energy carbon water

Connected Corridors for Climate Change Resiliency

Kendra Smith | Association of Clean Water Administrators | 08.16.2016

780 million people lack access to Clean Water
Climate change is predicted to alter hydrologic processes across the globe (UN, 2013)

Rivers, streams, riparian corridors, wetlands, floodplains, and forests deliver clean water when appropriately managed

Oregon’s diverse landscape









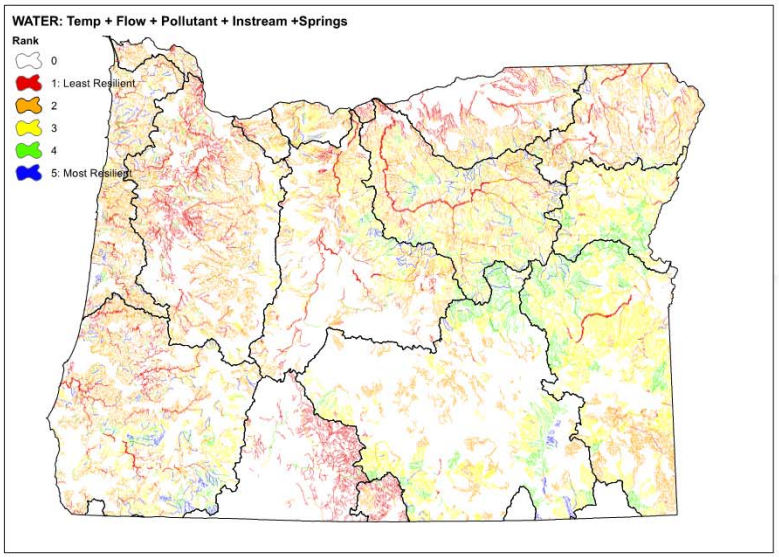
And Unique Habitats

In the face of a changing climate and limited financial, political and social resources, where should we focus our efforts to build resiliency?

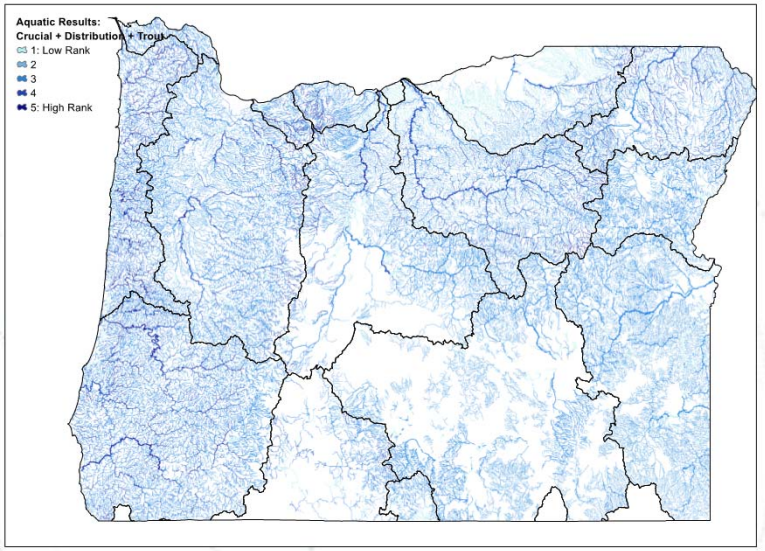
Statewide Datasets Used to Assess Climate Resiliency

Focal Target	GIS Datasets	Name In Databasin Or Other Source	Year	Source	Climate
Water	Predicted Change in Mean Summer Flow Present to 2040	Stream Flow Metric Database, NPLCC	2014	USFS, RMRS	x
	Predicted Change in 1.5yr Flow Events Present to 2040	Stream Flow Metric Database, NPLCC	2014	USFS, RMRS	x
	Predicted Change in Mean August Temp Present to 2040	NorWeST Project Database	2014	USFS, RMRS	x
	Spring density per HUC, groundwater dependency	None - TNC Conservation Gateway	2009	TNC	
	Number of Water Quality Limited Stream Parameters	Number of WQ Limited Parameters	2013	DEQ	
	Instream Flow Allocation	OWRD Instream Flow Designation	2011	OWRD	
Aquatic Habitat	ODFW Aquatic Crucial Habitat	Aquatic Crucial Habitat Overview	2014	ODFW	
	Number Anadromous Fish/Lamprey Species Use	Number Of Salmonid Species	2013, 2015	ODFW, NOAA	
	Climate shield projections for Native trout (Cutthroat / Brool	Projected habitat use in 2040	2015	USFS	x
Riparian Habitats	PNW Riparian Areas (and floodplain extents)	Potential Riparian Areas in the Pacific Northwest	2013	WGA/LCC	
	PNW Riparian Predicted Climate Change Resilience Index	Pacific Northwest Riparian Climate Corridors: scores attributed to ...	2013	WGA/LLC	x
	Riparian Bird Predicted Mean Bird Distribution 2040	http://data.prbo.org/apps/nplcc/aknw.php	2014	Avian Knowledge NW	x
	NLCD Classification of Vegetation Cover	http://www.mrlc.gov/nlcd11_leg.php	2011	NLCD, BEF	
Terrestrial Habitats	TNC Climate Resiliency Map	https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/oregon/scienc	2015	TNC	x
	Sage Grouse Habitat Similarity Index	Habitat similarity index values for greater sage grouse ac	2014	USGS	
	ODFW Terrestrial Crucial Habitat	http://www.dfw.state.or.us/maps/compass/md_terrestrial_crucial_habitat.asp	2014	ODFW	
	Oak/ Conifer/ Prairie Predicted Mean Bird Dist 2040	http://data.prbo.org/apps/nplcc/aknw.php	2014	Avian Knowledge NW	x

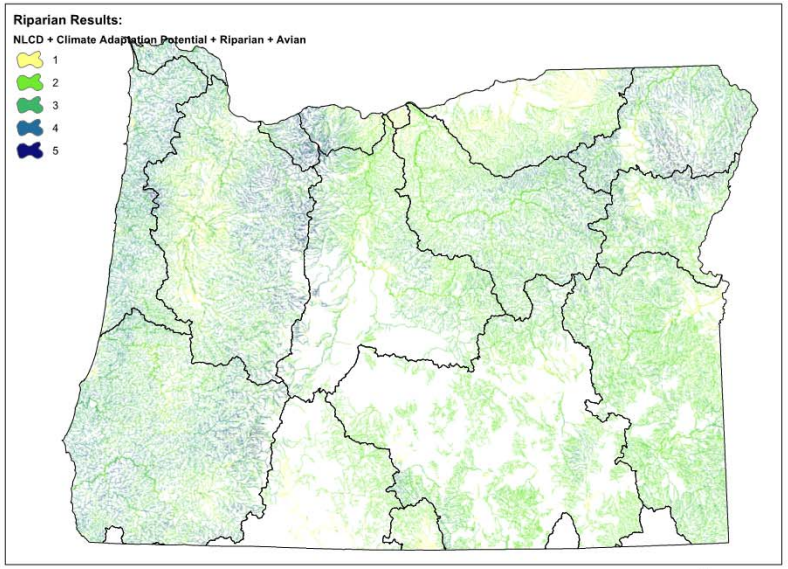
Statewide Climate Projection Data Mash



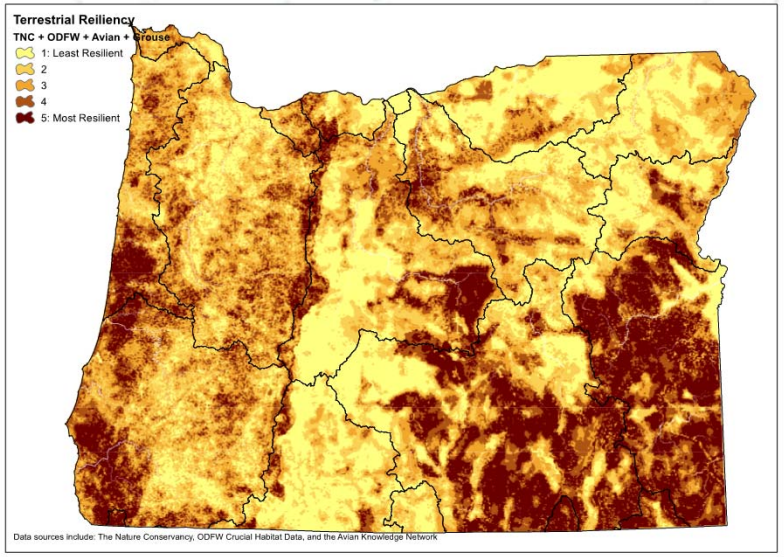
Oregon Water Resiliency



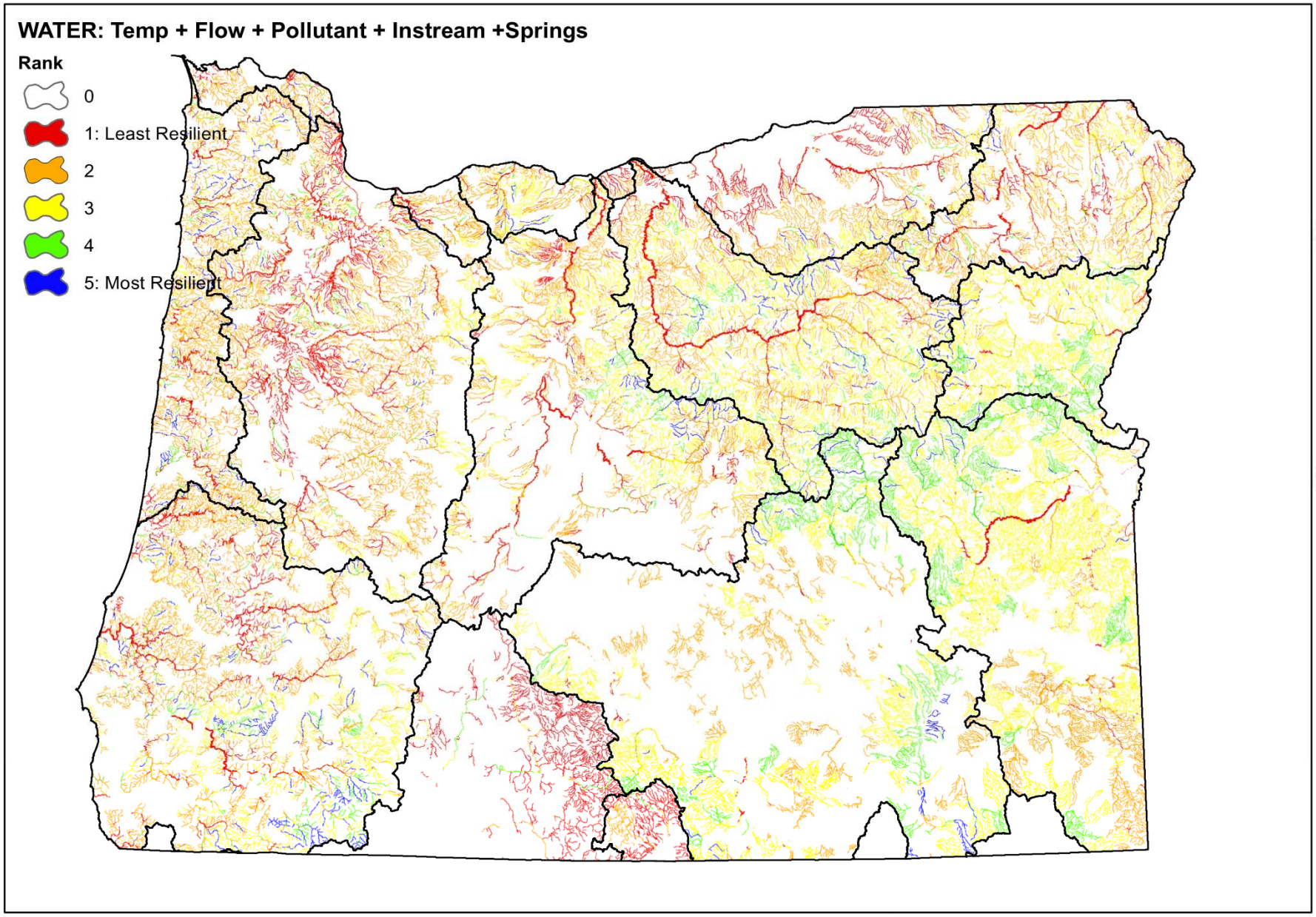
Oregon Aquatic Results



Oregon Riparian Resiliency



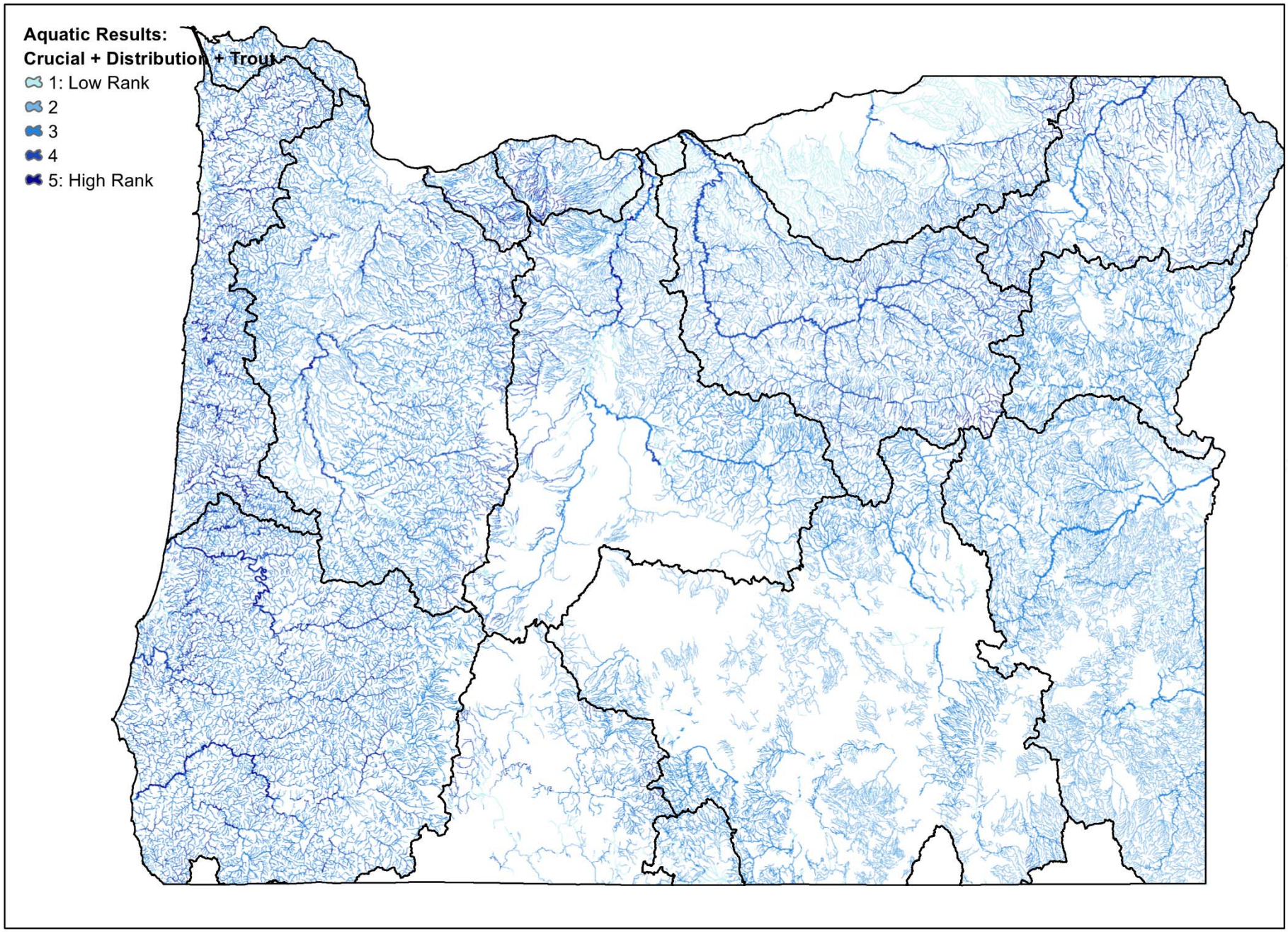
Oregon Climate Change Resiliency: Terrestrial



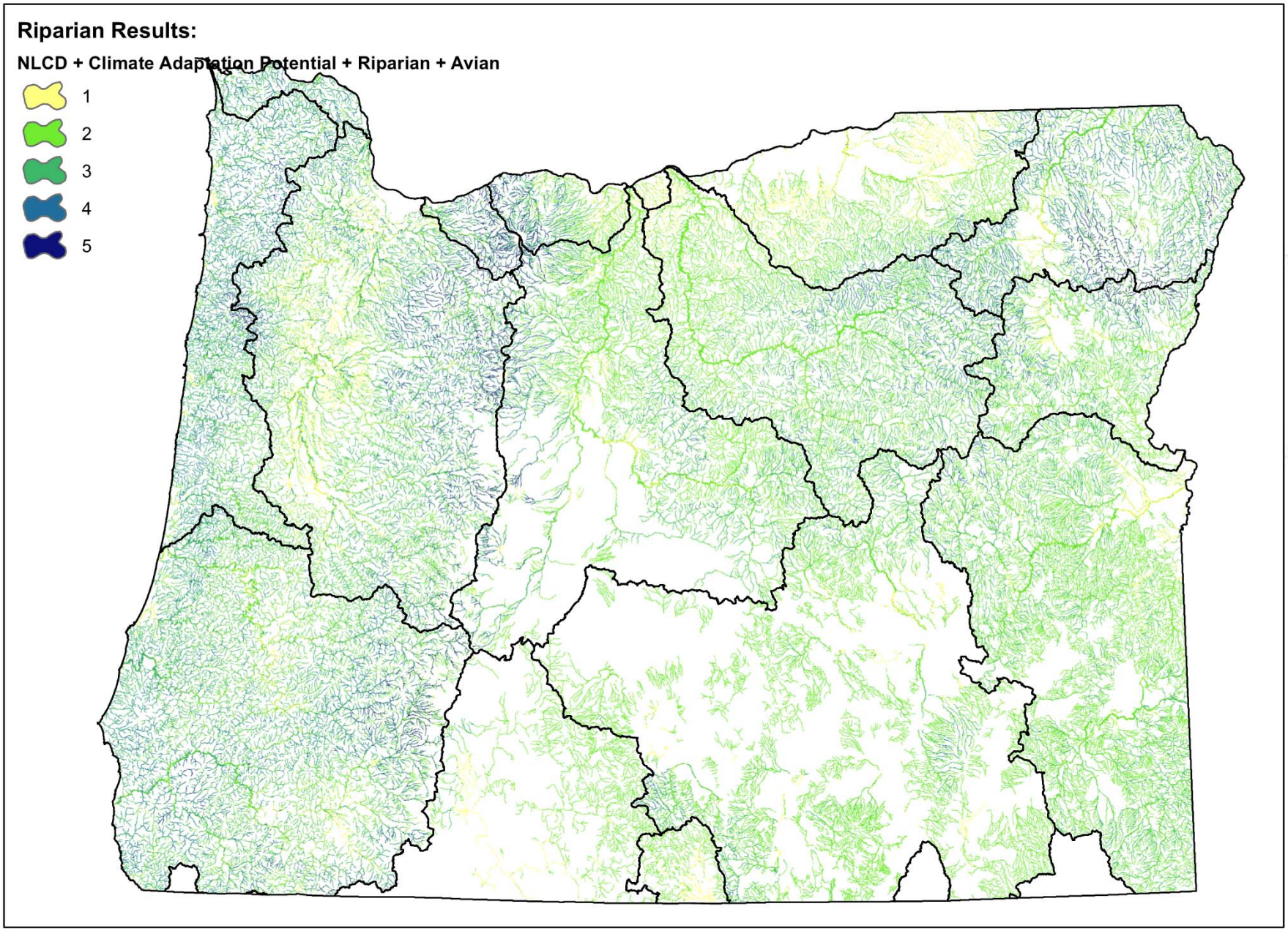
Oregon Water Resiliency

0 12.525 50 75 100 Miles

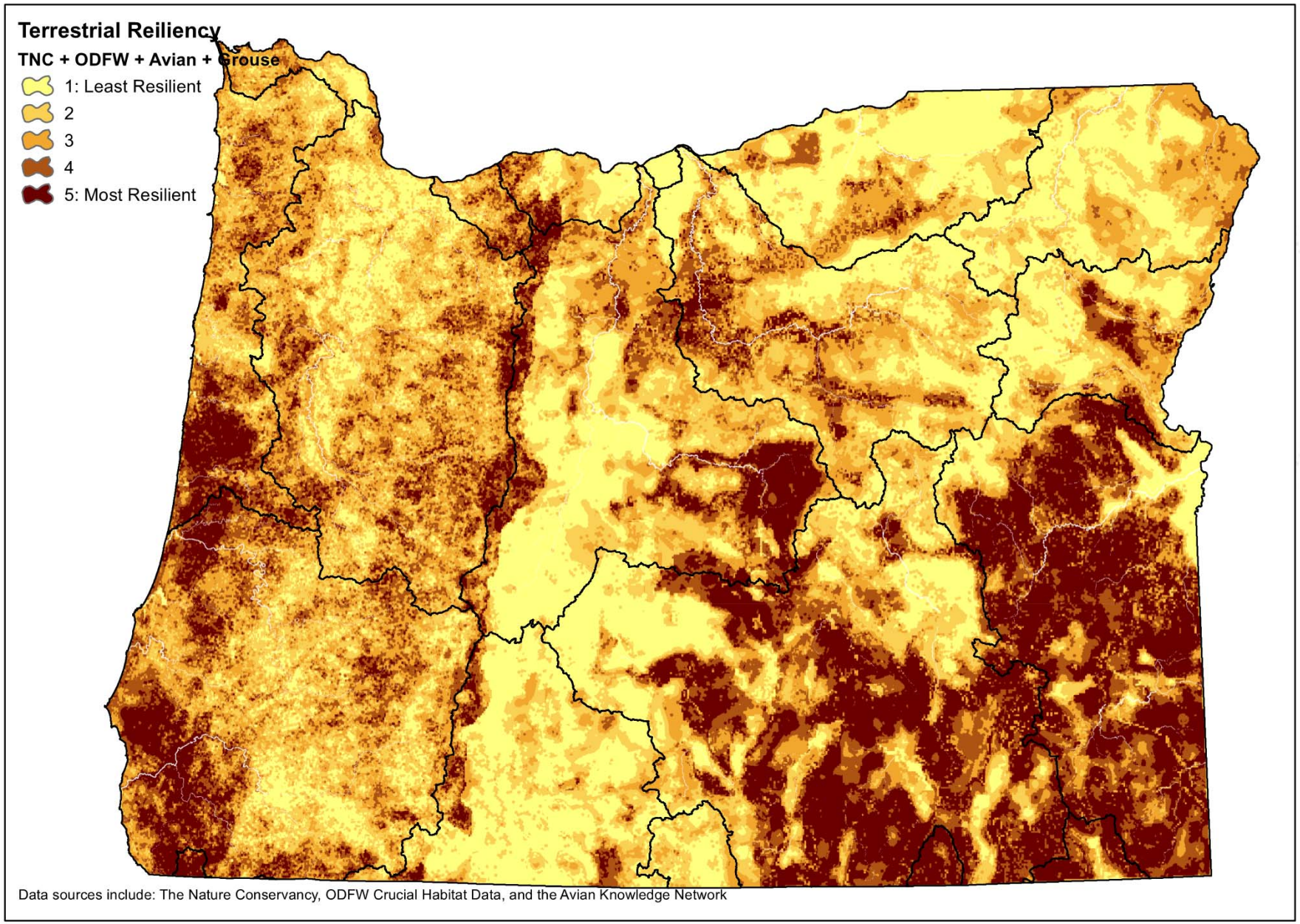
N



Oregon Aquatic Results



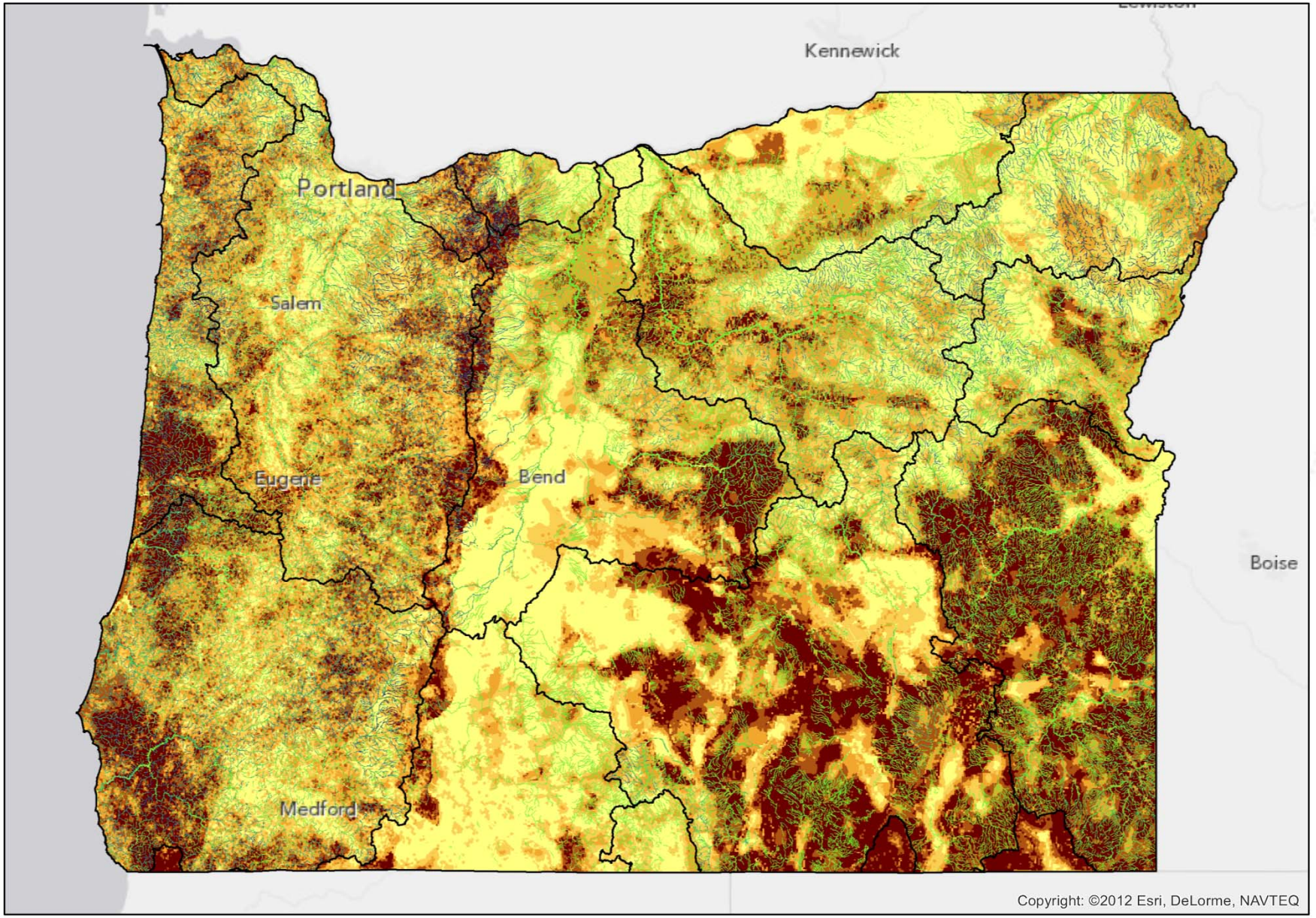
Oregon Riparian Resiliency



Oregon Climate Change Resiliency: Terrestrial

0 12.5 25 50 75 100 Miles

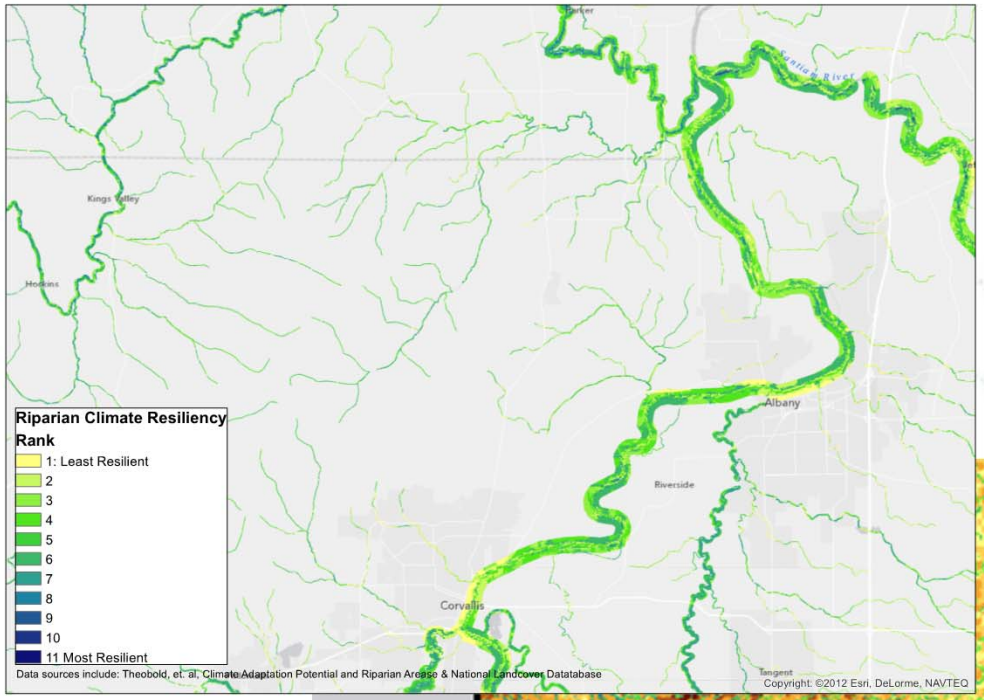
N



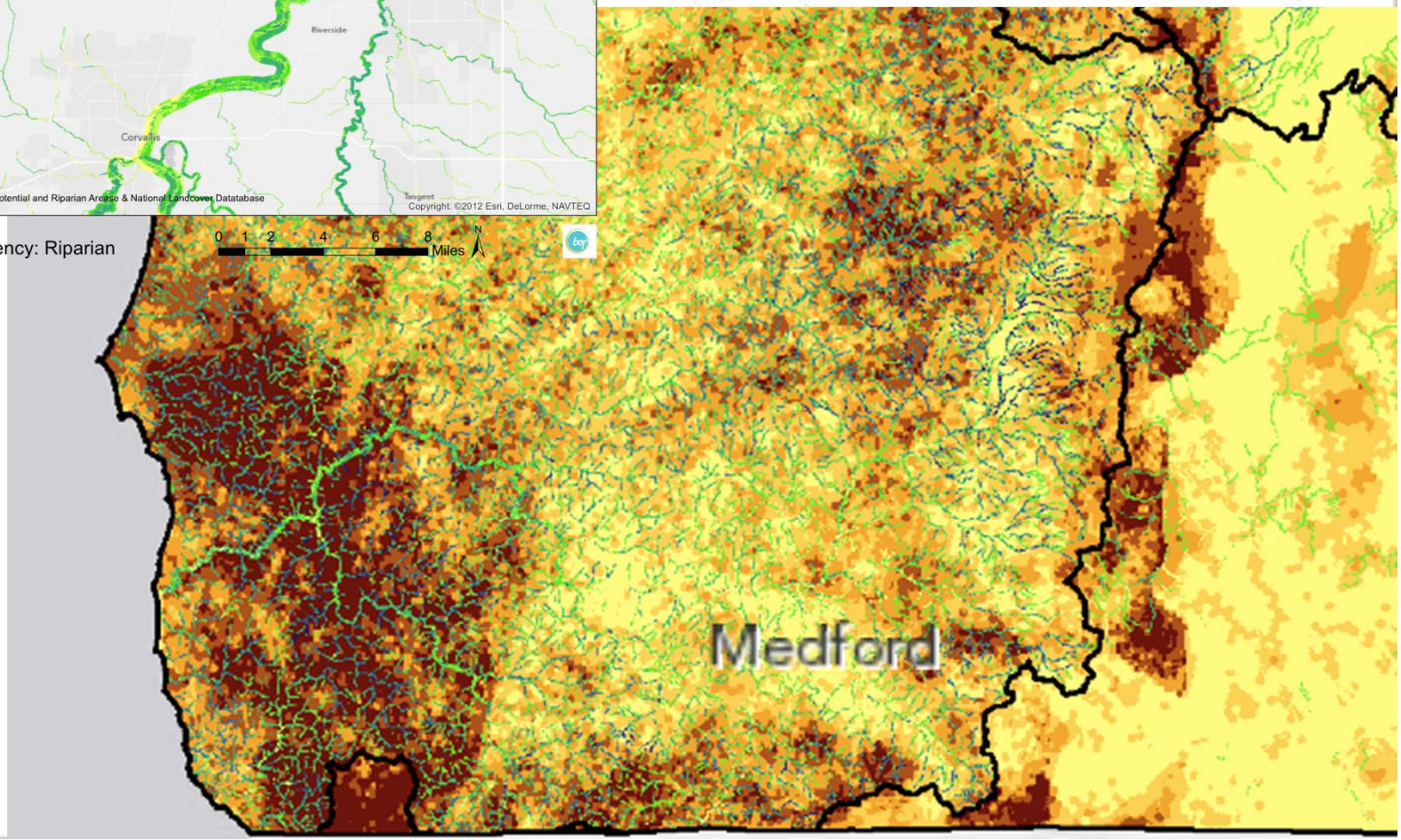
Terrestrial, Riparian, Aquatic, and Water Resiliency

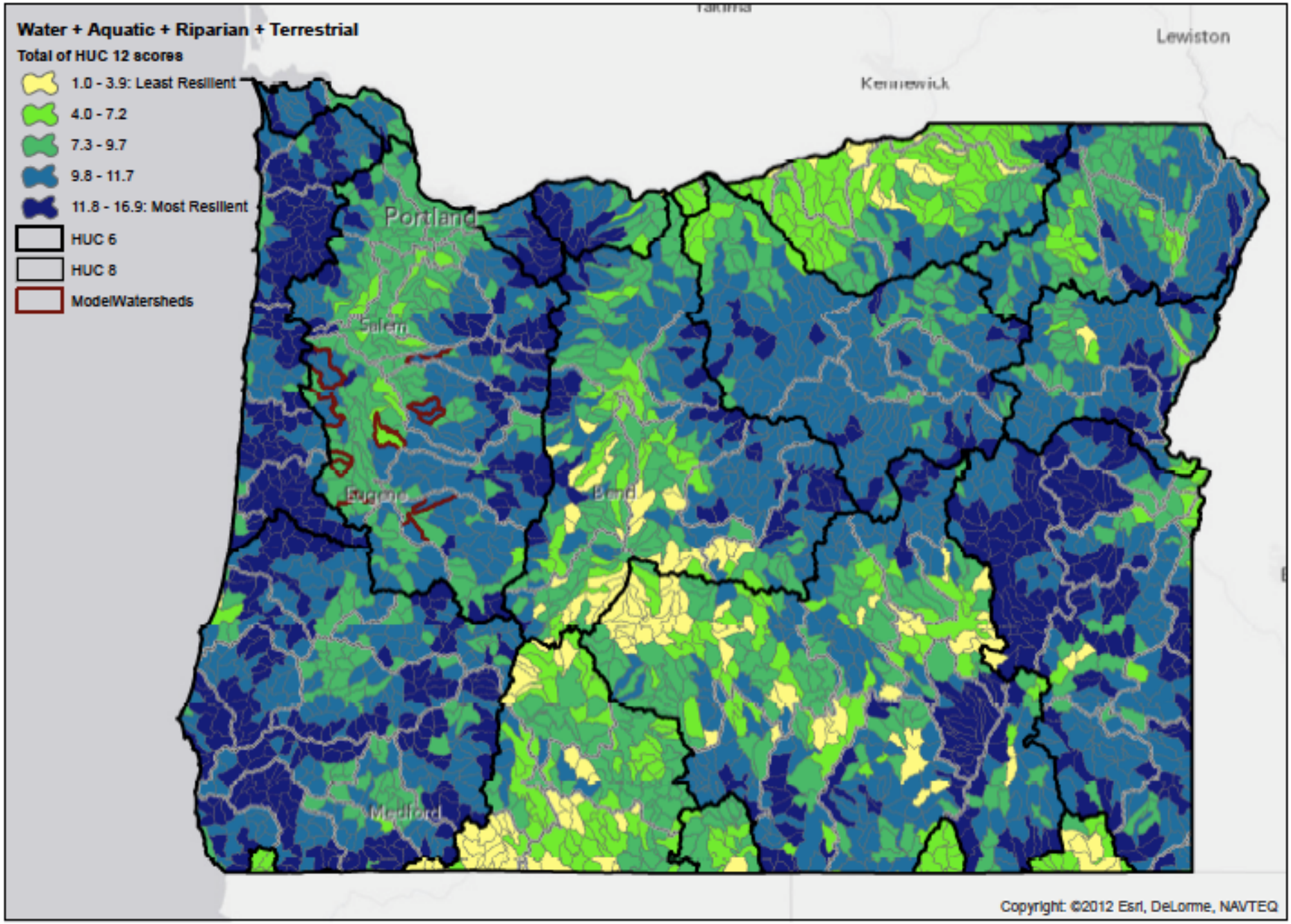
Miles
0 15 30 60 90 120

Look at the data at multiple scales to inform thinking

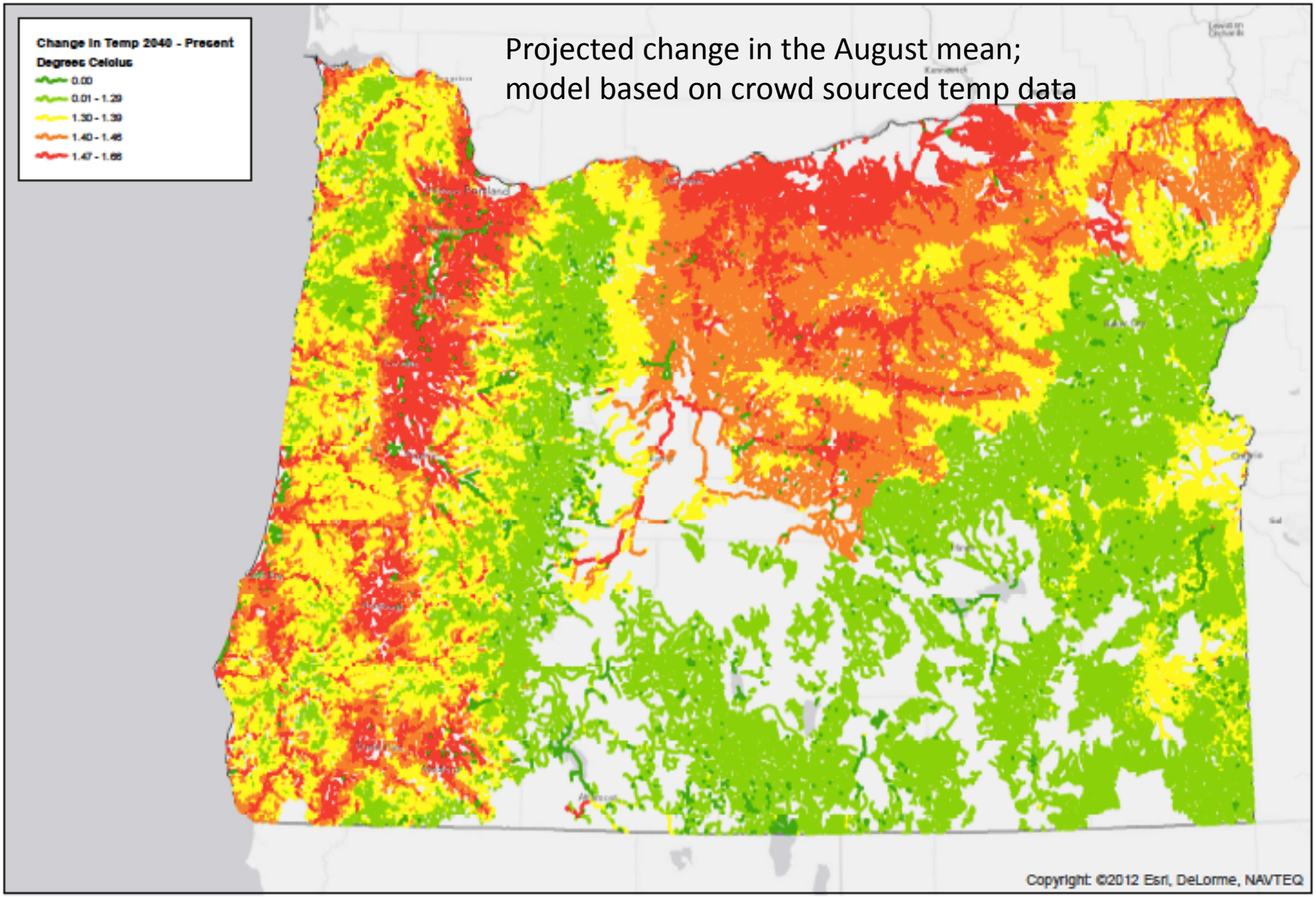


Oregon Climate Change Resiliency: Riparian





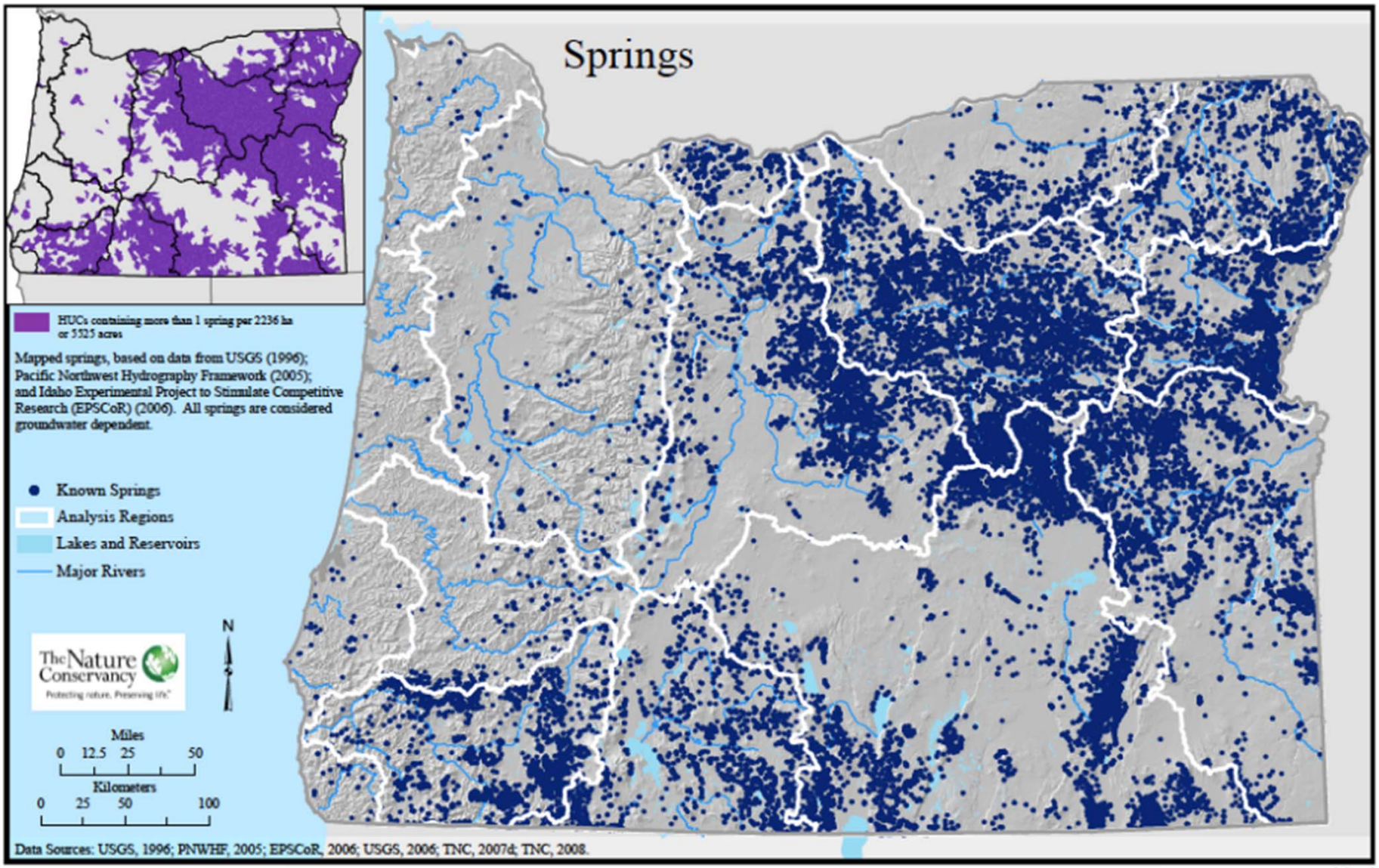
Total Resiliency



NorWest Stream Temperatures: Change in Temperature - 2040 - Present

0 10 20 40 60 80
Miles

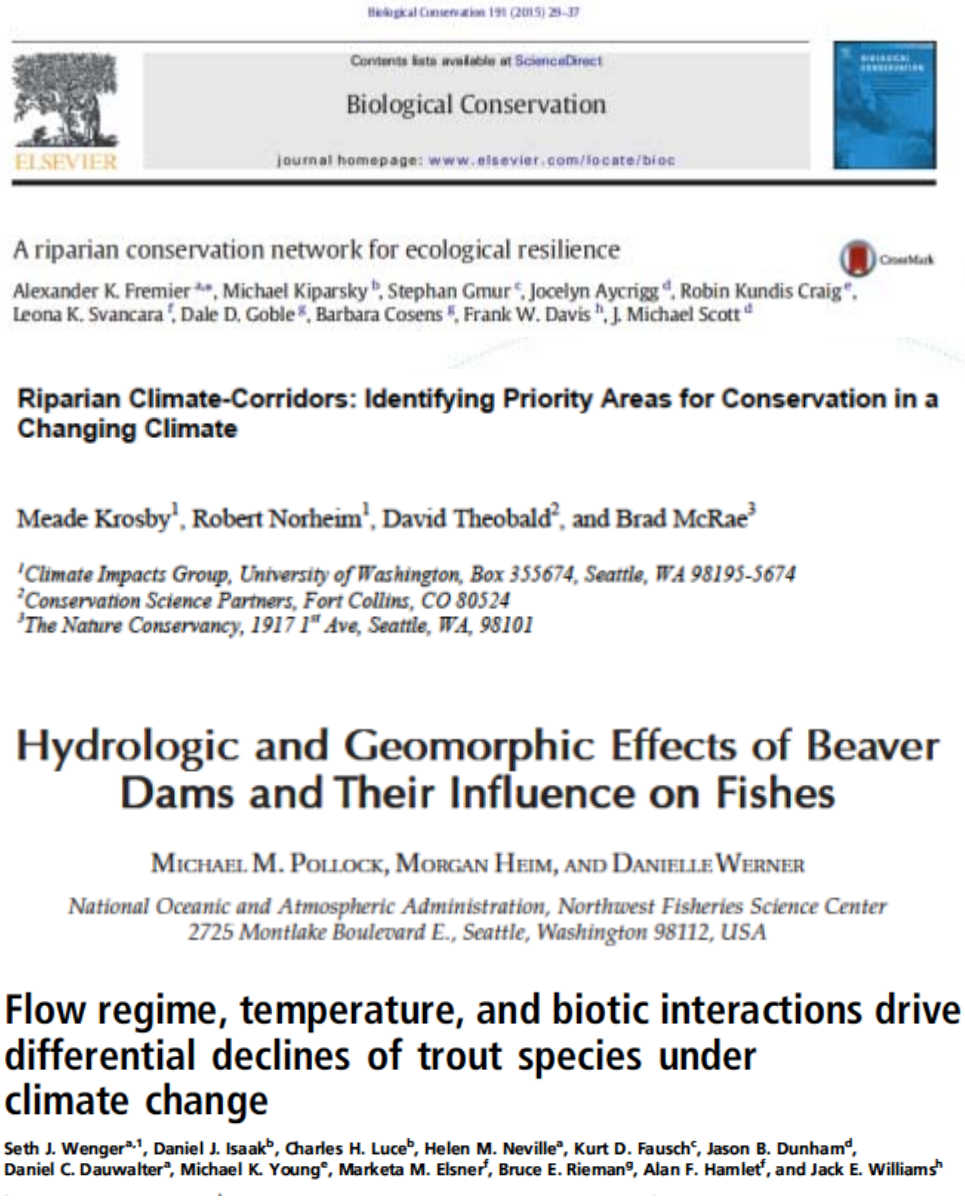
N



Groundwater springs location and density in Oregon

Riparian corridors buffer the impacts to water quality, quantity and habitat

Restoring them is one of the most important actions we can take today, for a resilient tomorrow



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A riparian conservation network for ecological resilience

Alexander K. Fremier [a,*], Michael Kiparsky [b], Stephan Gmur [c], Jocelyn Aycrigg [d], Robin Kundis Craig [e], Leona K. Svancara [f], Dale D. Goble [g], Barbara Cosens [g], Frank W. Davis [h], J. Michael Scott [d]

Riparian Climate-Corridors: Identifying Priority Areas for Conservation in a Changing Climate

Meade Krosby[1], Robert Norheim[1], David Theobald[2], and Brad McRae[3]

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[2]*Conservation Science Partners, Fort Collins, CO 80524*
[3]*The Nature Conservancy, 1917 1st Ave, Seattle, WA, 98101*

Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes

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2725 Montlake Boulevard E., Seattle, Washington 98112, USA

Flow regime, temperature, and biotic interactions drive differential declines of trout species under climate change

Seth J. Wenger[a,1], Daniel J. Isaak[b], Charles H. Luce[b], Helen M. Neville[a], Kurt D. Fausch[c], Jason B. Dunham[d], Daniel C. Dauwalter[a], Michael K. Young[e], Marketa M. Elsner[f], Bruce E. Rieman[g], Alan F. Hamlet[f], and Jack E. Williams[h]

ECOHYDROLOGY
Ecohydrol. (2015)
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(wileyonlinelibrary.com) DOI: 10.1002/eco.1645

Incorporating climate change projections into riparian restoration planning and design

Laura G. Perry,[1,2]* Lindsay V. Reynolds,[1,2] Timothy J. Beechie,[3] Mathias J. Collins[4] and Patrick B. Shafroth[2]

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[3] *Fish Ecology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 2725 Montlake Blvd E., Seattle, WA, USA*
[4] *Restoration Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 55 Great Republic Drive, Gloucester, MA, USA*

SPECIAL THEME: CLIMATE CHANGE AND ECOLOGICAL RESTORATION

Why Climate Change Makes Riparian Restoration More Important than Ever: Recommendations for Practice and Research

Nathaniel E. Seavy, Thomas Gardali, Gregory H. Golet, F. Thomas Griggs, Christine A. Howell, Rodd Kelsey, Stacy L. Small, Joshua H. Viers and James F. Weigand

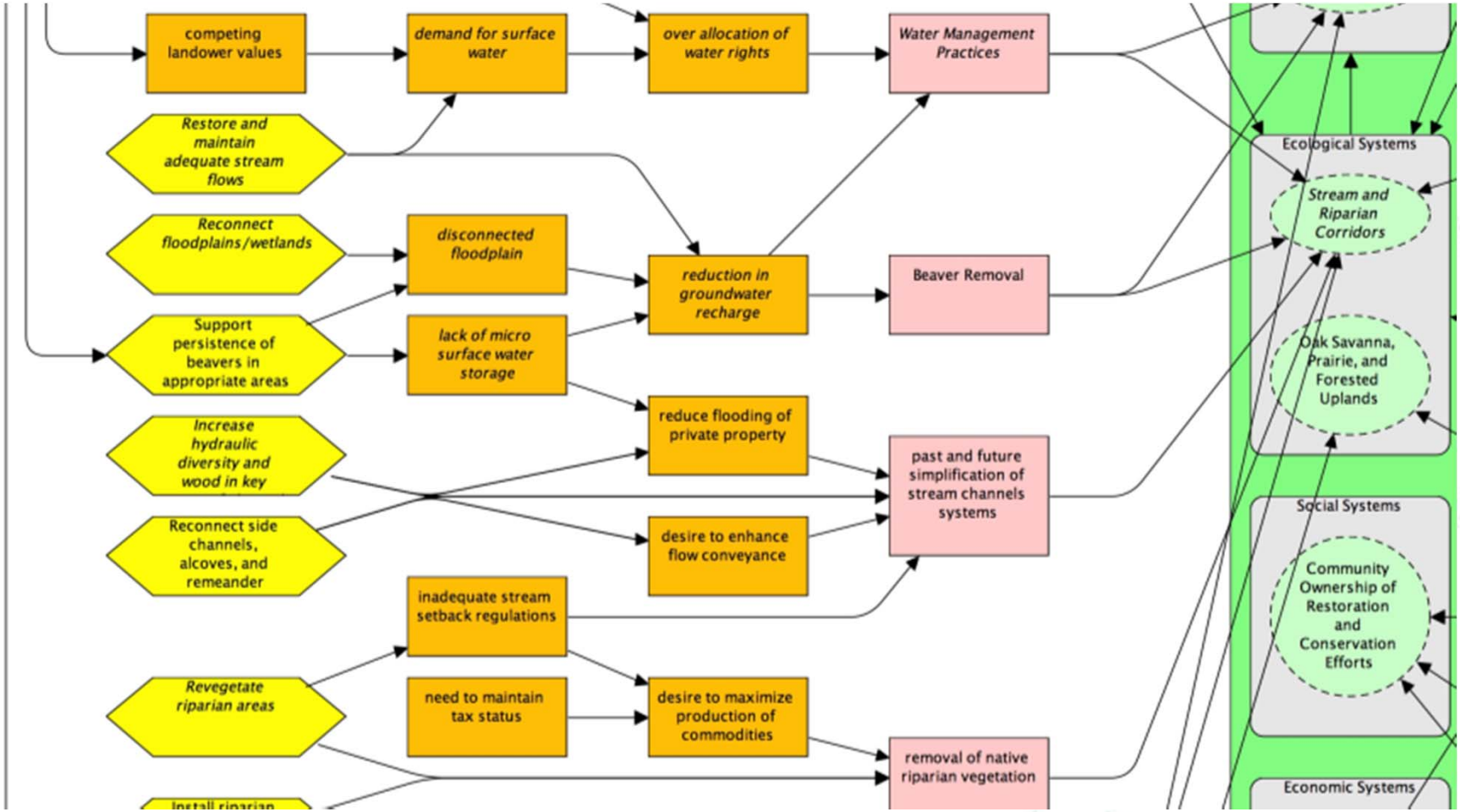
Oecologia (2002) 132:96–101
DOI 10.1007/s00442-002-0929-1

ECOSYSTEMS ECOLOGY

Justin P. Wright · Clive G. Jones
Alexander S. Flecker

An ecosystem engineer, the beaver, increases species richness at the landscape scale

Research Supports Action



Pathways Forward

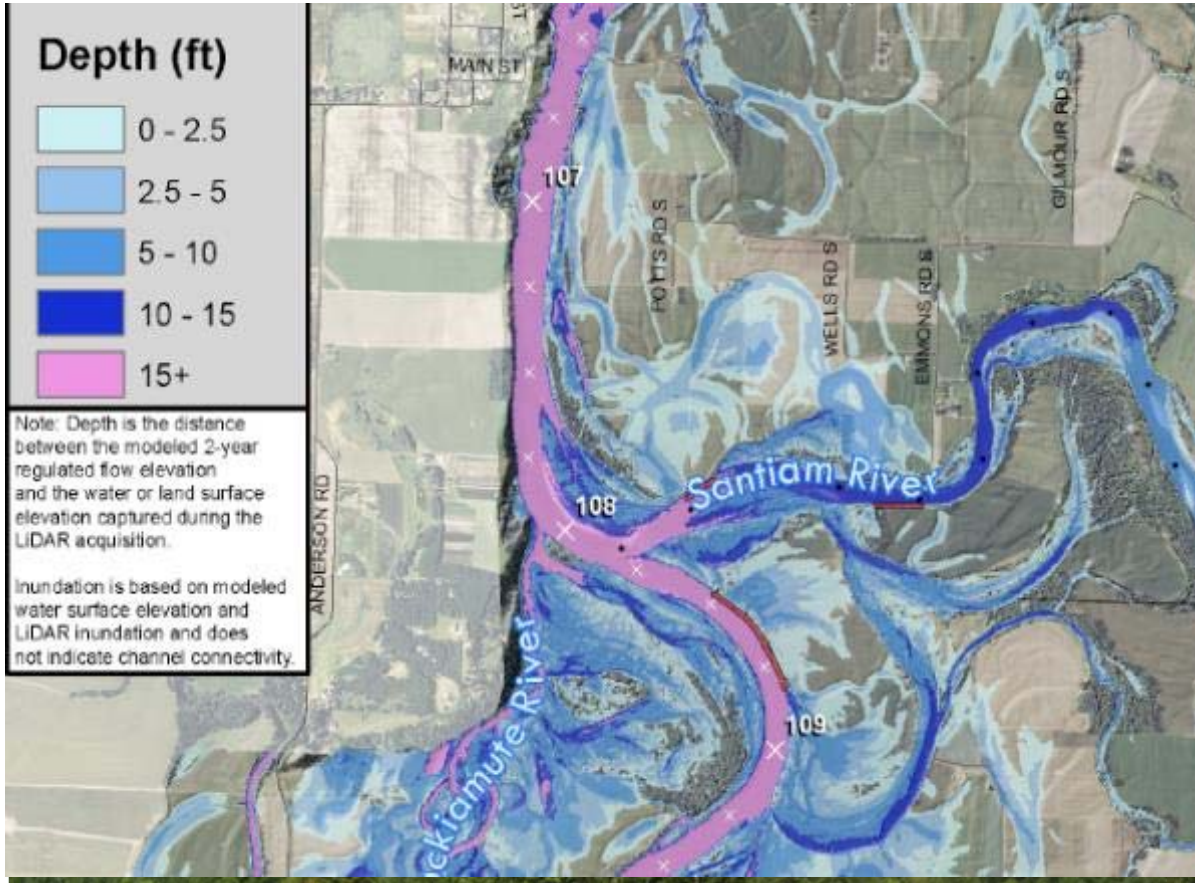
Restoration Vision

Restoration or Enhancement Approach

Landowner Engagement

Funding Diversification

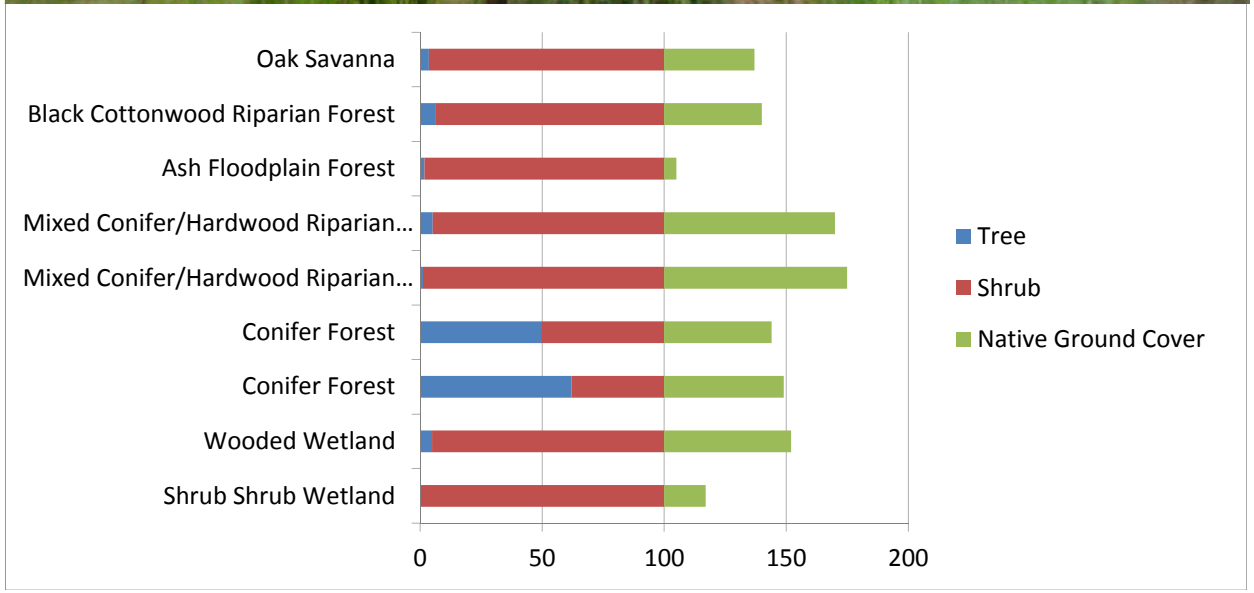
Evaluate Site Dynamics



Address Limiting Factors

Limiting Factor	Action
• Low summertime flows • Depth to water access for riparian plants • Lack of beaver building dams	• Install beaver dam analogs to change channel hydraulics
• High invasive vegetation cover • Lack of native riparian vegetation	• Suppress non-native vegetation • Plant native riparian vegetation at density and diversity of a mid seral stage using reference analogs
• High browse by Native Ungulates	• Fencing some areas, Harassment in others, or no fence but dense planting
• Browse by Livestock	• Fence stream corridor

Mimic References, Consider Future State



Create Defensible Project Boundaries

Complete Adequate Site Preparation

Design Planting Layout

Secure Plant Stock

Handle Plants Appropriately

Install Plants Correctly

Maintain Sites Regularly

Encourage Beaver at Appropriate Sites

Questions?

Anyone know where I could get some willow around here?

Credit Re Climate Resiliency Mash:
Jill Ory, GIS Consultant / Guru

Credits Re Riparian Planting:
Peter Guillozet, Brian Vaughn, Kendra Peterson Morgan, Jill Ory, Sarah Dyrdahl Toby Query, George Kral. SWCD and Watershed Council partners.

where to find me:

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Program Director, Oregon Model Watersheds

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