

SOO PROJECT OFFICE OPERATIONS OVERVIEW

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Operations Branch Chief

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SOO PROJECT OFFICE OVERVIEW





LOCK OPERATIONS

- Ensuring reliable navigation for 8,000 vessels per year
- 24/7 Lock Operations - Mar 25th to Jan 15th
- Poe Lock 1968 (Active)
- MacArthur Lock 1943 (Active)
- Davis & Sabin, 1914/1919 (Inactive)
- Lake Superior to lower Great Lakes - 21-foot elevation differential
- 70M - 80M Tons Annually
- Line handling for all vessels, including US, Canadian, and foreign flag





MAINTENANCE REPAIR STATION

- Highly Skilled Trades & Technicians
- Operations Industrial Controls
- Carpenter Shop
- Machine Shop
- Paint Shop
- Compensating Works Operators
- Support for Others


SECURITY

- National Security Critical Infrastructure
- Armed Guards & Physical Security
- Critical Infrastructure Cybersecurity
- Emergency Response Support
- Incident Response Command
- +10 Law Enforcement Partners




ST. MARYS RIVER

- Deep Draft Commercial Channel
- Great Lakes Connecting Channel by tonnage
- 75 Miles Binational Channel
- Rapid Response/Strike Removal
- Hydrographic Survey & Inspection
- EPA Area Of Concerns - 1987 Great Lakes Water Quality Agreement
- Top Fishing Destination in Michigan



NATIONAL HISTORIC LANDMARK

- National Register
- Historic Preservation
- Cultural Preservation
- Archeology
- Tribal Relations
- Sault Ste Marie Oldest City in Michigan

BUILDING STRONG

- Operations and Maintenance Program: 55 total projects ~ \$160M+ (projects under execution and funded FY21-FY24)
- Operations staff provide critical construction contract support to minimize construction and operational risks
- New Lock at the Soo



17 GREAT LAKES HARBORS & CHANNELS

<ul style="list-style-type: none"> Menominee Cedar River Little Bay De Noc Manistique Grays Reef Mackinaw City Straits of Mackinac Mackinac Island Les Cheneaux Islands Little Lake 	<ul style="list-style-type: none"> St Marys River Whitefish Point Grand Marais Detour Petosky Inland Route Cheboygan
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HYDROPOWER

- Unit 10 Oldest in USACE Inventory
- 5 Hydropower Units
- 21.5 MW Total Capacity
- Approx 4% used at the Lock Facility
- Supplies 20% to Eastern Upper Peninsula
- Power Sales Contract
- High Annual Generation Time - 98+%

RECREATION PROGRAM

- Class A Soo Locks Visitor Center - 500,000 Visitors Annually
- Canal, Brady & Rotary Parks
- Observation Platform
- Engineers Day Open House 5K - 10K Visitors
- Anchor Tourist Attraction in Eastern Upper Peninsula



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SOO LOCKS FACILITY

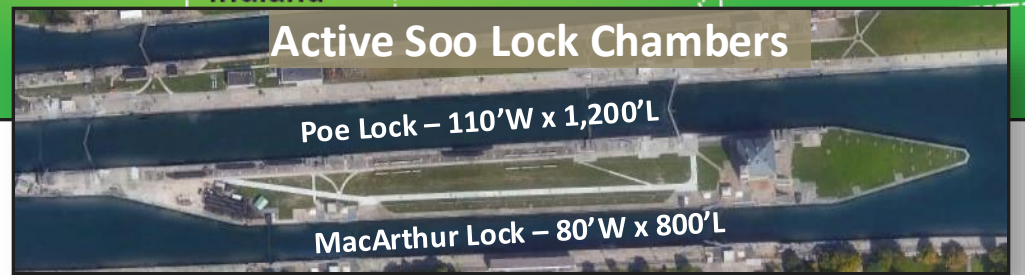
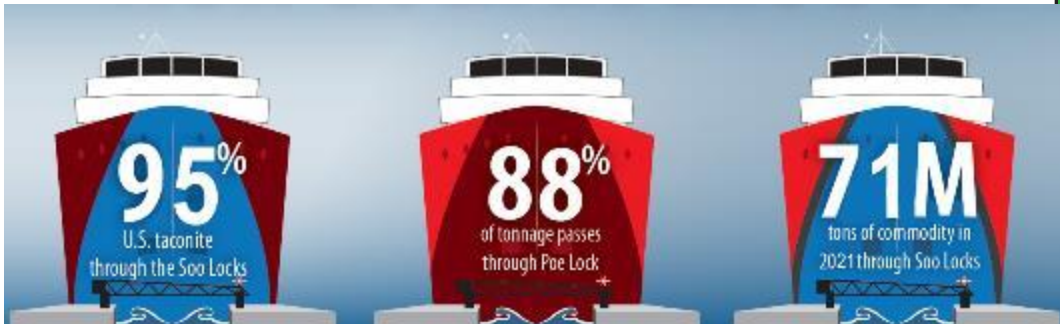


SOO LOCKS IMPORTANCE



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- 10% of US waterborne domestic traffic transported on the Great Lakes Navigation System
- Nearly all US domestic produced high strength steel is made with iron ore that transits the Poe Lock
- Within 2-6 weeks of an unscheduled Poe Lock outage, 75% of US high strength steel production would cease
- Six-month unscheduled outage would result in 11 million jobs lost and \$1.1 trillion economic impact





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OPERATIONS WORK FORCE – 140+ YEAR-ROUND EMPLOYEES

6



- ❖ **Line Handlers**
- ❖ **Lock Masters**
- ❖ **Lock Operators**
- ❖ **Hydropower Operators**
- ❖ **Civil Engineers**
- ❖ **Mechanical Engineers**
- ❖ **Electrical Engineers**
- ❖ **Geographers**
- ❖ **Engineering Technicians**
- ❖ **Archivist**
- ❖ **Program Analyst**
- ❖ **Management Analyst**
- ❖ **Purchasing Agent**
- ❖ **Administrative Officer**
- ❖ **Security Specialist**
- ❖ **Safety & Occupational Health Specialist**
- ❖ **Electronic Technician**
- ❖ **IT Specialist (INFOSEC)**
- ❖ **Student Trainees**
- ❖ **Divers**



- ❖ **Park Ranger**
- ❖ **Custodial Worker**
- ❖ **Facility Operations Specialist**
- ❖ **Facility & Equipment Management Specialist**
- ❖ **Facility Services Assistant**
- ❖ **Dive Program Coordinator**
- ❖ **Hydrographic Surveyor**
- ❖ **Small Craft Operator**
- ❖ **Tug Master**
- ❖ **Crane-Barge Master**
- ❖ **Derrick-Barge Master**
- ❖ **Deckhands**
- ❖ **Maintenance Workers**
- ❖ **L&D Equipment Mechanics**
- ❖ **Electricians**
- ❖ **Machinist**
- ❖ **Structural Iron Workers**
- ❖ **Welders**



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LOCK OPERATIONS TOWER / WUE-21





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EAST APPROACH





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POE LOCK & WEST APPROACH



SOO LOCKS ICE OPERATIONS



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GREAT LAKES ICE OVERVIEW

NOAA – TYPICAL LATE MARCH/EARLY APRIL

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STEAM SYSTEM





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UPPER APPROACH TYPICAL CONDITIONS

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Broken Plate to 4' Thick
Brash Ice to 20+' Thick
Vessels Push Ice into Chamber





COMPRESSED AIR SYSTEM





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COMPRESSED AIR SYSTEM GATE CURTAIN BUBBLERS

15





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COMPRESSED AIR SYSTEM POINT SOURCE BUBBLERS

16





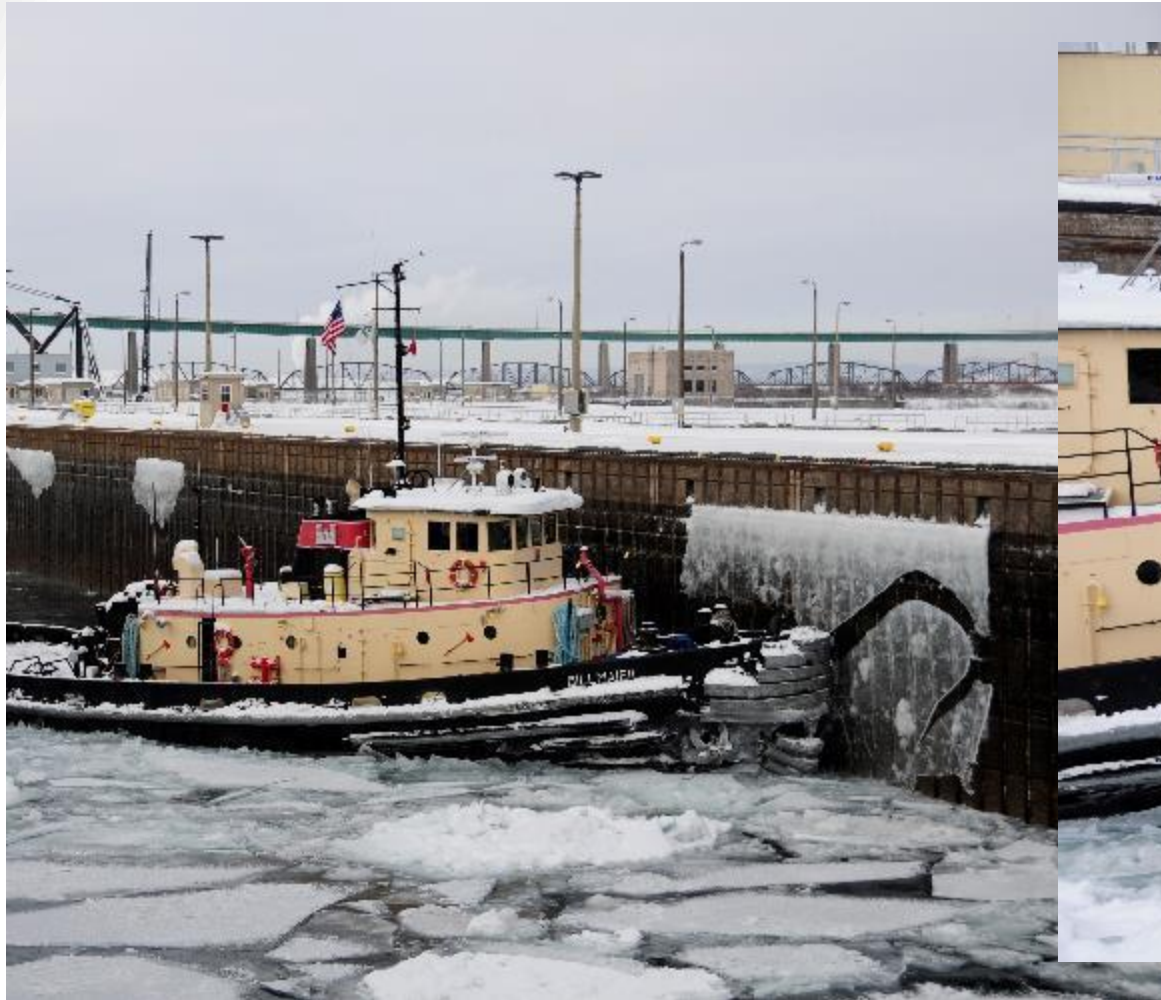
ICE LOCKAGE





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ICE COLLAR – TUGS, STEAM





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USCG AND CCG OPERATION TACONITE

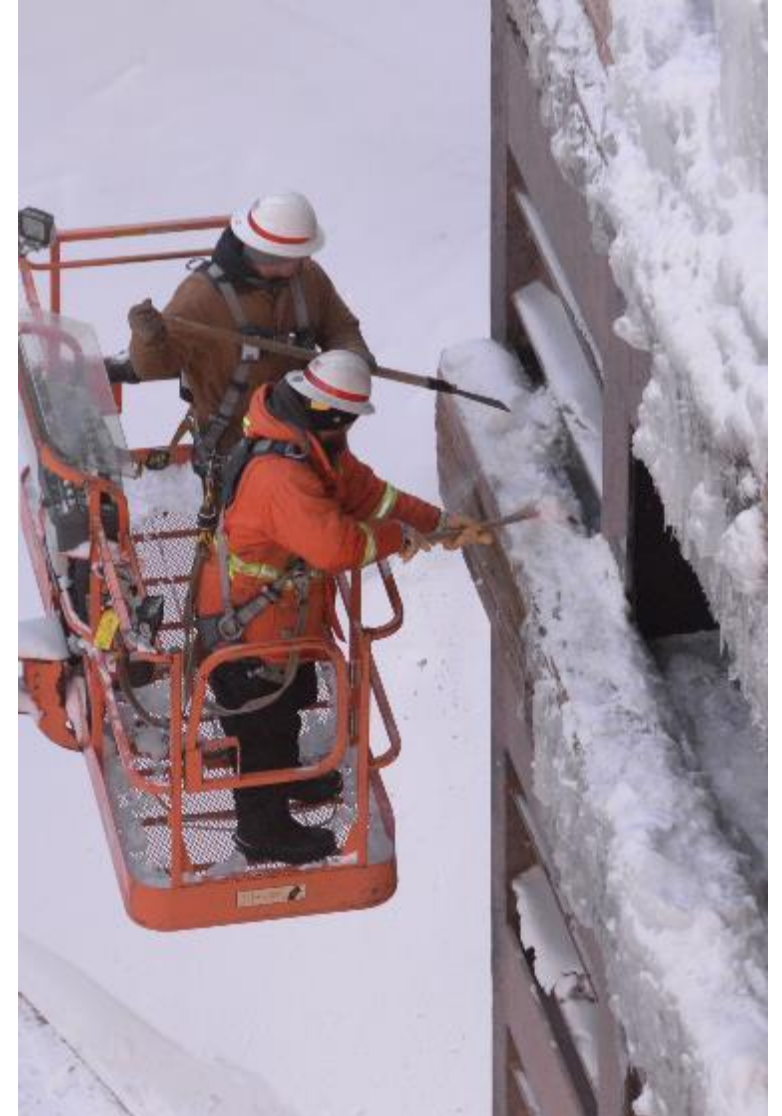
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OVERHANGING ICE



SOO LOCKS WINTER WORK 2024 SUMMARY



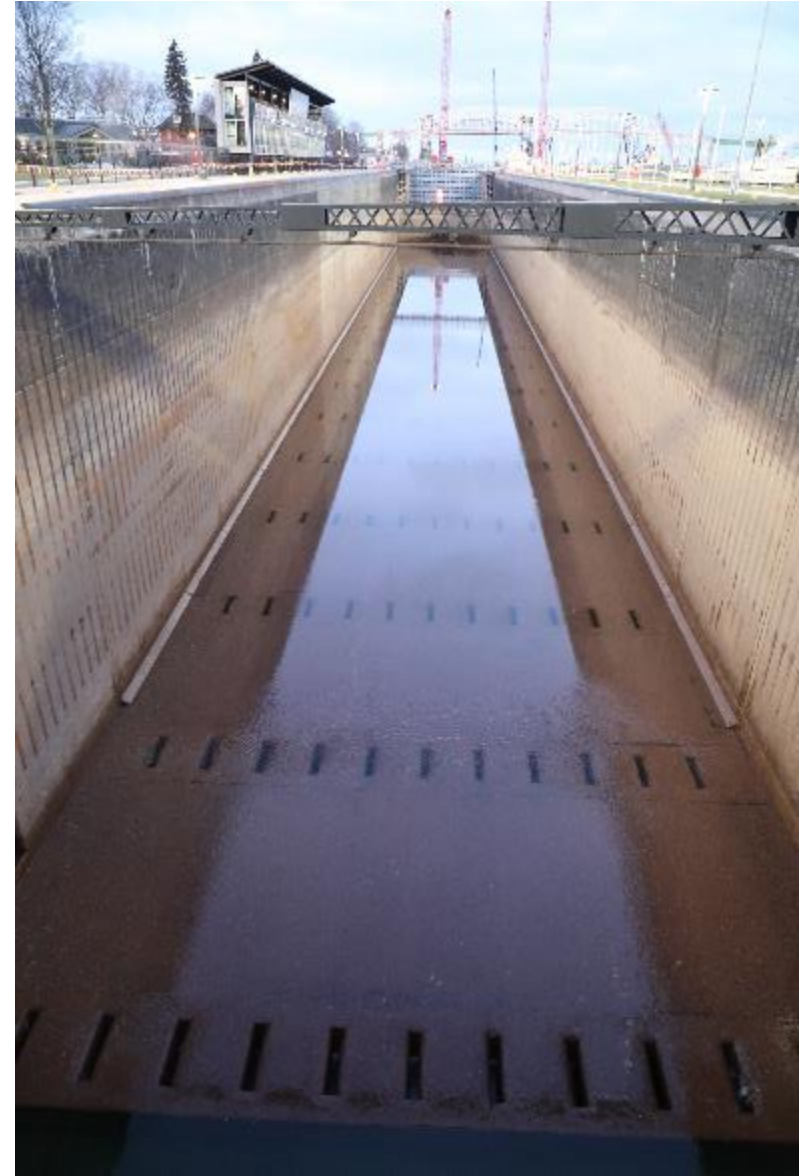
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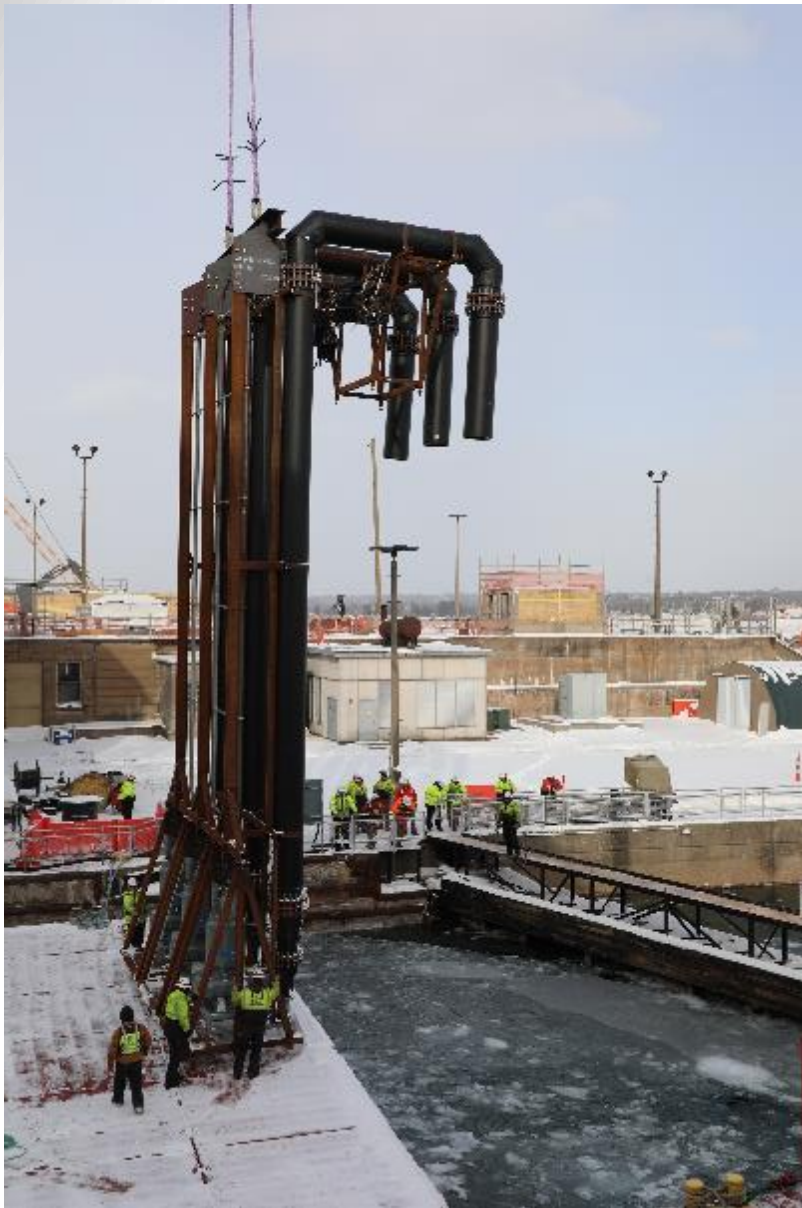
MACARTHUR LOCK DEWATERING





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INTERIM DEWATERING PUMPS





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POE LOCK BRIDGE SETTING





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GATE INSPECTIONS





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POE LOCK AIR BUBBLER REPAIR





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POE LOCK AIR BUBBLER REPAIR





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POE LOCK GATE 1 LIFTING LUGS INSTALLATION

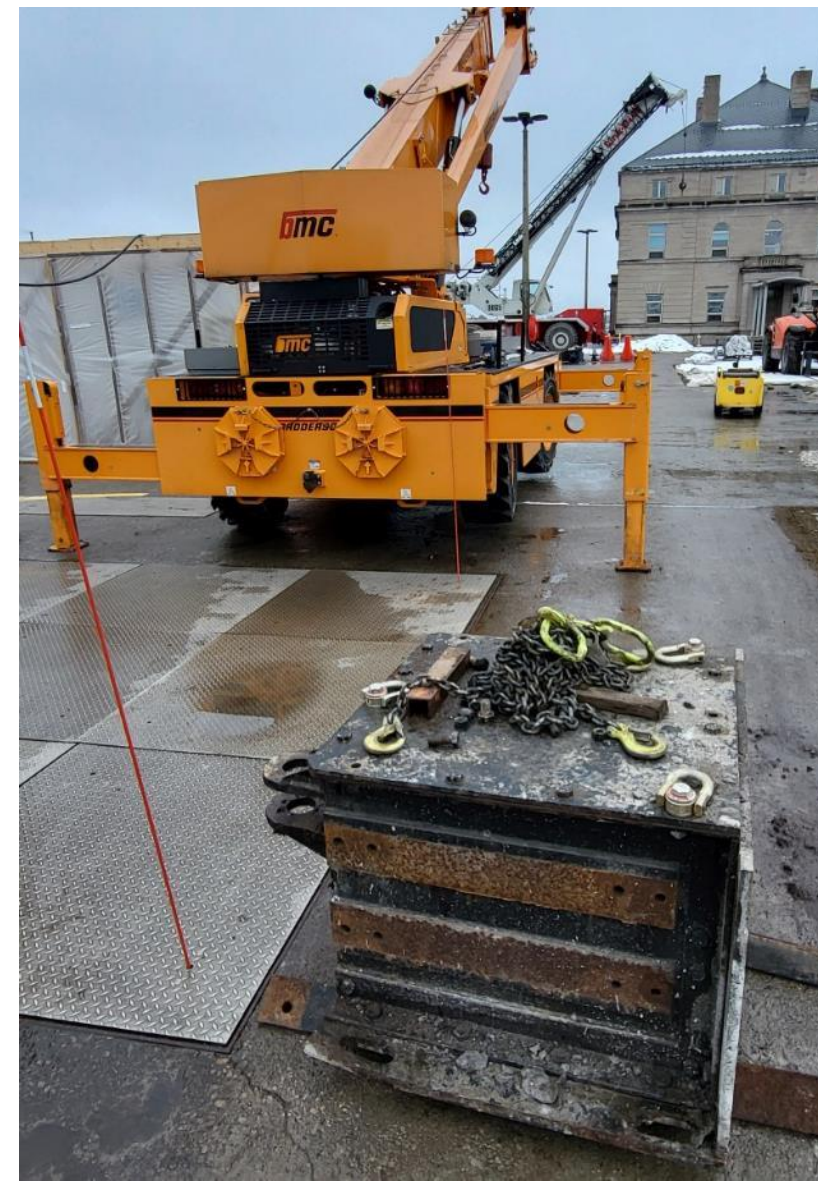
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POE MITER GATE 2 SPRING BOX AND LEVER ARM REPAIRS

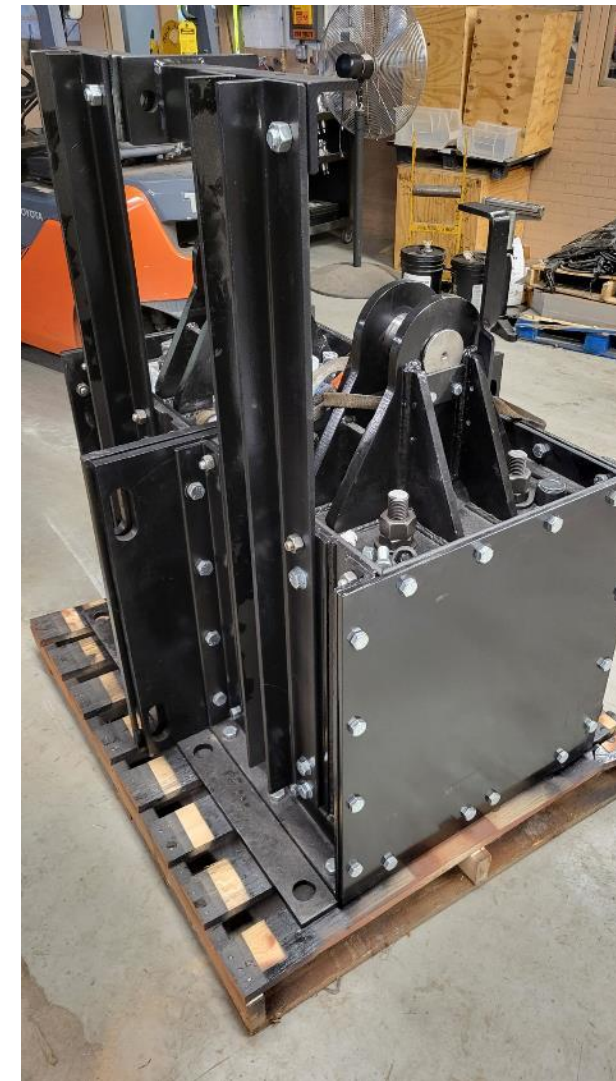




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POE MITER GATE 2 SPRING BOX AND LEVER ARM REPAIRS

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POE LOCK GATE 3 PREP WORK





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POE GATE 3 STRUCTURAL REPAIRS





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POE GATE 3 STRUCTURAL REPAIRS





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POE GATE 2 JACKING PAD REPAIRS





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POE GATE 2 JACKING PAD REPAIRS





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POE GATE 2 JACKING PAD REPAIRS





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DEWATERING SYSTEM MUCKING





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FENDER TIMBER REPLACEMENT





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POE LOCK SHIP ARRESTOR REHABILITATION





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POE LOCK SHIP ARRESTOR REHABILITATION





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POE LOCK SHIP ARRESTOR REHABILITATION



SOO LOCKS INVASIVE SPECIES PARTNERSHIPS



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DIDYMO

DIDYMOSPHENIA GEMINATA

Single-celled freshwater diatomaceous algae that creates thick mats
Discovered in the St. Marys River Rapids in 2015

Threatens salmonid fisheries by covering up critical spawning habitat in the rapids





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Determine environmental triggers that cause blooms

- Water quality monitoring at Soo L&D
- Nutrient Analysis
- Didymo Sampling
- Laboratory Analysis

Use this new information to develop potential management strategies



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Detroit District





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WATER QUALITY MONITORING

Water Quality Sonde installed at Soo L&D Powerhouse installed June 2023.

- Temperature
- Conductivity
- pH
- Dissolved Oxygen
- Turbidity (Water Clarity)



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Triplicate water samples collected
once/week



Analyzed for Nitrogen and Phosphorus
compounds thought to increase algae
growth.



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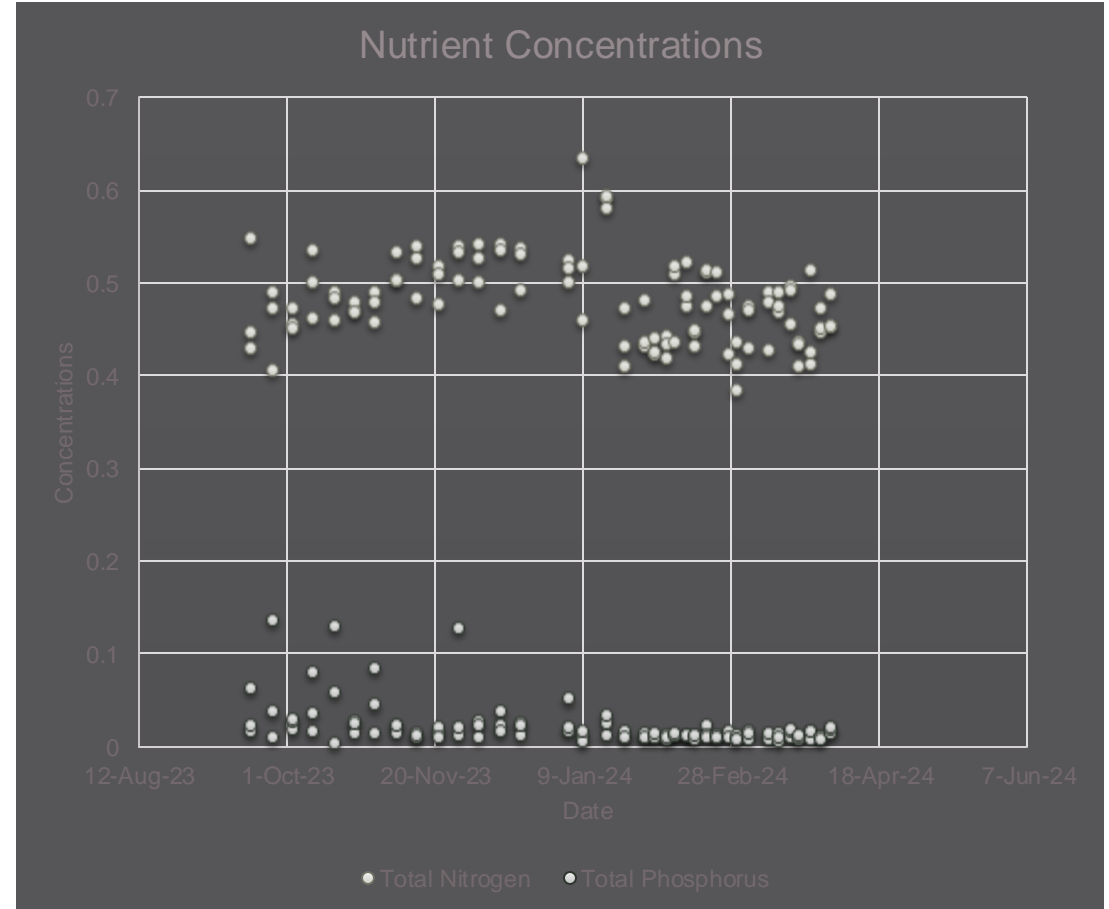
PRELIMINARY TRENDS



Dissolved Oxygen, Turbidity (Water Clarity), and pH fairly constant throughout the year

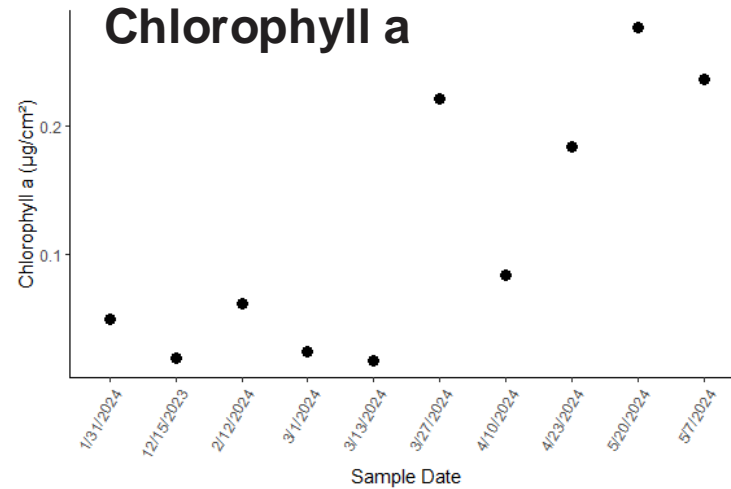
Total Phosphorus higher in the fall, low in the spring

Looking forward to seeing how Nitrogen changes through this summer

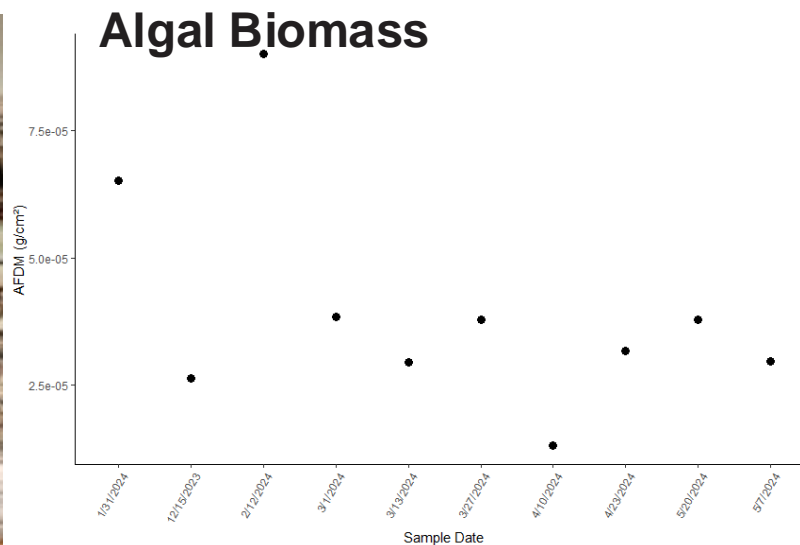




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- Didymo “blooms” observed consistently from January to May
- Highest algal biomass (= stalk production) in Jan/Feb
- Highest Chl a production (= cell production) in Apr/May



- Need to conduct Didymo cell counts yet and compare to water chemistry



Work is ongoing



Future work

Analyze correlations with water quality and nutrient data

Examine blooms for temporal patterns





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LABORATORY EXPERIMENTS

Test potential management strategies based on triggers identified in the water quality and nutrient analysis
Scheduled to begin later this year

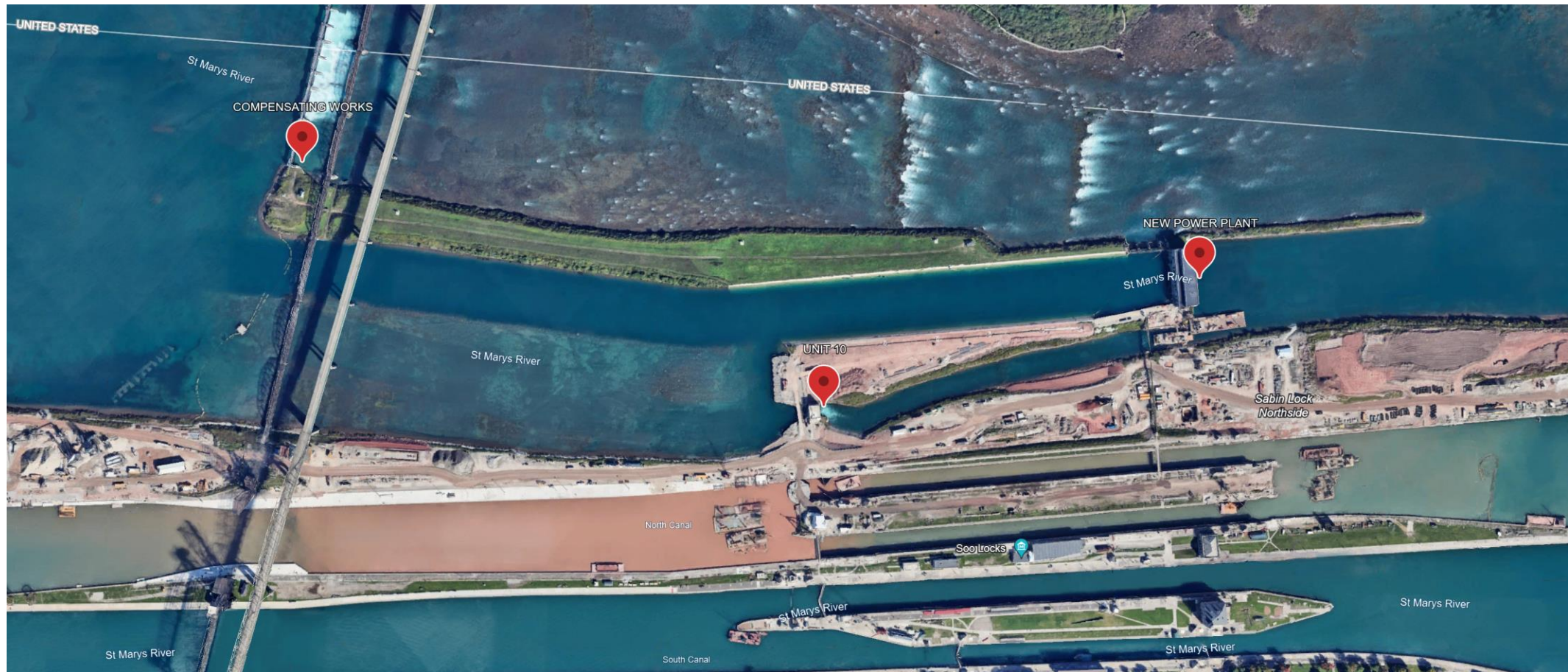




SEA LAMPREY CONTROL



TRAPPING ACTIVITIES PERFORMED BY USFWS
TRAPS PLACED AT 3 LOCATIONS





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SEA LAMPREY CONTROL

UNIT 10 – MOST EFFECTIVE TRAP LOCATION





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NEW POWER PLANT – 3 TRAPS





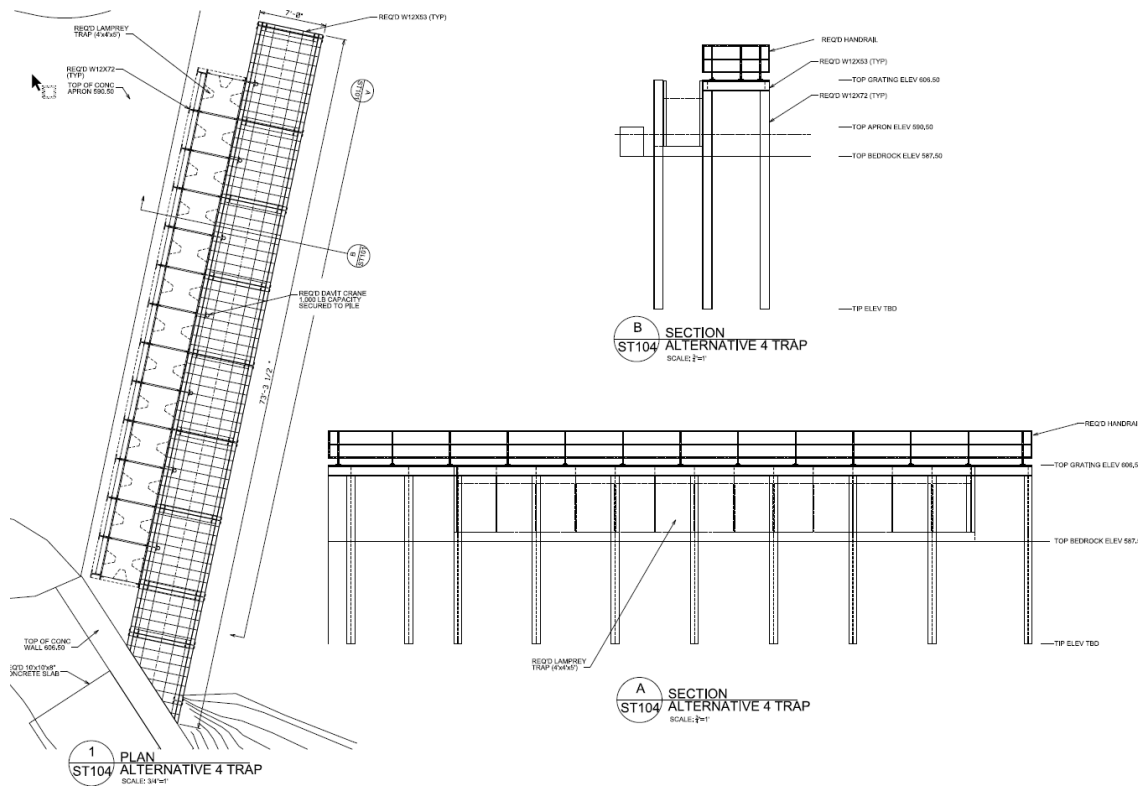
SEA LAMPREY CONTROL

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COMPENSATING WORKS – 2 TRAPS

POTENTIAL FOR FUTURE PLACEMENT OR CONSTRUCTION OF ADDITIONAL TRAPS





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QUESTIONS

