



# TACOMA POWER'S CUSHMAN HYDROELECTRIC PROJECT LICENSE IMPLEMENTATION UPDATE

Ryan McLaughlin



# PRESENTATION AGENDA

- **Settlement and License**
- **Where We Have Been?**
  - **Power House**
  - **Upstream Fish Collection Facility**
  - **Fish Sorting Facility**
  - **Little Falls**
- **Where Are We Now?**
  - **Cushman Hatcheries**
  - **Floating Surface Collector Facility**
- **Where Are We Going?**



**“We’ve had a long, contentious relationship with the city, but we really are making a lot of progress. We’ve probably made more progress with the City in the last year than in the last 80.”**

**Dave Herrera of the Skokomish Tribe, quote from News Tribune on March 8, 2008**





# KEYS TO SETTLEMENT

## Meet the Tribal interests first

- **Flows – Restore the river**
- **Fish – Restore the fisheries**





# OBJECTIVE: INTRODUCE FOUR SPECIES



Species	From
Sockeye	Skagit River- Baker Lake
Spring Chinook	Skagit River- Marble Mount
Winter Steelhead	Skokomish R.
Coho	Skokomish R.



# LICENSE RELEASE REQUIREMENTS

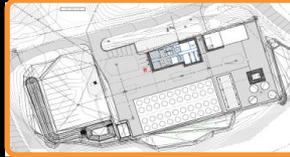
<b>Species</b>	<b>From</b>	<b>Life Stage at Release</b>	<b>Subtotal</b>	<b>Total</b>
<b>Sockeye</b>	<b>Skagit River- Baker Lake</b>	<b>Fed Fry (May)</b>	<b>1,200,000</b>	<b>2,000,000</b>
		<b>Fed Fry (June)</b>	<b>1,000,000</b>	
		<b>Fed Fry (Sept)</b>	<b>800,000</b>	
<b>Spring Chinook</b>	<b>Skagit River- Marble Mount</b>	<b>Fingerling</b>	<b>300,000</b>	<b>375,000</b>
		<b>Yearling</b>	<b>75,000</b>	
<b>Winter Steelhead</b>	<b>Skokomish R.</b>	<b>Smolts</b>	<b>15,000</b>	<b>15,225</b>
		<b>Adults</b>	<b>225</b>	
<b>Coho</b>	<b>Skokomish R.</b>	<b>Smolts</b>	<b>-</b>	<b>10,000 - 35,000</b>



# TOOLS TO GET THE JOB DONE

## HATCHERIES

North Fork Salmon Hatchery  
Saltwater Park Sockeye Hatchery



## ADULT COLLECTION

Cushman No. 2 Powerhouse,  
Adult Trap and Sorting Facility



## JUVENILE FISH COLLECTION

Floating Surface Collector



## FISH HABITAT

Flow Management  
Habitat Improvements

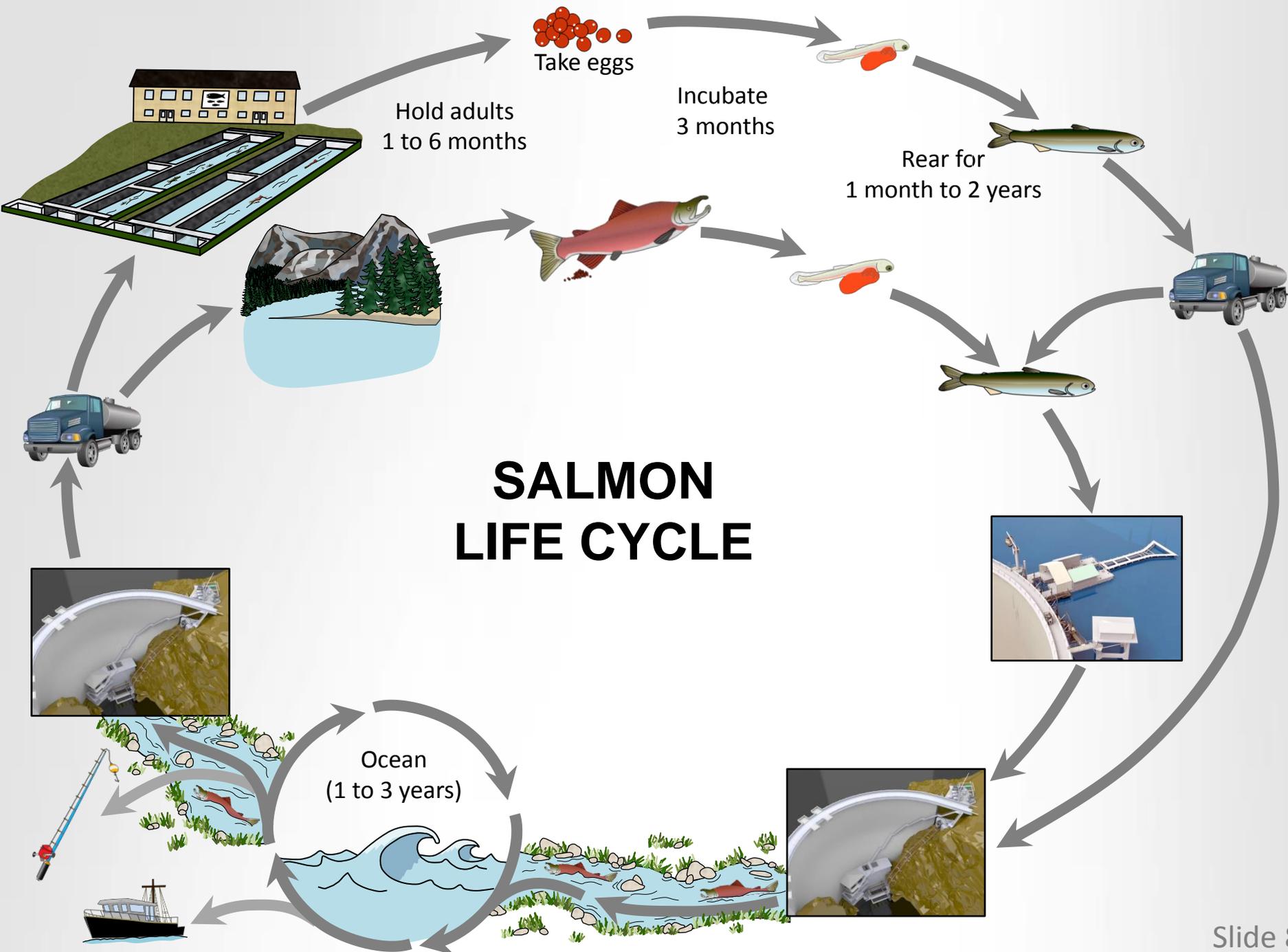


## KNOWLEDGE

Monitoring and Evaluation Program



# SALMON LIFE CYCLE

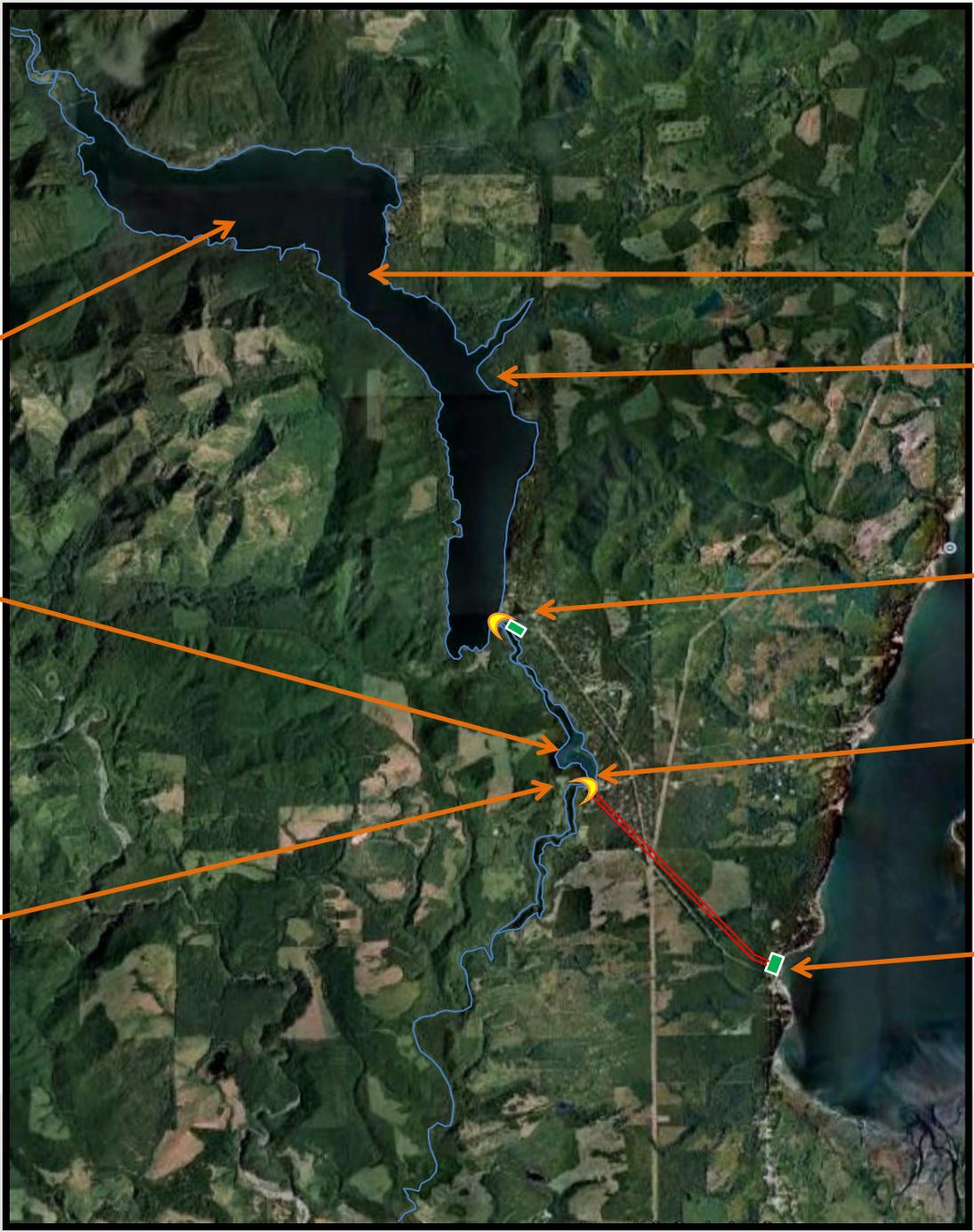




Lake Cushman

Lake Kokanee

No. 2 Dam  
Powerhouse  
Collection Facility  
Fish Tram  
Fish Sorting Facility



Debris Barrier

FSC Supply Const.  
Site/Boat Launch

No. 1 Dam  
FSC/Net

North Fork  
Hatchery

Cushman No. 2  
Powerhouse  
Saltwater Park  
Hatchery

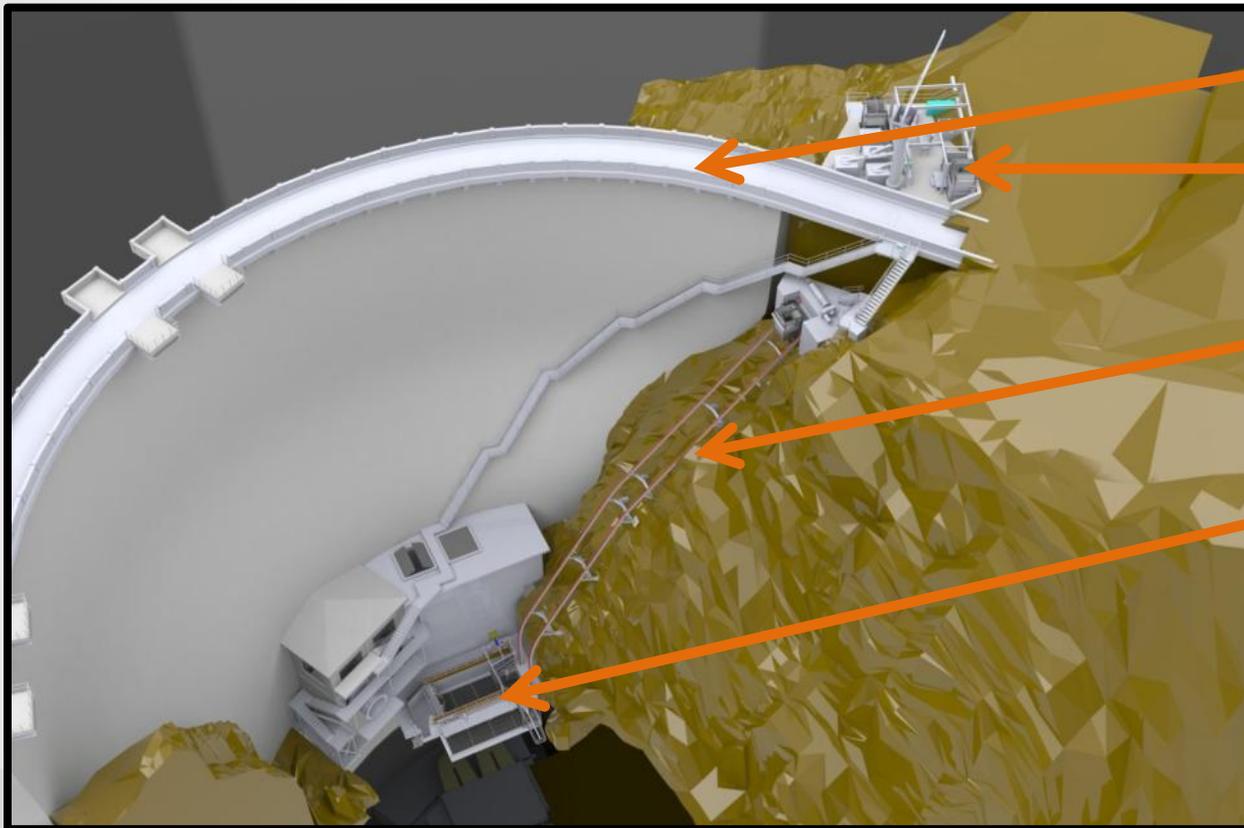


TACOMA POWER  
TACOMA PUBLIC UTILITIES



# WHERE HAVE WE BEEN?

- North Fork Powerhouse and Upstream Fish Passage
- Operational February 2013



Cushman  
#2 Dam

Fish Sorting  
Facility

Fish Tram

North Fork  
Powerhouse  
With Integrated  
Fish Collection  
Facility



TACOMA POWER  
TACOMA PUBLIC UTILITIES



# PROBLEM – LITTLE FALLS



# LITTLE FALLS (SIDE CHANNEL)



# WHERE ARE WE NOW?

- Saltwater Park Salmon Hatchery (Under Construction)
  - Operational 2015
- Sockeye Only
- Water Source: Pathogen-Free Springs





- **North Fork Hatchery (Under Construction)**
- **Operational 2015**

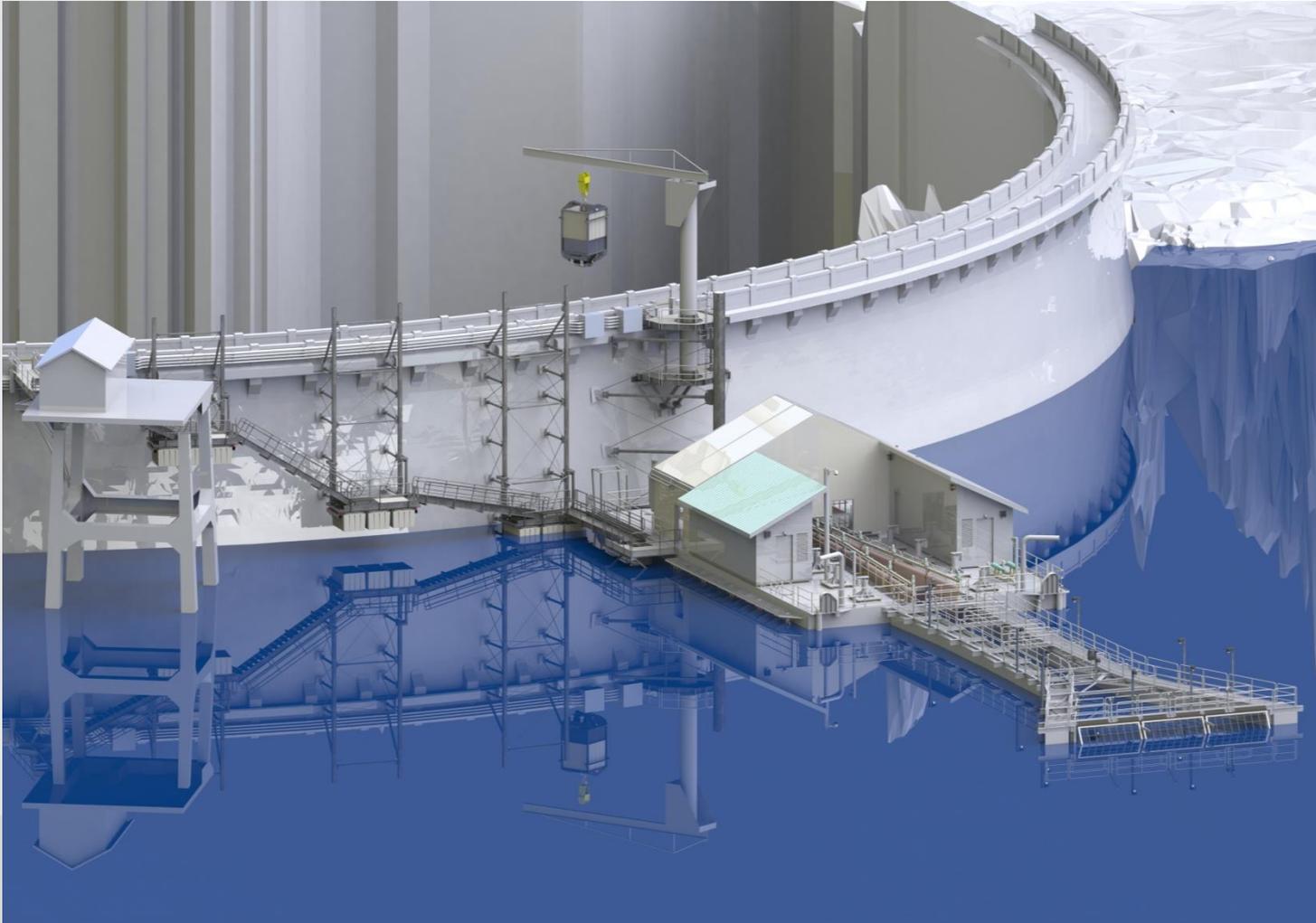
- **Spring Chinook, Coho, Steelhead**
- **Water Source: Lake Kokanee**





# CUSHMAN FLOATING SURFACE COLLECTOR AND DOWN STREAM FISH PASSAGE

Operational March 2015





# TACOMA POWER FSC PROJECT TEAM

## Cushman Relicensing Construction Manager:

Steve Fischer

## FSC Project Coordination:

Ryan McLaughlin

Matt Wilson

Donna Ebi

Peggy Burchill

## Fisheries Biologist:

Keith Underwood

Andrew Ollenburg

## Permitting Agent:

Paul Hickey

## Structural:

Andy Schildmeyer

Sara Imbruglio

## Mechanical:

Steve Belvin

## Electrical:

David Wagner

## Instrumentation:

Ernie Wooldridge

## Security/ Communications:

John Glover

Aaron Anderson

## Solidworks

### Modeling/Technicians:

Kim Jones

Jason Henry

Paul Paris

## Clerical/SharePoint Support:

Ronda Martin

Kim Jones

## Videographer:

Linda Brent

Kurt Topel





# TACOMA POWER PROJECT TEAM

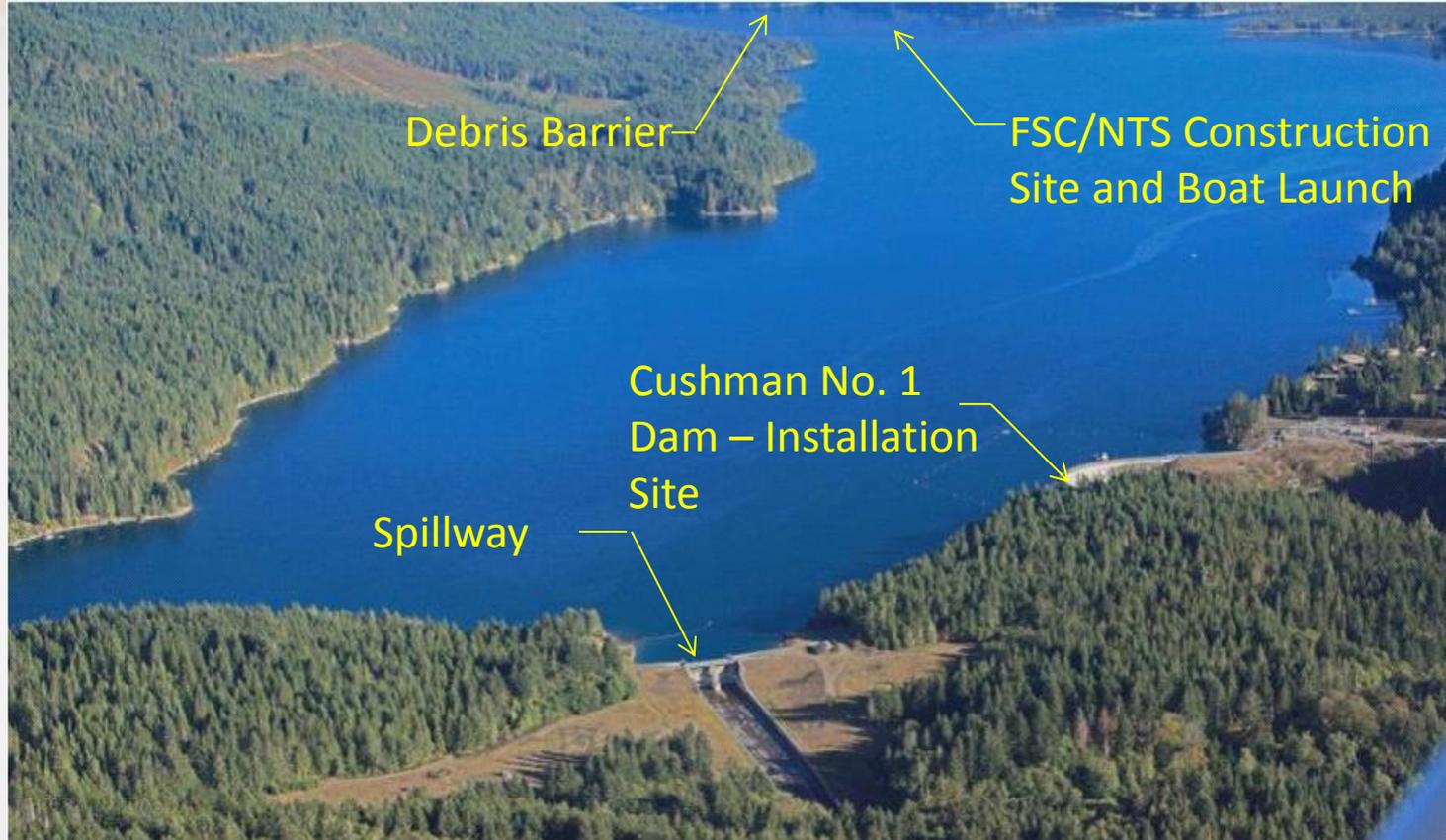
## Design/Construction Consultants:

**MWH**  
**Elliott Bay Design Group**  
**Deere & Ault Consultants**  
**Tennea & Associates**  
**Pacific Testing and Inspection**

## Prime Contractors:

**Dix/TMF JV**  
**Skanska**  
**Pacific Netting Products**  
**Quigg Brothers**

# LAKE CUSHMAN RESERVOIR





# DEBRIS BARRIER CONTRACT

- **Debris Barrier:**

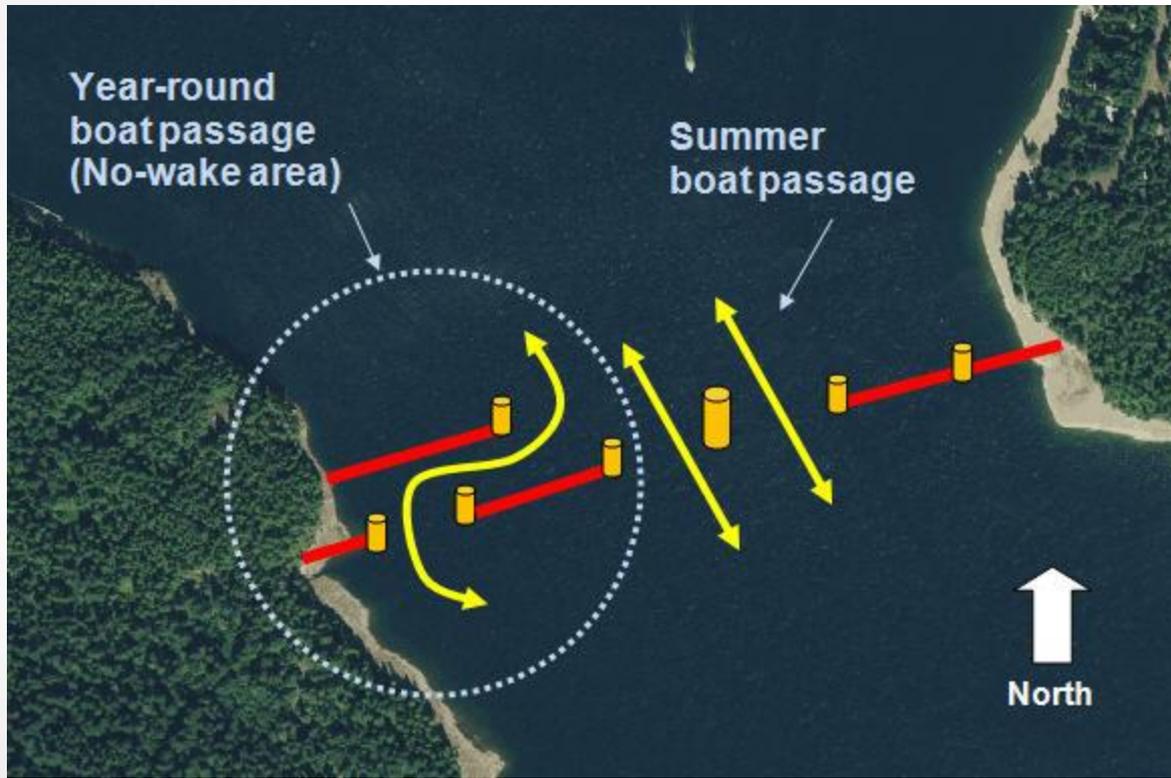
- **Contractor: Quigg Brothers**

- **Construction Schedule: Sept. 2012 – May 2013**



# DEBRIS BARRIER

## RECREATIONAL TRAFFIC FLOW





# DEBRIS BARRIER

- **Project Challenges:**

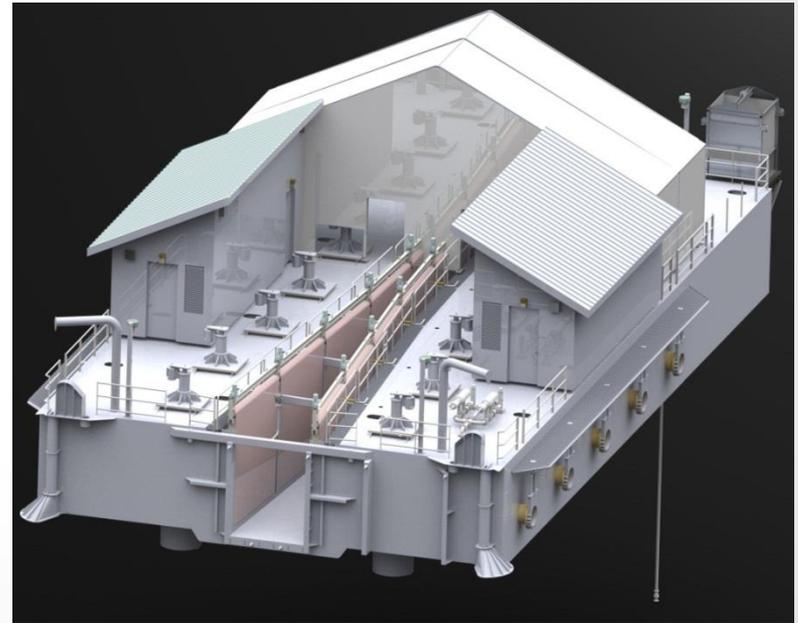
- **Bathymetry Survey/Investigation**
- **Sizing of Mooring Anchors**
- **Public Notification/Safety**



# FSC/NTS SUPPLY CONTRACT

- **FSC/NTS:**

- **Contractor: Dix/TMF Joint Venture**
- **Construction Schedule: Sept. 2013 – March 2015**





# FSC/NTS

- **Thinking Outside of the Box:**
  - **Revision to the Fish Capture Philosophy**
  - **Modularizing**
  - **Debris Management**
  - **Redundant Smaller Pumps**
  - **NTS Construction, Launch and Roll**



# FSC/NTS SUPPLY CONTRACT

- Shop Fabrication (Thompson Metal Fabrication)
  - Sept. 2013 – March 2014
  - Vancouver Washington





# FSC/NTS FIELD CONSTRUCTION

- Field Construction (Dix Corporation)
  - March 2014 – February 2015
  - Skokomish Park Boat Launch





# FSC/NTS COMMISSIONING

- Dix Corporation
- November 2014 – March 2015
- Cushman No. 1 Dam





# FSC/NTS

## •Project Challenges:

- FSC/NTS Launch Window
- NTS Launch in Shallow Reservoir
- Temporary Mooring/Public Safety after Launch
- Coating System



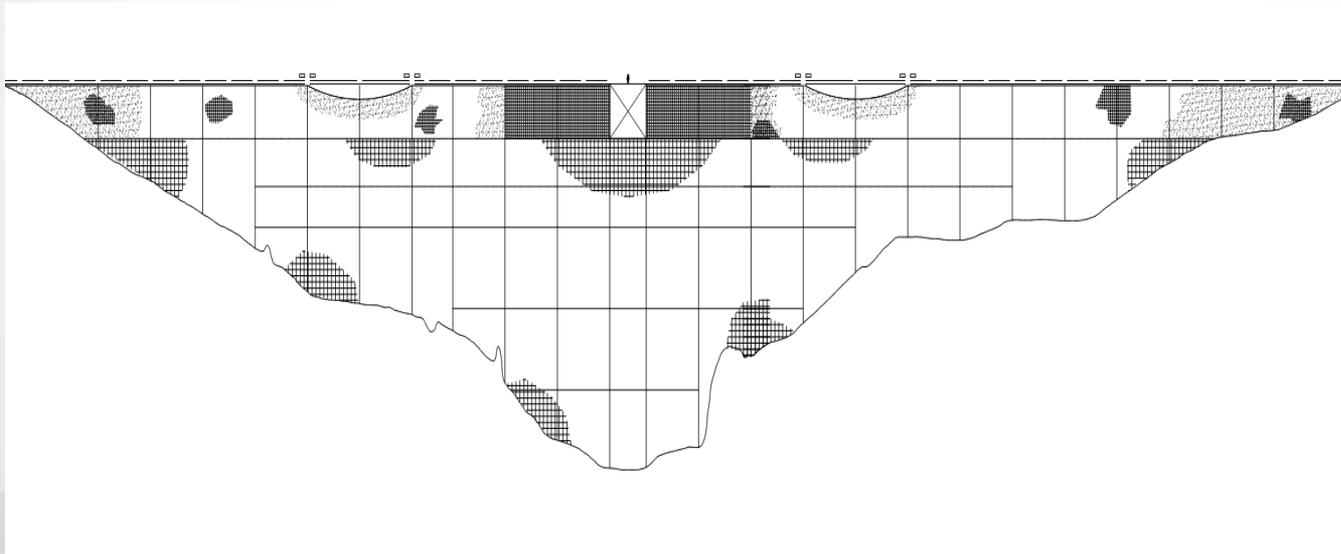
# NET SUPPLY CONTRACT

## • Net Supply:

- Contractor: Pacific Netting Products
- Construction Schedule: February 2014– July 2014

## • Fun Facts

- 167,000 SF (3 Football Fields)
- 1420 Feet Long (1/4 mile)
- 240 Feet Max Height (24 story Building)





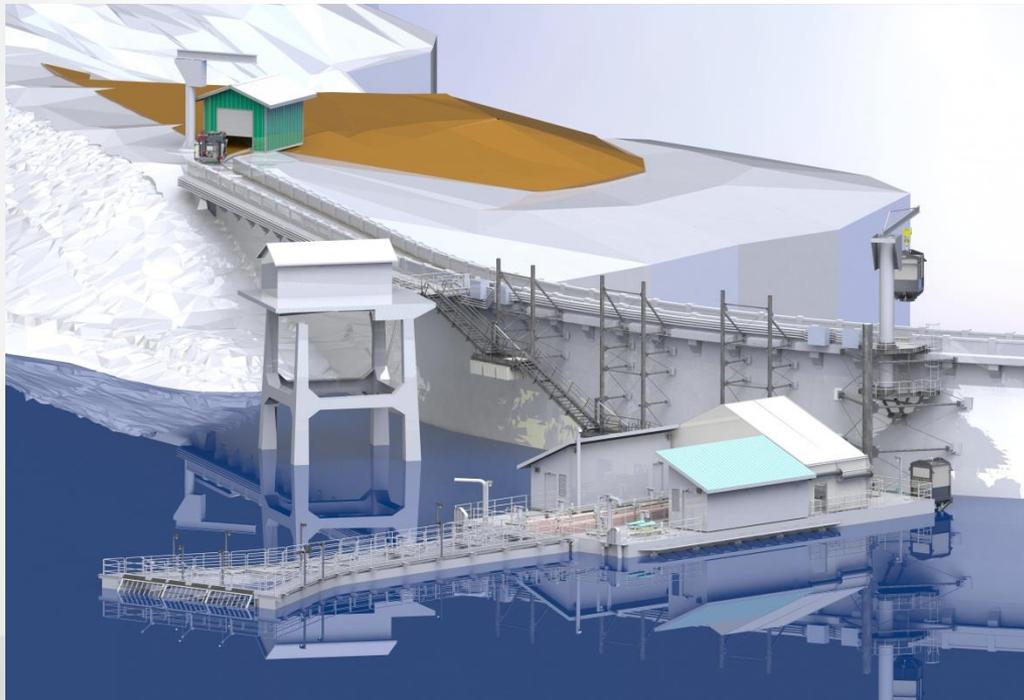
# NET SUPPLY

- **Thinking Outside of the Box:**
  - **Bathymetric Survey**
  - **Contractor/TPU Collaboration**
  - **Panelized Panel System**
  - **Net Protection at Shore Ends**
  - **Boat Passage**

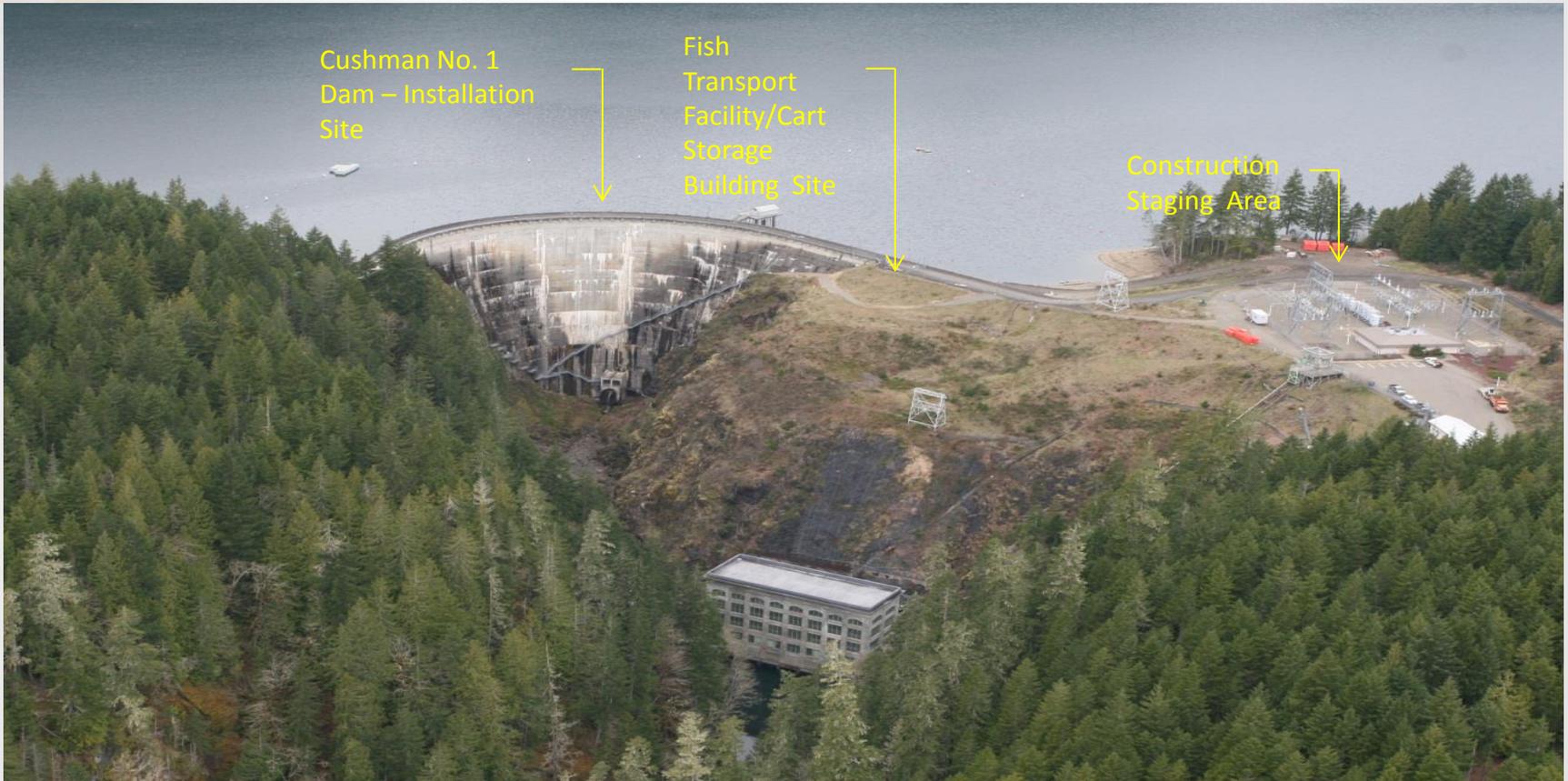


# FSC INSTALLATION CONTRACT

- **Contractor: Skanska**
- **Construction Schedule: January 2014 – March 2015**



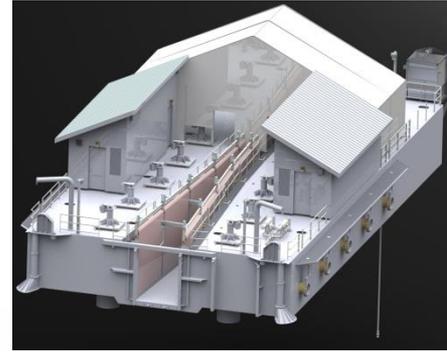
# FSC INSTALLATION CONTRACT PRE-CONSTRUCTION SITE





# FSC INSTALLATION CONTRACT

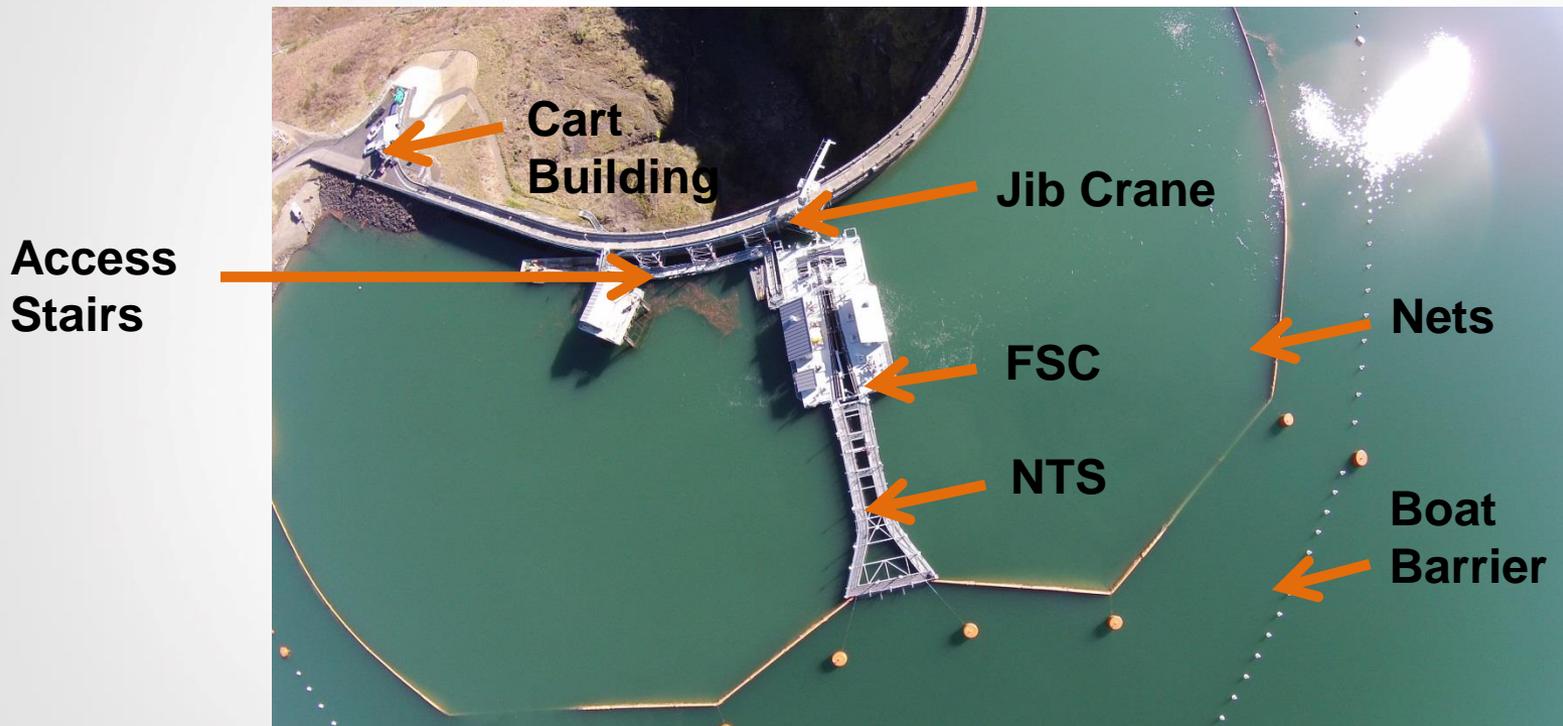
- **Installation Contract Overview**
  - **Phase 1: Support Structures**
  - **Phase 2: Mooring, Nets, and Wave Attenuator System**
  - **Phase 3: Electrical**
  - **Phase 4: FSC/NTS Installation**





# FSC – COMPLETED INSTALLATION

- Floating Surface Collector (FSC) Facility
- OPERATIONAL MARCH 2015





# FSC INSTALLATION

- **Thinking Outside of the Box:**
  - **Bathymetry/LIDAR Survey**
  - **Stair Access**
  - **FSC Aft End Mooring**
  - **Wave Attenuator System**



# CONTRACTS SUMMARY

	Original Bid	Final Cost	Difference	%
<b>Debris Barrier</b>	606,000	686,000	80,000	13%
<b>Net Supply</b>	1,995,000	1,746,000	(249,000)	-12%
<b>FSC/NTS Supply</b>	14,867,000	14,866,000	(1,000)	0%
<b>FSC/NTS Install</b>	9,580,000	9,678,000	98,000	1%
<b>Total</b>	27,048,000	26,976,000	(72,000)	0%



# WHERE ARE WE GOING?

## START LIVING THE DREAM

### Fish Survival Study 2015

- Operate May - July
- Test with Coho

### Introduce Sockeye Lake Cushman

- May 2016

### Fish Survival Study 2016

- Operate March 15 - July
- Test with Coho

### Sockeye Smolt Migration 2017



# QUESTIONS?

