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

Oregon: 5 - 10 Billion gallons/day

Source: U.S.G.S.
Threatened & Impaired Waters

- 30% of Stream Miles Assessed
- 54% of Assessed are Impaired or Threatened
Safe Drinking Water Act Focus

Water Filtration Process

Step 1: PRE-TREATMENT
- ALUM (coagulation)
- CARBON (taste and odor control)
- CHLORINE (disinfectant)

Step 2: FILTRATION
- Settling Basin
- Filter
- SODIUM HYDROXIDE (corrosion control)
- CHLORINE (disinfectant)

Step 3: POST-TREATMENT
- Hayden Bridge Reservoir
- Clean drinking water to your faucet

LEGEND
- Anaerobe
- Chemical Pollutants
- Cryptosporidium Cyst
- Cryptosporidium Parvum
- E. Coli
- Giardia
- Giardia Cyst
- Virus
- Big Dirt
- Carbon
- Floc Particles
- Small Dirt
Safe Drinking Water Act (1996A): Source to Tap
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.
Most common program:
Source Water Protection

Source: Ecosystem Marketplace.
Case Study:
EWWEB & The McKenzie River Watershed
Case Study: EWEB & The McKenzie River Watershed
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
Chemical Storage
Structural Risks
Structural Risks

2006 Aerial Photo

House foundation at bottom of river
The Cost of Business as Usual

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

<table>
<thead>
<tr>
<th>Economic</th>
<th>Socio-Demographic</th>
<th>Ideology</th>
<th>Sense of Place*</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Income</td>
<td>• Gender</td>
<td>• Political ideology</td>
<td>• Attachment</td>
</tr>
<tr>
<td>• Frequency of Use</td>
<td>• Education</td>
<td></td>
<td>• Identity</td>
</tr>
<tr>
<td></td>
<td>• Age</td>
<td></td>
<td>• Dependence</td>
</tr>
<tr>
<td></td>
<td>• Political attitudes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

EWEB Ratepayers
- Residential
- Owners/Renters
- Stratified census tract
Results: Measures

Willingness to Pay

**IPDWTP**
“In-Principle Definitely Willing to Pay”

220 (54%)

Maximum WTP
“Maximum Willingness to Pay”

---

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?

<table>
<thead>
<tr>
<th>Added cost to your water bill:</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Unsure</th>
<th>Probably No</th>
<th>Definitely No</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 cents per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

24% $0.50 | 44% $1.00 | 17% $3.00 | 11% $5.00 | 4% $10.00
### 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?

<table>
<thead>
<tr>
<th>Added cost to your water bill:</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Unsure</th>
<th>Probably No</th>
<th>Definitely No</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 cents per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Odds Ratio (p<0.05)

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Odds Ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>Income</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency of Use(ln)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Socio-Demographic</td>
<td>Gender (Male=1)*</td>
<td>0.59</td>
<td>↓</td>
</tr>
<tr>
<td></td>
<td>Education*</td>
<td>1.25</td>
<td>↑</td>
</tr>
<tr>
<td></td>
<td>Age*</td>
<td>0.23</td>
<td>↓</td>
</tr>
<tr>
<td>Ideology</td>
<td>Conservative***</td>
<td>0.66</td>
<td>↓</td>
</tr>
<tr>
<td>Sense of Place</td>
<td>SOP Score***</td>
<td>1.09</td>
<td>↑</td>
</tr>
</tbody>
</table>

[Diagram showing participation levels and odds ratios for different costs.]
## Results: Politics and Income

### Liberals support – conservatives oppose

**IPDWTW**

*“In-Principle Definitely Willing to Pay”*

220 (54%)

---

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

<table>
<thead>
<tr>
<th>Self-identified political ideology</th>
<th>Less than $25,000</th>
<th>$25,000 - $49,999</th>
<th>$50,000 - $74,999</th>
<th>$75,000 - $99,999</th>
<th>$100,000 or more</th>
<th>All (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willing to pay at least $0.50 per month on monthly water bill</td>
<td>23</td>
<td>27</td>
<td>31</td>
<td>23</td>
<td>19</td>
<td>123 (72)</td>
</tr>
<tr>
<td>Unwilling to pay</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>6</td>
<td>12</td>
<td>47 (28)</td>
</tr>
<tr>
<td>Willing to pay at least $0.50 per month on monthly water bill</td>
<td>14</td>
<td>24</td>
<td>18</td>
<td>11</td>
<td>13</td>
<td>80 (45)</td>
</tr>
<tr>
<td>Unwilling to pay</td>
<td>20</td>
<td>30</td>
<td>20</td>
<td>6</td>
<td>20</td>
<td>96 (55)</td>
</tr>
</tbody>
</table>

---

**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?

<table>
<thead>
<tr>
<th>Added cost to your water bill:</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Unsure</th>
<th>Probably No</th>
<th>Definitely No</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 cents per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Added cost to your water bill:</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Unsure</th>
<th>Probably No</th>
<th>Definitely No</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 cents per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Definitions:**

- **Definitely Yes:** Willing to pay at least $0.50 per month on monthly water bill.
- **Probably Yes:** Indifferent.
- **Unsure:** Unwilling to pay.
- **Probably No:** Willing to pay at least $0.50 per month on monthly water bill.
- **Definitely No:** Unwilling to pay.
## 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?

<table>
<thead>
<tr>
<th>Added cost to your water bill:</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Unsure</th>
<th>Probably No</th>
<th>Definitely No</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 cents per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10 per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Findings

- **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

- Build people’s connection to place
  - Sponsor events that build connections
  - Support organizations that link people to places
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

**Drinking Water as a Conservation Financing Mechanism**
Thank You
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

WATERSHED INVESTMENT FUND

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

LANDOWNERS
- Residential
- Agriculture
- Forestry (F2)
- Nonprofits
- Local Governments

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

Dividend Payments for Stewardship

Grants/Funding for Restoration

SWCDs
% of tax base
Next Steps: Clackamas