

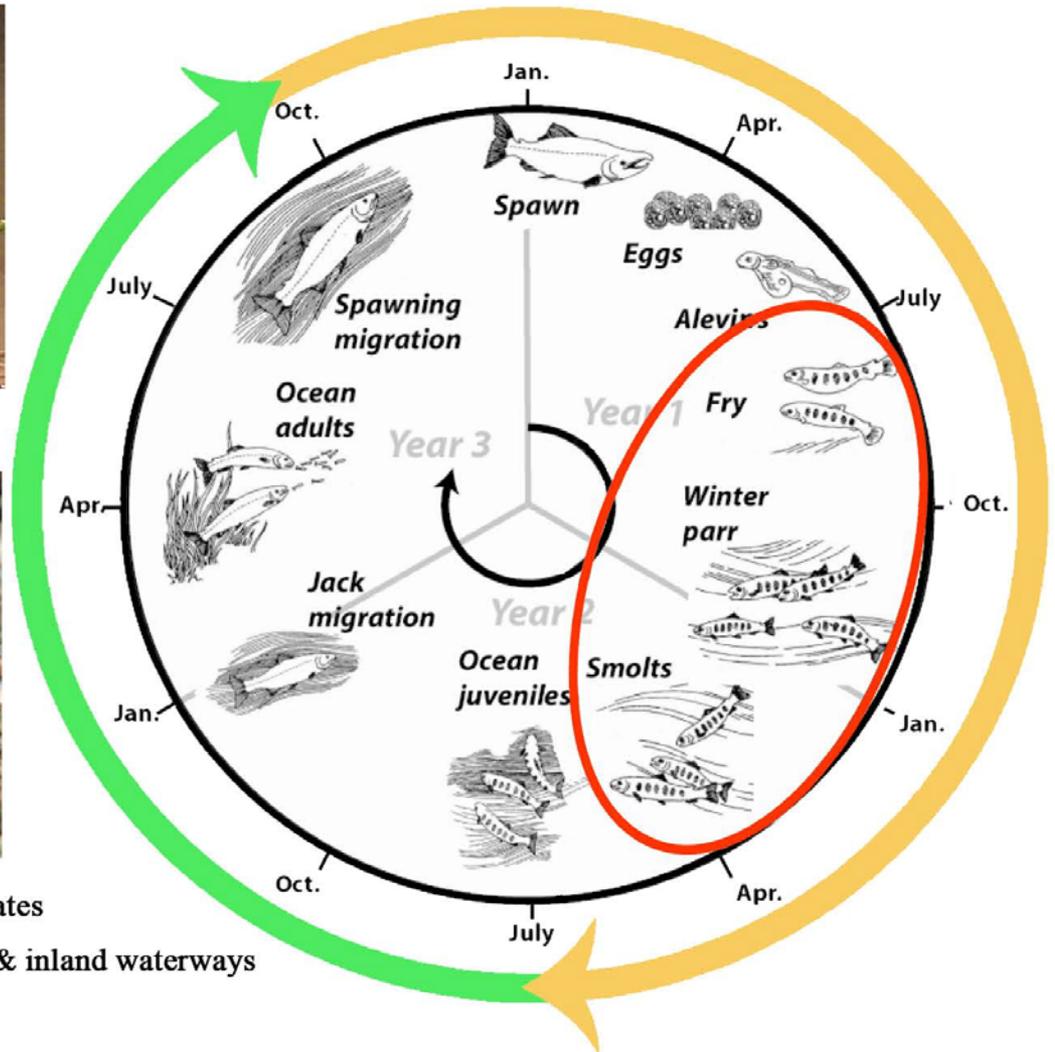
Coastal Off-Channel And Tidal Habitat Restoration Symposium
**Modern Tidegates & Muted Tidal Regulators
(MTR's)**



Leo Kuntz
Tidegate Specialist
Nehalem Marine Manufacturing
Nehalem, Oregon

November 15, 2012

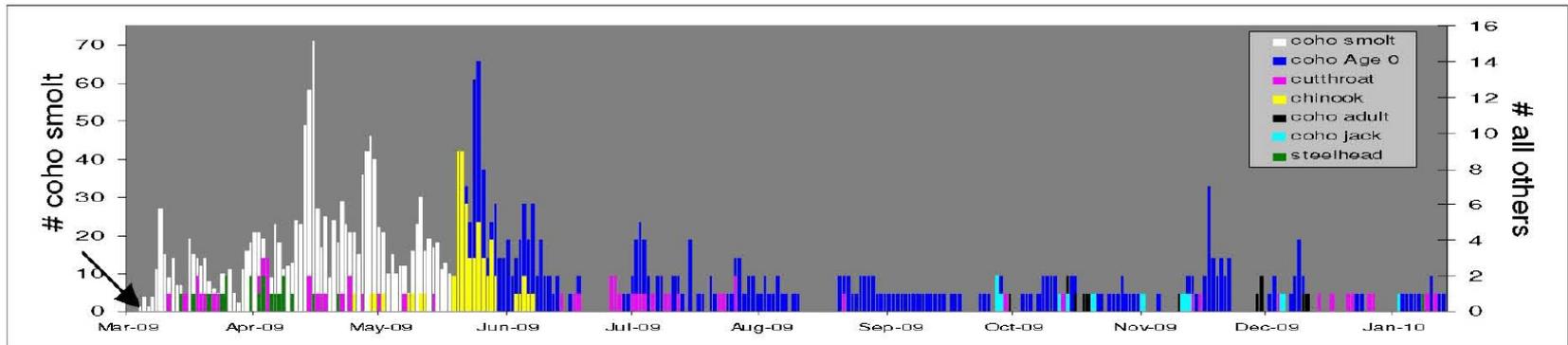
Coho Salmon Life Cycle



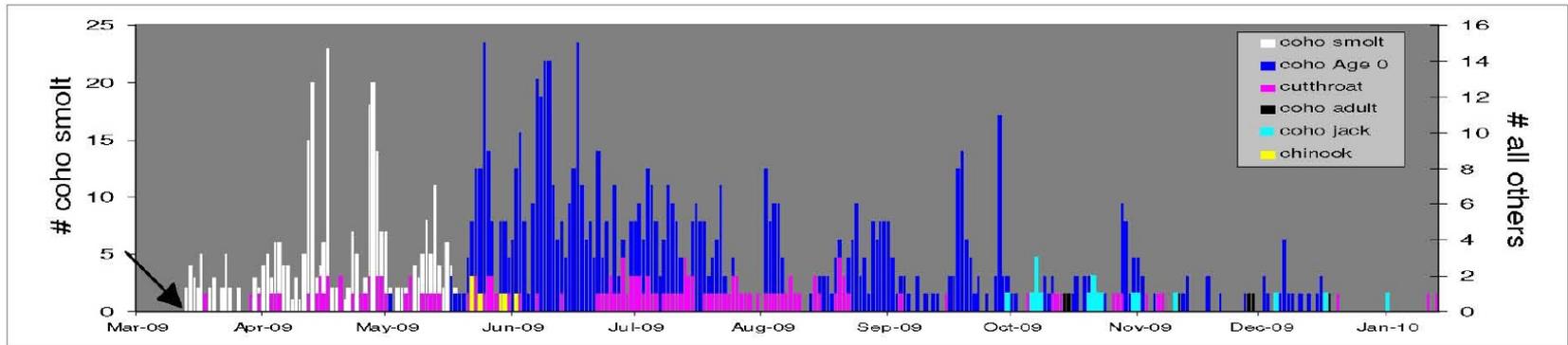
-  Lifecycle time spent within tidegates
-  Lifecycle time spent in estuaries & inland waterways
-  Lifecycle time spent in the ocean

Salmonid Presence at all Sites

Palouse
(Top Hinged)



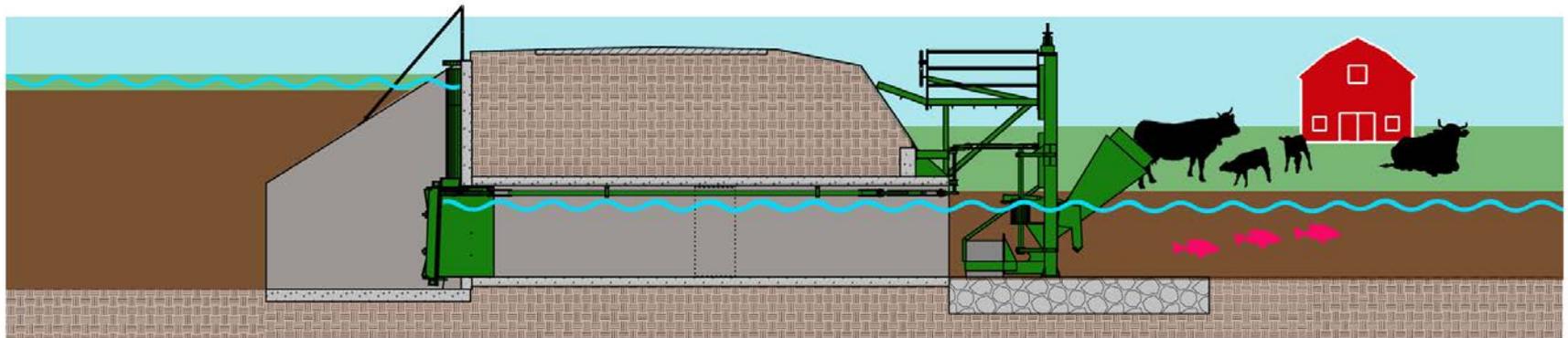
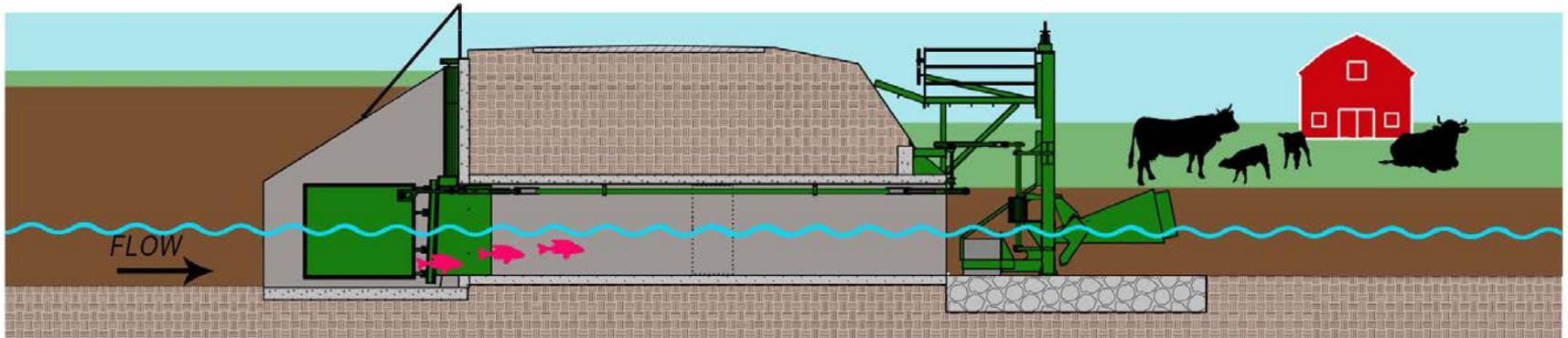
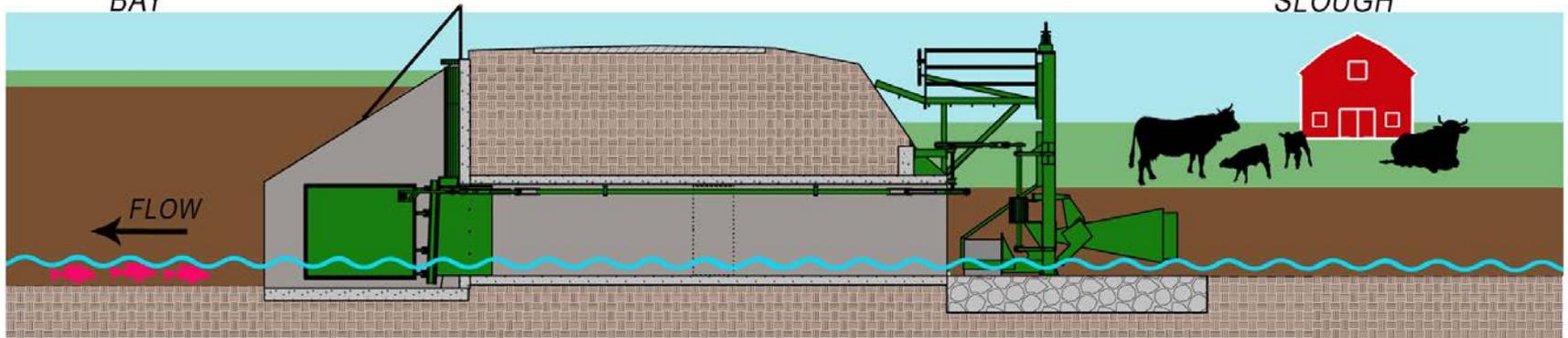
Larson
(Side Hinged)



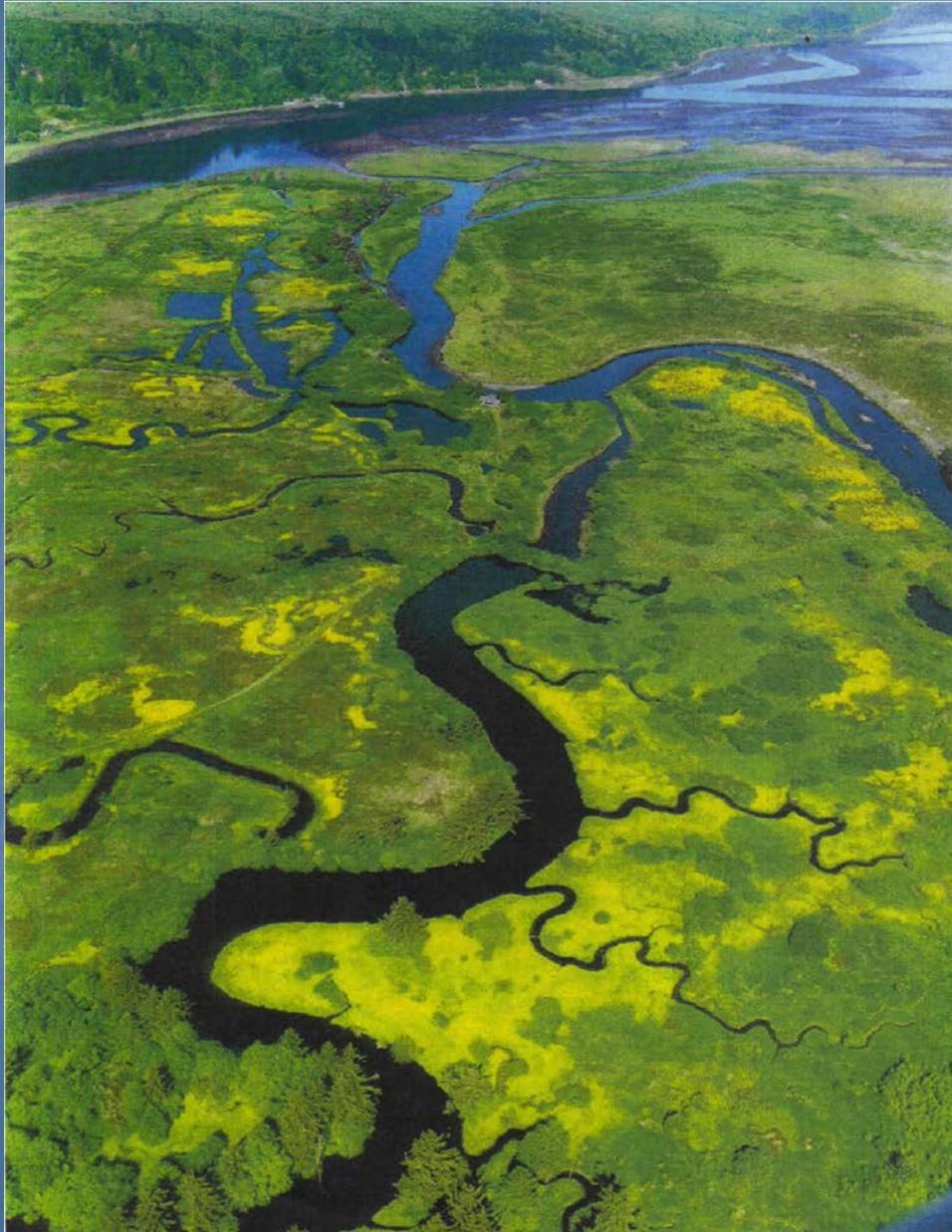
MUTED TIDE

BAY

SLOUGH



Blind Slough



Blind Slough



A Tidegate System From the Past



The old tidegate systems were bad for fish passage because they had a poor conveyance to size ratio which meant they had poor water flow.

Little Pompey Before Restoration

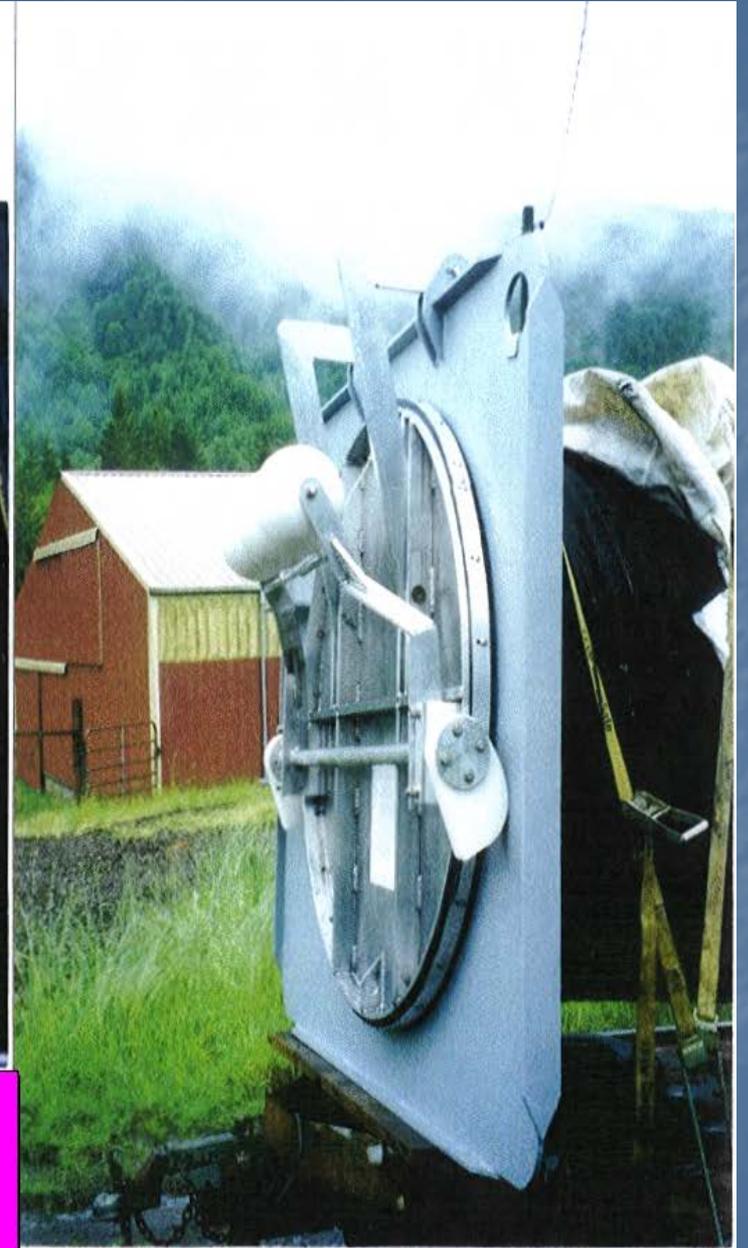


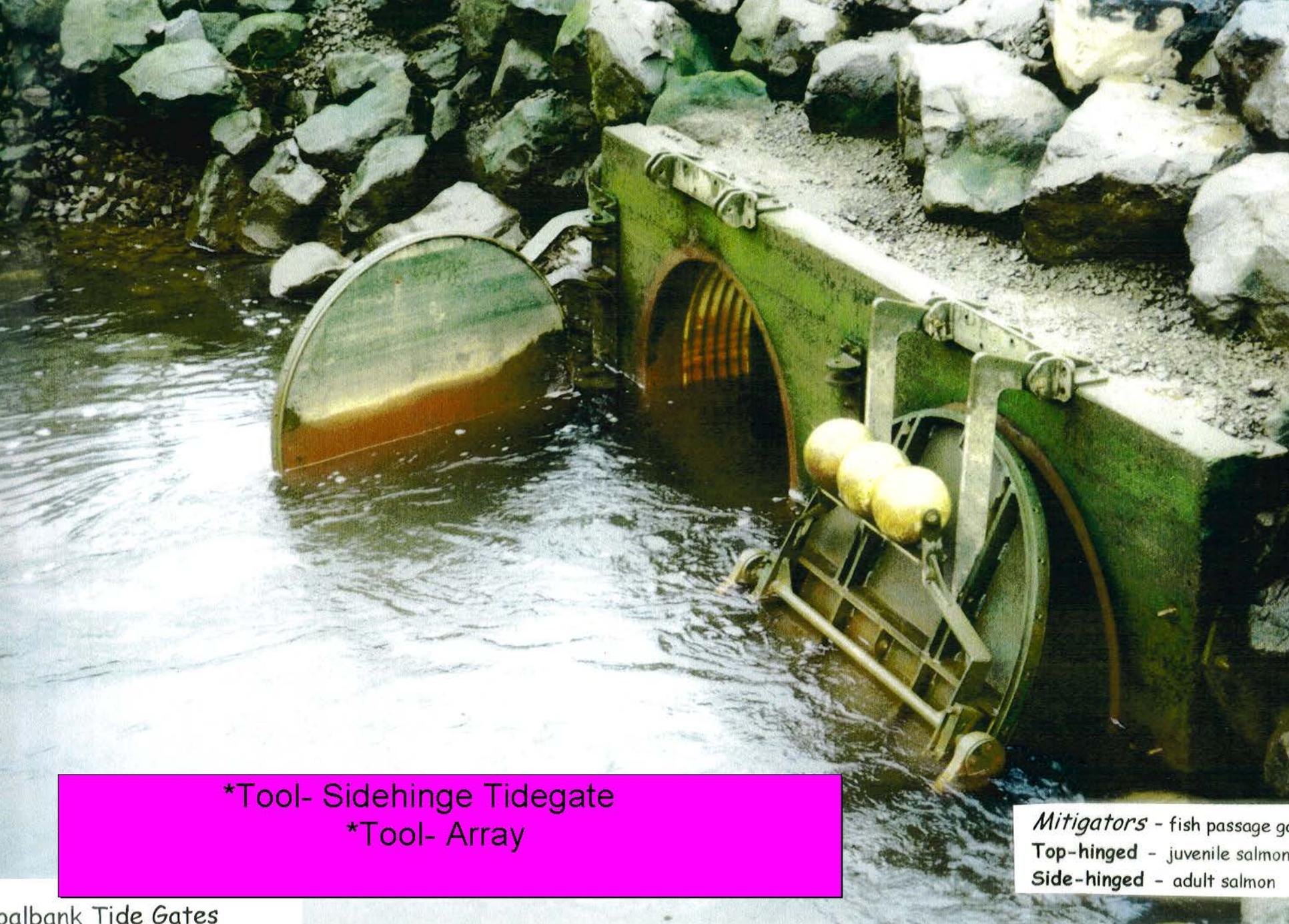
Old Tidegate System





Tool: Mitigator Fish Passage Device





*Tool- Sidehinge Tidegate
*Tool- Array

Mitigators - fish passage gate
Top-hinged - juvenile salmon
Side-hinged - adult salmon



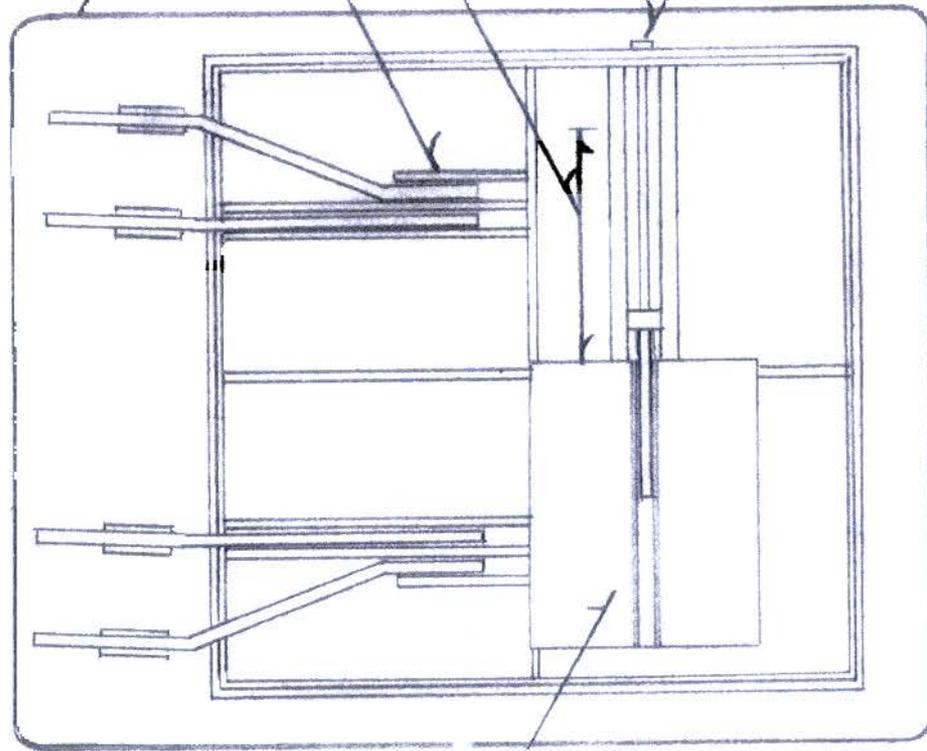
ALUMINUM 5086 & 6061 MARINE GRADE W/ EPOXY COATING

AUXILIARY DOOR ADJUSTMENT NUT

(CALL 8 POINTS)
1.5" STAINLESS PIN W/
30 UHMW BEARINGS

ALUMINUM HEADWALL

AUXILIARY DOOR RANGE OF ADJUSTMENT



AUXILIARY DOOR

NRSG-6-A TIDEGATE ASSEMBLY
FOR: MCBAIN & TRUSH-ROCKY
GULCH RESTORATION PROJECT
(CUSTOM UNIT)

34" x 1'
2/2/09
SAC



Nehalem Marine
24755 Miami-Foley Rd.
Nehalem, OR 97131

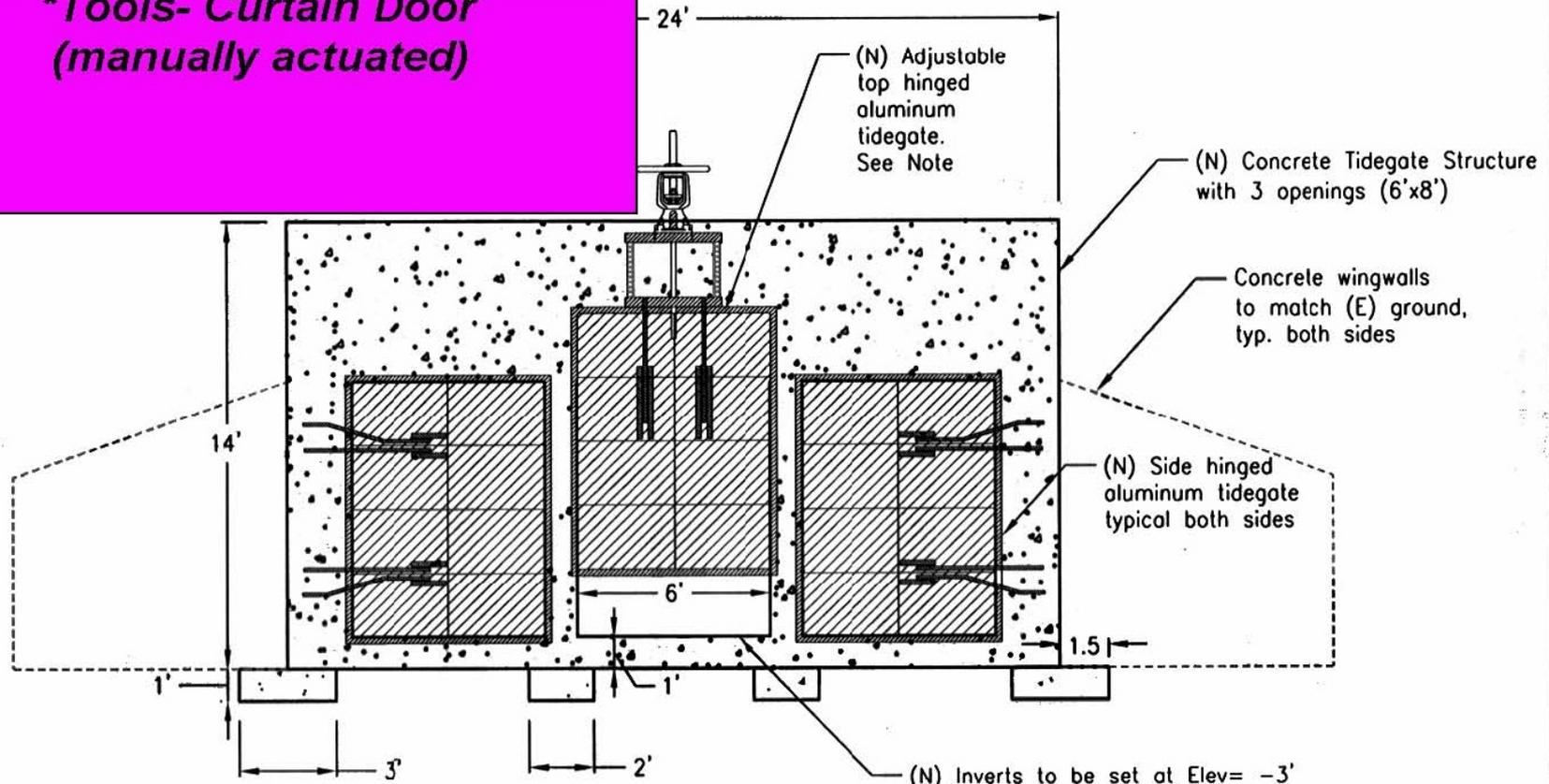
1 OF

*Tool- Adjustable Aperture Auxiliary Door



*Tool- Mitigator Type Controlled Aperture

***Tools- Curtain Door
(manually actuated)**



Note:
 (N) Top hinged tidegate fitted with adjustable opening (0' to 3' high) to create a muted tide cycle allowing tidal mixing and continuous fish passage within the Salmon Creek Estuary

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 24755 Miami-Foley Rd
 Nehalem, OR 97131

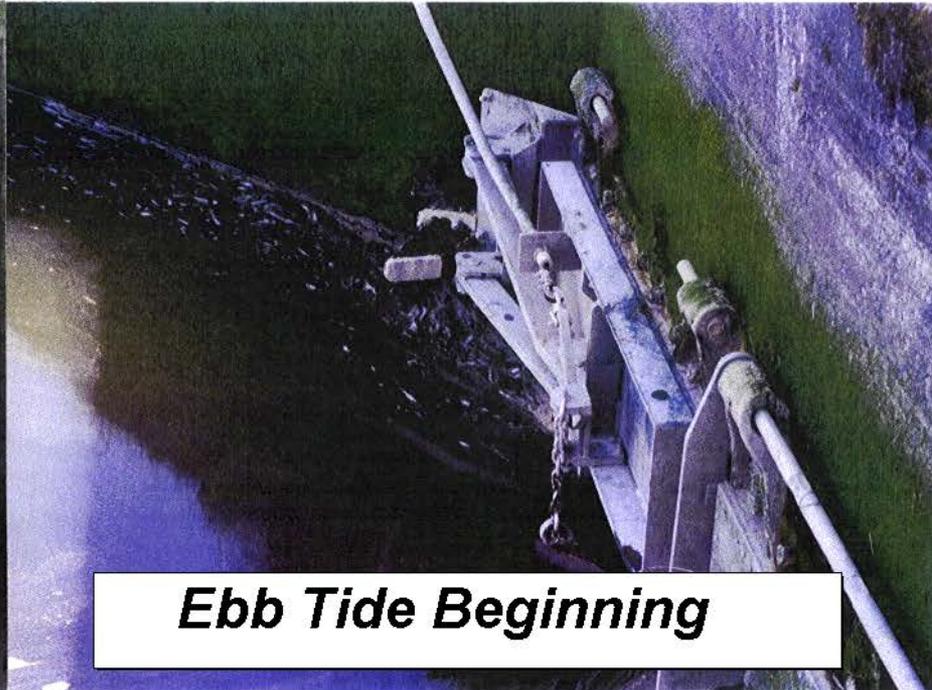
Jeff Anderson & Associates
 Engineering - Hydrology - Stream Restoration

New Tidegate Section, Typical		
Salmon Creek Enhancement Project		

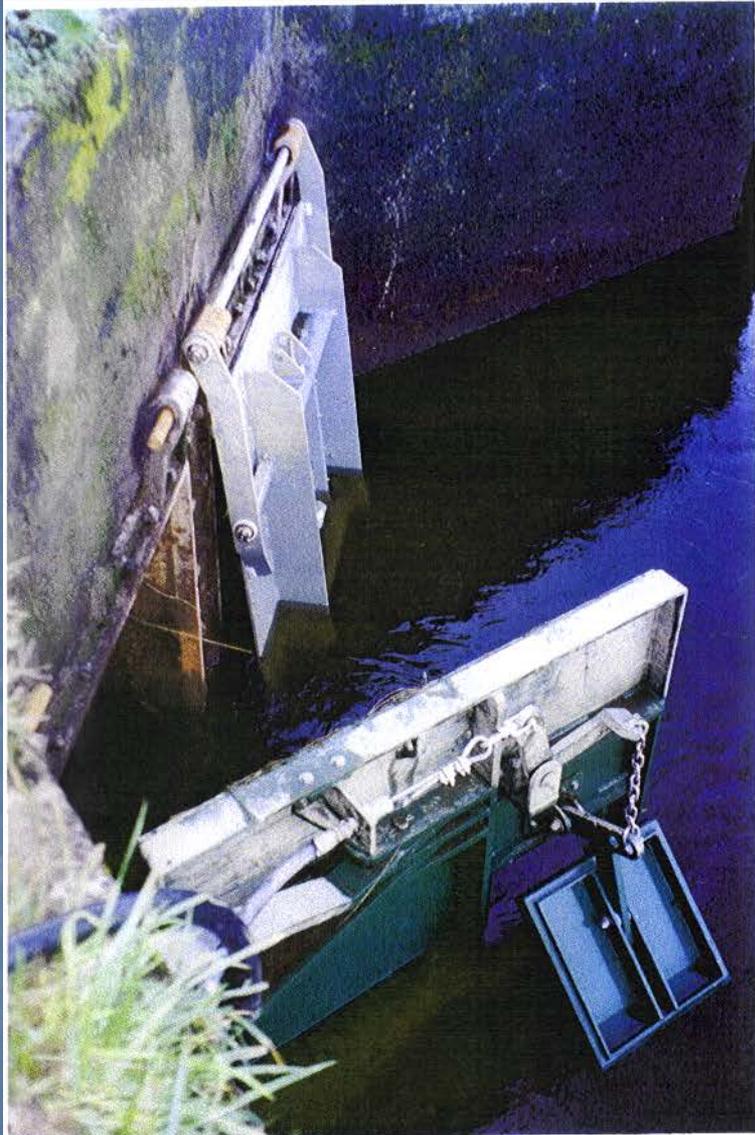
Figure 18, New tide gate section.



*Tool- Buoyancy Compensated Tidegate



Mid Ebb Tide



****Tool- Muted Tidal Regulator***

MTR Controlled Auxiliary Door



Tidal Management Tools

- Lightweight, double-hinged T/G
- Buoyancy compensated T/G
- Side-hinged T/G
- Manually adjusted curtain type T/G
- Adjustable apertures
- Mitigator type controlled aperture
- Arrays
- Mitigator
- **Muted Tidal Regulators (MTR)**

OREGON FISH PASSAGE LAW

ODFW Administers State Fish Passage Rules & Regulations
= Signed into Law 2001, *ORS 509.585*

This law requires all *new & replaced* structures (culverts, bridges water diversions, dams, tide gates, fishways, etc.) to meet fish passage criteria

All projects shall have ODFW Fish Passage approval (fish passage permit) prior to construction.

Contact your local ODFW District Office for information & assistance

Fish Passage Approval Forms @ ODFW website
<http://www.dfw.state.or.us/fish/passage/>

Greg Apke, 503-947-6228 greg.d.apke@state.or.us



OREGON TIDEGATE FISH PASSAGE CRITERIA

(SIMILAR CRITERIA CURRENTLY BEING ADOPTED BY
NOAA/NMFS)

- ALL TIDEGATES NO LESS THAN 4' WIDE
- VELOCITIES MUST BE AT OR UNDER 2FPS 50% OF TIME
- LEGAL FISH PASSAGE MUST BE MAINTAINED 50% OF TIME
- FULL FISH PASSAGE REVIEW WHEN TRIGGER OCCURS

OREGON STATE STATUTE

- Owners & Operators of Culverts Must Address Fish Passage when “Trigger Events” Occur.
- “Trigger Events” include
 - Major Replacement
 - Installation
 - Activities that Extend the Life of Culverts (new floors, aprons, wing walls, slip lining, etc.....)
 - Abandonment of Artificial Obstruction

Little Pompey Before Restoration



Little Pompey After Restoration



Muted Tidal Regulator (MTR) System

Pheylane



Pheylane MTR



Fish Passage @ Pheyplane



Kentuck Tidegates



Top Hinge Side Hinge Array with MTR

Kentuck Tidegates Monitoring Data

Main Screen | Water Trends | Gates Analysis | 24Hr Depth/Gate Analysis | 7Dy Depth/Gate Analysis | Water Temp & Gate Analysis | Callit

Nehalem Marine Manufacturing

Kentuck Inlet



North Gate
Angle 80.7°



Vertical Gate
Angle 8.5°



South Gate
Angle 46.6°

Last Updated at
11/11 15:50:00

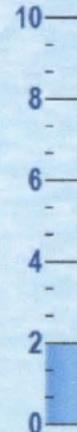
Inner Wall (Inlet)

Outer Wall (Bay)



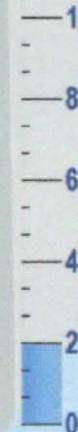
Water Temperature
48.2°F

1.9 ft



Water Level
Feet

1.9 ft



Water Temperature
48.1°F

Battery Voltage

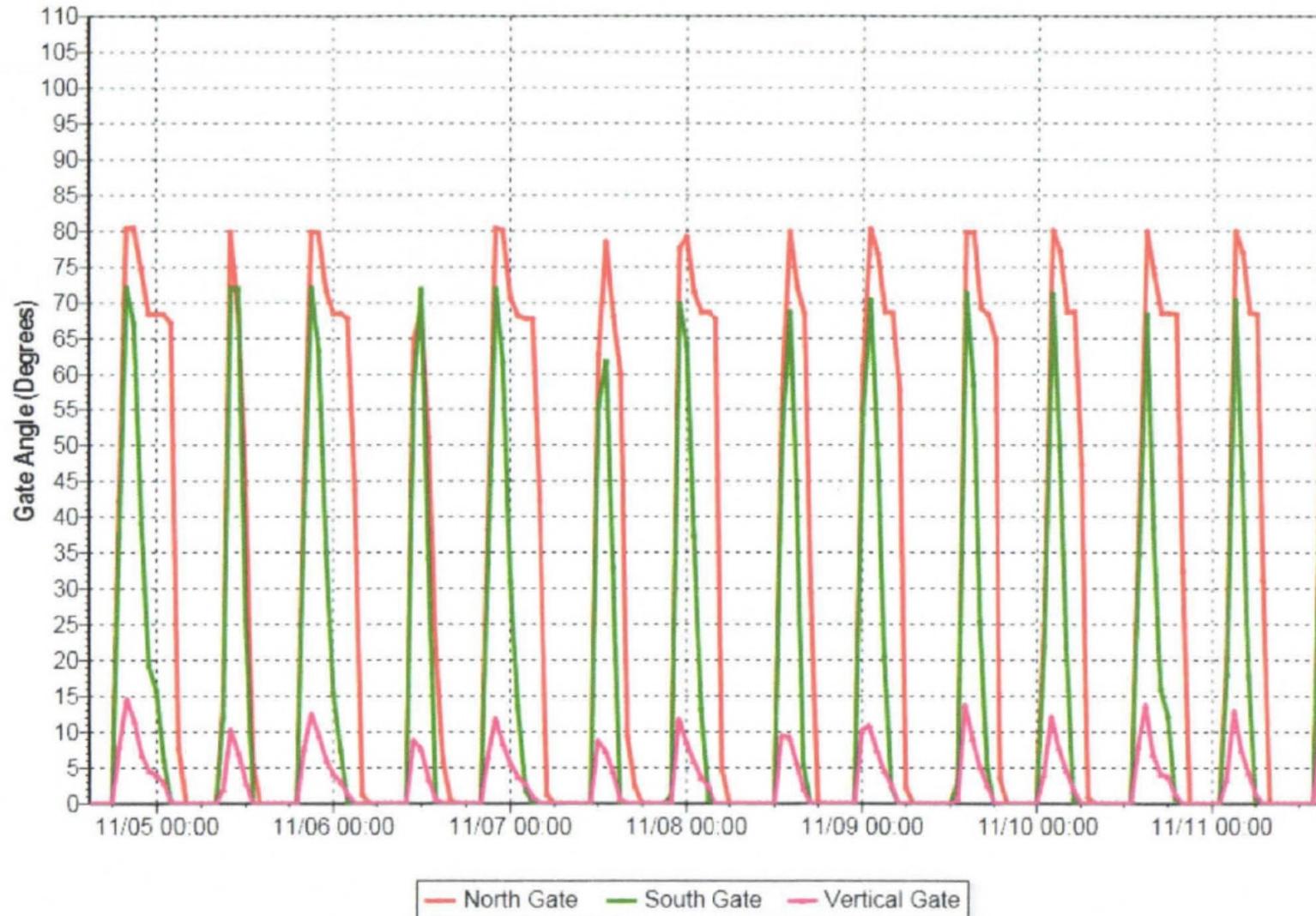
13.16 v

Kentuck Tidegates Monitoring Data

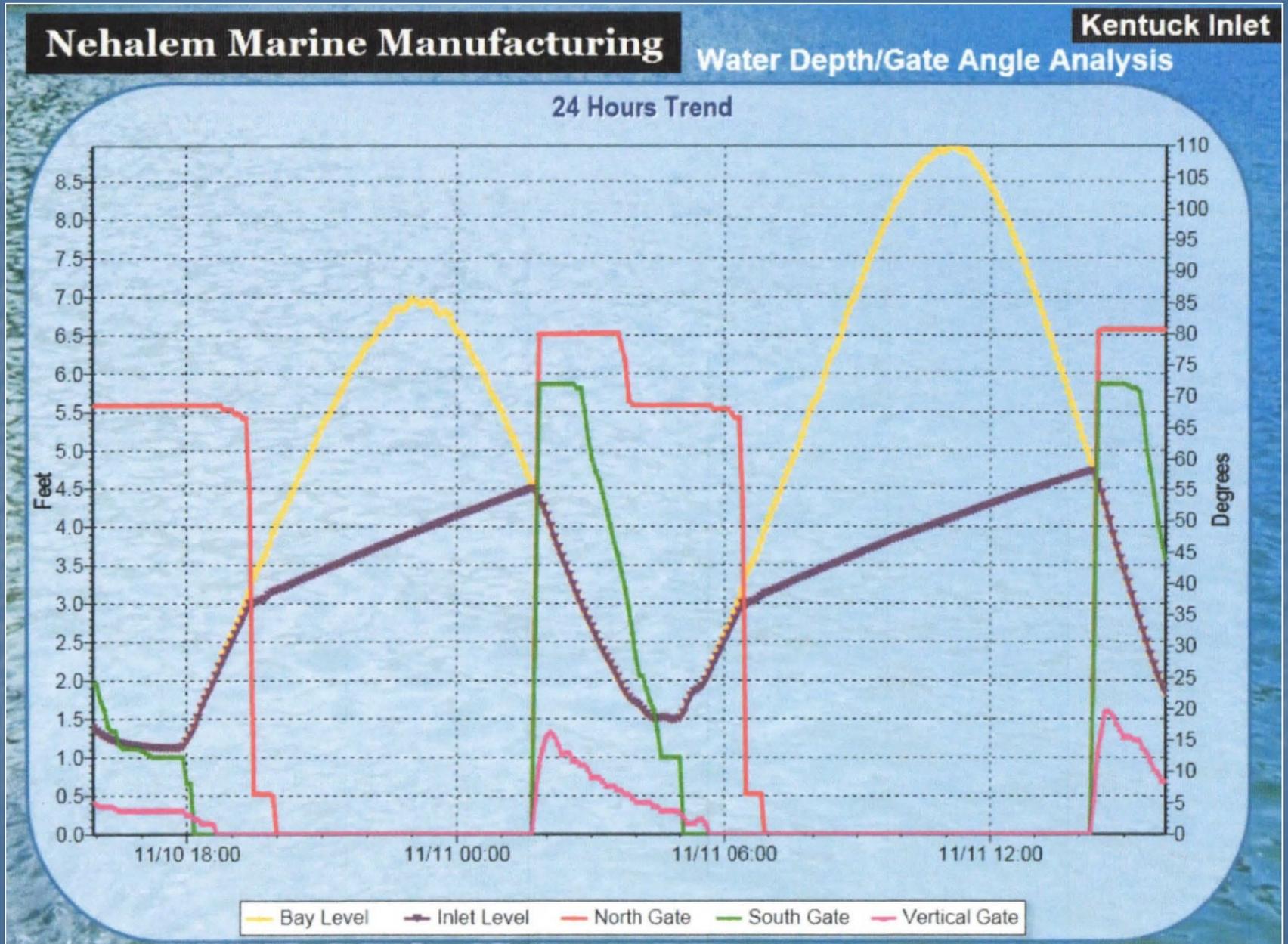
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Kentuck Inlet

Weekly Trend



Kentuck Tidegates Monitoring Data



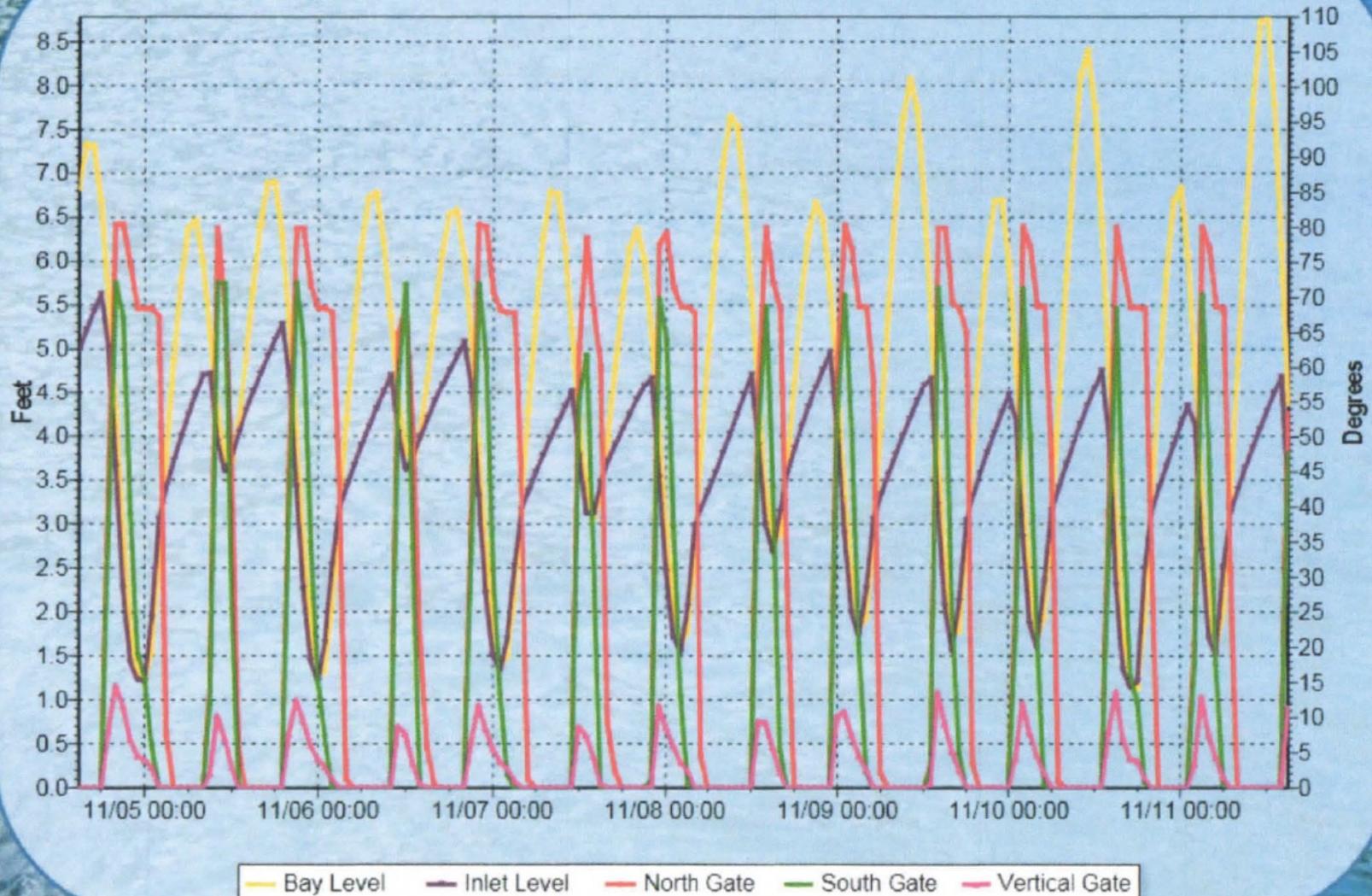
Kentuck Tidegates Monitoring Data

Nehalem Marine Manufacturing

Kentuck Inlet

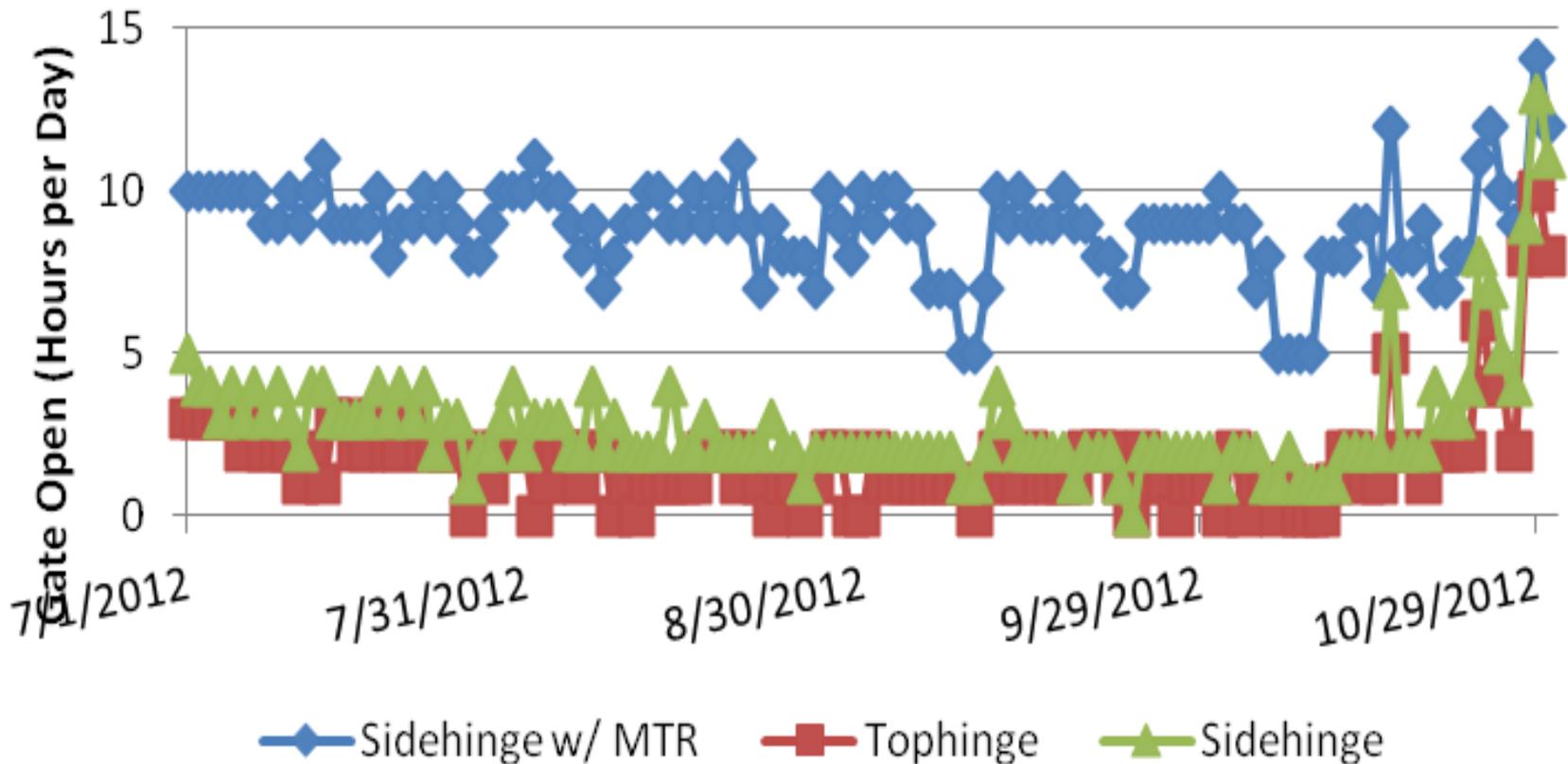
Water Depth/Gate Angle Analysis

Weekly Trend



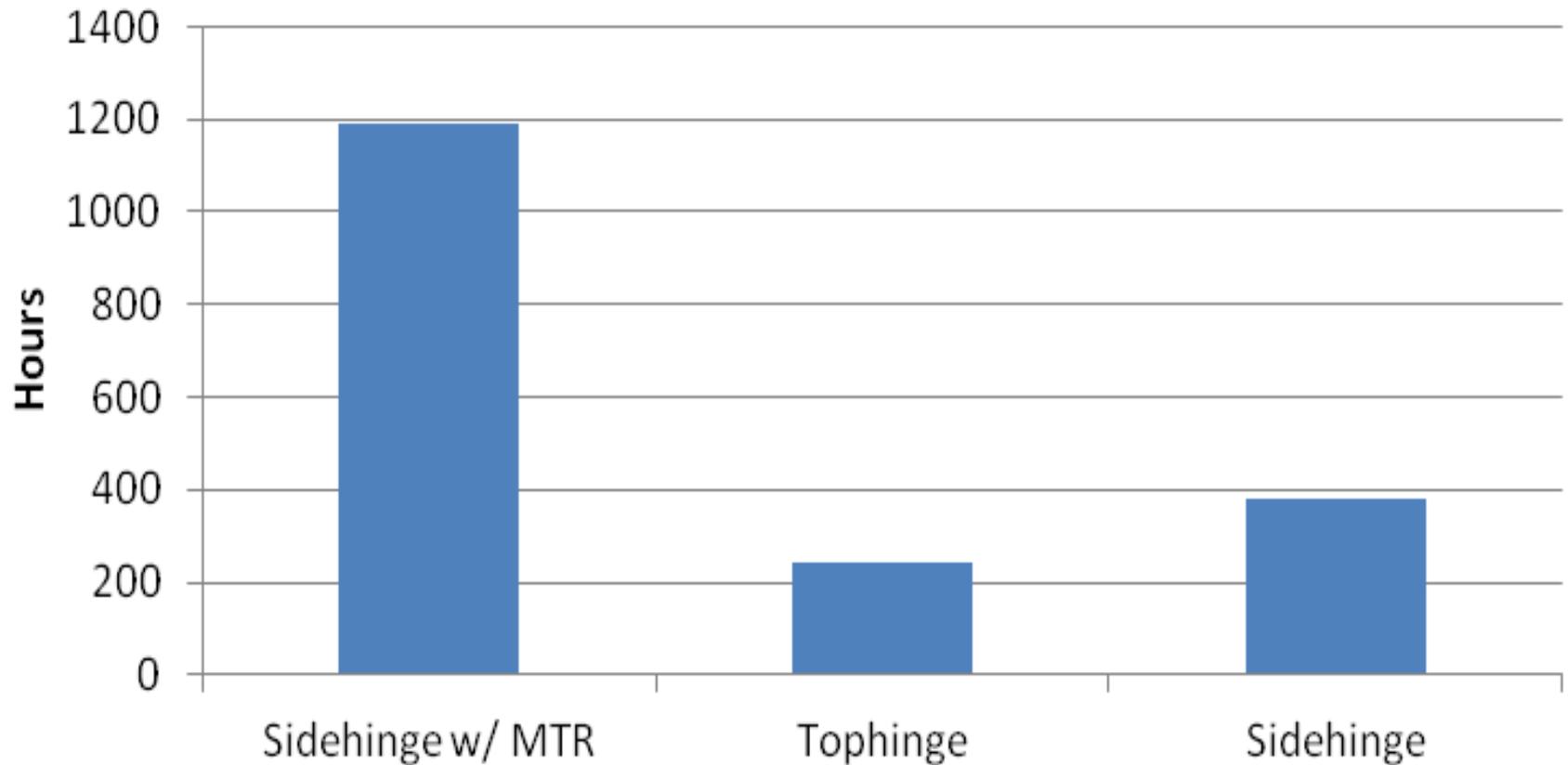
Kentuck Tidegates Monitoring Data

Tidal Gate Fish Passage Duration Jul 1- Oct 31, 2012



Kentuck Tidegates Monitoring Data

Fish Passage Time Hours from July 1 to October 31



Fisher Slough Restoration



Fisher Slough Tidegate Operations and Maintenance Manual



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PO Box 324,
Conway, WA 98238

&

The Nature Conservancy
Washington Operating Unit
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Prepared By:

Nehalem Marine Manufacturing

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E-mail: tidegates@oregoncoast.com

24755 Miami River Rd.
Nehalem, OR 97131
Leo Kuntz, President



December 21, 2009

NSRG9x11 Tidegate Muted Tidal Regulator Operations

Description:

The Muted Tidal Regulator (US Patent # 6988853 b1) represents the latest technology in Regulated tidegates and is an accessory to our NSG and NTG line of tidegates. The Muted Tidal Regulator (MTR) allows a controlled or muted tide to occur within a levied compound; the device causes a delay in the closing of the tidegate until a target depth of water elevation is obtained within the inner compound. This not only allows a very high level of restoration and fish passage, but also protects the inner compound from excessive water elevations. The device is also adjustable so the target elevation of the interior pool can be varied. The device is constructed of three main components:

1. Door Actuator (see Photo 1) - The actuator transfers the torque to the tidegate and When controlled by the other components act as a fulcrum to open the tidegate.

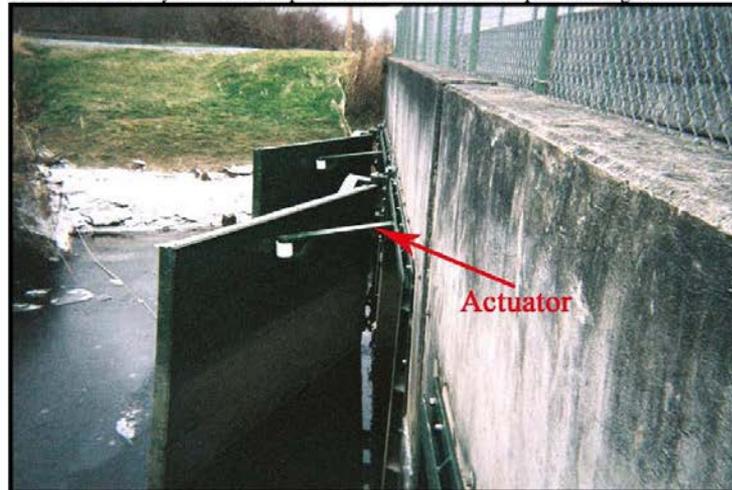
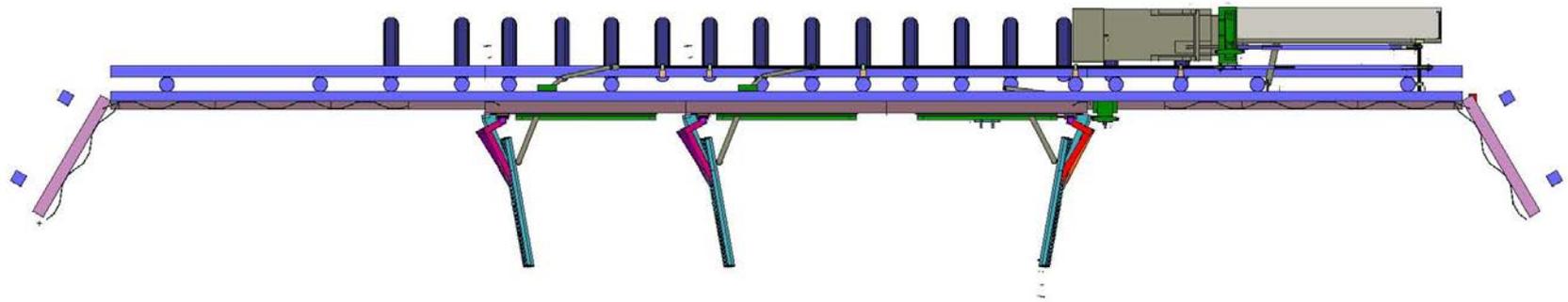
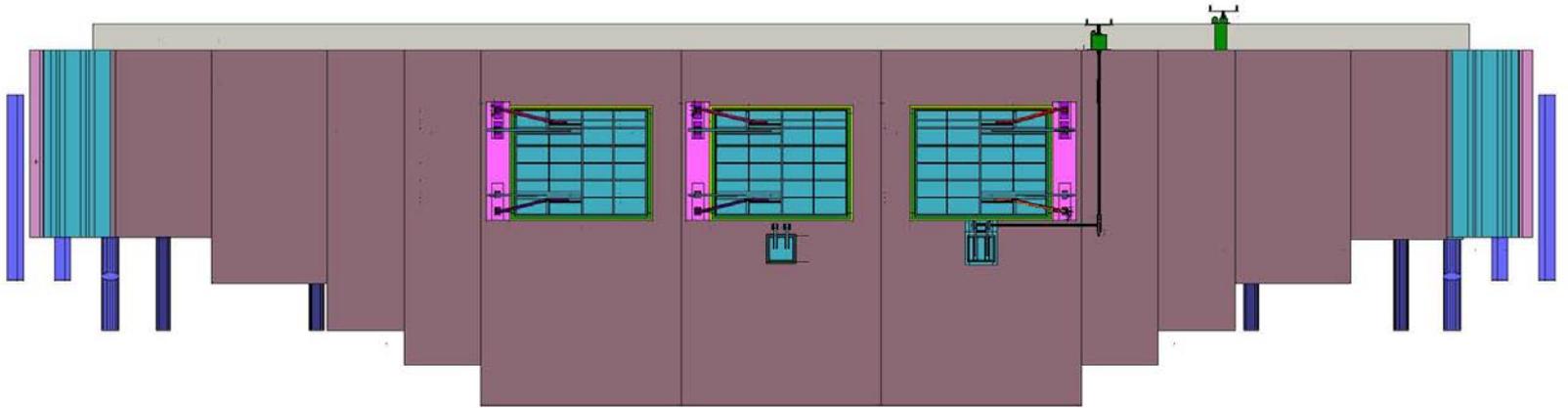
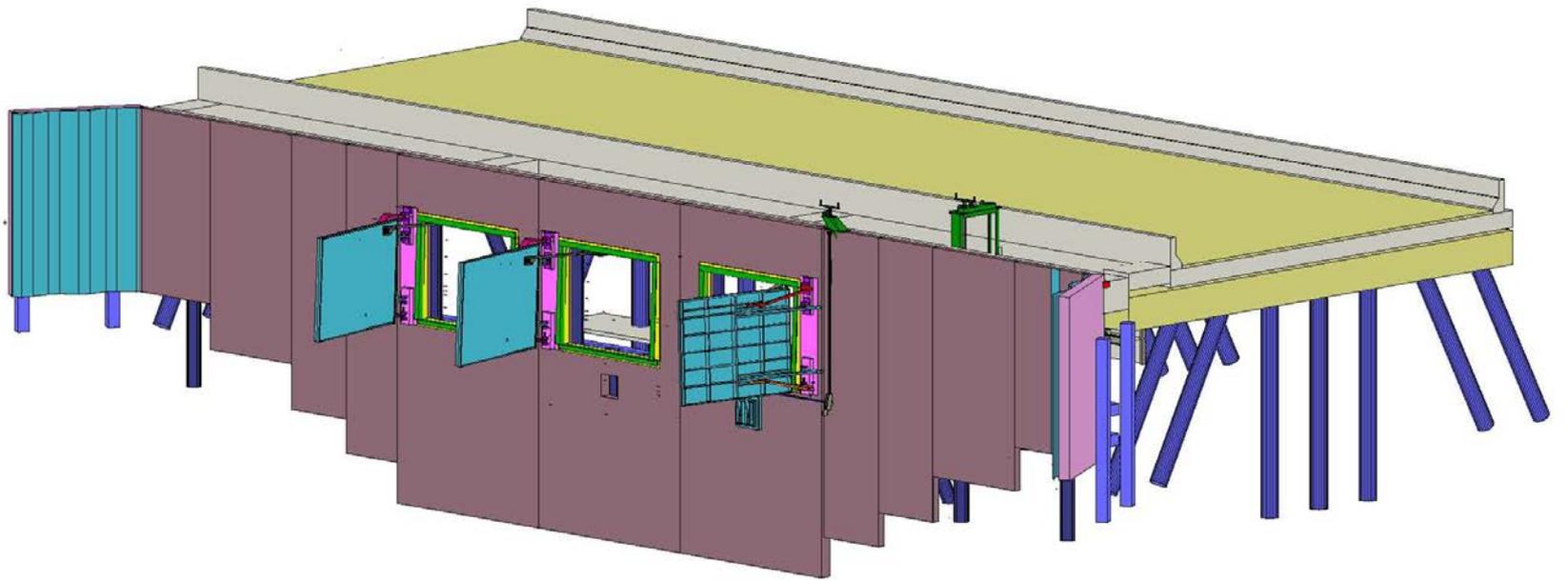
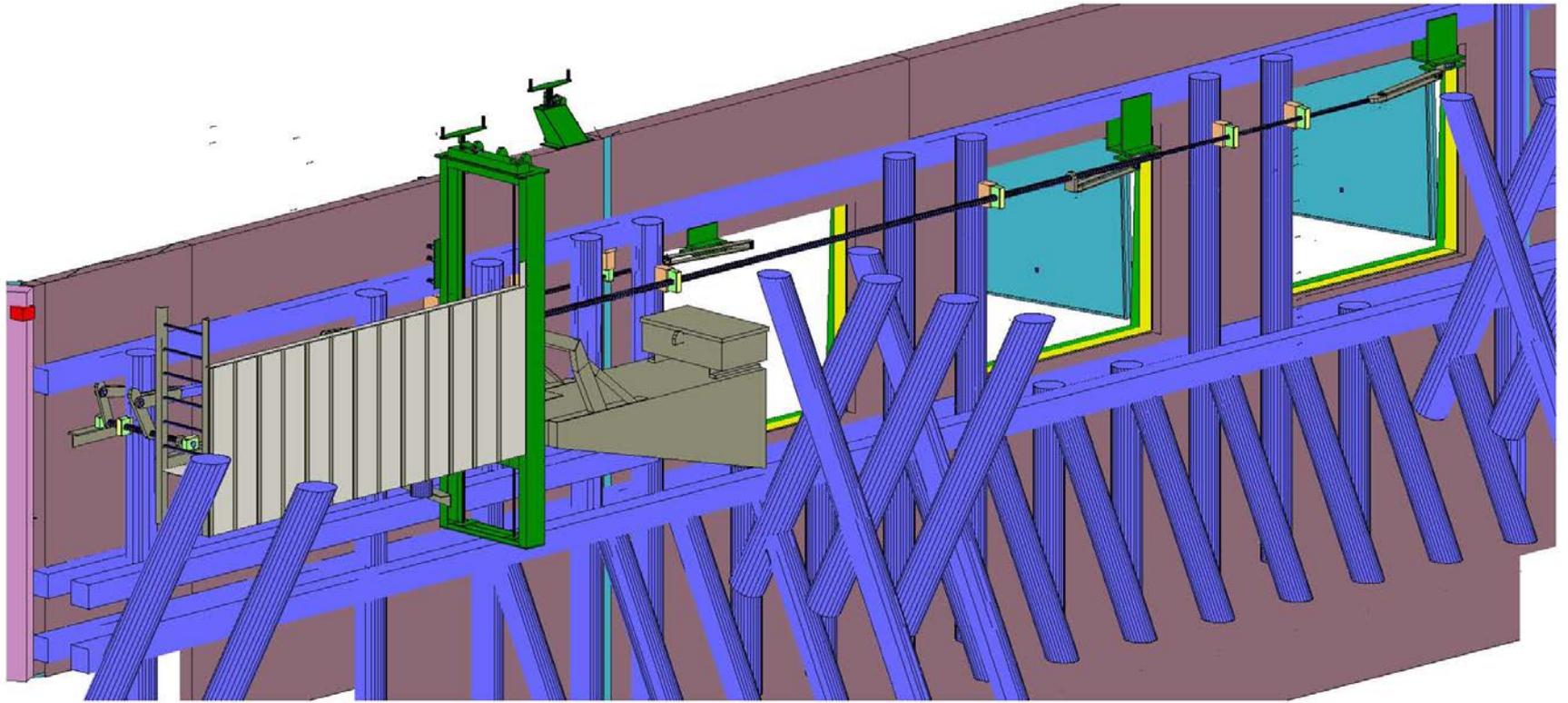


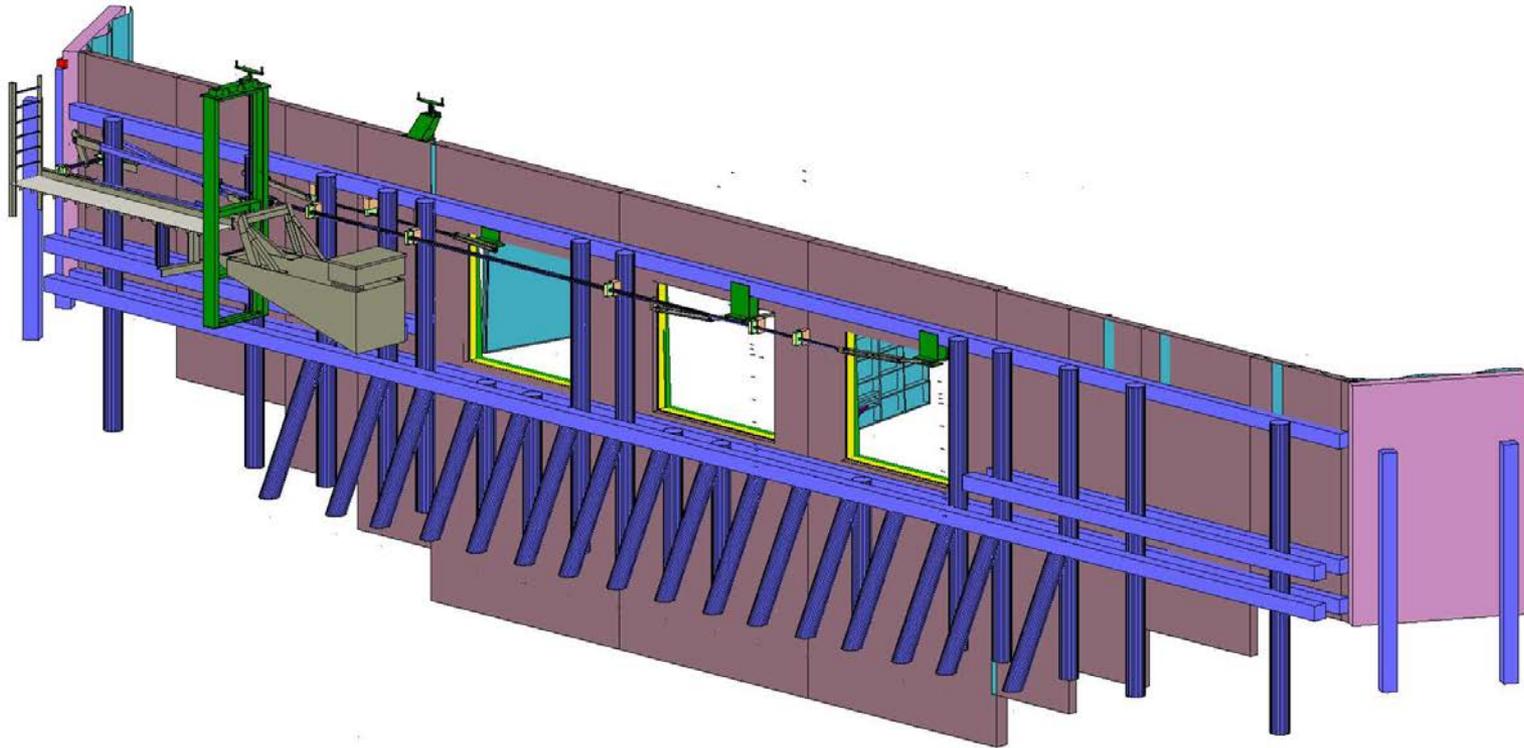
Photo 1

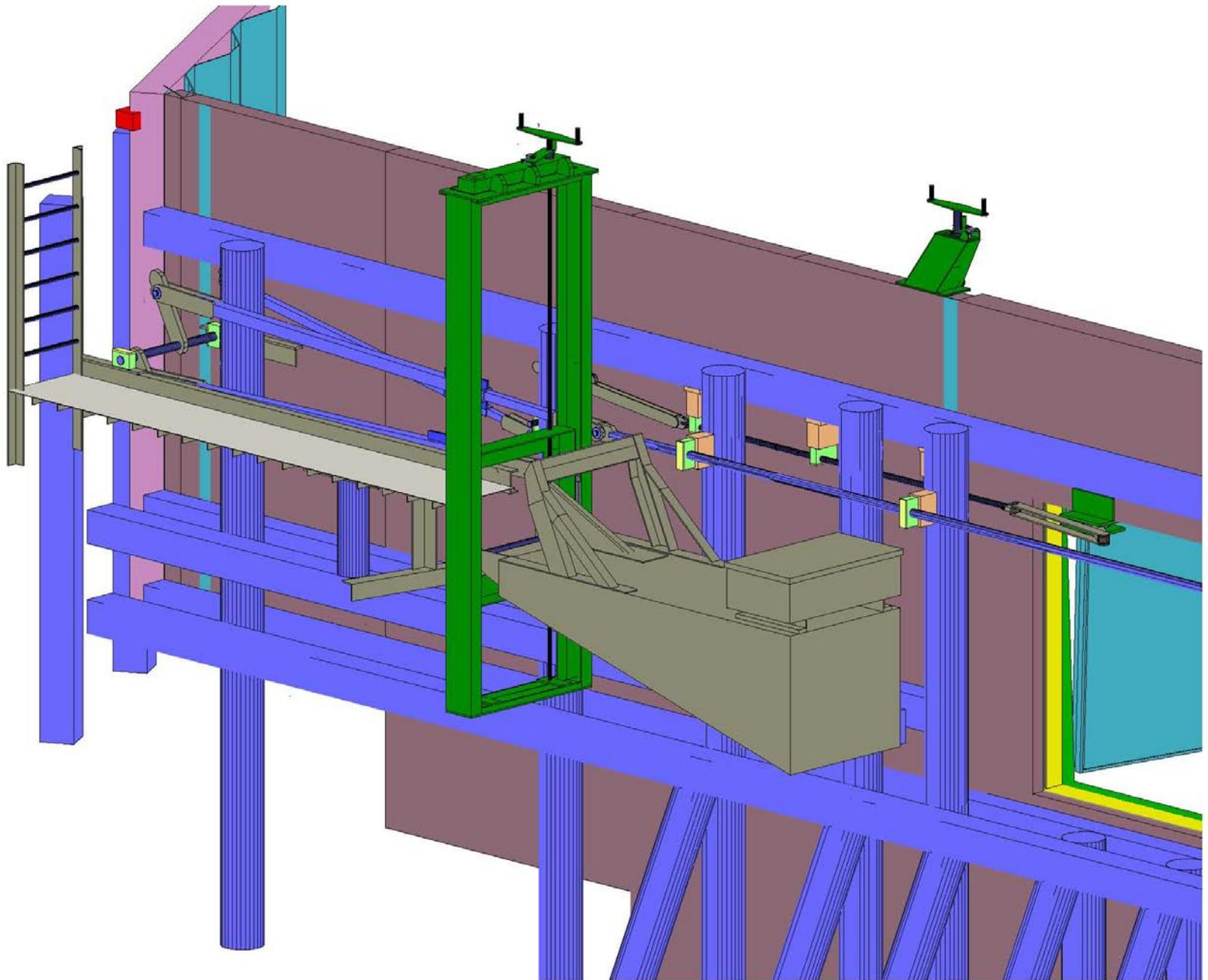












Fisher Slough Compatible Restoration

- This photo is intended to show restored/wet habitat adjacent to a growing commercial potato crop. This photo was taken as the water receded after three weeks of very high water in June and early July this year. The river had been near flood stage so the floodgates were closed much of the time and tributaries were also high. The dike and drainage measures we installed seemed to work great; the field was dry and the crop did fine. This was not the case in other fields in the delta.



Helpful Web Sites

- www.measuretek.com/resultxnehalem/home
Username: nehalemmarine mfg Password:
nmm101
- www.qdata.com Username: pheylaneguest_u
Password: pheylane
- www.nehalemmarine.com Nehalem Marine
Manufacturing's Home site.
- Tidegates & Salmon: Effects on Movement and
Migration
[http://www.cooswatershed.org/Publications/Art
%20Bass%20Power%20Point.pdf](http://www.cooswatershed.org/Publications/Art%20Bass%20Power%20Point.pdf)