

Implementing Small Hydro At Snohomish PUD

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Agenda

- Snohomish PUD
 - Utility Needs
 - Policy Direction
- Constructed Projects
 - Youngs Creek Project
- New Project Pursuits
 - Calligan Creek
 - Hancock Creek
 - Sunset Falls

PUD Overview

- 320,000 electrical customers and 20,000 water customers
- 12th Largest PUD in the US
- Three Elected Commissioners



Power Needs

- Currently 80% load (1400+ MW) from BPA
 - Largest customer
- Integrated Resource Planning (IRP)
 - covers the 13-year period from 2010 - 2022
 - expected 169aMW load growth
 - target goal of **126 aMW** of new energy sources
- Need for renewable resources above aggressive conservation.

Renewable Resources Board Direction

- Climate Change, March 2007
 - future growth through cost-effective conservation and a diverse mix of renewable energy resources
- Policy focus
 - local opportunities
 - minimize transmission losses
 - minimize environmental impacts
 - promote local economic development and education

Renewable Resources Investigated

- Tidal
- Geothermal
- Wind
- Solar
- Pumped Storage
- Biomass/Biogas
- Hydrogen-based Energy Storage System
- Pipeline Hydro
- Low Impact Hydroelectric



Low Impact Hydro Initiative

- Why Low Impact Hydroelectric?
 - Clean, reliable, non-greenhouse gas emitting resource
 - Energy production matches District's peak load
 - Hydro assets have a 50-100+ year life
 - Cost/MWh is very competitive
 - **Existing staff expertise**



Youngs Creek Hydroelectric Project (new construction on an old license)



Time line

1993 Licensed to Hydro West Group

Purchased by Snoqualmie Creek Hydro

2008 PUD purchased lands and rights to construct

2009 Permitting and Environmental Studies

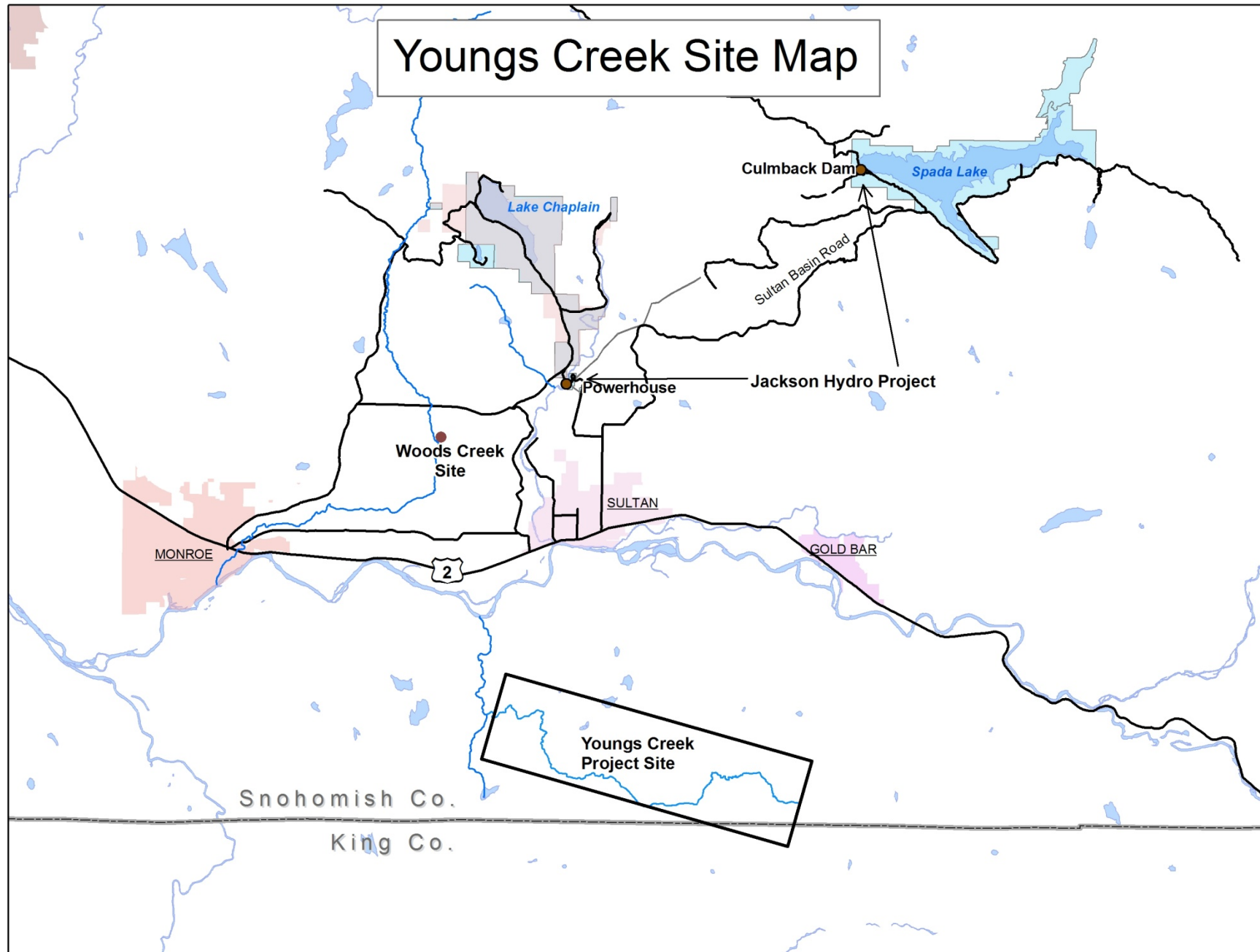
2010 Construction started

2011 Construction Completed

The Facts

- 7.5 MW Installed Capacity
- Above an anadromous fish barrier
- Run of River
- Penstock - 14,300 ft. of 51/48 inch pipe
- 900 ft of head (Gilkes Pelton)
- 120 cfs

Youngs Creek Site Map



The Challenges

The Challenges

- Too many permits
- Too many permit agencies

Snohomish County

- Grading Permit
- Critical Areas Review
- Flood Hazard Permit
- 5 Different Building Permits
- Right of Way Permit

City of Sultan – Right of Way Permit

Burlington Northern – Right of Way

Puget Sound Energy – Joint Use Permit

DNR – Aquatic Lease (Transmission Line)

Army Corps – 404 Permit (required concurrence from USFWS, NMFS, Tribe, DAHP)

Dept of Ecology – 401

WDFW – HPA's (multiple - transmission line, intake, culverts)

FERC – Approvals on avian protection

Update studies to new requirements

The Challenges

- Other Agreements

Hancock Forestry – Easements and road use

DNR – Easements

WDFW and **Ecology** – Off-license MOU on flows

BPA – Construction Agreement

- Balancing Authority Agreement

The Challenges

- **Construction**

In-Water Work Window - Too Short (June to mid Sept)

River Flows - Too Unpredictable

Too Much Rain =>

Record rainfalls - September 2010 & June/July 2011

Equipment & Penstock delivery - Remote Site / Forestry Roads

Traffic Control - Challenging for one lane roads

Theft – Keeping the riff raff out.

Steep Slopes Narrow Penstock Corridor



Too Many Big Rocks



08.01.2011



05.20.2010

The Challenges

- Construction

Bid Climate Too Good = Narrow Margins

=> Contractor arguing that items are “not in scope”

Pre-purchasing Turbine/Generator/ Controls/Pipe

- => +Start early on long lead items
- +Avoid General Contractor markup
- PUD - middle man between supplier and GC
- Delivery delays and management focus

Too Big - Turbine Case Size



300 Ton Crane



**Switch gear
Transformer**



Abutment Tie-In Required Field Changes

Supersacks



Ready for Ribbon Cutting and Rain



Next Projects

- Calligan Creek – 6 MW (King County)
- Hancock Creek – 6 MW (King County)
 - Previously Licensed (93-04) – adapted conditions
 - Acquired Preliminary Permits
 - Submitted Pre-Application Documents
 - Traditional Licensing Process
- Sunset Falls – 25 MW (Snohomish County)
 - Applied for a Preliminary Permit

Summary



NWHA Tech Seminar

- May 17-18, 2012
- Tulalip Casino Resort
- Marysville, WA
- Youngs Creek Tour



Low Impact Hydro Assessment

- Criteria:
 - 4 county area – Whatcom, Skagit, Snohomish and King
 - Upstream of or at a barrier to anadromous fish
 - Outside Federal Wilderness areas
 - Outside Federal Wild and Scenic River designation
 - Prior Environmental Impact Statements indicated no major environmental issues
 - No known geological hazards or unstable areas that would preclude construction
 - Location in close proximity to an existing transmission system
 - No known issues that would preclude advancing project to evaluation stage

Low Impact Hydro Assessment

- Results:
 - Initially 140 sites identified; 18 met District criteria
 - Met with Federal/State Agencies, NGOs and Tulalip Tribes on 18 possible short-listed sites
 - Reduced to 3 potential top-sites based on input