

The N-EWN Knowledge Series

A Continuing Education Series about Engineering with Nature



Glen Delaney

Making the Case for Nature-Based Solutions: Ecosystem Services, Benefit-Cost Analyses, and Storytelling

Carson Risner



Earth Economics

We all rely on services provided by nature, often in ways we don't fully recognize. Earth Economics identifies and quantifies those benefits to ensure they are included in the decision-making process at all levels, so communities can mitigate risk, increase resilience, and protect their natural capital wealth.

Awareness of the co-benefits associated with nature-based solutions and standardized methods to incorporate them into decision-making are limited. As a result, nature-based solutions are not appropriately considered, which may result in inefficient decision making. This can threaten existing natural resources and their life-sustaining services, which effectively lower the quality of life within communities. This presentation will provide real-world examples of how ecosystem services (co-benefits of NBS) have been integrated into existing frameworks and storytelling to support efforts that enhance community adaptability and well-being.

Save the date!

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**Apr. 17
12:30pm ET**

Glen Delaney & Carson Risner, Earth Economics

Making the Case for Nature-Based Solutions: Ecosystem Services, Benefit-Cost Analyses, and Storytelling

**May 15
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Cameron Adams, Ashby Worley, & Tharran Hobson, The Nature Conservancy

Scaling multi-benefit nature-based solutions projects: case study examples from The Nature Conservancy

**Jun. 26
12:30pm ET**

TBA

Register here: <https://bit.ly/3gR9ADL>

or scan:



1 Continuing Education Credit (CEC) is available to attendees

Recorded webinars will be posted online at:
<https://n-ewn.org/resources/n-ewn-knowledge-seminars/>

Presented by:



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Making the Case for Nature-Based Solutions:

Ecosystem Services, Benefit-Cost Analyses, and Storytelling

Glen Delaney & Carson Risner, Earth Economics | April 17,
2025

N-EWN Knowledge Series

Our Partners

Federal



Civil society



Indigenous



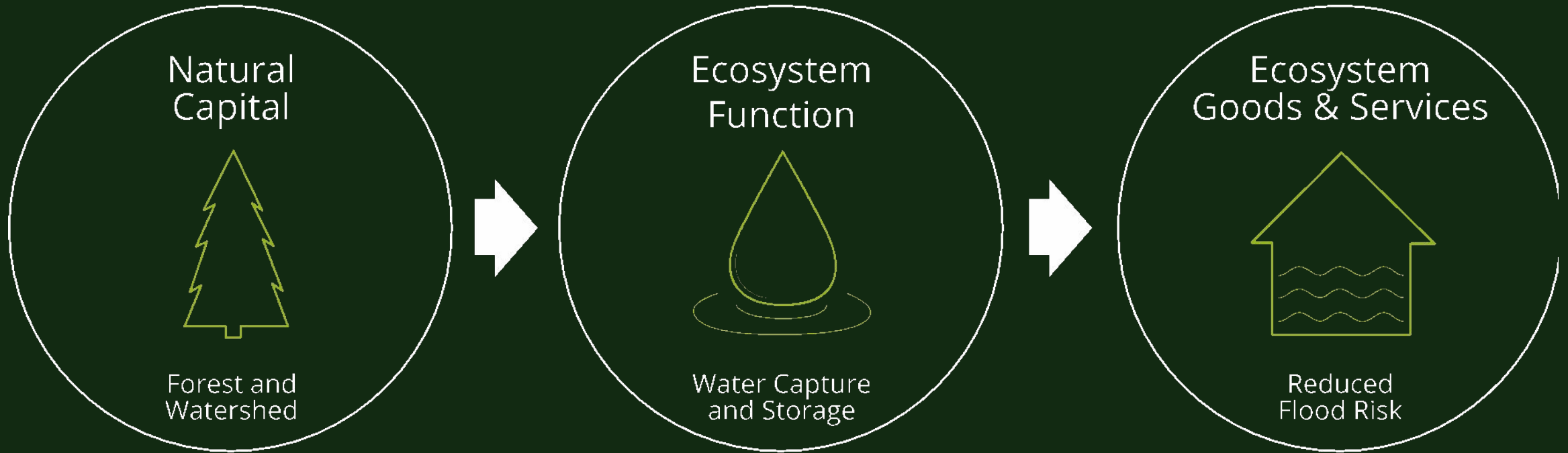
Business



Deloitte.



Natural Capital and Ecosystem Services



Ecosystem Services

Cultivated

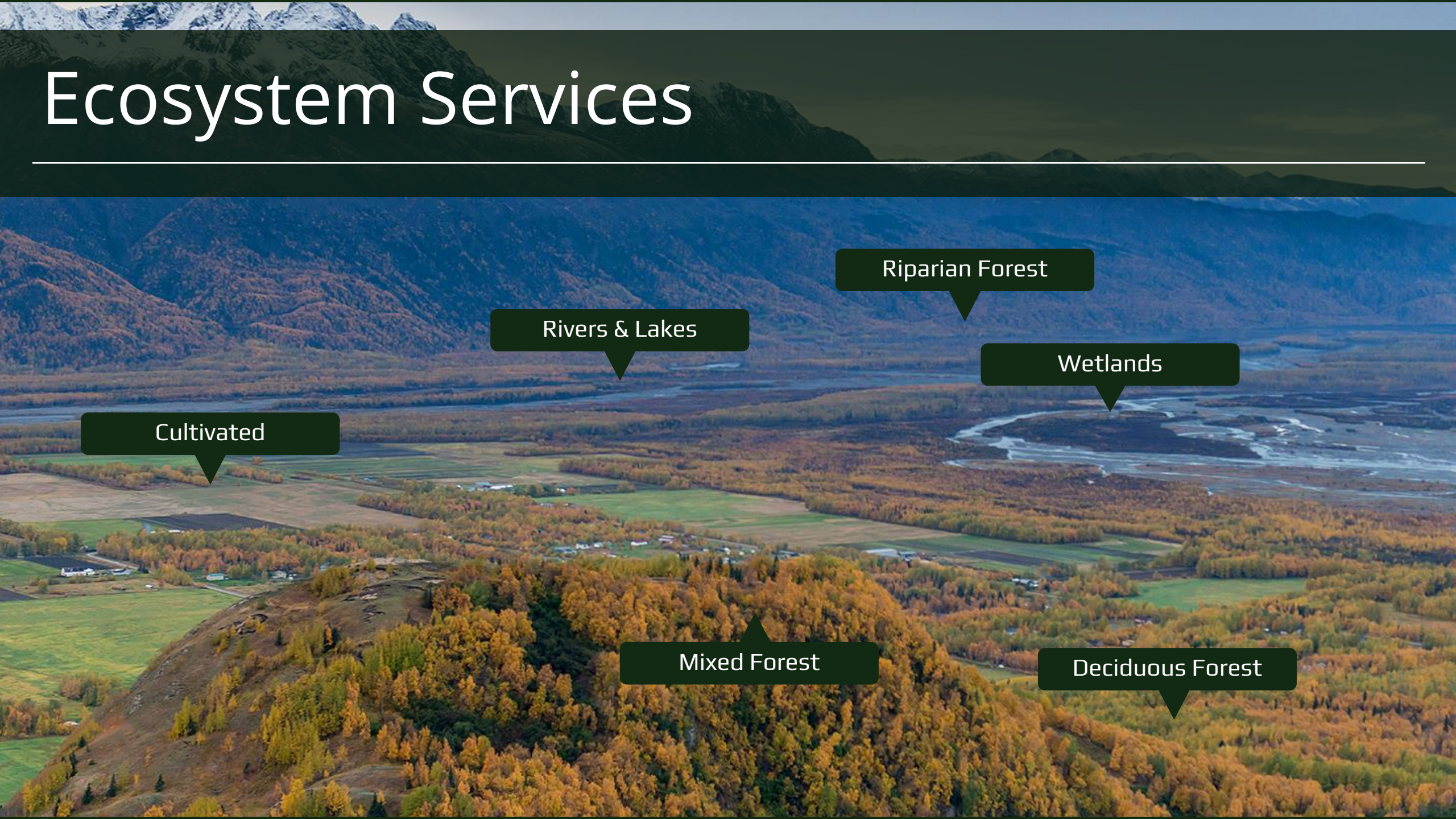
Rivers & Lakes

Riparian Forest

Wetlands

Mixed Forest

Deciduous Forest



Ecosystem Services

Cultivated

Ecosystem Services:

- Access to Local Foods
- Local Jobs/Livelihood's
- Tourism
- Development buffers
- Migratory Bird Habitat

Rivers & Lakes

Ecosystem Services:

- Drinking Water Supply
- Migration Corridor
- Migratory Bird Habitat
- Fish Habitat
- Recreation
- Scenic Views

Wetlands

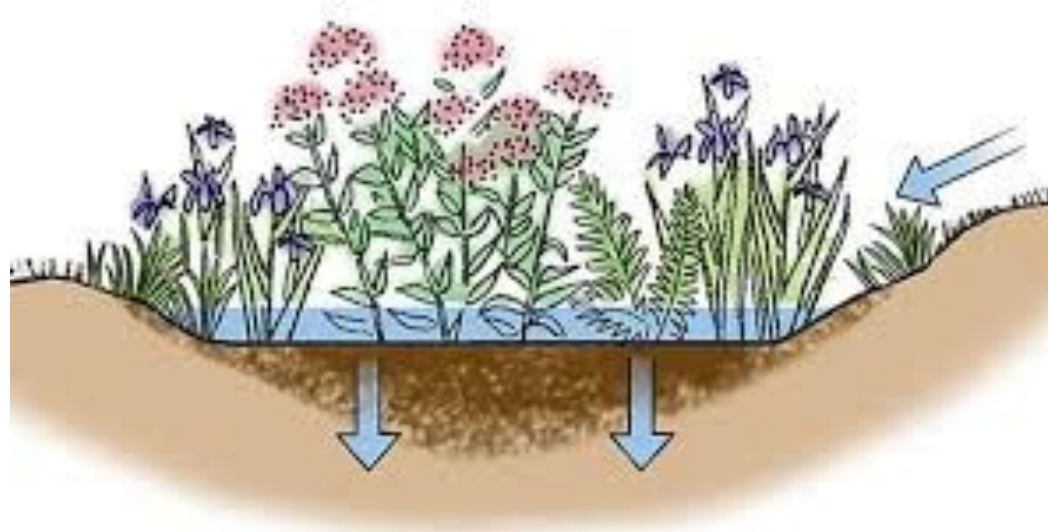
Ecosystem Services:

- Water Storage
- Wildlife and Bird Habitat
- Salmon Nursery
- Water Filtration
- Flood Control
- Wildfire Mitigation

Why Are They Important?



Nature-Based Solutions



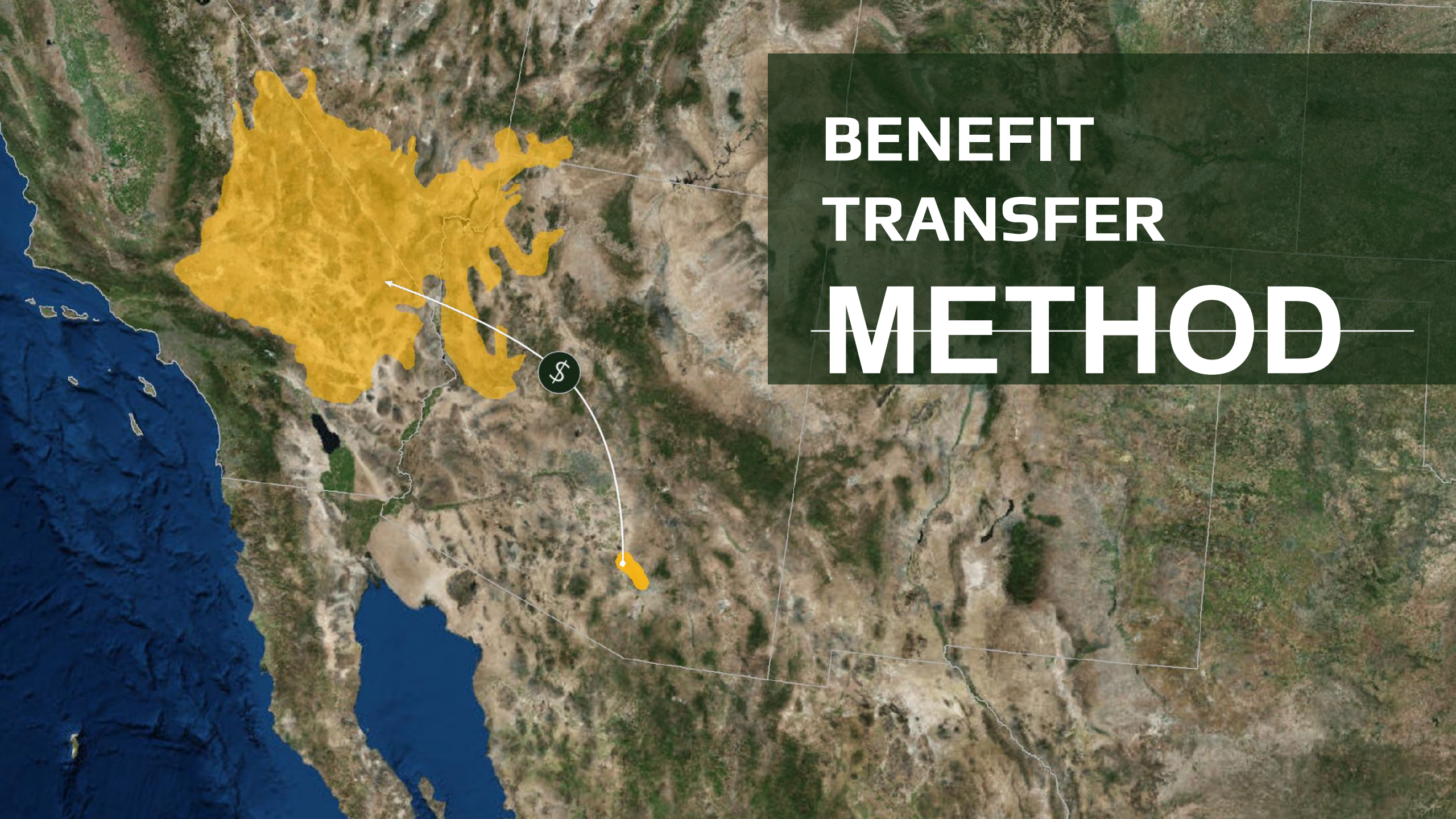
Supporting Communities



NBS Support:

- Environmental outcomes
- Health & well-being
- Economic development
- Education

BENEFIT TRANSFER METHOD



Why is Valuation Important?



Apple-to-Apple
Comparisons



Integrate into
Decision
Frameworks



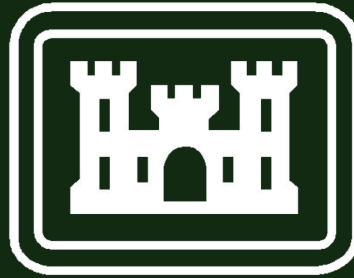
Empower
Community
Advocacy

Federal Frameworks



FEMA

Benefit-Cost
Analysis
Toolkit



**US Army Corps
of Engineers®**

Principles,
Requirements
, & Guidelines



Guidance
for federal
regulatory
analysis



Frameworks

FEMA BRIC

County of Sonoma - \$37 million for wildfire mitigation funding through the 2020 BRIC program

Paradise Recreation and Parks Department – 2020 Capability and Capacity Building Grant







Frameworks

Duckabush Estuary, WA

HIGHLIGHTED ECOSYSTEM SERVICES

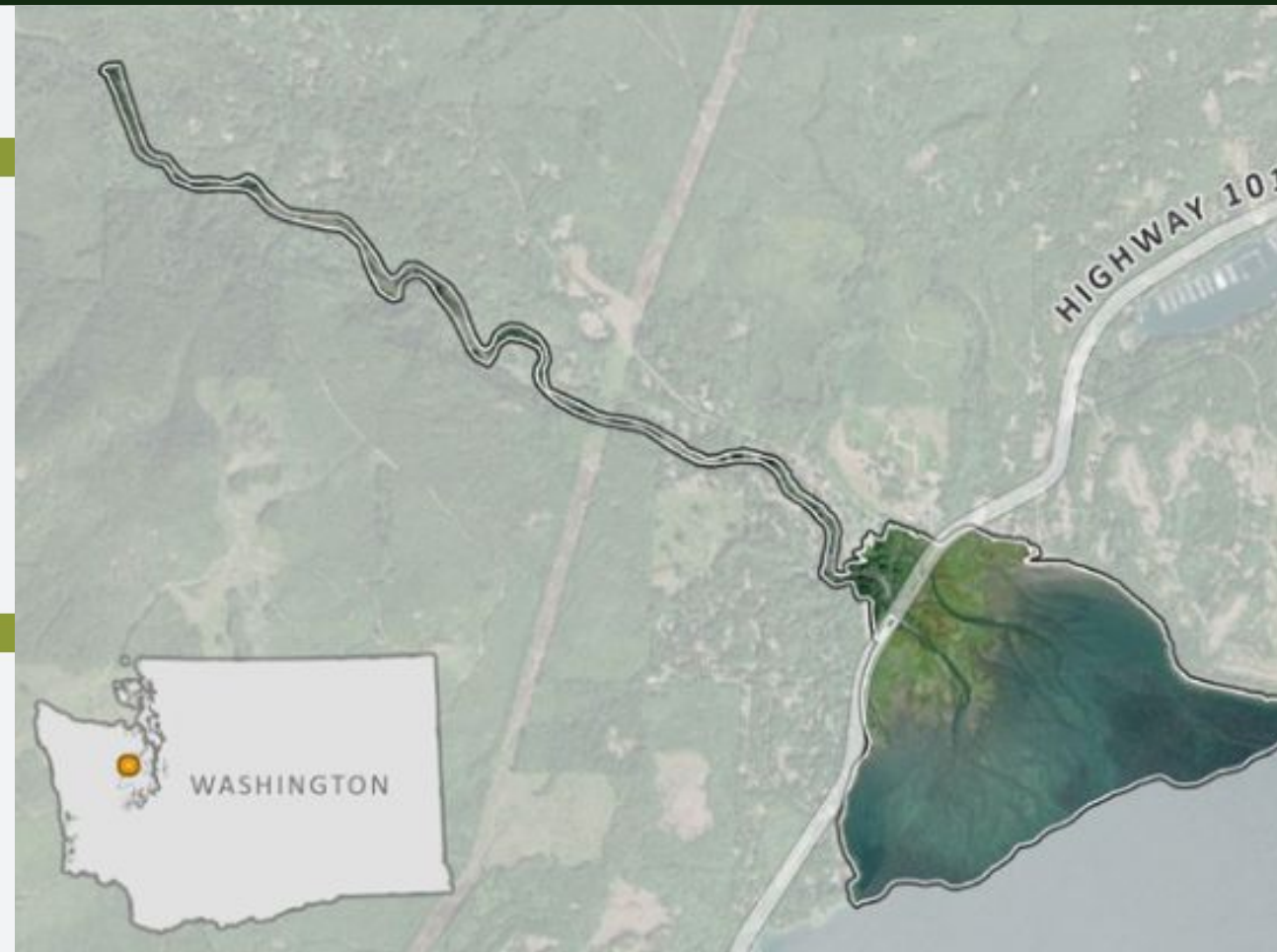
PROVIDED OVER THE BRIDGE'S LIFESPAN

ADDITIONAL VALUE

	FLOOD RISK REDUCTION +\$29K to \$90K		AVOIDED ROAD FLOODING +\$8K to \$54K
	CHUM SALMON VALUE in Puget Sound +\$30M to \$109M		AESTHETIC BENEFITS for residents +\$27M to \$84M
	WATER QUALITY improvement from bioswales +\$125K to \$386K		VALUE OF VOLUNTEER TIME +\$54K to \$60K

PROTECTED VALUE

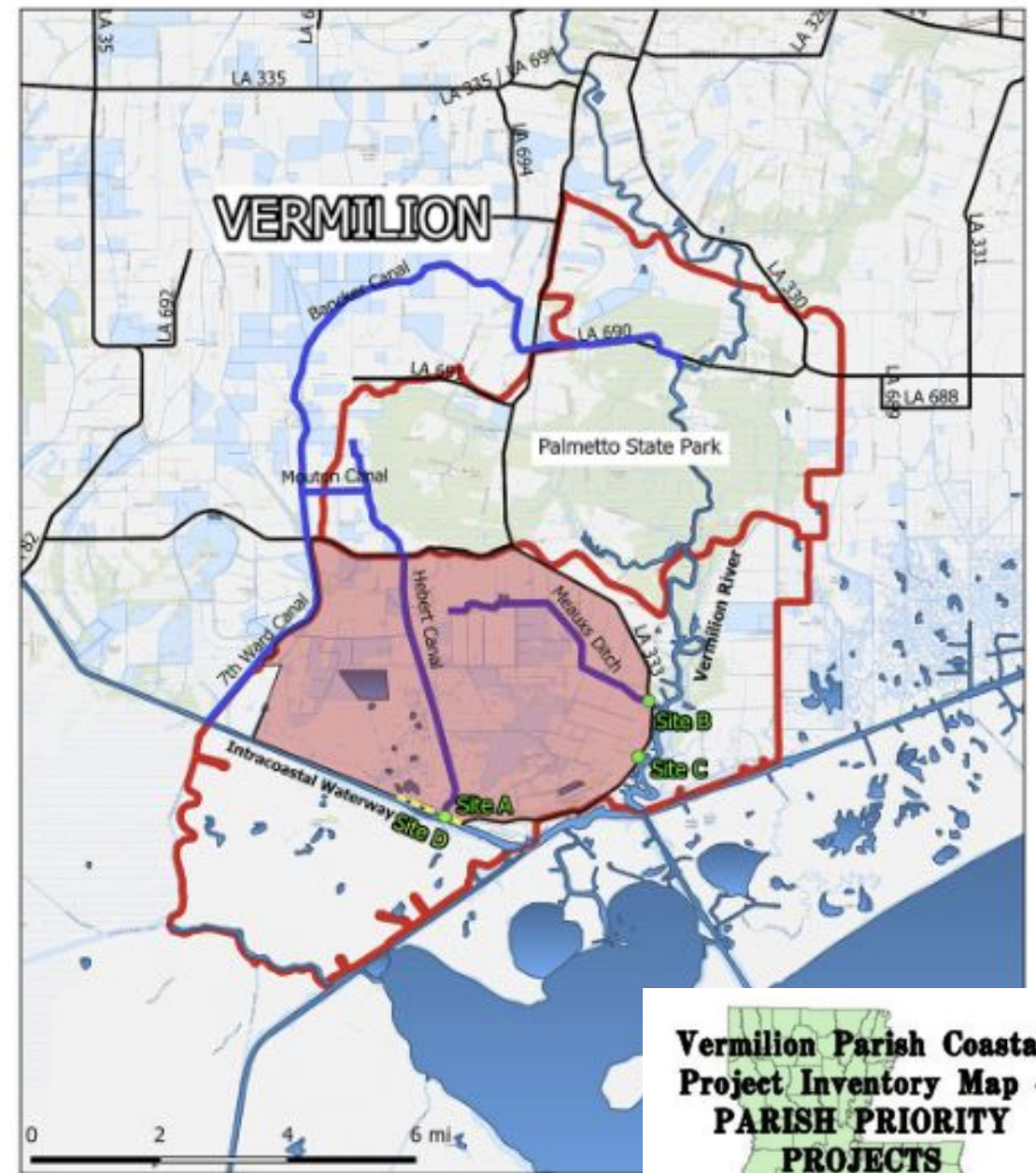
	RECREATION VALUE \$5M to \$15M		HABITAT FOR WILDLIFE \$7M to \$21M
	WATER QUALITY improvement from wetlands \$4M to \$14M		CARBON SEQUESTRATION \$577K to \$2M



Frameworks

Lower Vermillion River

- NRCS EA rejected without co-benefits
- Three options for water control systems and levees
- Scenario 2 - lifetime benefit-cost ratio of 1.61
- \$6 million in avoided crop losses



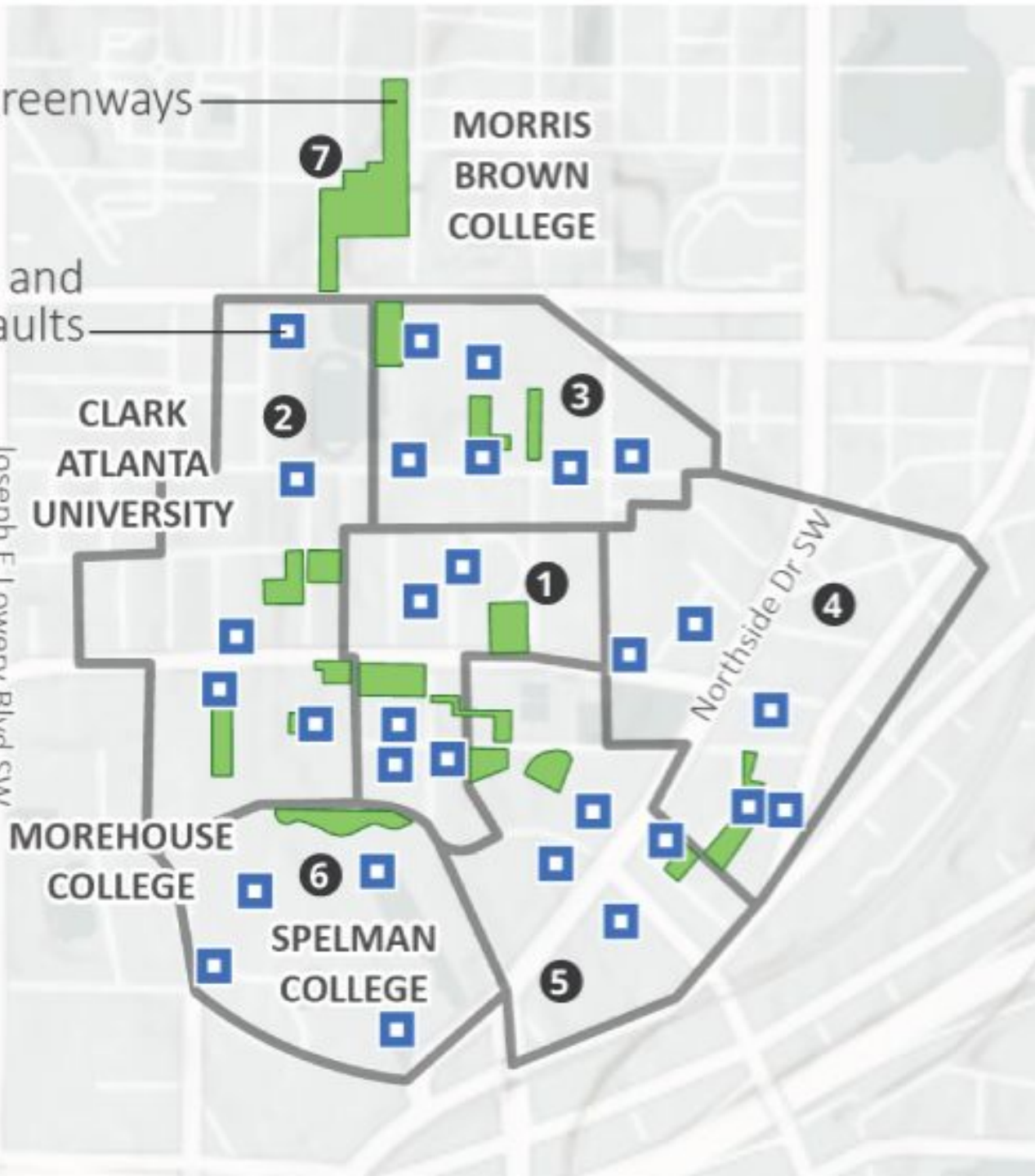
Scenario 2: Full Protection

Funding – Parks Tacoma Bond

- Parks Tacoma ecosystems provide between \$3.6 million and \$13.0 million in benefits to the regional economy every year.
- In April 2014, voters passed a \$198 million bond measure

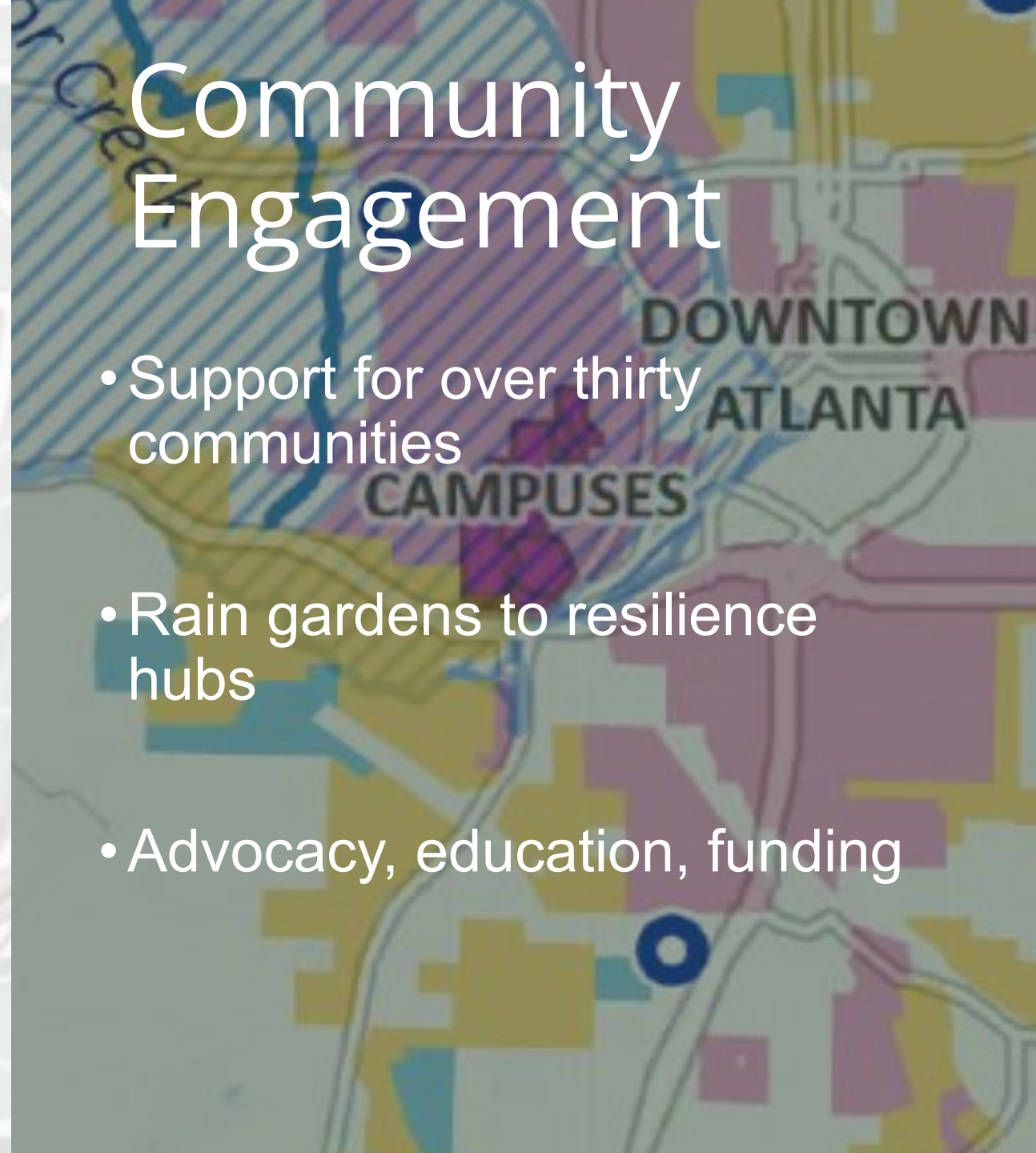
PARKS
T A C O M A

YOUR PARKS
YOUR VOICE



Community Engagement

- Support for over thirty communities
- Rain gardens to resilience hubs
- Advocacy, education, funding





Policy Change

*TNC Minnesota –
Natural Climate Solutions*



FORESTS

\$4.5 BILLION per year
in ecosystem services preserved by avoided conversion

\$32 BILLION per year
in ecosystem services generated by reforestation



GRASSLANDS

\$3.8 MILLION per year
in ecosystem services preserved by avoided conversion

\$65 MILLION per year
in ecosystem services generated by restoration



WETLANDS + PEATLANDS

\$114 MILLION per year
in ecosystem services preserved by avoided conversion

\$210 MILLION per year
in ecosystem services generated by restoration

Support Stewardship – Nez Perce



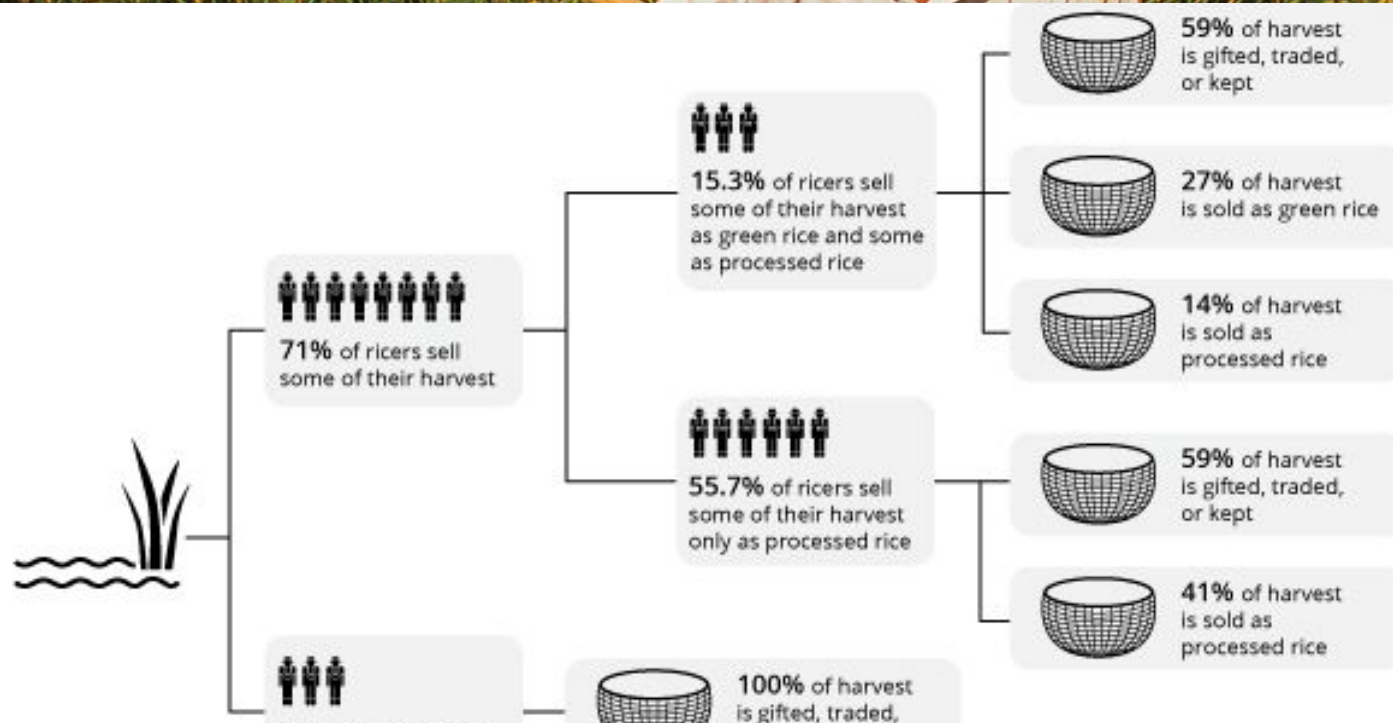
- Wetland restoration & conservation for carbon credits
- Options include water quality permit trading, biodiversity markets, mitigation banking, external partnerships



Support Stewardship

Fond Du Lac

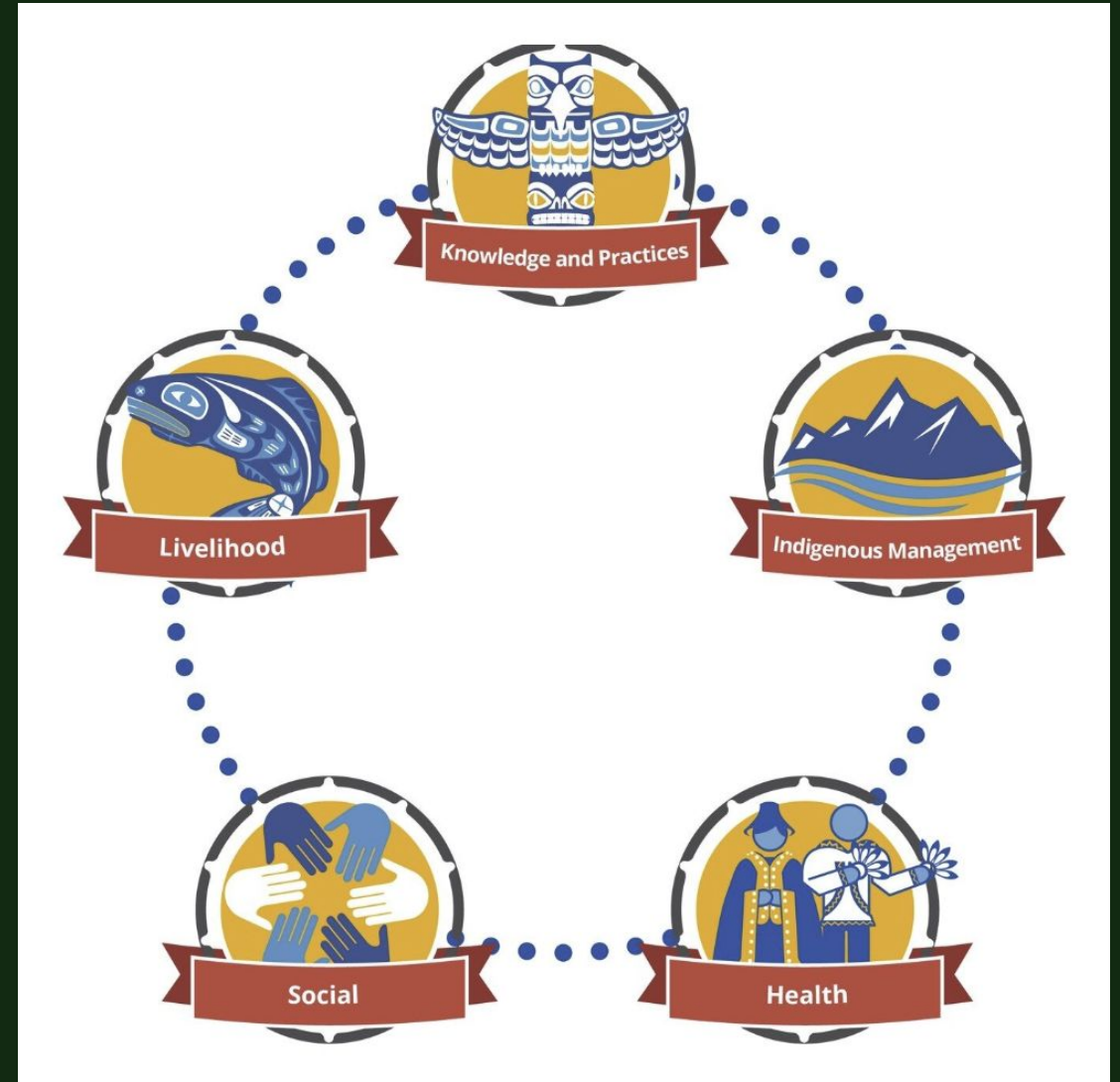
Aquatic sulfate
pollution threatens
wild rice harvests



Beyond Valuation- Cultural Value



The Sociocultural
Significance of Pacific
Salmon to Tribes and
First Nations



Beyond Valuation: Storytelling

Livelihood

"I remember hearing the elders talk about how many of the community members would end up moving to the coast in the summer and working in the fish processing plants and canneries to make money. It was an important source of income for the community. That doesn't happen anymore because of the downturn in the commercial fishery. "

Knowledge & Practices

"It's important as food, for sure, but it provides a linkage to the land and each one of those systems provides value to us in terms of our social wellbeing, our culture, our practices. Without having salmon, we're unable to practice our culture, traditions on those systems and those streams. "

Health

"Healthy water produces healthy fish, and if you don't have healthy fish then there is decline in the health of our First Nations members."

Social

"We have ceremonies here and we have a long house in the community. And in our community, salmon is so important to us. We purchase salmon from our Fishers and give it to the non-fishing families so everybody in the community gets fish. So that speaks to the importance and thus, it is a big budget we must put forward. Also, we have our first salmon ceremony. We also have ceremonial fisheries for family events, graduation ceremony, treaty day, (celebration day, the signing of the treaty) and Aboriginal Day."

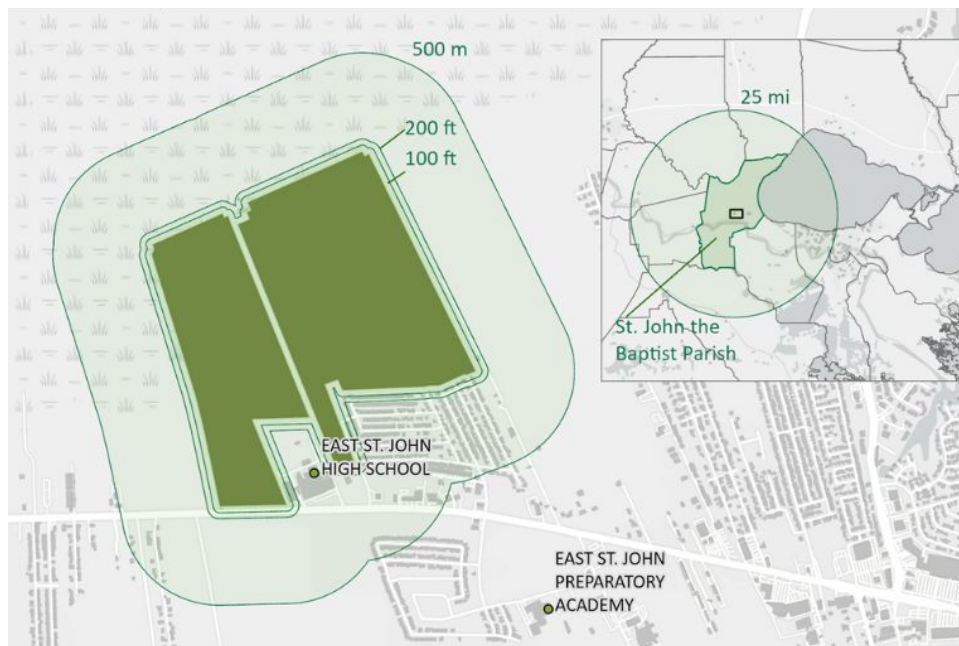
Indigenous Management

" The biggest thing I have learned in my time working for the communities that I work for is that everything is one and everything is interconnected. The Nations, don't look at salmon independently. They understand that salmon are connected to everything else. It is interwoven into all of their beliefs, stories, and practices; it is the foundation of their culture."

Beneficiary Mapping

Belle Pointe

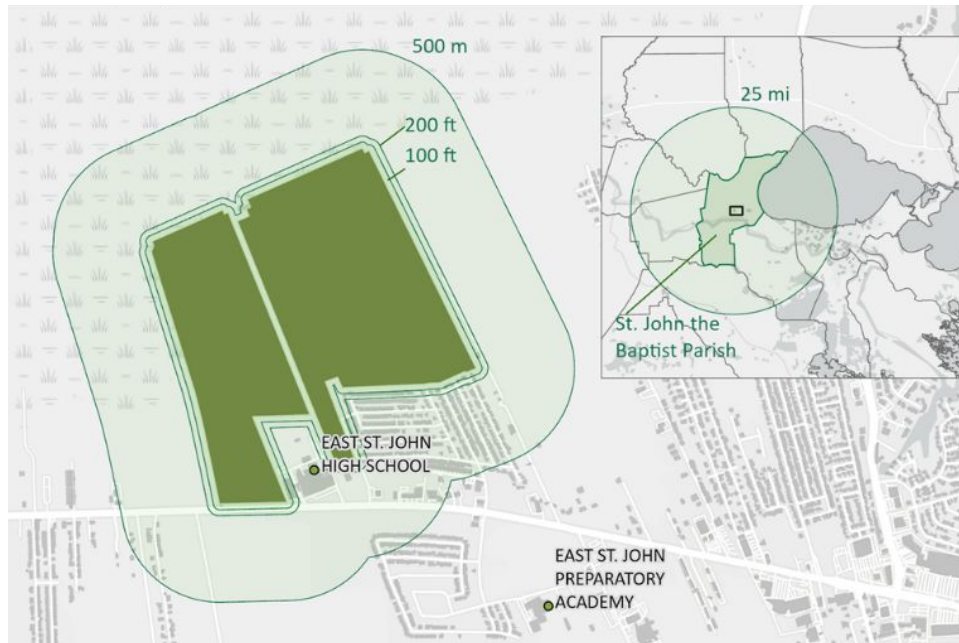
93 to 177 homeowners' properties gain value by beautifying the area



Beneficiary Mapping

Belle Pointe

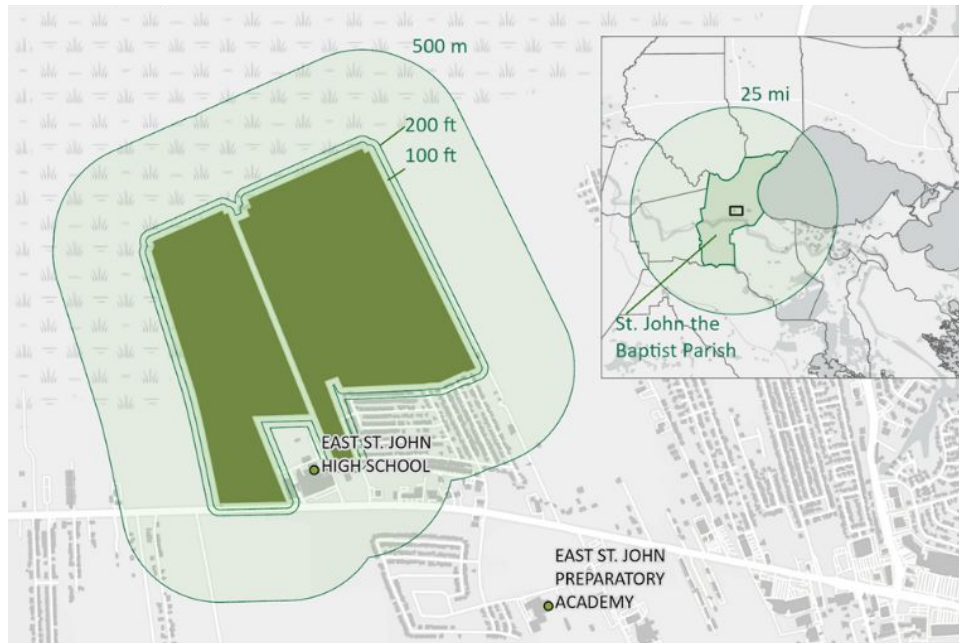
1,506 residents and 1,100 students will likely experience health benefits due to improved air quality



Beneficiary Mapping

Belle Pointe

42,100 residents in the Parish directly benefit from water quality improvements



Beneficiary Mapping

Avahoula



\$2.7 billion

in new and permanently
protected ecosystem services
(at a 3% discount rate)



12k-23k

migratory waterfowl supported
annually by restoration of food
sources



\$80 million

in ecosystem services created
every year



\$180k-\$400k

annually for improved
recreational experiences



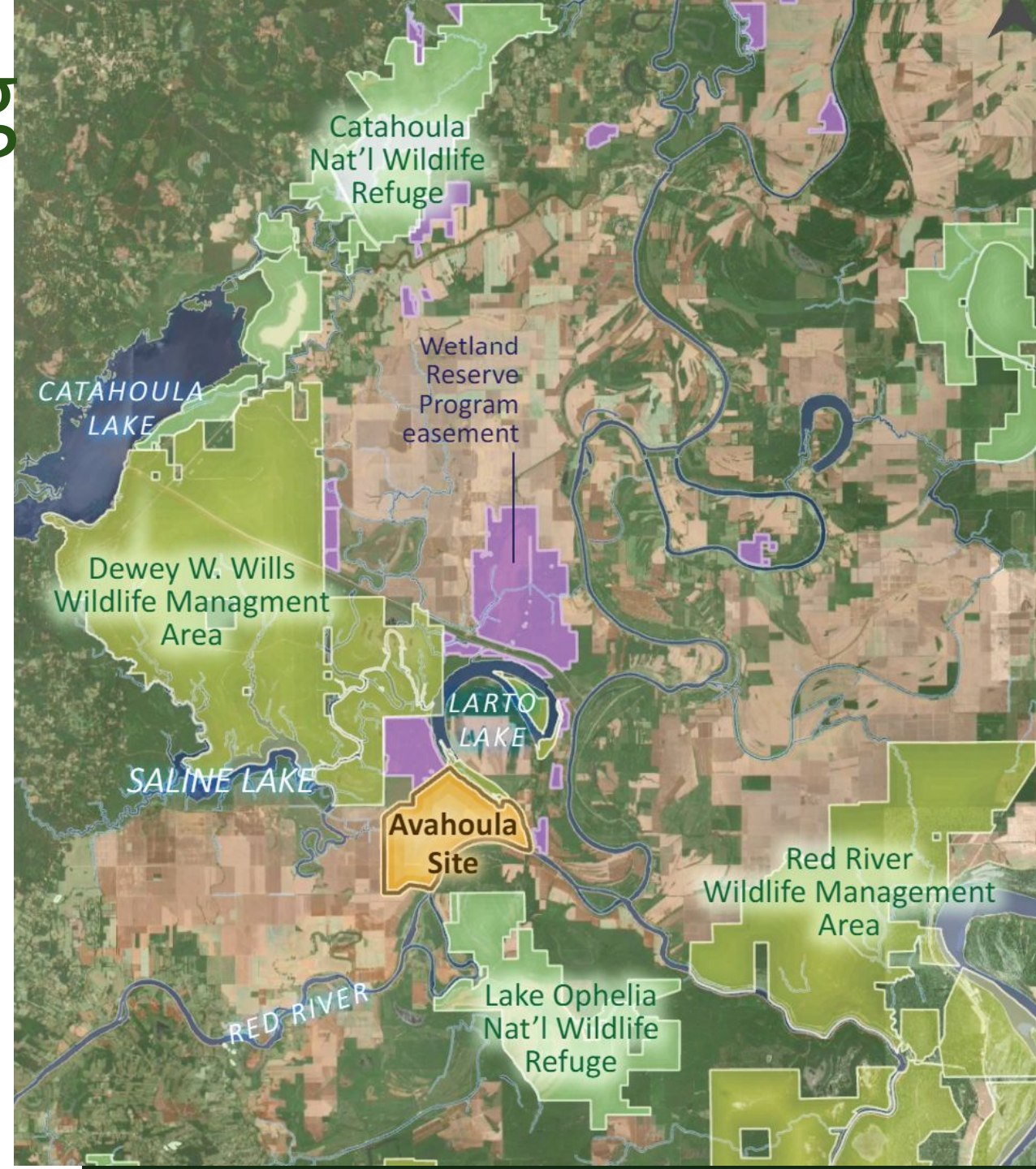
\$170 million

in climate resilience benefits
from 840K tons of CO₂e
captured over 40 years.



67k

Louisiana residents benefit
from Avahoula's impacts



Beneficiary Mapping

Avahoula

Through restoration, the following groups will receive benefits:

15 Farmers

adjacent to the project site



15 Landowners

in 3,355 acres surrounding the project site



67K Residents

local to the area



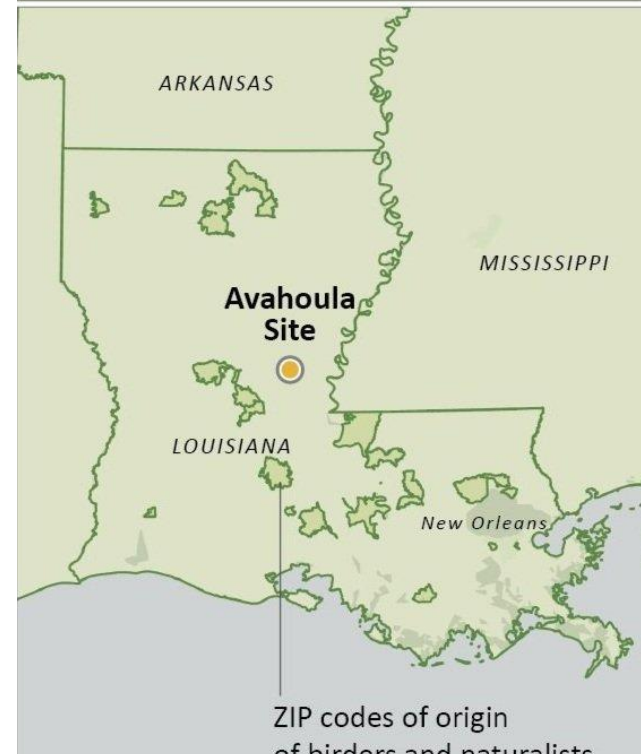
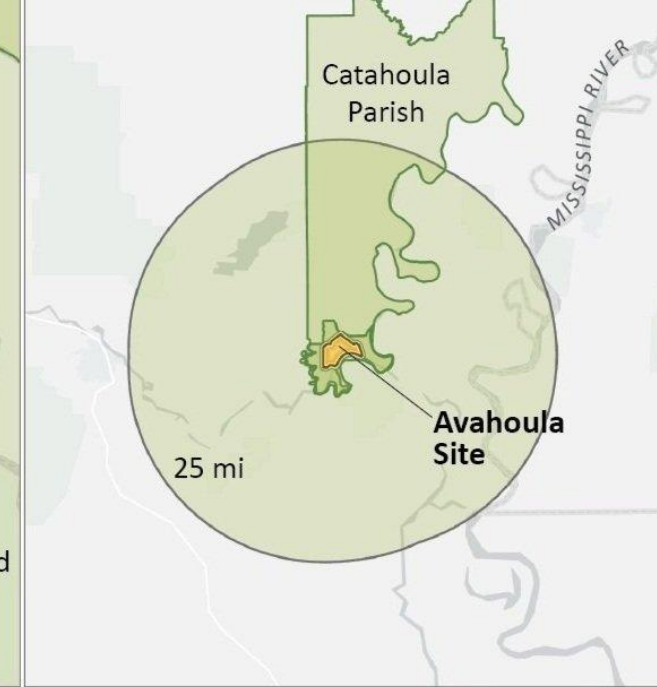
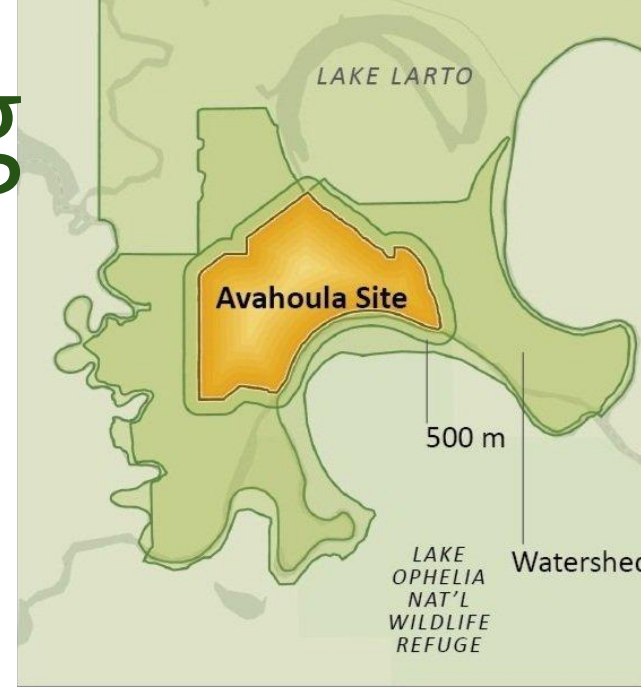
3.7K Water Users

downstream in the watershed



46K Tourist Visits

to the area



Beneficiary Mapping

Corporate Perspective

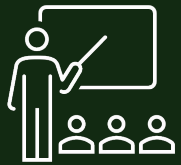


- Floodplain reconnection for water supply
- 189,588 people live within the sub-basin
- Each resident uses 37,524 gallons per year
- 33.5 million gallons of water supplied serves 893 people
- Of these 535 (SVI) or 651 (CEJEST) are underserved

Challenges for Implementation



Status quo



Awareness and Education



Policy Limitations

Limitations of Valuation



Cultural Values



Primary Research

Advancing Valuation

- Benefits tracking
- Health
- Flood models

What's next?

- Continual advocacy for non-market values
- Support awareness and education
- Collaboration

Next steps

High-level valuation tool
filling in gaps

1,467 ecosystem services
values from 181 US
studies

Eleven services across
nine ecosystems

MODEL INPUTS

Fill out the questions below pertaining to location and types of access on your site. Enter your selection from the drop-down GRAY cells. **All gray cells must have a value for the model to run correctly.** Your state affects model outputs, while the questions affect which ecosystem services are reported in the Outputs tab.

Choose your state	Alabama	Where the project is located.
Are there residences within a mile of the site?	yes	If yes, the model generates an aesthetic value based on
Is the site publicly accessible?	yes	
Is the site grazed?	yes	

Specify a discount rate and timespan of analysis. A discount rate represents the value of a dollar received in the future relative to a dollar received today. The default is set to 2.00%.

Timespan refers to the number of years into the future for which you want to estimate the value of the ecosystem services. See the User Guide for more guidance on determining these values.

Enter a discount rate (must be in percent):	2.00%
Timespan of analysis (in number of years):	30

For each land cover type found at your site, select the type from the drop-down menu. Leave the fields blank.

If your site includes acreage of a land cover type that cannot be determined, select "Other" from the drop-down menu. This type must be excluded from the input table.

Land Cover Types	
Mixed Forest	no
Herbaceous Wetland	no

MODEL OUTPUTS

This tab shows the annual values provided by ecosystem services at your site. Definitions for each ecosystem service can be found in the User Guide. The arrows in the table's header rows indicate which services are reported in the table.

The present value per year and the total value based on the timespan of analysis.

If you make changes to the inputs, run the tool again to update the outputs. Then click "Refresh All" under "Queries and Connections." You must refresh the data.

Ecosystem Service	\$/year
Climate Stability	\$ 309,588
Aesthetic Value	\$ 307,847
Habitat	\$ 204,877
Recreation	\$ 189,540
Water Supply	\$ 142,325
Non-Use Value	\$ 135,889
Forage	\$ 102,574
Disaster Risk Reduction	\$ 94,139
Water Quality	\$ 59,375
Air Quality	\$ 6,775

Total Value P

Total

Using a Discou

THANK YOU



Glen Delaney – gdelaney@eartheconomics.org
Carson Risner – crisner@eartheconomics.org

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