Seeing the rivers for the trees

Watershed restoration on
National Forests in the Pacific Northwest

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Regional Hydrologist
USFS-PNW Region

Forest Restoration: What's the Vision?

A Vision

- A short time from now…
- in a Region very near you…

A Vision

- all life will depend on water…

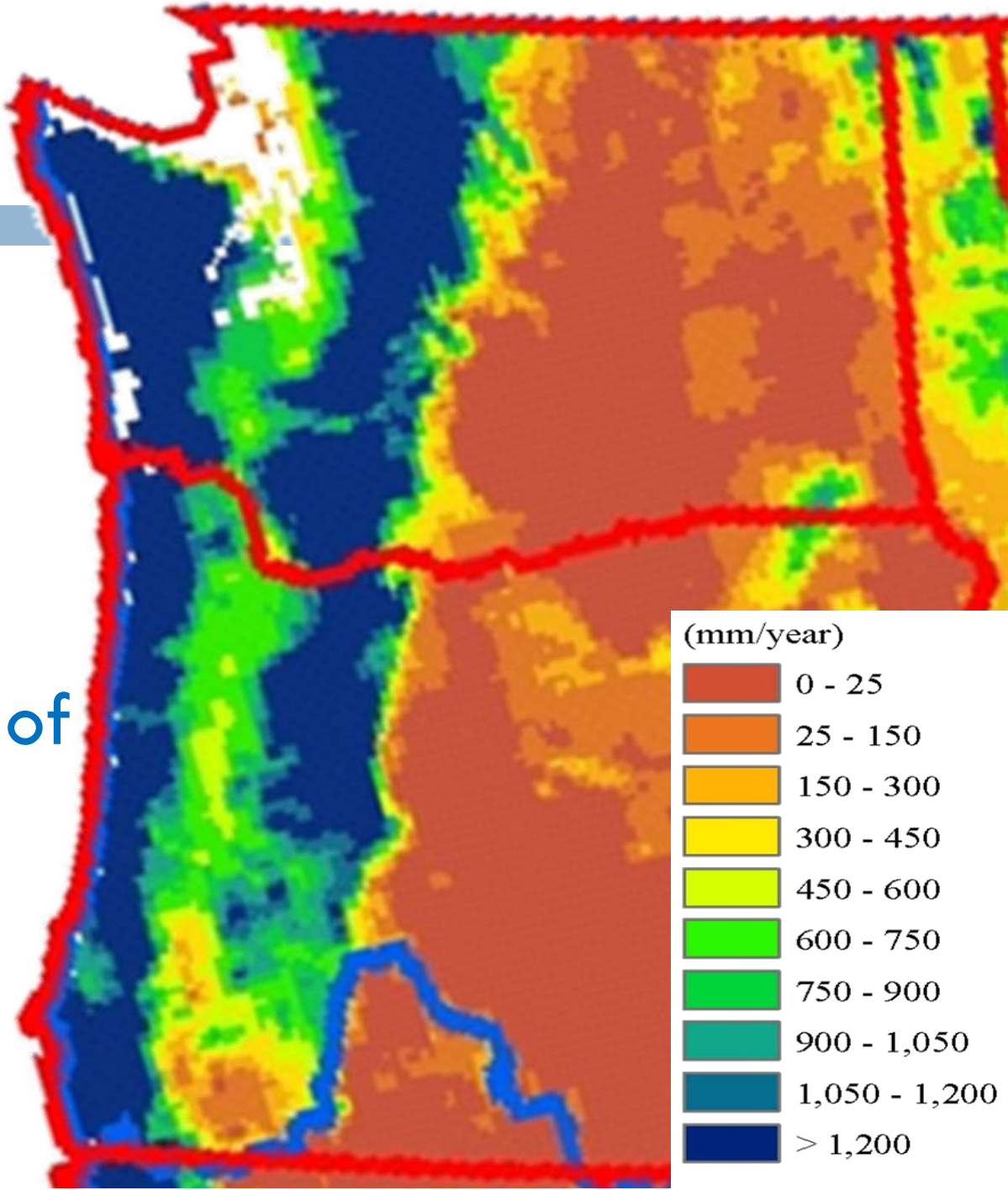
A Vision

- there'll be 25 million acres of national forests…

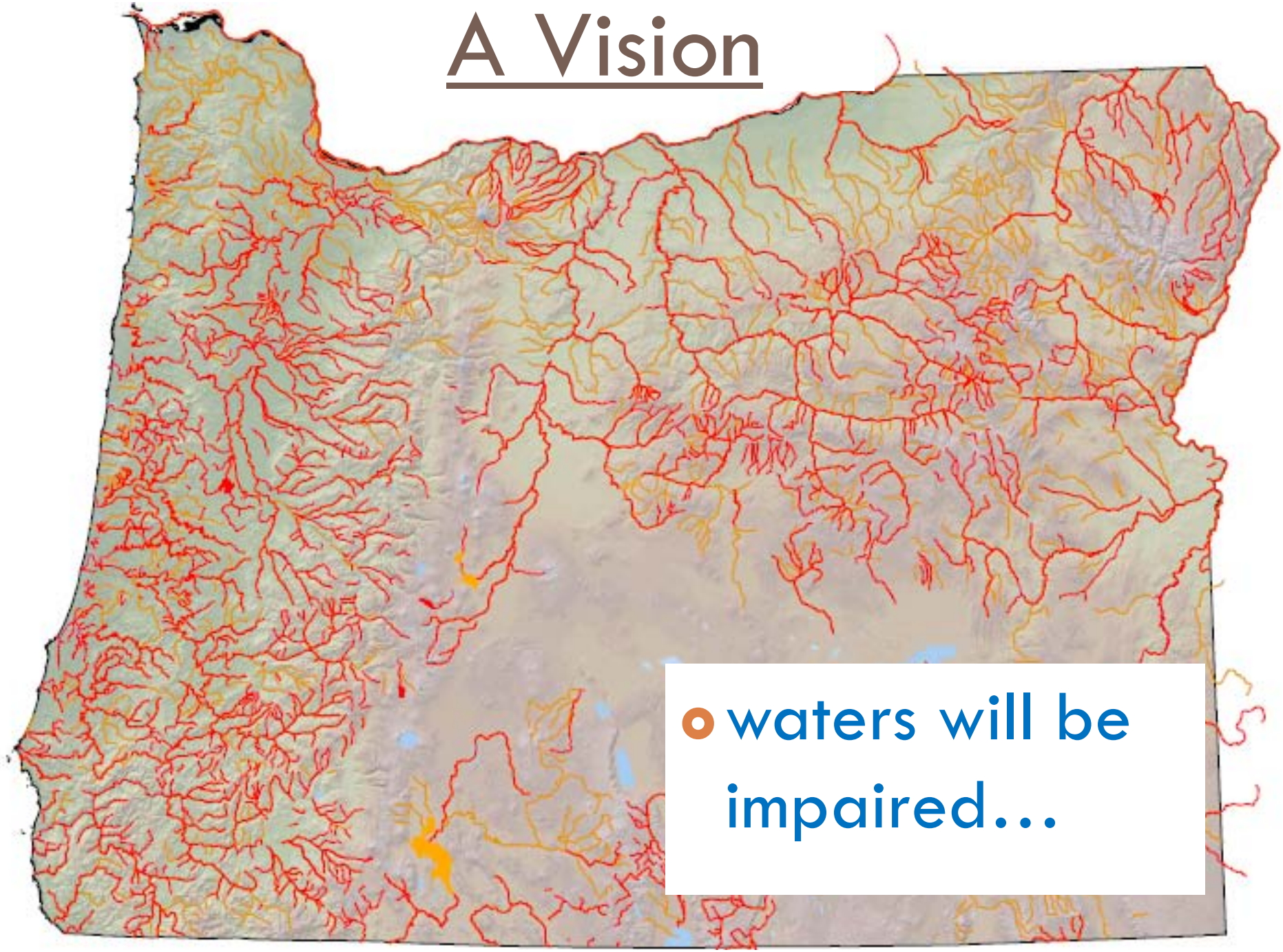
A Vision

- that'll contain 25,000 miles of streams…
- & supply ~40% of the runoff…

Brown et al. 2008



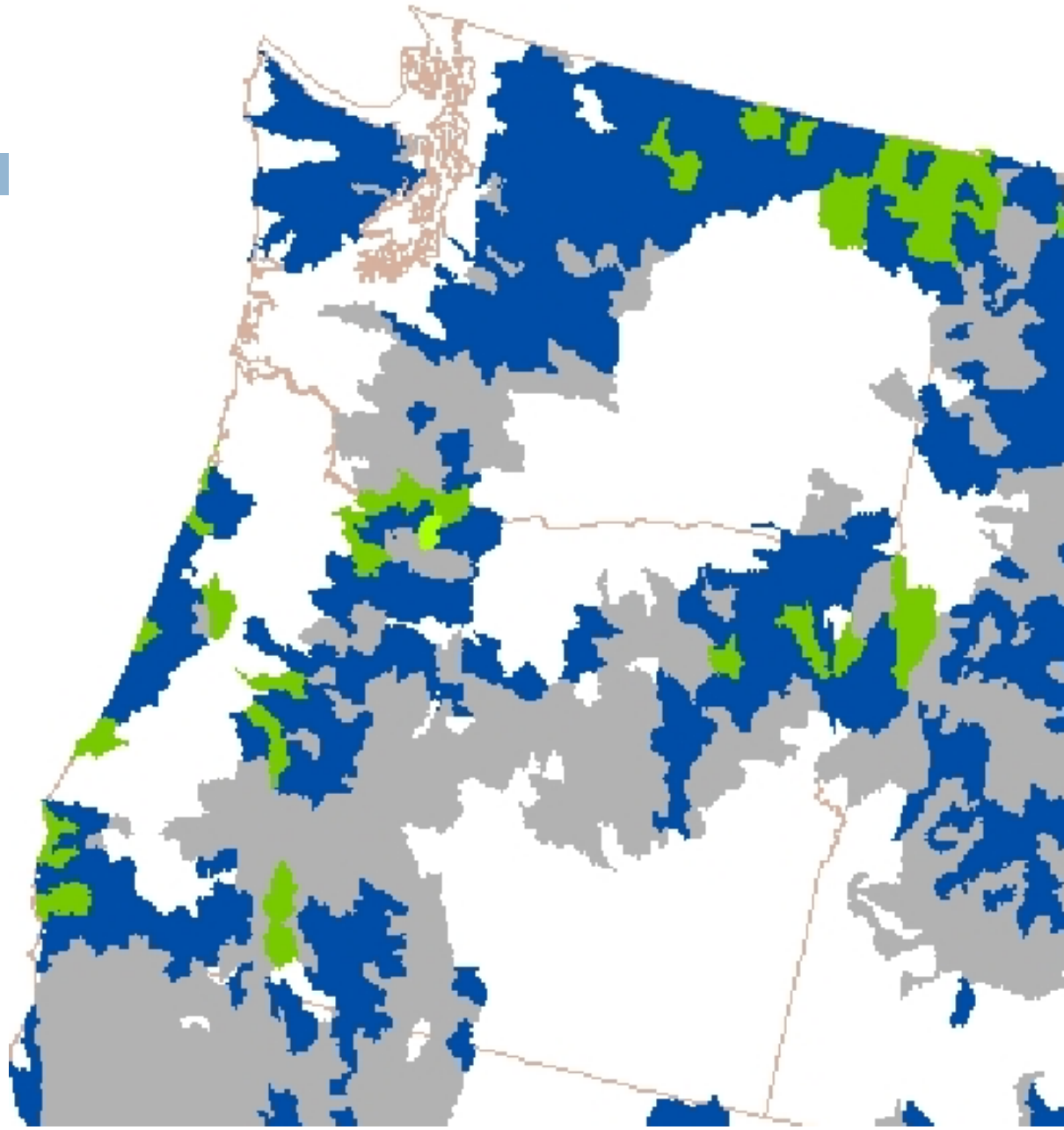
A Vision



- waters will be impaired…

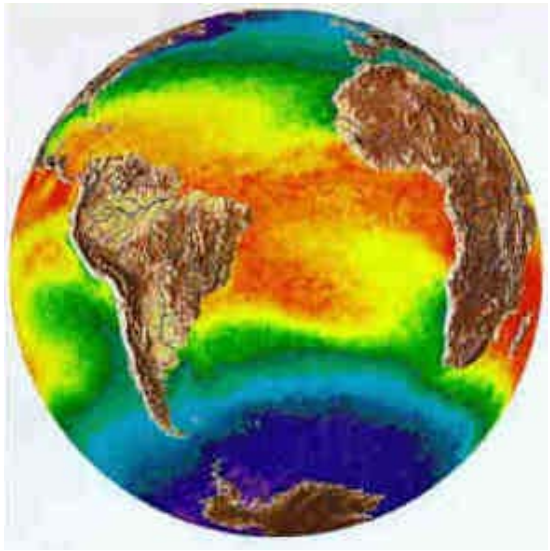
A Vision

- aquatic species & ecosystems will be threatened…



A Vision

- many causes…



- that require comprehensive solutions…

A Vision

- Implementation of USDA Secretary's vision will be well underway.
  - *"Our shared vision begins with restoration …first and foremost to protect our water resources."*
- Our work will focus on restoring *forested watersheds*.
  - fuels reduction
  - but much more…

A Vision of Watershed Restoration

- focused on water/aquatic resources
- based on integrated, whole-watershed management strategies
  - ridgetop to valley bottom
  - protection/passive restoration as foundation
  - complemented by active restoration

A Vision of Watershed Restoration

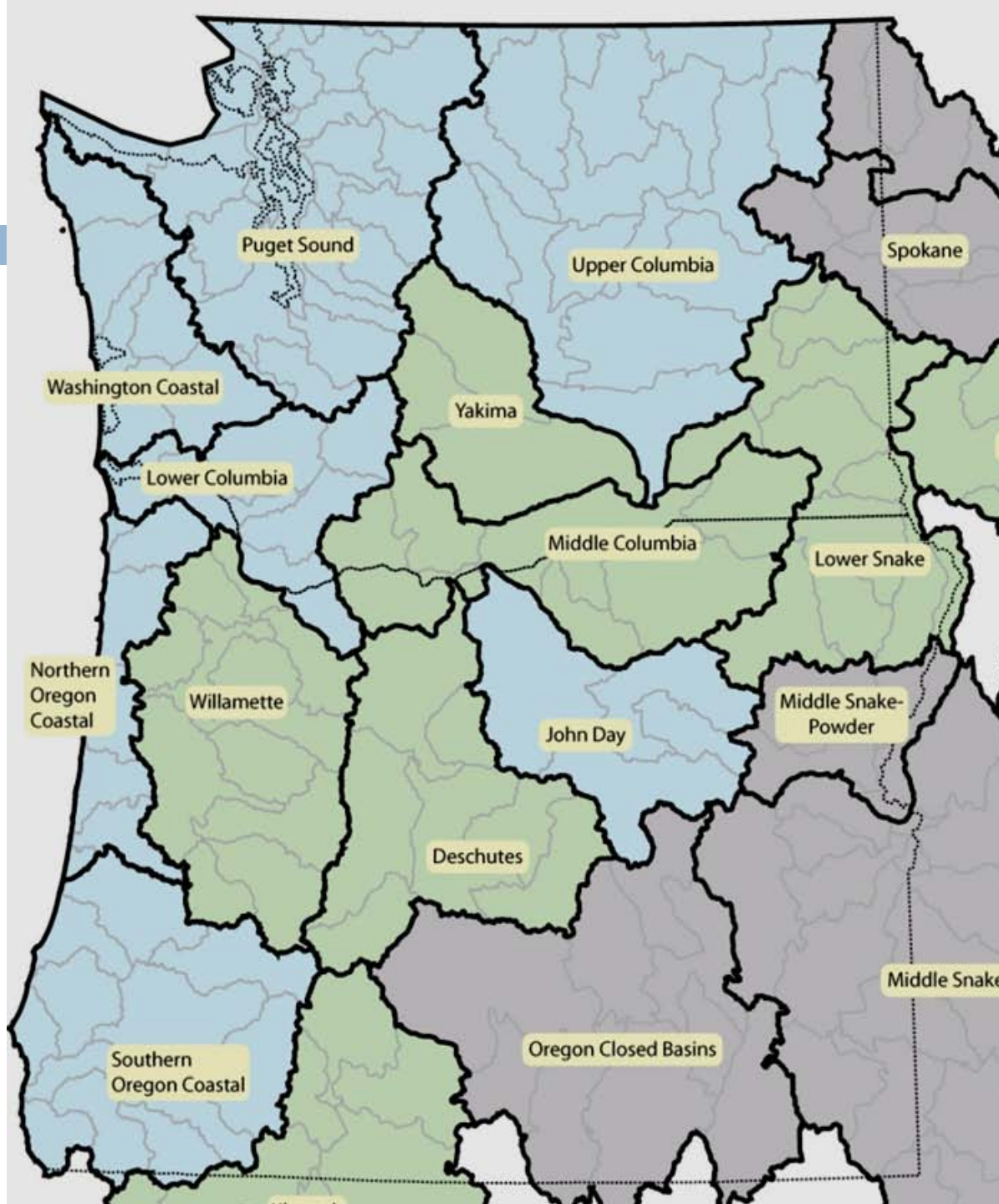
- Integrated approaches
- Aquatic Conservation Strategies
  - Riparian Reserves
  - Key Watersheds
  - Watershed Analysis
  - Standards & Guidelines/BMPs
  - Monitoring
  - Watershed Restoration

A Vision of Watershed Restoration

- Active restoration
  - strategic
  - integrated
  - effective & efficient
  - accountable & adaptive
  - economically-productive

Strategic

- Multi-scale assessment & prioritization
  - River Basin
    - stream conditions
    - watershed threats
    - watershed sensitivity



Strategic

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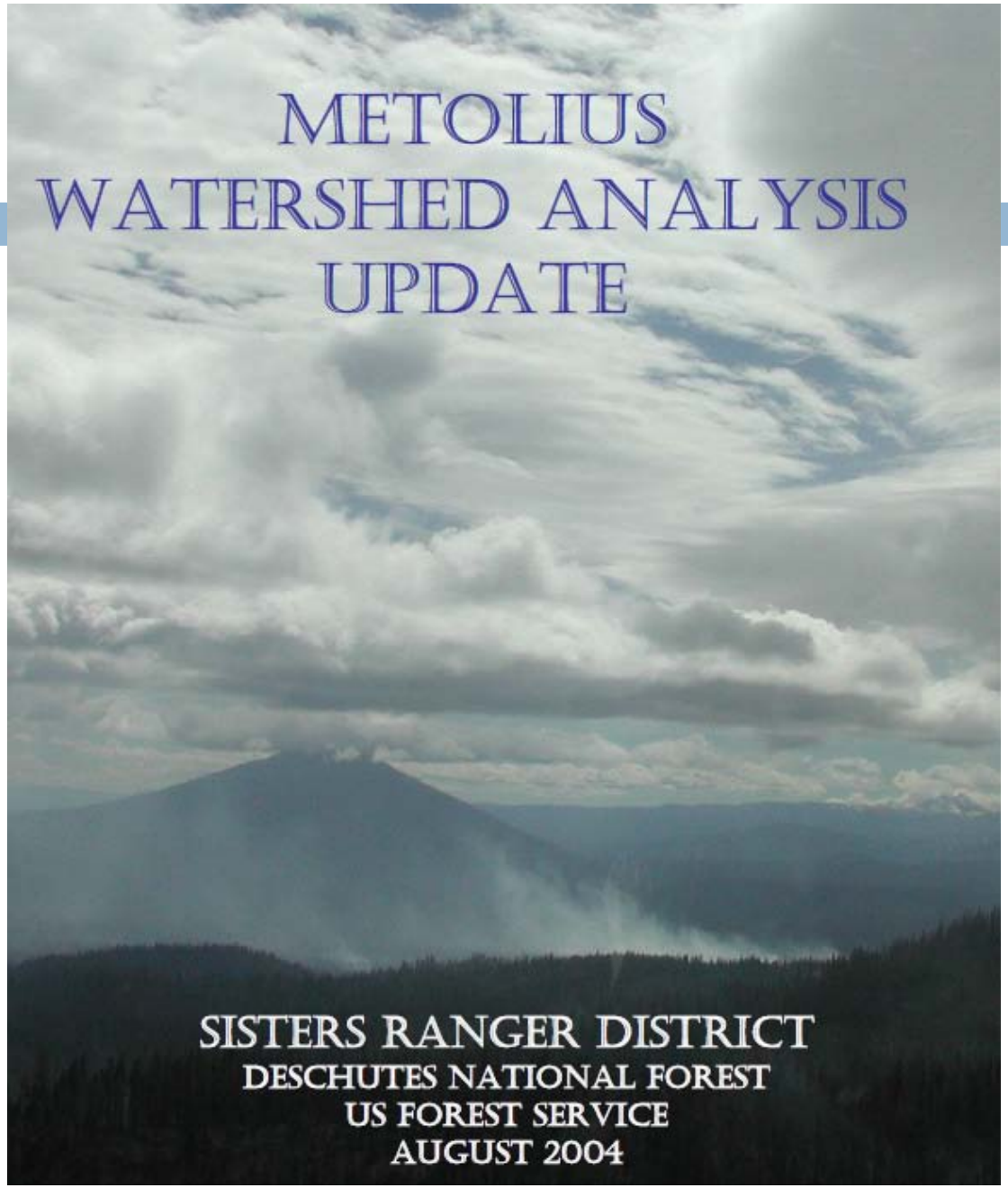

Strategic

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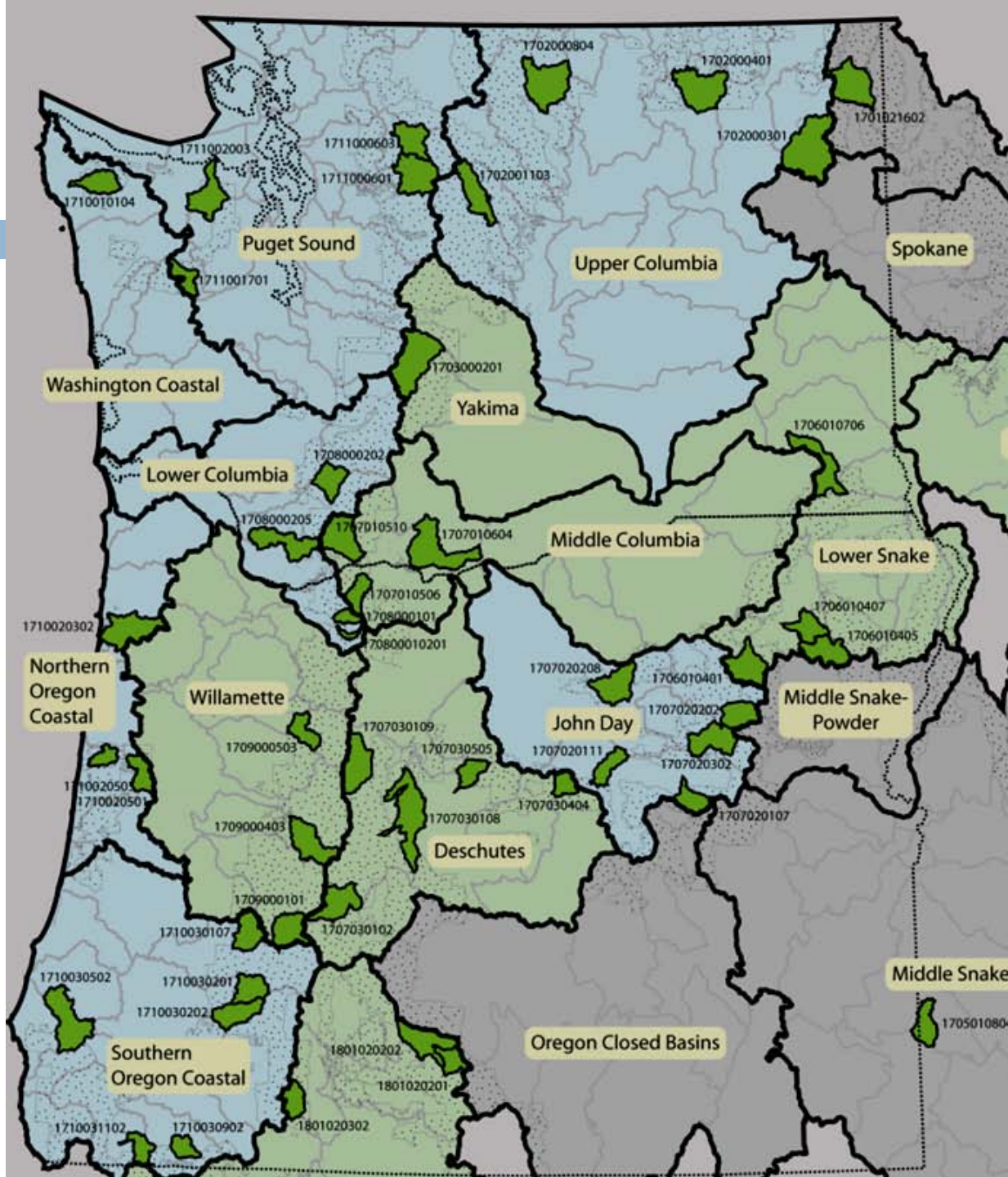


Strategic

- Multi-scale assessment & prioritization
  - River Basin
  - Watershed
  - Subwatershed
    - Condition Class 1
    - Condition Class 2
    - Condition Class 3

USDA

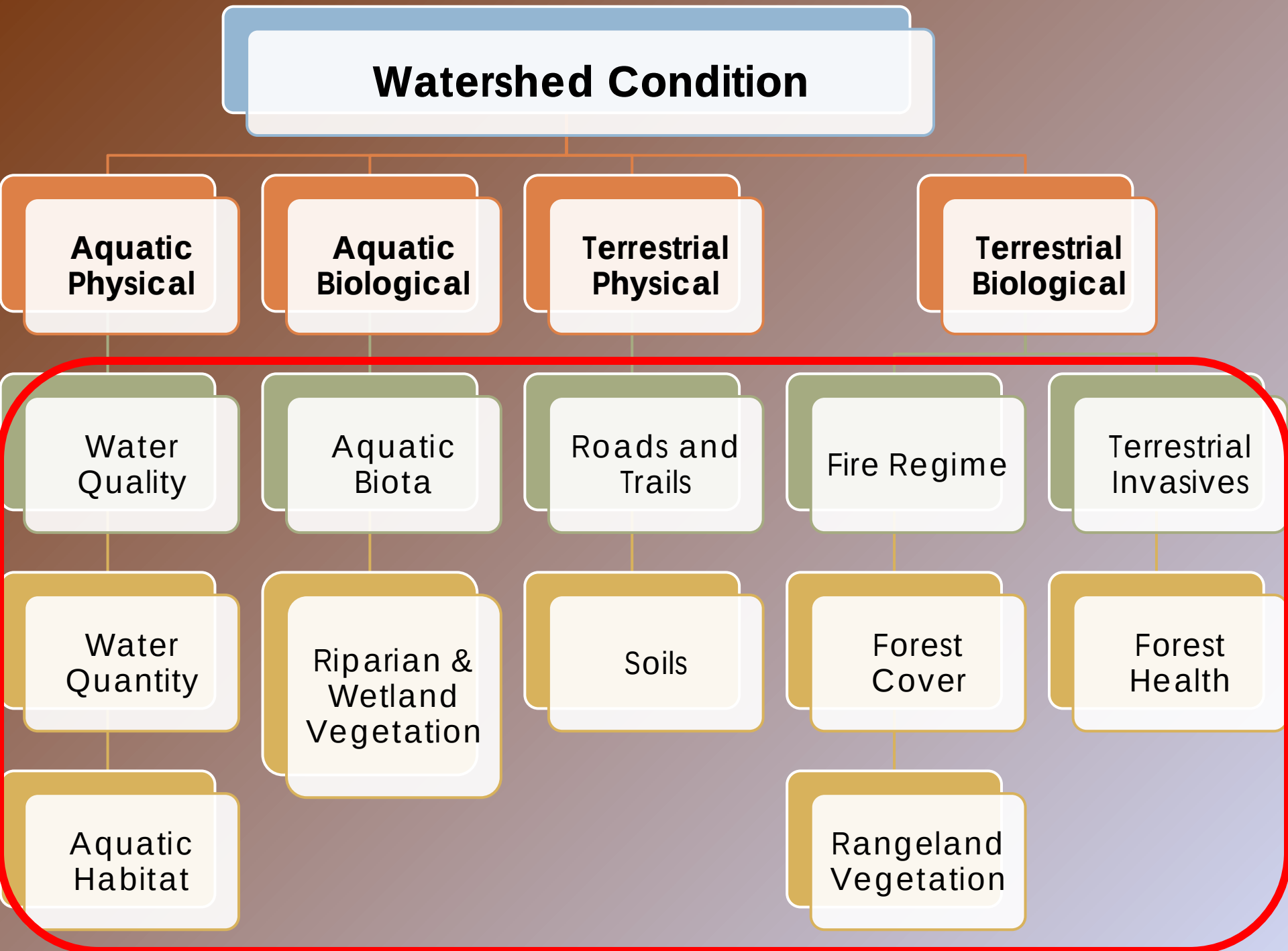
United States Department of Agriculture

Forest Service

FS-978

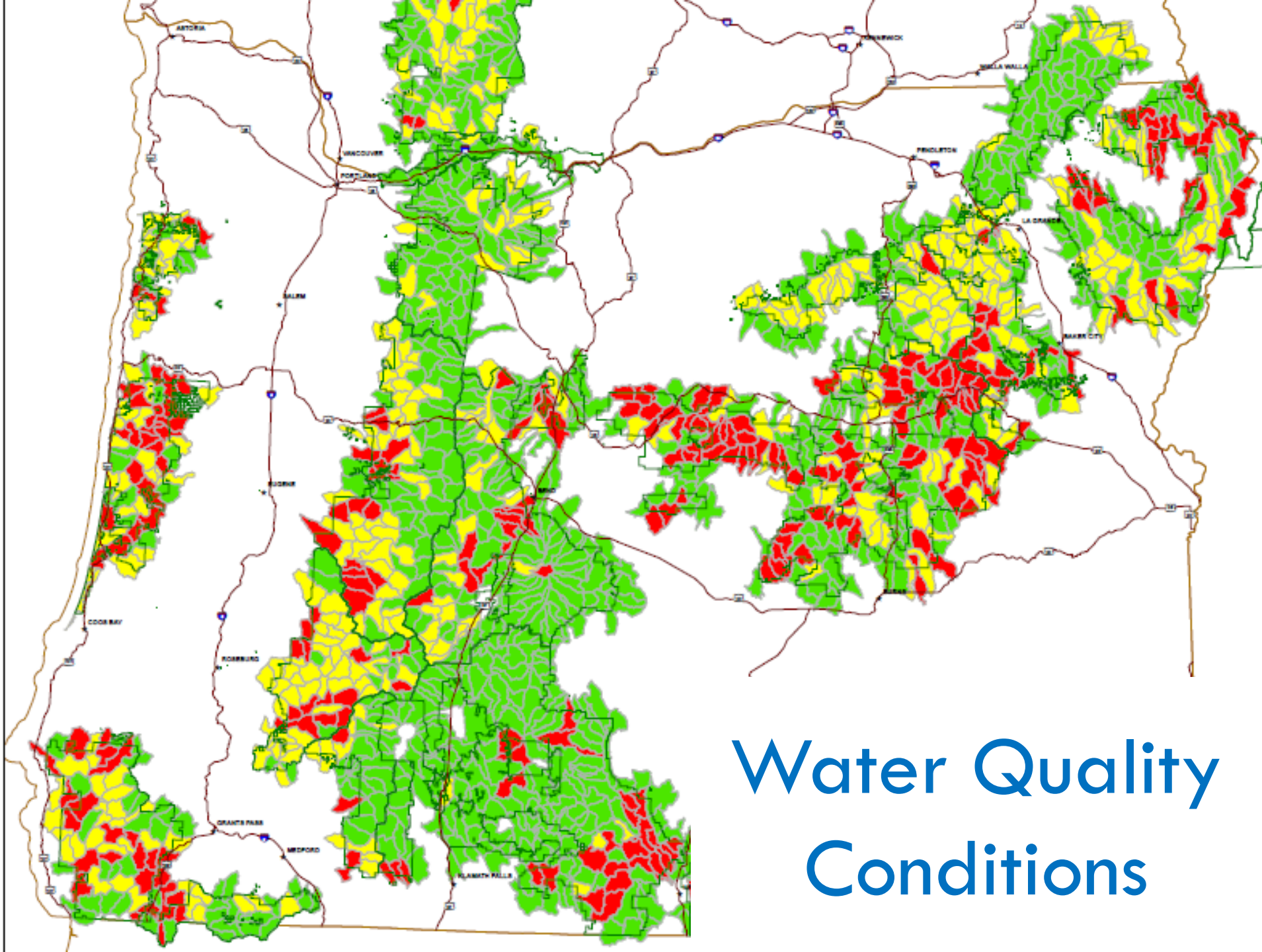
July 2011

Watershed Condition Classification Technical Guide

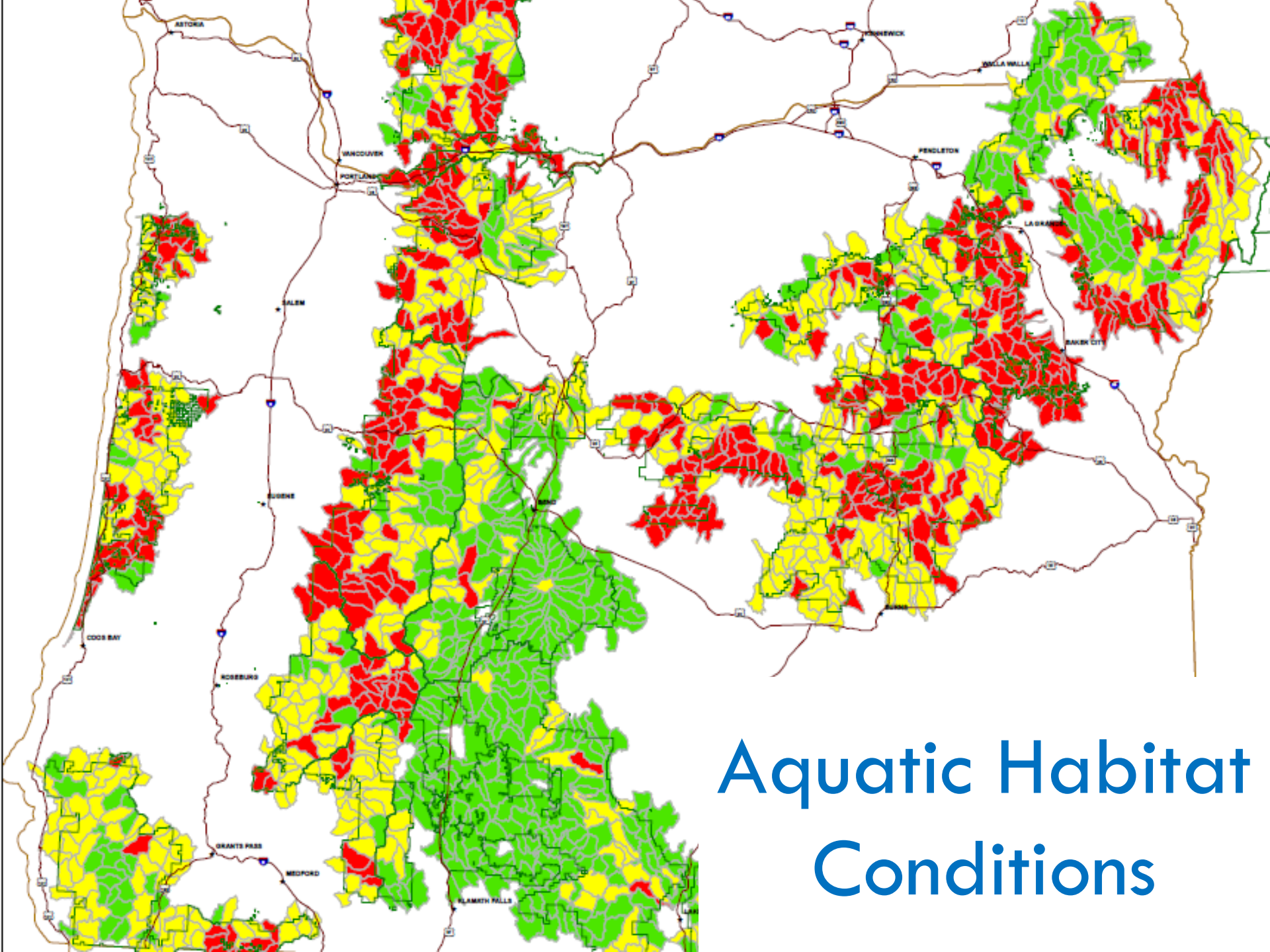

Watershed Condition
Aquatic Physical
Aquatic Biological
Terrestrial Physical
Terrestrial Biological
Water Quality
Water Quantity
Aquatic Habitat
Aquatic Biota
Riparian & Wetland Vegetation
Roads and Trails
Soils
Fire Regime
Forest Cover
Rangeland Vegetation
Terrestrial Invasives
Forest Health

Strategic

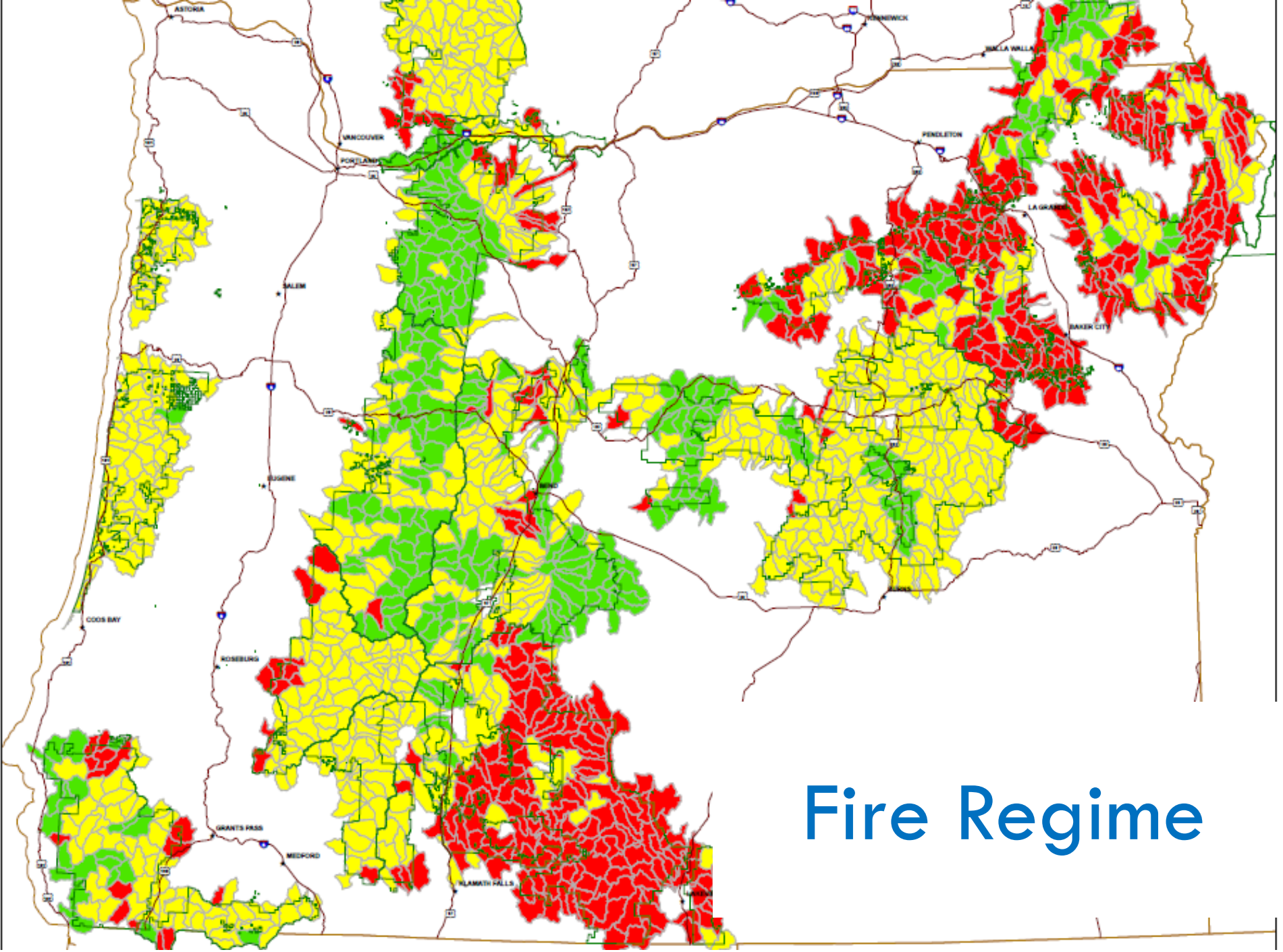
- Multi-scale assessment & prioritization
  - River Basin
  - Watershed
  - Subwatershed



Water Quality Conditions



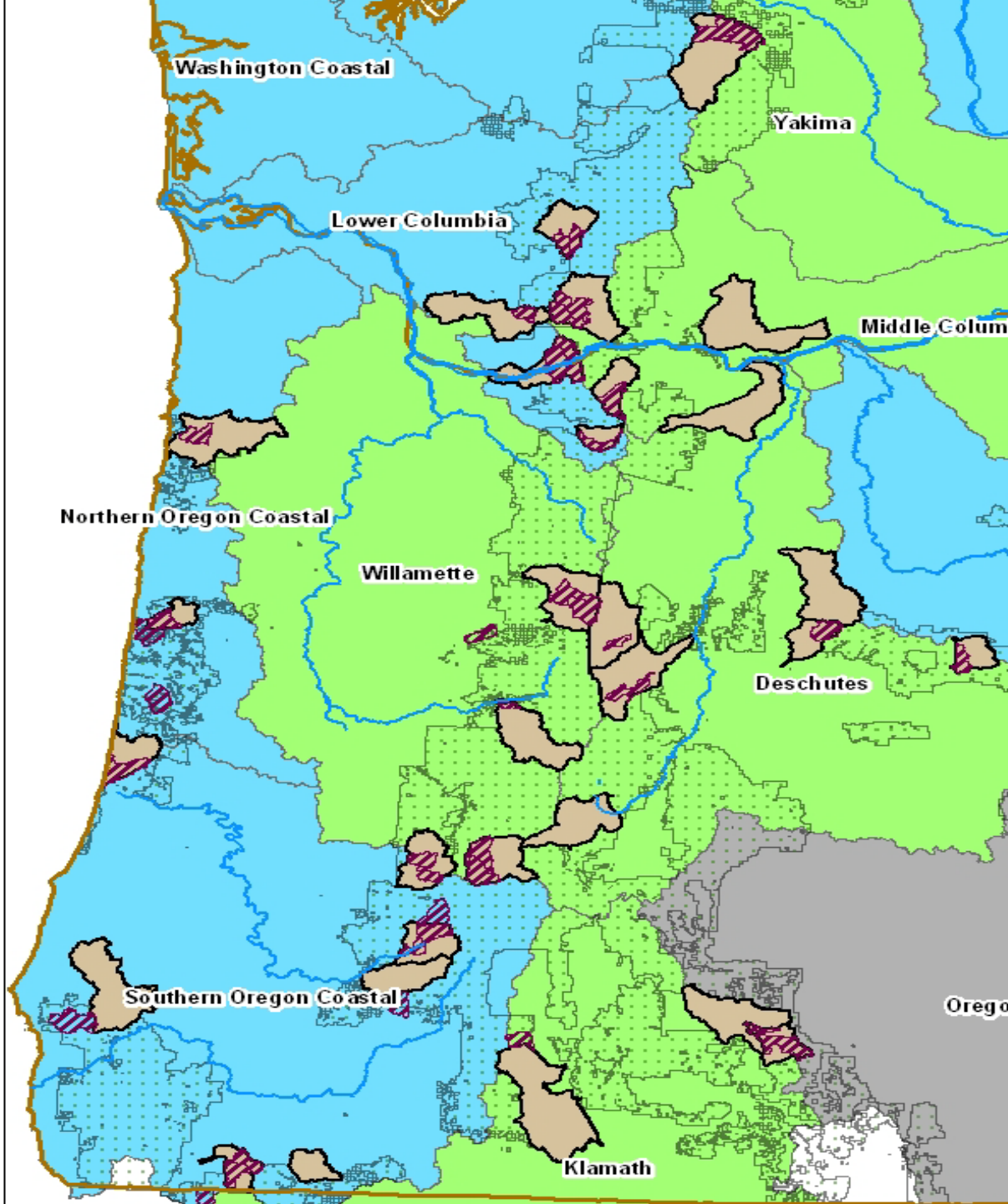
Aquatic Habitat Conditions


ASTORIA
KENNEWICK
WALLA WALLA
VANCOUVER
PORTLAND
PENDLETON
LA GRANDE
SALEM
BAKER CITY
EUGENE
BEND
COOS BAY
ROSEBURG
GRANTS PASS
MEDFORD
KLAMATH FALLS

Fire Regime

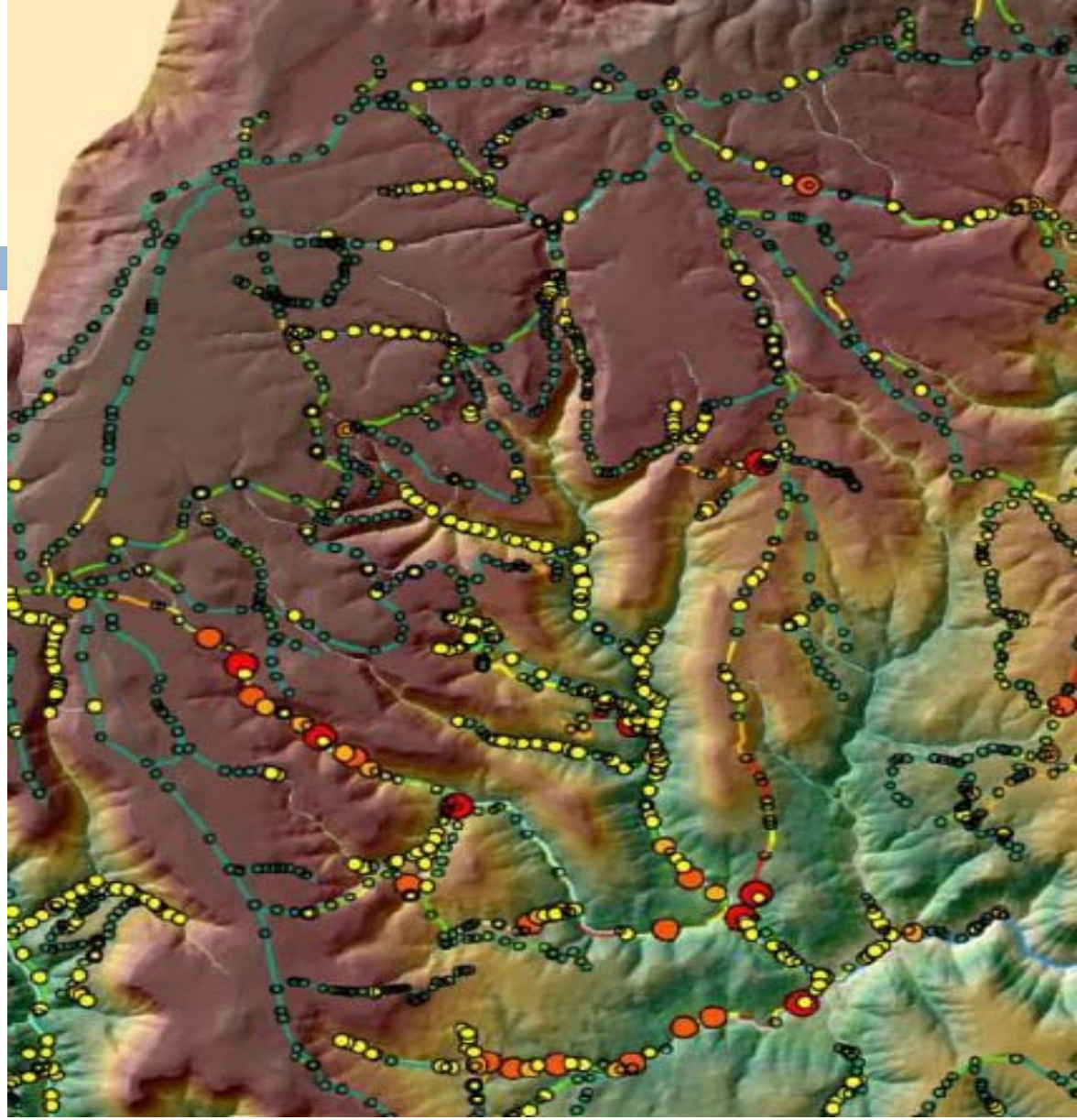
Strategic

- Multi-scale assessment & prioritization
  - River Basin
  - Watershed
  - Subwatershed



Strategic

- Multi-scale assessment & prioritization
  - River Basin
  - Watershed
  - Subwatershed
  - Site



>90% of road sediment comes from 10% of road system.

Wall Creek, Umatilla NF

Integrated

- multiple, diverse actions
- implemented at the watershed-scale
- all lands
- documented in an action plan
- based on watershed analysis

United States Department of Agriculture

USDA Forest Service

Pacific Northwest Region Aquatics

Illinois Valley Watershed Council

Illinois Valley Soil & Water Conservation District

Watershed Condition Framework

FY2011 Transition Watershed Restoration Action Plan

Pacific Northwest Region
Rogue River-Siskiyou National Forest
Wild Rivers Ranger District

Sucker Creek Watershed

6th FIELD SUBWATERSHEDS

Upper Sucker Creek
Middle Sucker Creek (*priority*)
Grayback Creek (*priority*)
Lower Sucker Creek

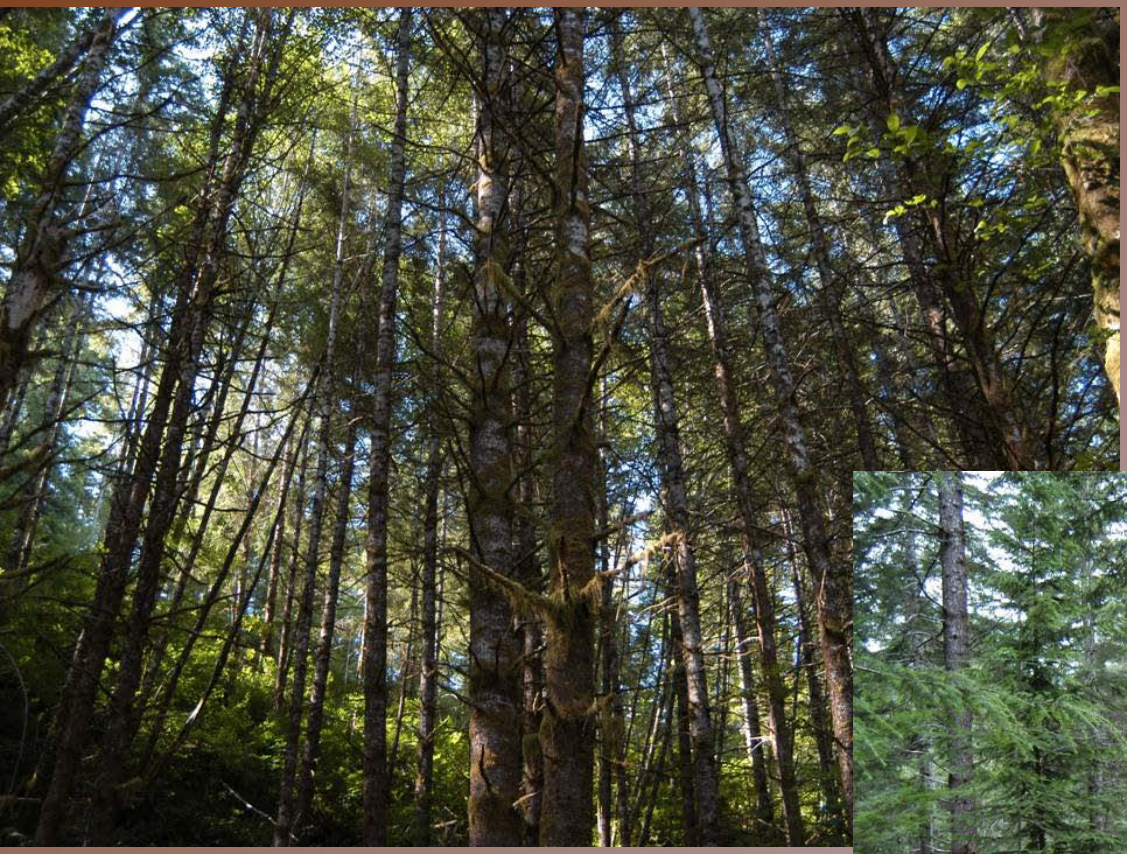
August 2011

Fuels Management

Okanogan-Wenatchee NF

Riparian Restoration, Veg Mgt

Siuslaw NF



Riparian Management

Fremont-Winema NF

Riparian Planting

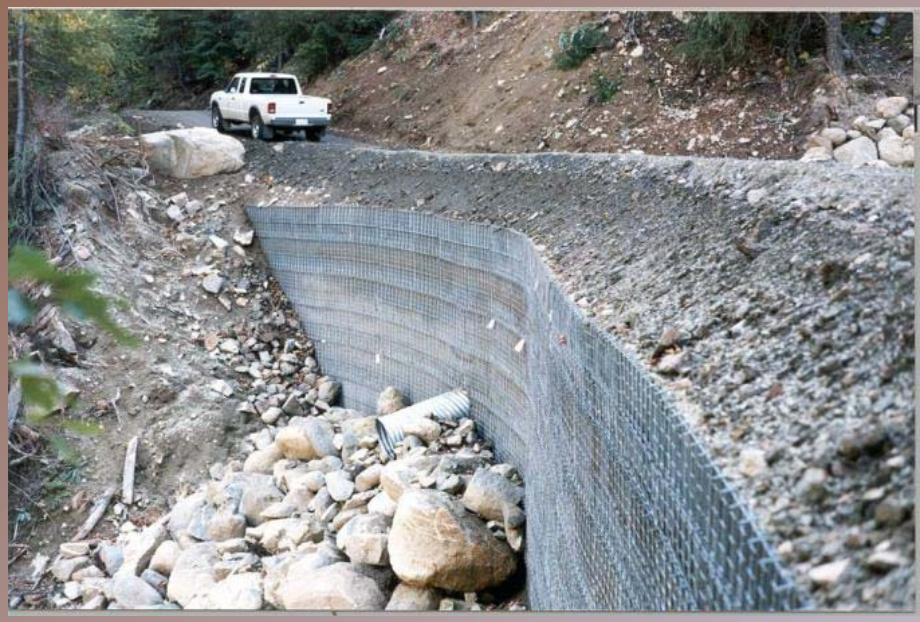
Deschutes NF

Road Decommissioning

Siuslaw and Olympic NFs

Road Improvements

Rogue-River Siskyou and Malheur NFs



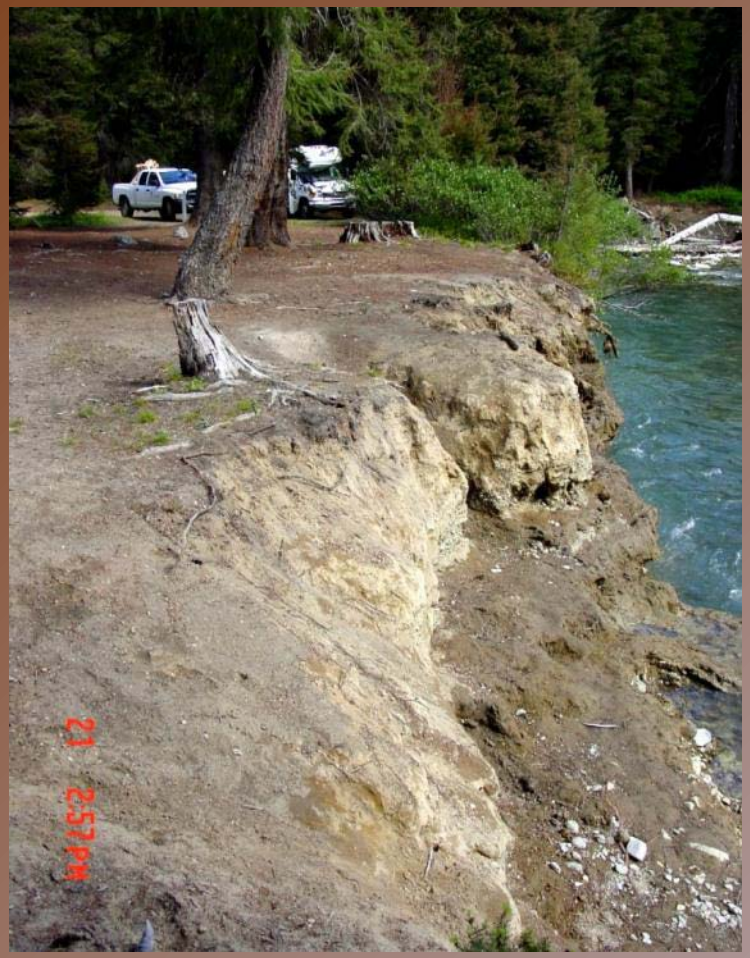
Floodplain & Riparian Restoration

Wallowa-Whitman NF

Wetland Restoration

Siuslaw and Deschutes NFs

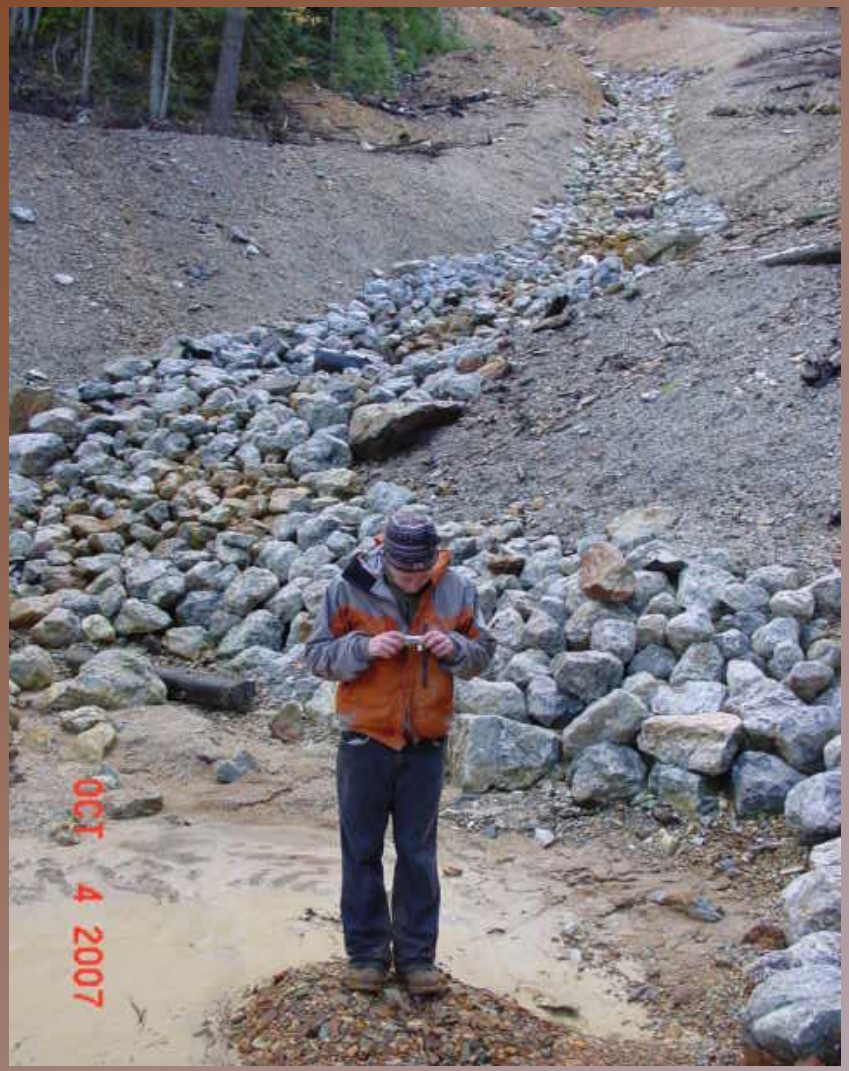
Riparian Restoration, Recreation



Okanogan-Wenatchee NF

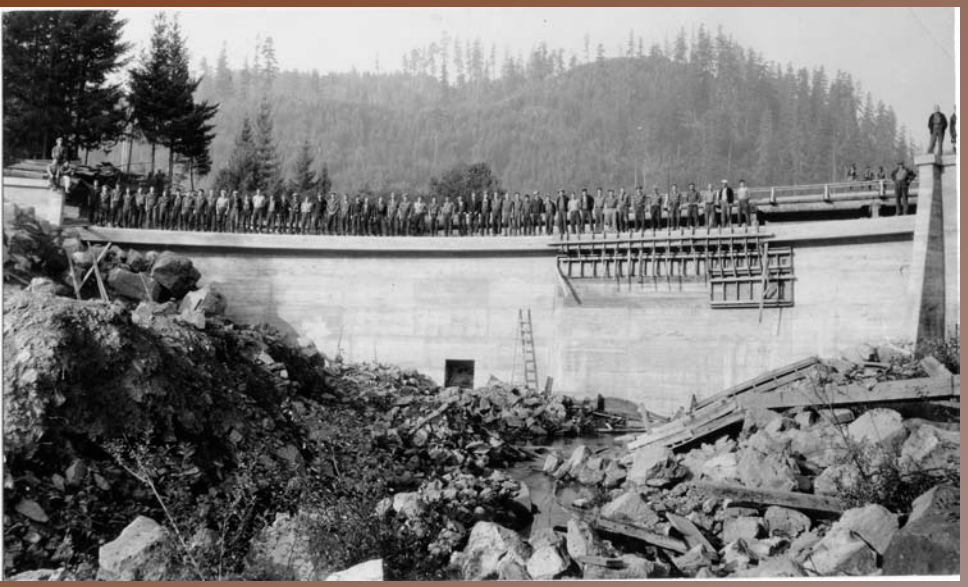
Mine reclamation

Rogue River-Siskyou NF



Instream Restoration

Gifford Pinchot and Colville NFs



Instream Restoration

Umpqua and Siuslaw NFs

Active Restoration: Instream Flows

Invasive Species

Umpqua NF

Integrated

Bringing it together at the watershed-scale

- 25-30 watersheds restored in past 15 years.
- Others getting close.

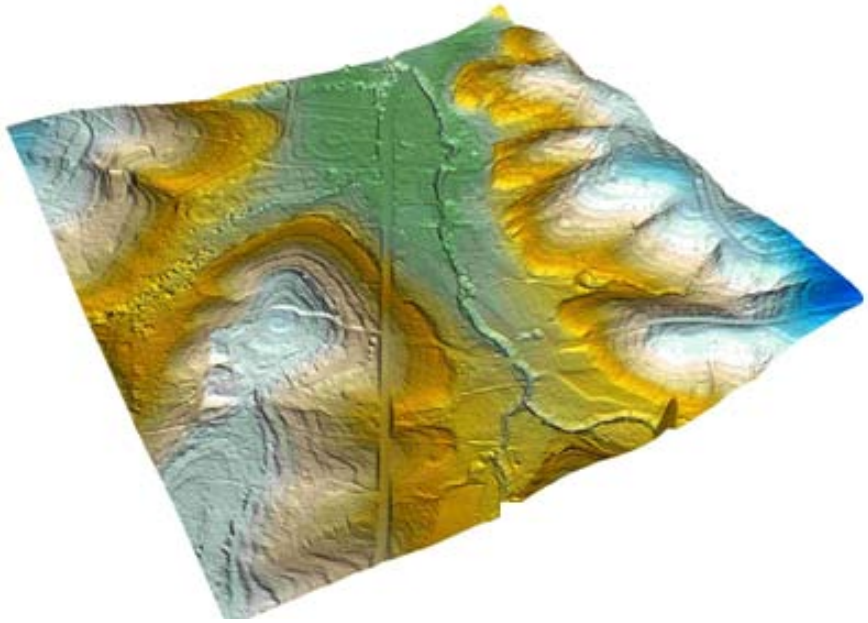
Boulder Creek

95%
Completion of Priority Restoration Actions

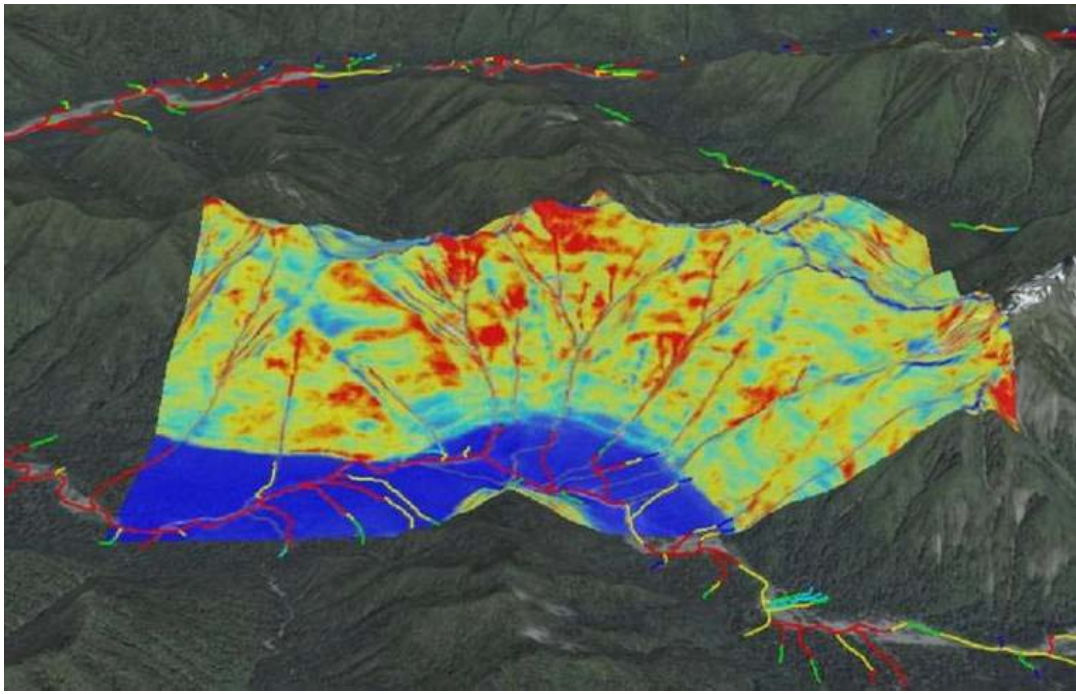
Upper Applegate River

90%
Completion of Priority Restoration Actions

Effective

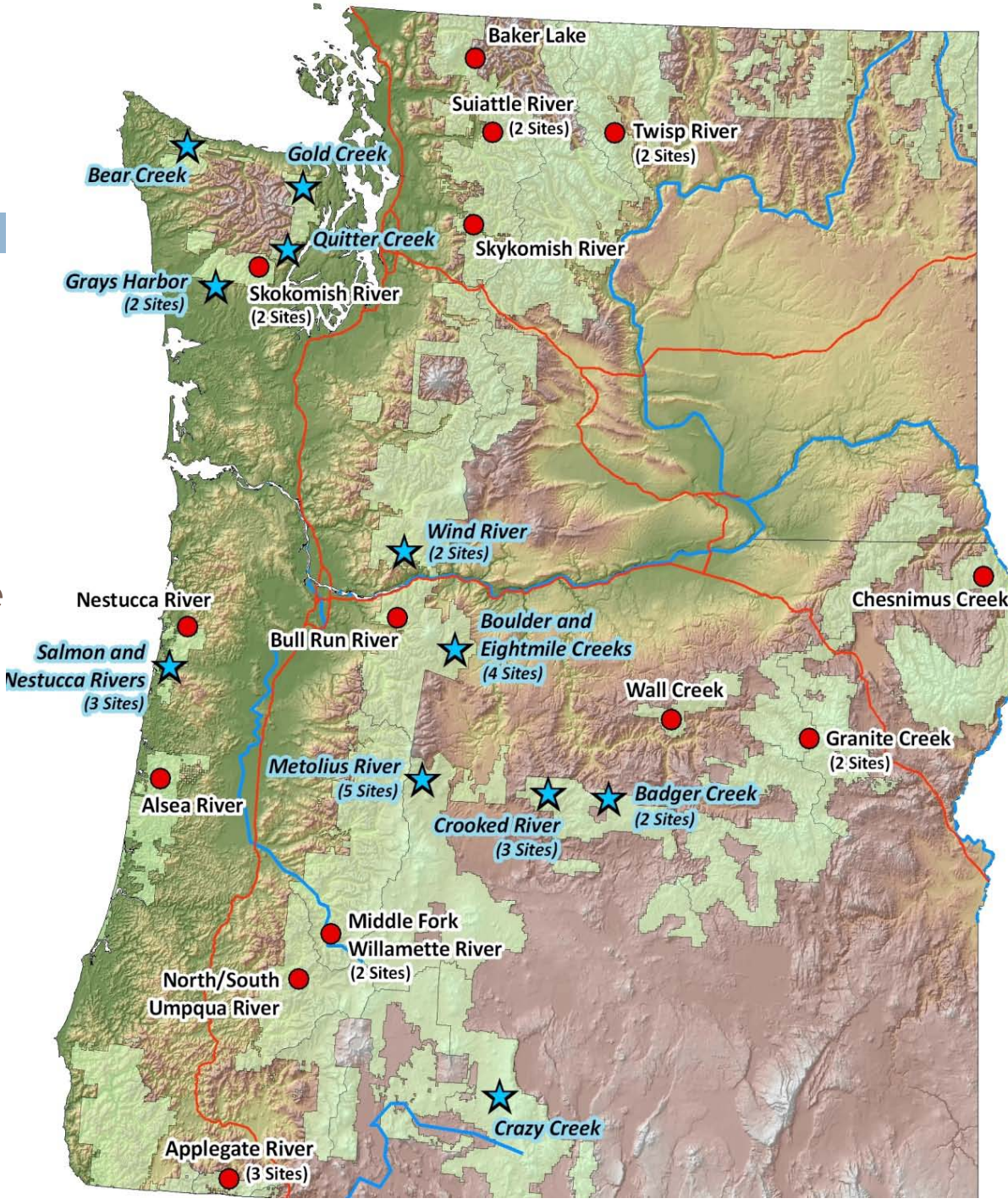


- science-based
  - protect first
  - treat best vs. worst first
  - restore natural process and function
  - use new data & analysis tools



Effective

- Legacy Roads effectiveness monitoring
  - 14 decom or storage
  - 7 stormproofing
  - 21 fish passage



Effective

Road Decommissioning/Storage

- road-stream connectivity: ↓ 16-70%
- sediment delivery: ↓ 9-81%
- xing fill at risk: ↓ 432-4098m^3

Road Stormproofing

- road-stream connectivity: ↓ 11-38%
- sediment delivery: ↓ 47-58%

Effective

Fish Passage

- passage demonstrated at 75% of new stream crossings (mark/recapture)
- fish present within crossing at remaining 25%

Efficient

- community & partnership-based
  - leverage skills/resources
- streamlined regulations
  - programmatic

ecotrust

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

BLM NATIONAL SYSTEM OF PUBLIC LANDS

OREGON WATERSHED ENHANCEMENT BOARD OWEB

Accountable

STEP A

Classify Watershed Condition

STEP B

Prioritize Watersheds for Restoration

STEP C

Develop Watershed Restoration Action Plans

STEP D

Implement "Essential" Projects

STEP E

Track Restoration Accomplishments

STEP F

Monitor and Verify

Watershed Condition Framework

Adaptive

Improving program & project design

- Road Deco
  - full excavation needed at stream Xings.
  - contractors require more oversight!

Adaptive

Improving program & project design

- Road Stormproofing
  - can reduce some impacts…
  - but sometimes cause others.
  - need to consider tradeoffs in steep terrains.

Adaptive

Improving program & project design

- Drainage-spacing to minimize gullies

Hillslope (%)	Max Road Length (m)
5%	1200
10%	300
15%	150
20%	75
25%	50
35%	25
45%	15
70%	5

Adaptive

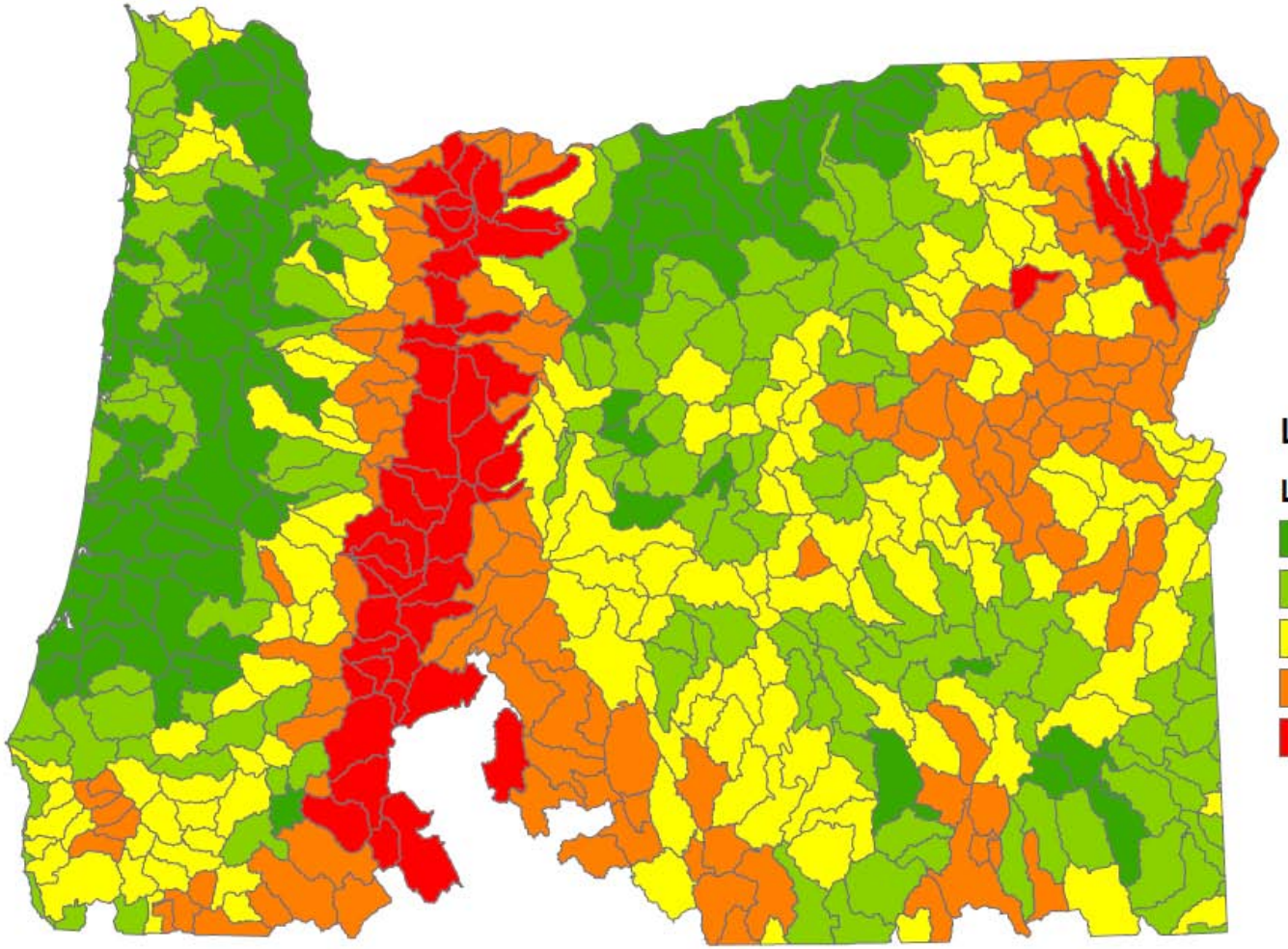
Improving program & project design

- Fish passage
  - constructing channels is needed in Xings to simulate natural streams

Adaptive

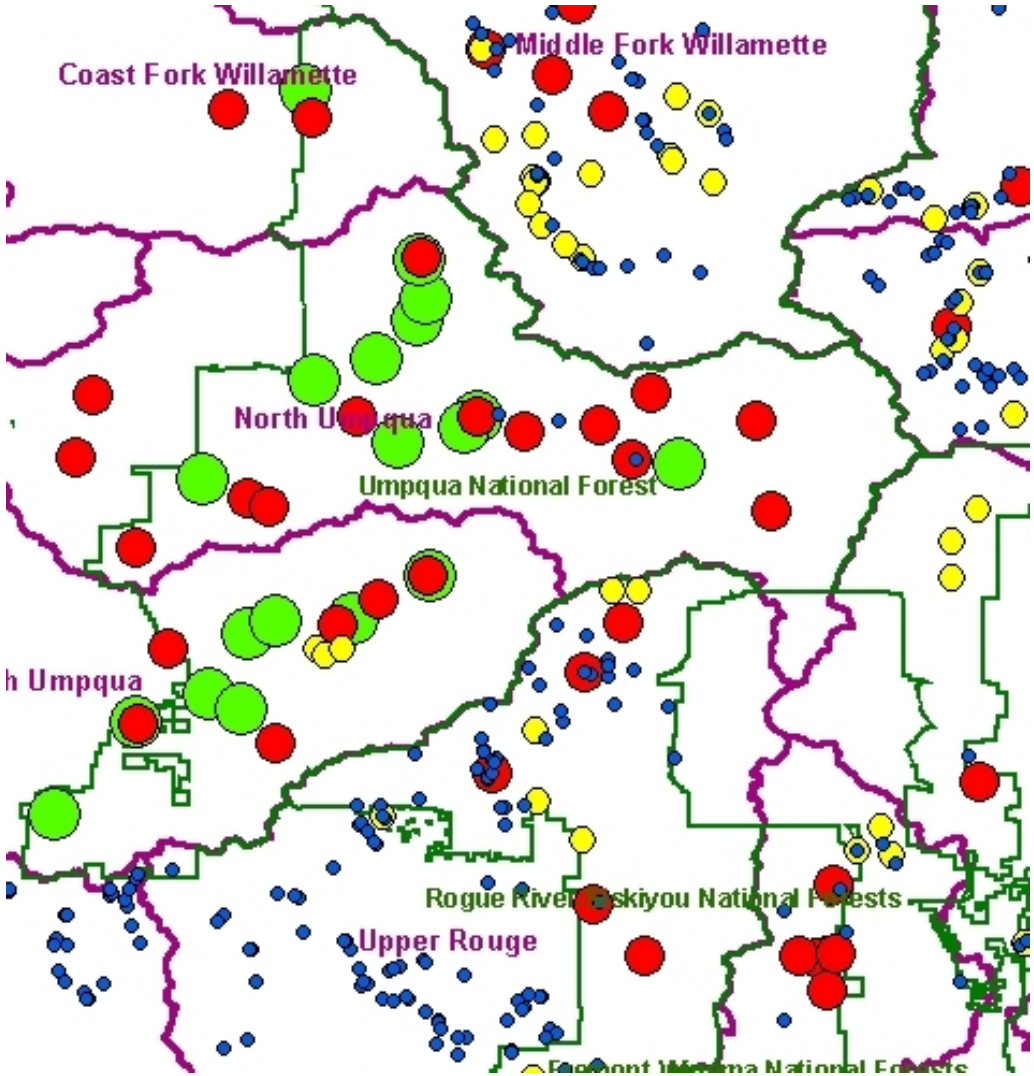
Incorporating climate change

summer flow sensitivity to Δ snowmelt magnitude



Grant et al. (in prep)

Summer Stream Temperature Sensitivity



- FS monitoring network
  - 3,000 sites
  - 12,000 site-years of data

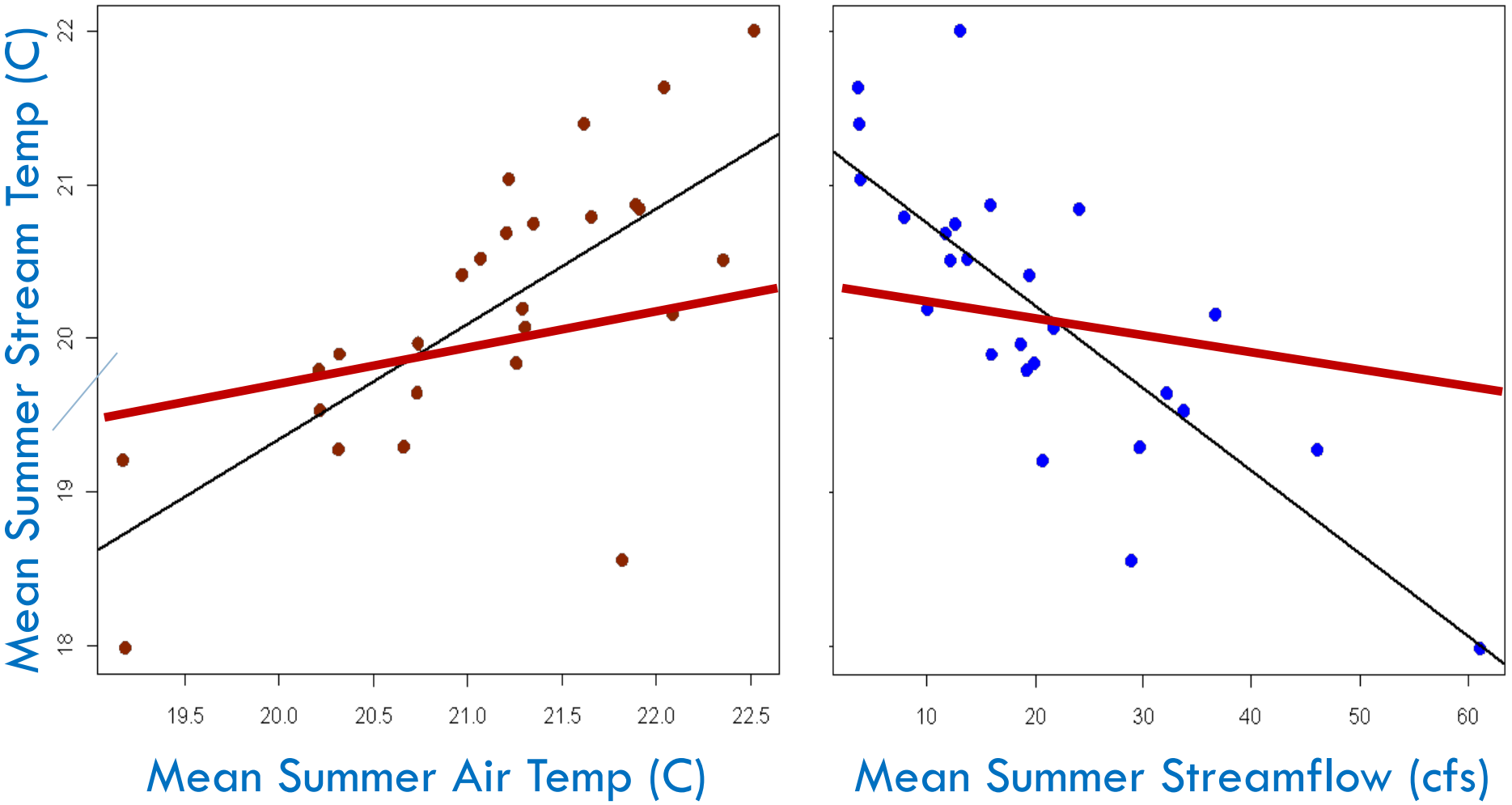
Legend

Number of Years of Sampled YEARS

- 1-5
- 6 -10
- 11 - 20
- 20 +

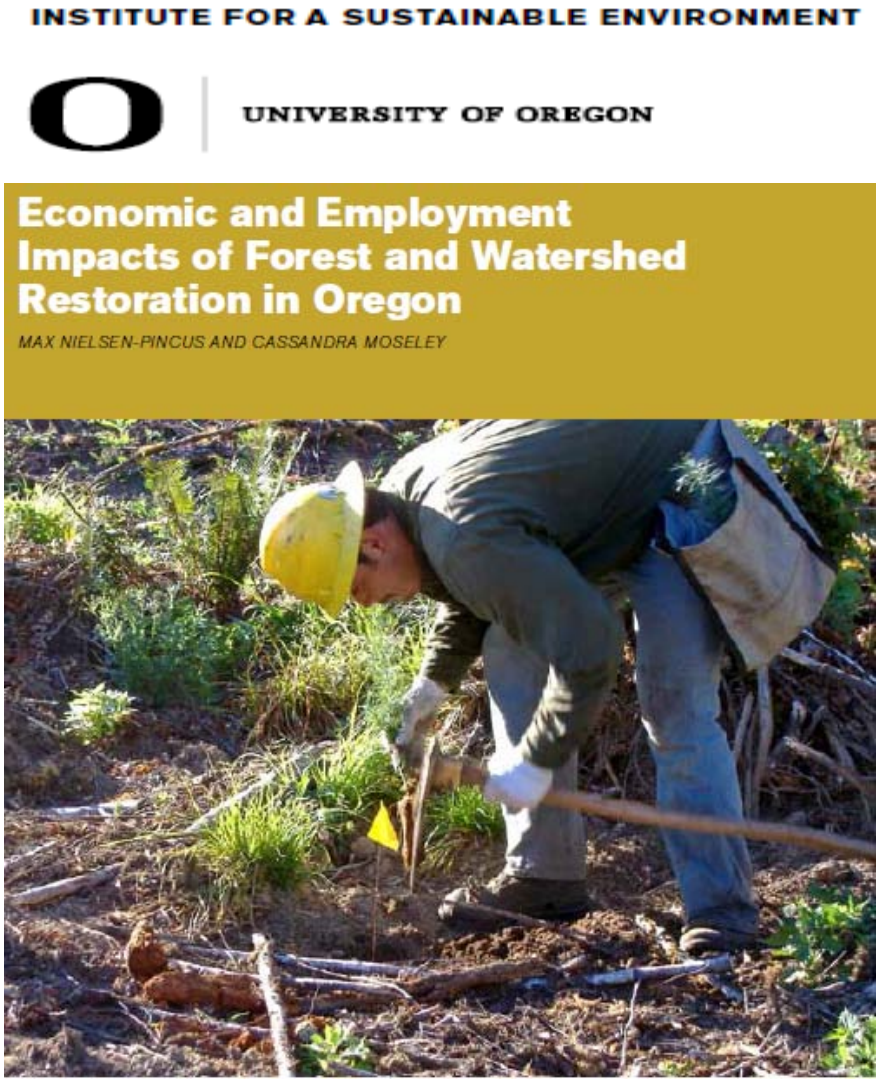
Summer Stream Temperature Sensitivity

Elk Creek, Oregon (1974-2009)



Economically Productive

- 16-24 jobs per $1million invested in restoration
- PNW Legacy Roads Program, 2008-2010
  - 600-900 jobs



Conclusions

- Water resource protection/restoration should be a primary objective of forest restoration.
- Will require fuels management, but much more.
- FS has made strides towards being more
  - strategic
  - integrated
  - effective & efficient
  - accountable & adaptive
  - economically-productive.
- There's lots more to do.