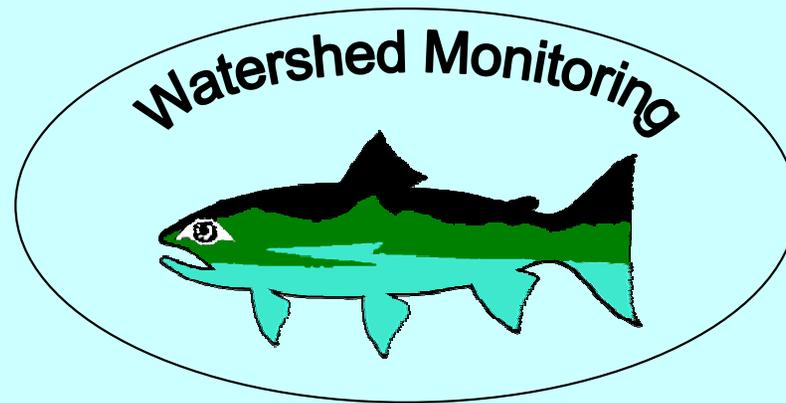


Adaptive Monitoring

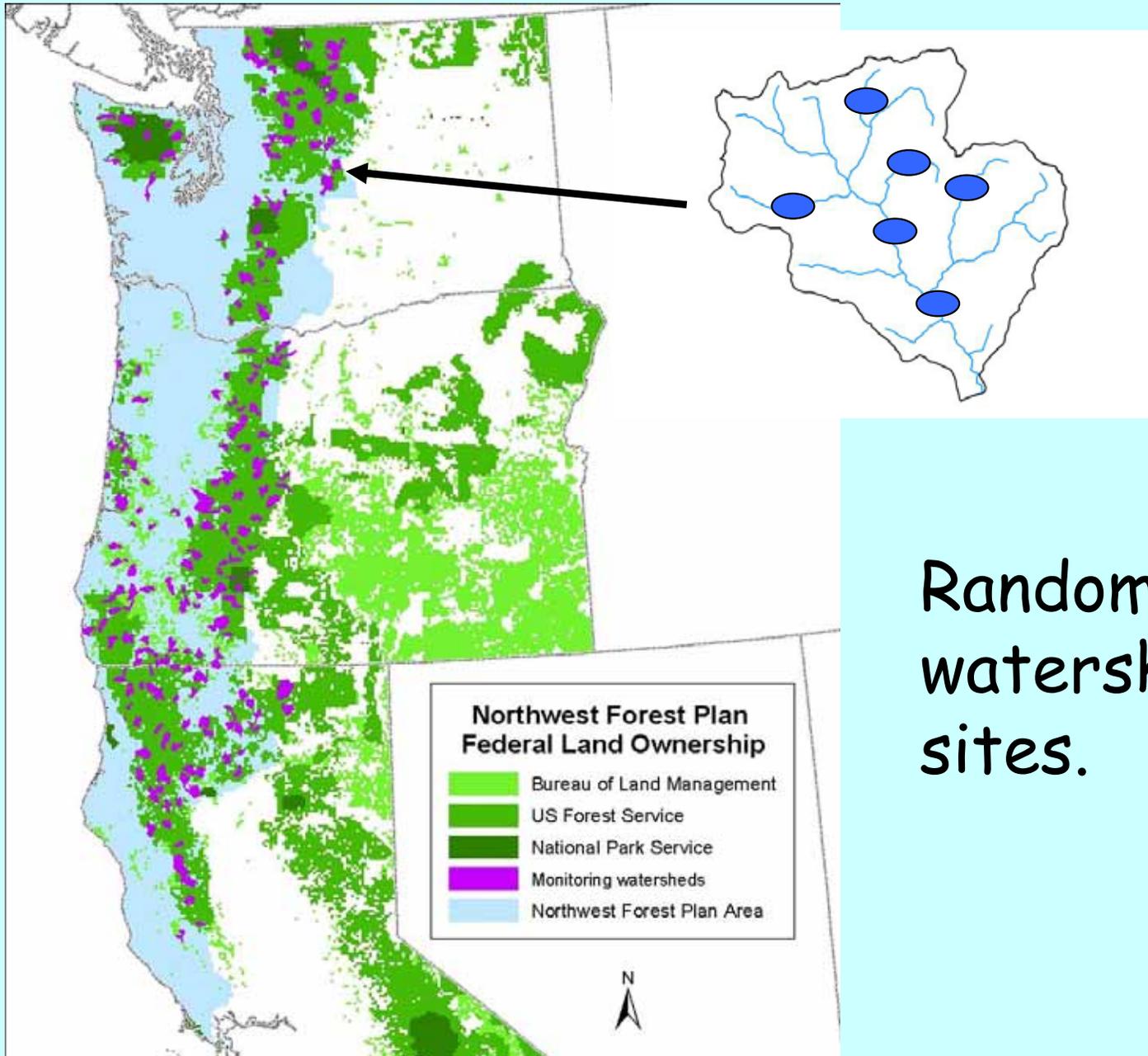
Watershed Condition Assessments Using GIS and Field Data



Aquatic-Riparian Effectiveness Monitoring Program



AREMP Sample Design

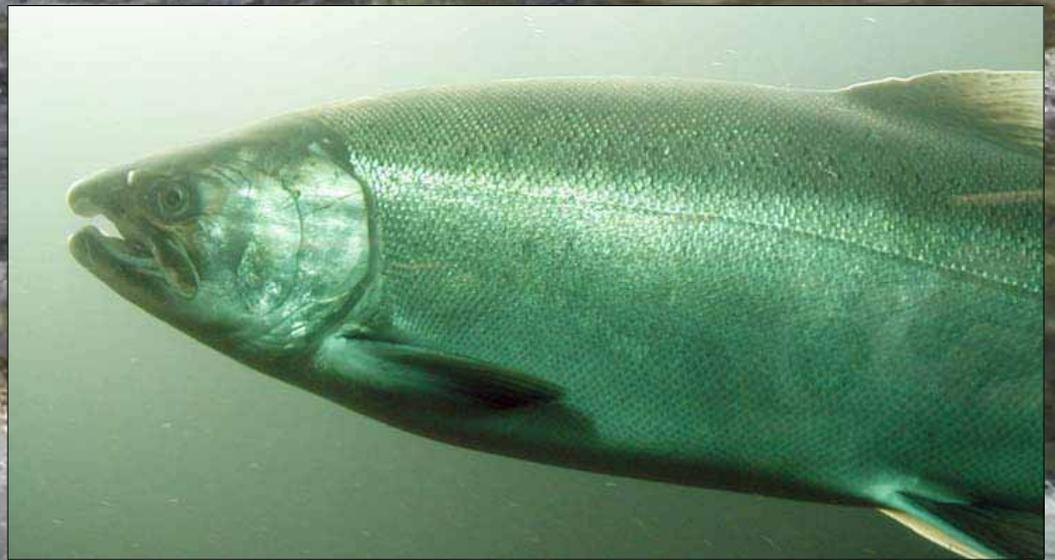


Randomly draw both
watersheds and sample
sites.

?? Watershed Condition ??

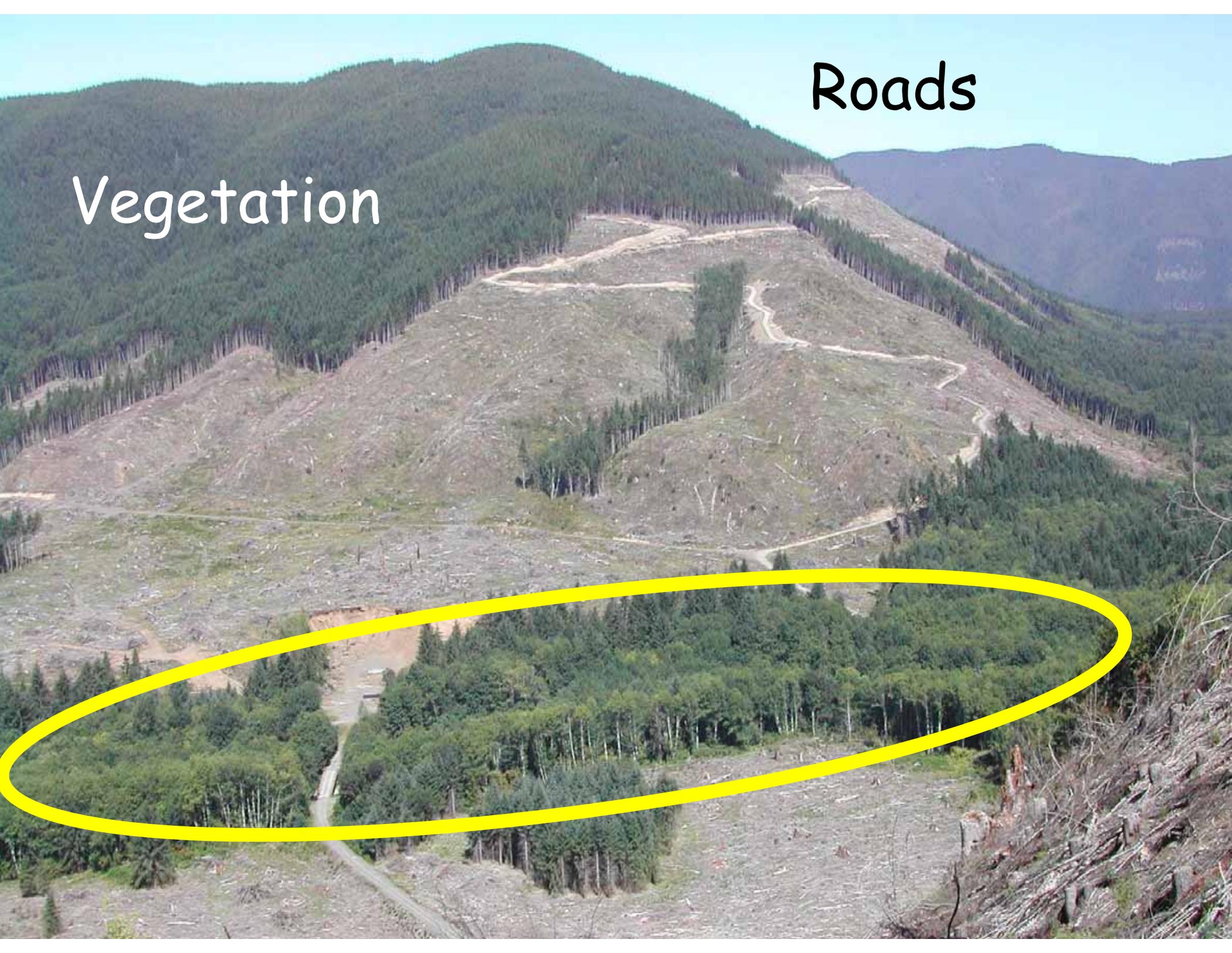


Streams

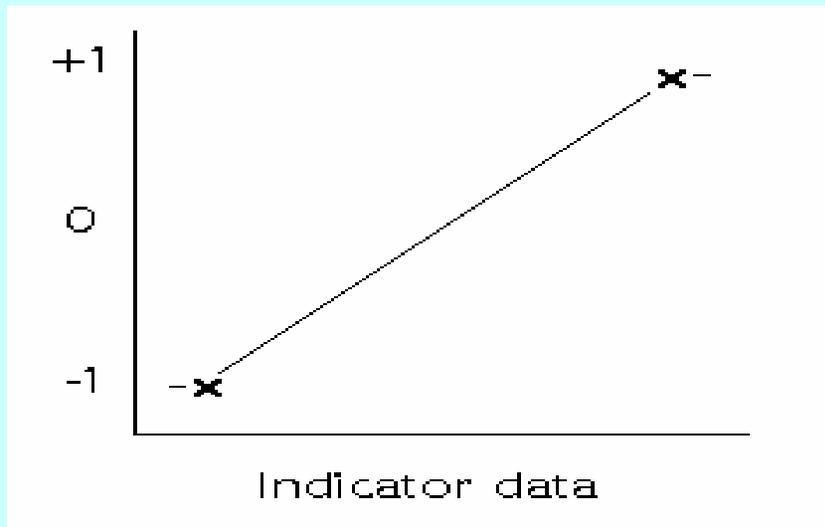


Roads

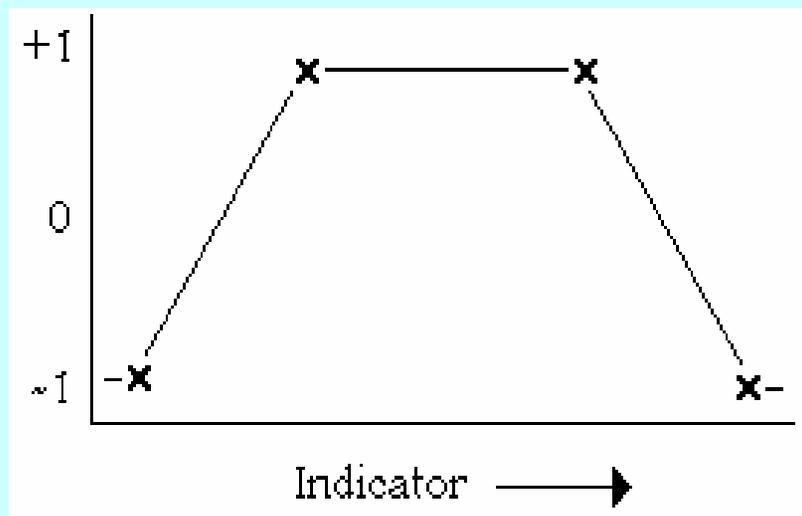
Vegetation



Evaluation Criteria

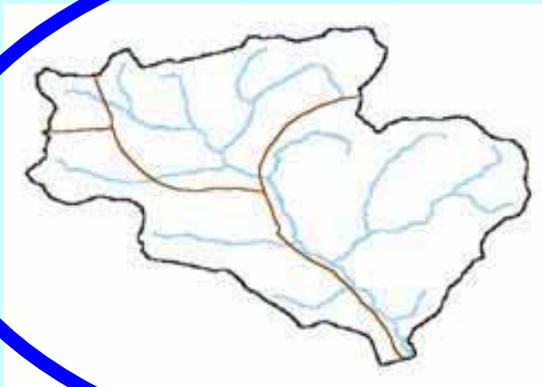
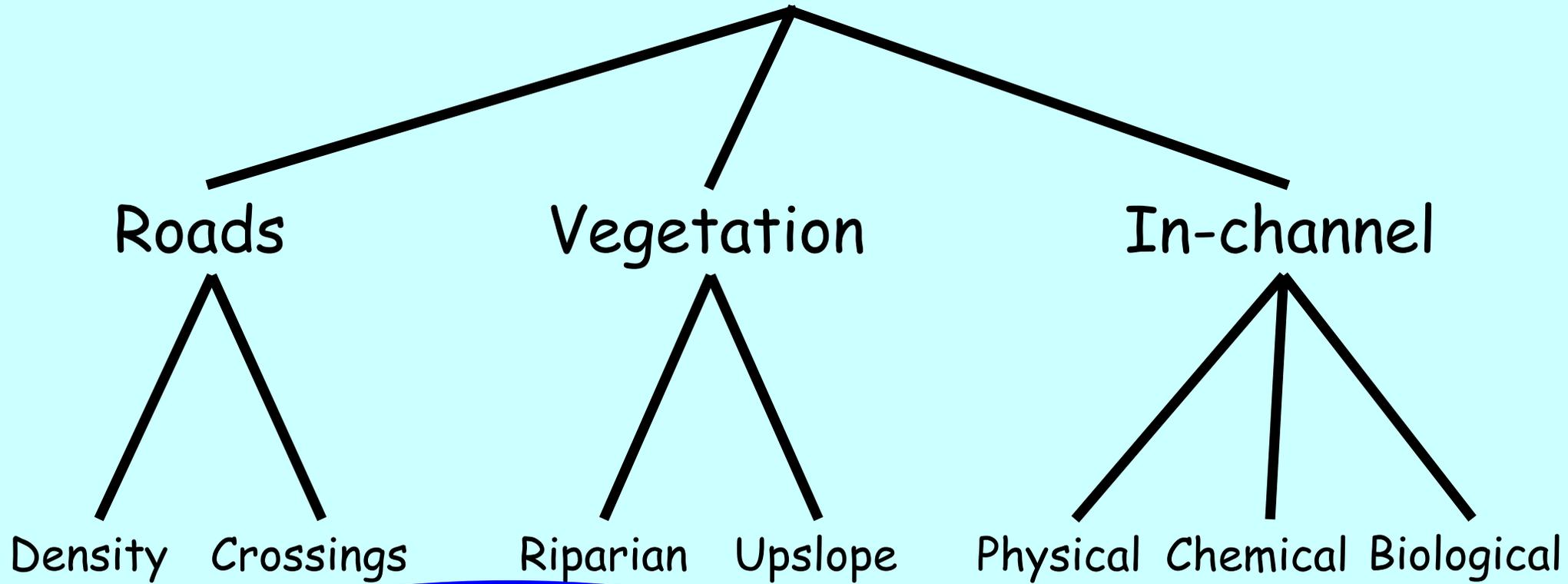


- ❖ Data that fall between the "poor" and "good" criteria are assigned a value between -1 and +1
- ❖ Relationship may have a positive or negative slope



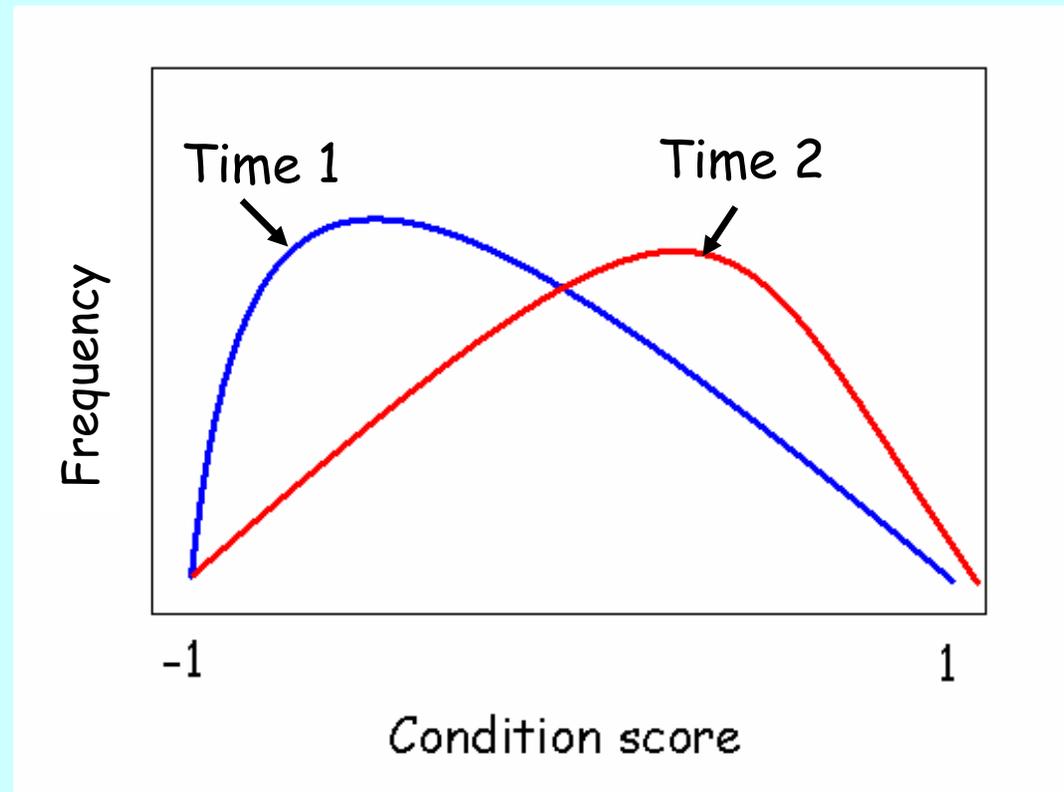
- ❖ Indicator data that fall within range of "good" criteria are assigned value of +1

Watershed condition



Aquatic Conservation Strategy

- ❖ Goal is to maintain or improve the condition of watersheds.
- ❖ Does not describe the baseline distribution nor identify a "desired" distribution.
- ❖ We infer that the distribution should move toward improved condition.



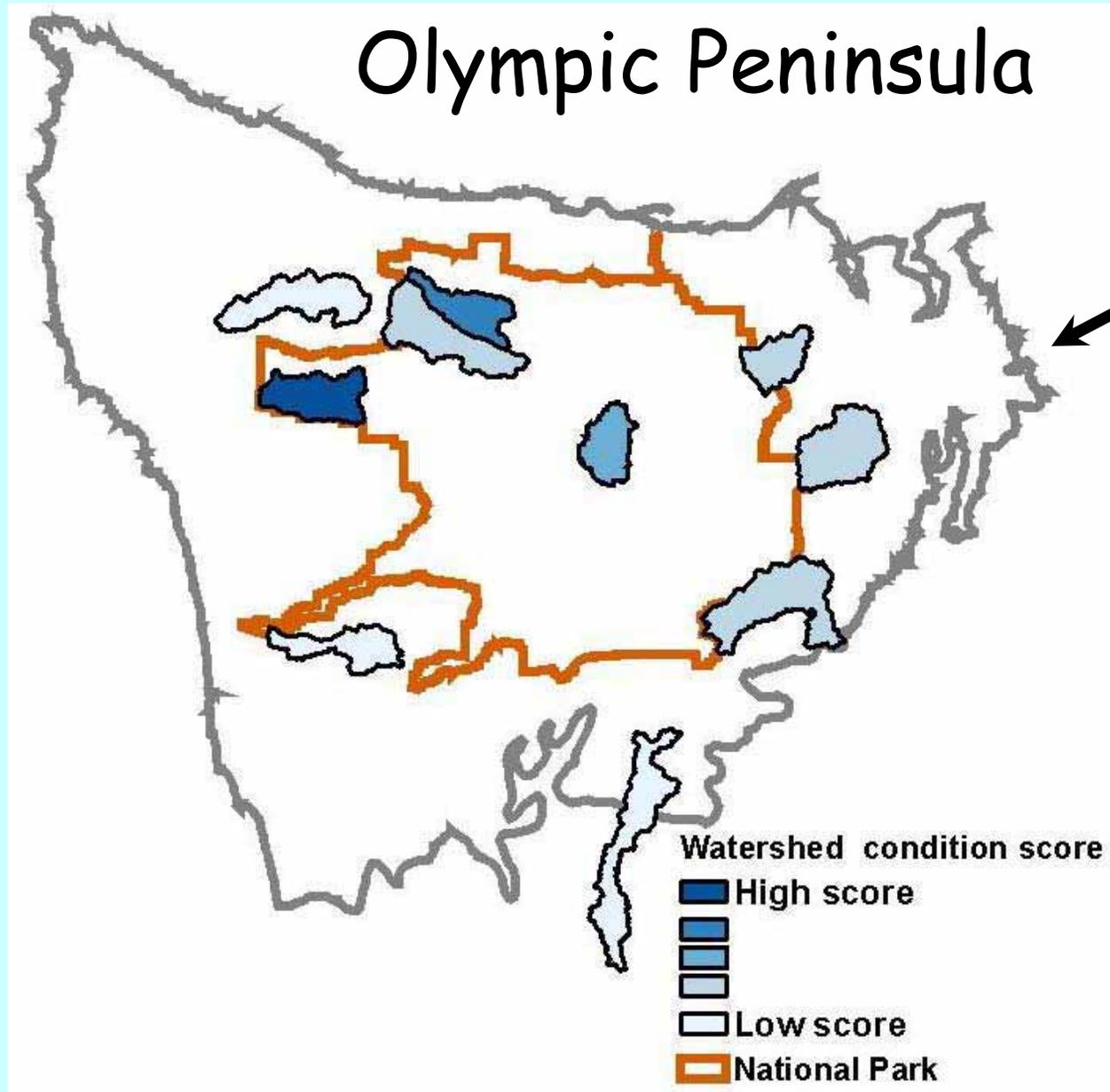
New Direction from Executives

Evaluate watershed condition at different spatial scales.

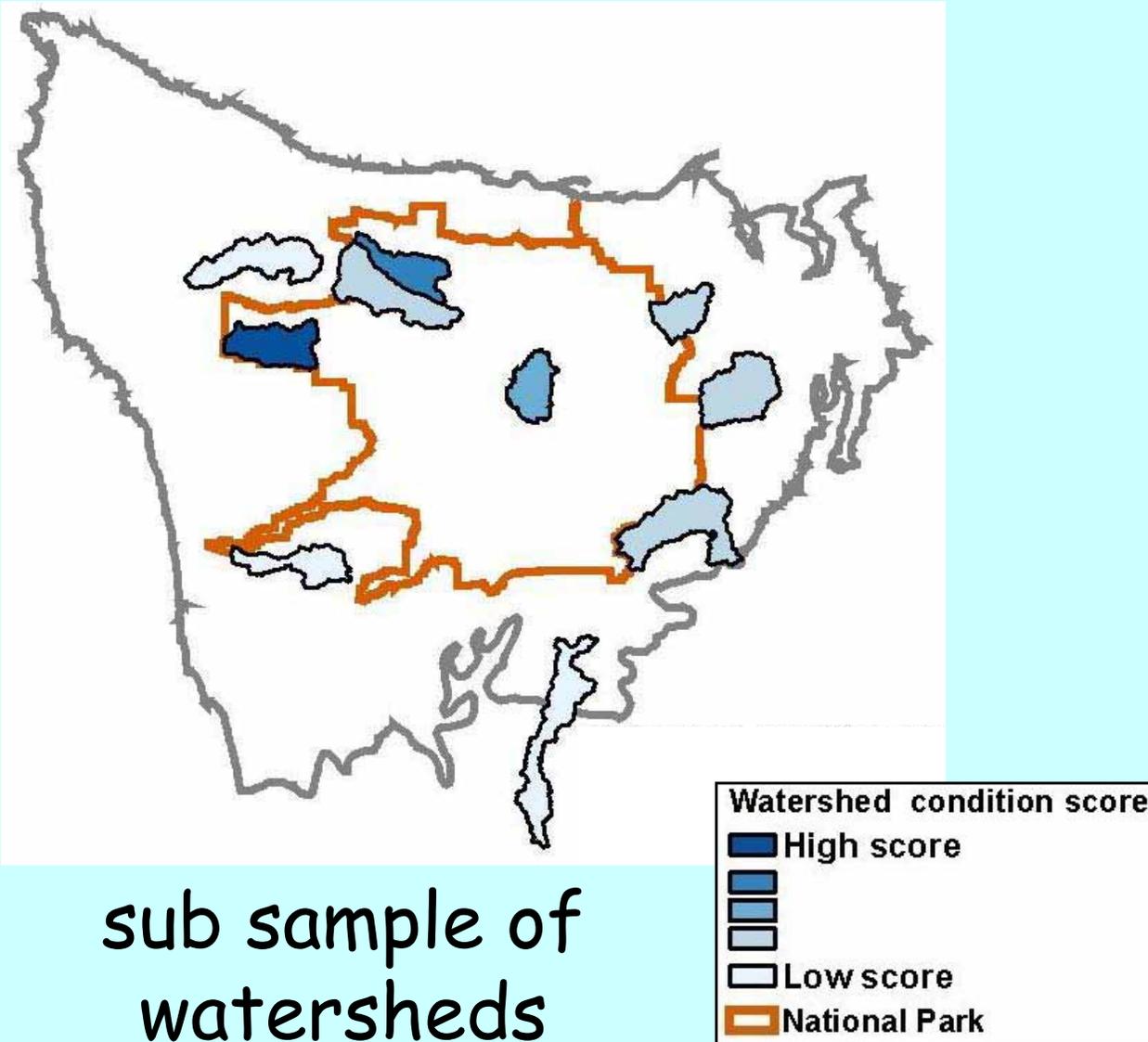


Watershed condition based on roads & vegetation (on federal lands)

Olympic Peninsula

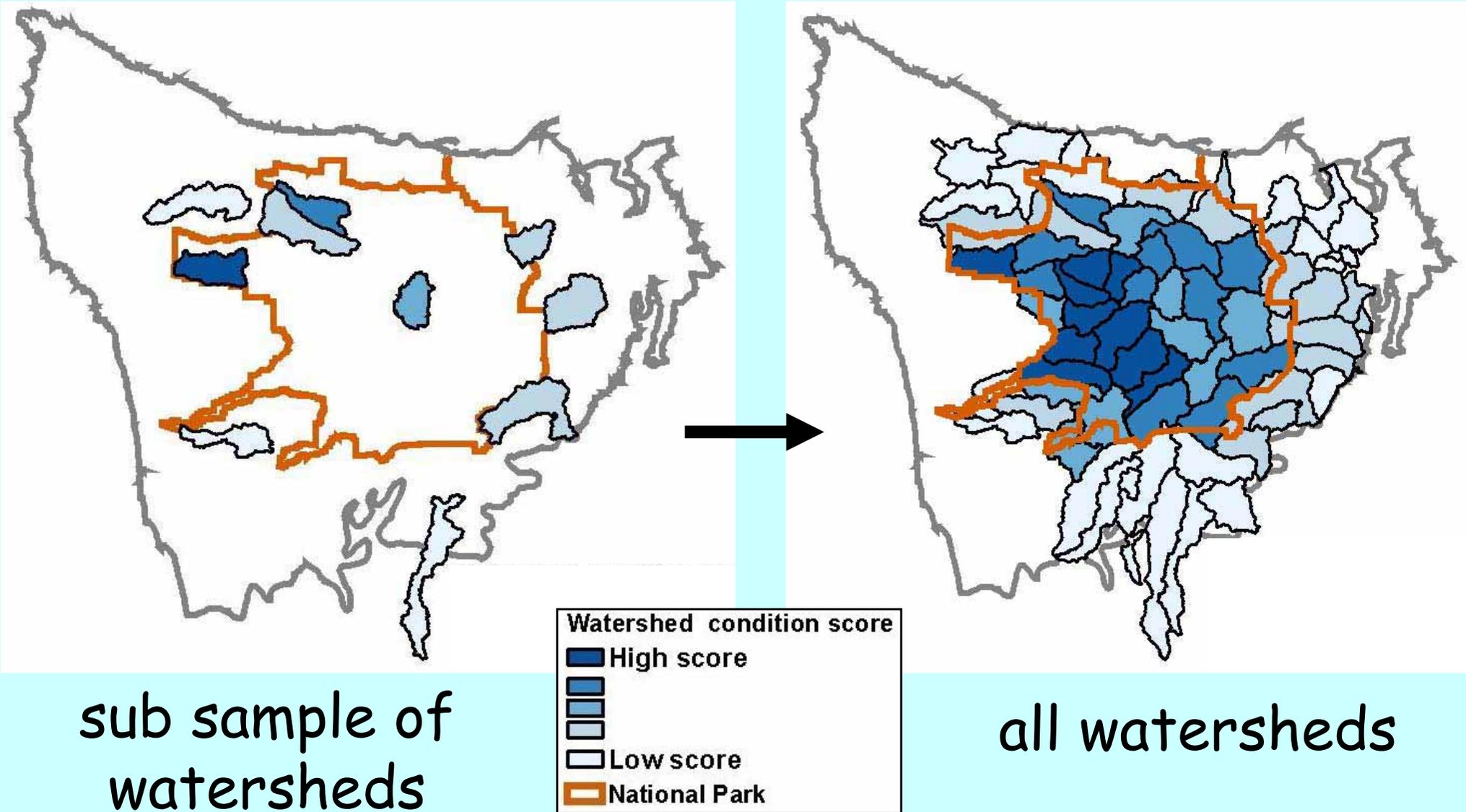


Watershed condition based on roads & vegetation (on federal lands)

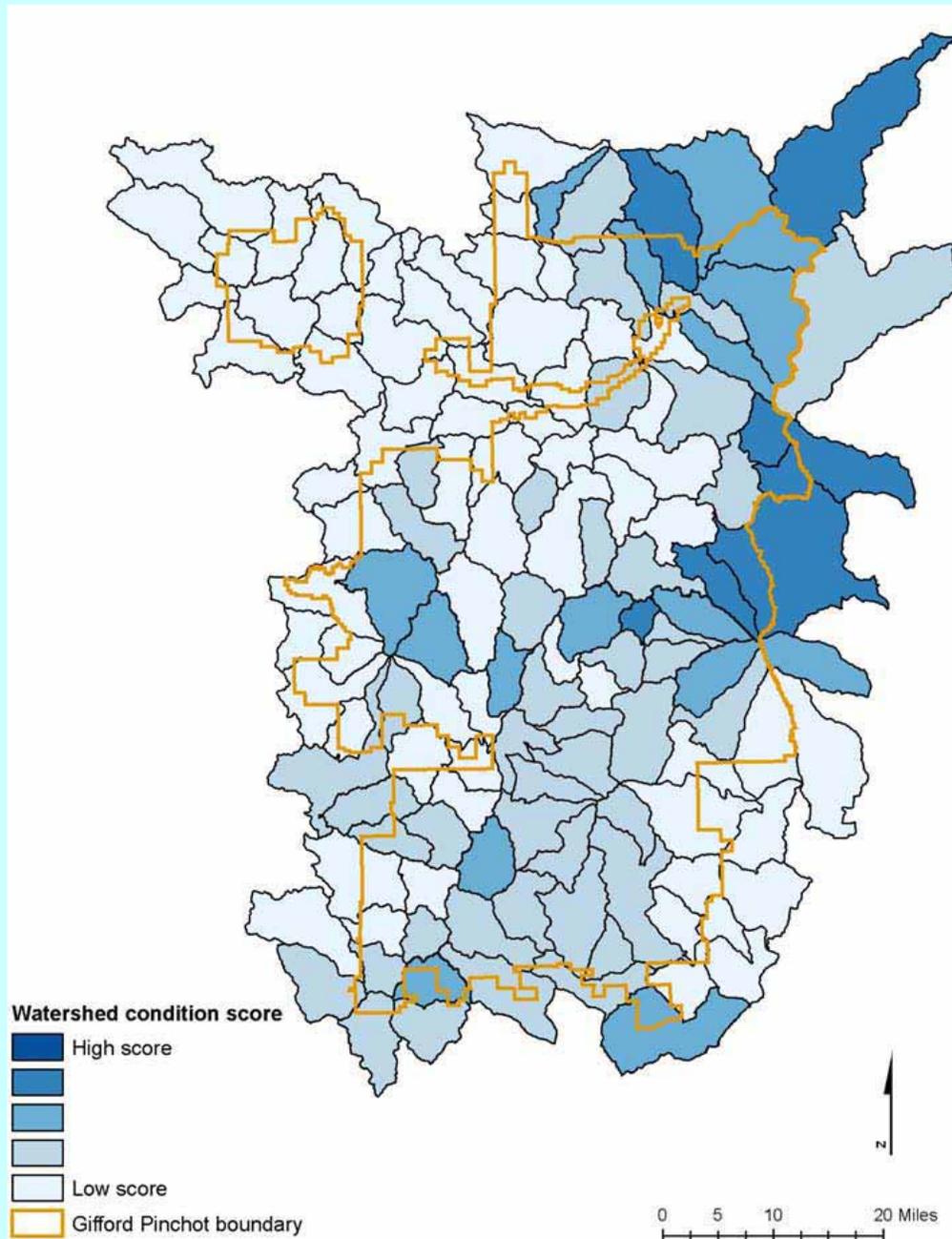


sub sample of
watersheds

Watershed condition based on roads & vegetation (on federal lands)

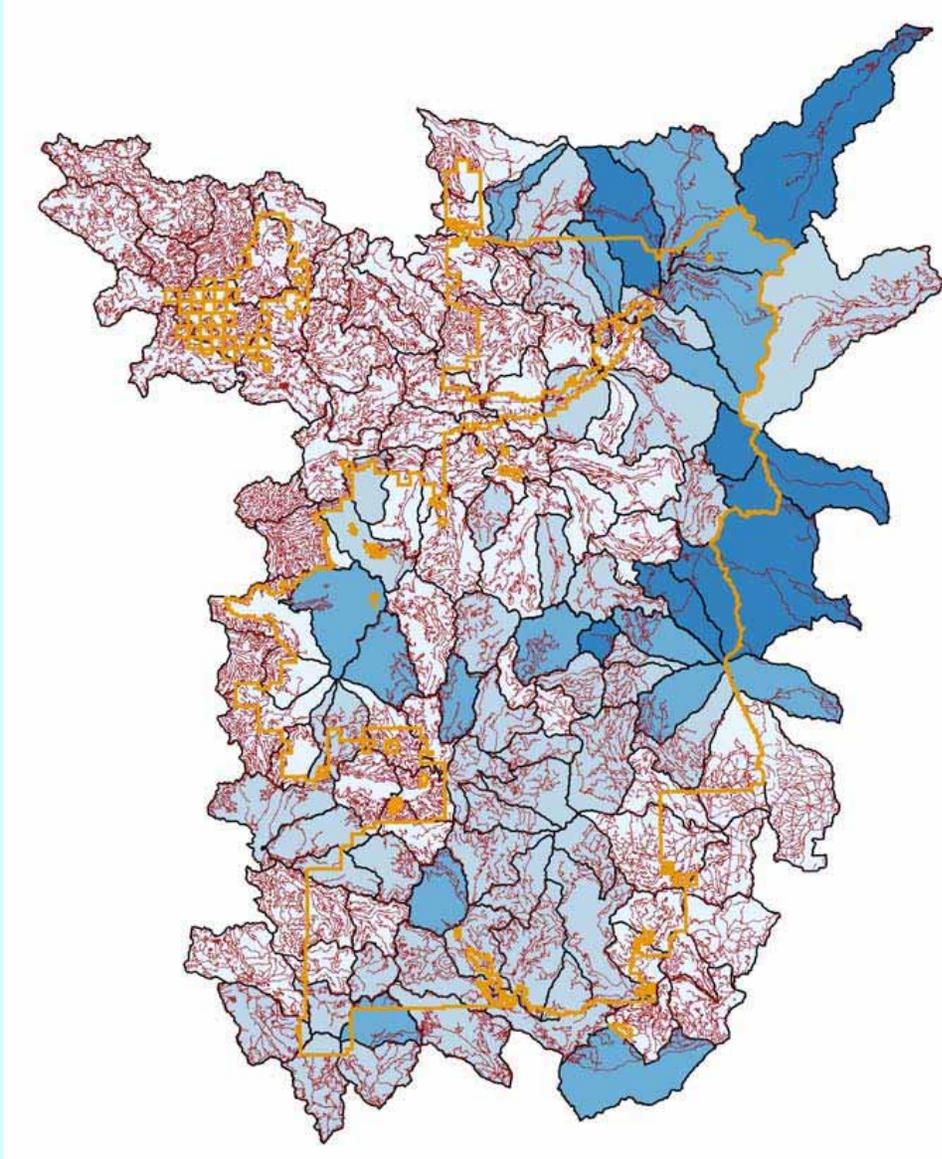


Gifford Pinchot National Forest



Watershed
condition scores
based on
vegetation and
road attributes

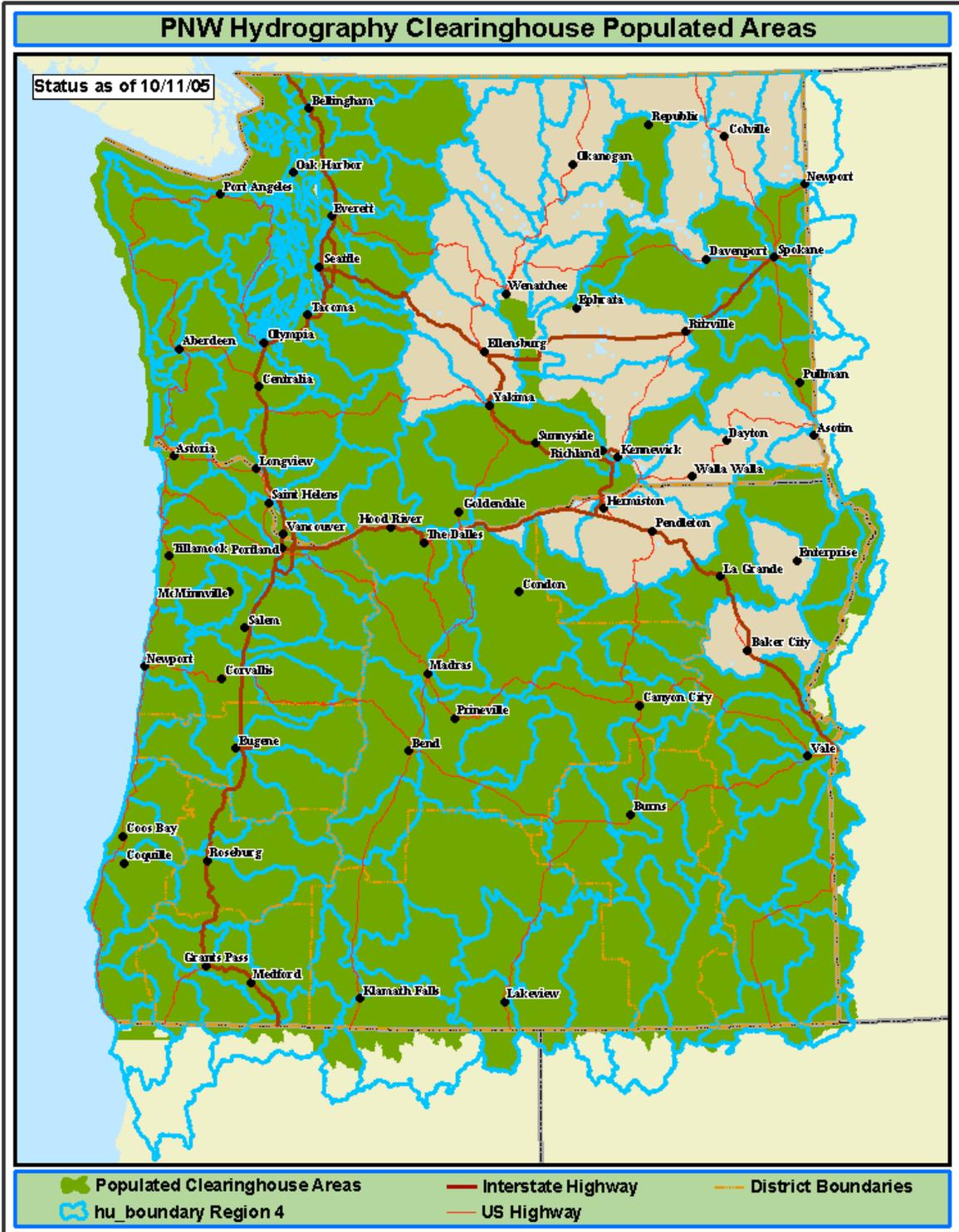
Gifford Pinchot National Forest



Roads layer
overlaid on
watershed
condition
scores



What
GIS/remote
sensing data
are
available?



Interagency
stream
layer
2005

PNW Hydrography Clearinghouse Populated Areas

Status as of 1/24/06



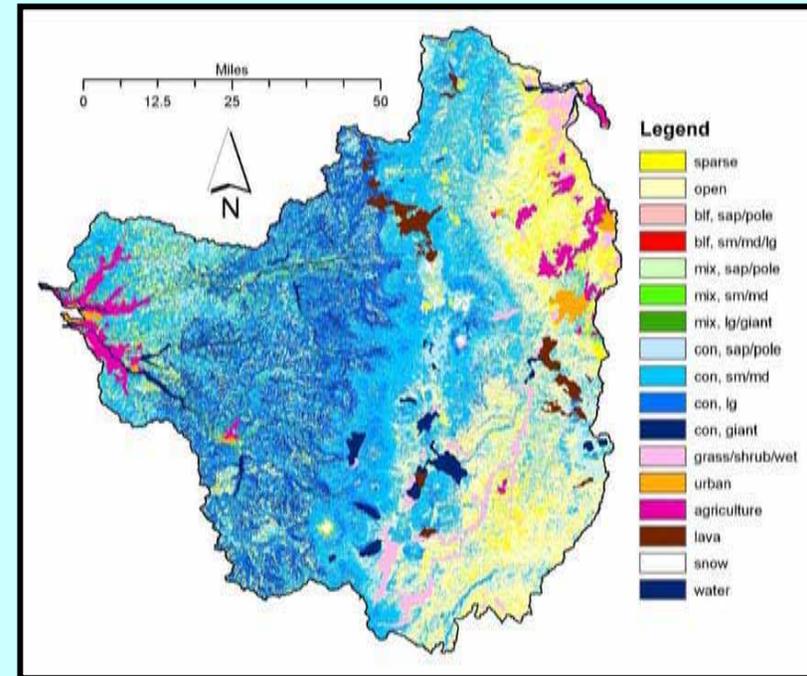
Populated Clearinghouse Areas Interstate Highway County
hu_boundary Region 4 US Highway

Interagency
stream
layer
2006

Interagency Mapping and Assessment Project (IMAP)

Wall-to-wall **vegetation** data

- ❖ Tree size distributions
- ❖ Species composition
- ❖ Snag and log densities
- ❖ Forest and non-forest
- ❖ Periodically updated



Landscape planning models

- ❖ Comparison of management alternatives
- ❖ Analysis of broad and mid-scale fire, wildlife, utilization (biomass, timber), fire risk & other landscape attributes

Interagency Mapping and Assessment Project (IMAP)

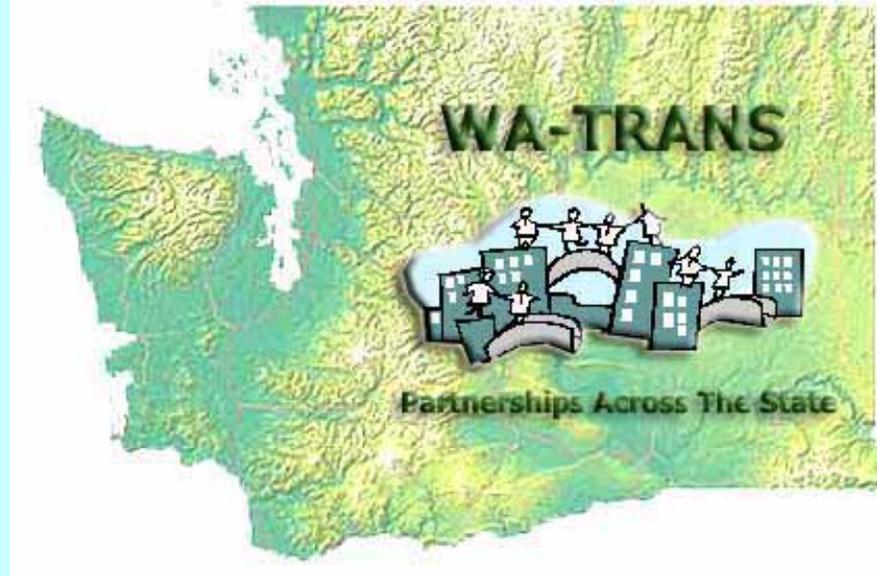
Current Partners

- ❖ US Forest Service (WA, OR, CA)
- ❖ BLM (OR, CA)
- ❖ Forest Service - Pacific Northwest Research Station
- ❖ Oregon Dept. Forestry
- ❖ The Nature Conservancy

Proposed New Partners

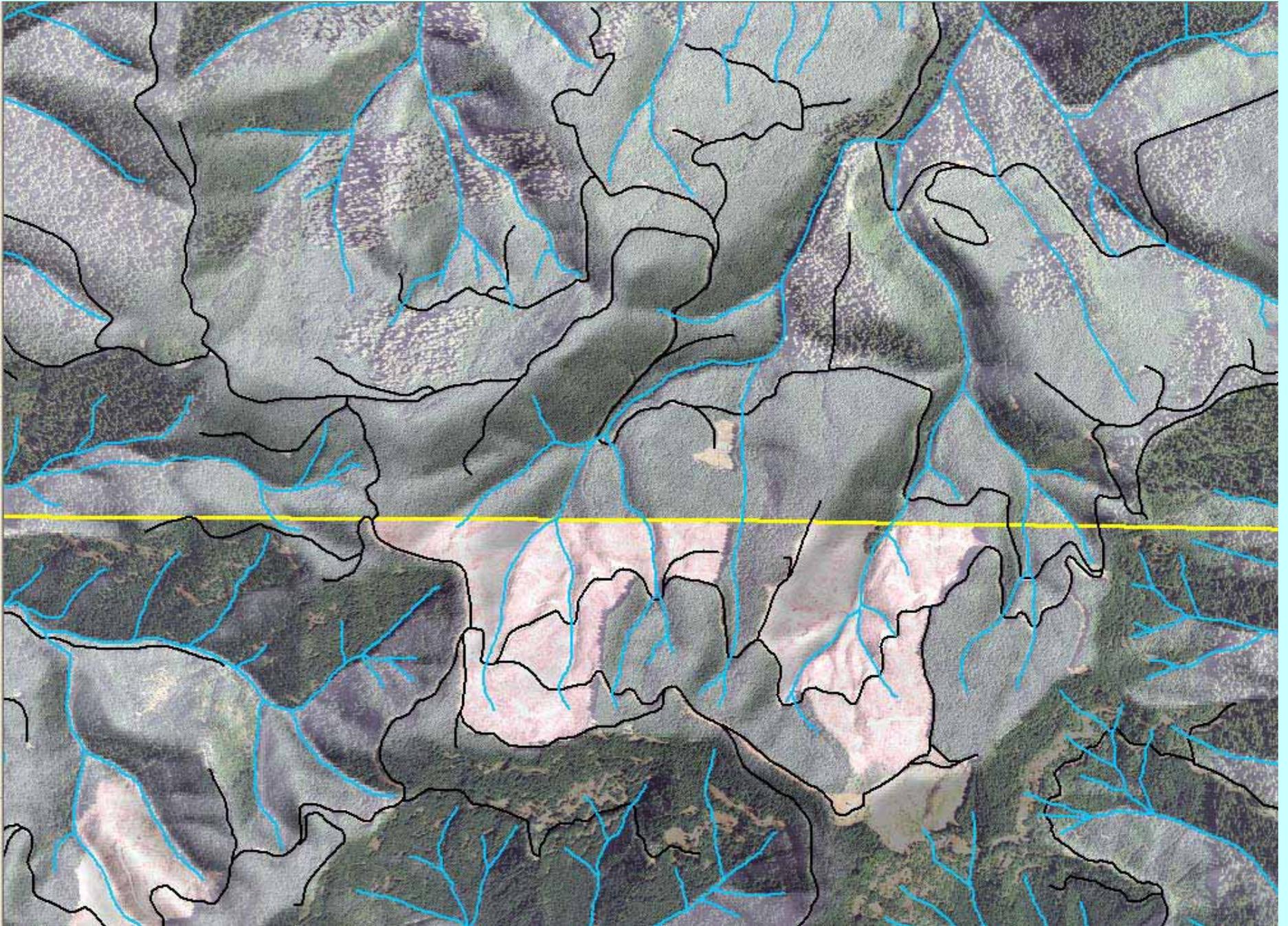
- ❖ Washington DNR & DFW
- ❖ National Park Service

Washington Transportation Framework Project



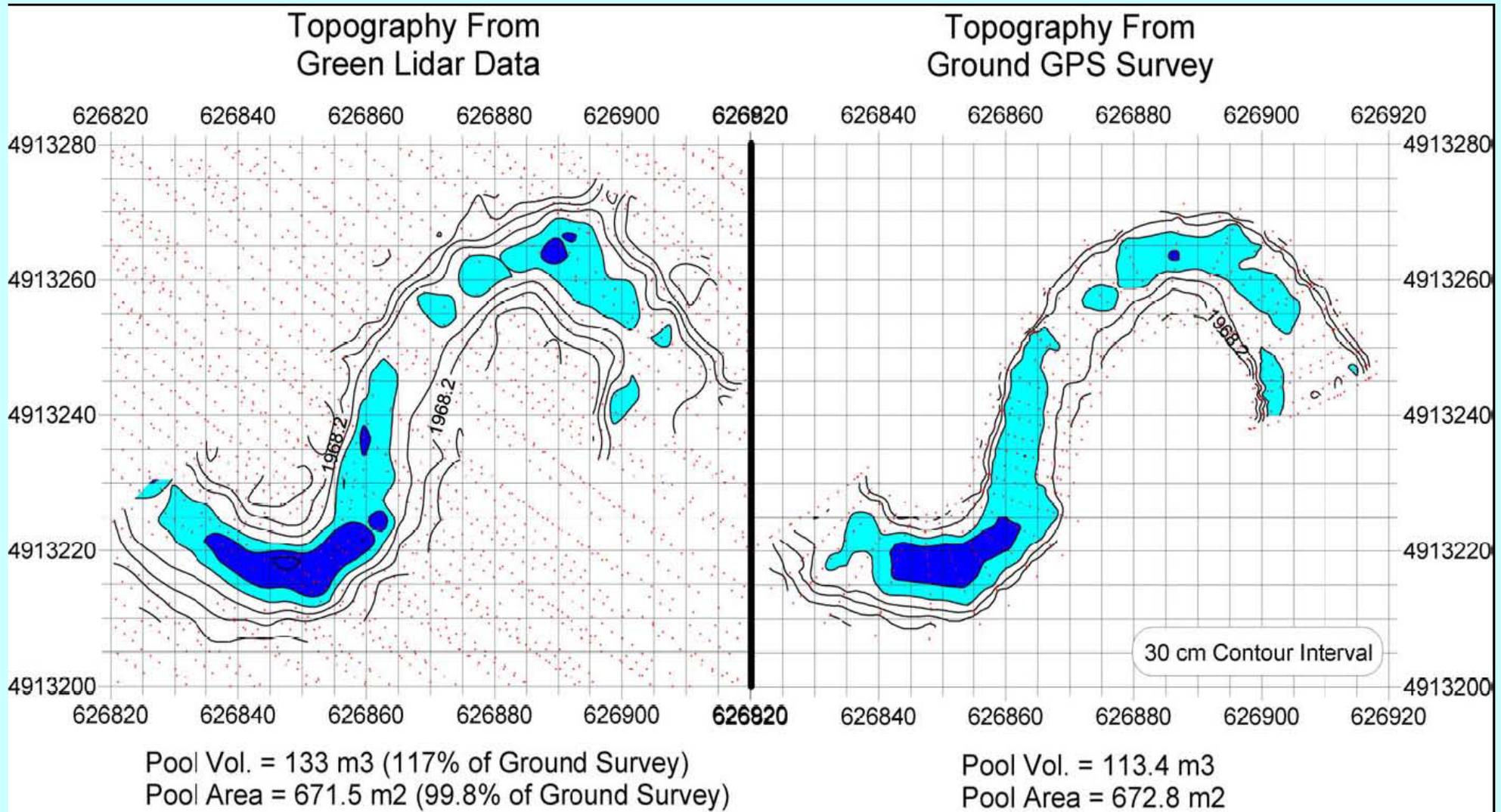
- ❖ Partners include USGS and Census Bureau, 22 counties (5 are on steering committee), DOT
- ❖ Tribes interested and some are participating
- ❖ DNR quit participating - has hurt ability of transportation framework to meet natural resources needs.
- ❖ US Forest Service is not participating.

1 meter resolution aerial photography

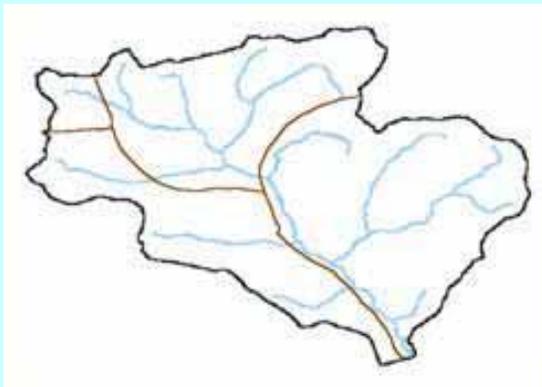
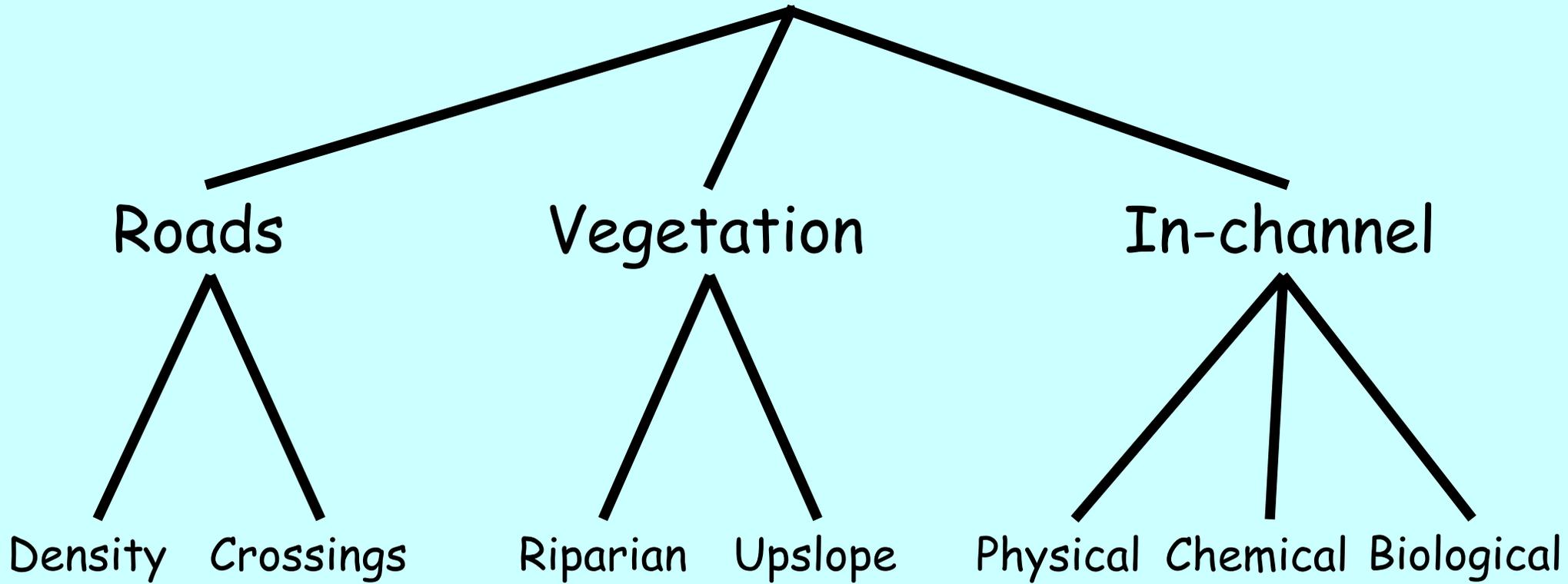


In-channel characteristics

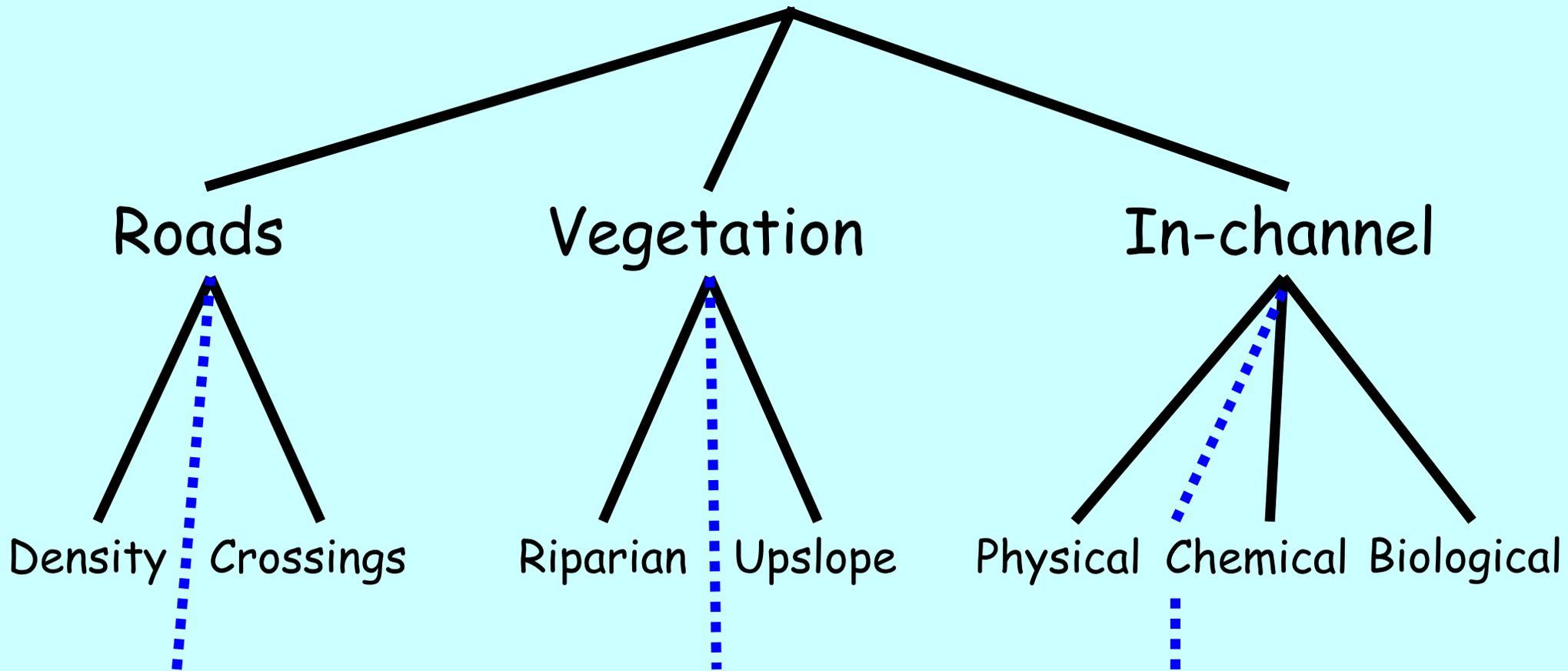
"Green LIDAR"



Watershed condition



Watershed condition



landslides



fire condition



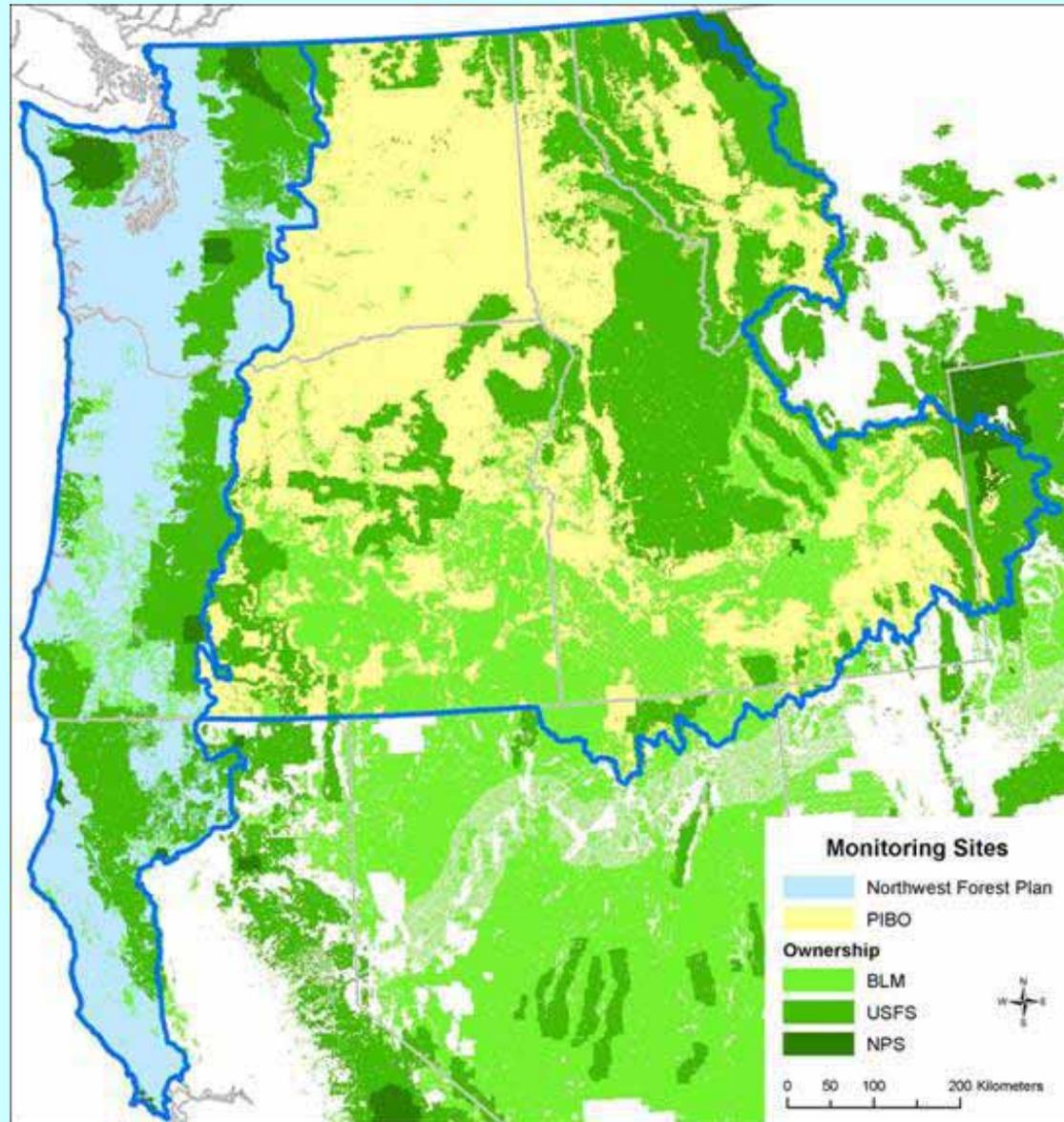
fish passage

Field data is needed...

- ❖ To develop upslope/riparian and in-channel attribute relationships.
- ❖ To ensure that model results reflect on-the-ground conditions.



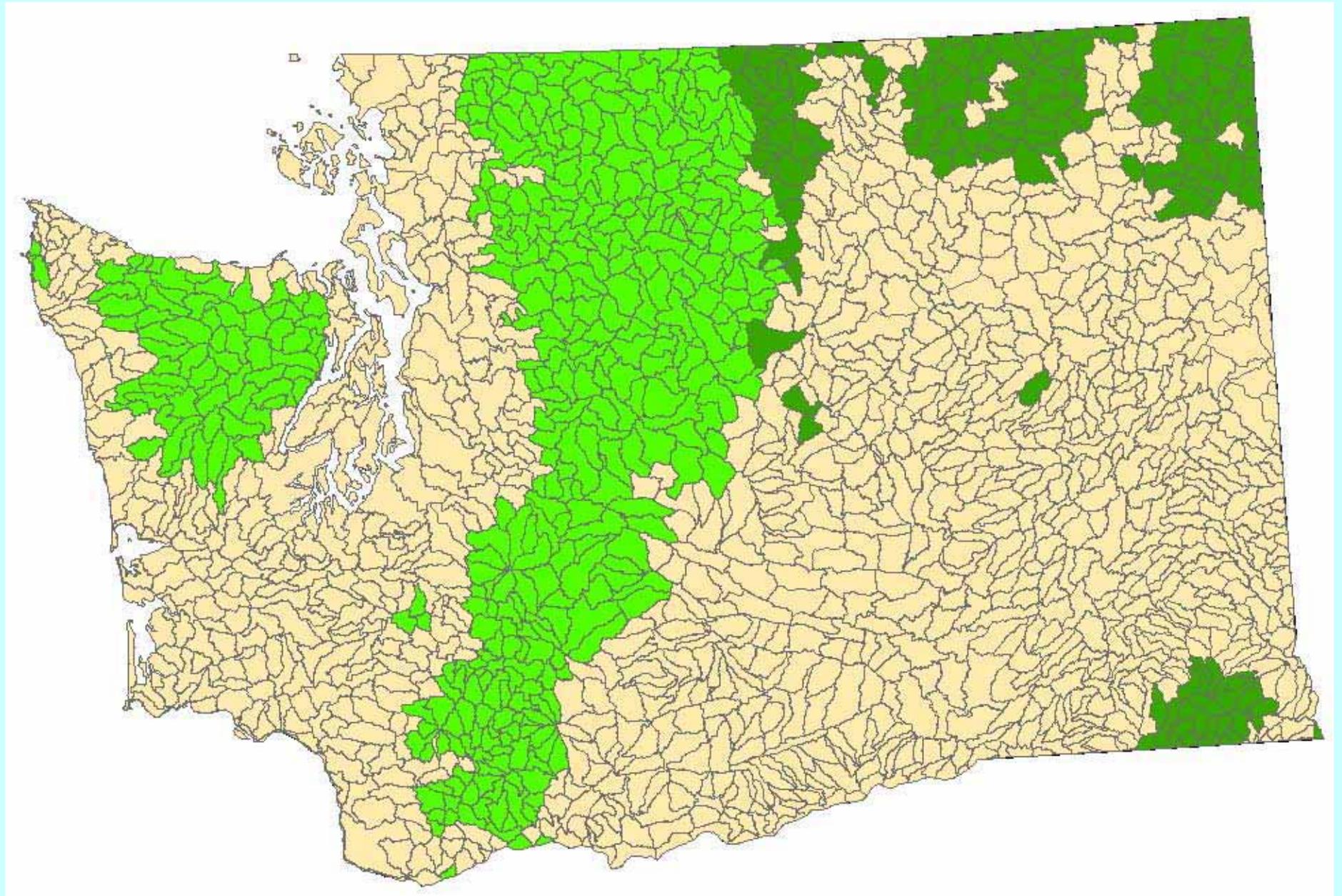
Aligning westside and eastside monitoring programs



AREMP & PIBO agree...

- ❖ Use probabilistic sample designs.
- ❖ Develop relationships between up-slope/riparian and in-channel conditions.
- ❖ Use decision support models for determining watershed condition.
- ❖ Answer monitoring questions at a Forest/BLM Field Office scale or larger.

An opportunity to work together



Questions?



www.reo.gov/monitoring/watershed

Changes in condition scores (% of watersheds) n = 250

	degraded	0	improved
Plan-wide	4	39	57
Key	2	24	74
Nonkey	5	48	48

Why did condition change?

vegetation growth
(+)



road decommissioning
(++)



wildfire
(--)

