

# Use of Voluntary Incentives to Protect Drinking Water in the McKenzie Watershed, Oregon

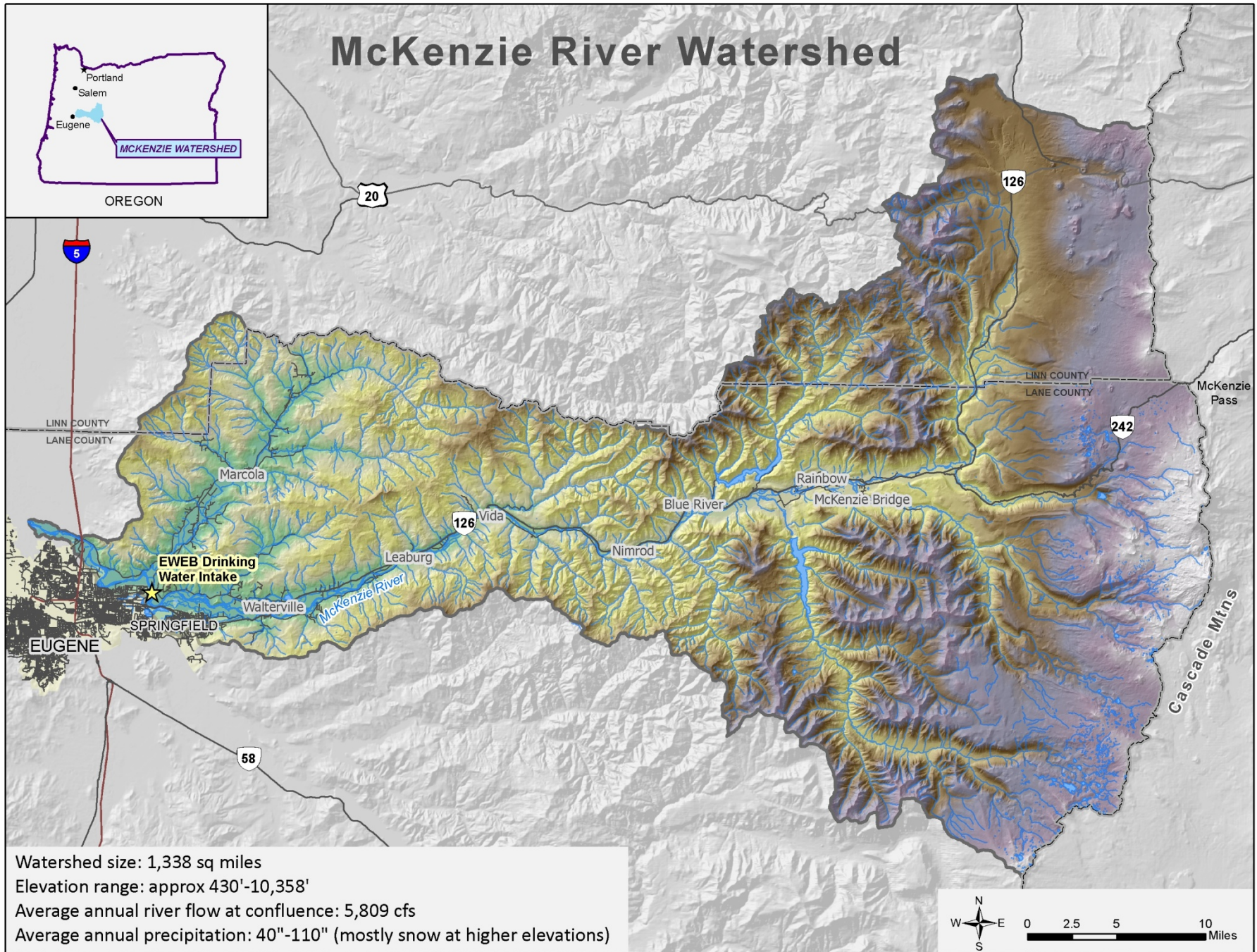
Karl Morgenstern, Eugene Water & Electric Board

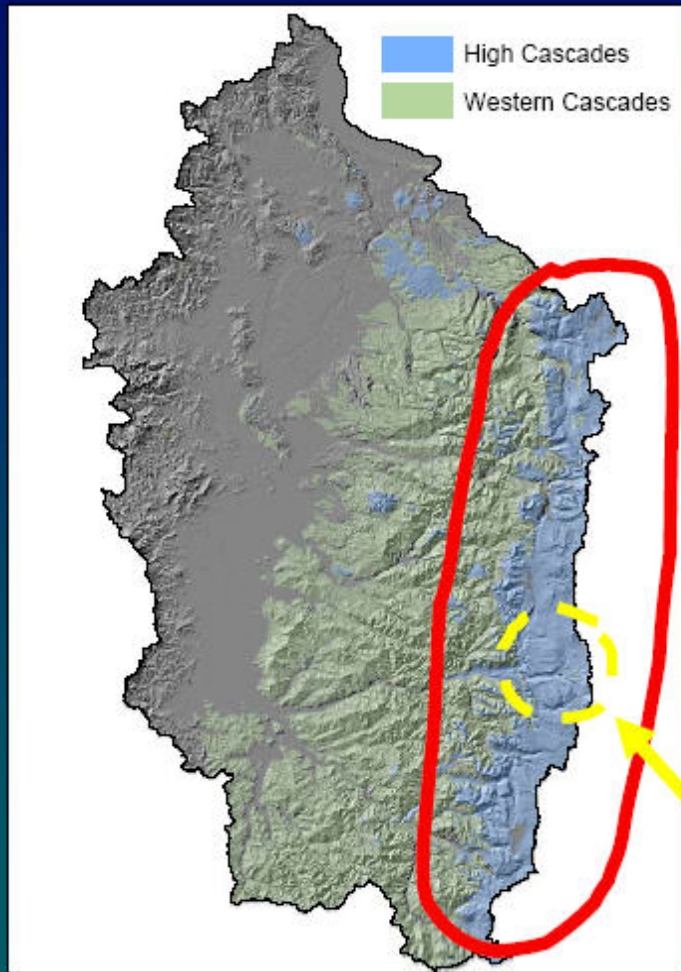


# Discussion Summary

- Background
  - McKenzie Watershed
  - Climate Change Impacts
  - EWEB's Source Protection Program
- Valuing Riparian Forests
- Voluntary incentives to protect riparian forests as extension of EWEB treatment infrastructure

# McKenzie River Watershed





# High Cascades

*Young basalts, basaltic andesites, andesites, pumice, and ash < 7 million years old*

*Youngest Mckenzie Pass lava flows ( $\leq 3000$  years old)*



BELKNAP CRATER

LITTLE BELKNAP SHIELD

MT. WASHINGTON

MT. JEFFERSON

BALD PETER

DUGOUT BUTTE

GREEN RIDGE

BLACK BUTTE

BLACK CRATER

# Cascade Springs - GUSHERS!



## Groundwater Residence Time



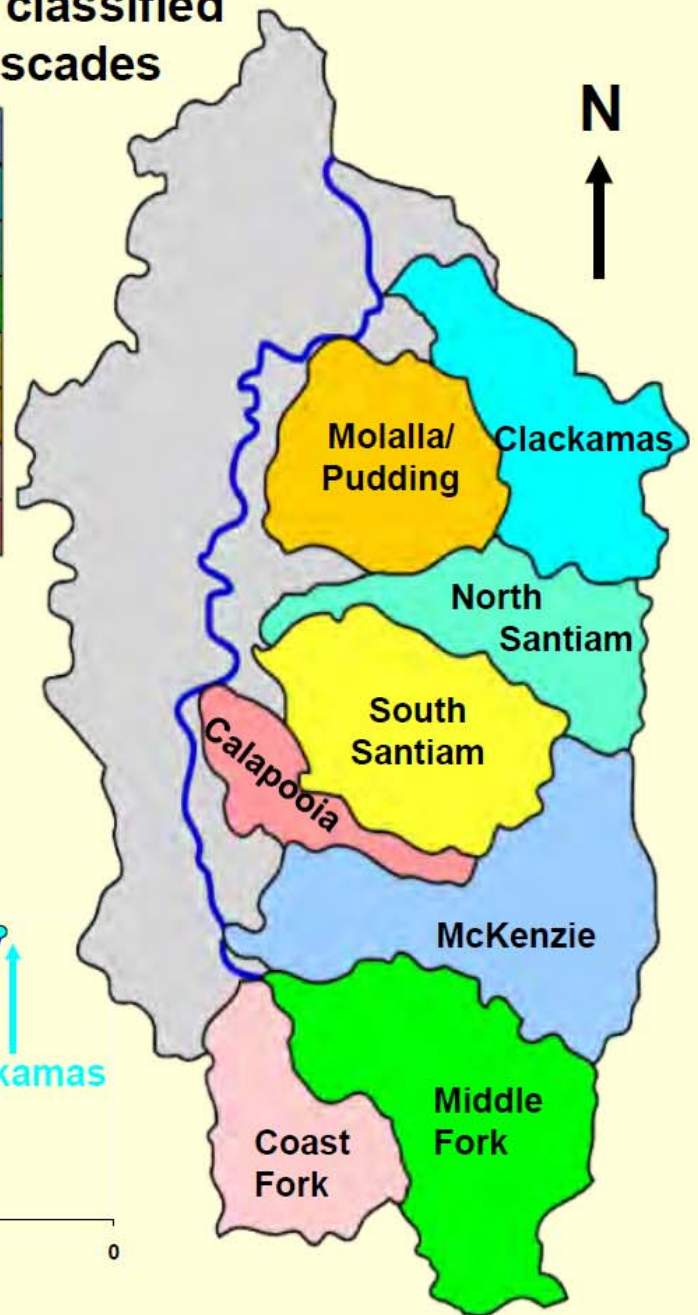
<5 – 10 years from  
snowfall to spring water



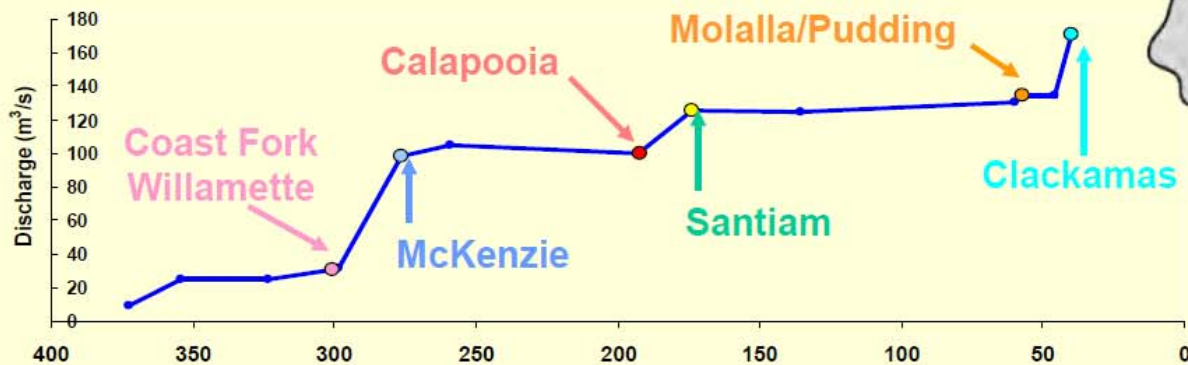
## % of basin classified as High Cascades

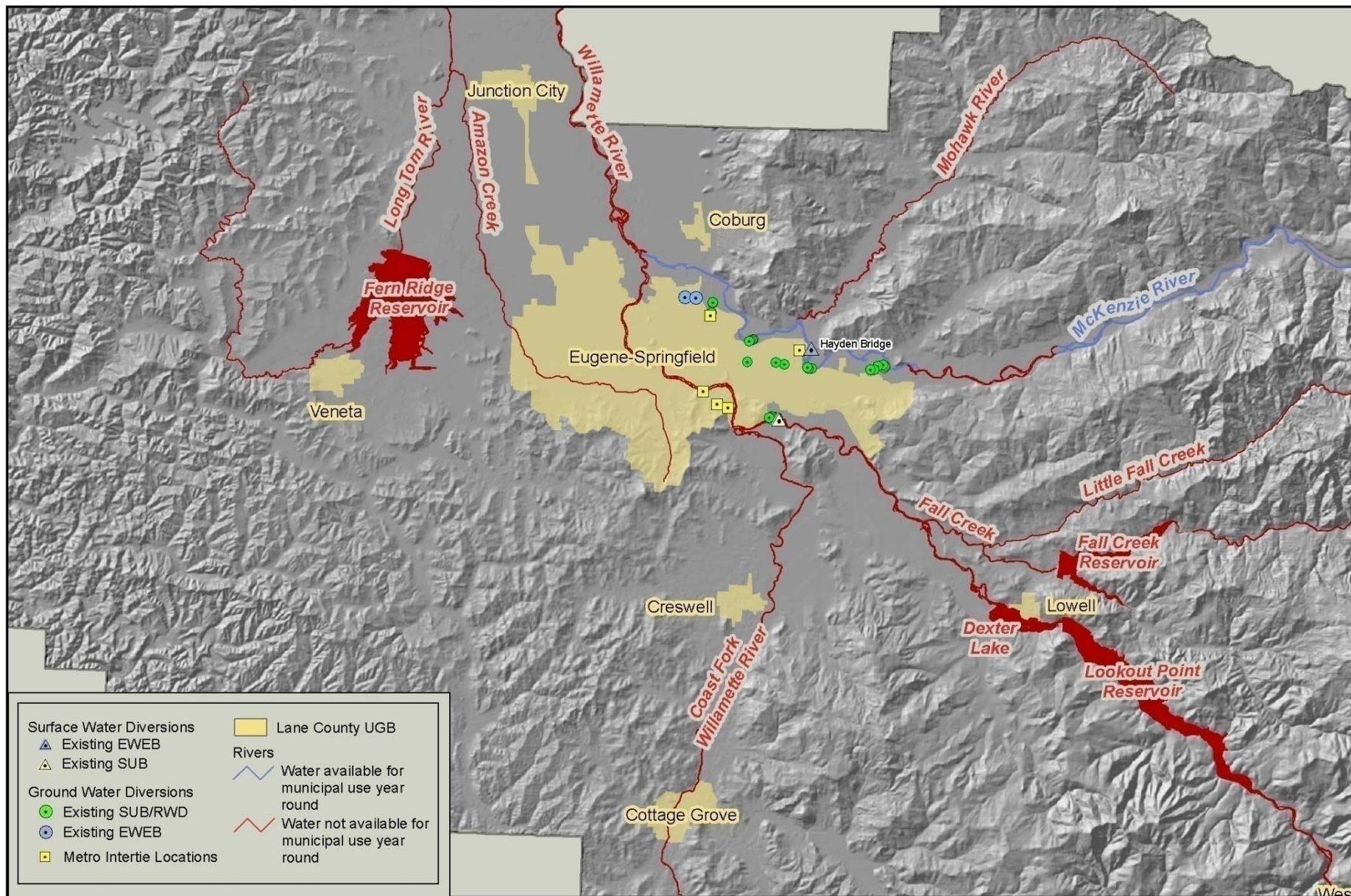


*Willamette River at Portland*



## 1950 Low Flow



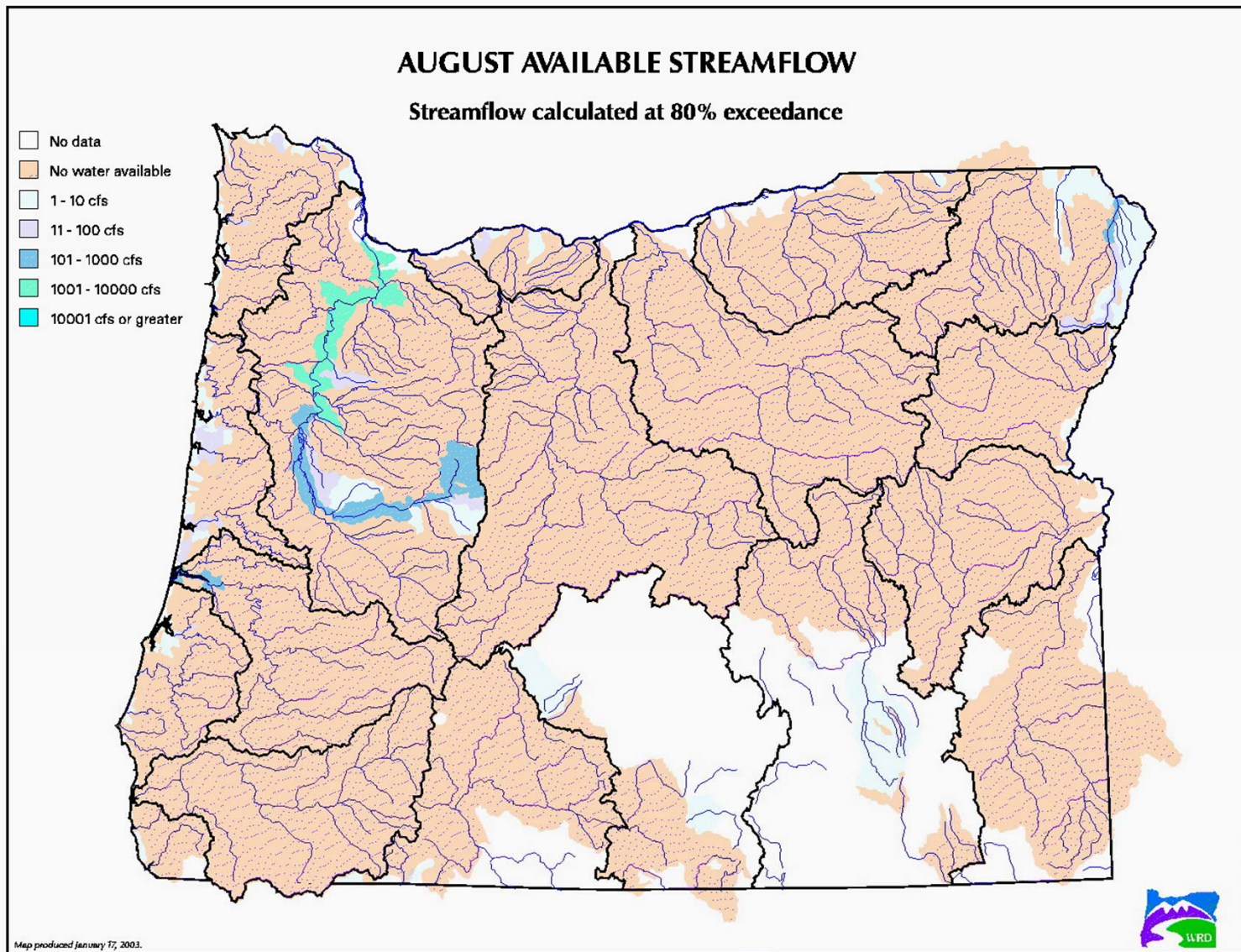


Regional Water Availability



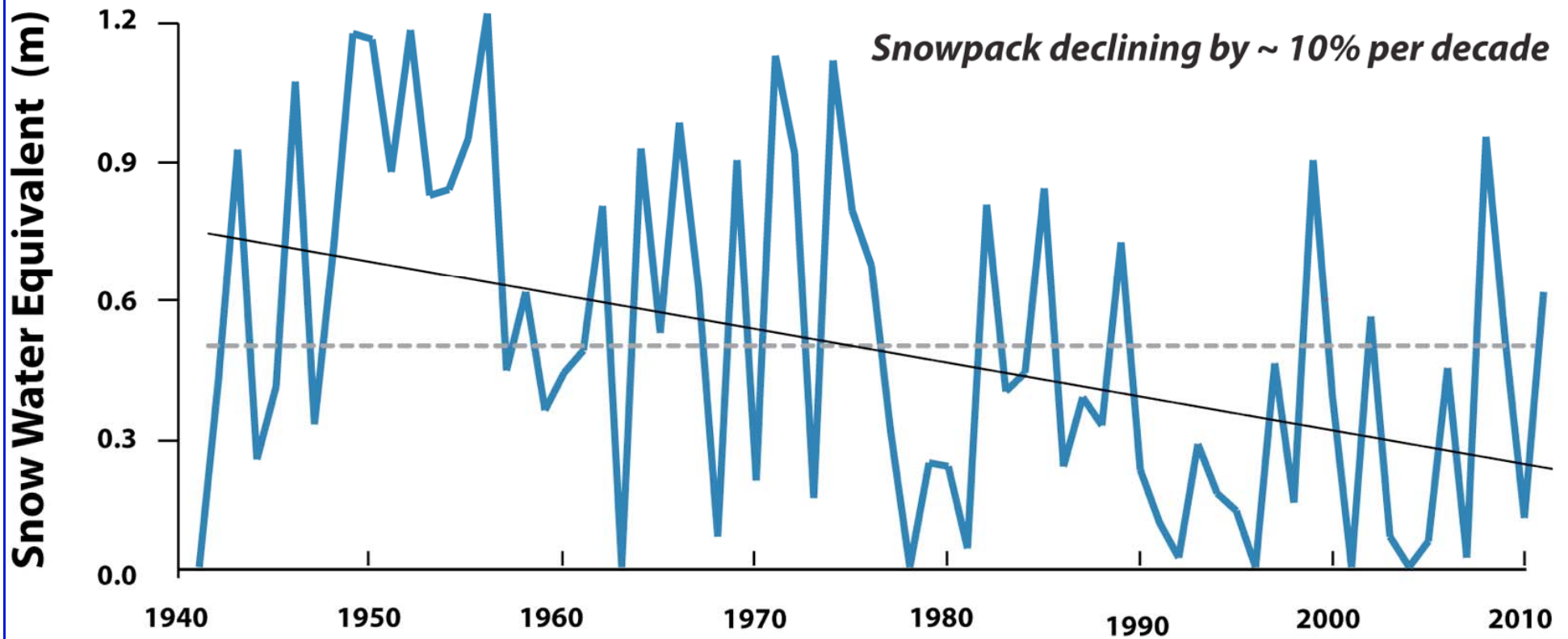


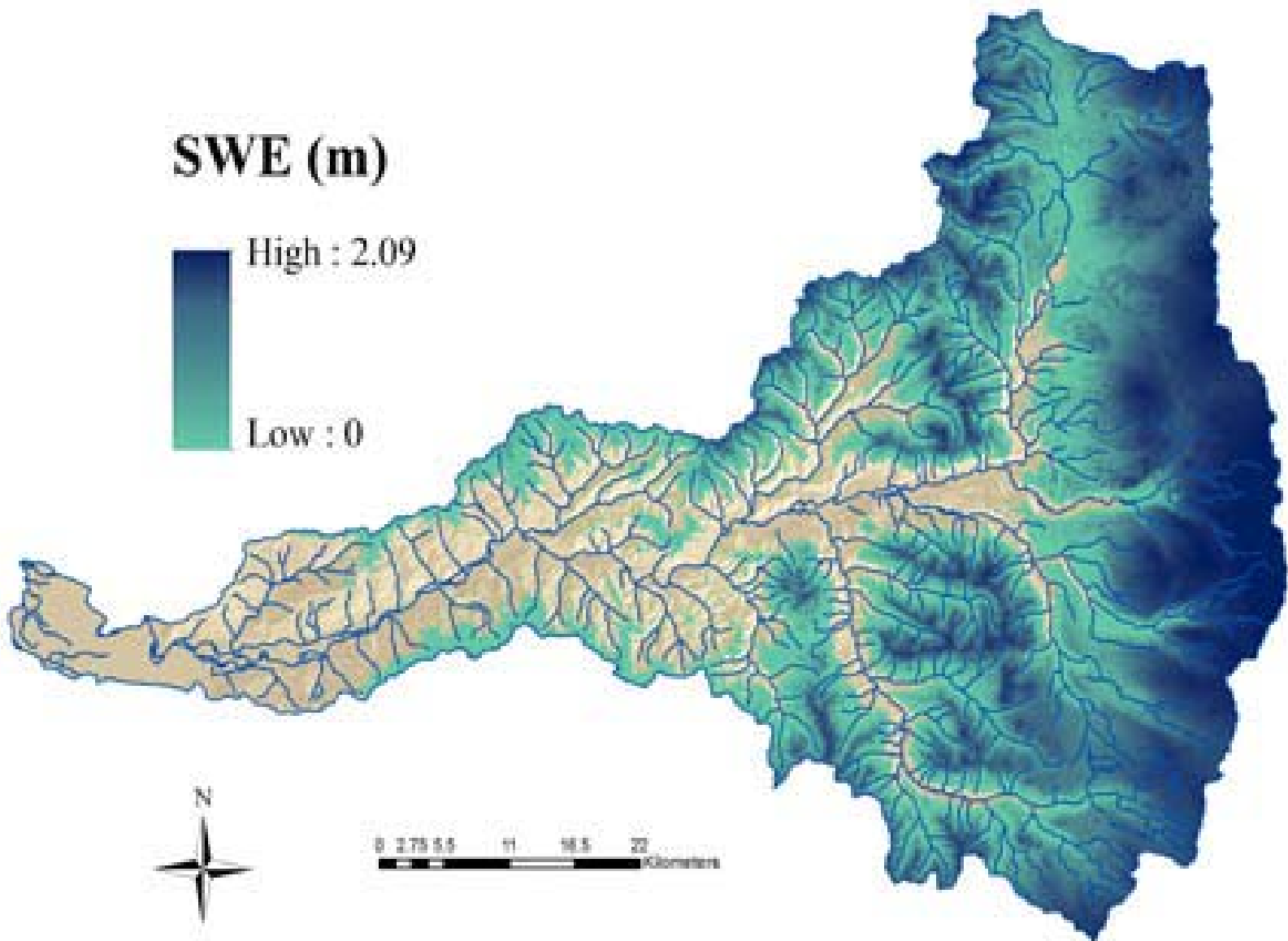
# Fully Appropriated Summer Flow

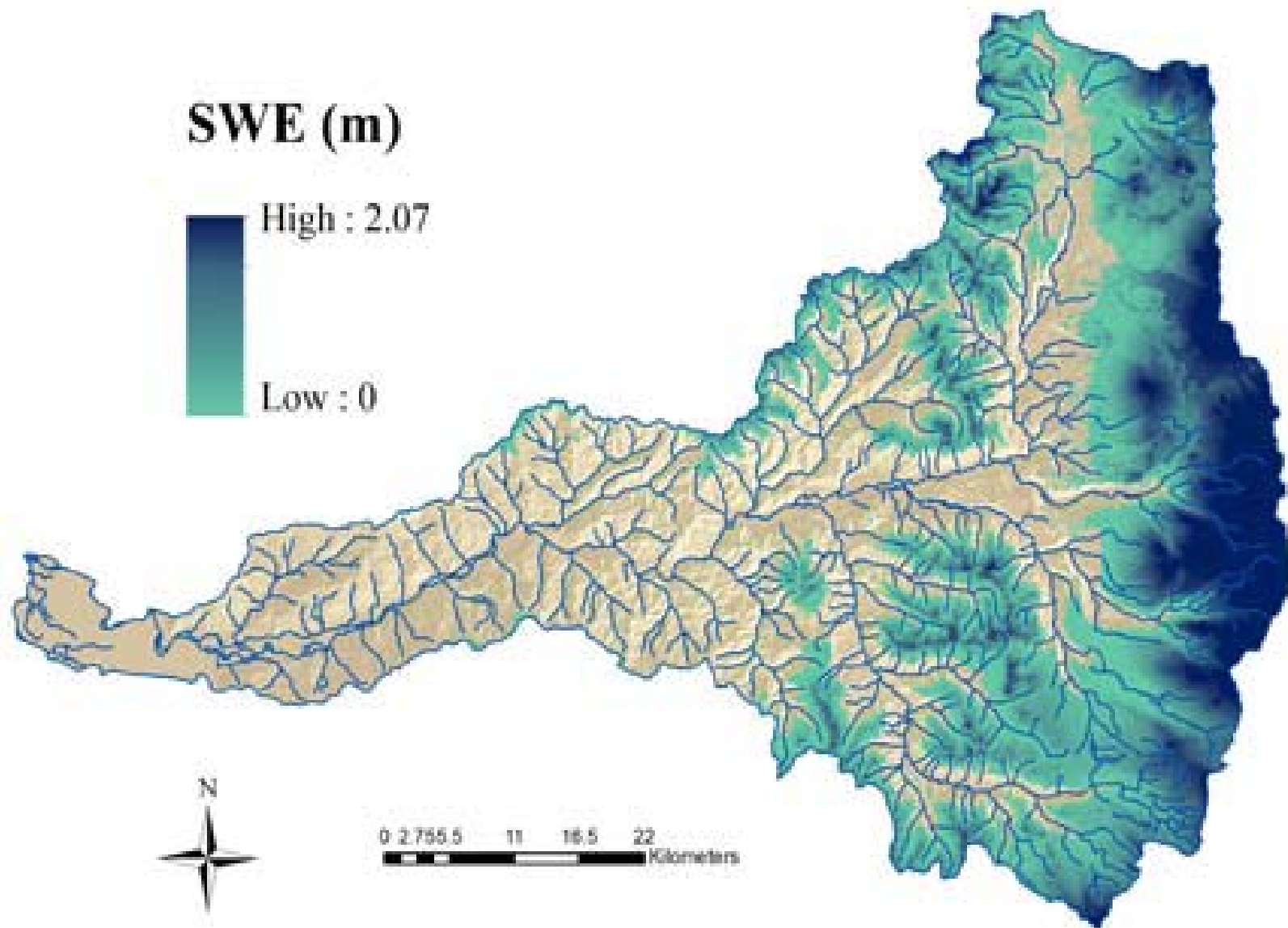


# Observing Results of Climate Change

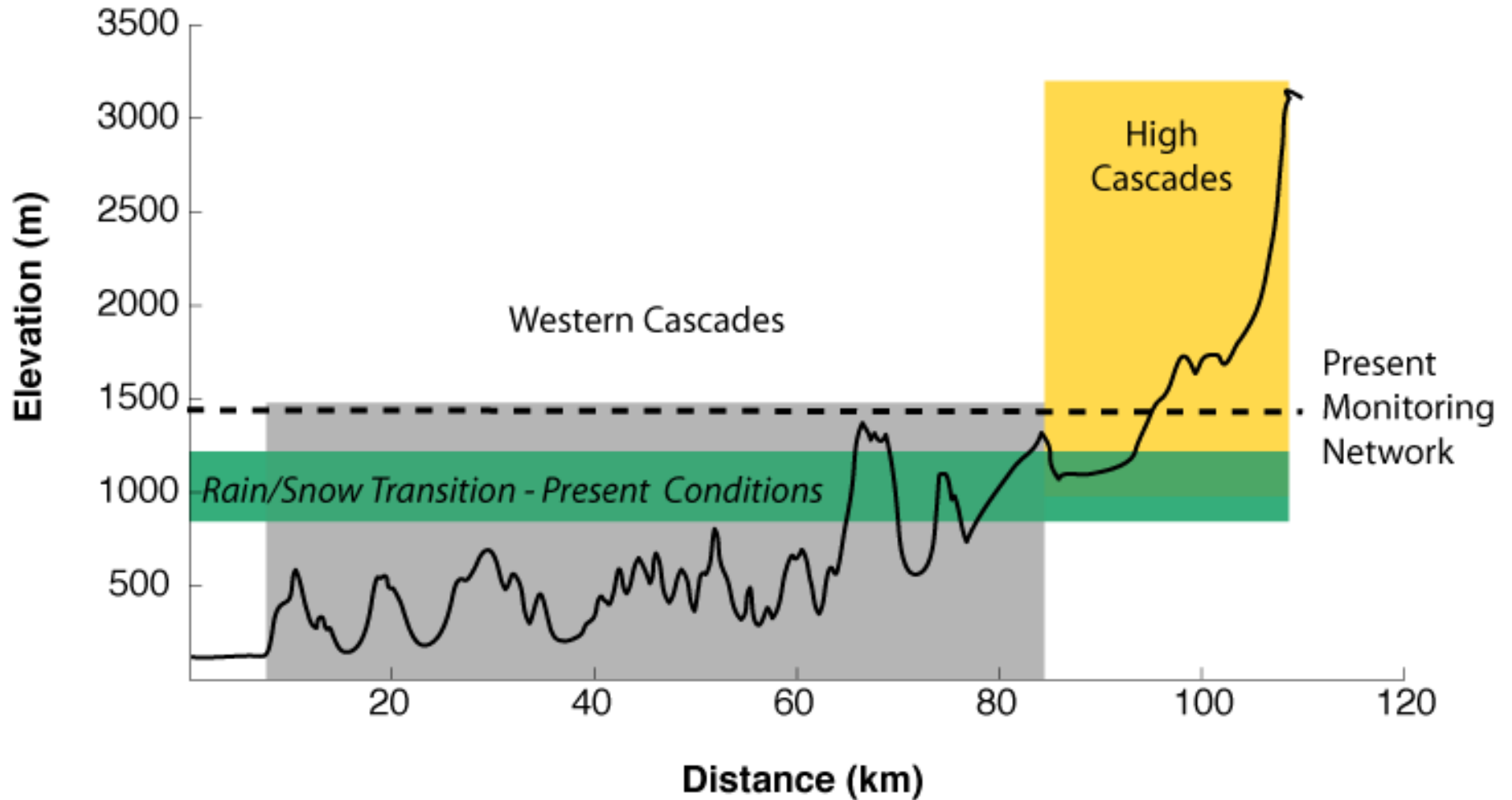
Santiam Junction on April 1st (1941 - 2011)



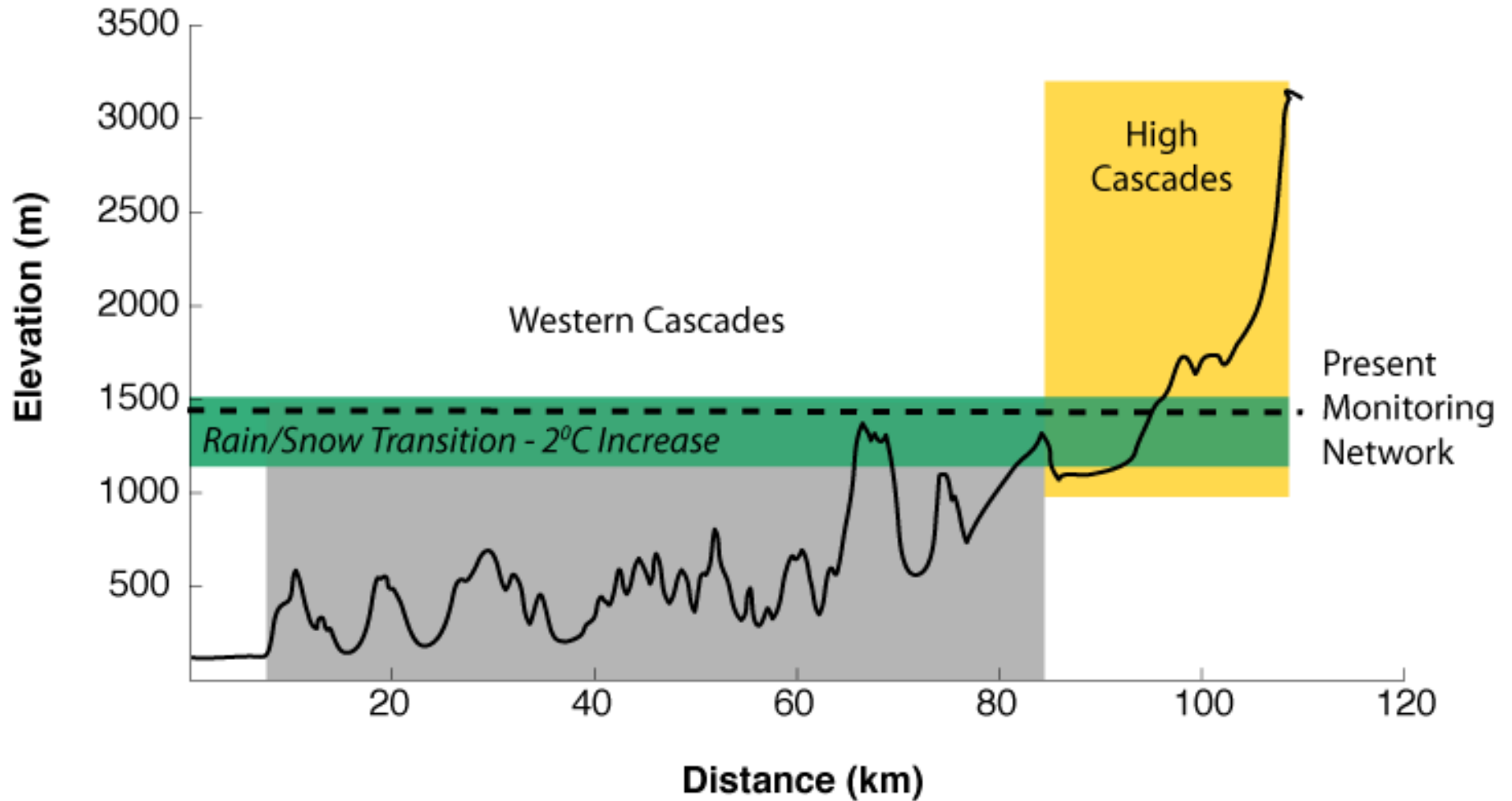




## Elevational Profile of the McKenzie River Basin



## Elevational Profile of the McKenzie River Basin



# Climate Change Impacts to SWE

- Loss of snow pack in 3,000' to 4,500' zone
  - 56% of volume of water currently stored as snow
  - Equivalent of twice the volume of Cougar Reservoir or 400,000 acre feet
  - More rain on snow events – winter flooding
- Peak spring snow melt/runoff happens 12 days earlier

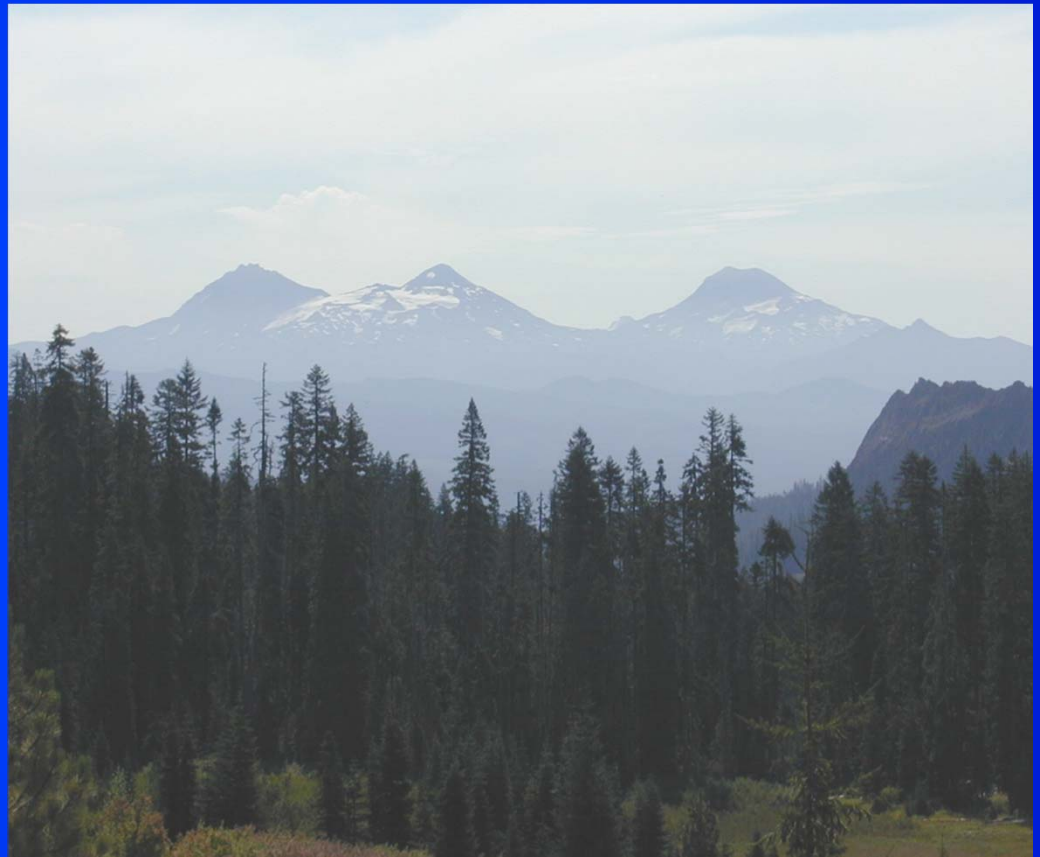
# EWEB's Drinking Water Source Protection Program



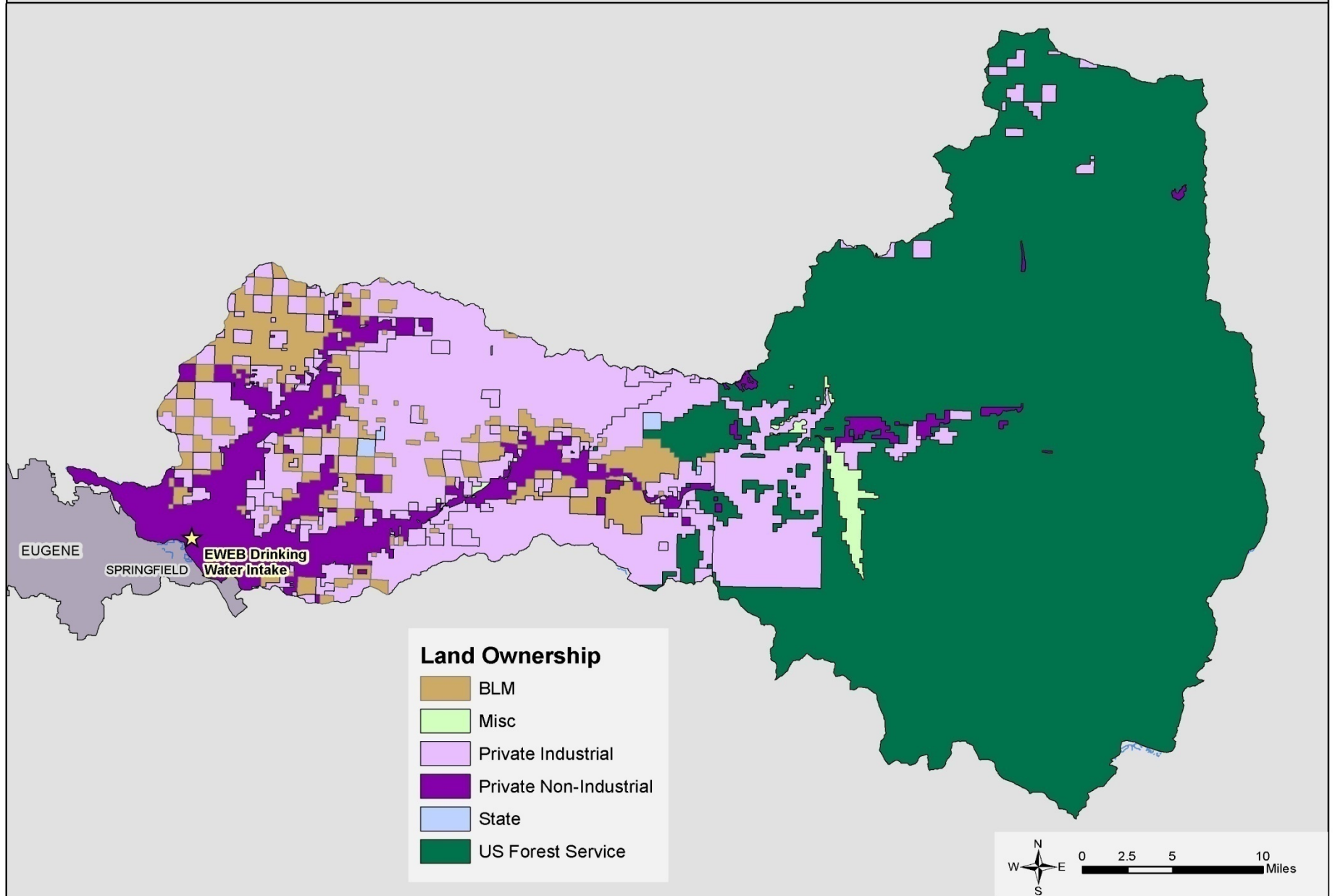


# Source Protection Program Goal

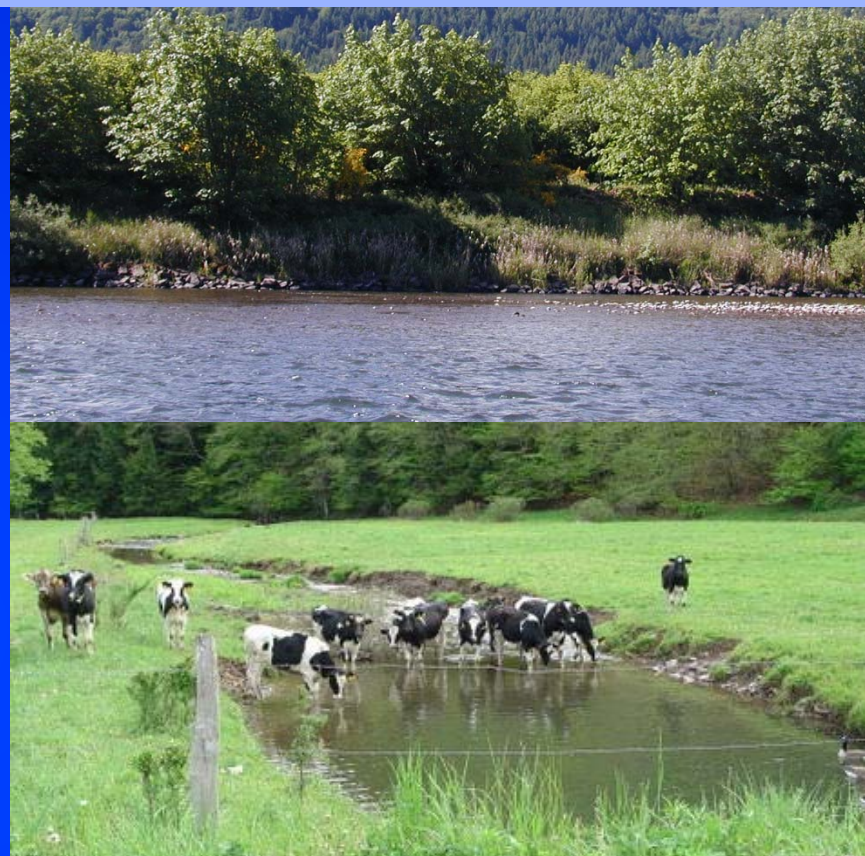
- To measure the balance between watershed health and human use over time and to implement actions that maintain a healthy balance for production of exceptional water quality.



# Land Ownership in the McKenzie River Watershed



# Increase economic viability while reducing chemical use/increase buffers



Development on River



Urban Runoff



Industry



Hazardous Material Spills

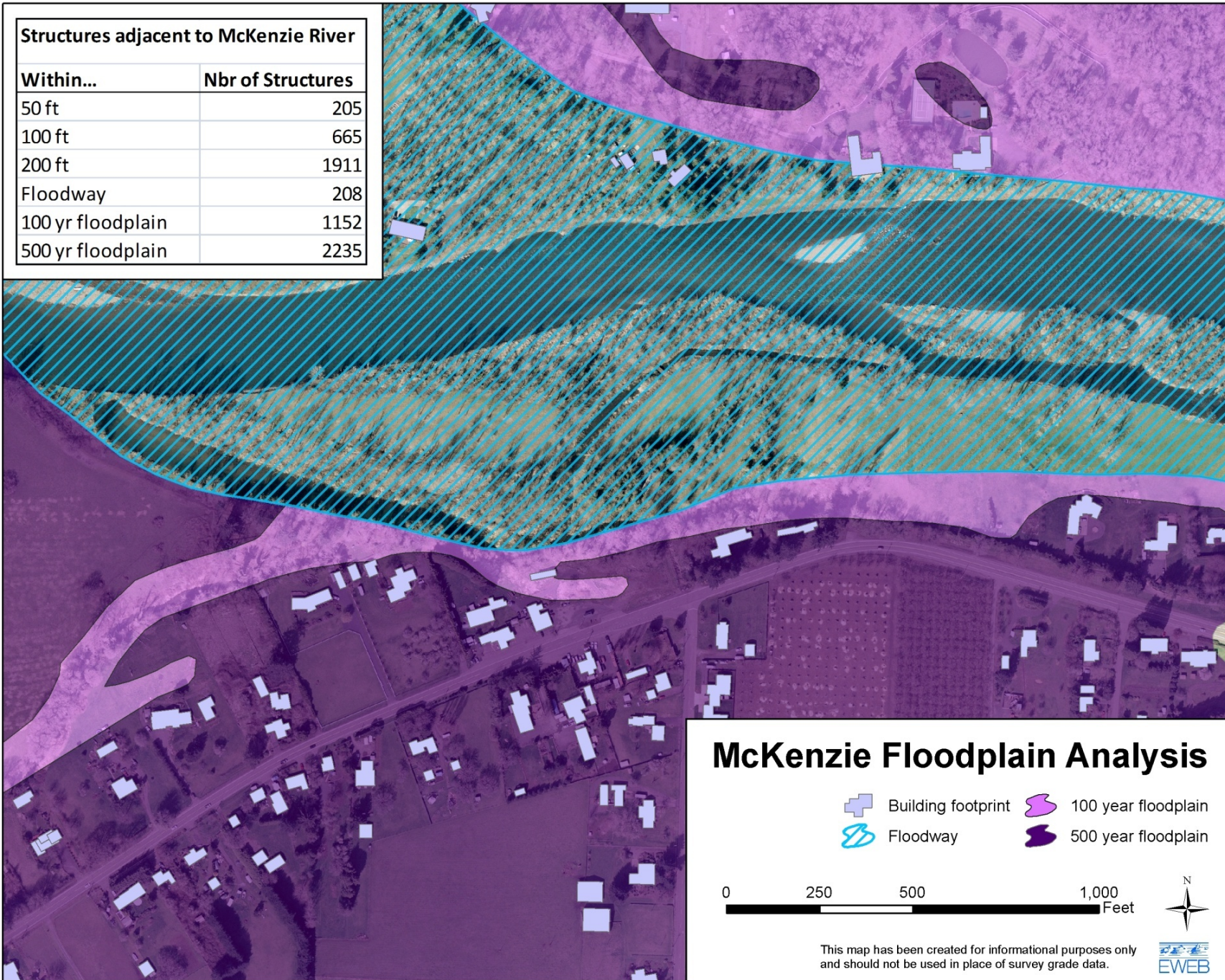


# Development along river



### Structures adjacent to McKenzie River

Within...	Nbr of Structures
50 ft	205
100 ft	665
200 ft	1911
Floodway	208
100 yr floodplain	1152
500 yr floodplain	2235



## McKenzie Floodplain Analysis

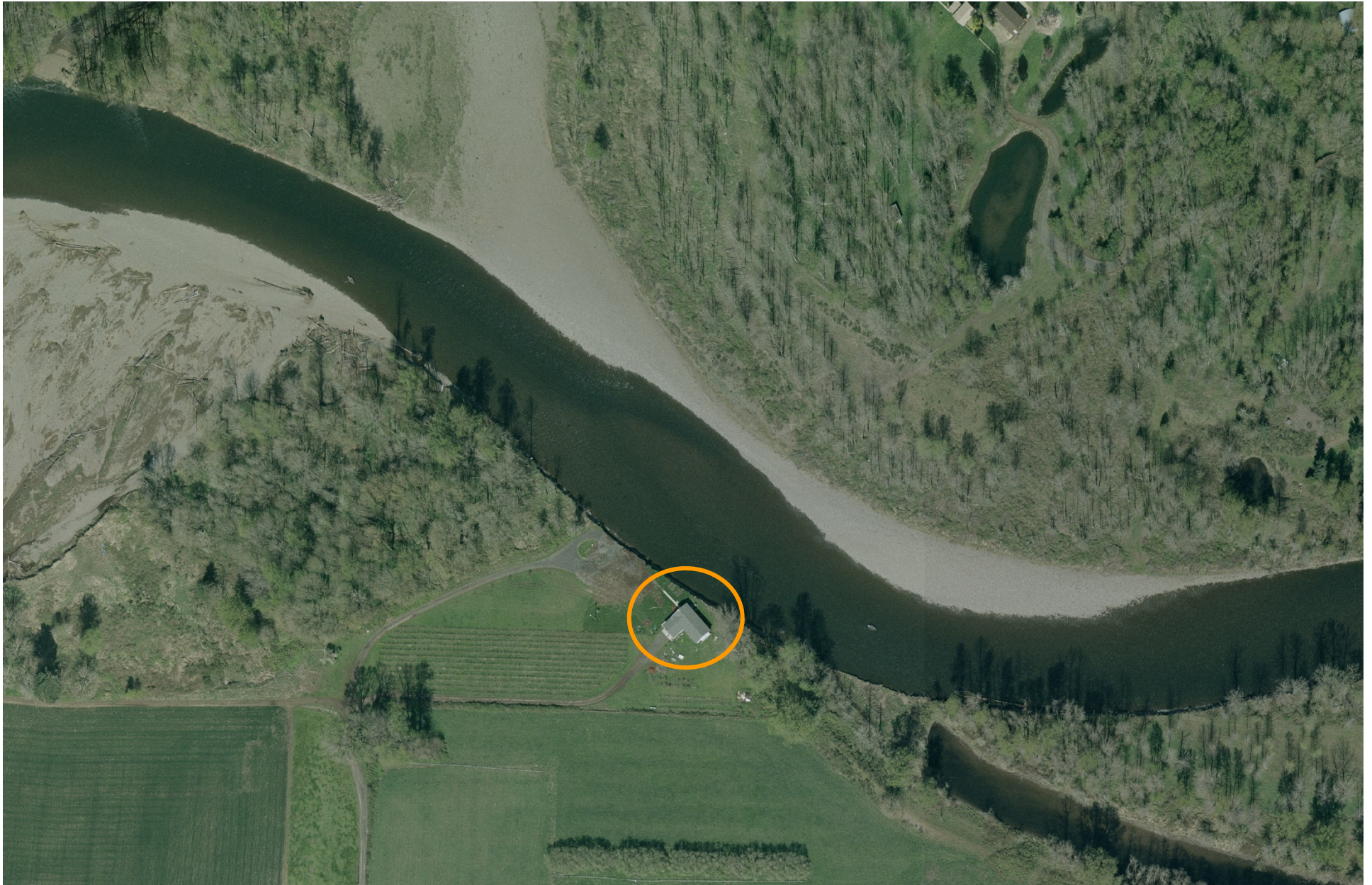
-  Building footprint
-  Floodway
-  100 year floodplain
-  500 year floodplain

0 250 500 1,000 Feet



This map has been created for informational purposes only and should not be used in place of survey grade data.





Structures within meander zones are also at risk

2004 Aerial Photo



House foundation  
at bottom of river

2006 Aerial Photo





### Channel Changes Affecting Septic System Setback Distance

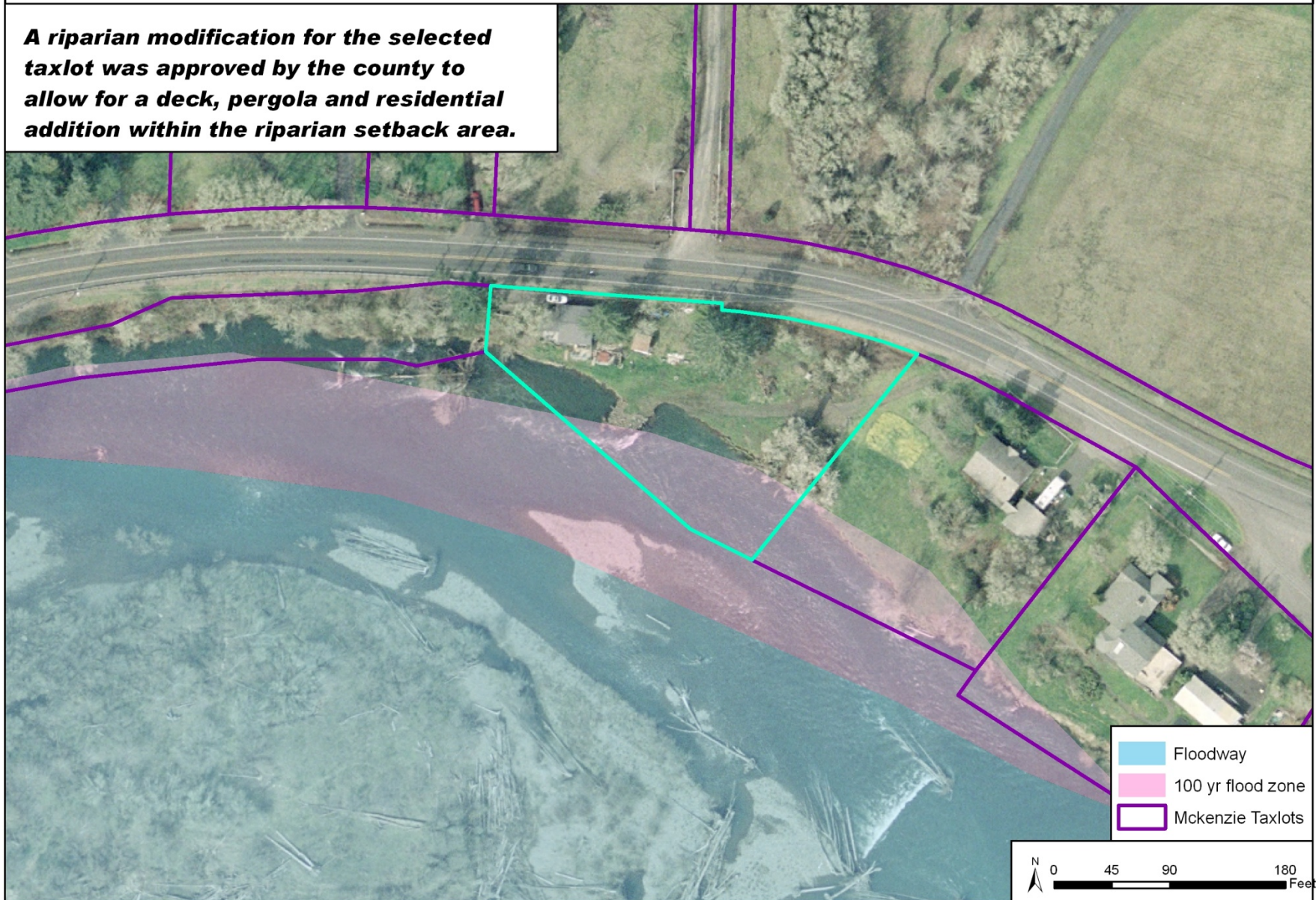
-  Approximate Location of Drainfield
-  Taxlot



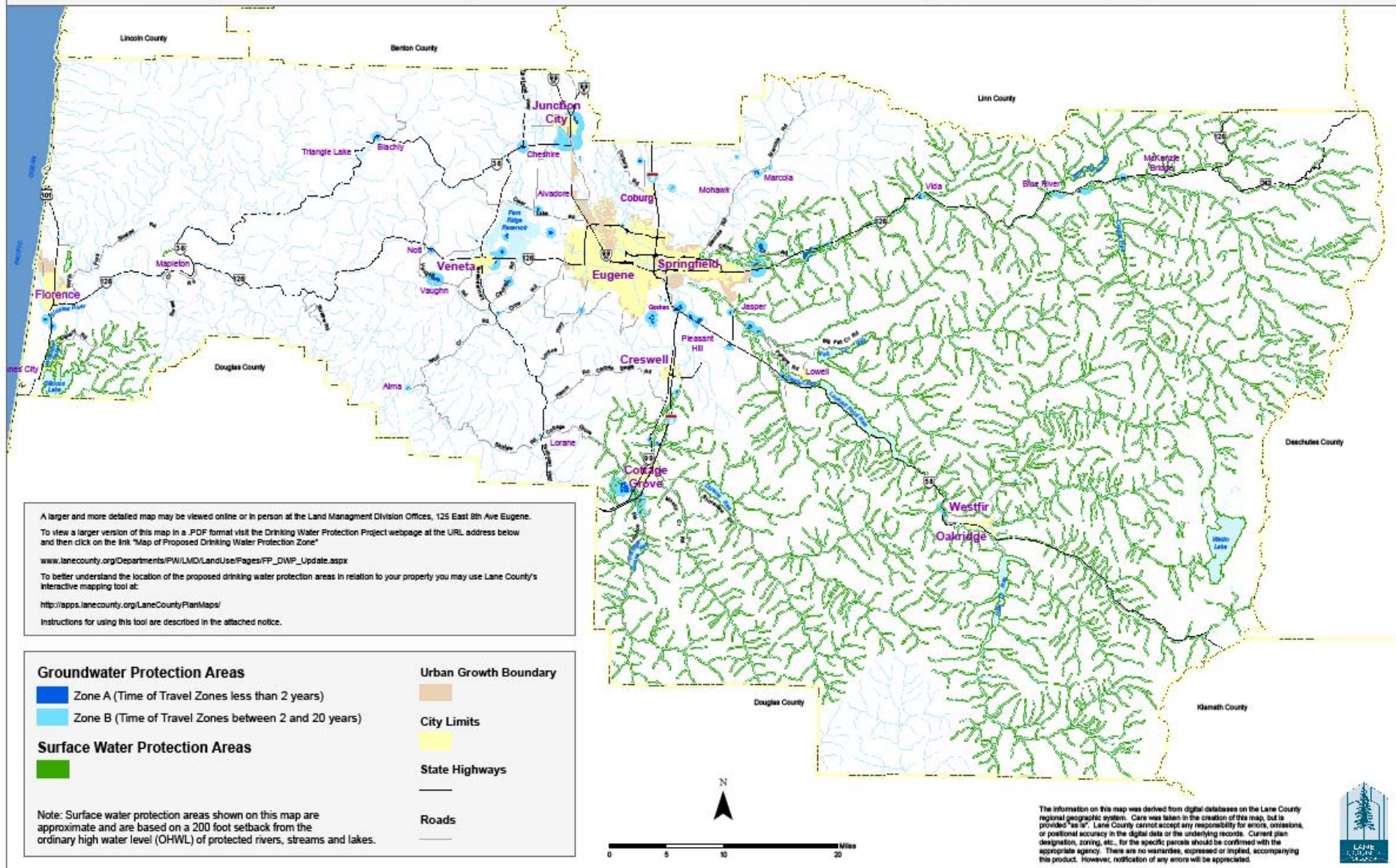
This map has been created for informational purposes only and should not be used in place of survey grade data.

# Example of Riparian Modification Approval

***A riparian modification for the selected taxlot was approved by the county to allow for a deck, pergola and residential addition within the riparian setback area.***



# Proposed Drinking Water Protection Overlay Zone Map (Draft)



# Reaction to Protection Ordinance

- No new regulations
- Less Government
- Private Property Rights
- Urban vs Rural

## LAND USE

### A river of discontent

A decision to put new riverside development restrictions on a fast track left landowners feeling sidelined

BY MATT COOPER  
*The Register-Guard*

Appeared in print: Sunday, Nov. 14, 2010, page A1

On Oct. 4, John Sullivan could see the storm coming.

Three days earlier, Lane County had sent letters to 9,000 property owners notifying them of plans to protect public drinking water by dramatically expanding riverside development restrictions. One of the proposals: a 200-foot buffer between water sources and development — four times the current setback.

Sullivan, a Lane County Planning Commission member, was worried. People didn't seem to understand the proposals; misinformation was spreading. Property owners were talking about hiring attorneys and challenging the proposals.

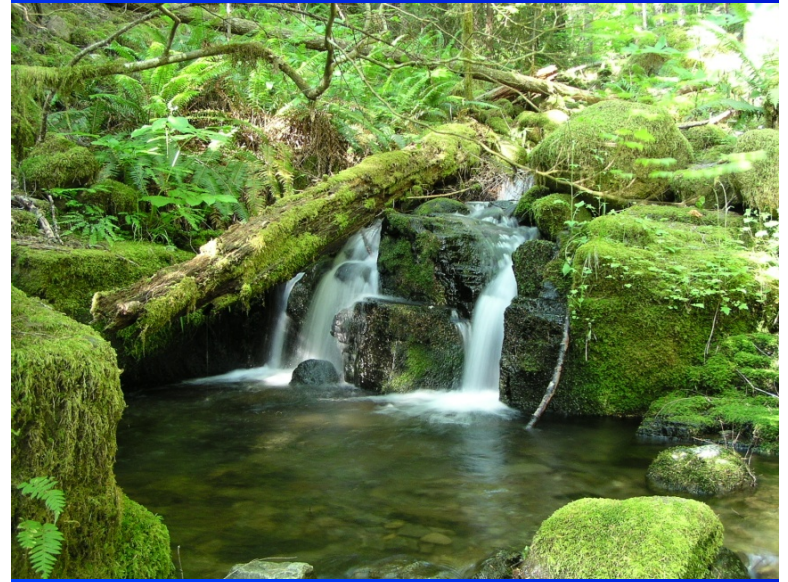
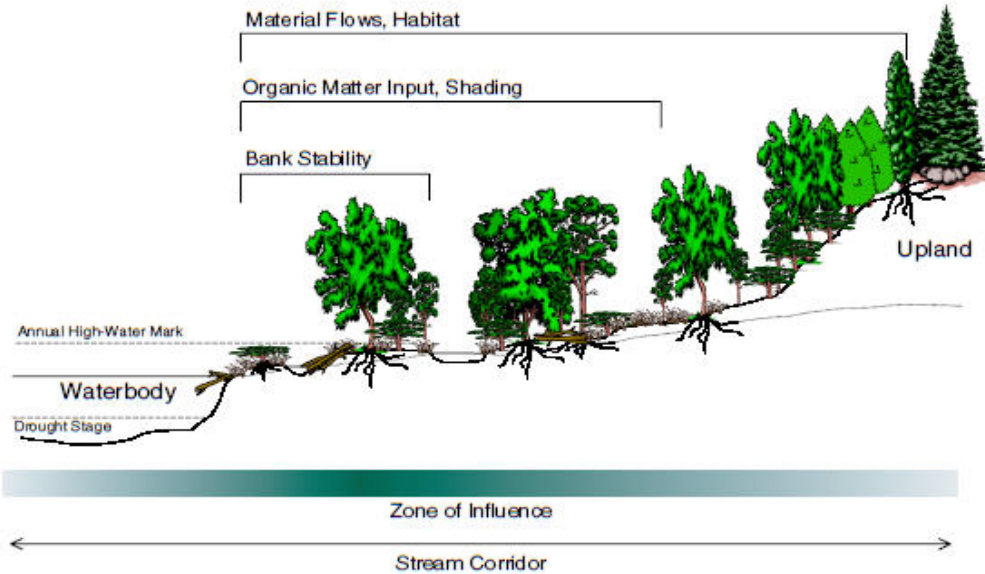
Even worse, Sullivan wasn't sure the people were wrong. The county had been working on the proposals for months with the Eugene Water & Electric Board, watershed councils and environmentalists — but not with property owners. Sullivan wasn't sure the public would get a chance for full input before the county Board of Commissioners voted on the changes.

"I have suggested to citizens not to hire attorneys yet, but am concerned things will move along without citizens full engagement," Sullivan wrote in an e-mail to county Commissioner Faye Stewart. "So maybe they should be hiring attorneys."

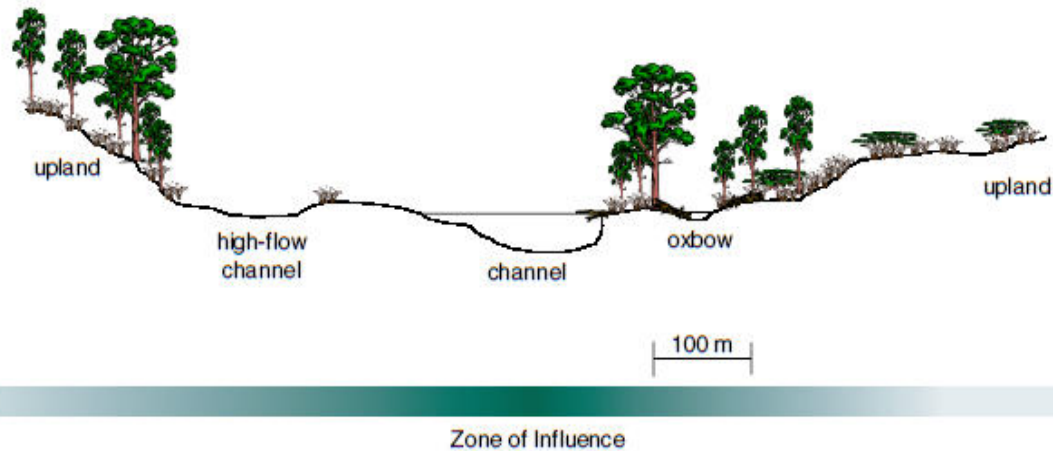
The storm hit Oct. 26: More than 400 people flooded the county building in Eugene for a hearing on the drinking-water protections, many angry with what they saw as a surprise government land grab.

In a rare spectacle for Lane County government, the standing-room-only crowd overwhelmed Harris Hall and shouted over the assembled officials; the hearing was quickly canceled because the crowd exceeded the hall's fire code limit. And shortly after, the county dropped the entire project indefinitely.

# Healthy Riparian Areas Provide Critical WQ & Habitat Functions



## Large River



# Watershed Valuation – Adding Value to Natural Processes

Figure 1 - The Link between Natural Infrastructure and Ecosystem Goods and Services

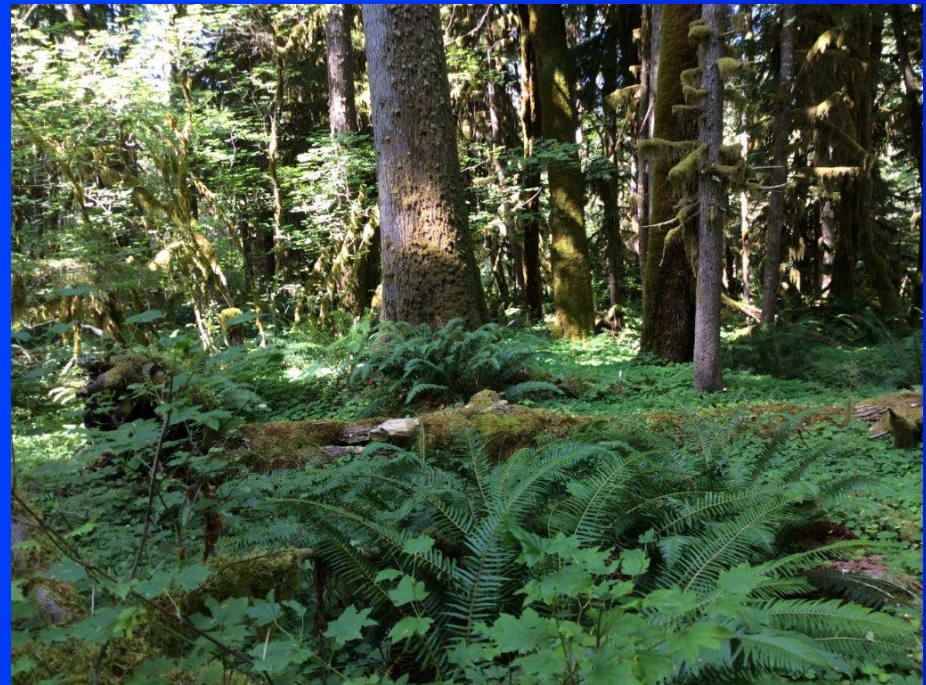


[www.eartheconomics.org](http://www.eartheconomics.org)

# Voluntary Incentives Program (VIP)

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Purpose: Reward good stewardship through payments to landowners who maintain healthy riparian areas over long term and help facilitate restoration on other properties that need work.



**Nature's Value in the McKenzie Watershed**  
A Rapid Ecosystem Service Valuation

May 2012

EARTH  
ECONOMICS 



<http://eweb.org/public/documents/water/EarthEconomics.pdf>



Table 5 - Ecosystem Services Valued and/or Identified in the McKenzie Watershed

		Agricultural Lands	Forest	Grasslands	Lakes/Rivers	Pasture	Riparian Buffer	Shrub/Scrub	Urban Green Space	Wetland
Provisioning	Water Supply		X		X		X	X		X
	Food		X	X	X					X
	Raw Materials		X							
	Genetic Resources		X							
	Medicinal Resources									
	Ornamental Resources									
Regulating	Gas Regulation	X	X	X			X	X	X	X
	Climate Regulation	X	X	X			X	X	X	X
	Disturbance Prevention	X	X				X			X
	Soil Retention	X	X	X			X	X		
	Water Regulation		X	X					X	X
	Biological Control	X	X	X		X		X		
	Water Quality, Waste Treatment		X	X			X			X
	Soil Formation	X	X	X		X		X		
	Nutrient Regulation	X	X							
	Pollination	X	X	X		X	X	X		
	Habitat	Habitat and Biodiversity		X		X		X	X	
Nursery			X		X		X	X		X
Information	Aesthetic Information	X	X		X	X	X	X	X	X
	Recreation		X		X	X	X	X	X	X
	Cultural and Artistic Information									
	Science and Education		X					X	X	
	Spiritual and Historic Information									

Key:

	Ecosystem service exists with the land cover but is not valued in this report
X	Ecosystem service produced by land cover and valued in this report
	Ecosystem service not produced by land cover

## Example of Studies Used in McKenzie Valuation – Riparian Buffer

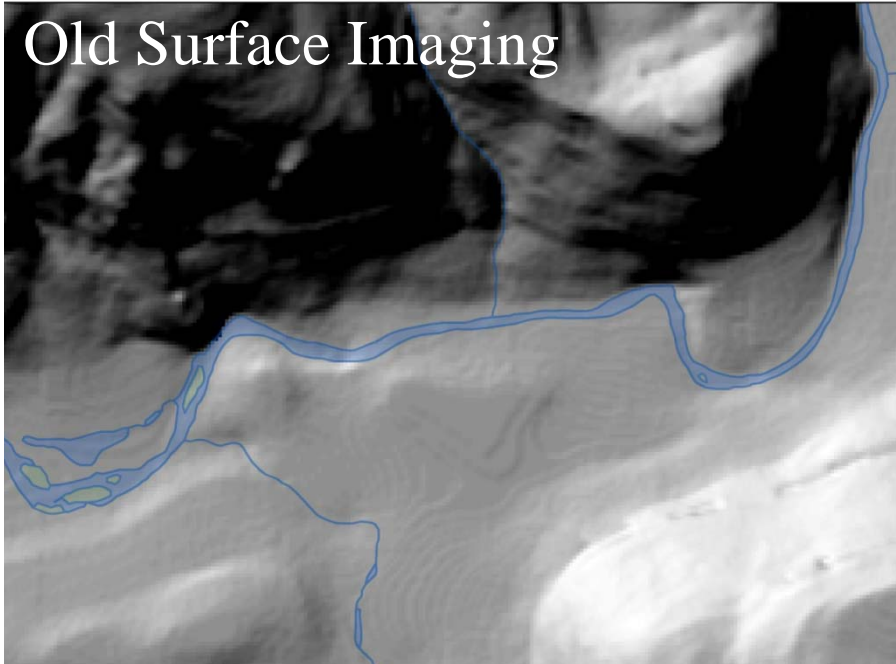
Riparian Buffer	Aesthetic & Recreational	Kulshreshtha, S. N. and Gillies, J. A.	HP	\$76.90	\$76.90
		Qiu, Z. et al.	CV	\$238.72	\$1,169.41
		Shafer et al.	CV	\$438.43	\$438.43
Disturbance Regulation		Rein, F. A.	AC	\$3,884.40	\$3,884.40
		Zavaleta, E.	AC	\$43.31	\$59.90
Gas & Climate Regulation		Birdsey, R.A.	MP	\$381.28	\$381.28
Habitat Refugium & Nursery		Amigues, J. P., et. al.	CV	\$59.96	\$59.96
		Haener, M. K. and Adamowicz, W. L.	CV	\$ .93	\$6.21
		Knowler, D.J., MacGregor, B.W., Bradford, M.J., Peterman, R.M.,	P	\$ .41	\$2.17
Pollination				\$413.50	\$413.50
Soil Erosion Control		Rein, F. A.	AC		
		Zhou, X. et al.	AC	\$ .10	\$84.33
Waste Treatment		Qiu, Z. et al.	AC	\$47.96	\$455.93
Water Supply		Zavaleta, E.	AC	\$67.30	\$267.81

\*Valuation Method Acronyms: Market Pricing (MP); Contingent Valuation (CV); Avoided Cost (AC); Production Approach (P); Travel Cost (TC); Hedonic Pricing (HP); Replacement Cost (RC); Value Transfer (VT); Meta-Analysis (MA).

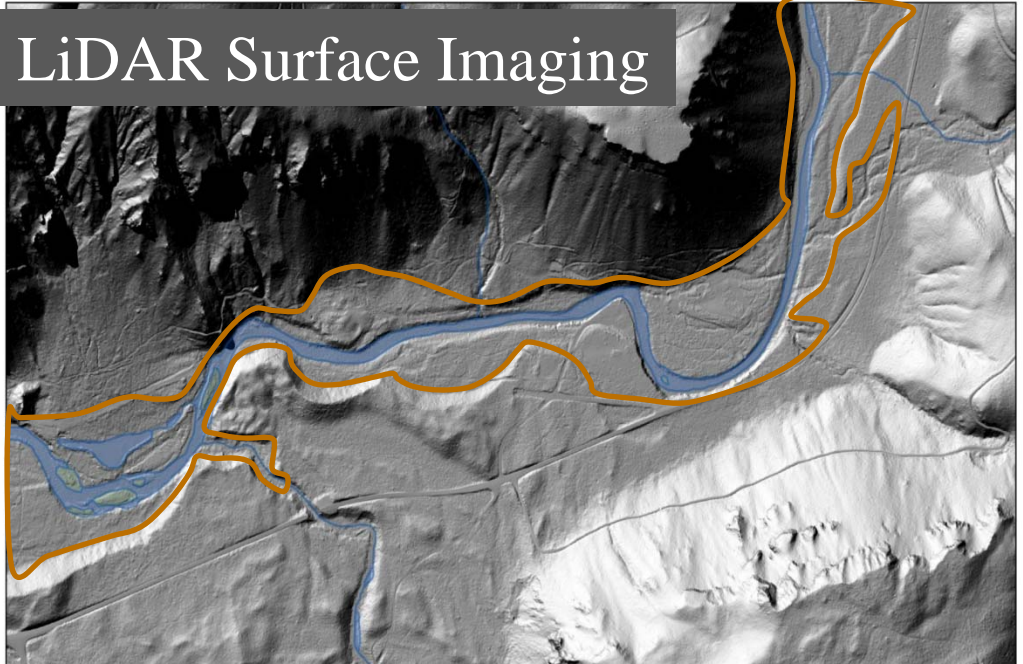
# Comparison of Natural Asset Values

Land Cover Type (Generalized)	Highest Natural Asset Value (\$/acre/year)
Wetlands	\$34,888
Lakes and Rivers	\$23,041
Riparian Buffer	\$6,717
Forest	\$3,677
Shrub and Scrub	\$2,710
Grassland	\$695
Agricultural lands	\$644

# Old Surface Imaging



# LiDAR Surface Imaging



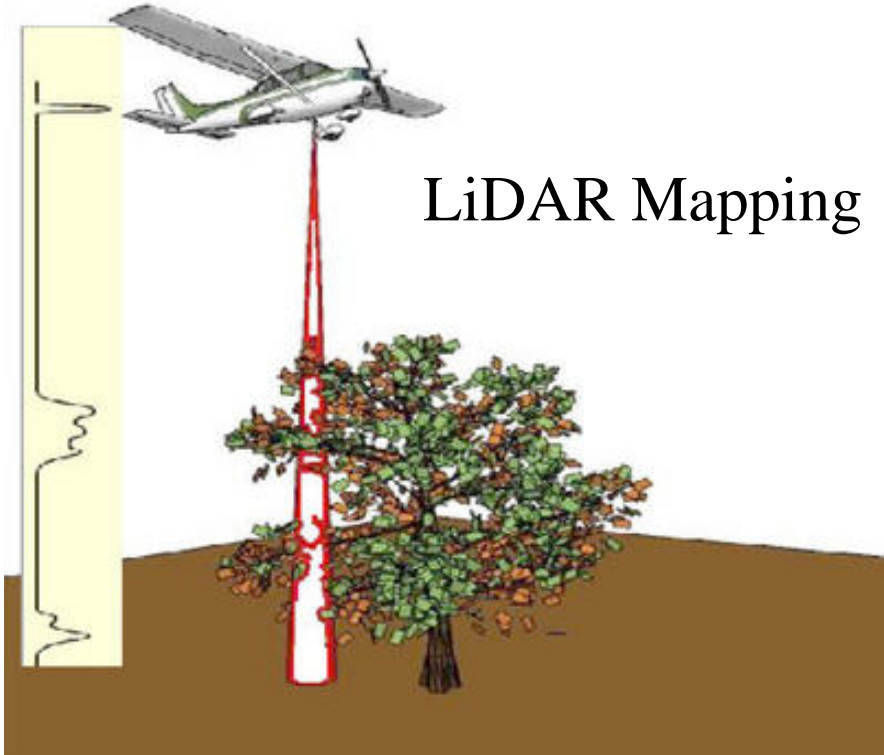
Leaburg Forest - LiDAR Aerial Photo w/Feature Height (ft)

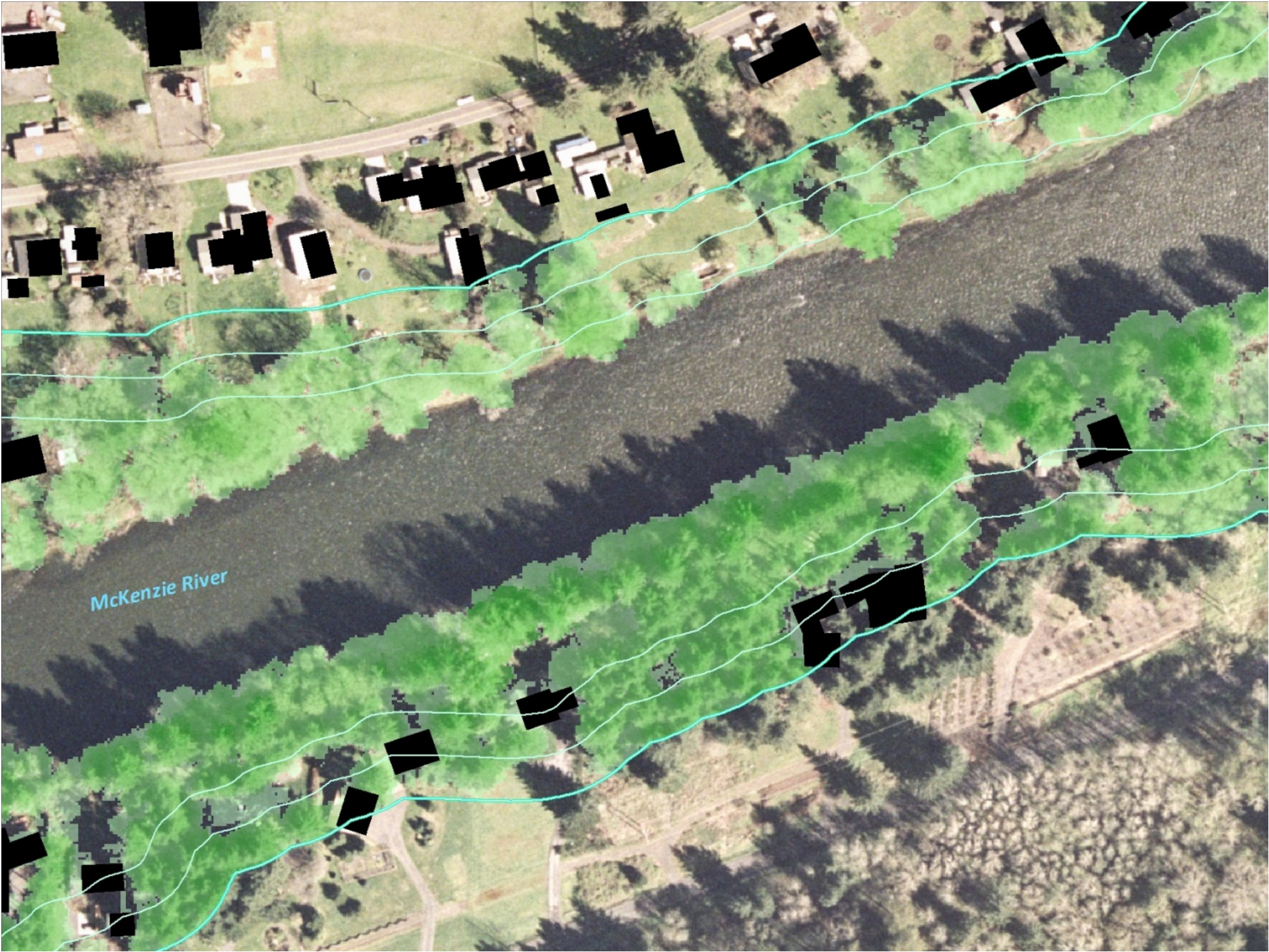


featureheight
<VALUE>
-72.11260986 - 10.7292569
10.72925691 - 30.77164402
30.77164403 - 50.81403114
50.81403115 - 72.19257741
72.19257742 - 96.24344195
96.24344196 - 125.6389431
125.6389432 - 160.3790807
160.3790808 - 268.6079712

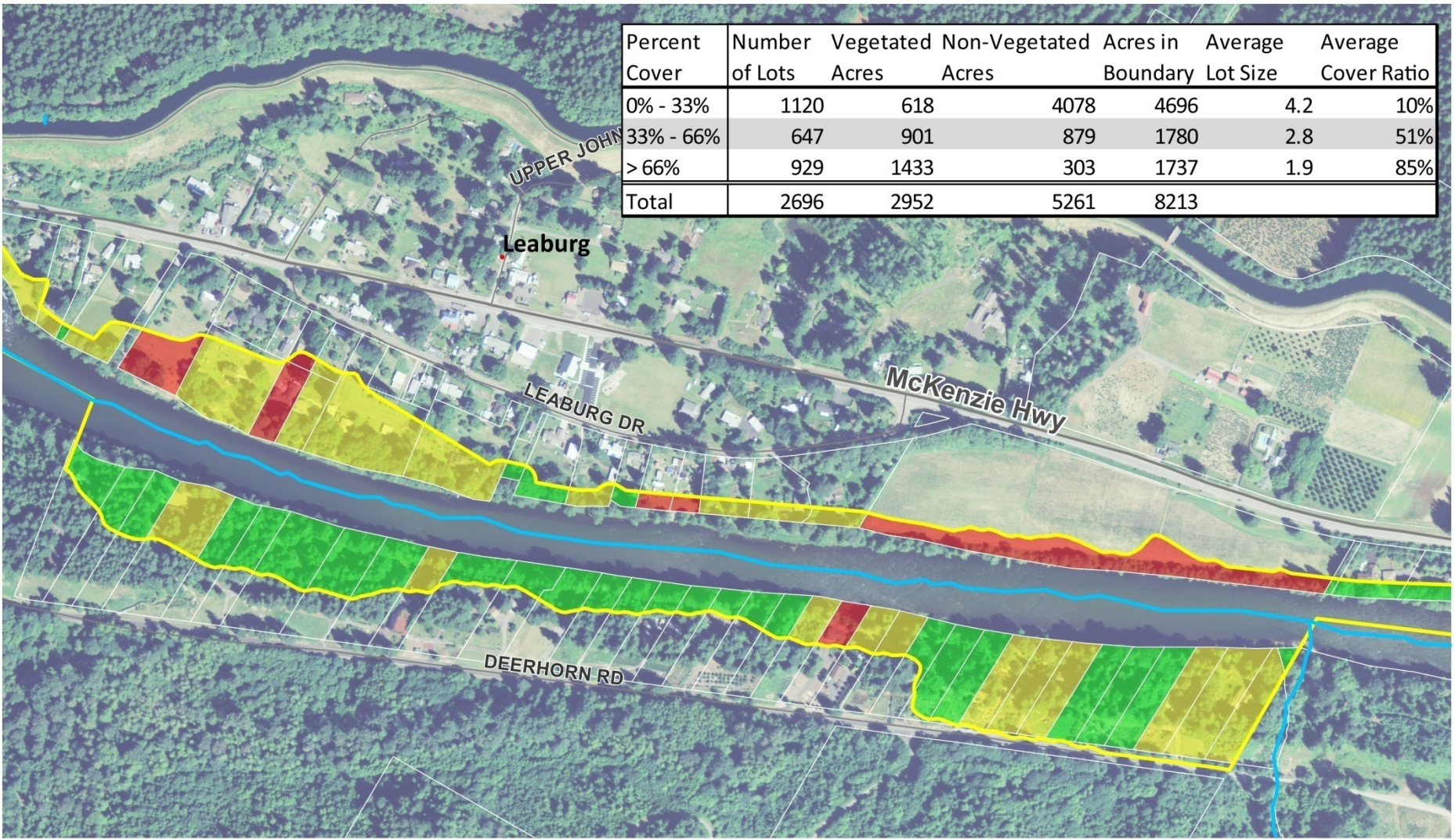


# LiDAR Mapping





McKenzie River

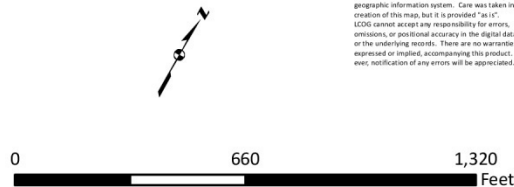


Percent Cover	Number of Lots	Vegetated Acres	Non-Vegetated Acres	Acres in Boundary	Average Lot Size	Average Cover Ratio
0% - 33%	1120	618	4078	4696	4.2	10%
33% - 66%	647	901	879	1780	2.8	51%
> 66%	929	1433	303	1737	1.9	85%
<b>Total</b>	<b>2696</b>	<b>2952</b>	<b>5261</b>	<b>8213</b>		

### McKenzie River Riparian Voluntary Incentive Program Boundary

- Streams Modeled for VIP Boundary
  - VIP Boundary
  - Affected Tax Lots (white)
- 
- Percent Cover\***
  - 0% - 33%
  - 34% - 67%
  - 68% - 100%

\* Percent Cover for tax lot area within current VIP boundary



The information on this map was derived from digital databases on Lane County of Governments' regional geographic information system. Care was taken in the creation of this map, but it is provided "as is". LCOG cannot accept any responsibility for errors, omissions, or positional accuracy in the digital data or the underlying records. There are no warranties, expressed or implied, accompanying this product. However, notification of any errors will be appreciated.

### Index Map



Date: 9/8/2013  
Document Path: T:\Model\B&M\Mode\LCOG\Map\Matcher\_VIP\_MapBook\_july2013\_slide.mxd

# ALIGN FUNDING

## EWEB

Rate Payer Funds  
Bond/Ballot Measure

## Businesses

Investment, Sponsorship

## Grants/Foundations

One-Time Investments

## OWEB

Restoration /  
Protection funds

## USFS/BLM

Stewardship Contracting  
% of O & C Receipts

## MWMC WTP

WQ Credits: Temp./Shade

## Mitigation Funds

Developers, ODOT  
Hydroelectric, DSL

## Federal Programs

NRCS Prgms, BPA,  
FEMA, Tax deductions

# PARTNERS

- McKenzie River Trust
- McKenzie Watershed Council
- Upper Willamette SWCD
- Lane Council of Governments
- Cascade Pacific RC&D

# PROGRAM INFRASTRUCTURE

Riparian Health Assessments  
Landowner Agreements  
Fiscal Mngt/Accounting  
Monitoring & Planning  
Agreement Compliance  
Education/Outreach/Marketing  
Restoration Design/plans  
Restoration Project Mngt

\$

**WATERSHED INVESTMENT FUND (501(c)3)**

\$

\$

**Dividend Payments for Protection**

\$

**Business Sponsorship Incentives**

**VIP LANDOWNERS**

Residential  
Agriculture  
Forestry (F2)  
Nonprofits

**SWCDs**

% of tax base

**Funding for Restoration**

# LiDAR Analysis – Healthy Riparian Forest Cover Summary

Percent Cover	Acres	Percent of Total Area
0-33%	4,696	57%
34-66%	1,780	22%
67-100%	1,737	21%
Total Acres	8,213	

## Paying Dividends on Landowner’s Natural Capital

\$250,000/8,213 acres = \$30.44/ac

Year 1 – 300 acres enrolled = \$9,131 payout

\$490,868/8,213 acres = \$59.77/ac

Year 2 – 600 acres enrolled = \$35,860 payout

\$705,008/8,213 acres = \$85.84/ac

Year 3 – 1,000 acres enrolled = \$107,230 payout

\$869,167/8,213 acres = \$105.83/ac





# 2014/2015 VIP Pilot Project

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- 15 landowners (4.2 miles of river front/ 140 acres of riparian area)
- Varying land sizes and characteristics

## Goals:

- Test program elements & determine feasibility
- Refine partner roles and working relationships
- Establish projected budget needs/funding sources
- Develop website for landowner recruitment
- Develop dashboard for reporting/ accountability
- Evaluate pilot project to enhance full VIP program



Funded by OWEB (\$150,000) and EWEB (\$200,000)



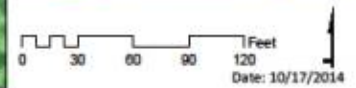
VIP Land Owner Pilot Sites

**LO Lower McKenzie 1**

HAUN RICHARD T

**Legend**

- Parcels
- ▭ Sites
- ▭ Units
- Site Address
- ▭ Lane County Taxlots
- Forested Site Units**
- ▭ Medium
- ▭ Short
- ▭ Tall
- Land Cover Units**
- ▭ Grass, Gravel, or Ground (0' - 3')
- ▭ Shrub (3' - 15')
- ▭ Short Tree (15' - 40')
- ▭ Medium Tree (40' - 80')
- ▭ Tall Tree (40' - 80')
- ▭ 11
- ▭ 12
- ▭ Short Wetland Tree (40' - 80')
- ▭ Medium Wetland Tree (40' - 80')
- ▭ Tall Wetland Tree (40' - 80')
- ▭ Developed (15' buffer)
- ▭ Water

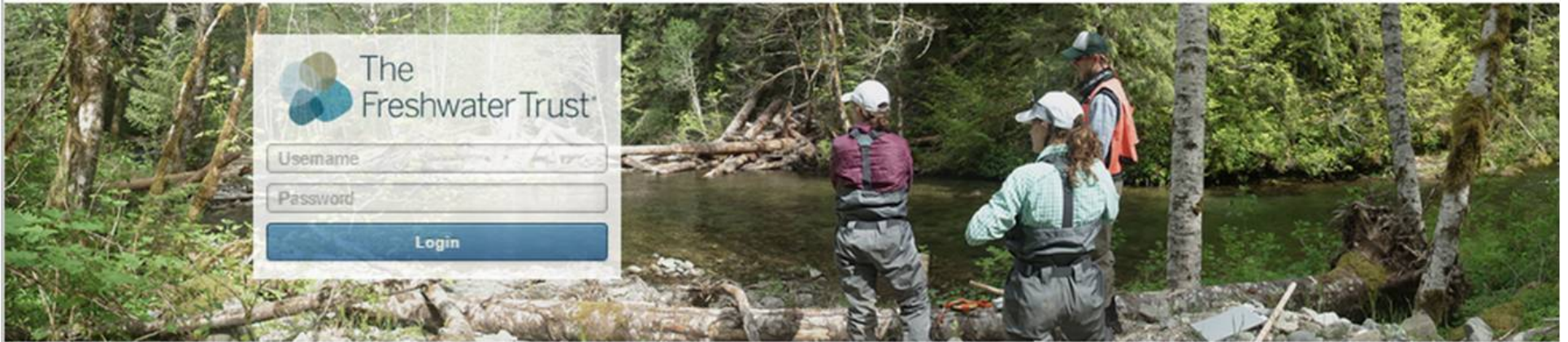


LCOG conducts desktop GIS analysis – creates data for field



- Rebecca Ley, UW SWCD
- Jared Weybright, MWC
- Kris Stenshoel, EWEB

# StreamBank® Monitoring



StreamBank® Monitoring  
changes the way watershed  
restoration works.

© 2014 The Freshwater Trust

- Species biodiversity
- Snags/downed wood
- Forbs, shrubs, trees
- % Invasives
- Canopy cover
- Impervious surface
- Bank conditions
- Human infrastructure

# Landowner Assessment Report

- Summarize property characteristics and observations
- Provide landowner pathways for land within VIP boundary:
  - Receive incentives to protect the best
  - Restoration plan for funded work
- Direct to other programs (Septic, sustainable landscaping, HHW, etc.)

# Timeline/Next Steps

- Complete VIP pilot project with 16 landowners (July 2015)
- Re-design and enhance VIP based on lessons learned from pilot project (November 2015)
- Marketing, outreach, and education to landowners, businesses and EWEB customers (March 2016)
- Full VIP implementation and landowner enrollment (May 2016)

# Scaling-up VIP

	Large Tax lots (>30ac)	Medium Tax Lots (5-30 ac)	Small Tax Lots (<5 ac)
Total Number TLs	197	467	1,571
TLs Enrolled in other EWEB programs	27	41	285
TLs w/Healthy Riparian Canopy Cover (>60%)	21%	32%	10%
TLs w/impacted Riparian Canopy Cover (<60%)	79%	68%	90%
Landowner Outcomes	Protection & Restoration	Protection & Restoration	Naturescaping
Success (% TLs enrolled in VIP in 3 yrs)	25% (49 TLs)	20% (93 TLs)	20% (314 TLs)



EWEB [Canopy cover & # TLs assessed for initial 100' from waterbody]



Rely on us.

<http://www.eweb.org/sourceprotection/vip>



Contact Karl Morgenstern at:

(541) 685-7365 or via e-mail [Karl.morgenstern@eweb.org](mailto:Karl.morgenstern@eweb.org)