

Sense of Place and Willingness to Pay for Ecosystem Services: Investing in Drinking Water Source Riparian Conservation



Portland State
UNIVERSITY

Environmental Science & Management Dept

ACES – Dec 10, 2014
Washington D.C.
Max Nielsen-Pincus

Acknowledgements

- Patricia Sussman (Environmental Incentives LLC), Bob Parker (UO), Hannah Gosnell (OSU), Drew Bennett (OSU)
- Karl Morgenstern (EWEB),
- USDA – NIFA Grant #2011-67023-30108
- 700+ EWEB Ratepayers, McKenzie watershed landowners, and Eugene business managers



United States Department of Agriculture
National Institute of Food and Agriculture



UNIVERSITY OF OREGON

Seminar Outline

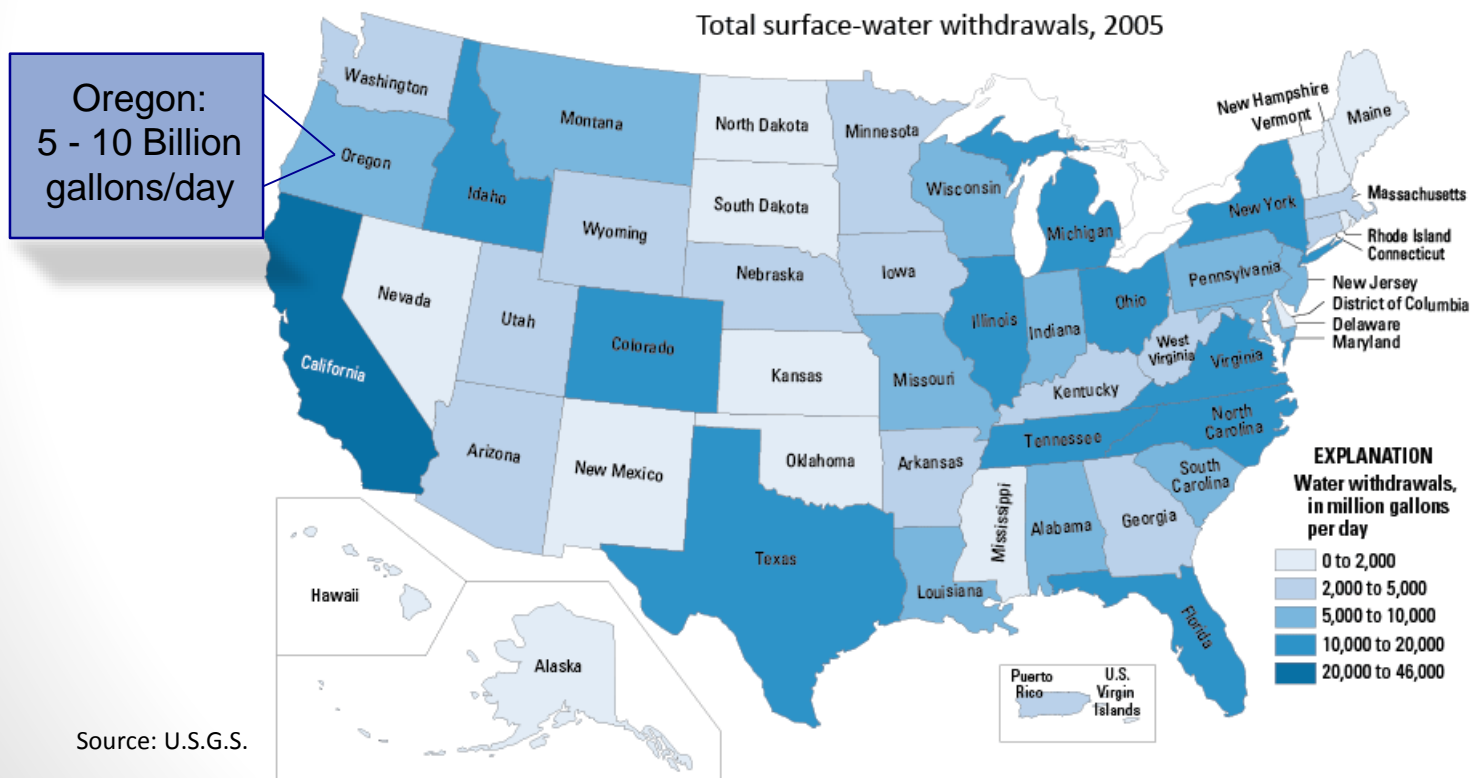
- **Drinking water in the US**
- **McKenzie River Case Study**
- **Research Questions & Methods**
- **Influence of Sense of Place on Support for Drinking Water**
- **Conclusions**



Drinking Water Overview

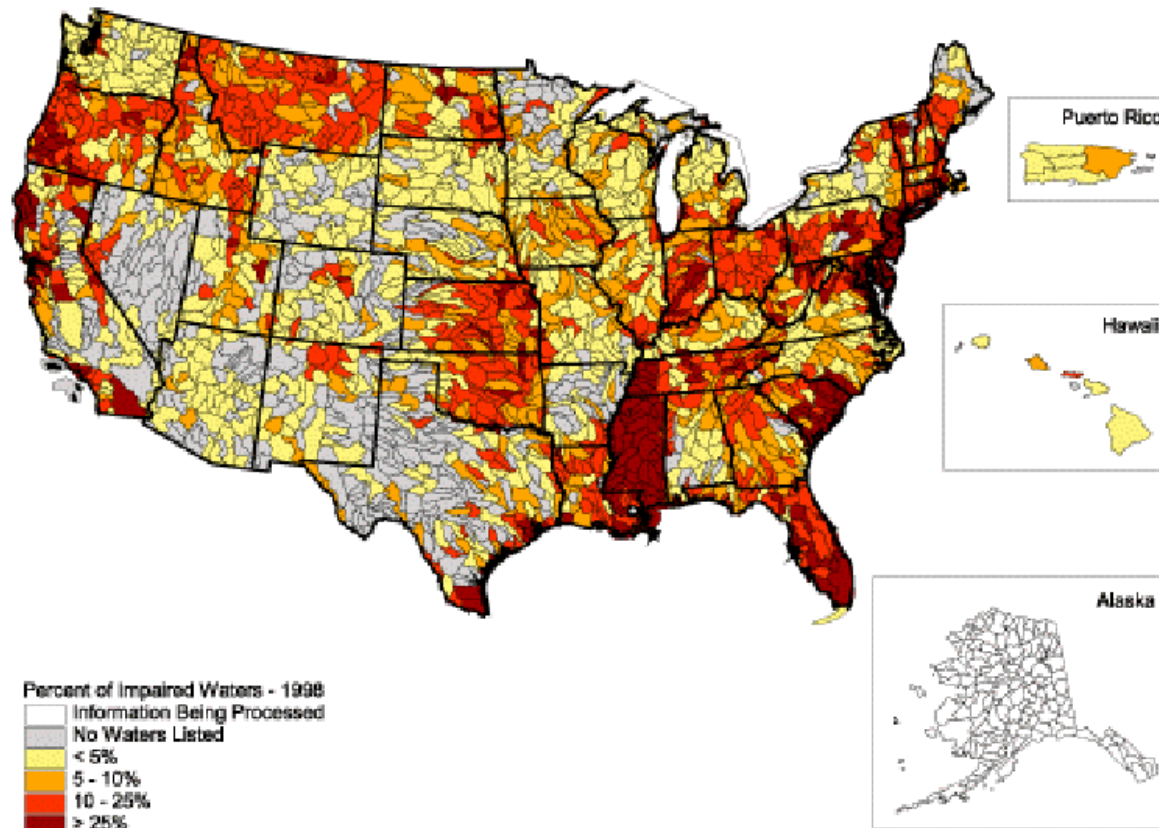
In the **United States** more than **210 million people** rely on **surface drinking water** from rivers and streams (75% of Oregonians)

Source: U.S. Environmental Protection Agency (EPA) 2012



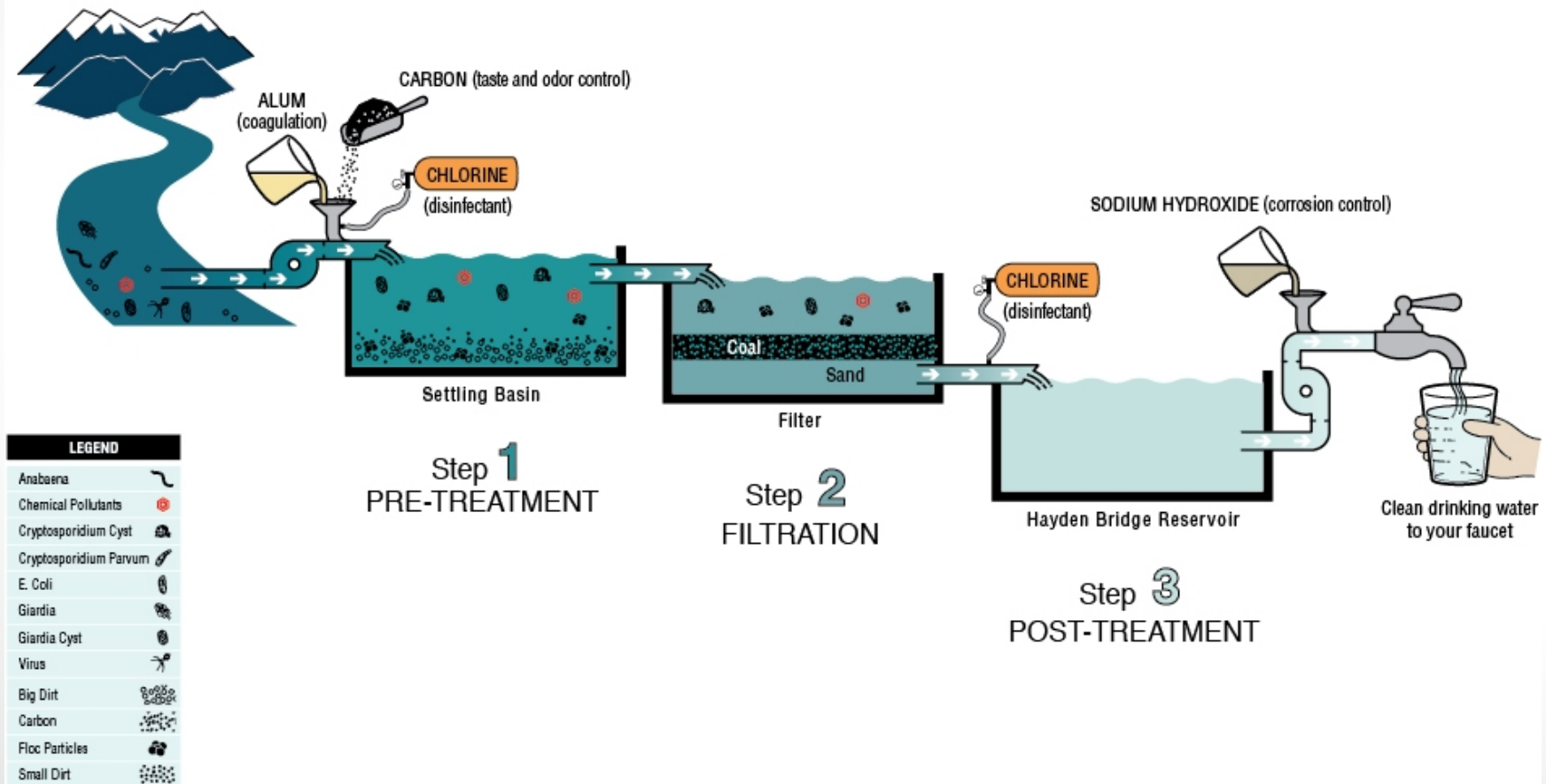
Threatened & Impaired Waters

- 30% of Stream Miles Assessed
- 54% of Assessed are Impaired or Threatened

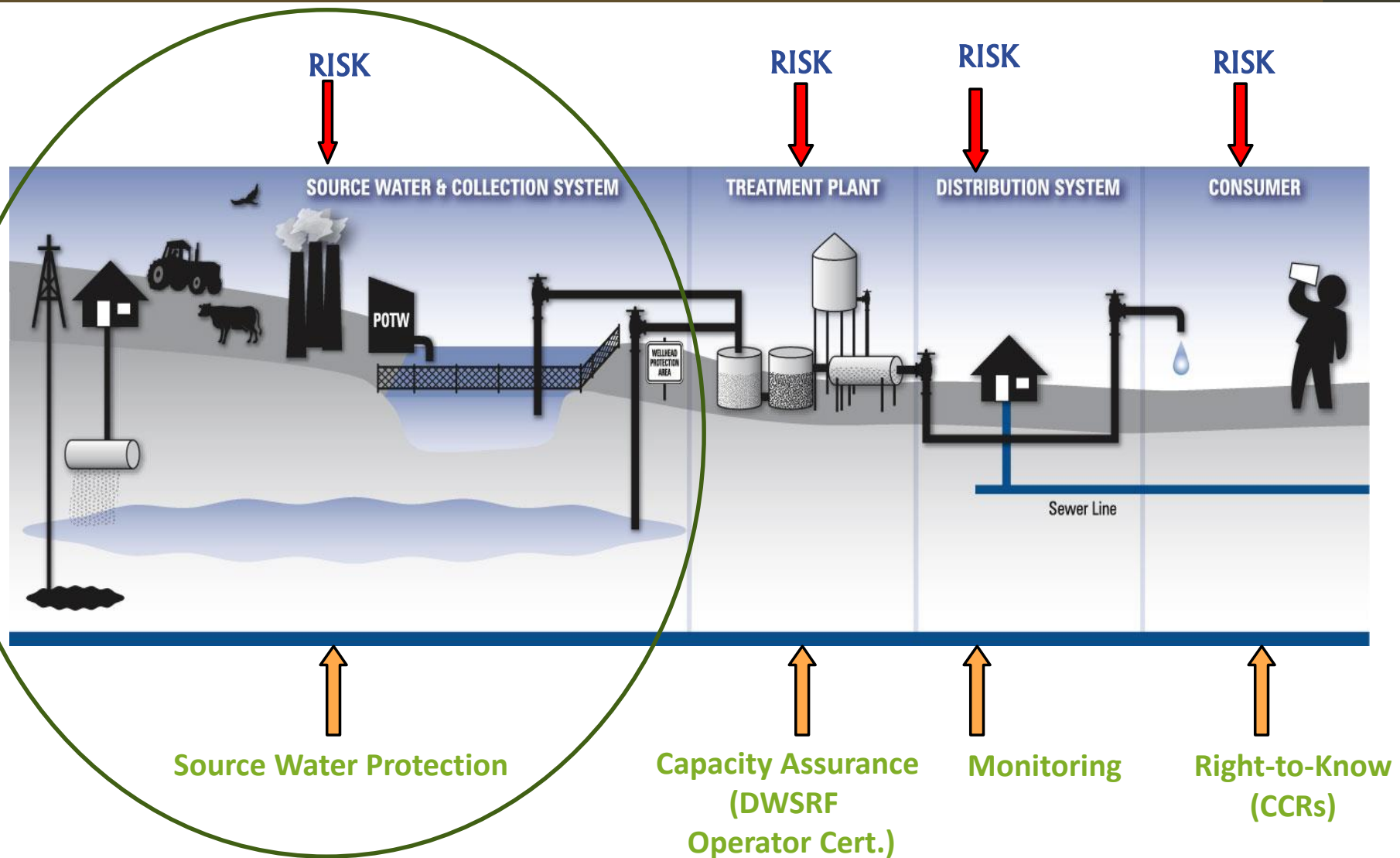


Safe Drinking Water Act Focus

Water Filtration Process



Safe Drinking Water Act (1996A): Source to Tap



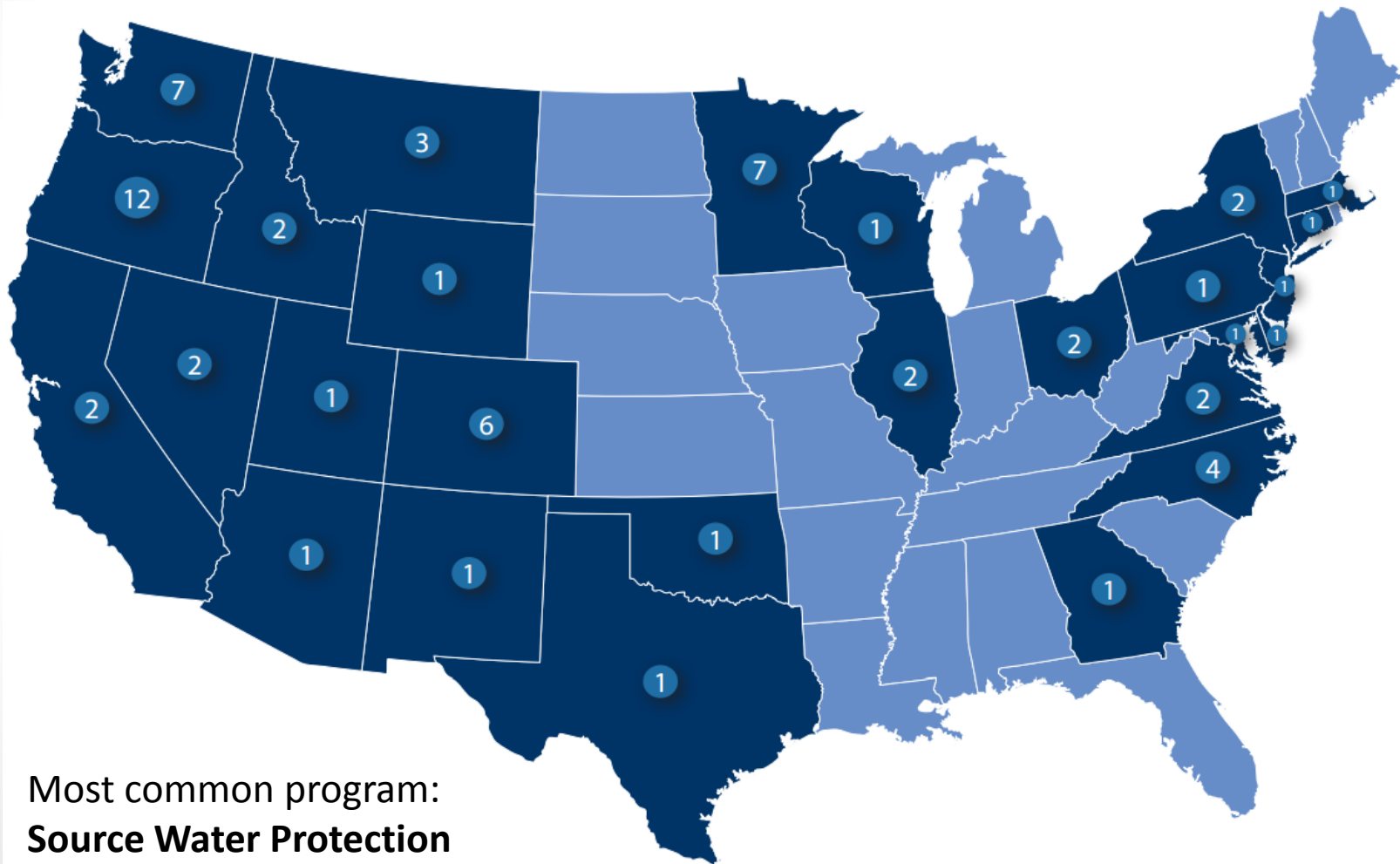
Payments for Watershed Services

What are “payments for watershed services”?

....an incentive-based approach to rewarding landowners who practice good land stewardship that provides valuable watershed services for those downstream.



PWS in the US – Active Programs



Most common program:
Source Water Protection

Source: Ecosystem Marketplace.

Case Study:

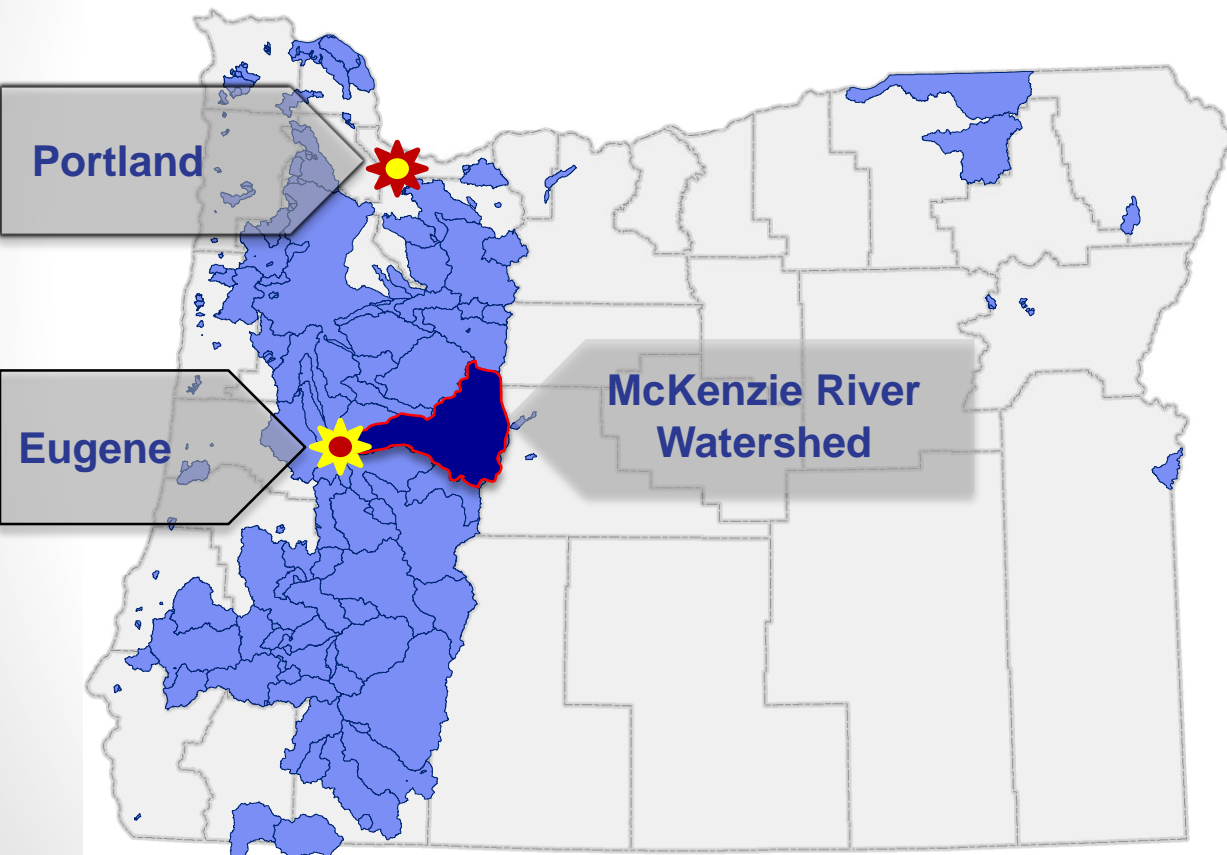
EWEB & The McKenzie River Watershed



Case Study:

EWEB & The McKenzie River Watershed

Drinking Water Source Areas for Oregon Public Water Systems -
Surface Water



Threats to EWEB Drinking Water

...increased development and the conversion of land threaten the health of the McKenzie River

Human Threats to Drinking Water

- Degradation of critical riparian areas
- Chemical fertilizer and pesticide runoff
- Failing septic systems
- Forestry runoff
- Urban stormwater runoff
- Riverbank alterations

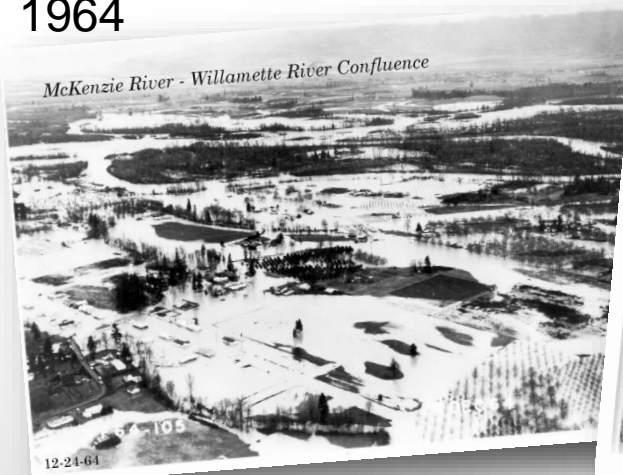


Threats to EWEB Drinking Water

Development

- 15% of all homes in the McKenzie Basin are located in the 100 year Floodplain

1964



1945

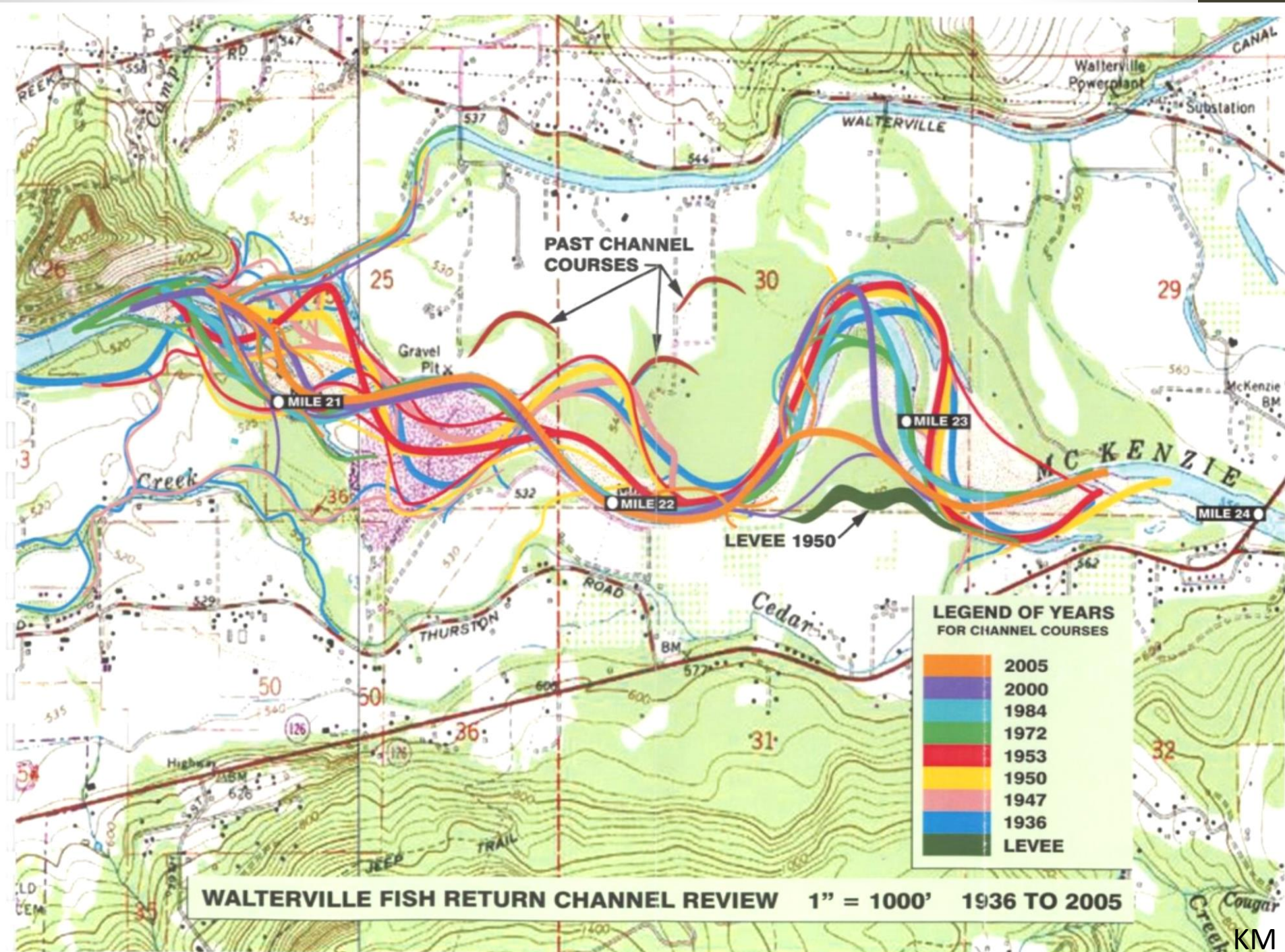


1996



Chemical Storage





Structural Risks



2004 Aerial Photo

Structural Risks



2006 Aerial Photo

Threats to EWEB Drinking Water

The Cost of Business as Usual

...EWEB estimates that future upgrades to drinking water treatment facilities to cost between \$60 - \$130 million

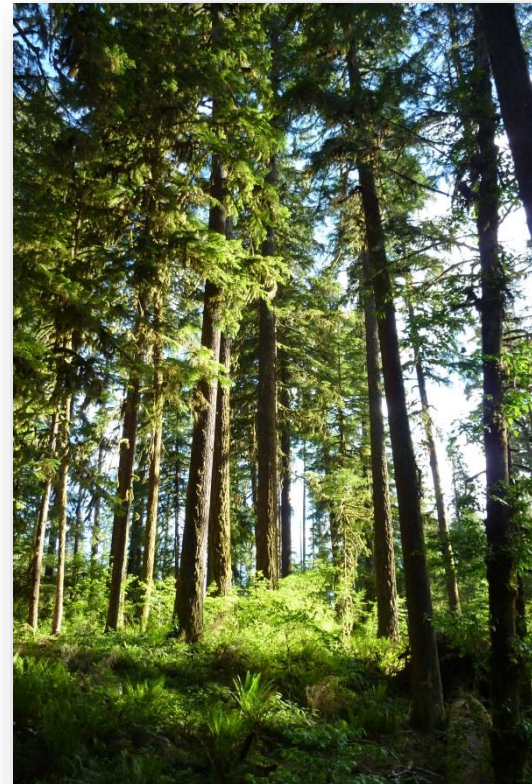


EWEB Source Protection

EWEB Drinking Water Source Protection Program

Voluntary Incentive Program

- Based on a Payment for Ecosystem Services Program
- An incentive based alternative to land use regulation
- Rewards landowners for good stewardship of riparian areas



Voluntary Incentive Program



- Reward good stewardship through payments to landowners who maintain healthy riparian areas over long term
- Pays dividends on natural capital provided by their land
- Landowners must be within designated program boundary

Research Objectives:



- What affects ratepayers willingness to pay for source water protection program? **(Surveys)**
- What affects landowners' willingness to participate in source water protection? **(Surveys, Focus Groups)**
- What affects business' willingness to contribute to source water protection? **(Surveys, Focus Groups)**

Explaining Ratepayer Willingness to Participate

Factors that influence Ratepayer Willingness to Pay

Economic

- Income
- Frequency of Use

Socio-Demographic

- Gender
- Education
- Age
- Political attitudes

Ideology

- Political ideology

Sense of Place*

- Attachment
- Identity
- Dependence

Sense of Place

- Psychologists, Sociologists, Geographers, Anthropologists, etc.
- “Place is a center of meaning constructed by experience.”
 - Yi-Fu Tuan (1975)
- Many use a tripartite notion of our relationship with places:
 - **Attachment** – An emotional bond with a place
 - **Identity** – A belief that a place reflects your self-identity
 - **Dependence** – A behavioral commitment to a place
- Sense of place explains attitudes and behaviors towards places
- Sense of place has not been used to examine support for PWS

Methodology

Mail Surveys – Tailored Design Method (Dillman 2000)

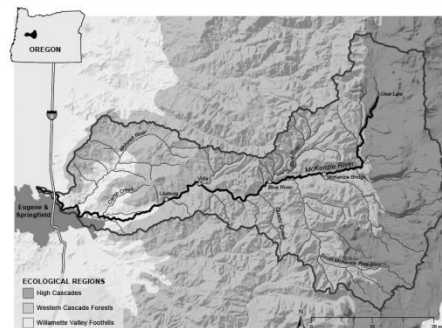
Spring 2012

McKenzie River Watershed: A Survey of Eugene Residents

EWEB Ratepayers

- Residential
- Owners/Renters
- Stratified census tract

The McKenzie River Watershed



A Survey of Eugene Residents

~~~~~  
Your help with this effort is greatly appreciated! Thank you!

#### Instructions:

- Please carefully read each question and make your responses clear.
- Feel free to write in any additional comments or explanations anywhere on the survey.
- Please mail your completed survey back in the prepaid envelope provided.
- All of your answers will be kept completely anonymous.

A watershed is an area of land within which all water drains to the same place. The McKenzie River is approximately 90 miles long and is fed by many smaller rivers, creeks, streams and springs. The McKenzie River converges with the Willamette River near Eugene and Springfield, and eventually meets the Columbia River in Portland. The McKenzie River Watershed encompasses nearly 1,380 square miles. Forested lands comprise the majority of the watershed area, mostly in the higher elevations. Several small communities and agricultural land (primarily orchards, nurseries, row crops, and pastureland) are located in the lower elevations. The cities of Springfield and Eugene are located near the mouth of the McKenzie River, but the cities themselves are mostly outside of the watershed.

### Survey Stats:

- Sample Size: 980
- Responses: 421
- Response Rate: 43%



# Results: Measures

## Willingness to Pay

### IPDWTP

“In-Principle Definitely  
Willing to Pay”

220 (54%)

**Program 1:** All of the money collected will be used to fund water quality improvements projects within the **McKenzie River** corridor only. For each price level, would you participate in the program?

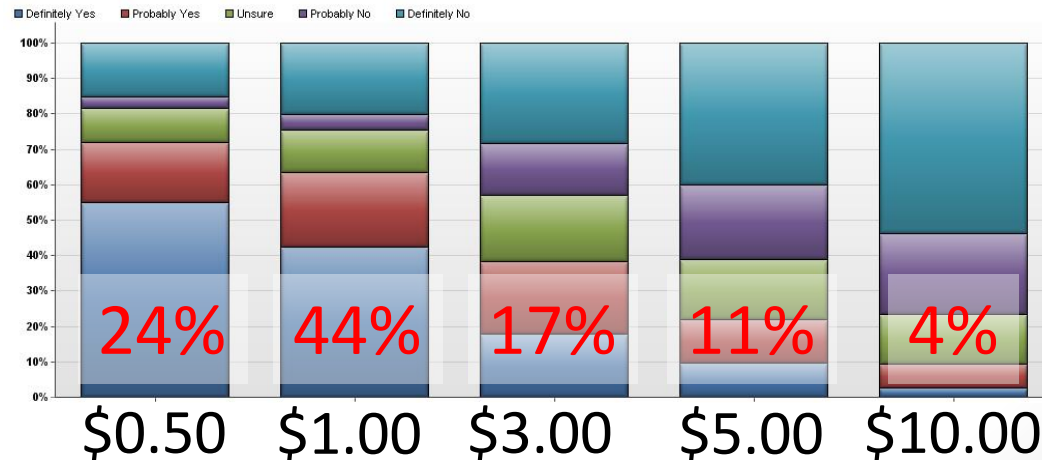
| Added cost to your water bill: | Definitely Yes        | Probably Yes          | Unsure                | Probably No           | Definitely No         |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 50 cents per month             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$1 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$3 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$5 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$10 per month                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

1

0

### Maximum WTP

“Maximum  
Willingness to Pay”



# Results: Logistic Regression

## IPDWTP (Nagelkerke $R^2 = 0.24$ )

### IPDWTP

“In-Principle Definitely  
Willing to Pay”

220 (54%)

**Program 1:** All of the money collected will be used to fund water quality improvements projects within the **McKenzie River** corridor only. For each price level, would you participate in the program?

| Added cost to your water bill: | Definitely Yes        | Probably Yes          | Unsure                | Probably No           | Definitely No         |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 50 cents per month             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$1 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$3 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$5 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$10 per month                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

1

0

Odds Ratio (p<0.05)

Economic

- Income
- Frequency of Use(ln)

NS

NS

Socio-Demographic

- Gender (Male=1)\*
- Education\*
- Age\*

0.59



1.25



0.23



Ideology

- Conservative\*\*\*

0.66



Sense of Place

- SOP Score\*\*\*

1.09



# Results: Politics and Income

## Liberals support – conservatives oppose

### IPDWTP

“In-Principle Definitely  
Willing to Pay”

220 (54%)

**Program 1:** All of the money collected will be used to fund water quality improvements projects within the **McKenzie River** corridor only. For each price level, would you participate in the program?

| Added cost to your water bill: | Definitely Yes        | Probably Yes          | Unsure                | Probably No           | Definitely No         |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 50 cents per month             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$1 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$3 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$5 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$10 per month                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

1

0

**Table 3.** Frequencies of willingness to pay tabulated by income categories and political ideologies.

|                                             |                                                                | Self-reported 2011 Household Income Categories |                     |                     |                     |                   | All (%)   |
|---------------------------------------------|----------------------------------------------------------------|------------------------------------------------|---------------------|---------------------|---------------------|-------------------|-----------|
|                                             |                                                                | Less than \$25,000                             | \$25,000 – \$49,999 | \$50,000 – \$75,000 | \$75,000 – \$99,999 | \$100,000 or more |           |
| Self-identified liberal political ideology  | Willing to pay at least \$0.50 per month on monthly water bill | 23                                             | 27                  | 31                  | 23                  | 19                | 123 (72)  |
|                                             | Unwilling to pay                                               | 7                                              | 10                  | 12                  | 6                   | 12                | 47 (28)   |
| Conservative and other political ideologies | Willing to pay at least \$0.50 per month on monthly water bill | 14                                             | 24                  | 18                  | 11                  | 13                | 80 (45)   |
|                                             | Unwilling to pay                                               | 20                                             | 30                  | 20                  | 6                   | 20                | 96 (55)   |
| All                                         |                                                                | 64                                             | 91                  | 81                  | 46                  | 64                | 346 (100) |

# Results: Sense of Place and Politics

## Sense of Place Matters

### IPDWTP

“In-Principle Definitely  
Willing to Pay”

220 (54%)

**Program 1:** All of the money collected will be used to fund water quality improvements projects within the **McKenzie River** corridor only. For each price level, would you participate in the program?

| Added cost to your water bill: | Definitely Yes        | Probably Yes          | Unsure                | Probably No           | Definitely No         |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 50 cents per month             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$1 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$3 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$5 per month                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| \$10 per month                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

1

0

- **Sense of Place** → Partial  $R^2 = 0.11$
  - **Political Ideology** → Partial  $R^2 = 0.14$
- Similar explanatory power,  
opposite direction



# Conclusion:

## Do what others have already done

- **Build on people's connection to place**

- Emotional bonds
- Cognitive associations
- Behavioral dependencies

**MCKENZIE  
MEDICAL  
IMAGING**



**McKenzie  
River  
Music**

- **Build people's connection to place**

- Sponsor events that build connections
- Support organizations that link people to places



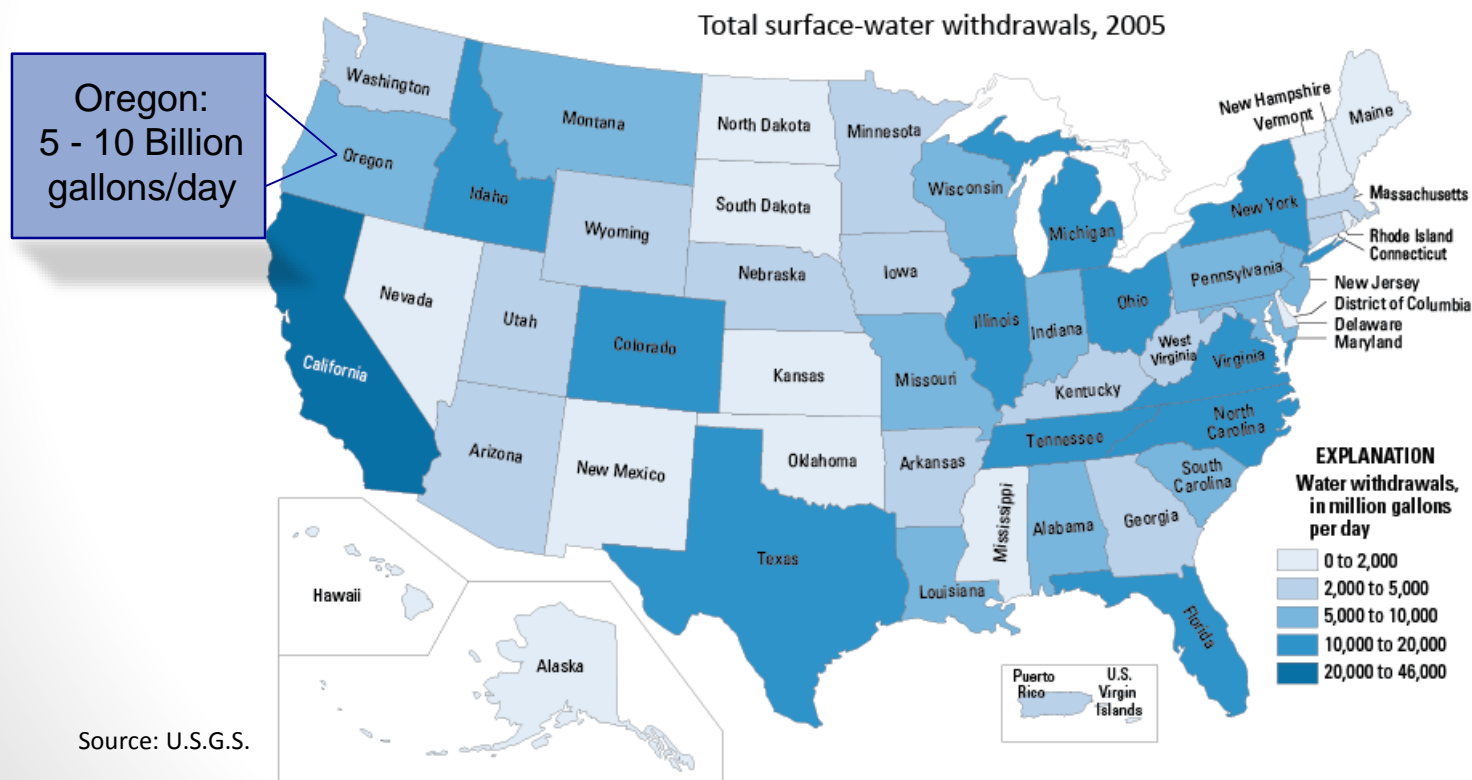
*The*  
**LIVING  
RIVER**  
**FILM  
FESTIVAL**



# Drinking Water as a Conservation Financing Mechanism

In the **United States** more than **210 million people** rely on **surface drinking water** from rivers and streams (75% of Oregonians)

Source: U.S. Environmental Protection Agency (EPA) 2012



Source: U.S.G.S.



# Thank You

[maxnp@pdx.edu](mailto:maxnp@pdx.edu)





## ALIGN FUNDING

### EWEB

Rate Payer Funds  
Bond/Ballot Measure

### CORPORATIONS

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

### Federal Programs

NRCS Progs, BPA,  
FEMA, Tax deductions

### Mitigation Funds

Developers, ODOT  
Hydroelectric, DSL

## 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

Dividend Payments  
for Stewardship

Grants/Funding  
for Restoration

### SWCDs

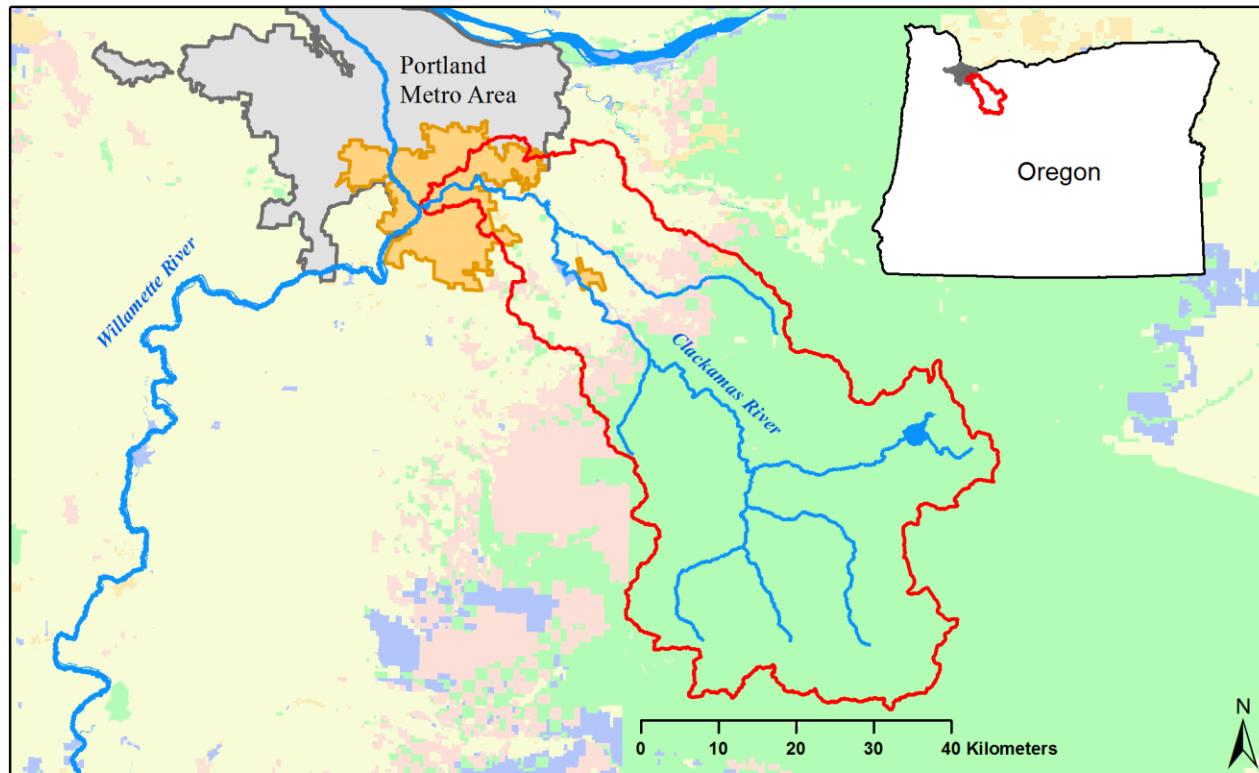
% of tax base

### LANDOWNERS

Residential  
Agriculture  
Forestry (F2)  
Nonprofits  
Local Governments



# Next Steps: Clackamas



## Legend

- Clackamas River Watershed
- Clackamas River Water Providers Drinking Water Service Districts

## Land Use and Cover

- Agricultural Land
- Federal Forest Land
- Industrial Forest Land
- State Land
- Local Government Land