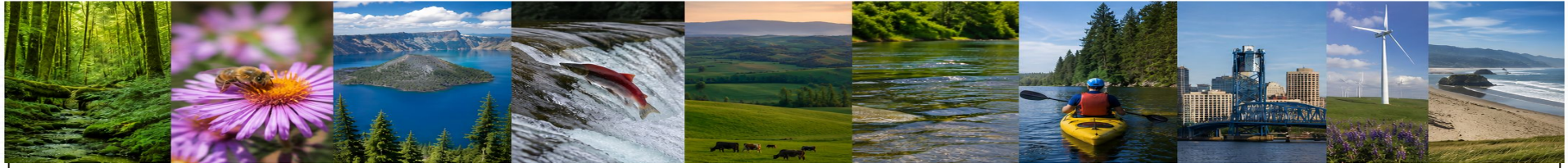


Money in the Bank: A Detailed Exploration of Oregon's Ecosystem Service Values

Kathryn T. Liebrecht
Department of Biology

Sahan T. M. Dissanayake
Associate Professor
Department of Economics

Luis A. Ruedas
Professor and Chair
Department of Biology

Portland State University

2026 Pacific Northwest Regional Economic Conference

May 21st 2026

Email:sdissan2@gmail.com Web:http://sahan.org/ Twitter: https://twitter.com/sahanorg

Motivation

Increasing conversion of undeveloped habitat to human dominated landscapes.

Only about 50% of the forest area that existed at the time of the rise of agriculture remain.

Humans have increased the rate of species extinction by as much as 1,000 times

Habitat loss and fragmentation is a primary cause of extinction.

Globally intact ecosystems are being converted at over 1% per year.

More than 70% of remaining forests are within 1 mile of the edge.

Millennium Ecosystem Assessment, 2005.
The TEEB Report – The Economics of Ecosystem Services and Biodiversity, 2010

Motivation: The Invisibility of Nature

- The “Invisibility of Nature” refers to the **undervaluing** or **overlooking** the true value of nature.

- Need to make nature visible so it can **be accounted** for appropriately in policymaking.

Motivation: The Invisibility of Nature

- The market does not capture the full value of goods and services
  - How much is nature in the U.S. worth?
  - What is the U.S. GDP?

*Costanza et al. (1997) The value of the world's ecosystem services and natural capital. *Nature*.
37,000 citations

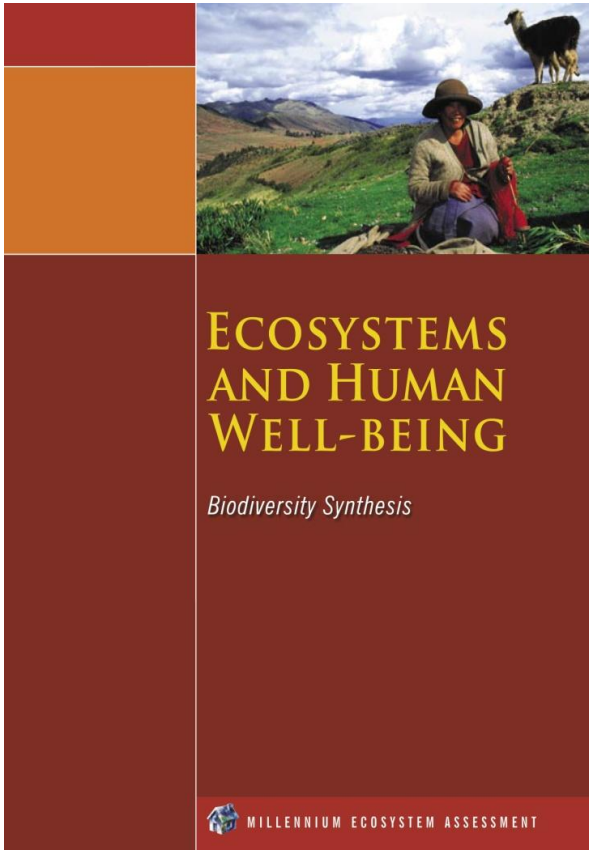
* Costanza et al. (2014) Changes in the global value of ecosystem services. *Global Environmental*

MEA and Framework for Ecosystem Services

A Framework for Understanding – The Millennium Ecosystem Assessment (MA)

What is the MA?

- Shows the importance of ecosystem services for human well-being and business development.
- The Assessment was a four-year international audit of ecosystems.
- Involved more than 1,360 scientists, economists, business professionals, and other experts from 95 countries.
- Its findings provide the first state-of-the-art scientific evaluation of the condition and trends in the world‘s ecosystems and the services they provide.



Framework for Ecosystem Services

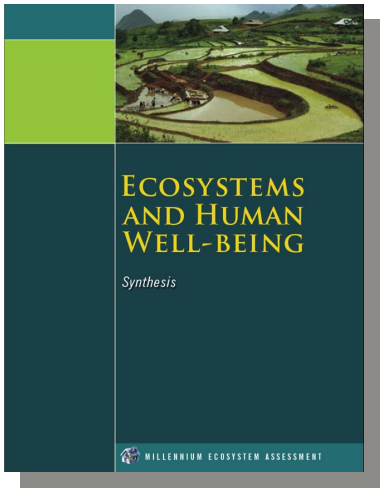
Provisioning
Goods or products produced by ecosystems

Regulating
Natural processes regulated by ecosystems

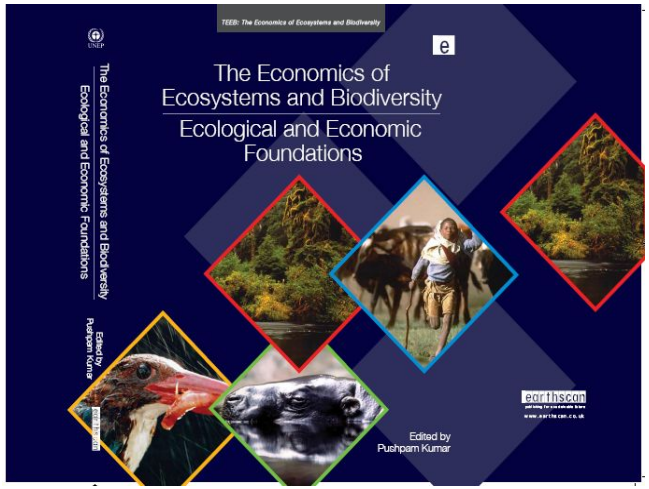
Cultural
Intangible benefits obtained from ecosystems

Supporting: Functions that maintain all other services

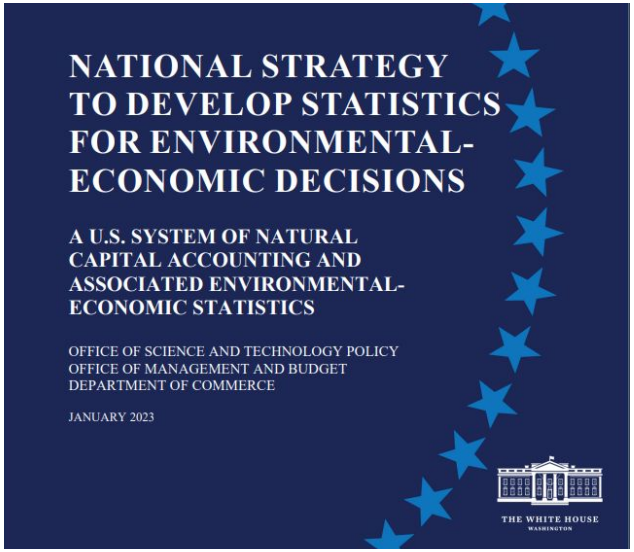
Growing Global Efforts



The Millennium Ecosystem Assessment (2005)



The Economics of Ecosystems and Biodiversity (TEEB)
Launched at CBD 2010



US National Accounting

2023

The Economics of Biodiversity: The Dasgupa Review

Launched in 2021

IPBES 2012+

BizBiodiversity Feb 2026

Research Question

- What is the value of Oregon's ecosystem services?
  - What ecosystems provide the most value?
  - What are the highest valued ecosystem services?

- How are ecosystem service values distributed across the state?

Valuing Oregon's Ecosystem Services

Summer 8-2025

What's the Value of a State? Accounting for the Ecosystem Services and Natural Capital of Oregon

Kathryn Liebrecht
Portland State University

Methods

1

Oregon GIS Map

156 unique ecosystems identified across Oregon's 25M hectares

Institute for Natural Resources habitat map.

2

Match to ESVD Biomes

Ecosystems condensed into 45 groups

Matched to 14 ESVD biomes based on climate & ecological similarity.

3

Filter Values

ESVD filtered to W. Europe & N. America

23 ecosystem services selected by TEEB classifications. Remove duplicates

4

Value Transfer

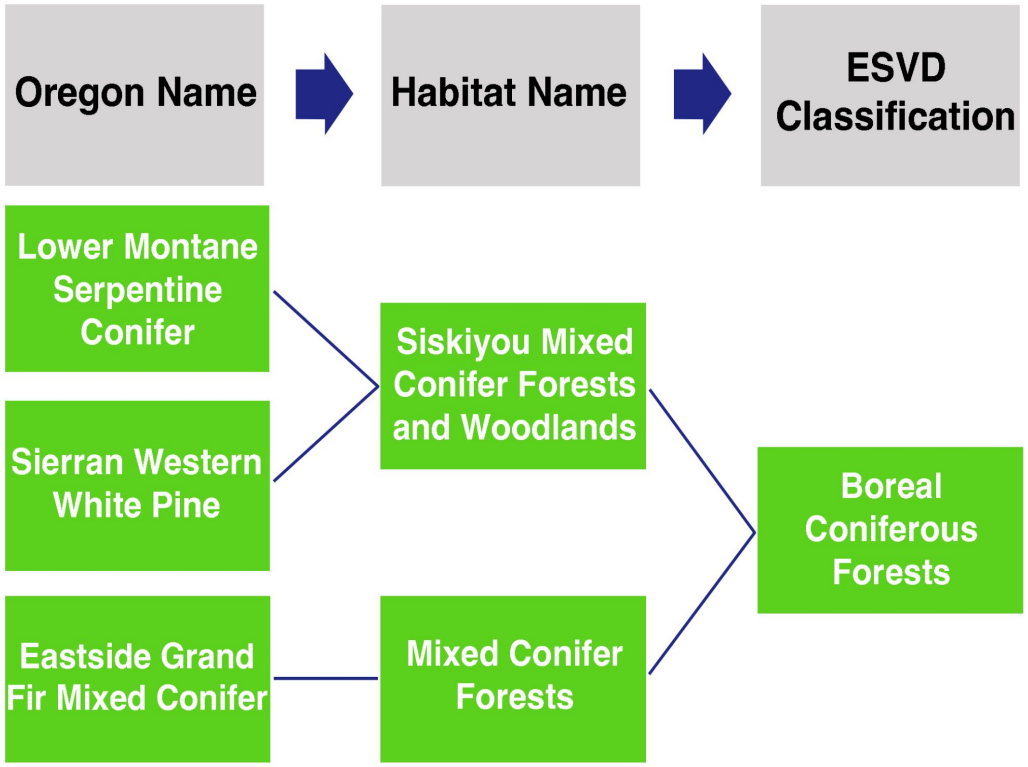
Median $/ha/yr values applied to Oregon's areas.

Inflation-adjusted to 2024 USD (21.5% CPI adjustment from 2020).

Ecosystem Service Valuation Database (ESVD) - 12,390 valuations in 2020 $s.

Methods

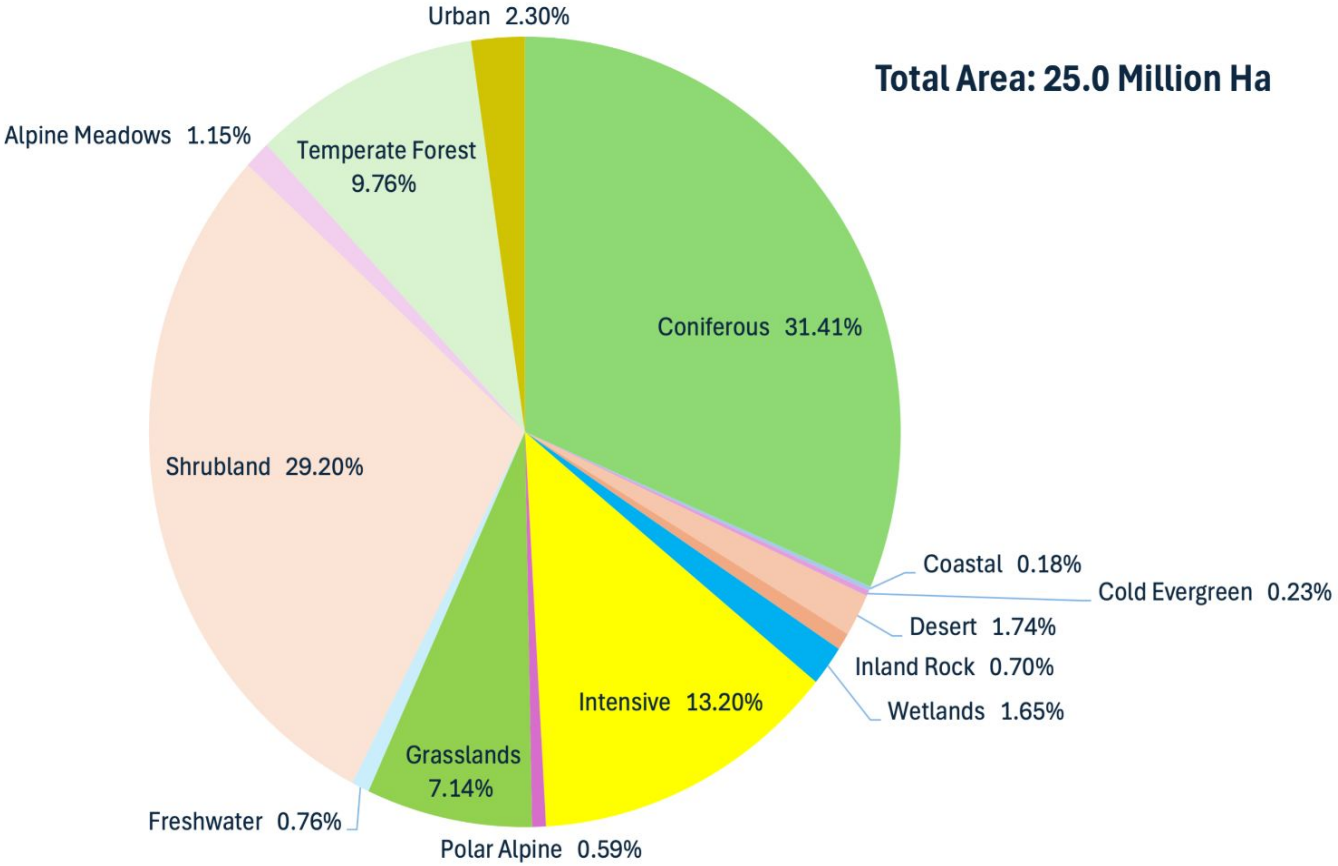
Ecosystems Included in the Study



1. Polar and alpine systems
2. Cold climate evergreen forest and woodland
3. Inland rock formations
4. Temperate alpine meadows and shrublands
5. Desert and semi desert
6. Coastal systems
7. Inland wetlands
8. Rivers and lakes
9. Intensive land use
10. Temperate forest and woodland
11. Urban green and blue infrastructure
12. Rangelands and natural grasslands
13. Shrubland and shrubby woodland
14. **Boreal coniferous forest**

Methods

Ecosystems Included in the Study



13. Shrubland and shrubby woodland

14. **Boreal coniferous forest**

Methods

The ecosystem services included in the study:

1. Aesthetic information
2. Air quality regulation
3. Biological control
4. Climate regulation
5. Erosion prevention
6. Existence, bequest values
7. Food
8. Genetic resources
9. Information for cognitive development
10. Inspiration for culture, art and design
11. Maintenance of soil fertility
12. Medicinal resources
14. Opportunities for recreation and tourism
15. Ornamental resources
16. Pollination
17. Raw materials
18. Regulation of water flows
19. Spiritual experience
20. Waste treatment
21. Water
22. Total
23. Maintenance of genetic diversity
24. Maintenance of life cycles

Results

Total Ecosystem Service Value for Oregon

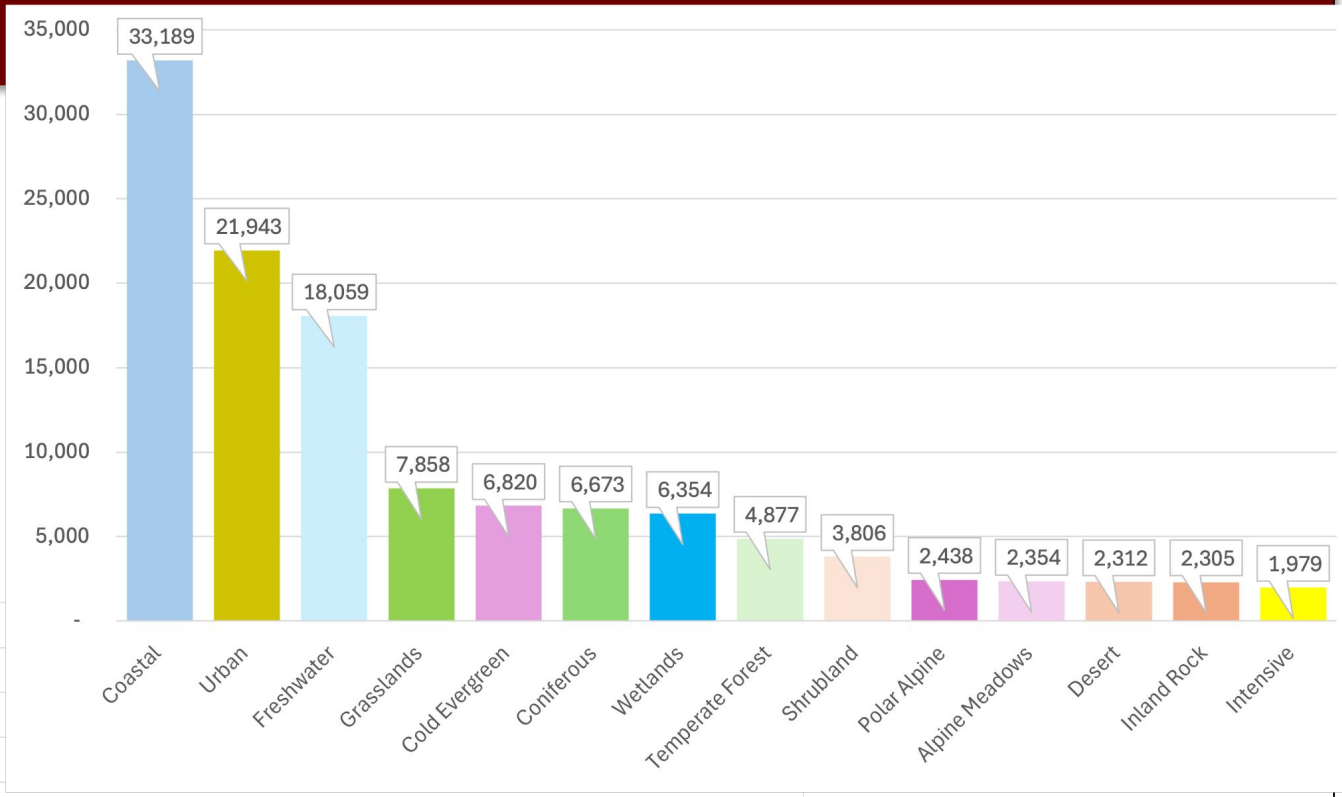
Median value: $136.1 billion per year

≈ 51% of Oregon's GDP (2024 real GDP was $265 billion)

Natural capital is economically significant!!

Results

Fig. 3: Median per hectare per year values by land classification (in USD 2024).



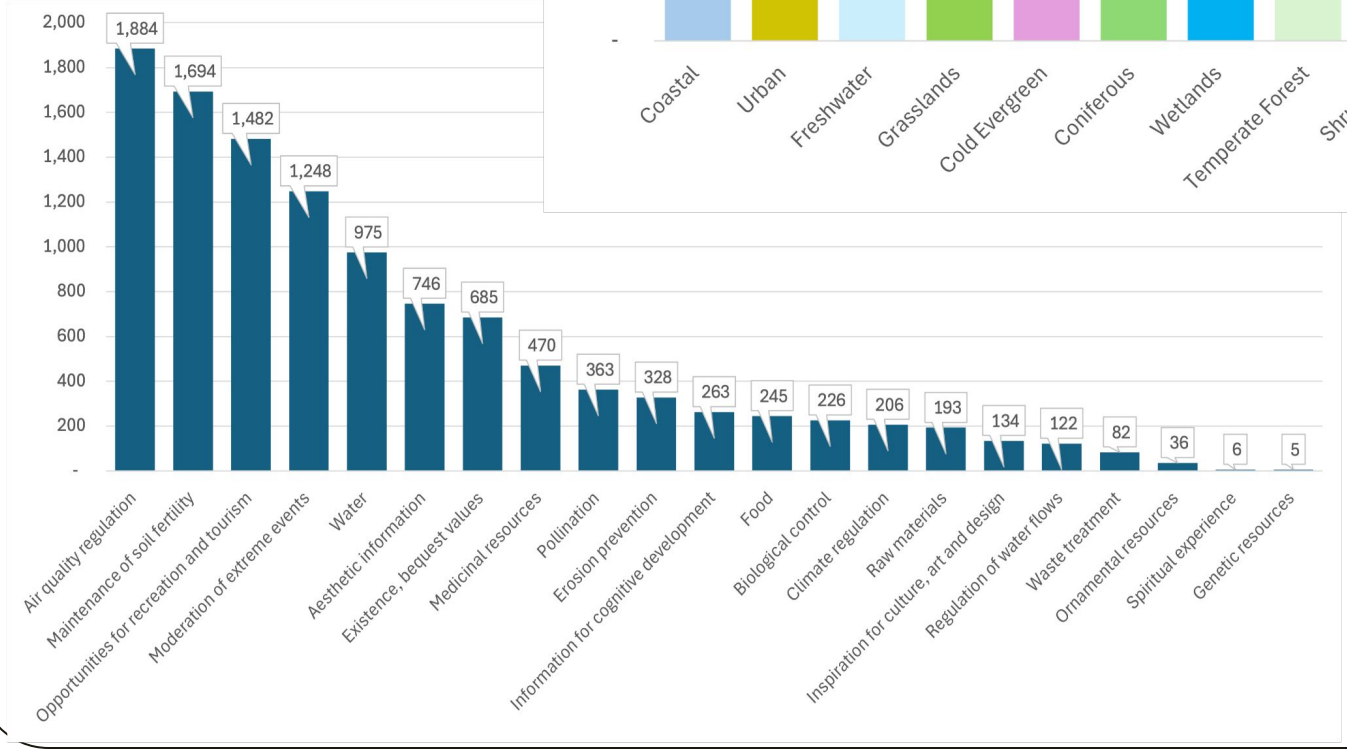


Fig. 4: Average of median per hectare per year values by ecosystem service (in USD 2024).

Results

Total Annual Median Value by Land Classification

Recreation & Tourism	$38.4B/yr
Existence & Bequest Values	$18.1B/yr
Aesthetic Information	$17.5B/yr
Air Quality Regulation	$10.2B/yr

Ecosystem service contribution to total median value for Oregon

Results

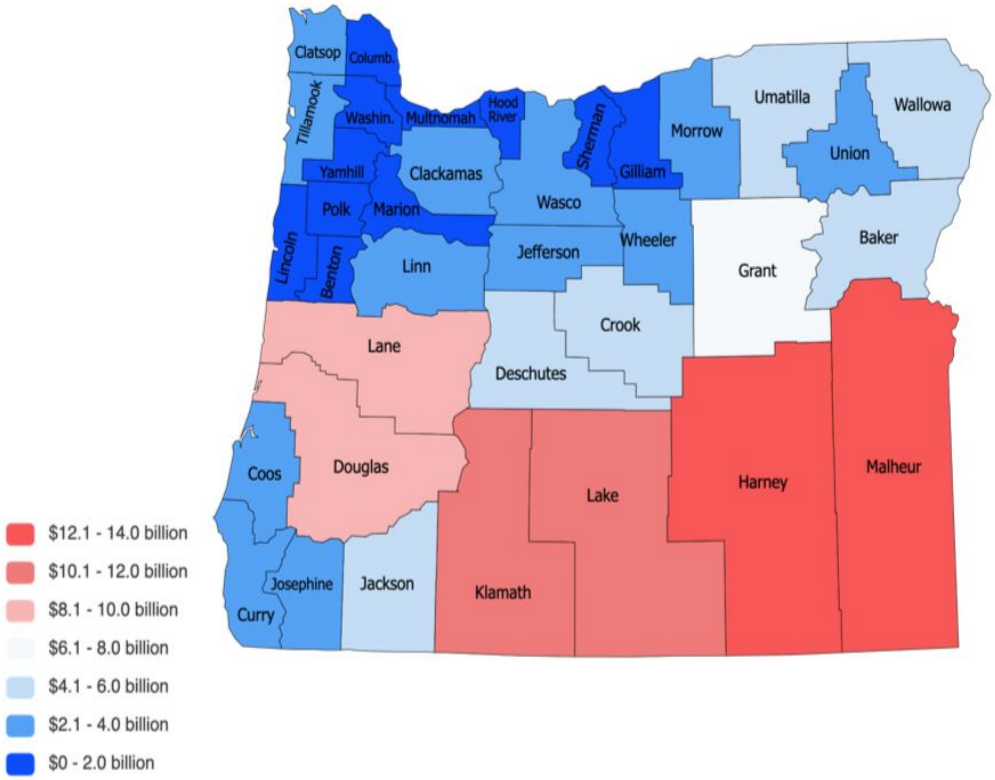
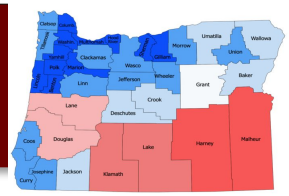


Fig. 7: Total median values per year by county ($bil/yr).

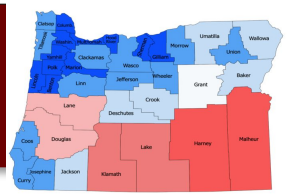
- Rural counties with vast undeveloped land generate outsized ecosystem value — highlighting the case for rural conservation funding.

Caveats



- Values are likely underestimates — many services are not yet fully understood or studied.
  - Deserts, inland rock formations, and services like biological control and spiritual value are under-studied.
- Benefit transfer assumes ecological similarity; local primary research is preferred.
- Values reflect the present ecosystem mix; climate change will alter this over time.
- Not a price for privatization — these represent public benefits that could be lost.

Conclusion and Policy Implications



- Nature's contribution - $136.1 billion — over 51% of Oregon's GDP
  - Integrating these values into land-use planning is a starting point for decisions that sustain both ecosystems and the economies that depend on them. **Ignoring values is not a neutral act.**

- Integrate into Cost-Benefit Analyses
  - Since NEPA (1980), CBAs are required for Env
    Assessments. Including ecosystem values lea

- Rural Conservation Funding
  - India's Finance Commission allocates funds t
    could adopt a similar model, channeling reso
    the most ecosystem value but receiving the l

Thank you! Questions?

Working with biologists and economists can be fun and productive for economists!

Katie is very talented, hardworking, creative, and recently graduated!!

Email:sdissan2@gmail.com Web:http://sahan.org/ Twitter: https://twitter.com/sahanorg