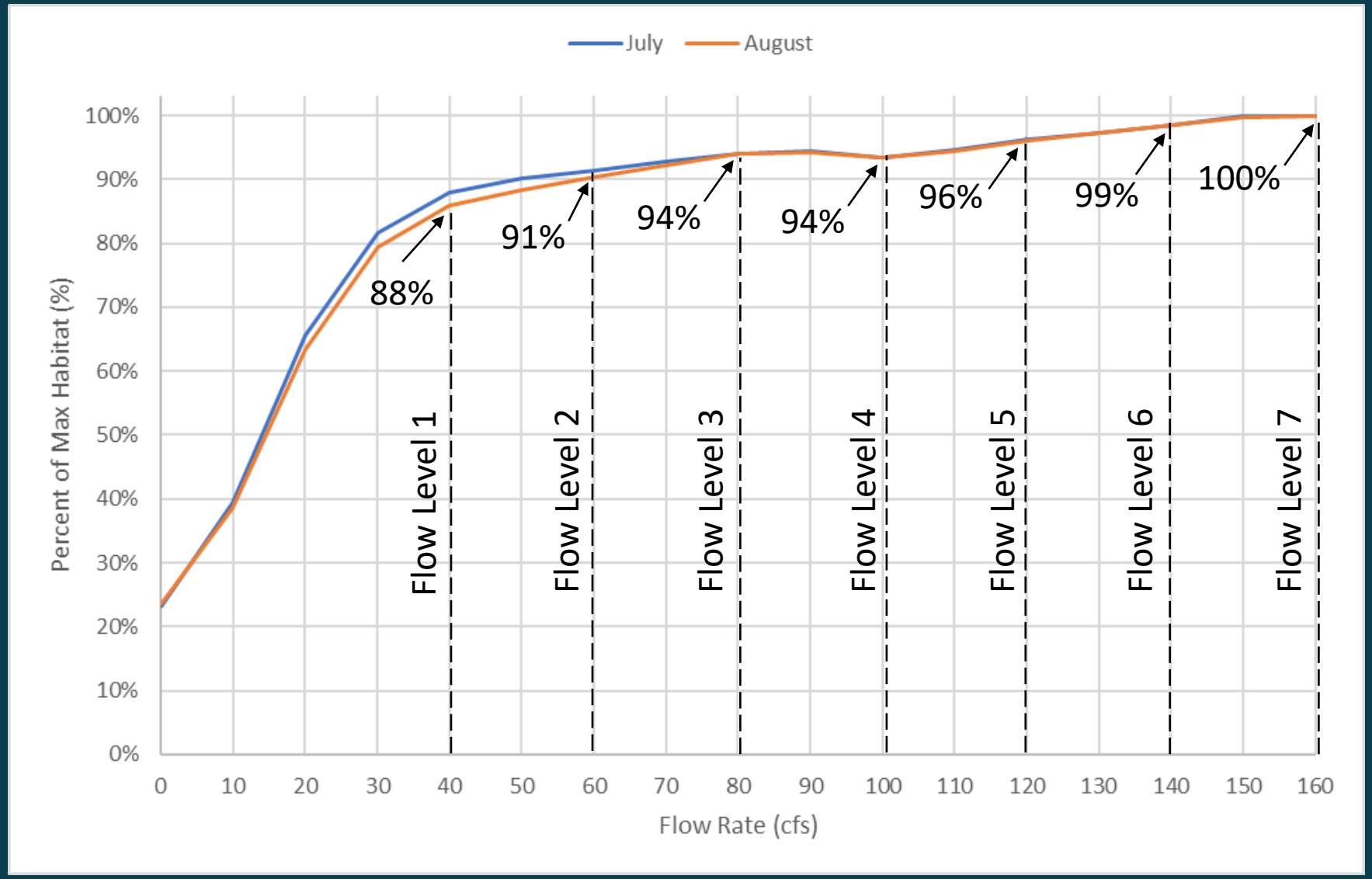
Spawning Distribution in 2022



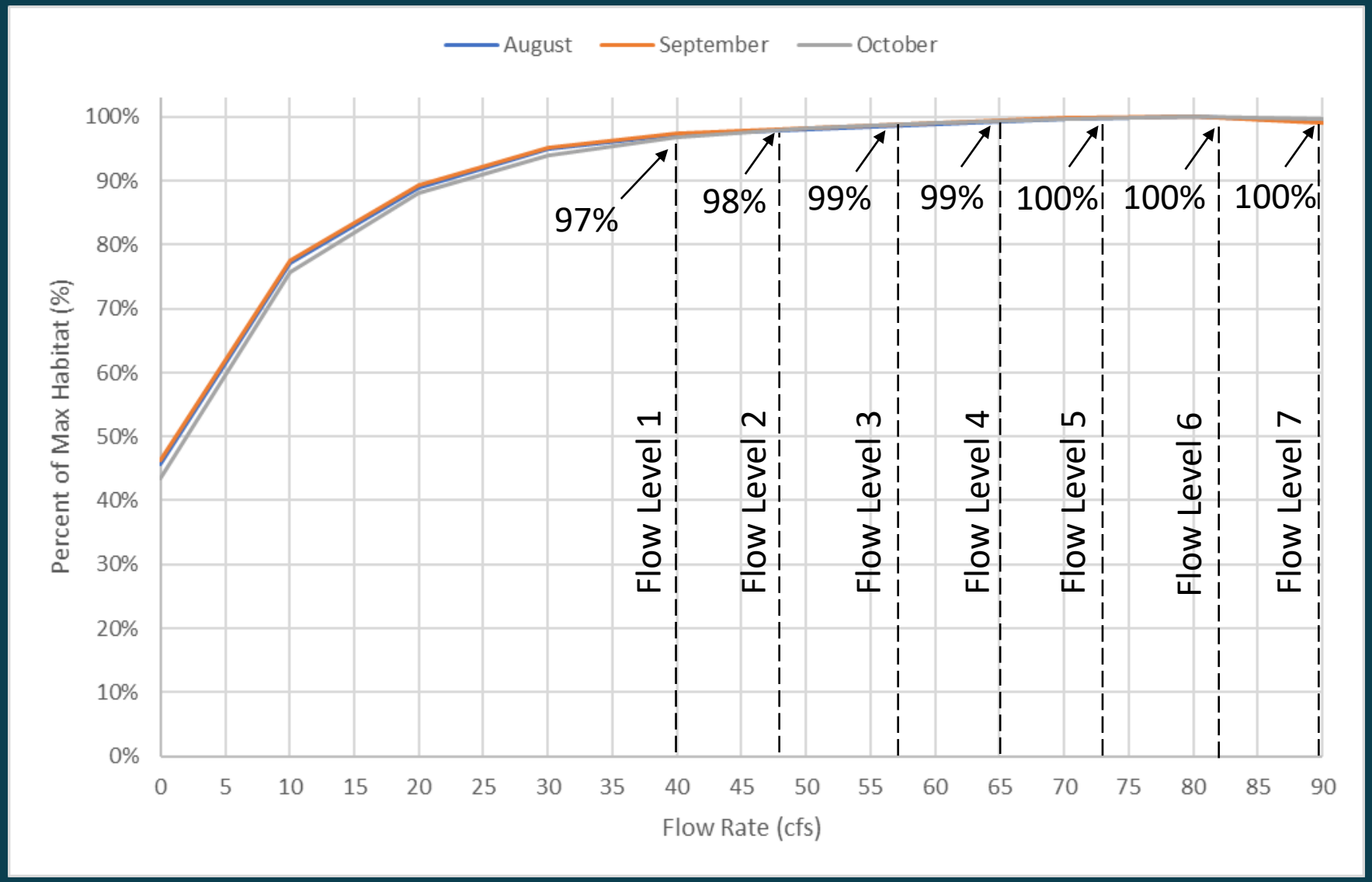
Potential Flow Regimes



Chinook Spawning Flows



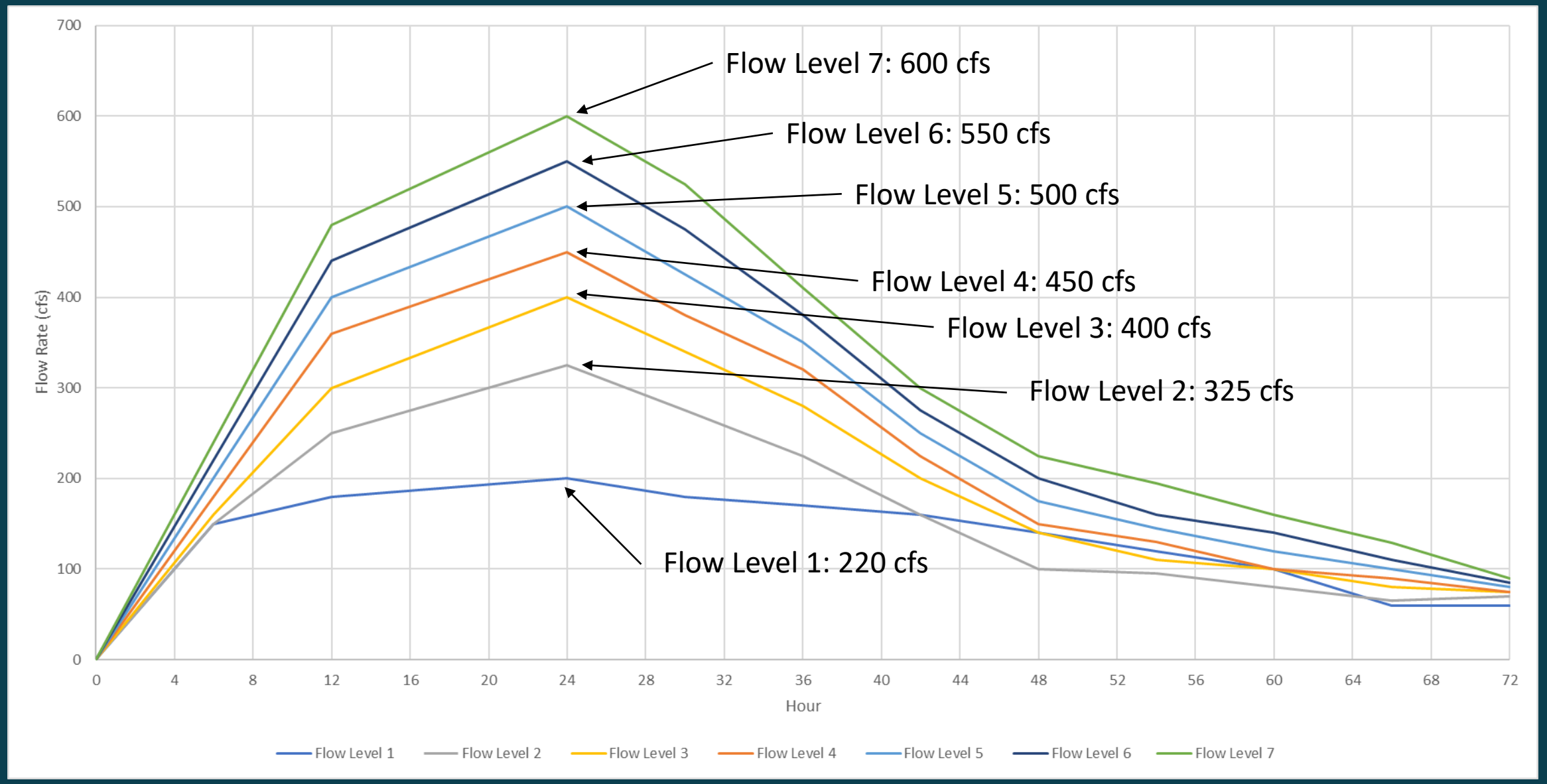
Coho Spawning Flows



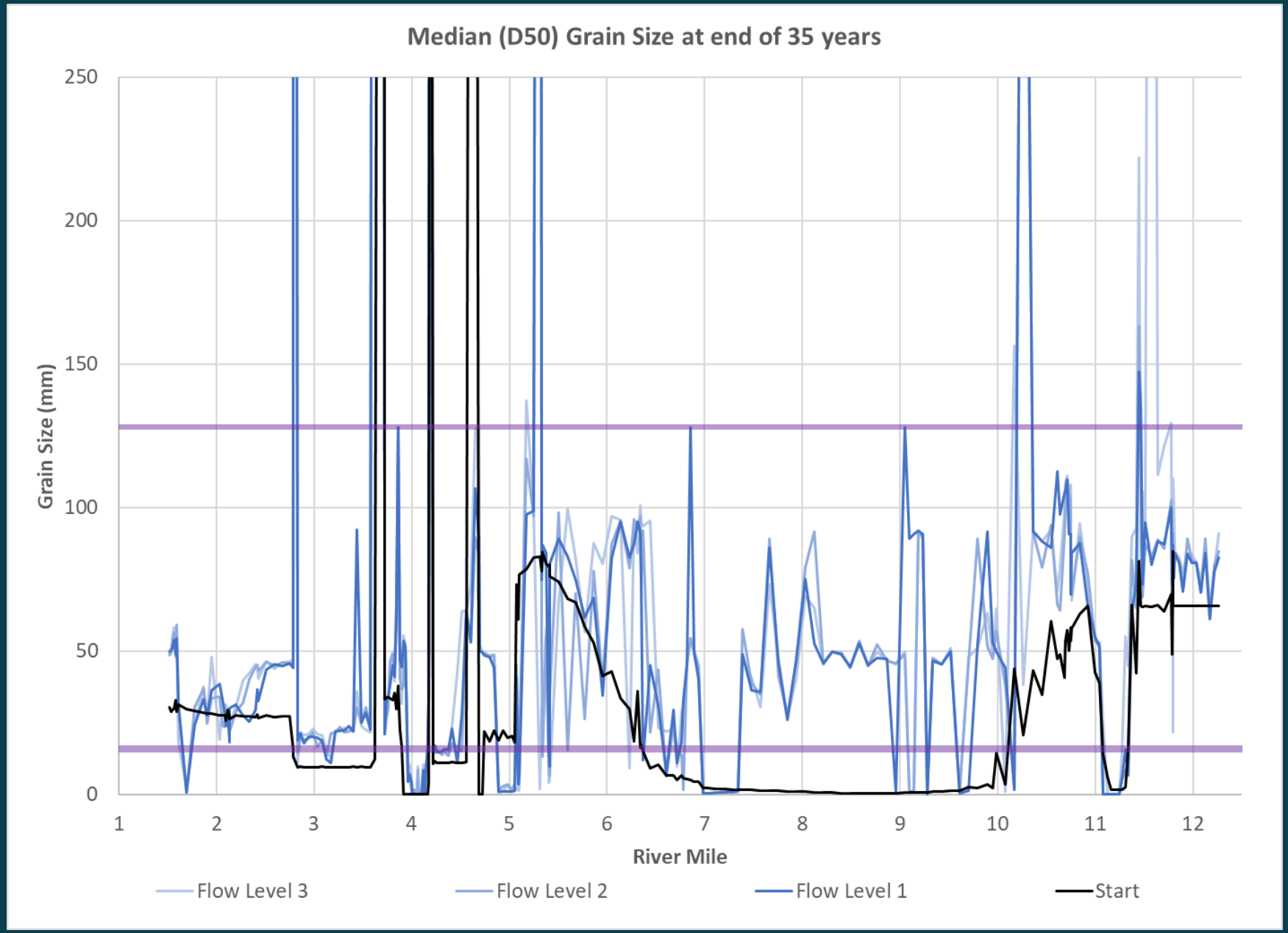
Eklutna River Habitat Gains

Scenario			Time-Averaged Habitat (%)				
			Chinook		Coho		Sockeye
			Spawning	Juvenile Rearing	Spawning	Juvenile Rearing	Spawning
Habitat Improvement (%)	Dam Release	Flow Level 1	227%	75%	89%	90%	75%
		Flow Level 2	240%	84%	92%	99%	78%
		Flow Level 3	254%	92%	94%	108%	77%
		Flow Level 4	254%	99%	94%	115%	74%
		Flow Level 5	265%	104%	93%	122%	71%
		Flow Level 6	274%	110%	93%	128%	67%
		Flow Level 7	280%	116%	91%	136%	62%
	Portal Release	Flow Level 1	209%	53%	65%	67%	58%
		Flow Level 2	215%	61%	65%	75%	57%
		Flow Level 3	221%	69%	65%	83%	54%
	Pipeline Release	Flow Level 1	48%	28%	32%	32%	35%
		Flow Level 2	44%	35%	31%	39%	33%
		Flow Level 3	42%	42%	29%	45%	30%

Channel Maintenance Flows

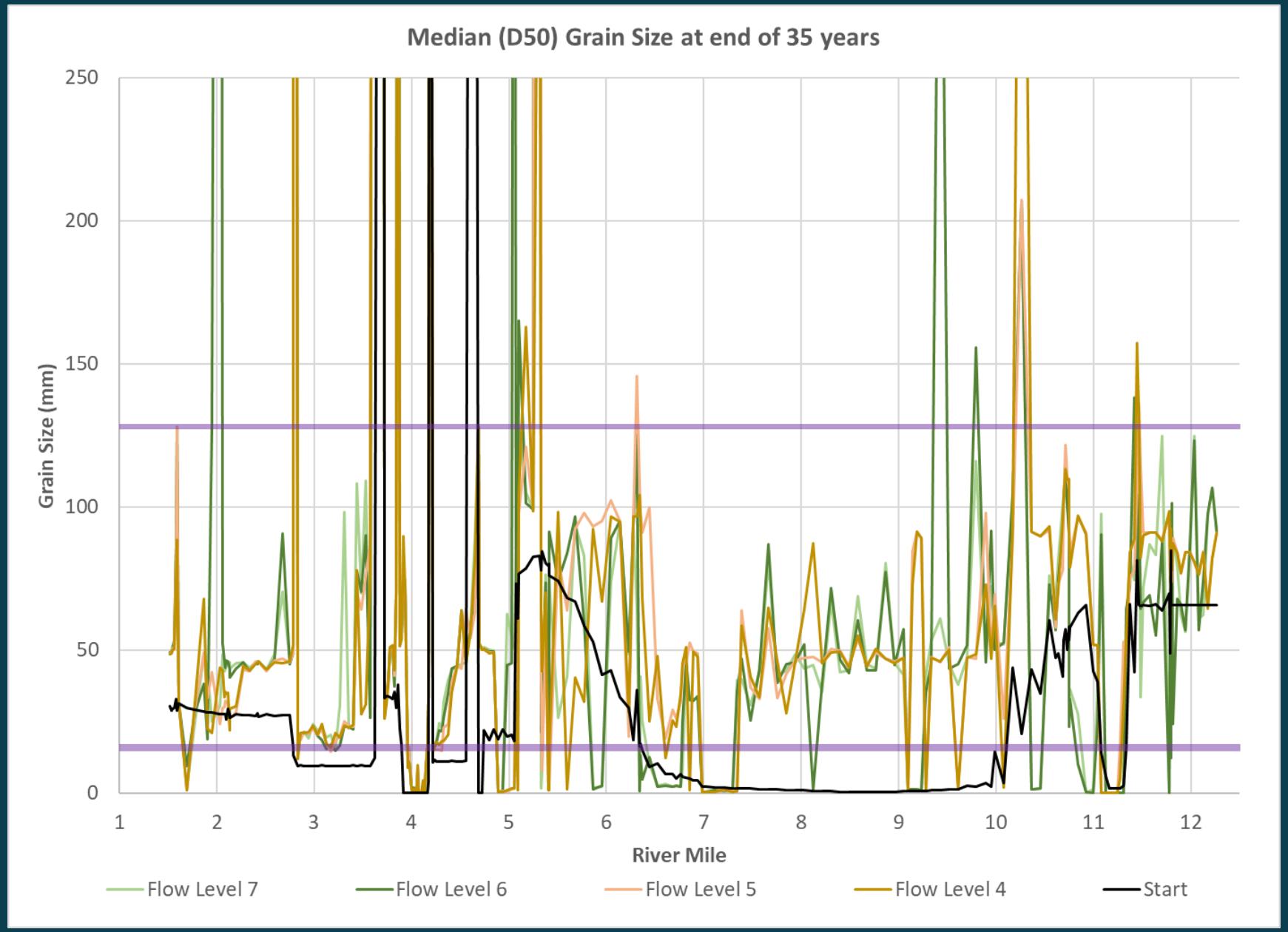


Flow Levels 1-3



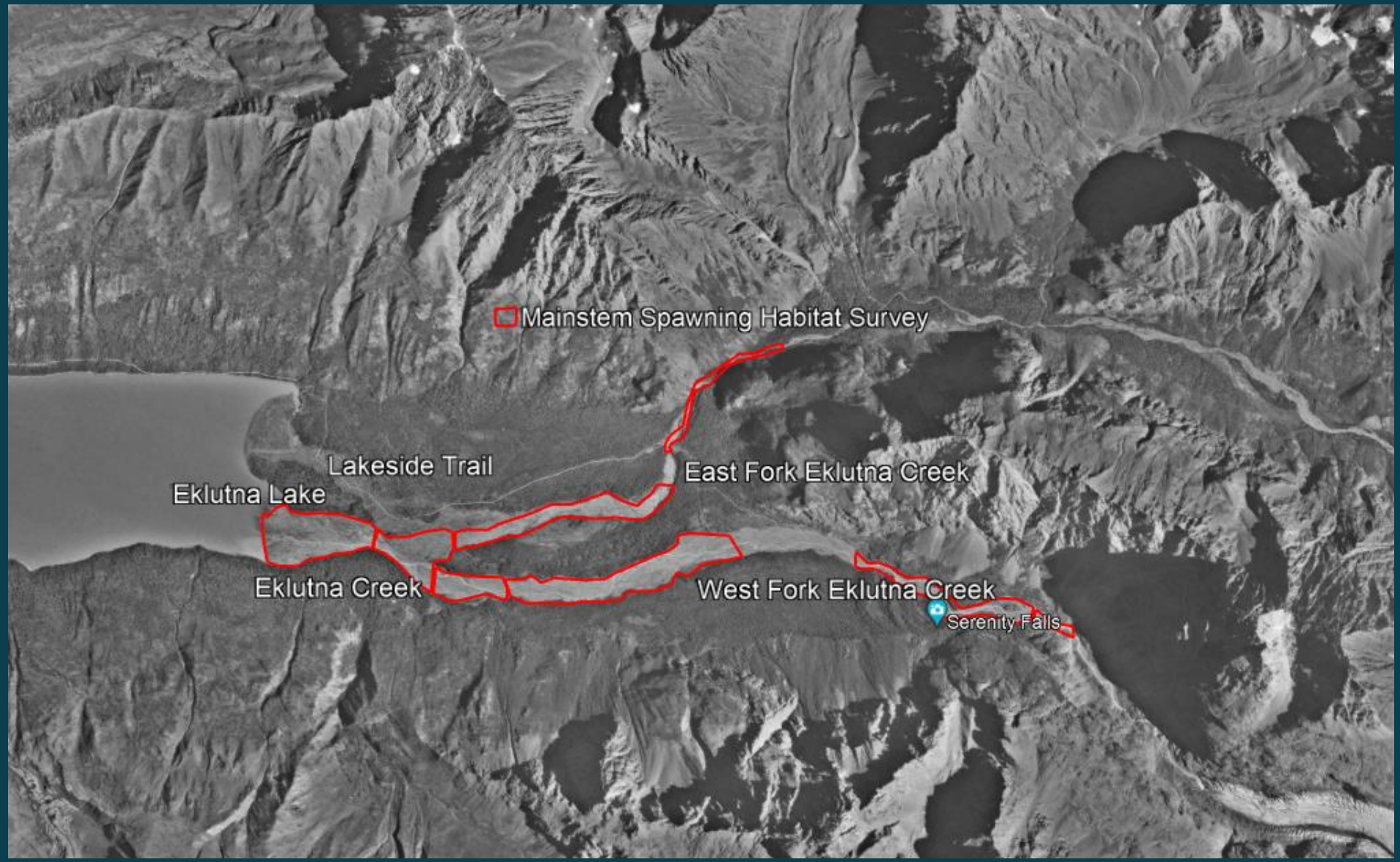
Channel Maintenance Flow = 220/325/400 cfs - 72 Hr Shaped - Every 3 Years

Flow Levels 4-7

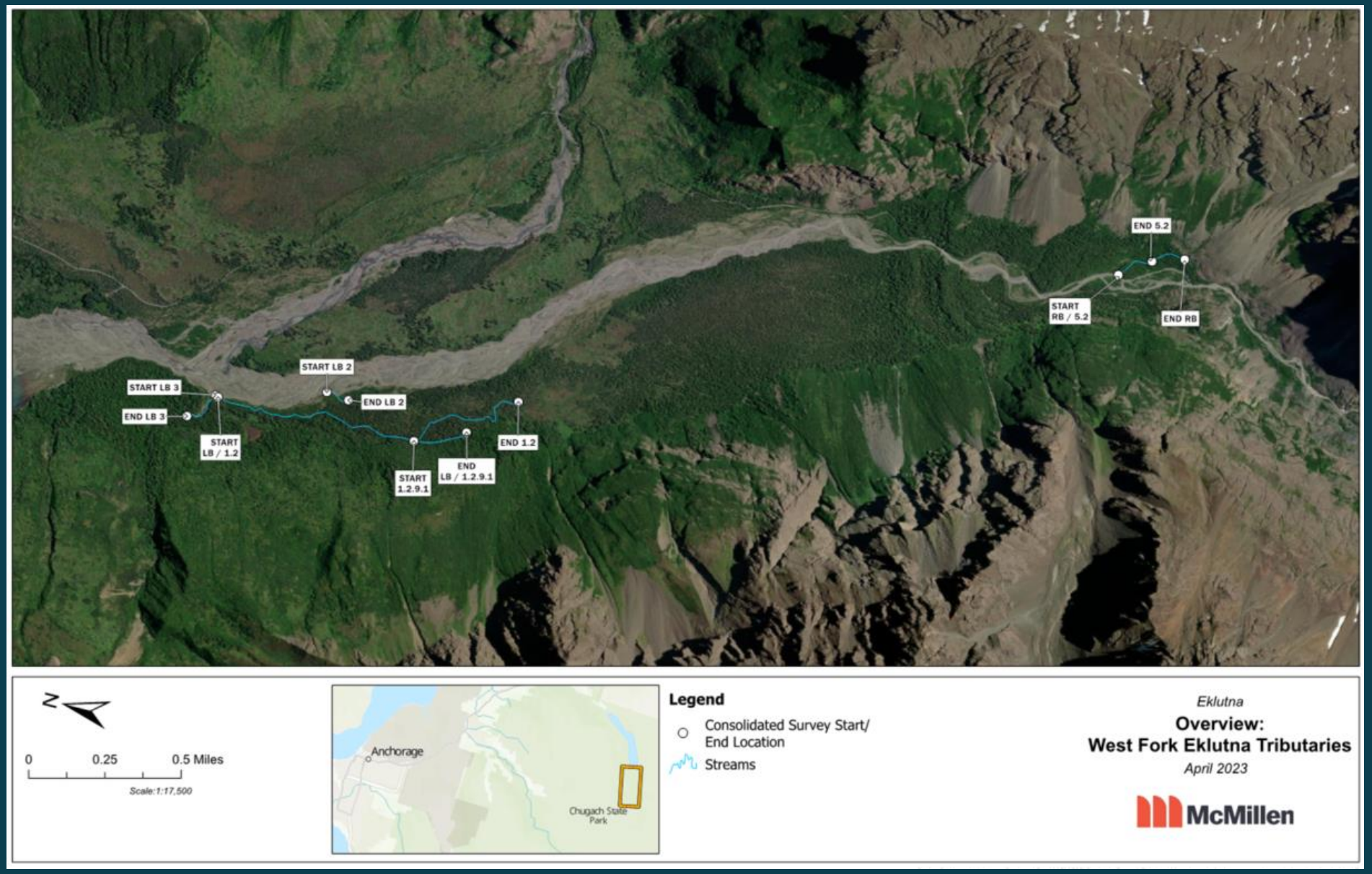


Channel Maintenance Flow = 450/500/550/600 cfs - 72 Hr Shaped - Every 3 Years

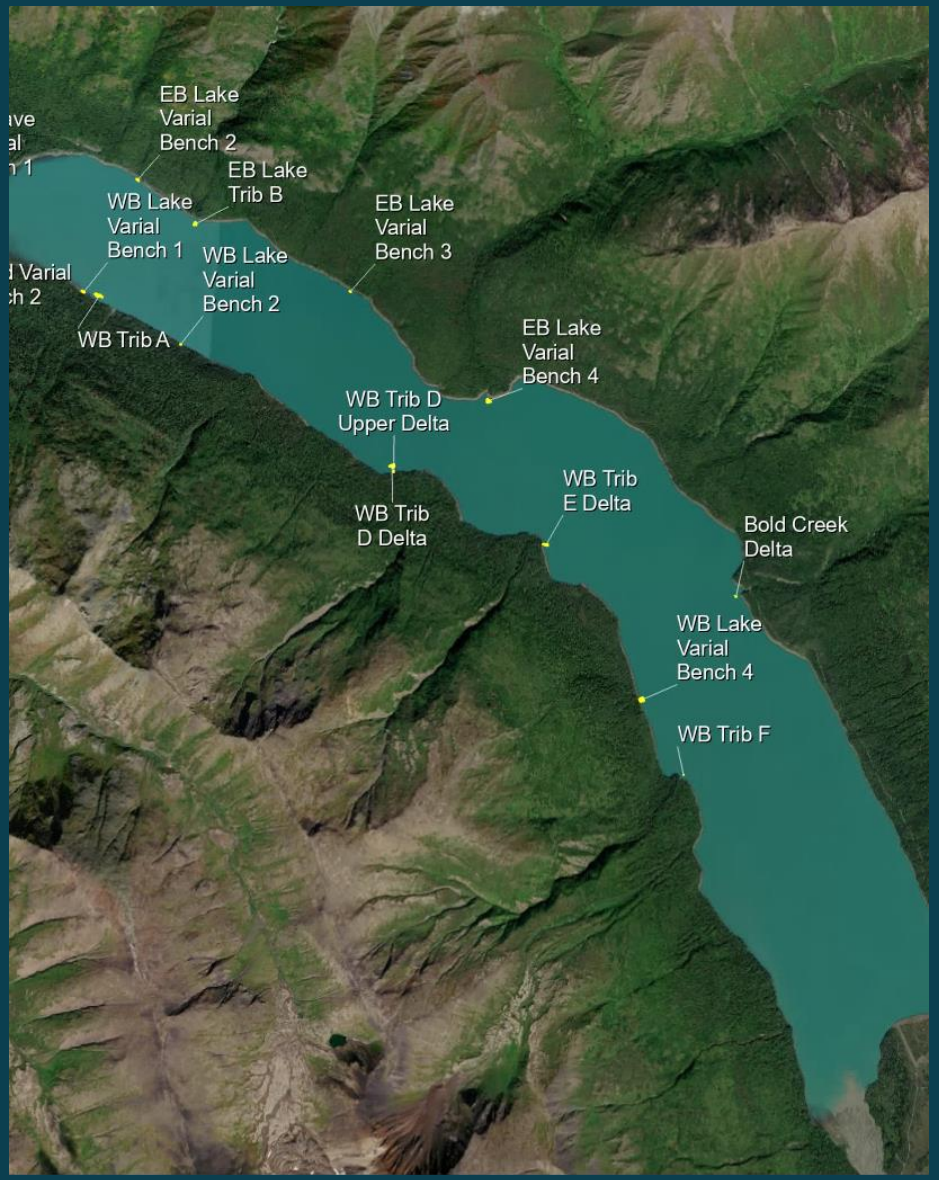
Mainstem Spawning Habitat Survey Area



West Fork Eklutna Creek Survey



Lake Shoreline Habitat



Lake Productivity

Sample Source	Chlorophyll *a* (ug/l)	Total Phosphorus (mg/l)	Secchi Depth (m)	TSI Value*
Eklutna Lake (2021)	0.29	<0.04	0.85	18.5
Eklutna Pond (2021)	0.47	<0.04	2.04	23.2
Eklutna Lake (2022)	0.13	*not collected*	*not collected*	10.6
Eklutna Pond (2022)	0.12	*not collected*	*not collected*	9.8
** Calculation Equation: TSI = 9.81* ln(CHL a) + 30.6*				

- All Trophic Status Index (TSI) values are low (<30) which indicates low primary productivity (oligotrophic status)
- Most likely due to nutrient deficiency and/or turbidity from glacial flour limiting light penetration
- Low primary productivity (phytoplankton) indicates limited secondary production (zooplankton)

Kokanee

A hooked-jawed, 13-inch male kokanee in spawning color.

Typical 5-inch kokanee from Eklutna Lake

Eklutna Lake Habitat Gains

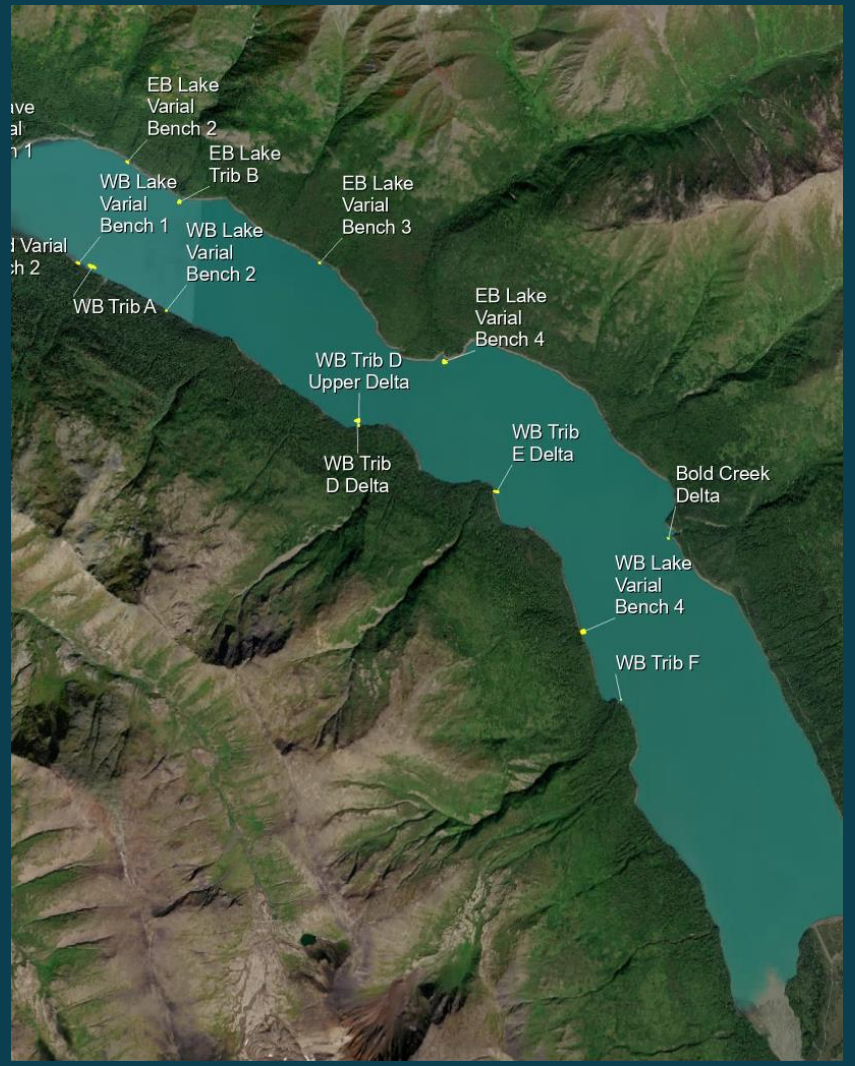
Fish Passage:

(E. & W. Forks Eklutna Creek)

Spawning Habitat:	1.145 Acres (50% Suitability)
Rearing Habitat:	Unknown

(Eklutna Lake Shoreline)

Spawning Habitat:	2.6 Acres (w/o Fluctuation)
Spawning Habitat:	0.03 Acres (w Existing Fluctuation)
Rearing Habitat:	Low Productivity



Alternatives Analysis

Stakeholder Engagement

Received ~36 total comprehensive alternatives from the following entities:

- Native Village of Eklutna (NVE)
- Alaska Department of Fish and Game (ADFG)
- Chugach State Park (ADNR)
- National Marine Fisheries Service (NMFS)
- U.S. Fish & Wildlife Service (USFWS)
- Trout Unlimited (TU)
- The Conservation Fund (TCF)
- Hydro Project Owners (CEA/MEA/MOA)

Note: ADNR Dam Safety has no comments on flow regime but will have input on any modifications to the dam and appurtenant structures.

Stakeholder Preferred Alternatives

Native Village of Eklutna

- Replacement Dam / US Passage / DS Passage Spill 3 Months / Infrastructure Improvements

USFWS

- Plan A – Replacement Dam / US Passage / DS Passage FSC / Infrastructure Improvements
- Plan B – Existing Dam / FWG / US Passage / DS Passage FSC / Infrastructure Improvements
- Plan C – Existing Dam / FWG / No Passage / Infrastructure Improvements
- Plan D – AWWU Portal / FWG / No Passage / Infrastructure Improvements

The Conservation Fund

- Plan A – Replacement Dam / US Passage / DS Passage Spill 3 Months / Infrastructure Improvements
- Plan B – Existing Dam / FWG / US Passage / DS Passage FSC / Infrastructure Improvements

NMFS

- Plan A – Replacement Dam / US Passage / DS Passage FSC / Infrastructure Improvements
- Plan B – AWWU Portal / FWG / No Passage / Infrastructure Improvements

ADFG

- AWWU Portal / No Passage / Infrastructure Improvements

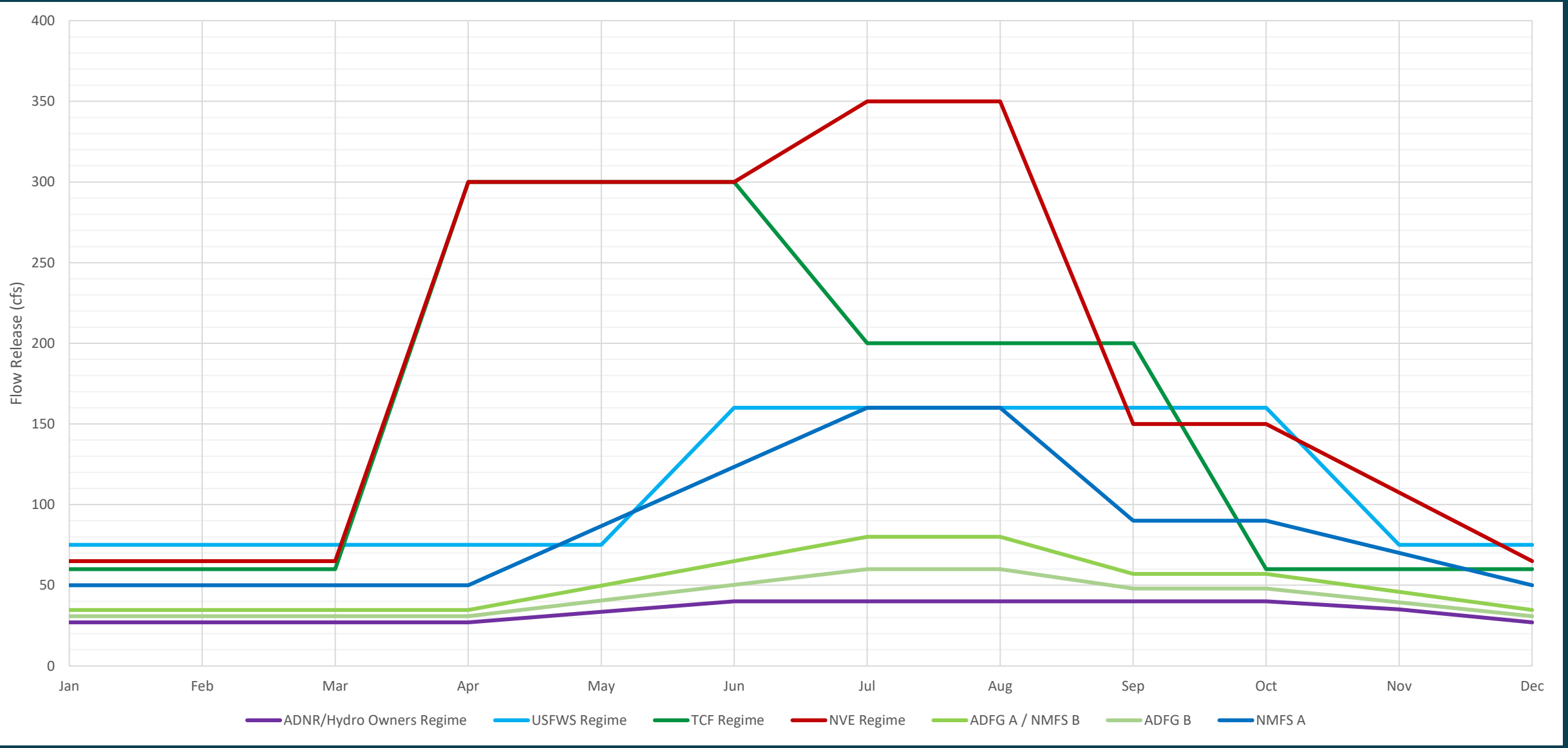
Hydro Project Owners

- AWWU Portal / No Passage / Infrastructure Improvements

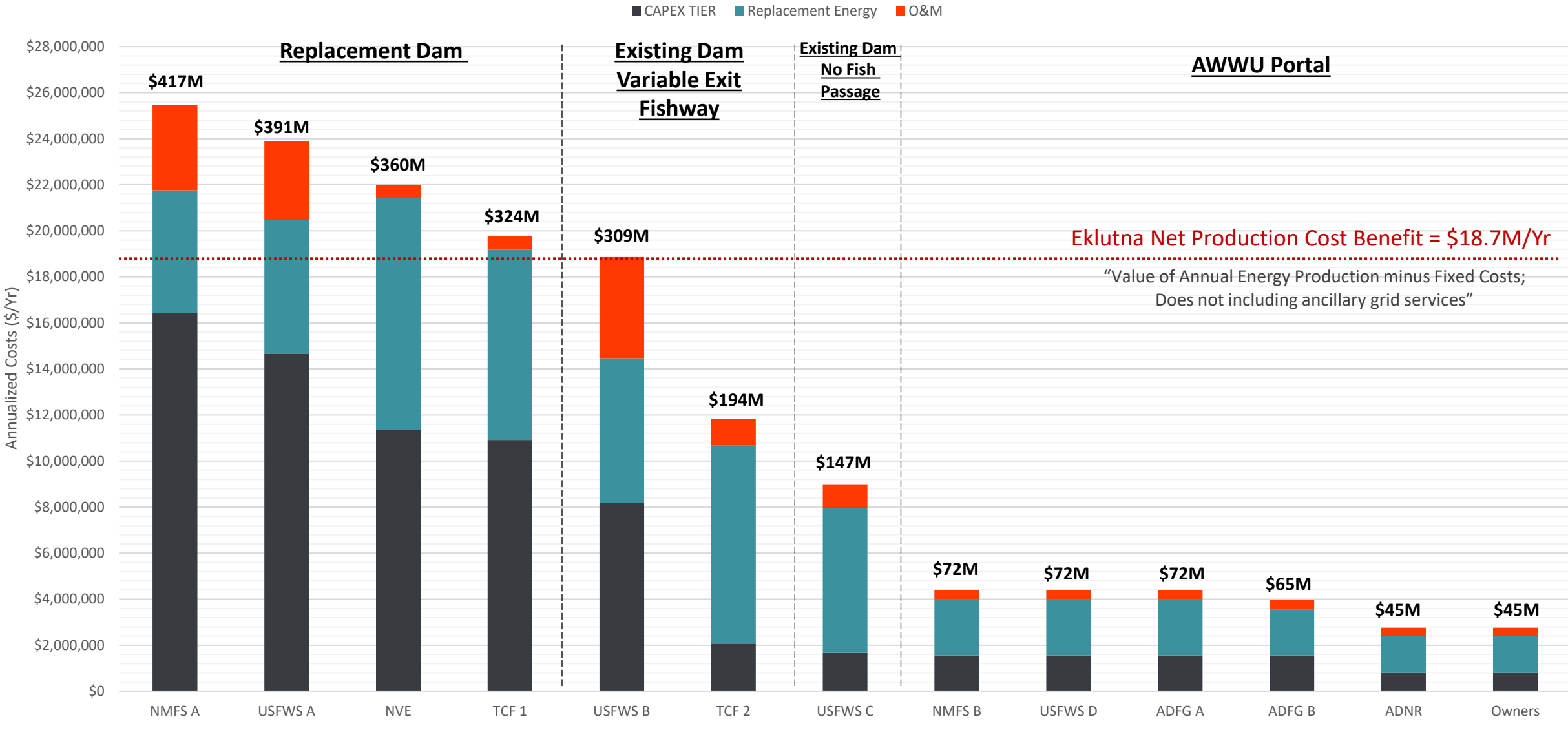
ADNR – State Parks

- AWWU Portal / No Passage / Infrastructure Improvements

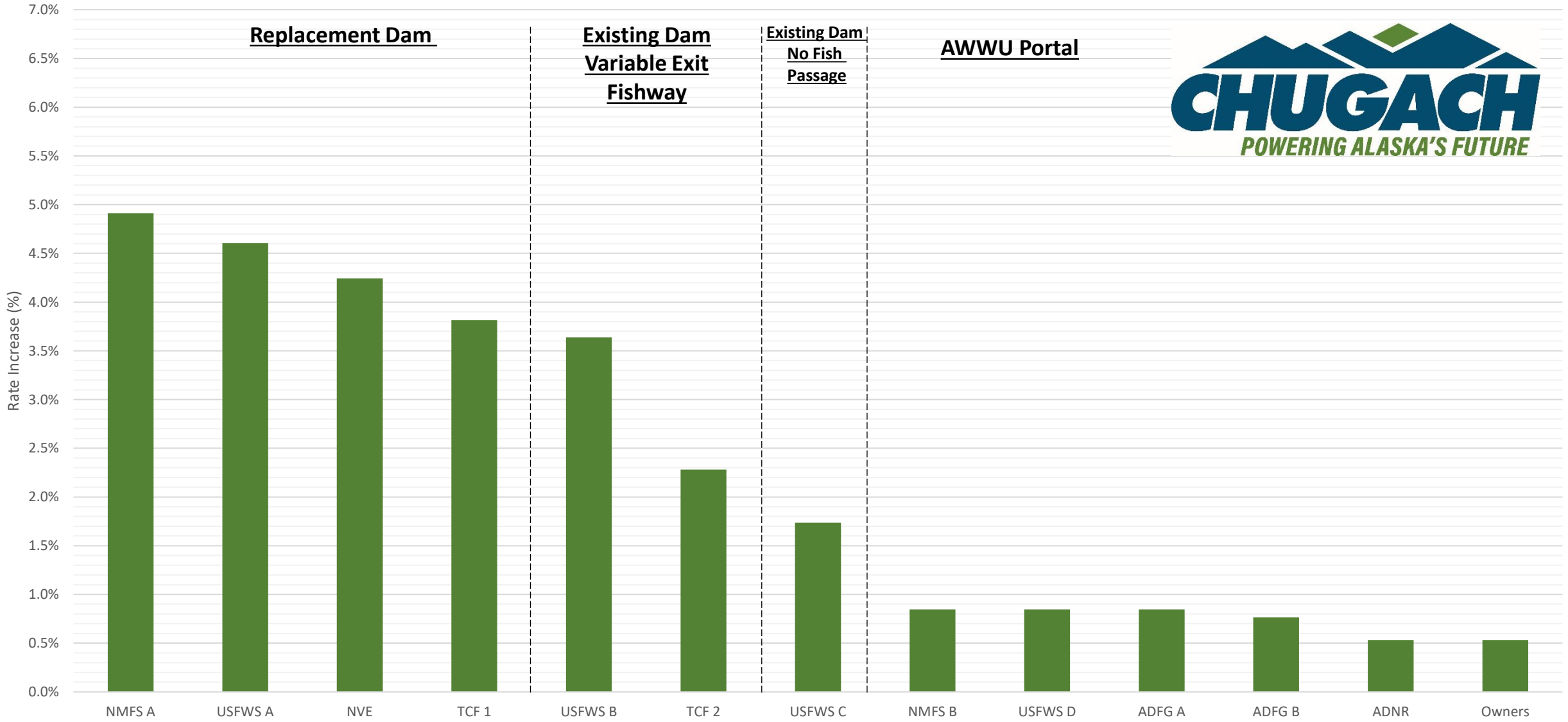
Preferred Flow Regimes



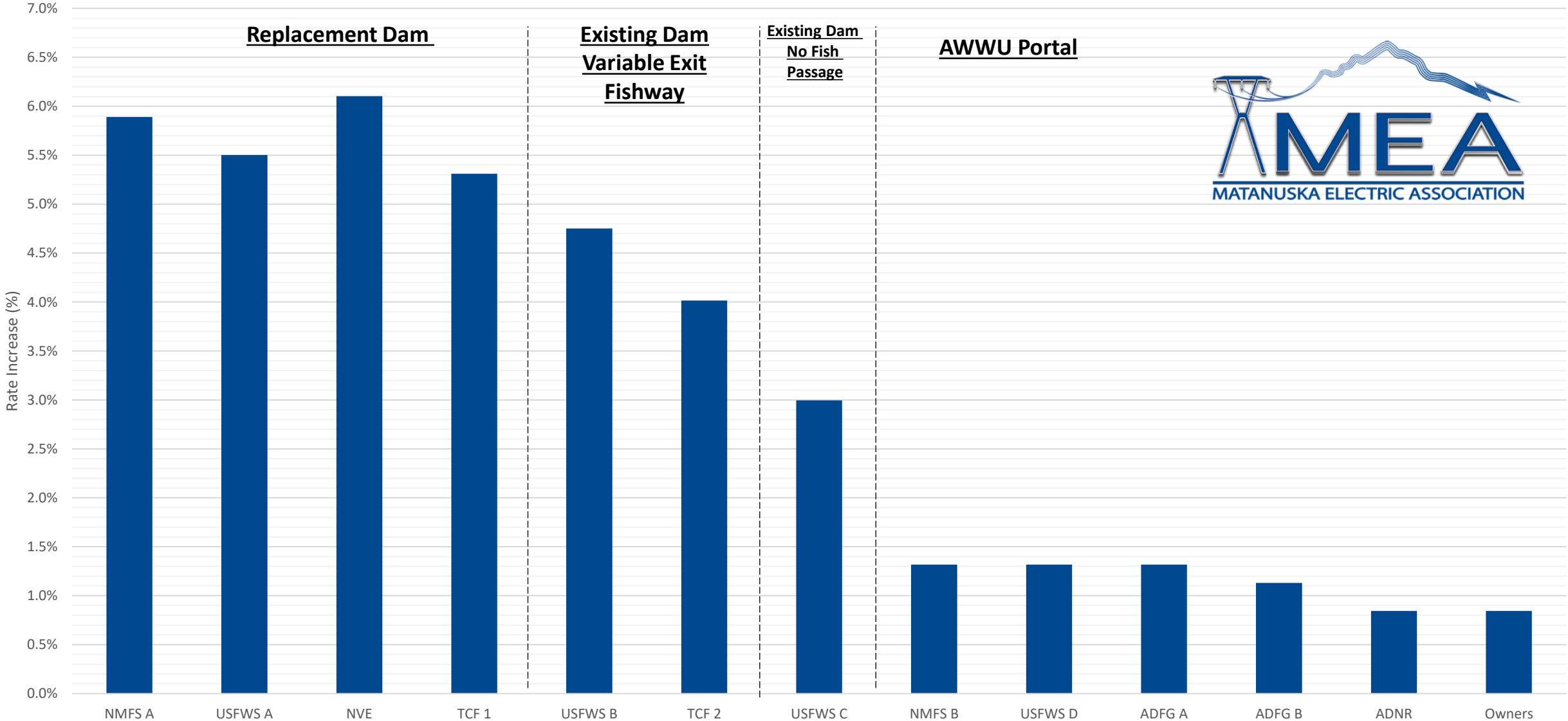
Annualized Costs / Present Value



Chugach Electric Ratepayer Impacts

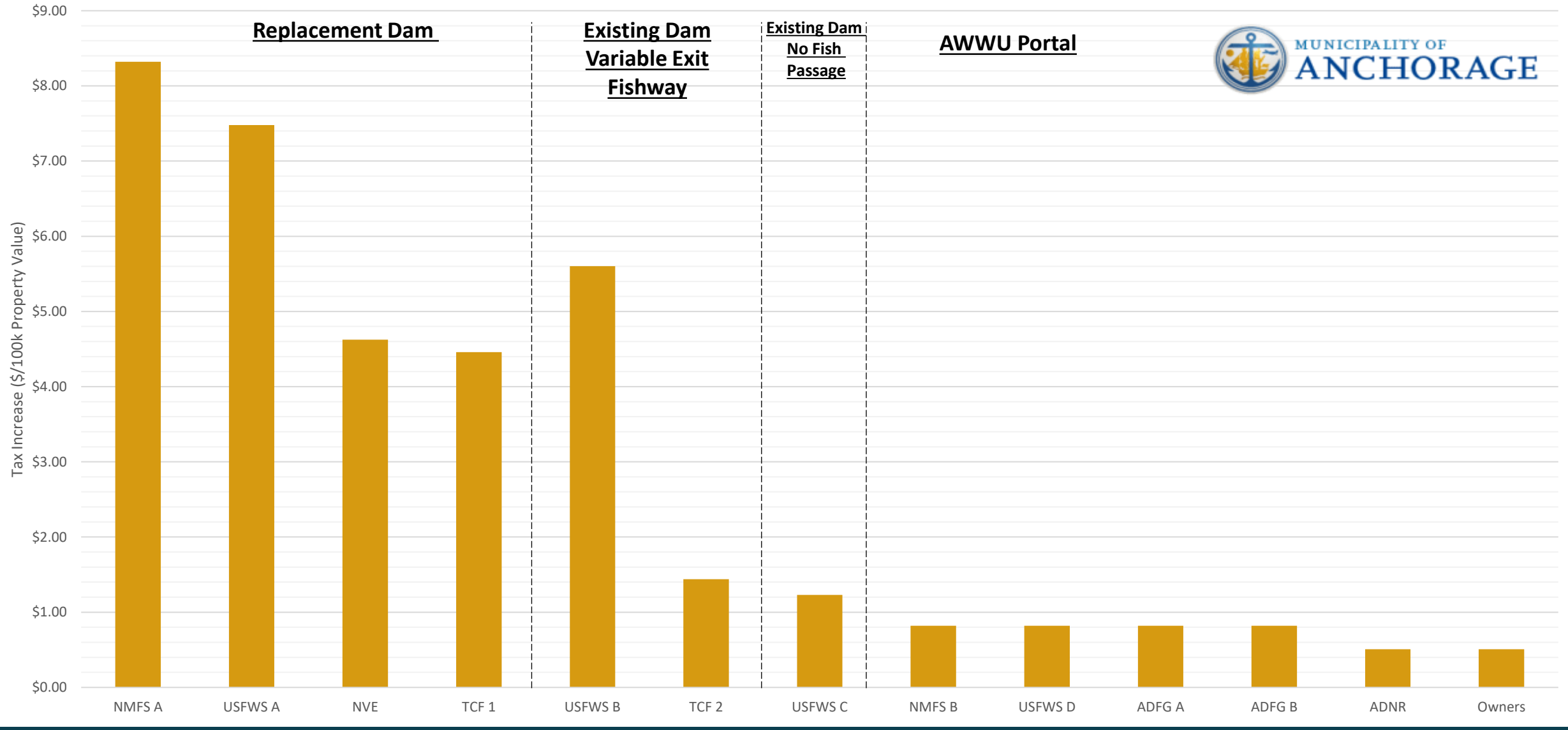


Matanuska Electric Ratepayer Impacts

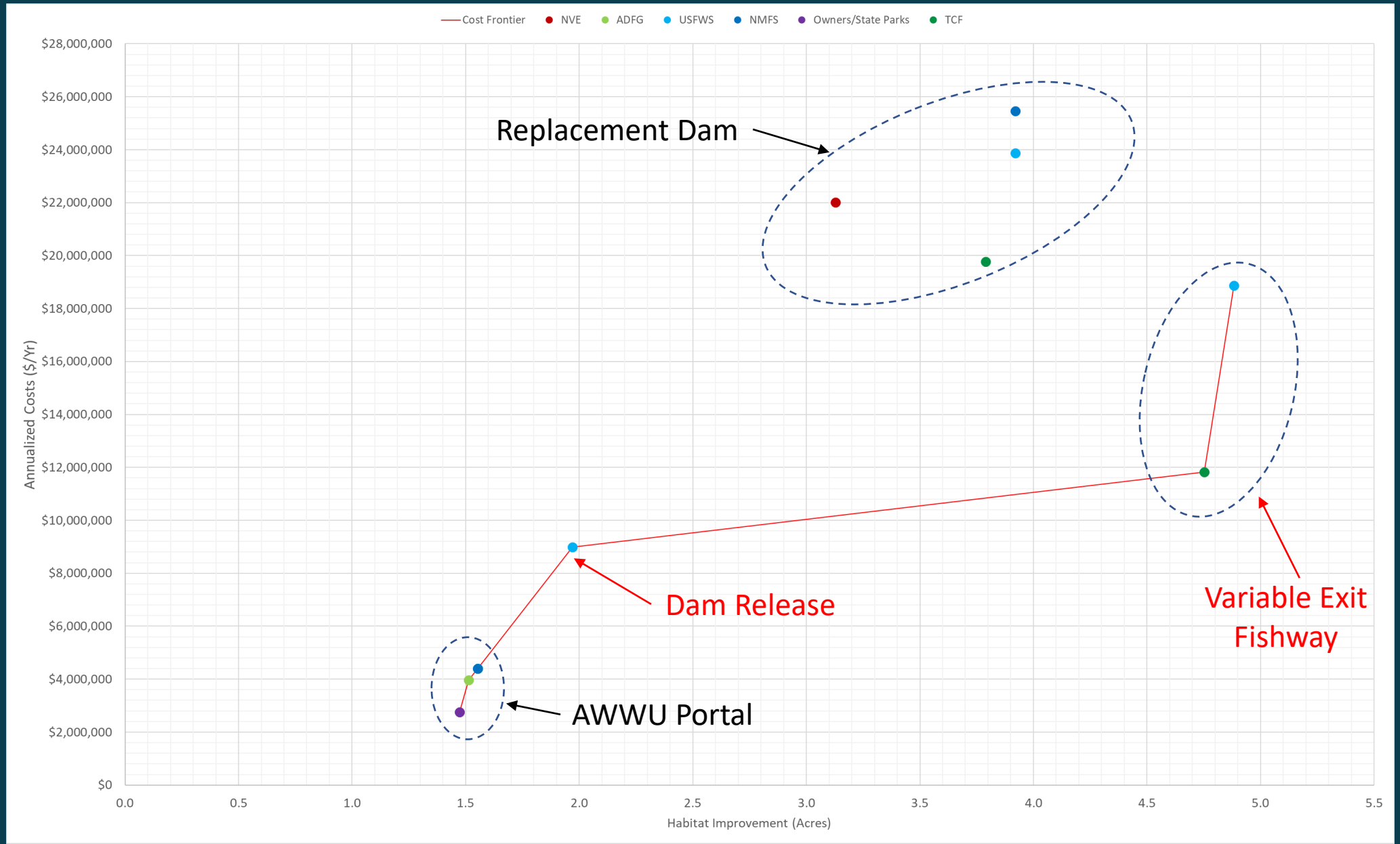


MEA
MATANUSKA ELECTRIC ASSOCIATION

MOA Property Tax Impacts



Cost Effectiveness – Chinook Spawning Habitat



Cost Effectiveness – Chinook Spawning Habitat

Cost Effective Alternatives for Habitat Gains

- AWWU Portal – Flow Level 1
  - Owner/ADNR Alternative
  - Annual Costs - $2.8M
  - Habitat Gains – 1.5 Acres
  - **$1.9M/Acre**
- AWWU Portal – Flow Level 2
  - ADFG Alternative
  - Annual Costs - $4.0M
  - Habitat Gains – 1.5 Acres
  - **$2.6M/Acre**
- AWWU Portal – Flow Level 3
  - ADFG/NMFS Alternative
  - Annual Costs - $4.4M
  - Habitat Gains – 1.6 Acres
  - **$2.8M/Acre**
- Dam Release – USFWS Alt 1 Regime
  - USFWS Alternative
  - Annual Costs - $9.0M
  - Habitat Gains – 2.0 Acres
  - **$4.6M/Acre**
- Variable Exit Fishway – TCF Regime
  - TCF Alternative
  - Annual Costs - $11.8M
  - Habitat Gains – 4.8 Acres
  - **$2.5M/Acre**
- Variable Exit Fishway – USFWS Alt 1 Regime
  - USFWS Alternative
  - Annual Costs - $18.9M
  - Habitat Gains – 4.9 Acres
  - **$3.8M/Acre**

Alternatives Analysis Meeting 4

- Presented everyone’s preferred alternative(s)
- Presented results for potential velocity barriers in the canyon reach
- Discussed potential positive and negative impacts to:
  - Wetlands and Wildlife Habitat
  - Public Water Supply
  - Recreational Facilities and Uses
  - Historic Resources

Next Steps

Next Steps

- **August 2023** – Alternatives Analysis Meeting 5
  - Discuss an appropriate monitoring program and adaptive management approach
- **October 2023** – Distribute Draft Fish and Wildlife Program
  - 30 days for review and comment
  - Attempt to resolve differences
- **January 2024** – Public Meetings (Anchorage and Mat-Su Valley)
- **April 2024** – Submit Proposed Final Fish and Wildlife Program
  - 60 days for parties to review and comment
  - 30 days for project owners to respond
  - Allows 2 months for Governor to consider
- **October 2024** – Governor issues Final Fish and Wildlife Program


McMillen