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Washington

July 2, 2013

MEMORANDUM

TO: Council Members

FROM: Charlie Black

SUBJECT: Briefing on Relicensing of Tacoma's Cushman Hydro Project

Tacoma Power owns and operates the Cushman Hydroelectric project, located on the Skokomish River near Hood Canal on the Olympic Peninsula.

At the Council meeting in Seattle on July 10, 2013, Patrick McCarty, Tacoma Power's Generation Manager, will provide a briefing on the Cushman Hydro Project, including its history, relicensing, Northfork Powerhouse, fish passage, hatcheries, wildlife and recreation.



TACOMA POWER'S CUSHMAN HYDROELECTRIC PROJECT

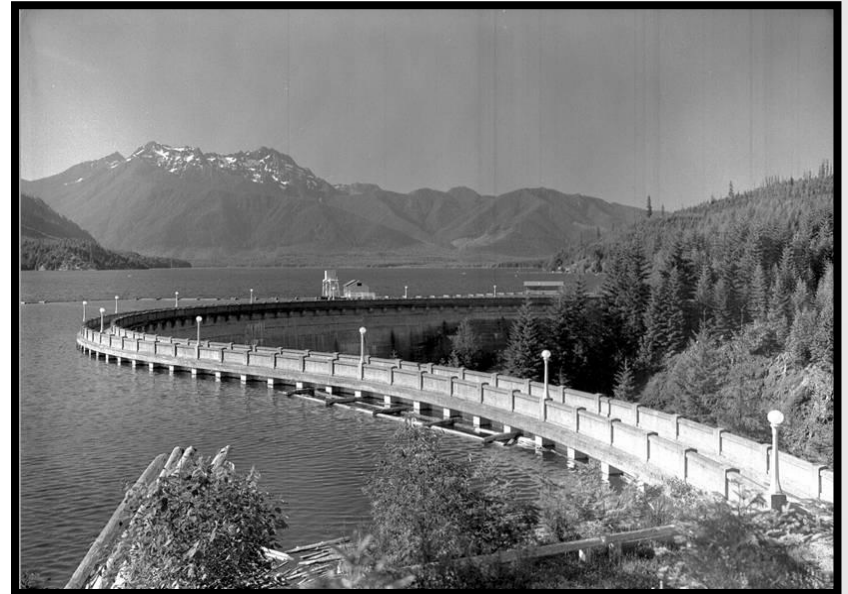
Northwest Power and Conservation Council
July 10, 2013

Pat McCarty, Generation Manager
Tacoma Power



AGENDA

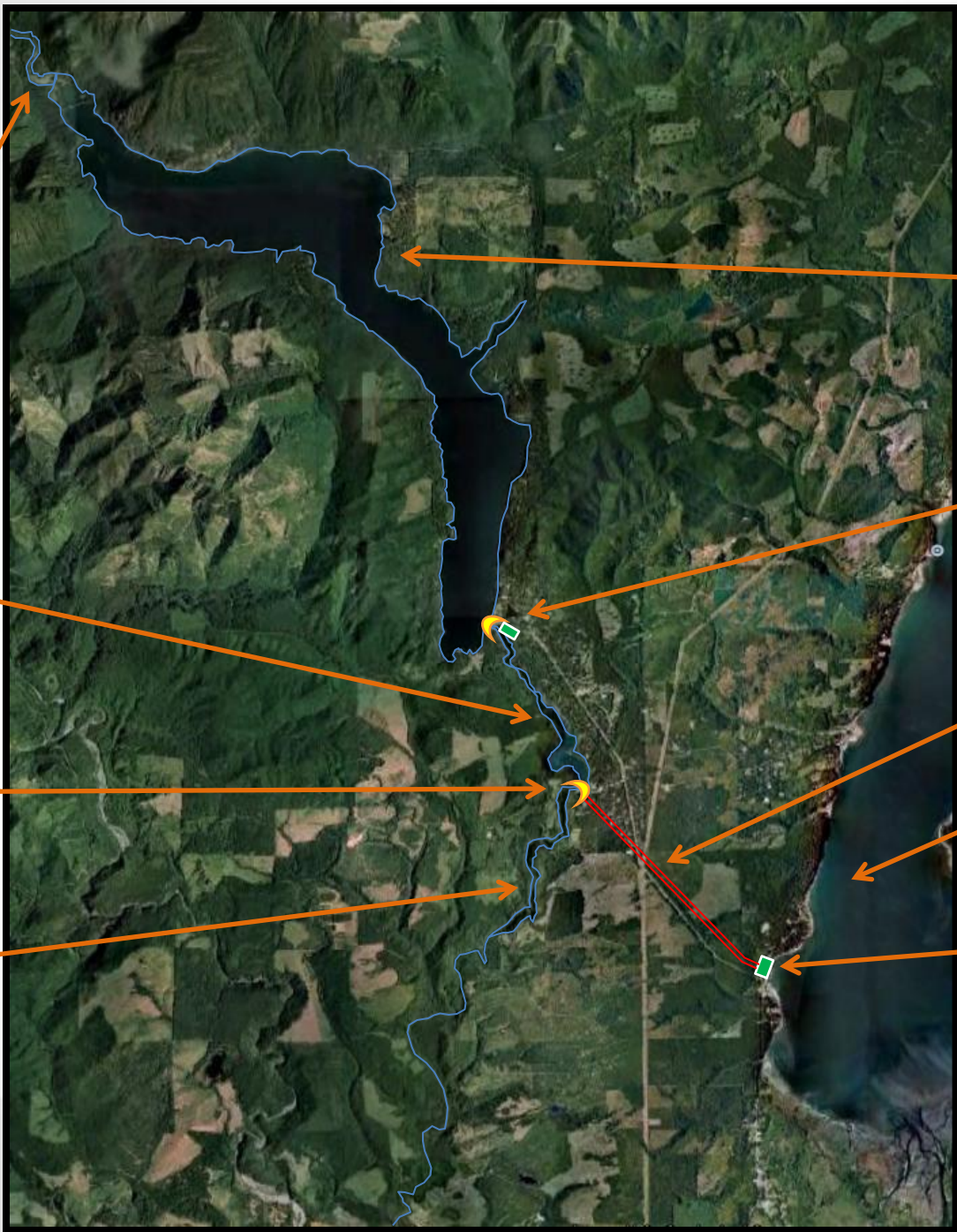
- **Project Location and Features**
- **Cushman History**
- **Settlement & License Summary**
- **Northfork Powerhouse**
- **Fish Passage**
- **Hatcheries, Wildlife & Recreation**
- **Summary**





CUSHMAN HYDROELECTRIC PROJECT





Lake Cushman

No. 1 Dam and Powerhouse

Power Tunnel and Penstocks

Hood Canal

Cushman No. 2 Powerhouse



TACOMA POWER
TACOMA PUBLIC UTILITIES

North Fork Skokomish River

Lake Kokanee

No. 2 Dam

North Fork Skokomish River



CUSHMAN NO. 1 DAM

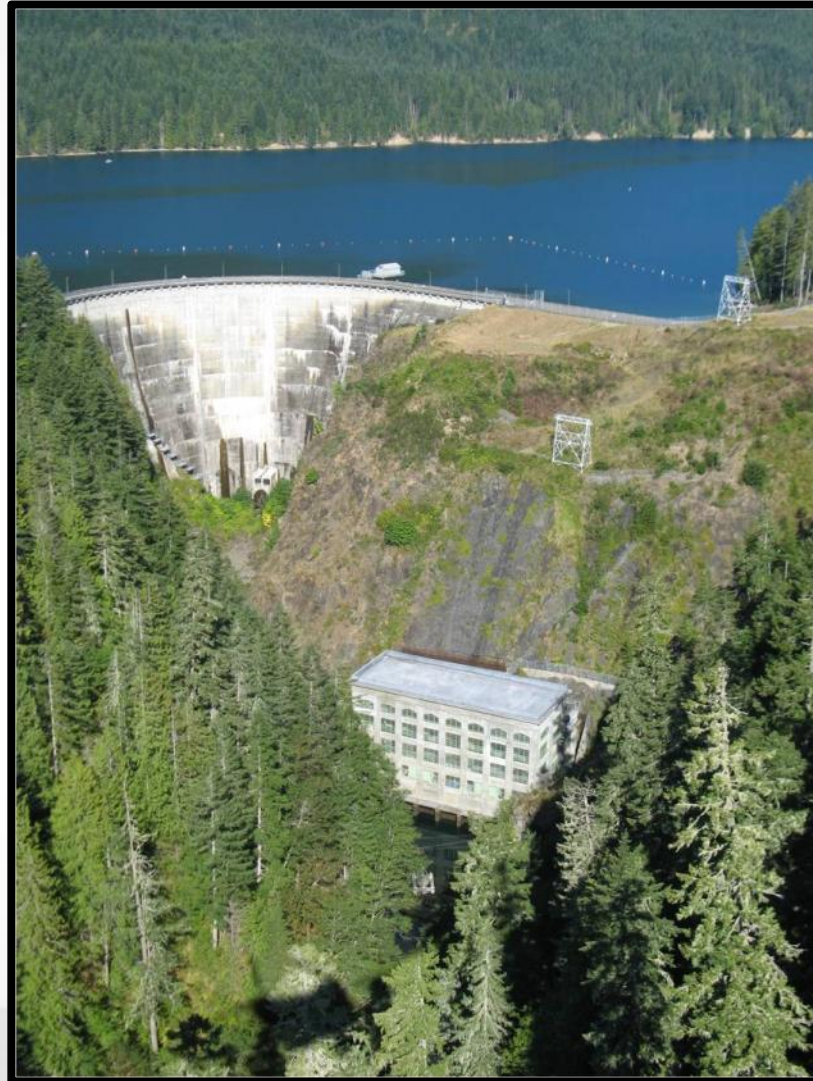


- Completed in 1926
- 235 feet tall
- 1100 feet long
- Retains 10-mile long Lake Cushman



CUSHMAN NO. 1 POWERHOUSE

- Two 22 Mw Turbine-Generators
- Accessible by aerial tram





CUSHMAN NO. 2 DAM



- Completed in 1930
- 175 feet tall
- 575 feet long
- Retains two-mile long Lake Kokanee



CUSHMAN NO. 2 POWERHOUSE



- Three 27 Mw Turbine-Generators
- Water flows 2.5 miles through 17' diameter power tunnel from Lake Kokanee



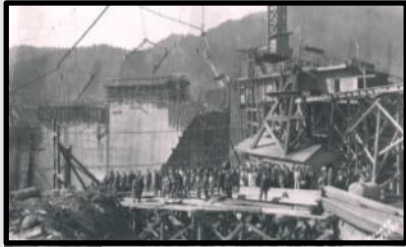
NARROWS CROSSING



- At 6,240', it was the worlds longest electrical crossing when constructed in 1926
- Original four 325-foot high towers were replaced with two 450-foot high towers in 2006



EARLY CUSHMAN HISTORY



1924

- Federal Power Commission issues a 50-year license
- Construction begins on Cushman No. 1



1926

- Enough water in reservoir to open gates and generate power
- President Coolidge hits a telegraph key in Washington, D.C., starting the turbines



1929

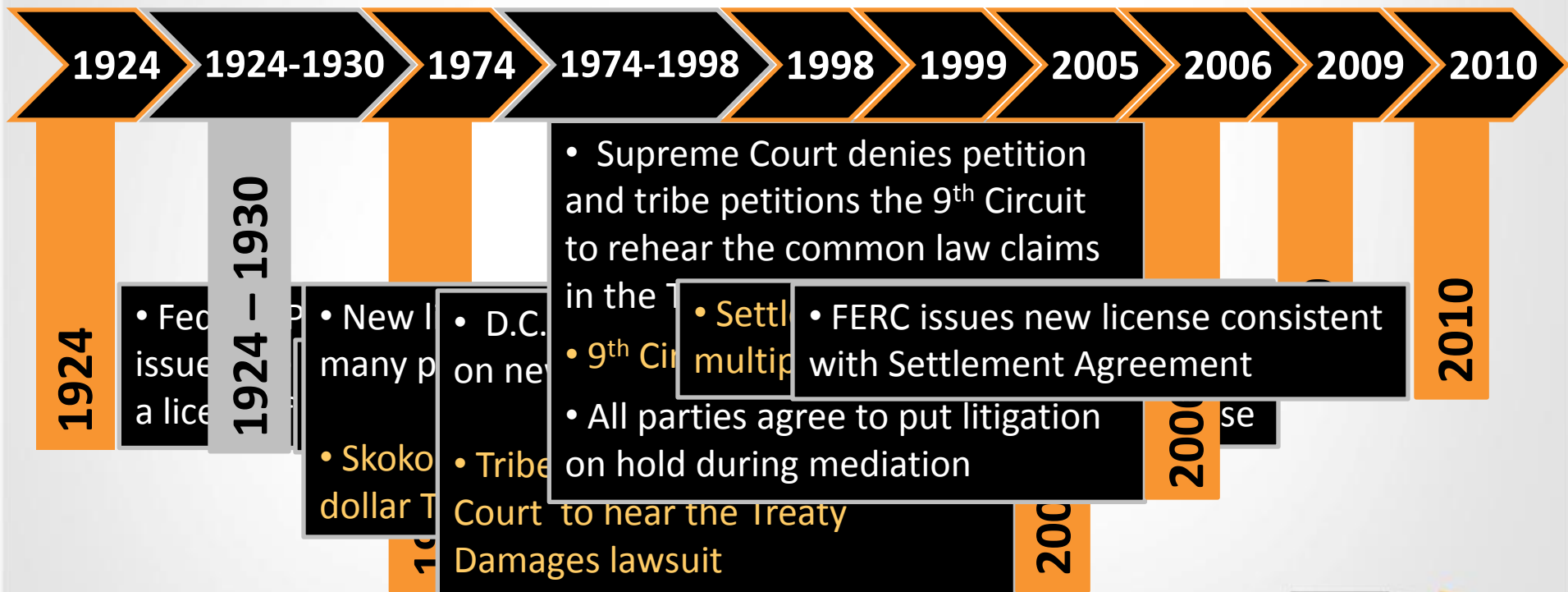
- Construction begins on Cushman No.2



1930

- Cushman No.2 starts generating power on New Year's Eve

RELICENSE HISTORY





SETTLEMENT SUMMARY

PARTIES

- City of Tacoma
- U.S. Fish & Wildlife Service
- U.S. Bureau of Indian Affairs
- U.S. Forest Service
- National Marine Fisheries Service
- Washington Department of Fish & Wildlife
- Washington Department of Ecology
- Skokomish Indian Tribe

AGREEMENT

- Proposed license articles
- Application for license amendment to construct North Fork Powerhouse
- 50 year term from 1998
- Off-license agreements
 - Skokomish Tribe
 - WDFW
 - USFS



TRIBAL SETTLEMENT

- Effective 7/20/2011 - Celebration with the Skokomish Tribe held in September 2011
- Paid \$1.6M to Bureau of Indian Affairs for distribution to allottees
- Paid \$11M to the Office of Special Trustee for American Indians for distribution to tribal members
- Transferred over 1,000 acres of land
- 7.25% of the value of power from Cushman No. 2





FERC LICENSE

LICENSE ARTICLES ADDRESSED

- Flows
- Fish passage
- Habitat restoration and enhancement
- Road management
- Recreation
- Fish supplementation

- **July 15, 2010 - FERC issues amended Cushman Project license**
- **No changes from terms of settlement agreement**
- **License expires in 2048**



FERC
FEDERAL ENERGY REGULATORY COMMISSION





KEY LICENSE ARTICLES

FISHERIES

- 412: Fish Habitat Enhancement & Restoration Plan
- 414: Downstream Fish Passage
- 415: Upstream Fish Passage
- 417: Fish Supplementation Program



RECREATION

- 425: Recreation Plan



WILDLIFE

- 421: Comprehensive Wildlife Habitat Enhancement Plan

FLOWS & RESERVOIR ELEVATIONS

- 403: Channel Conveyance Capacity
- 407: Minimum Flows



SHORELINE MANAGEMENT

- 424: Shoreline Management Plan

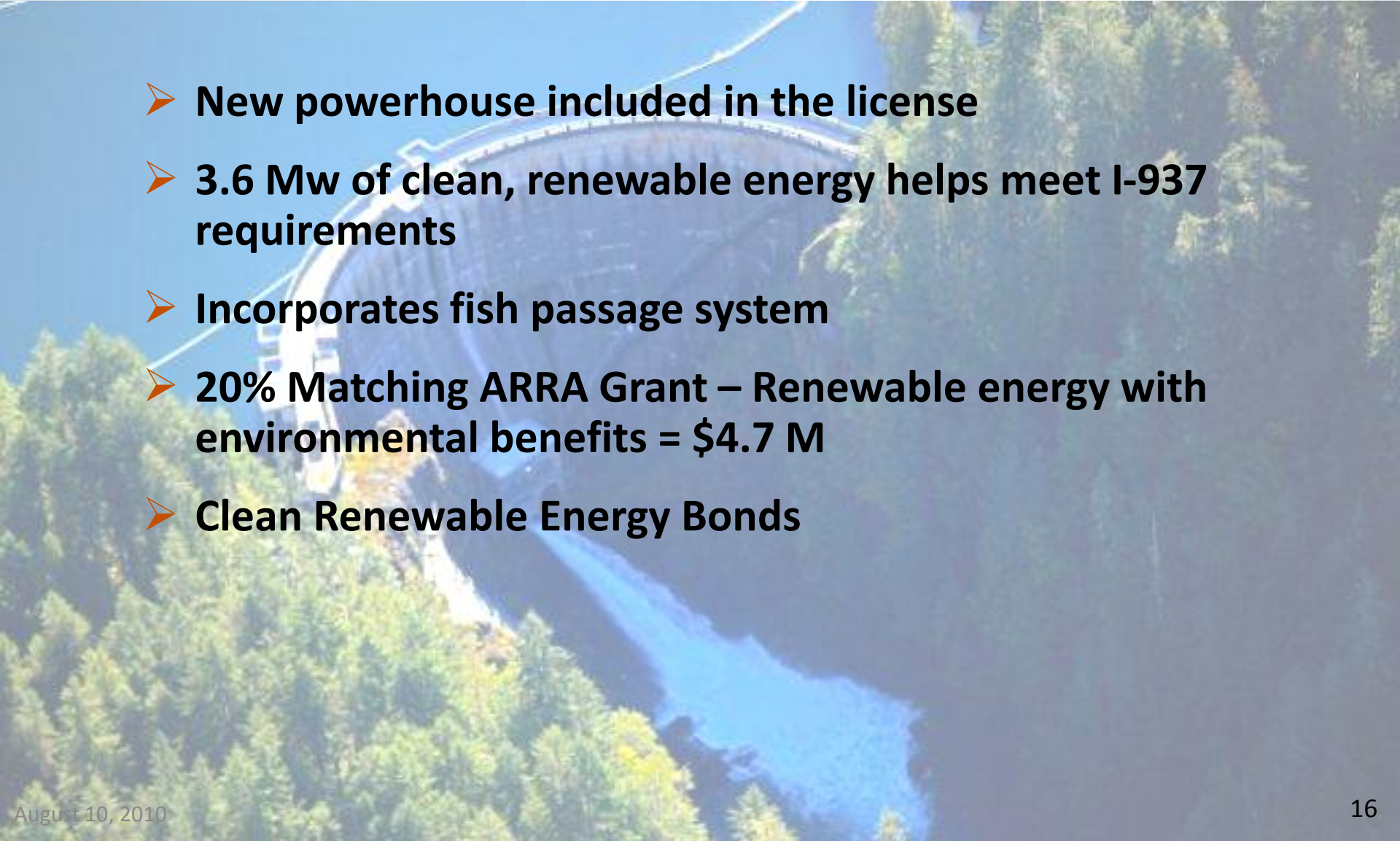
CULTURAL/HISTORICAL RESOURCES

- 429: Historic Properties Management Plan





North Fork Powerhouse

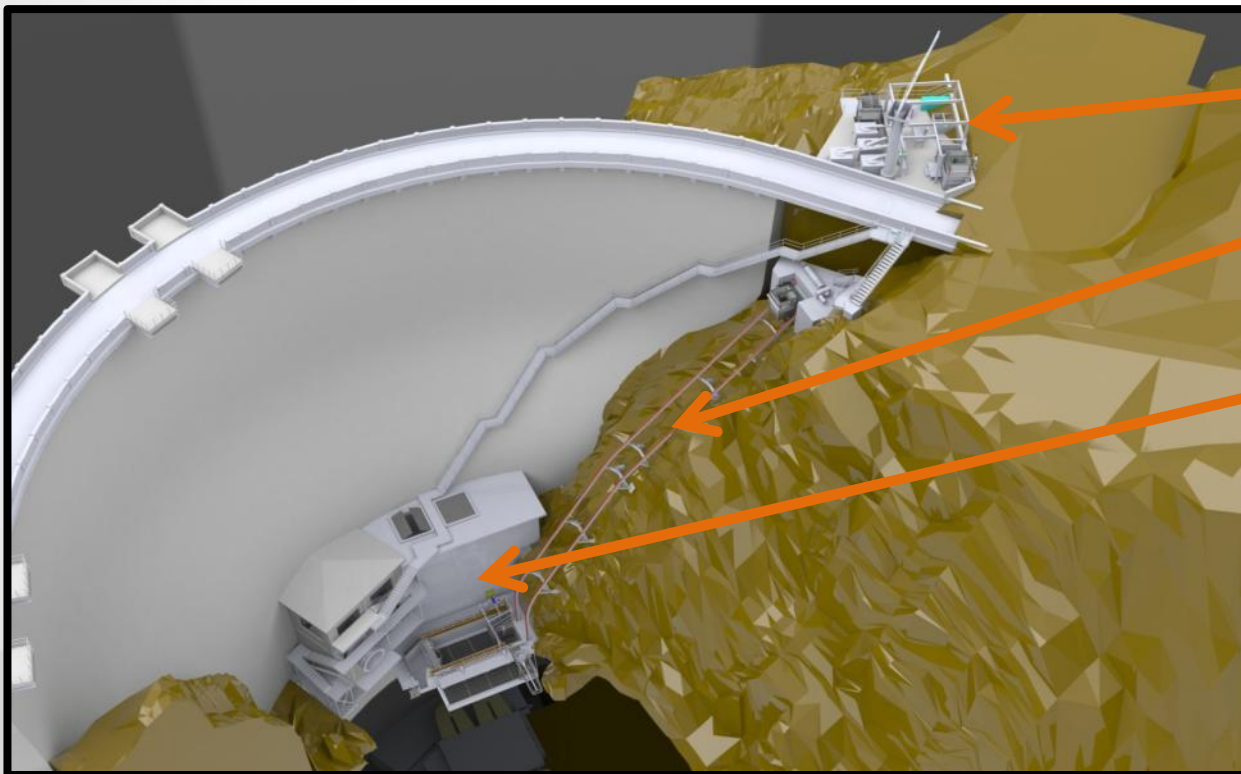
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- **New powerhouse included in the license**
 - **3.6 Mw of clean, renewable energy helps meet I-937 requirements**
 - **Incorporates fish passage system**
 - **20% Matching ARRA Grant – Renewable energy with environmental benefits = \$4.7 M**
 - **Clean Renewable Energy Bonds**



NORTH FORK POWERHOUSE AND UPSTREAM FISH PASSAGE

OPERATIONAL FEBRUARY 2013

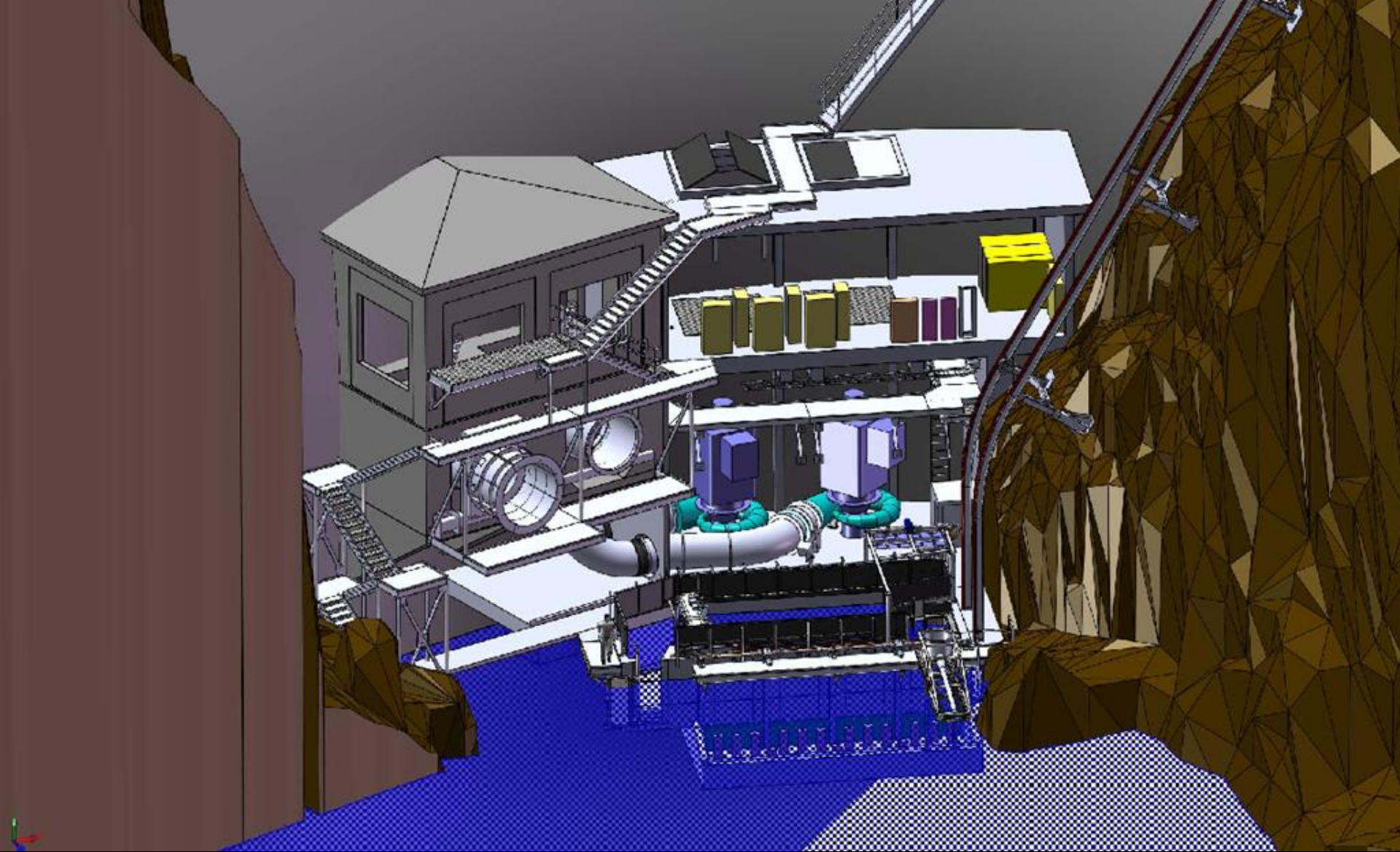
- The Fish Collection Facility provides fish passage over the Cushman No. 2 dam
- Includes two 1.8 MW turbine-generator units to pass the required flows into the North Fork while generating approximately 24 million kW-hours of Clean, Renewable Energy each year

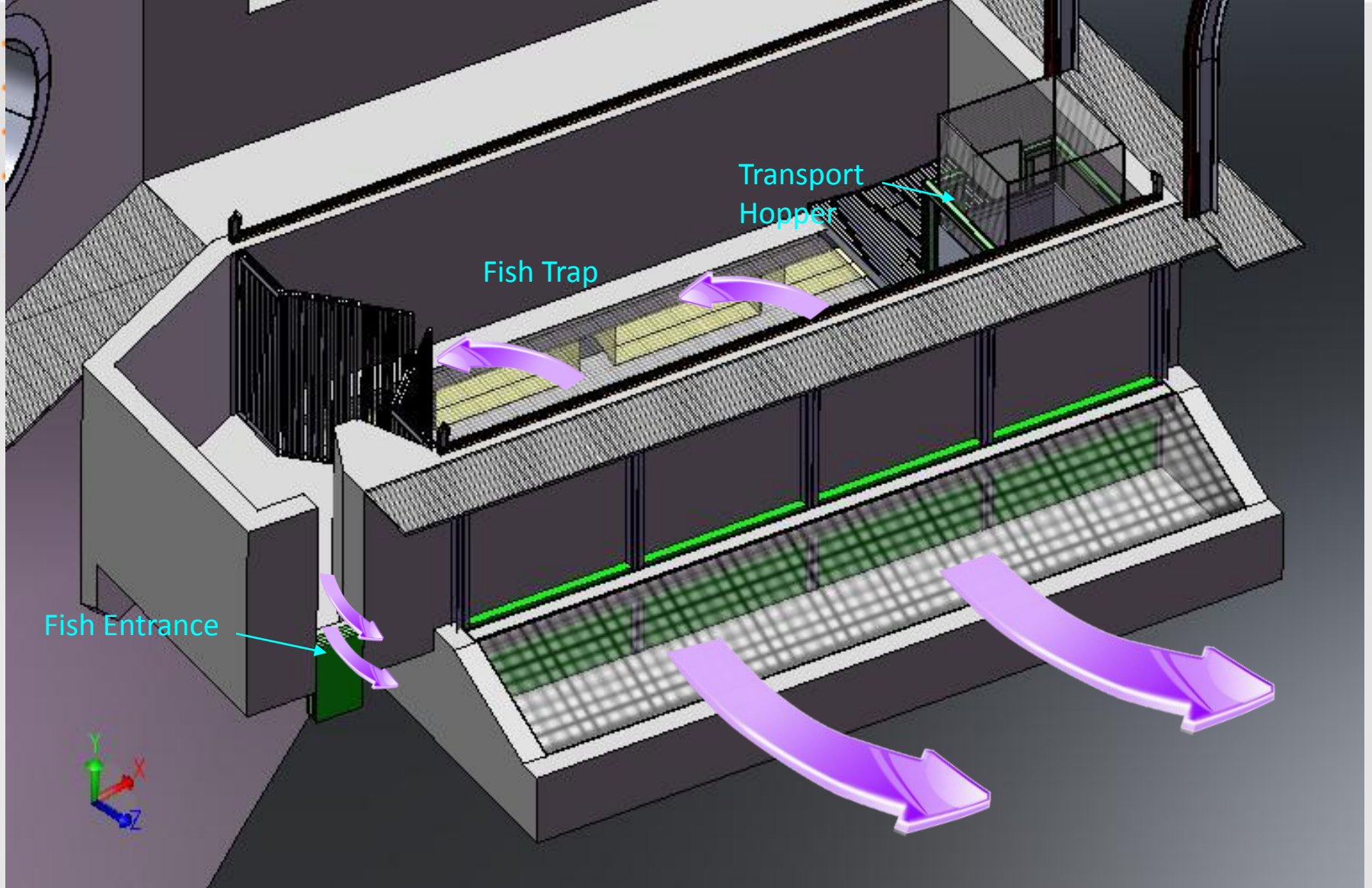


Fish Sorting
Facility

Fish Tram

North Fork
Powerhouse
With Integrated
Fish Collection
Facility





Water discharged from the turbines is used to attract the fish into a fish friendly entrance and trap



DECISION ANALYSIS SUMMARY NORTH FORK POWERHOUSE

- **ARRA Grant Opportunity – Renewable energy with environmental benefits – CREB’s Financing**
- **Business Case in 2010 concluded we should move forward with the development of the North Fork Project:**

Net Values (Benefits – Costs)

- Base Case
\$13.80/MWh
- High Cost Case (25% higher cap)
\$6.91/MWh

Net Present Value Levelized

\$6.8 M
\$3.4 M



DOWNSTREAM FISH PASSAGE

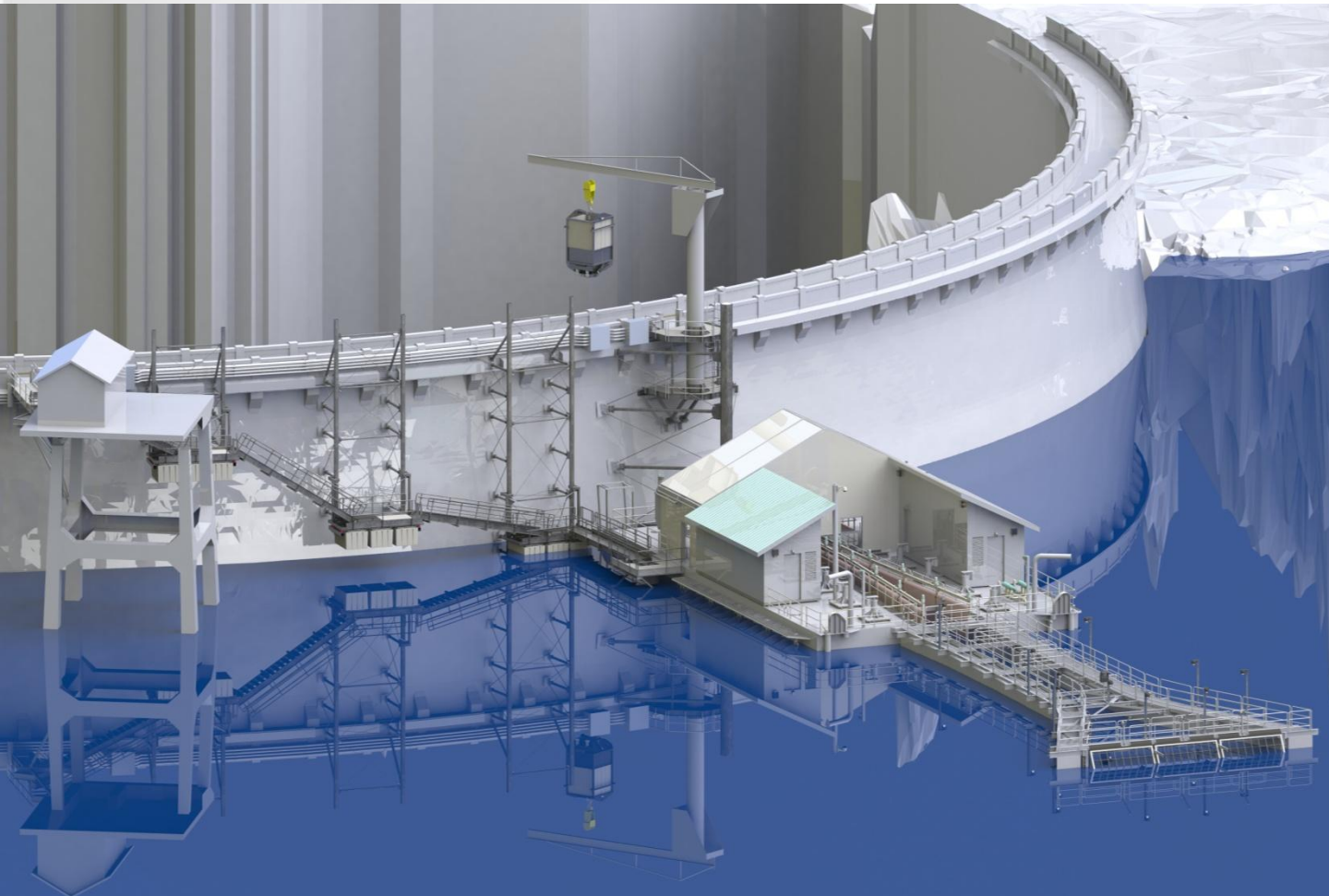
OPERATIONAL 2015

- Full exclusionary nets will keep fish from entering the turbines
- The Floating Surface Collector (FSC) in Lake Cushman will collect juvenile salmon wanting to migrate to the ocean
- Fish will be transported and released into the North Fork Skokomish River at the base of Cushman No. 2 Dam





CUSHMAN FLOATING SURFACE COLLECTOR AND NTS



- 250 CFS Flow
- Fish are captured in the Net Transition Structure (NTS) before any water is screened off



CUSHMAN FSC FROM THE DECK OF THE DAM



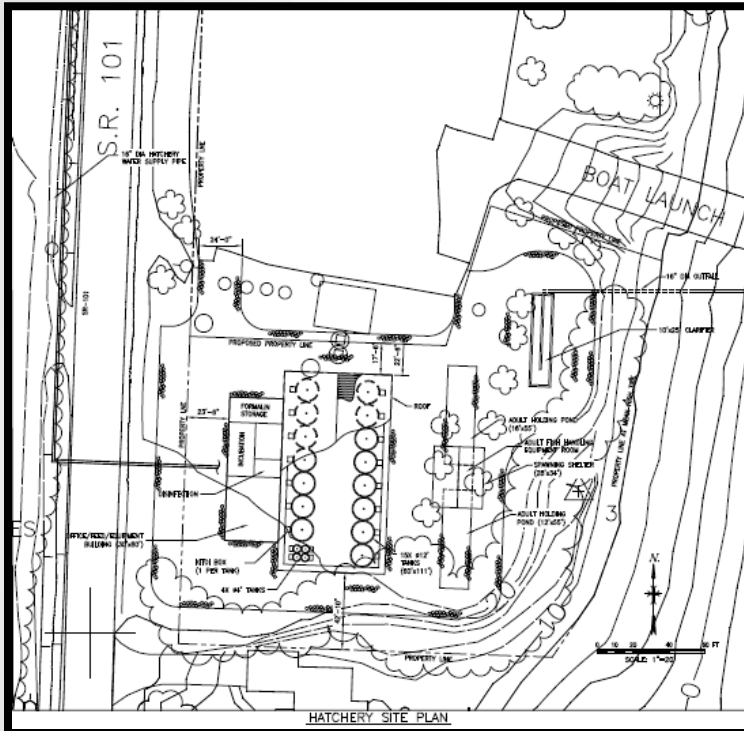
- After screening off almost all the water, fish are sorted by size and held in hoppers.
- Fish are transported in hoppers by truck to the tram at No. 2 dam



TACOMA POWER
TACOMA PUBLIC UTILITIES

SALTWATER PARK HATCHERY

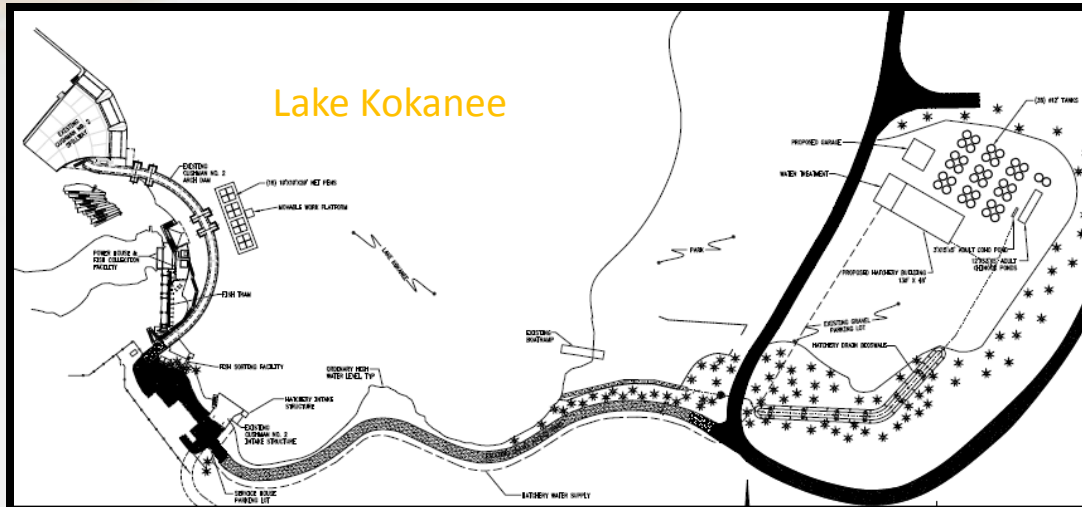
OPERATIONAL 2015



- Raise 2,000,000 Sockeye fry per year to plant in Lake Cushman
- Uses spring water from hillside

NORTH FORK HATCHERY

OPERATIONAL 2014



- Raise over 400,000 Chinook, Steelhead and Coho smolts to plant in the North Fork below the dam

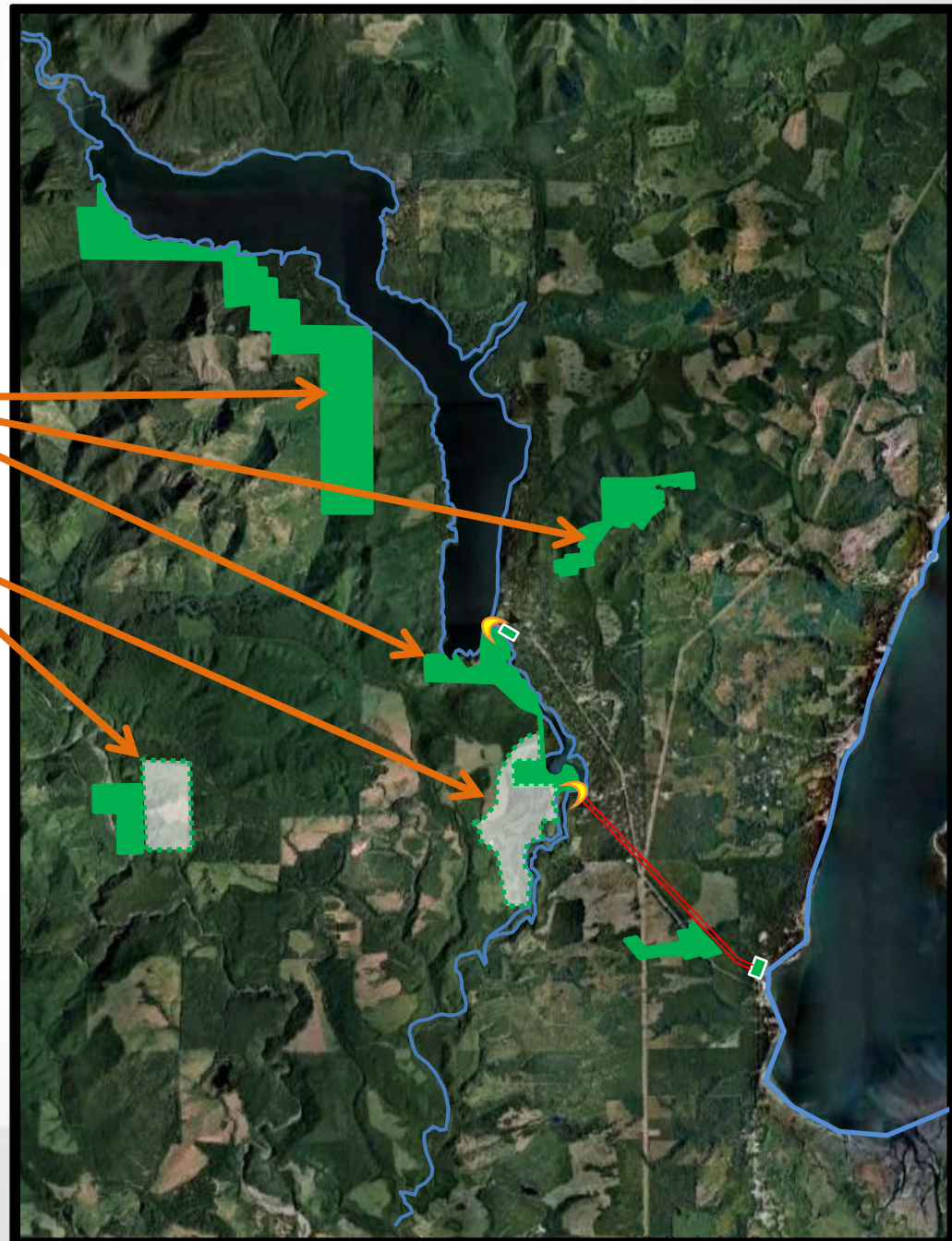


WILDLIFE

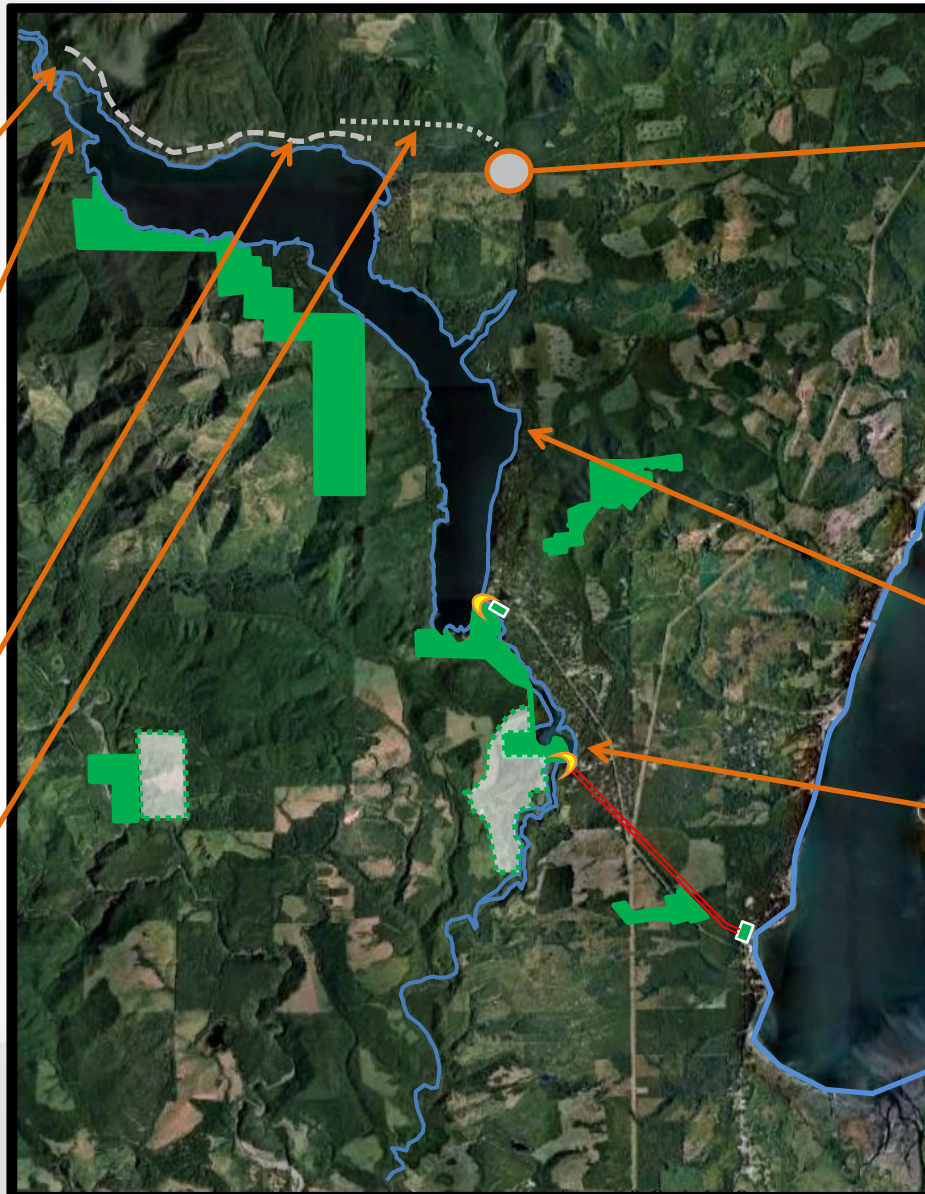
- Existing 2,000 acres designated as wildlife habitat
- Acquired 750 additional acres for wildlife habitat
- Enhance native plants and wildlife on Project lands

Existing Tacoma-Owned Wildlife Lands

Wildlife Acquisition Lands



RECREATION



• Improve Bear Gulch Access

• Relocate Dry Creek Trail

• Staircase Road & Day-use Sites

• Construct Bike Trail

• Improve Big Creek Campground

- Up to 60 campsites
- Two picnic shelters
- Vault toilets
- Limited water and power
- Camp host site

• Improve Lake Cushman Viewpoint

• Improve Lake Kokanee Boat Launch Facilities



SUMMARY

- **The Cushman Hydroelectric Project was a key component of the growth of the City of Tacoma, in the 1920's it was viewed as an "Engineering Marvel"**
- **It's development and subsequent relicensing were fraught with challenges, in the 1980's and 90's the Cushman Project was viewed as an "Environmental Disaster"**
- **The Settlement Agreement ended major contention and resulted in a new direction for the Skokomish watershed**
- **Innovative solutions enabled Tacoma Power to settle and accept the amended FERC license but will significantly increase the O&M costs**

QUESTIONS?

