



Forests as Green Infrastructure

When Can Water Pay for Carbon?

Payment for Watershed Services Pilot in the Nisqually
Watershed, Washington

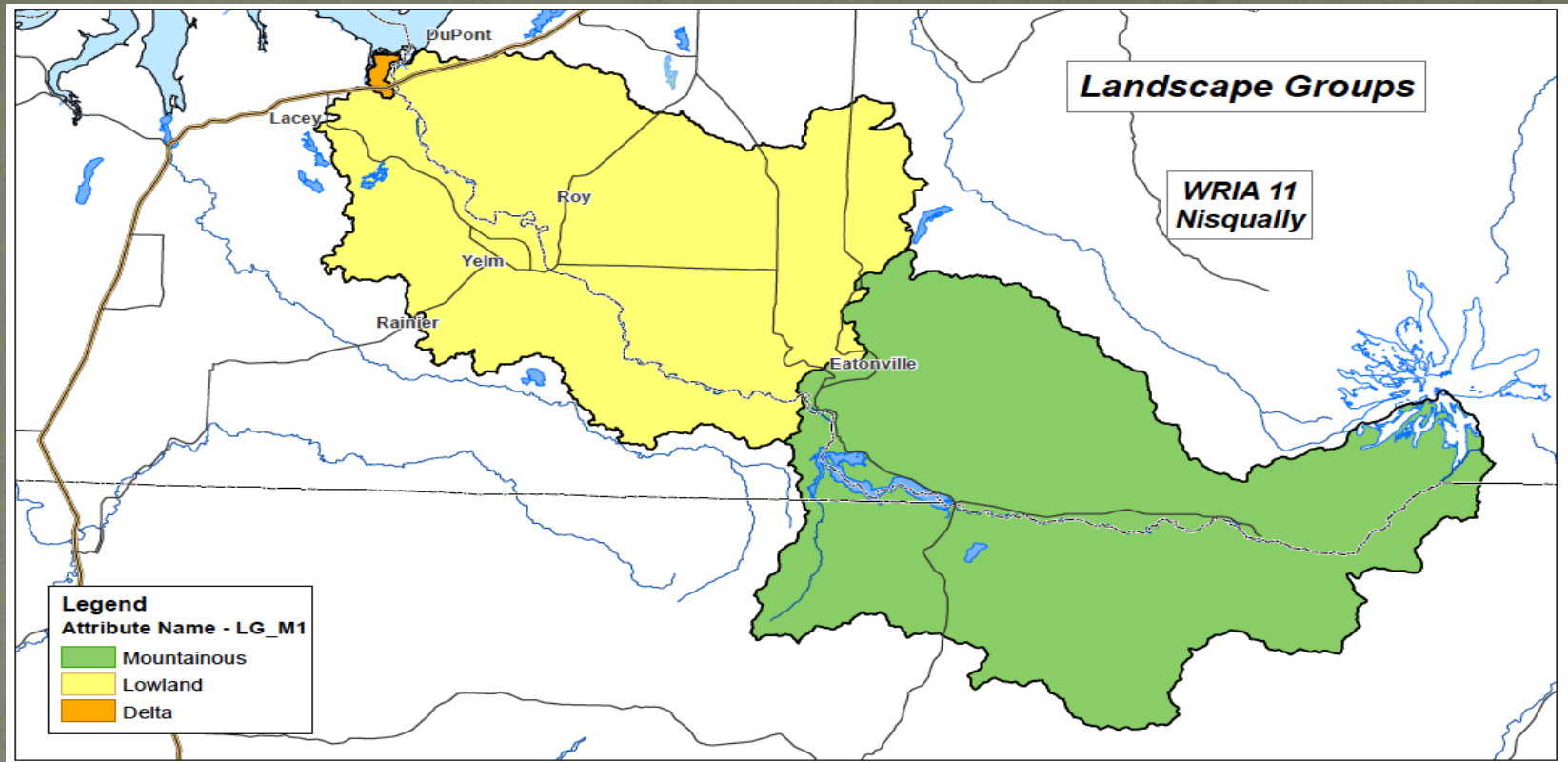
Paula Swedeen, Ph.D.
Washington Environmental Council
Nisqually River Foundation

Forest-related Water Issues in Washington State

- Winter flooding/storm water overflows
 - Water pollution
 - Property damage
 - Sediment delivery
 - Stream structural degradation
- Low summer/early fall flows
 - High temperatures: salmon habitat issues
 - Drinking/agricultural/industrial water use limitations
- Aquifer degradation
 - Re-charge
 - Contamination

What do forests do for water?

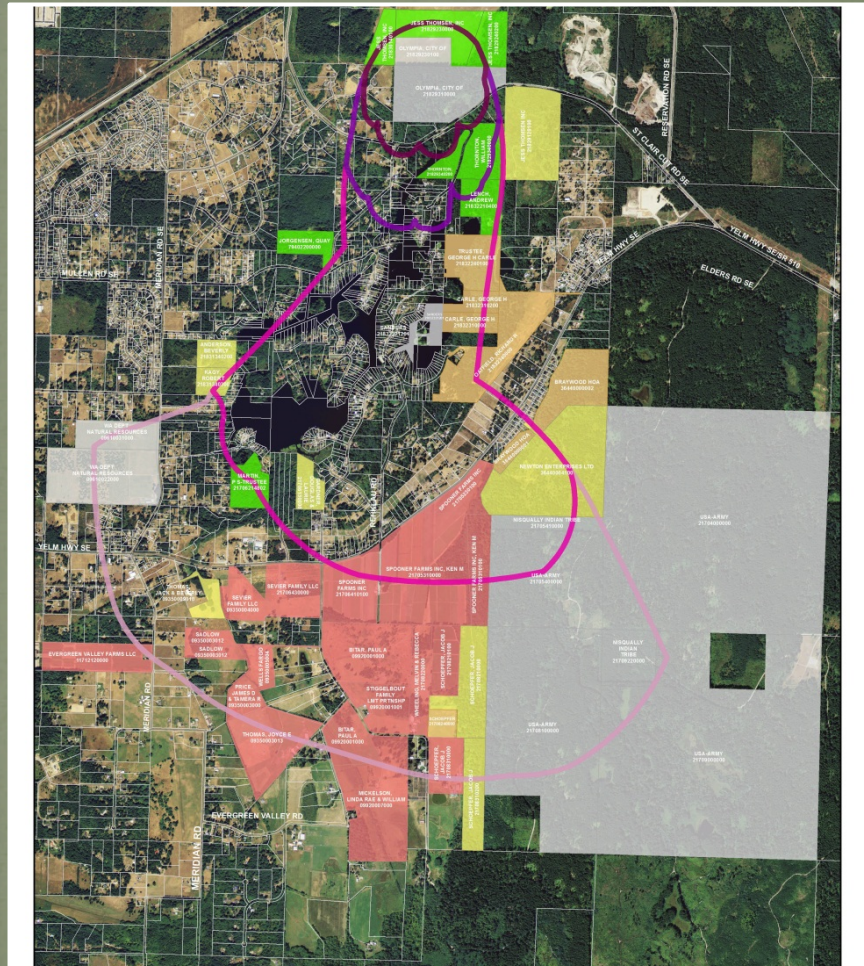
- Watersheds with a high proportion of mature forest:
 - Keep summer low flows within normal seasonal range
 - Moderate winter flows: prevent flashiness
 - Absorb a lot of rainwater so prevent high storm water flows in towns and cities
 - Prevent high sediment loads in streams
- Retaining forest cover keeps groundwater clean
 - Forest soils break down contaminants
 - Facilitates re-charge but filters water along the way
 - Excludes land uses known to increase chance of groundwater contamination



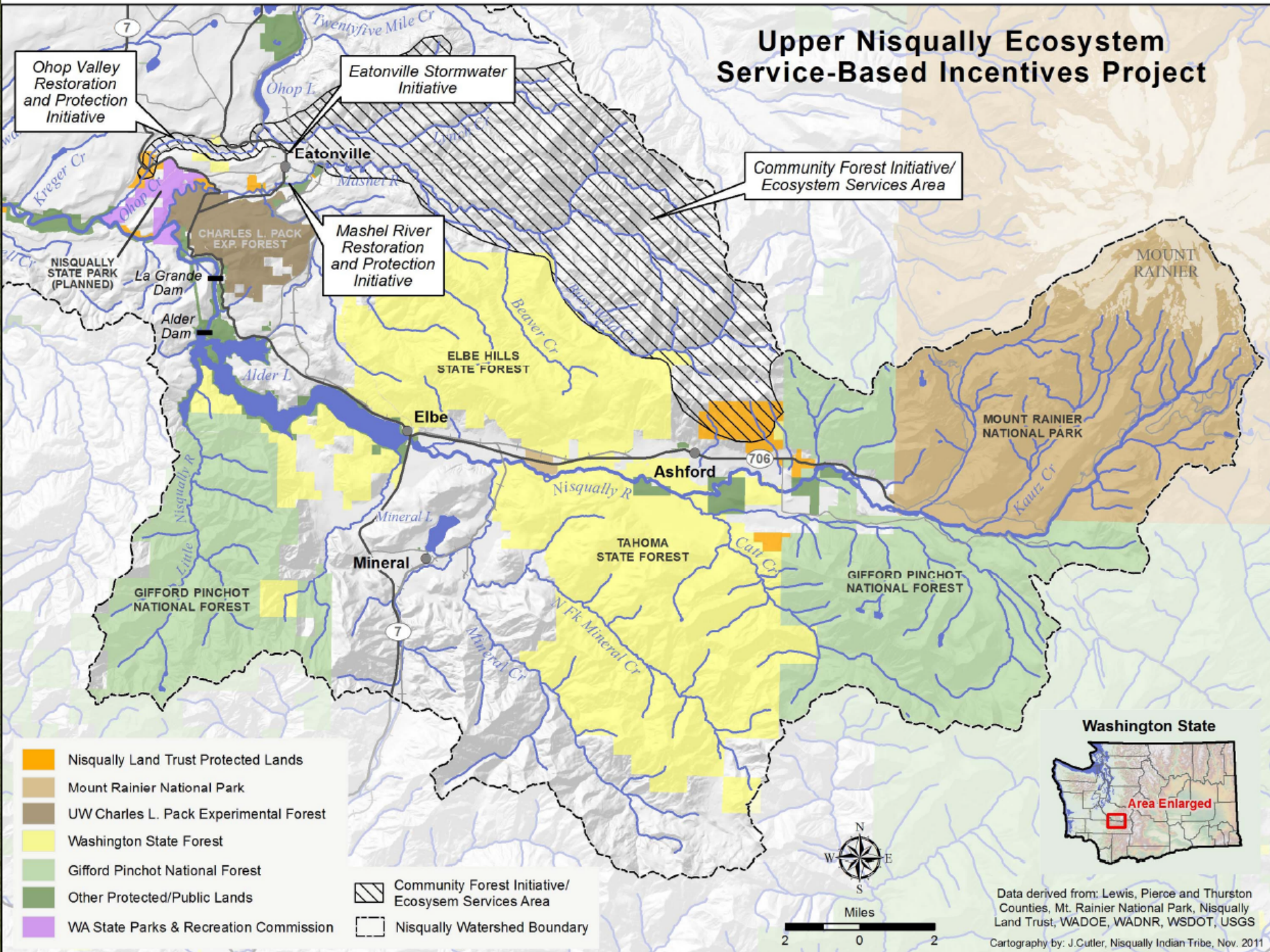
- Funded by EPA Grants with Puget Sound focus
- Nisqually Tribe, DNR, Nisqually Land Trust, NNRG, Earth Economics
- WEC supporting upper watershed work; scaling to broader Puget Sound applications

City of Olympia Wellhead Protection

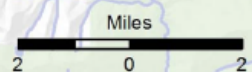
- City has some rate-payer funds for wellhead protection
- Use easements instead of fee purchase
- Focused landowner outreach effort
- Use ecosystem services frame to describe, quantify benefits



Upper Nisqually Ecosystem Service-Based Incentives Project



- Nisqually Land Trust Protected Lands
- Mount Rainier National Park
- UW Charles L. Pack Experimental Forest
- Washington State Forest
- Gifford Pinchot National Forest
- Other Protected/Public Lands
- WA State Parks & Recreation Commission
- Community Forest Initiative/Ecosystem Services Area
- Nisqually Watershed Boundary



Data derived from: Lewis, Pierce and Thurston Counties, Mt. Rainier National Park, Nisqually Land Trust, WADOE, WADNR, WSDOT, USGS
 Cartography by: J.Cutler, Nisqually Indian Tribe, Nov. 2011



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Eatonville

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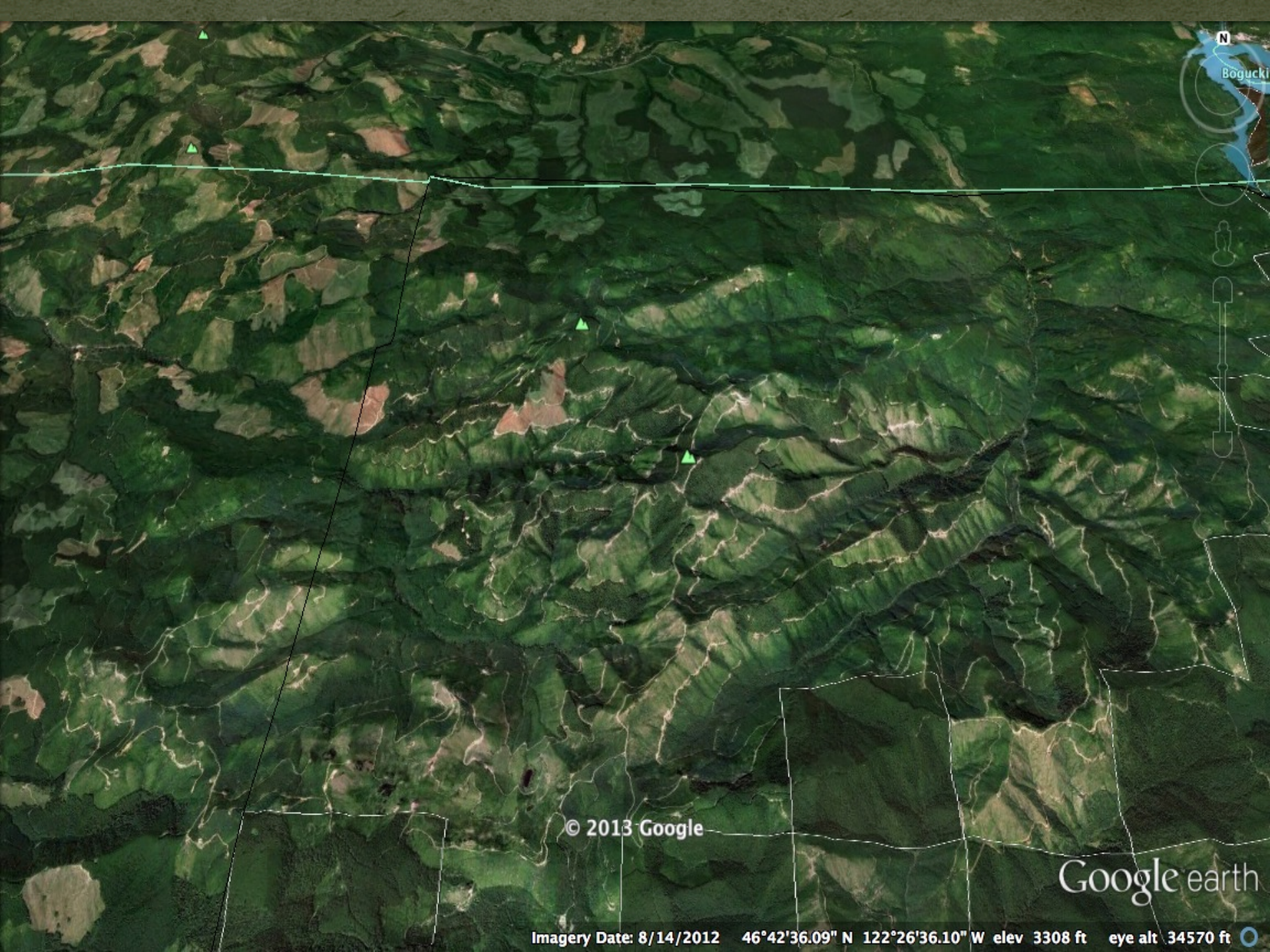
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Imagery Date: 8/14/2012 46°49'16.98" N 122°05'21.47" W elev 2846 ft eye alt 10.79 mi

Barriers/Needs

- Quantitative modeling at watershed scale to underpin rationale for mitigation/prevention in ESA, Clean Water Act, Safe Drinking Water Act contexts
- State agency buy-off to use forests for mitigation
- Speed up adaptive management research under FP rules
- More water utility-based funding
- Large state-based funding pools to purchase fee or easements:
 - Recognize combined water infrastructure/ESA/climate benefits of less intensive management at the landscape scale



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Imagery Date: 8/14/2012 46°42'36.09" N 122°26'36.10" W elev 3308 ft eye alt 34570 ft



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Pierce

Mowich Lake Rd

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Imagery Date: 8/14/2012 46°56'50.20" N 121°58'31.79" W elev 3443 ft eye alt 15.11 mi