The Trask River Watershed Study

Aquatic Ecosystem Response to Contemporary Forest Management

Photo by Kelly James

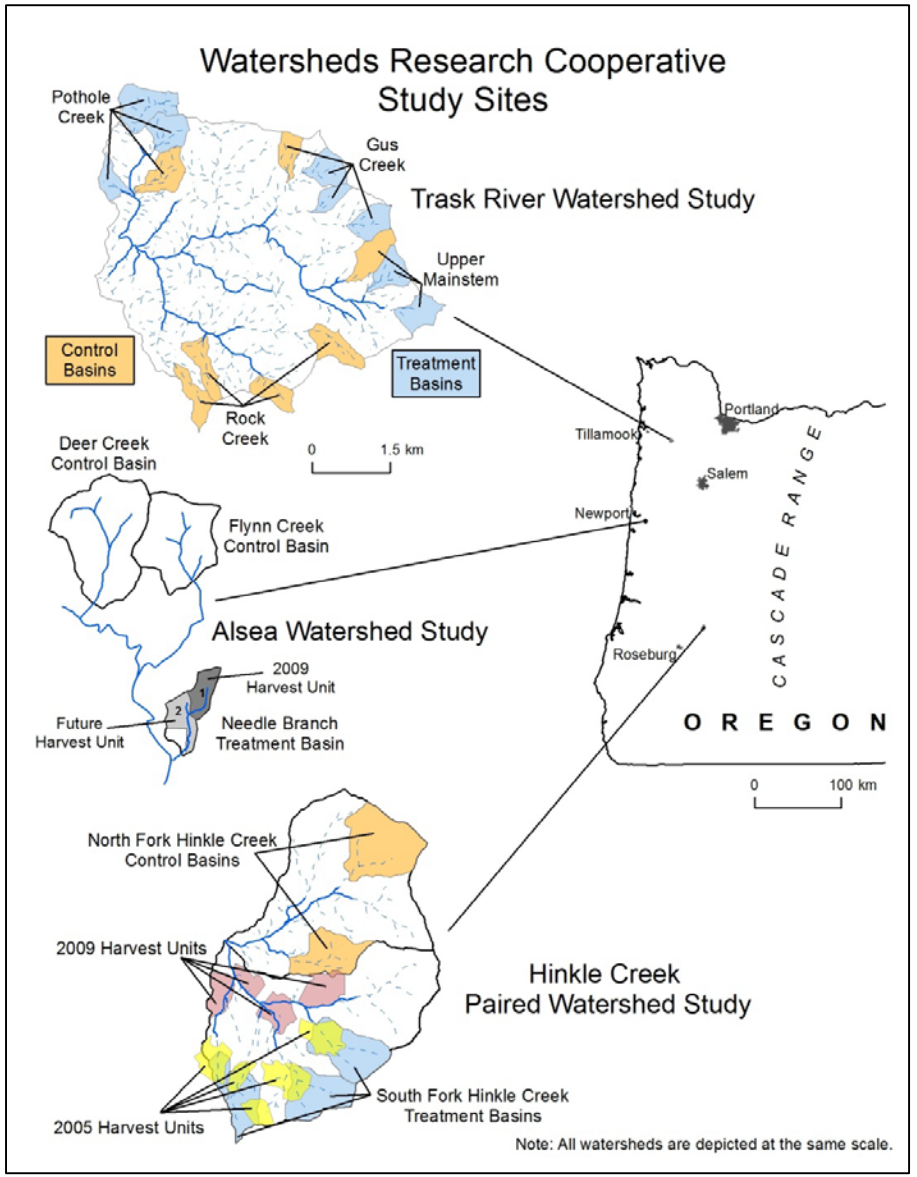
Watershed Research Cooperative Study Sites

Coop established in 2006 by OSU College of Forestry

Agency, industry and academic organizations participate

Goal: Quantify effects of current forest practices on streams – OR focus but results applicable across coastal PNW

Approach: Watershed-scale experimental studies; Cooperative, multi-disciplinary and long-term (decade).



Trask River Watershed Study Objectives

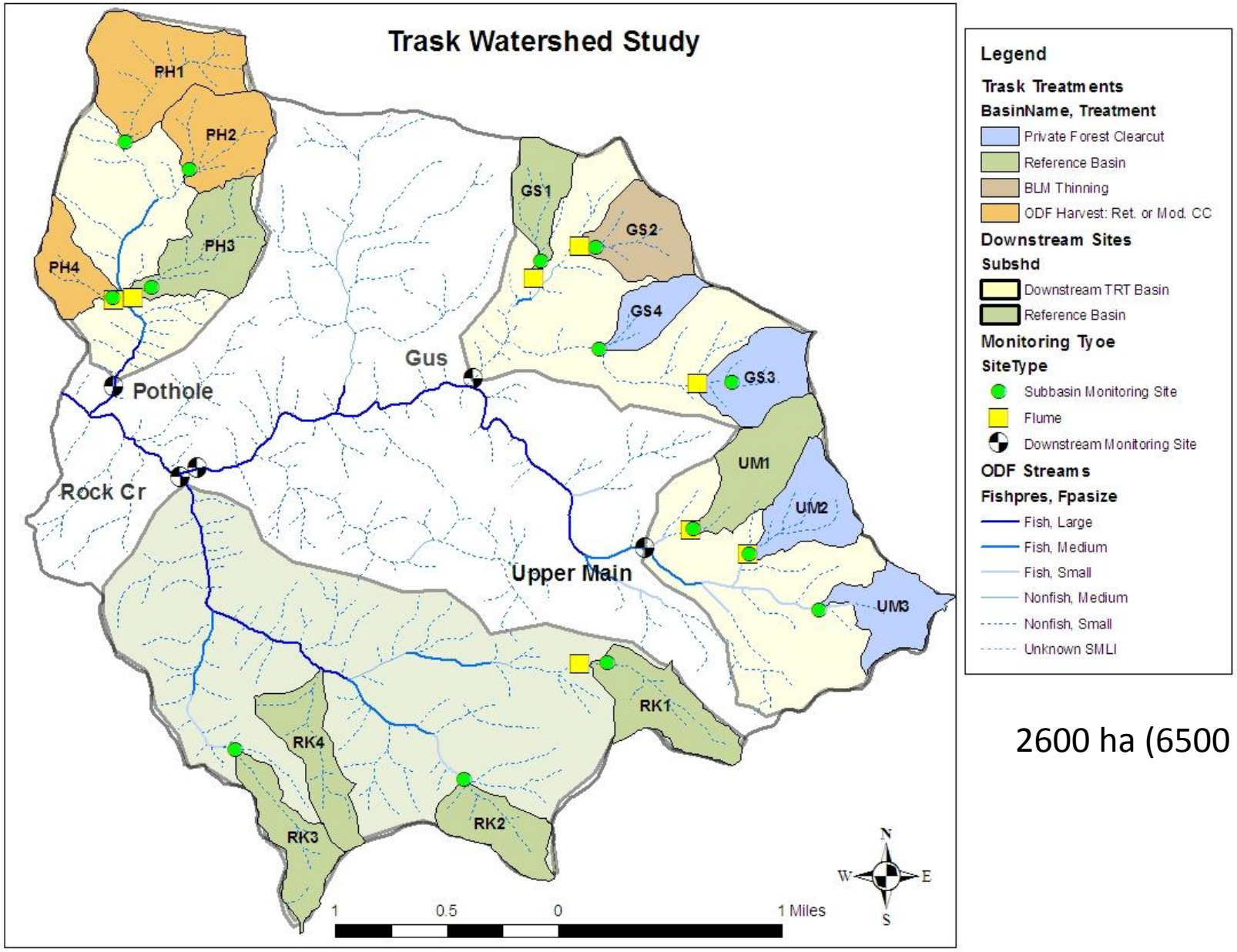
- Quantify effects of forest harvest on the physical, chemical and biological characteristics of small, headwater streams
- Examine extent to which harvest in headwaters influences the physical, chemical and biological characteristics in downstream fish-bearing reaches

Collaboration

- ODF and Weyerhaeuser were primary project sponsors – together own >90% of the study area
- Seven research organizations involved in the study; more than 20 scientists
- Support from ODF and Weyerhaeuser totaled more than $4,000,000 (not including time of agency/company scientists and staff)
- This investment leveraged through in-kind and matching funds from USGS, PNW-USFS, OSU, BLM totaling nearly $2,000,000
- Additional grants were obtained from Oregon Watershed Enhancement Board, Salem and Coos Title II RAC funds, OFIC, Forestry Research Lab F&W Managed Forest funds and NCASI (about $650,000)

Dr. Sherri Johnson, *PNW Research, USFS*
Dr. Bob Bilby, *Weyerhaeuser Company*
Liz Dent, *Oregon Dept of Forestry*
Dr. Jason Dunham, *USGS FRESC*
Dr. Michael Adams, *USGS FRESC*
Dr. Arne Skaugset, *OSU College of Forestry*
Maryanne Reiter, *Weyerhaeuser Company*
Dr. Judy Li, *OSU Fisheries and Wildlife*
Dr. Joan Hagar, *USGS FRESC*
Doug Bateman, *OSU College of Forestry*
Linda Ashkenas, *OSU Fisheries and Wildlife*
Nate Chelgren, *USGS FRESC*
Alex Irving, *OSU College of Forestry*
Dr. Brooke Penaluna, *OSU Fisheries and Wildlife*
Bill Gerth, *OSU Fisheries and Wildlife*
Janel Sobota, *OSU Fisheries and Wildlife*
Amy Simmons, *OSU College of Forestry*
Dr. Jeremy Groom, *Oregon Dept of Forestry*
Dr. Ivan Arismendi, *OSU Fisheries and Wildlife*
Dr. Alba Argerich, *OSU College of Forestry*
Dr. Mark Meleason, *Oregon Dept. of Forestry*

Trask River Watershed Study Design



2600 ha (6500 acres)

Study Timeline

2006-11
Baseline
data collection

2011
Road
upgrades

2012
Headwater
harvest in
8 basins

2013-16
Post-treatment
data collection

Harvest Volumes

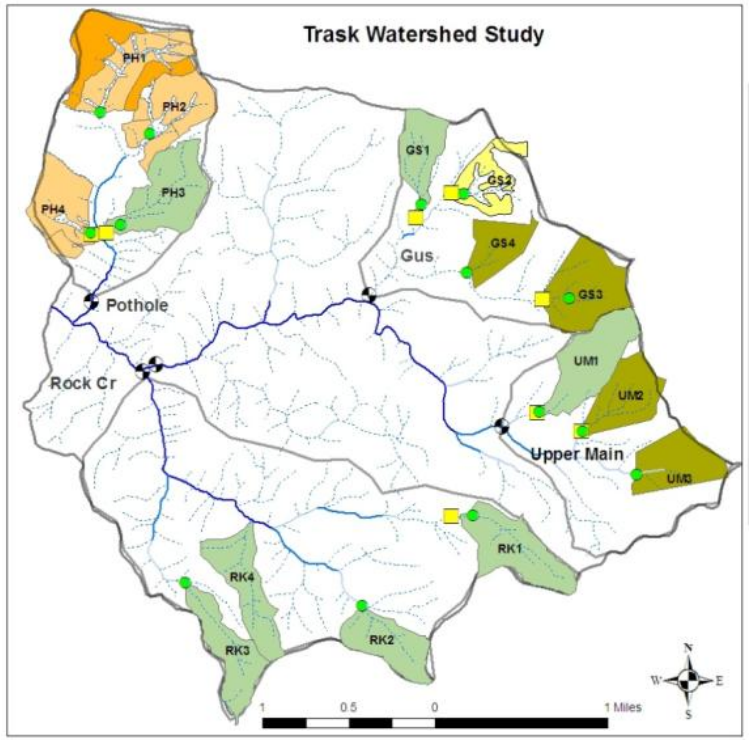
<u>Pothole Creek Sites – ODF</u>
- 7209 mbf

<u>Upper Main Sites – Weyerhaeuser</u>
- 4775 mbf

<u>Gus Creek Sites – Weyerhaeuser</u>
- 6025 mbf

<u>Gus Creek Site – BLM</u>
- 750 mbf

Harvest Treatments by Landowner



Unit Name	Owner	% of Study Watershed Treated	Harvest Type	Stream Buffer Requirements
Gus3	WY	93.9	CC	No overstory
Gus4	WY	91.4	CC	No overstory
UM2	WY	82.6	CC	No overstory
UM3	WY	56.1	CC	No overstory
GUS1	BLM	54.9	Thin	50 ft no touch
PH1	ODF	76.8	MC/RC	25 ft no touch
PH2	ODF	78.2	Mostly MC, some RC	25 ft no touch
PH4	ODF	91.9	MC	25 ft no touch

CC: A clearcut is a harvest where few seedlings, saplings or poles remain. Oregon Coast Geo-region: no overstory retention required. Private forests goal: Ensure continuous growing and harvesting of forest tree species consistent with sound resource management.

MC: Modified clearcuts leave residual green trees, snags, or trees destined to become snags specifically for their biological or environmental values.

RC: Retention cuts are partial cuts, leaving a significant proportion of trees.

Thin: Basal area retention target for thinning = 120 sq ft per acre.

Treatments - Small Headwater Streams

Hemispherical Photos

Pre-Harvest - 2008

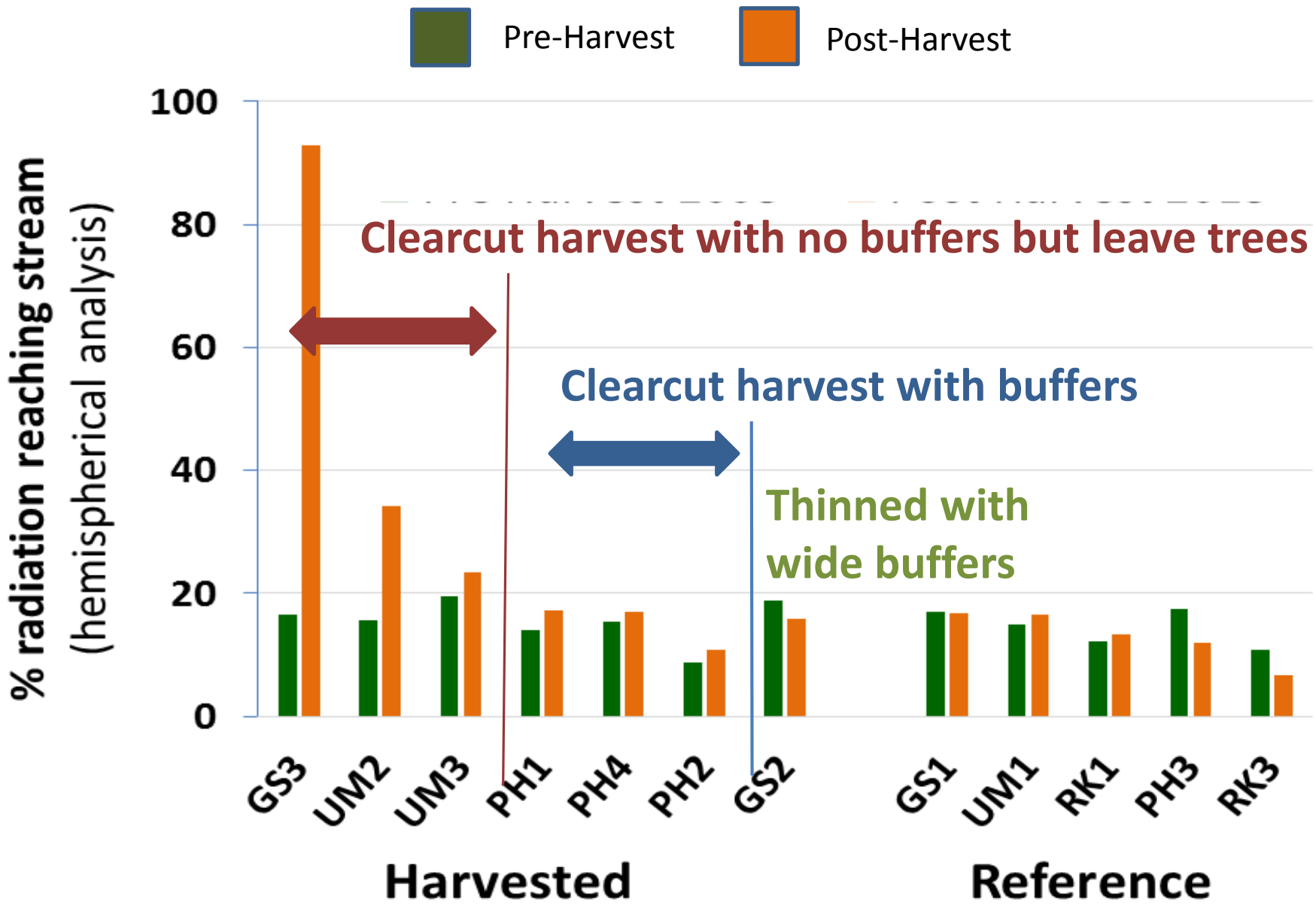
Post-Harvest - 2013

Clearcut, no buffer: GS3

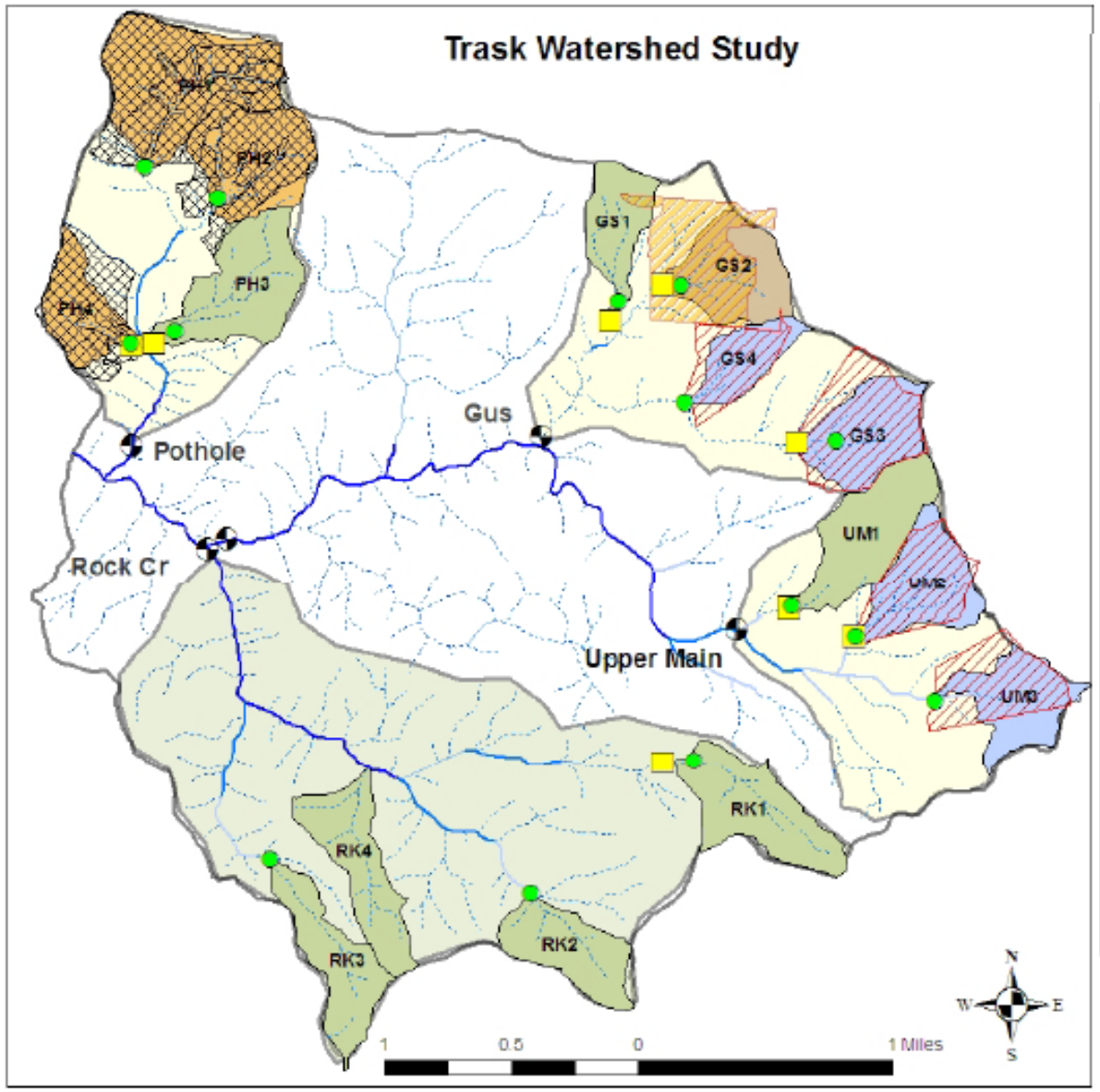
Clearcut, leave trees: UM2

Clearcut, riparian buffer: PH2

Change in Incident Light



Treatments – Downstream Sites

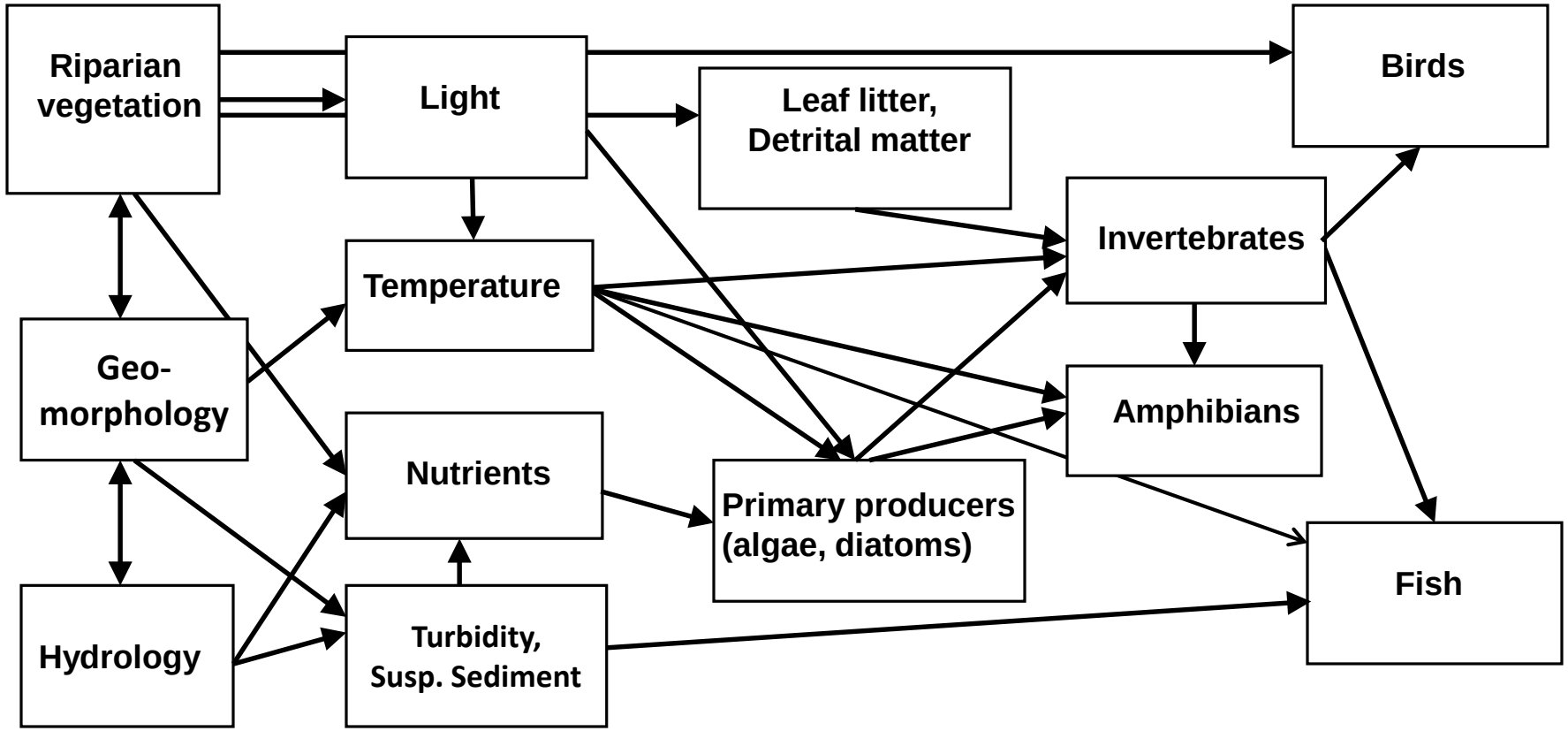


Percent area above downstream sites harvested in 2012:

Gus	30%
Pothole	44%
Rock:	0%
Upper Main	24%

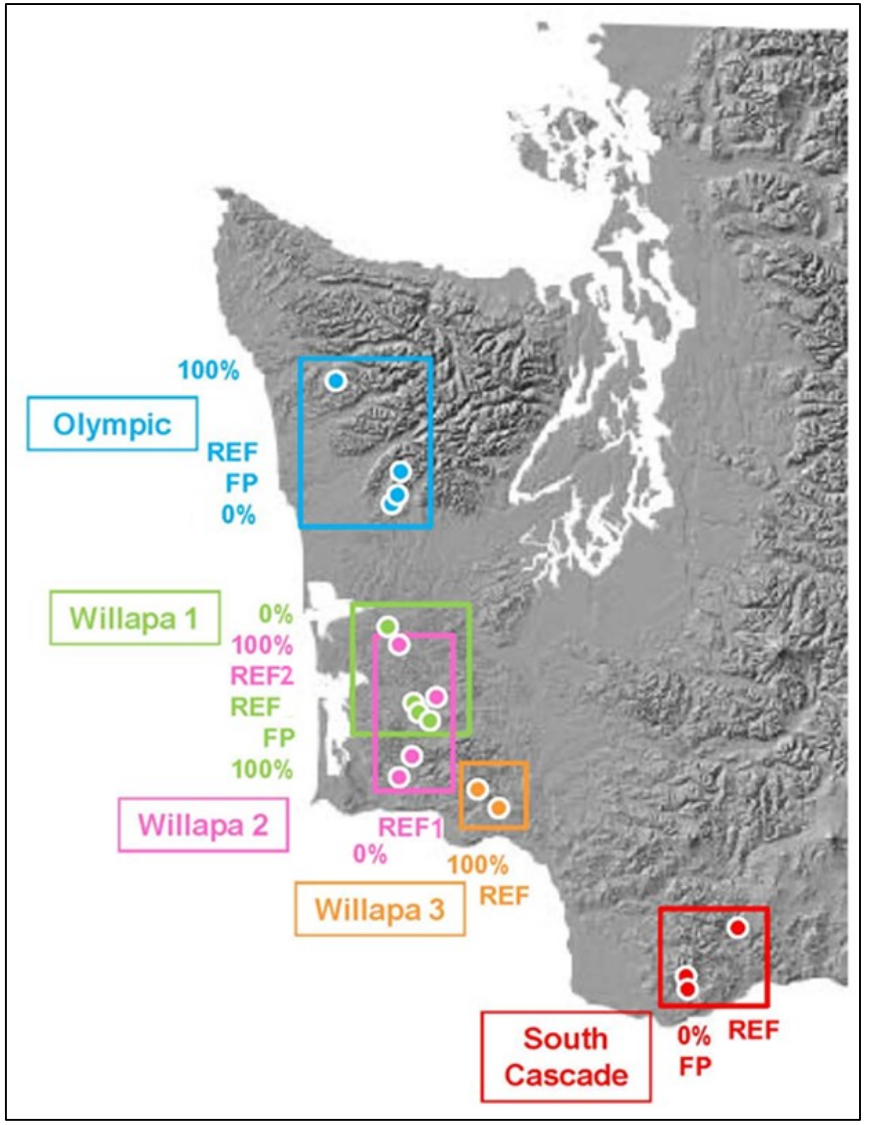
Understanding Ecosystem Response

Conceptual Model of Aquatic System Organization



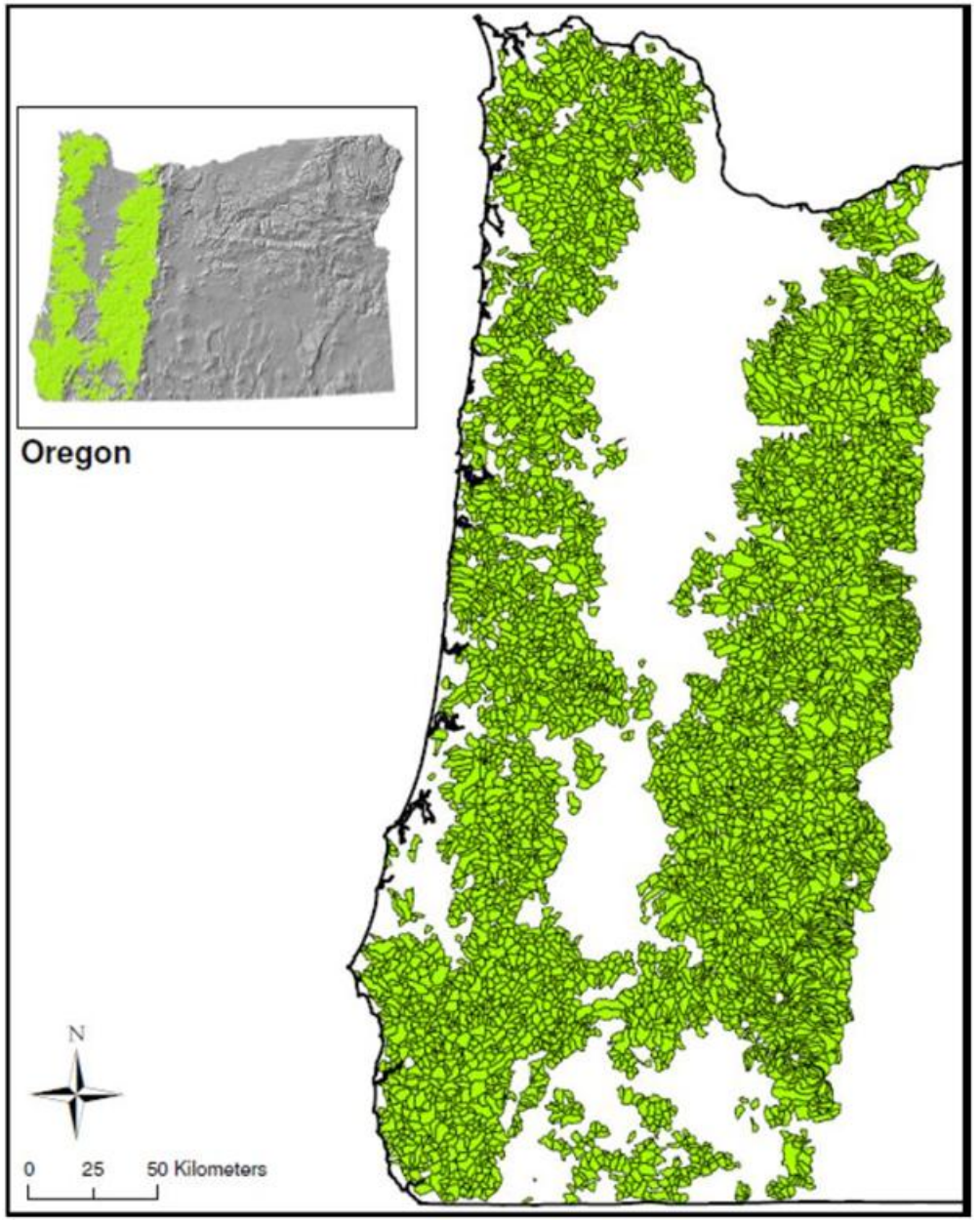
Extending Results Beyond Study Sites

- Synthesis of results from multiple studies examining similar treatments
  - Hinkle Cr.
  - WA Type N study
- Modeling
  - Hydrology/water quality models
  - Biological models (individual-based models for fish)
- Watershed classification
  - Watersheds with physical characteristics comparable to study watersheds most likely to respond similarly

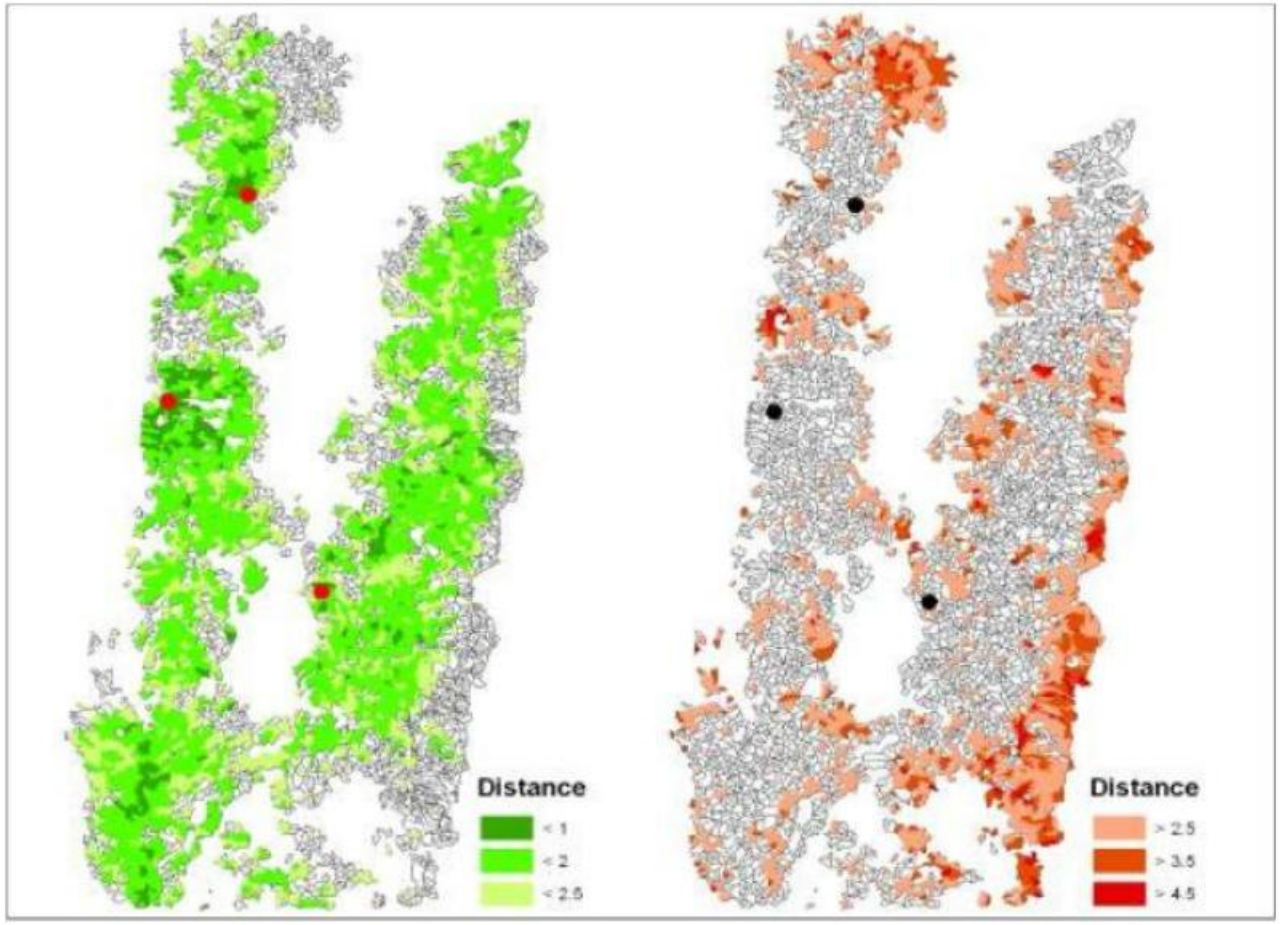


Watershed Classification - Forested Watersheds in OR

- Examined forested watersheds in western Oregon
- Watershed delineation from USGS EROS (Earth Resources Observation System) data
- 5528 watersheds delineated – about 2 sq. mi. each
- Characterized using multiple features
  - Climate
  - Land use
  - Vegetation cover
  - Geology
  - Topography
- Calculated relative similarity to the WRC watersheds determined



Similarity Results



	HA < 2.5	% Landscape	# of Basins
Trask	1915568	39.4	2117
Hinkle	2120057	43.6	2385
Alsea	2319306	47.7	2534
All WRC Basins	3215564	66.2	2796