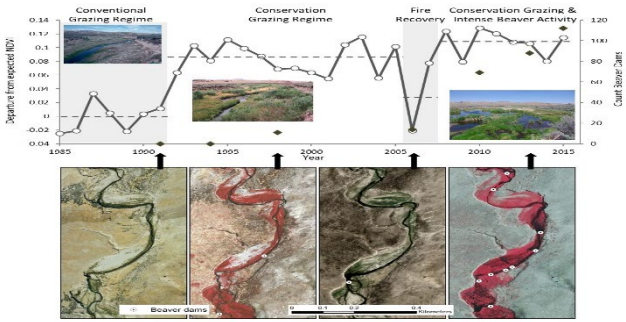
Using Science to Advance Our Conservation Mission

Helen Neville, helen.neville@tu.org

TU: 360+ Gov't Affairs, Conservation, and Science+ staff



Vol Opps staff & Grassroots lend considerable capacity/expertise!

Chris Wood, *CEO/President*

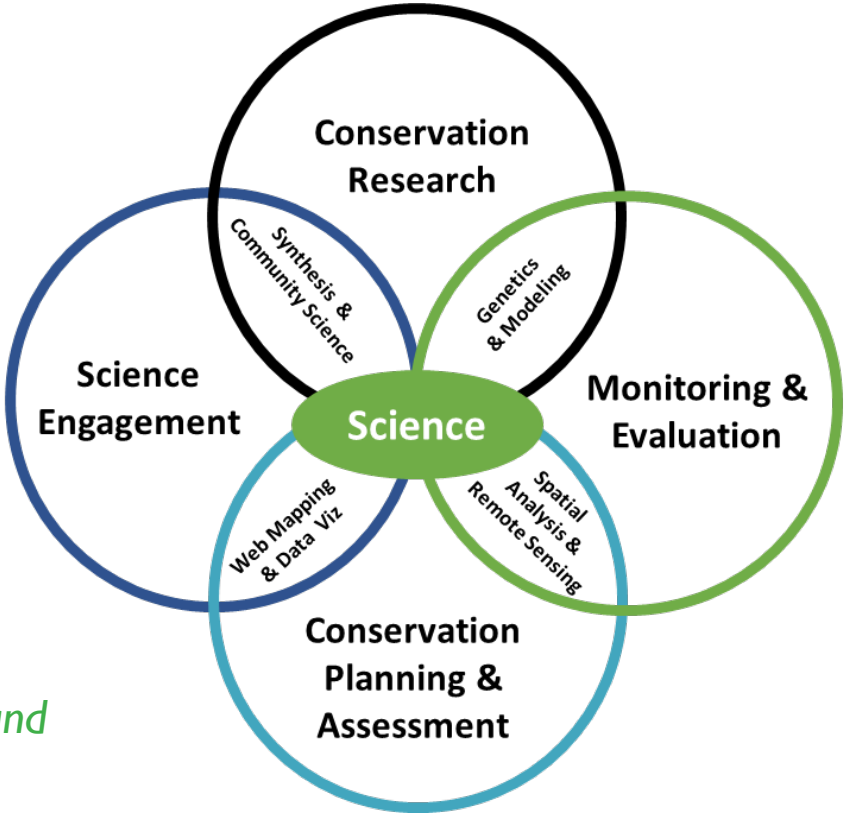
TU National Science, what we do:

- Conservation Planning and Assessment
- Monitoring & Evaluation
- Conservation Research
- Science Engagement

+specialized skills within each

Guidance, assessment, synthesis and tool-development within TU;

Research with various external agency, university and NGO partners



TU Science Vision:

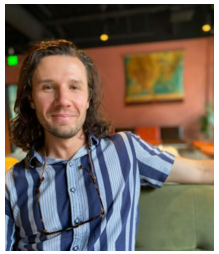
We believe TU's conservation impact is maximized when we are all inspired by the natural aquatic world and when our conservation objectives, practices, and policies are enabled and guided by the best available science. TU Science provides the framework for this practice.

TU National Science: Who we are

Helen Neville, PhD
Senior Scientist

Dan Dauwalter, PhD
Fisheries Science Director

Brian Hodge, MS
Fisheries Scientist



Louis Jochems, PhD
GIScience Director

Matt Mayfield
Senior GIS Analyst

Bryce Larson
GIS Analyst

Haley Ohms, PhD
Salmon Biologist

Gary Marston, MS
Steelhead Science Advisor

Sabrina Beus
Assoc Project Manager

Jason Barnes
Lahontan Biologist

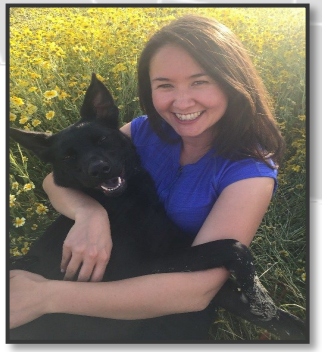
Emma Lundberg, PhD
Aquatic Resiliency Scientist

Jordan Fields, PhD
Aquatic Resiliency Scientist

State/region-based science staff

Rene Henery , PhD
California Science Director

Natalie Stauffer-Olsen, PhD
California Staff Scientist



Mia Van Docto, MS
California Hydrologist
(+ Conservation Hydrology Program)

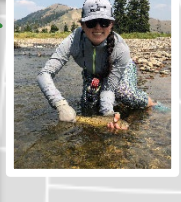
Jake Lemon
Monitoring and Community Science Manager

Shawn Rummel , PhD
Northeast Coldwater Habitat Program Science Advisor

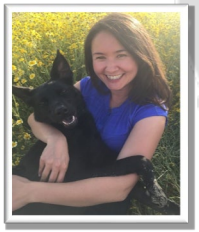
11 Science Liaisons

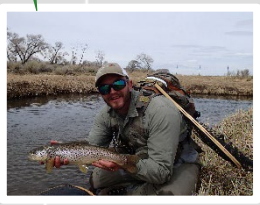








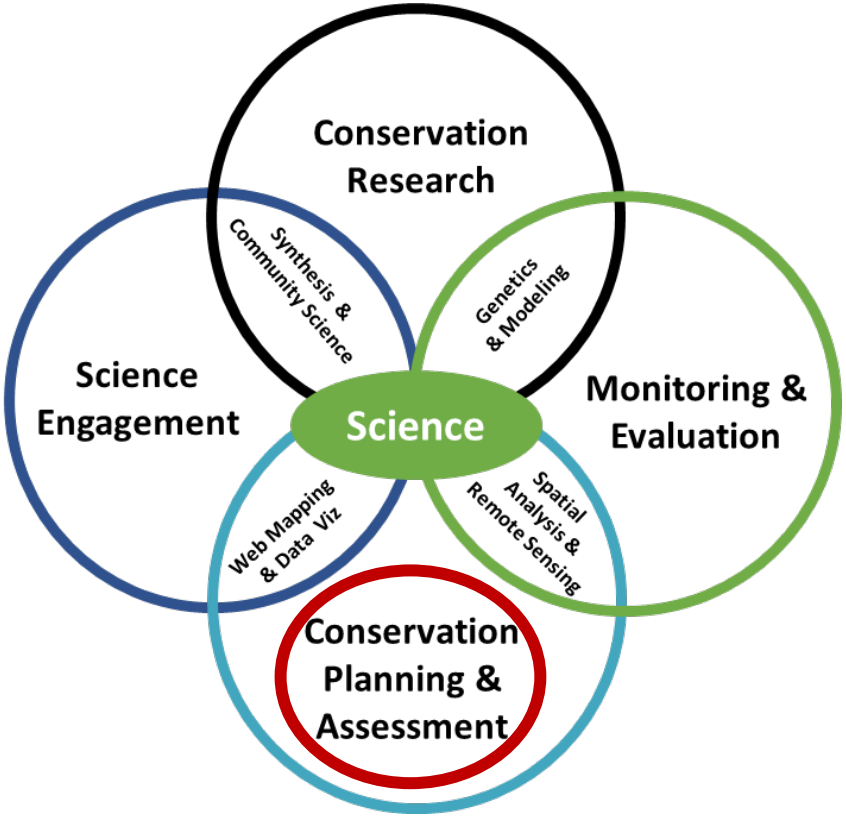




Shawn Rummel
Jake Lemon
Mia Van Docto
Christine Brissette
Jim DeRito
Mark Hieronymus
Tasha Sorensen
Jason Willis
Kevin Terry
Tommy Cianciolo
Leslie Steen

Help interconnect Science & Programs

Conservation Planning and Assessment



Conservation Planning & Assessment:

Conservation Success Index

Portfolios for inland trout

North American Journal of Fisheries Management

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ujfm20

Spreading the Risk: Native Trout Management in a Warmer and Less-Certain Future

Amy L. Haak [a] & Jack E. Williams [b]

[a] Trout Unlimited. 910 Main Street. Suite 342. Boise. Idaho. 83702. USA

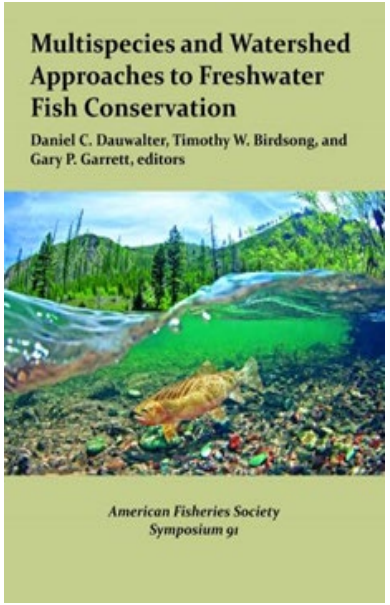
Ecological, genetic and life history attributes:

"3 R's":

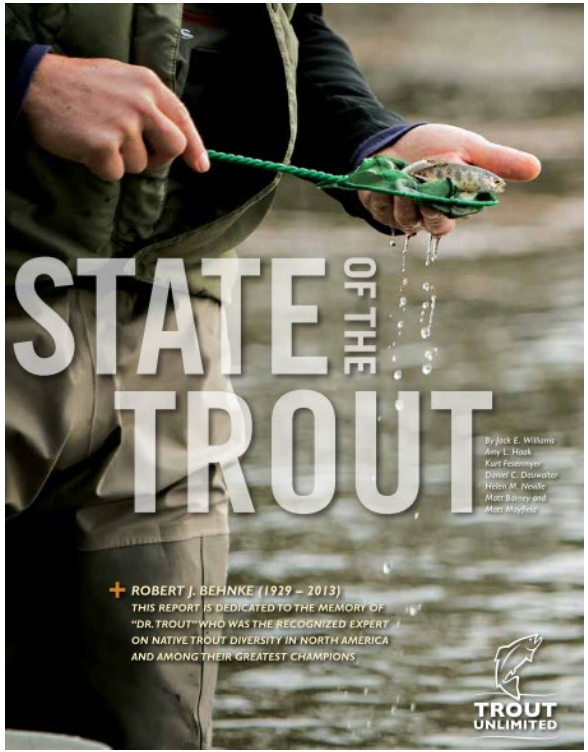
Representation

Resilience

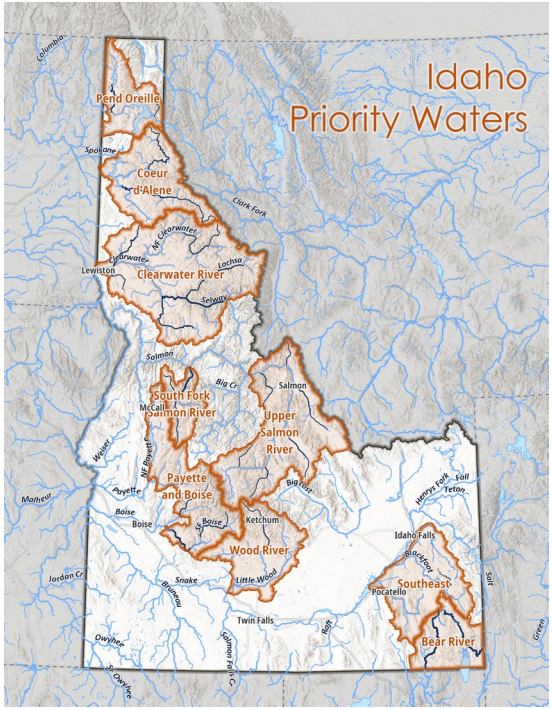
Redundancy



Conservation Planning & Assessment:

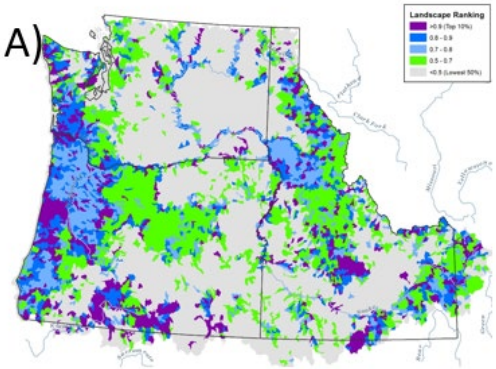


Region	Trout Taxa	Climate Change	Energy	Non-native Species	Water Demand	Percent of Historical Habitat Occupied
Pacific Coast	Coastal Cutthroat					>50
	Coastal Rainbow Trout					>50
	Bull Trout*					60
	Dolly Varden					10 - 25
	Columbia River Redband Trout*					44
	Klamath Redband Trout					>50
Central Valley and Sierra Nevada	Sacramento Redband Trout					22
	Eagle Lake Rainbow Trout					38
	California Golden Trout					49
	Little Kern Golden Trout					100
	Kern River Rainbow Trout					15
	Bull Trout*	EXTINCT WITHIN THIS REGION				
Interior Columbia Basin—Northern Rockies	Westslope Cutthroat Trout					42
	Yellowstone Cutthroat Trout					41
	Bull Trout*					60
	Columbia River Redband Trout*					44
	Lake Trout*					10 - 25
Interior Basins	Lahontan Cutthroat Trout					4
	Humboldt Cutthroat Trout					>9
	Bonneville Cutthroat Trout					31
	Paiute Cutthroat Trout					0
	Alvord Cutthroat Trout	EXTINCT				
Colorado Plateau—Southern Rockies	Colorado River Cutthroat Trout					11
	Greenback Cutthroat Trout					>1
	Yellowfin Cutthroat Trout	EXTINCT				
Southwest	Rio Grande Cutthroat Trout					10
	Apache Trout					25
	Gila Trout					5
Great Lakes—Upper Mississippi	Brook Trout*					35
	Lake Trout*					10 - 25
Northeast	Brook Trout*					55
	Sunapee Trout/Blueback Char					>10
	Lake Trout*					10 - 25
	Silver Trout	EXTINCT				
Mid-Atlantic	Brook Trout*					55
Southeast	Brook Trout*					55
Rangewide	Brook Trout*					55

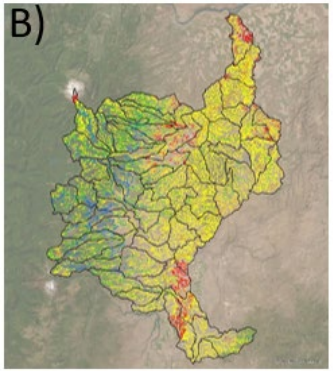


Conservation Planning & Assessment

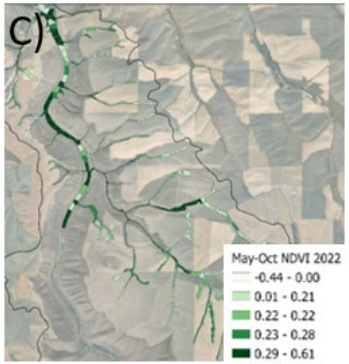
Decision support tools for BLM and TU to identify process-based restoration opportunities



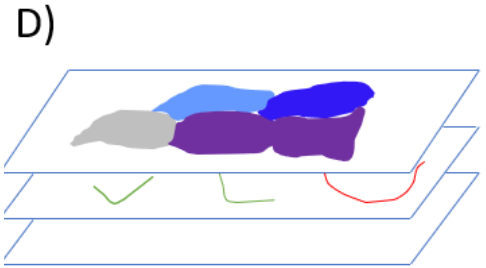
Native Fish Assessment



Beaver Capacity

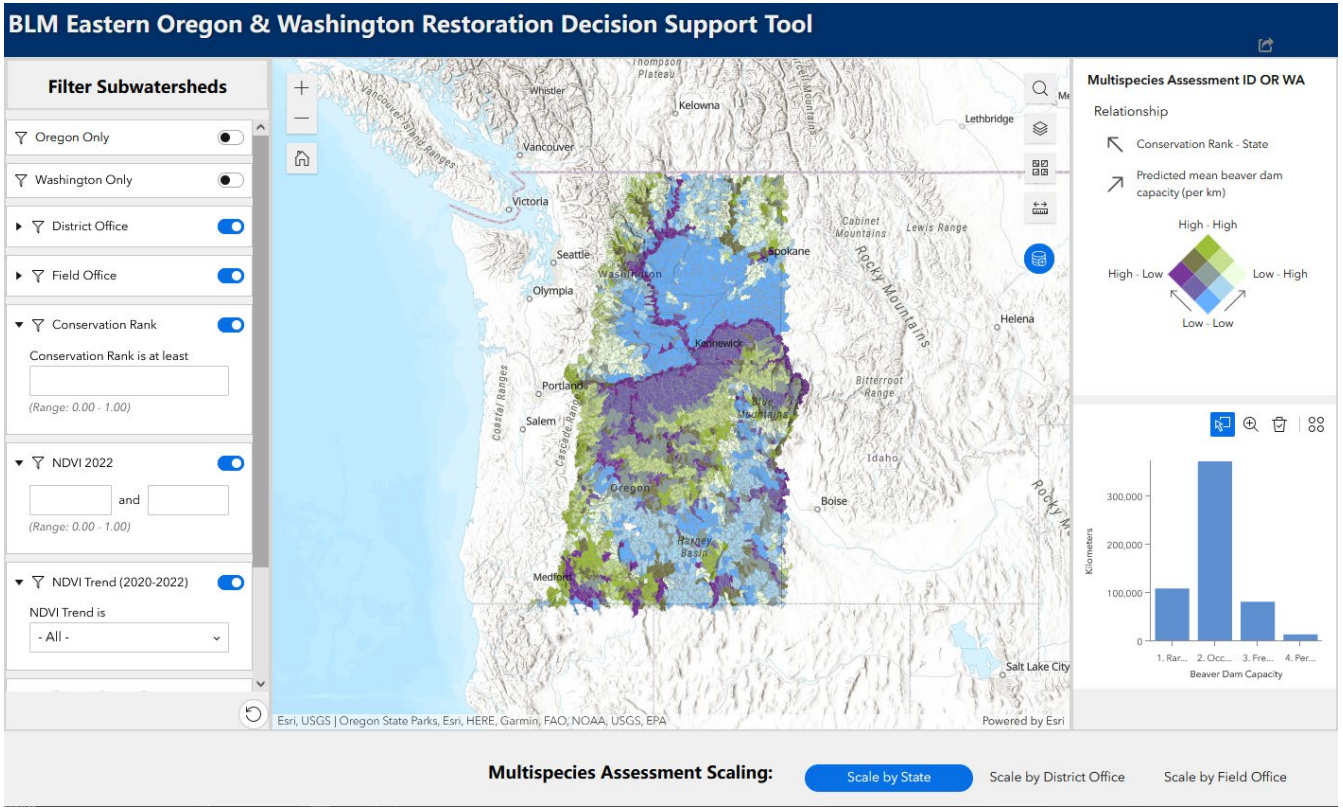


Riparian Vegetation Status and Trend (NDVI)

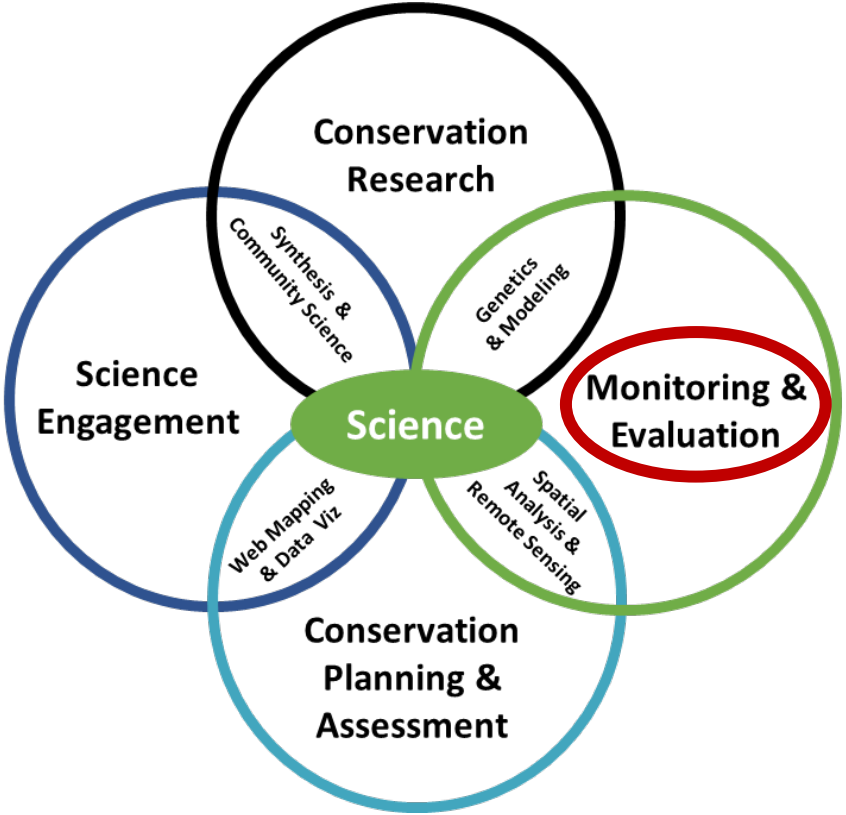


Filterable datasets in a decision support tool

Conservation Planning & Assessment



Monitoring & Evaluation



Monitoring & Evaluation – Guidance:

RESTORATION MONITORING

A Get-Started Guide

Dan Dauwalter, Brian Hodge, Jim DeRito, Shawn Rummel, Helen Neville
Trout Unlimited, Arlington, Virginia

Internal resource

Apache Trout Monitoring Plan

2017

Credit: AZGFD

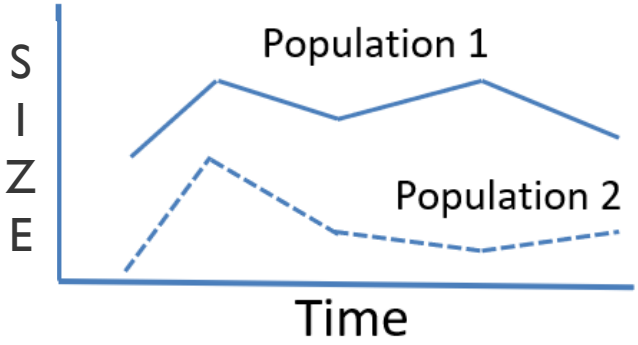
Apache Trout populations are influenced by both short-term, stochastic events such as wildfire and long-term non-native species and land use impacts. Because of the need to determine the status of individual populations after stochastic events as well as assessing long-term changes periodically over time, the goals and objectives outlined in this plan are based on accurately and precisely estimating the status of Apache Trout populations on a 5-year interval.

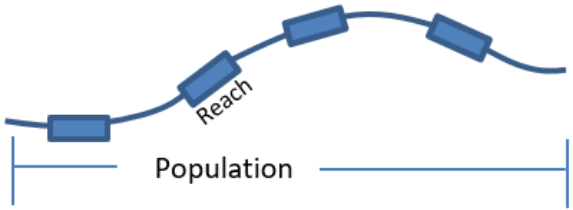
A monitoring plan for small and isolated trout populations

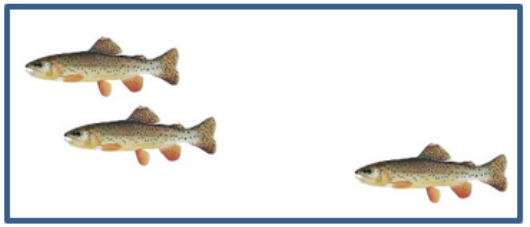
External resource

Measuring population sizes is not so easy

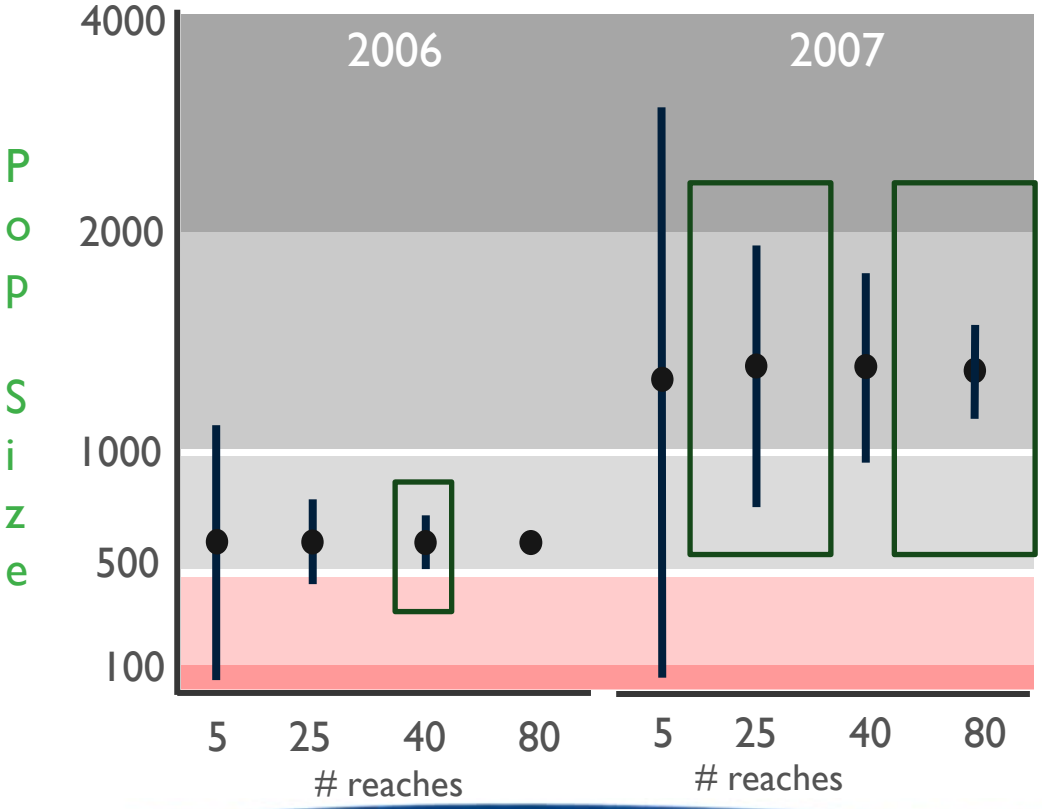
Differences in population size and dynamics, habitat characteristics, and sampling details influence ability to estimate accurately



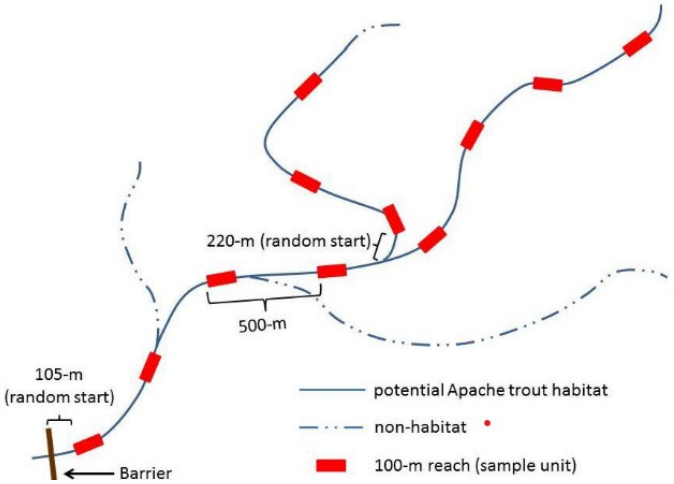




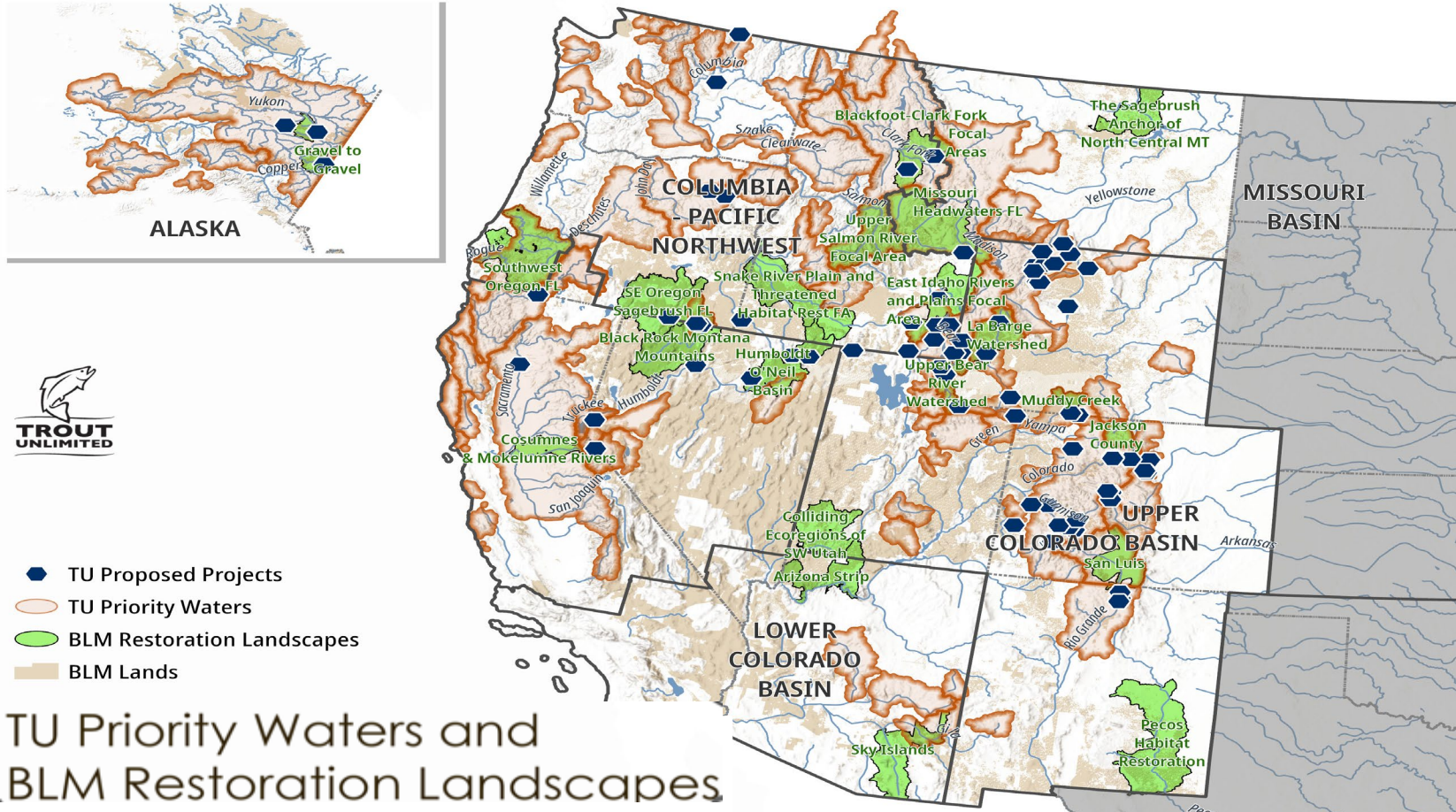
Lots of science behind this!



Need to consider in sampling design: Apache, and LCT

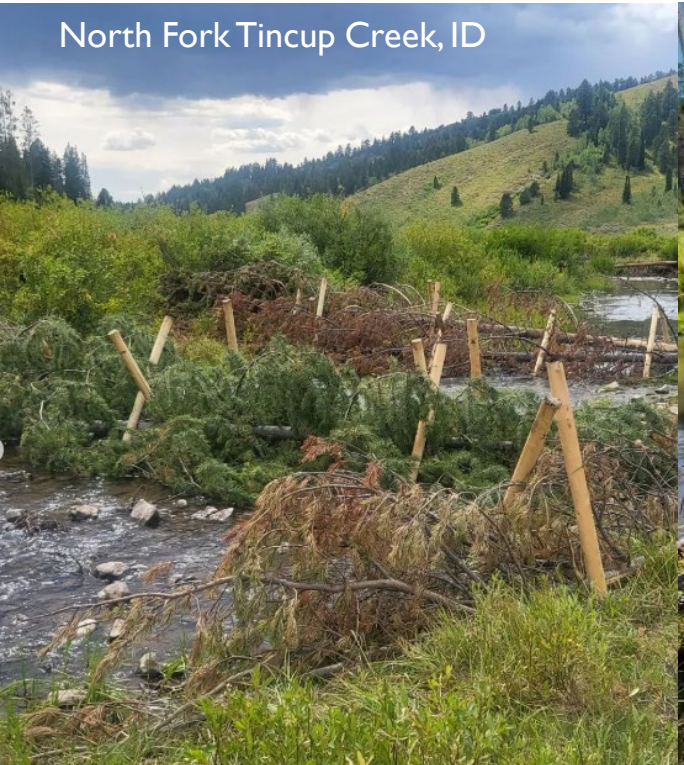


Monitoring and Evaluation – INFRASTRUCTURE $$$



TU Priority Waters and BLM Restoration Landscapes

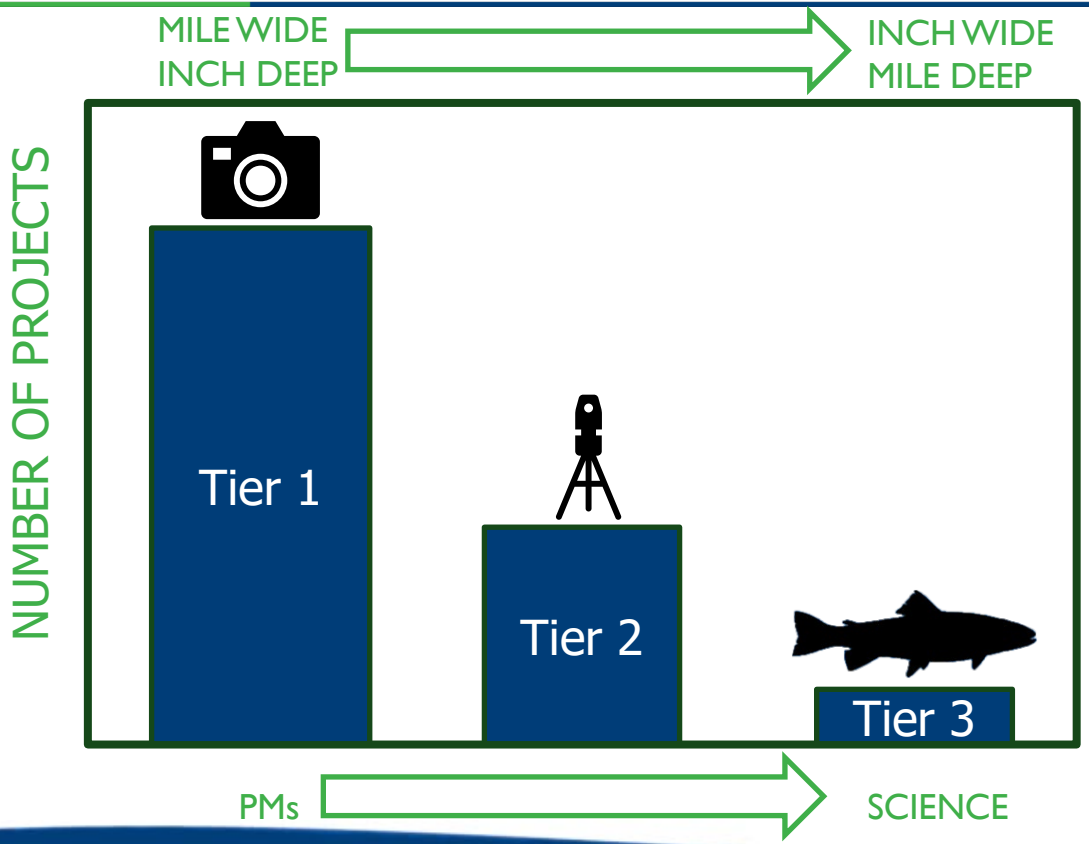
How do we measure and communicate the outcomes of our work?



Process-Based Restoration Monitoring Handbook

TROUT UNLIMITED

PBR monitoring framework



Remote sensing for measuring impacts at scale

FEATURE

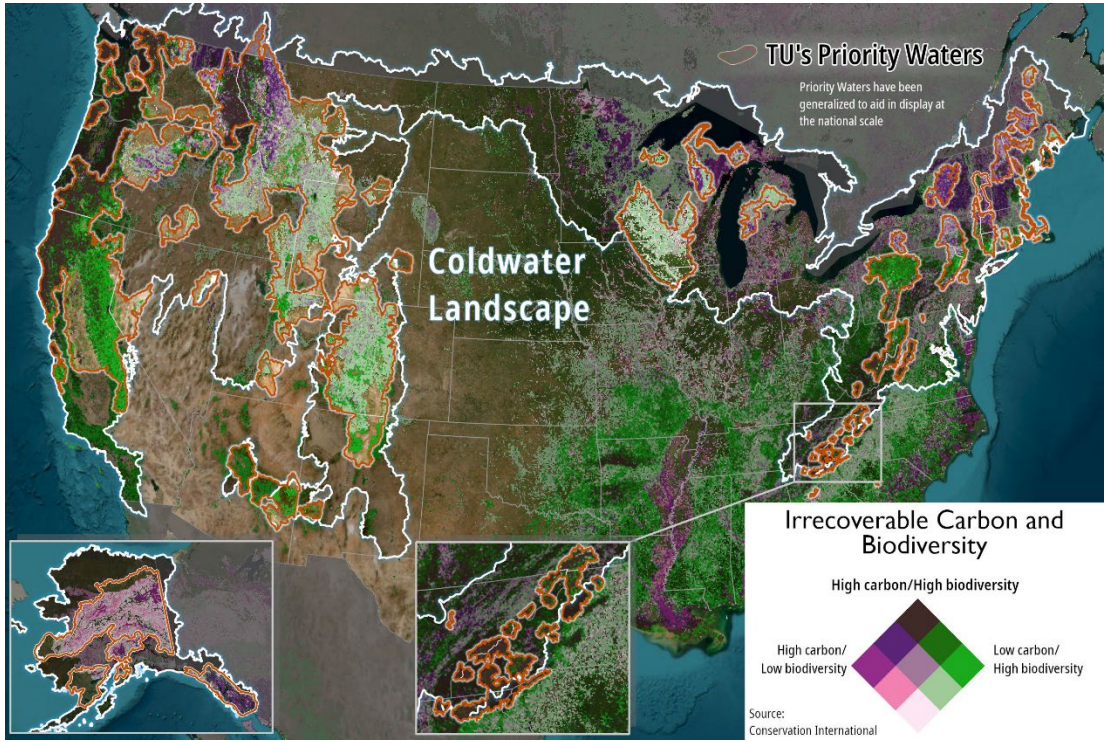
Satellite and Airborne Remote Sensing Applications for Freshwater Fisheries

Daniel C. Dauwalter | Trout Unlimited, 910 Main Street, Suite 342, Boise, ID 83702. E-mail: ddauwalter@tu.org
Kurt A. Fesenmyer and Robin Bjork | Trout Unlimited, Boise, ID
Douglas R. Leasure and Seth J. Wenger | River Basin Center and Odum School of Ecology, University of Georgia, Athens, GA

Photo credit: NASA's Goddard Space Flight Center

Figure 4. Digitization of beaver ponds (yellow) from satellite imagery in Birch Creek, southeastern Idaho.

Deepening Science of Nature-Based Solutions



Emma Lundberg, PhD
Aquatic Resiliency Scientist

Fisheries, PBR/beaver
Human dimensions

Jordan Fields, PhD
Aquatic Resiliency Scientist

Fluvial Geomorphology, Hydrology, Carbon Dynamics

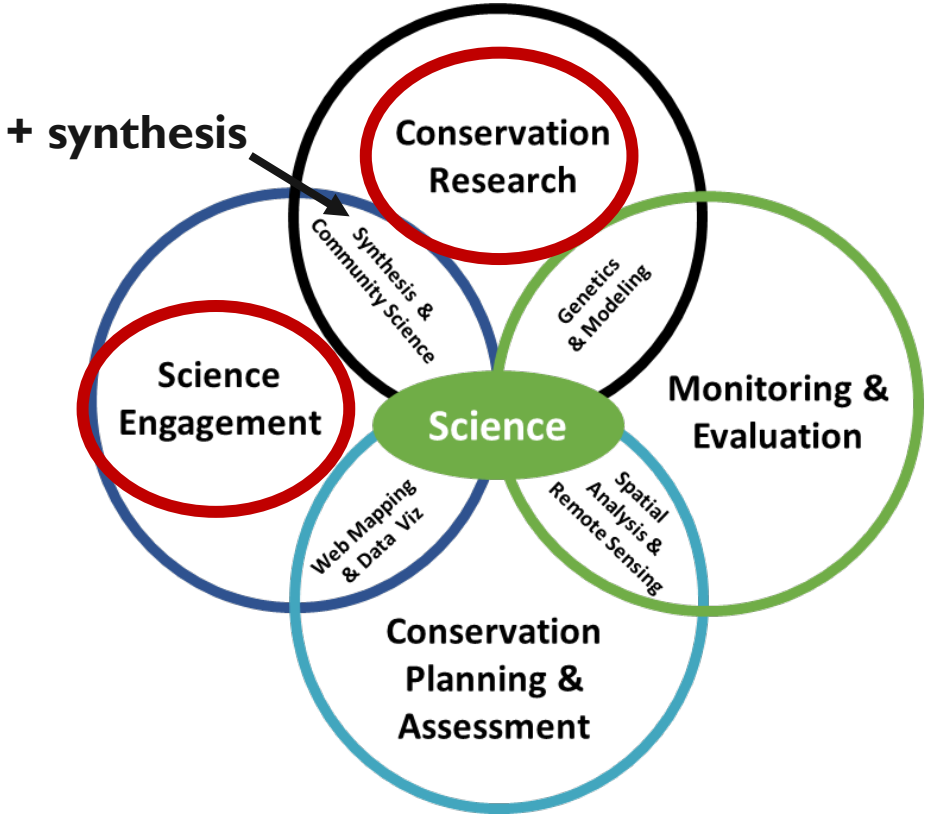
Tools to estimate carbon benefits of your work

PLANT FOR OUR FUTURE TROUT UNLIMITED

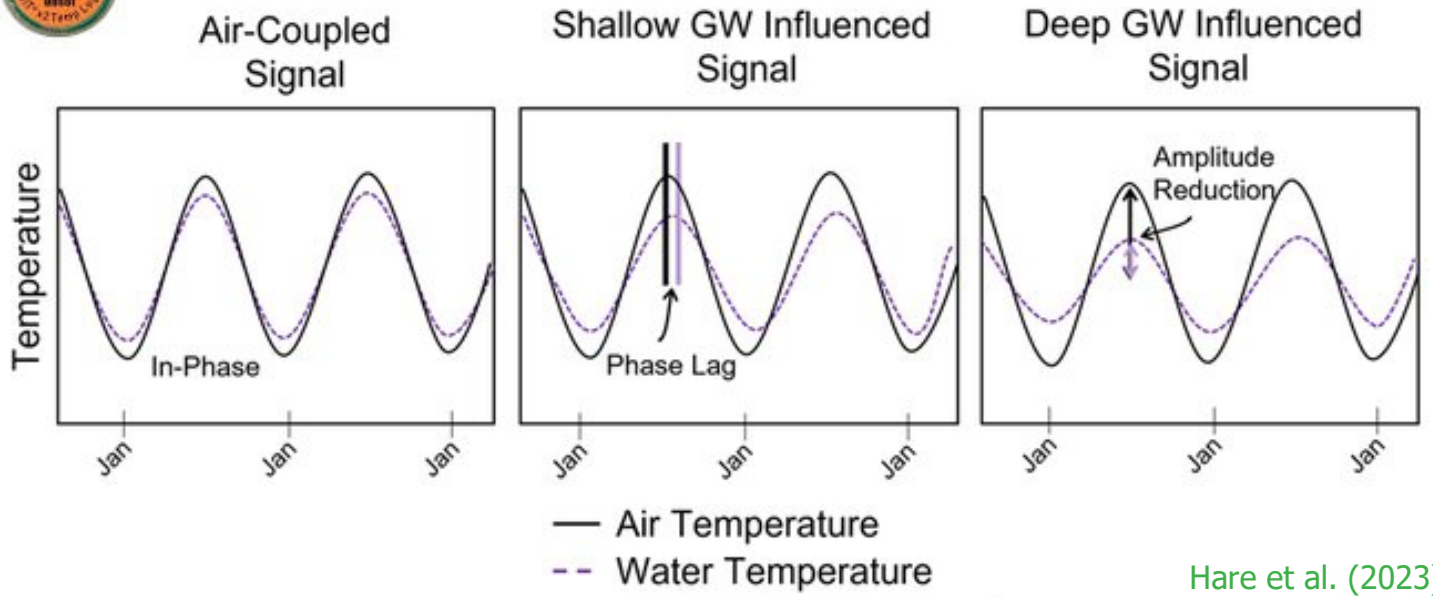
PLANT FOR OUR FUTURE

HOSTING TREE PLANTINGS TO RESTORE STREAMS, BUILD COMMUNITIES AND SEQUESTER CARBON DIOXIDE TO COMBAT CLIMATE CHANGE

Science Engagement & Conservation Research



Patterns of Air vs Water temp can provide insight on GW



Hare et al. (2023)

nature COMMUNICATIONS

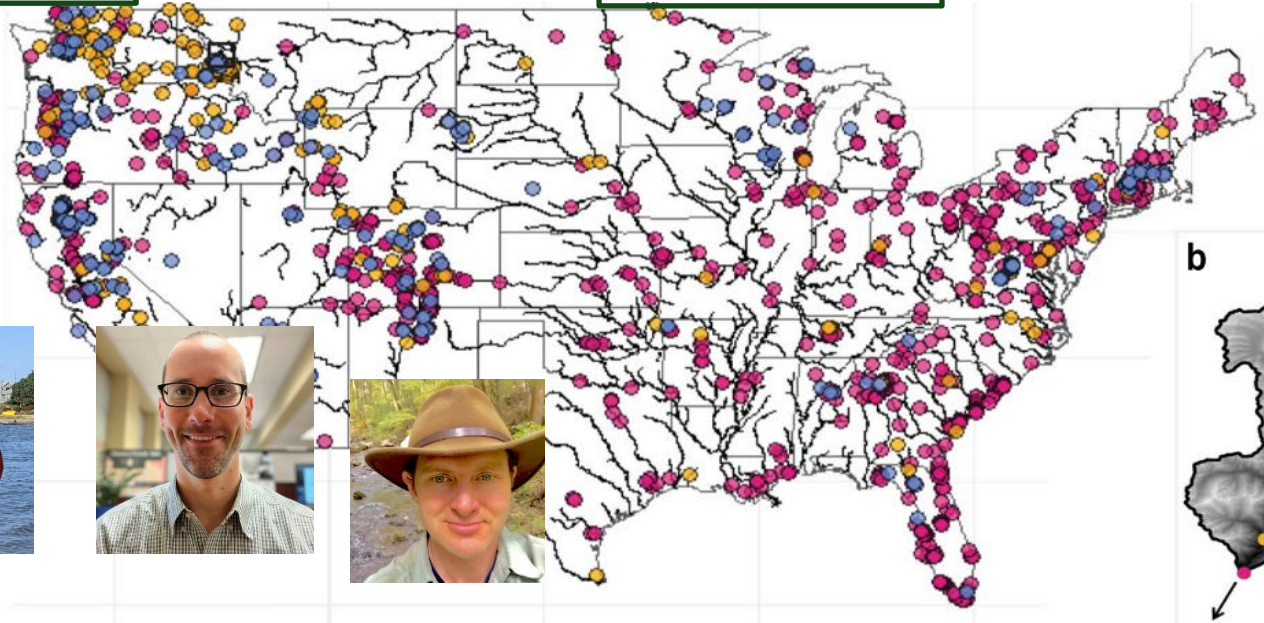
ARTICLE

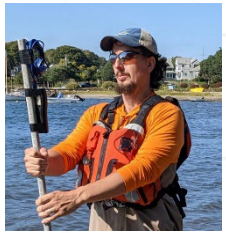
https://doi.org/10.1038/s41467-021-21651-0 OPEN

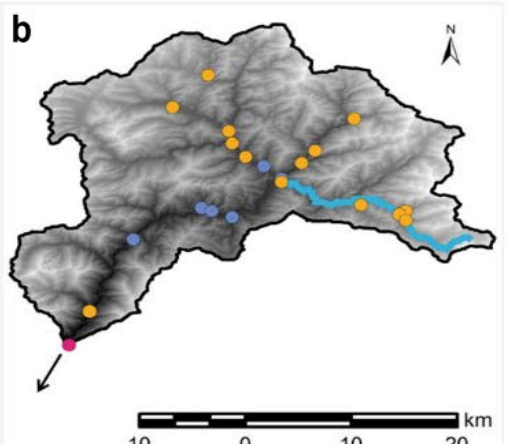
Check for updates

Continental-scale analysis of shallow and deep groundwater contributions to streams

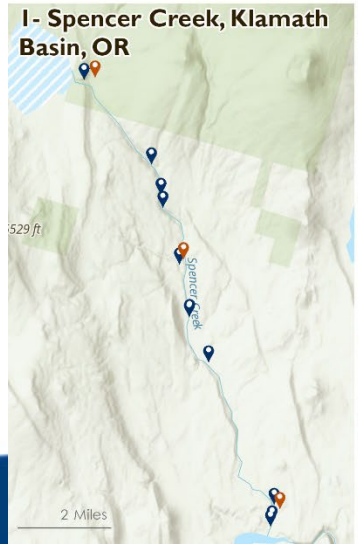
Danielle K. Hare [1,2]✉, Ashley M. Helton[1,3], Zachary C. Johnson [4], John W. Lane[5] & Martin A. Briggs [5]

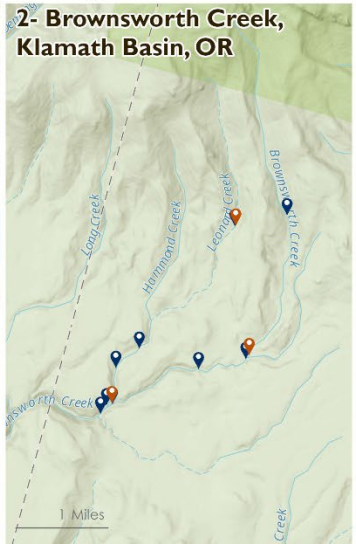






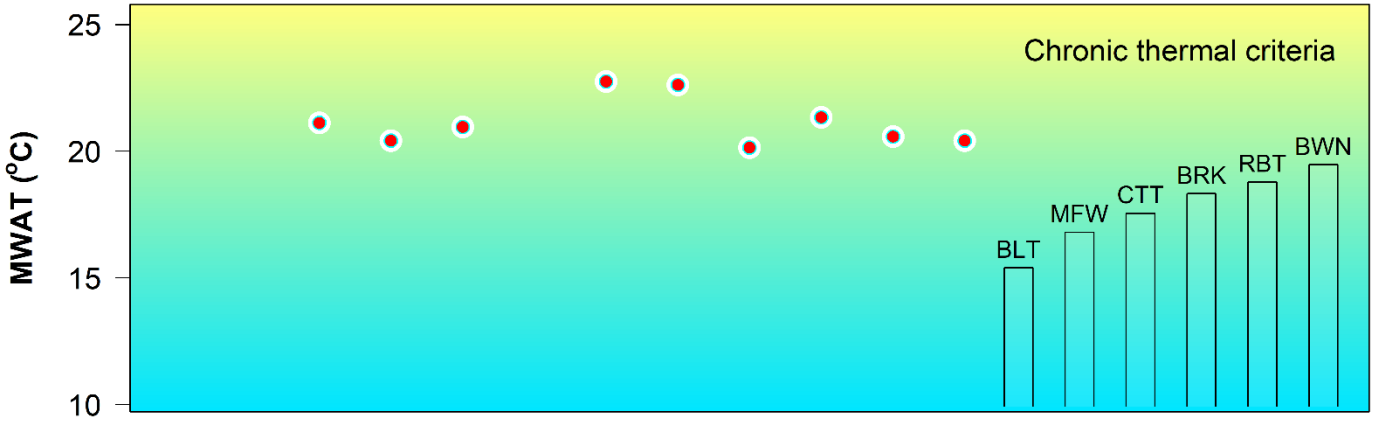
Sensor Type: Air Water

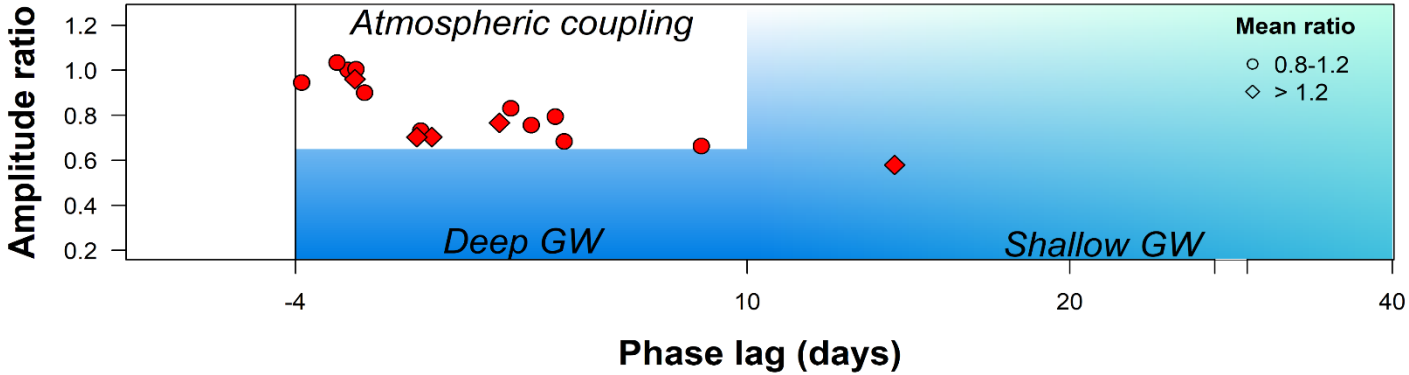




Suitability x sensitivity

Spencer Creek (OR)



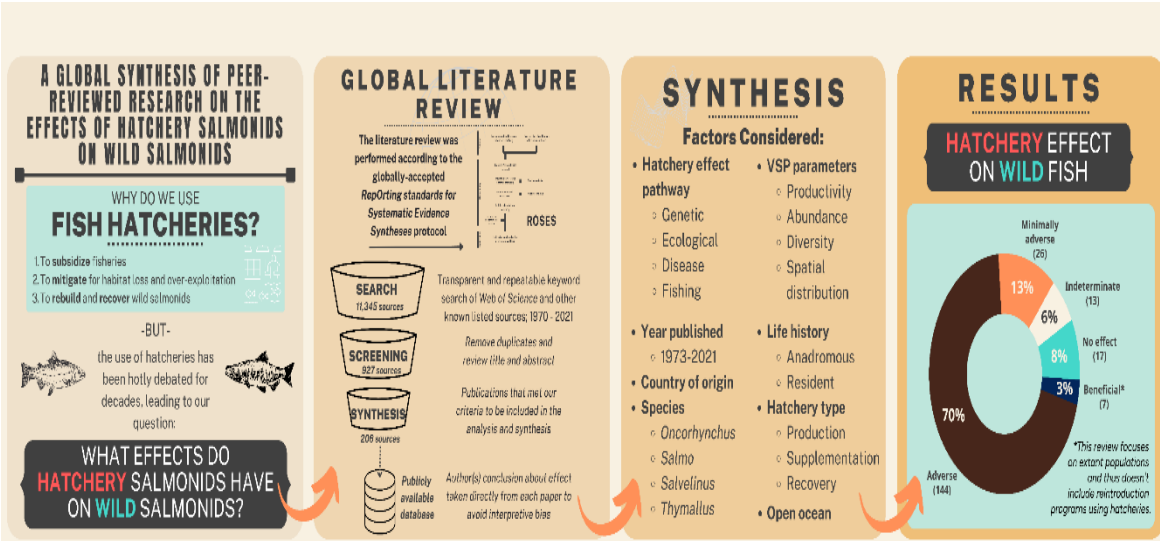


Useful information for understanding restoration effectiveness

Science Synthesis and Conservation Research

A global synthesis of peer-reviewed research on the effects of hatchery salmonids on wild salmonids

John R. McMillan[1] | Brian Morrison[2] | Nick Chambers[3] | Greg Ruggerone[4] | Louis Bernatchez[5] | Jack Stanford[6] | Helen Neville[1]



Hatchery-Wild systems under environmental change

Trout Unlimited

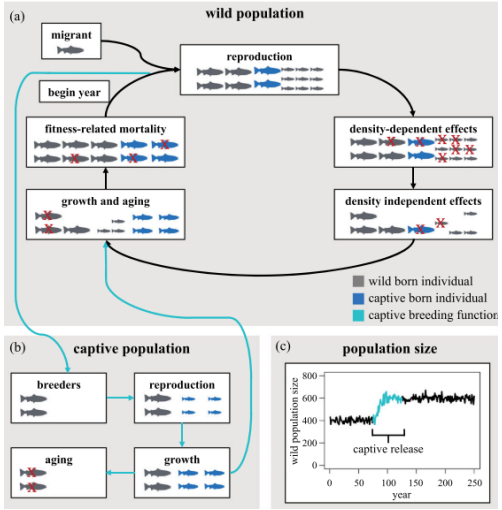
University of Idaho

USGS science for a changing world

Contributed Paper

Long-term demographic and genetic effects of releasing captive-born individuals into the wild

Janna R. Willoughby [1]* and Mark R. Christie [1,2]

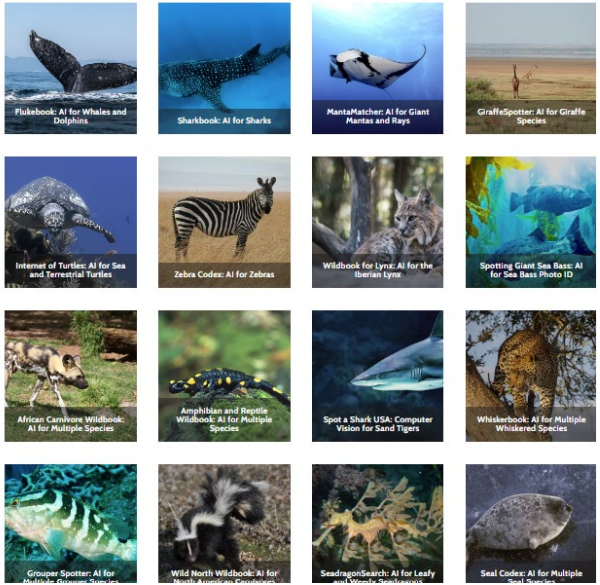


Realistic management scenarios

Community Science: AI models to identify individual fish

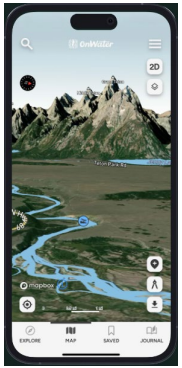
USGS science for a changing world

WILDME

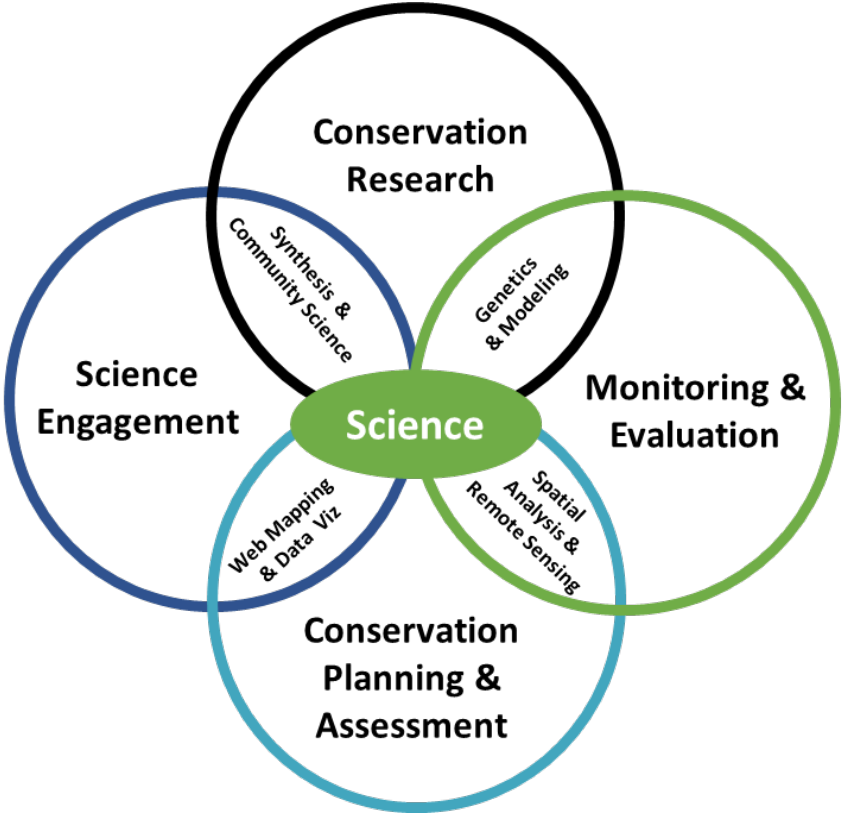


TROUTSPOTTER

coming soon…

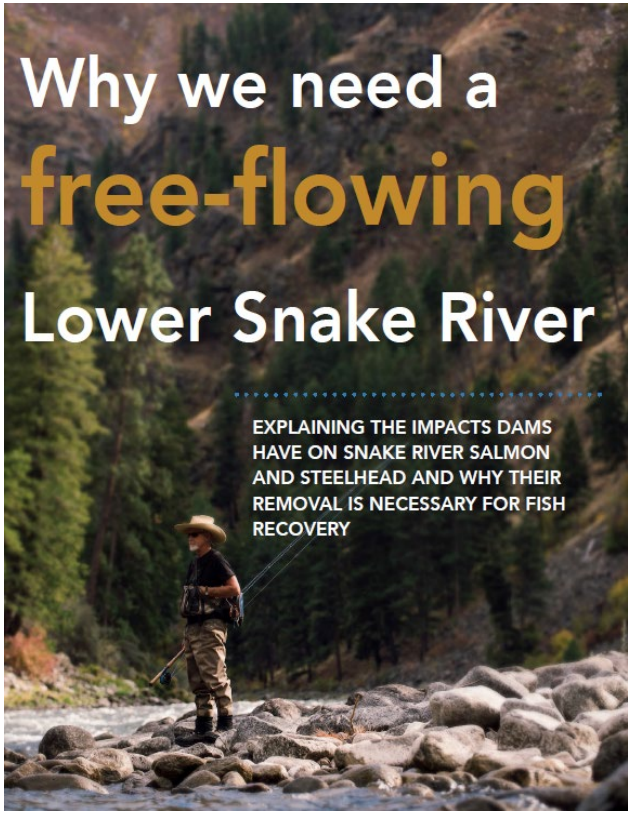


Science to inform policy:



POLICY

Science to inform policy: Snake River Dams



Science to inform policy: Clean Water Act/WOTUS

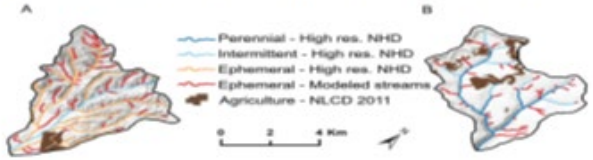
Various court decisions and rulings have put headwater streams at risk – TU priority

NWPR removed ephemeral streams but "couldn't" quantify scope of impact: "unmappable"

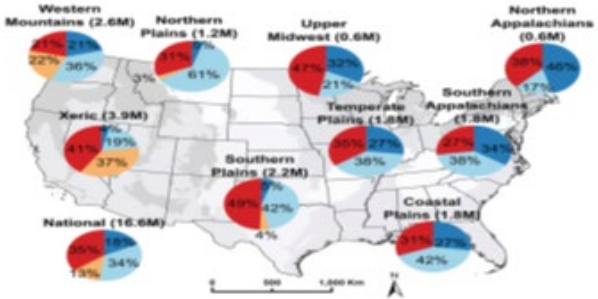
Science to inform policy:

Large portion of USA streams lose protection with new interpretation of Clean Water Act

Kurt A. Fesenmyer[1,5], Seth J. Wenger[2,6], David S. Leigh[3,7], and Helen M. Neville[1,8]



~50%!



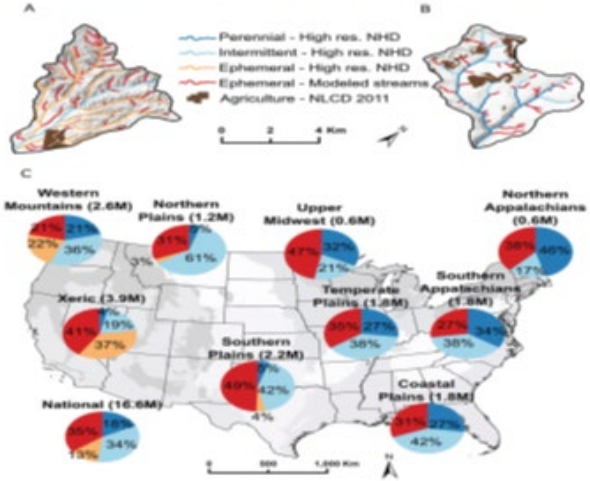
TU used as foundation for joining Amicus briefing and other advocacy efforts

Repeal of NWPR

Science to inform policy:

Large portion of USA streams lose protection with new interpretation of Clean Water Act

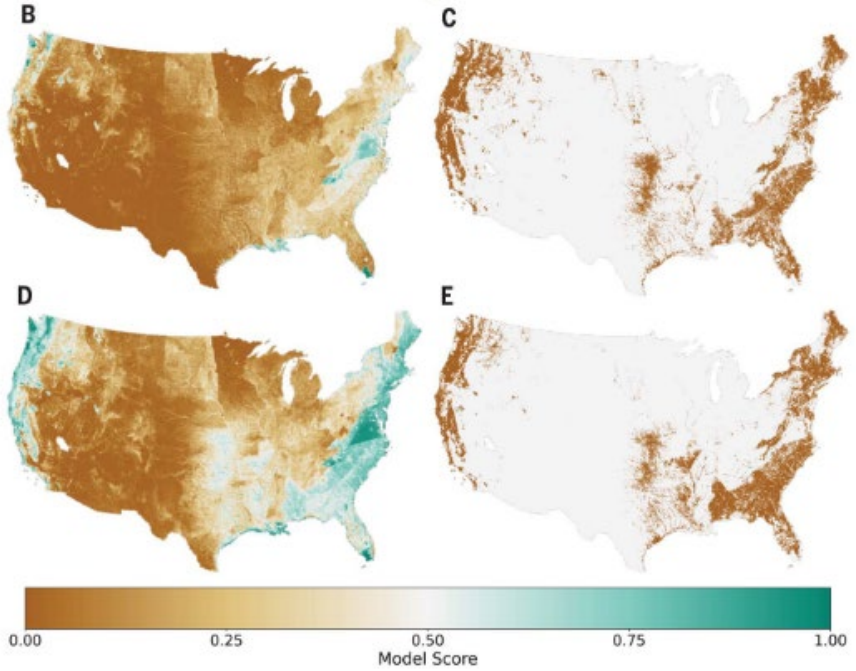
Kurt A. Fesenmyer[1,5], Seth J. Wenger[2,6], David S. Leigh[3,7], and Helen M. Neville[1,8]



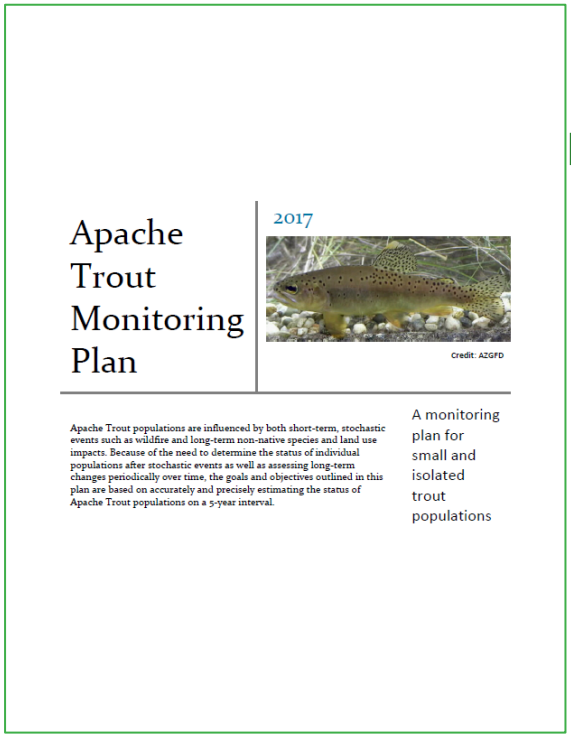
ENVIRONMENTAL POLICY

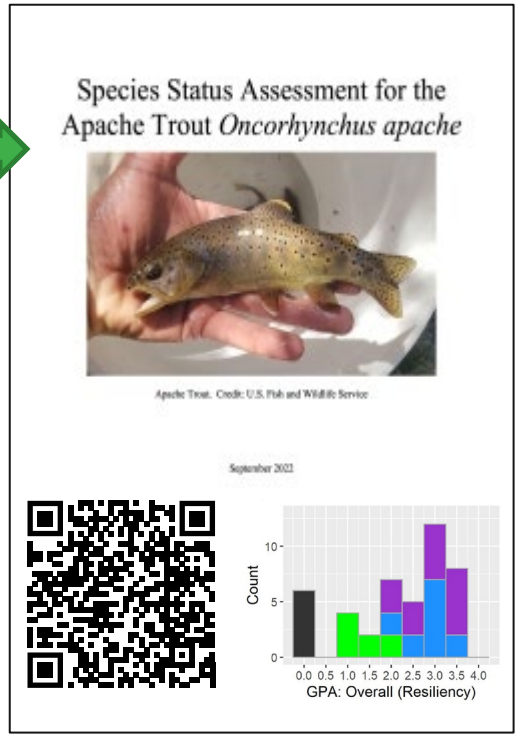
Machine learning predicts which rivers, streams, and wetlands the Clean Water Act regulates

Greenhill et al. 2024



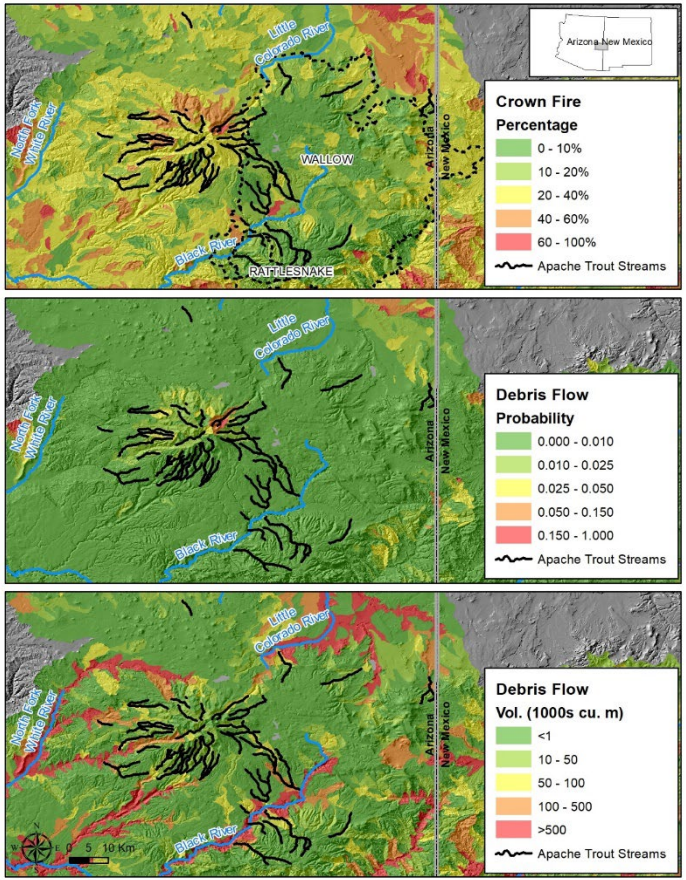
Species Status Assessment: Science to Inform Policy

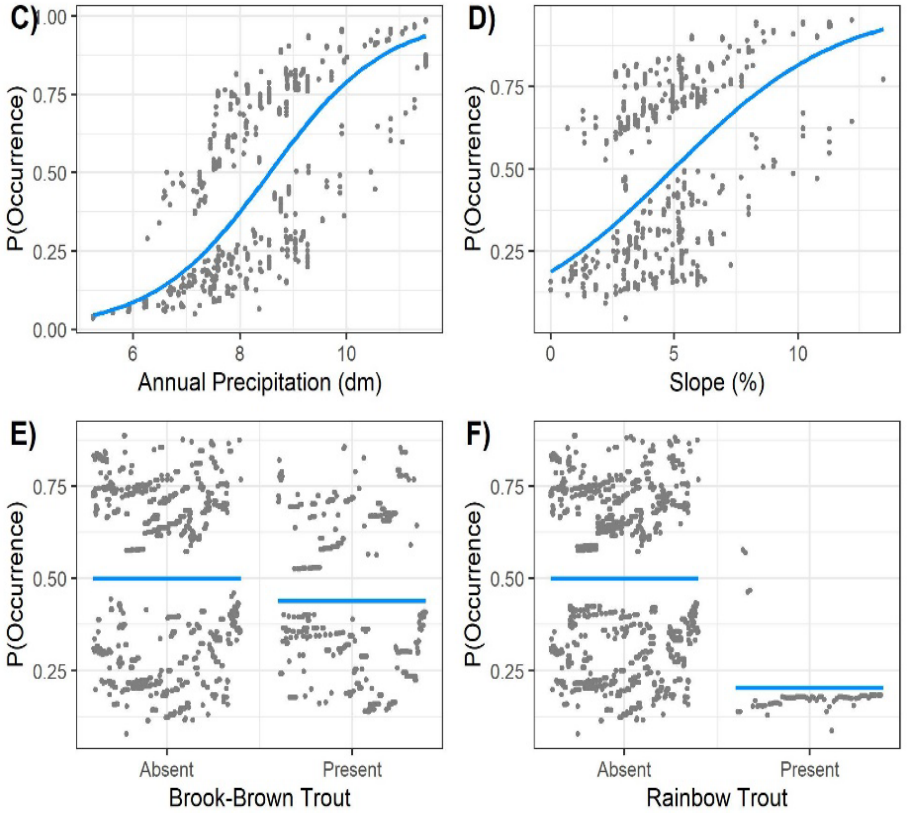




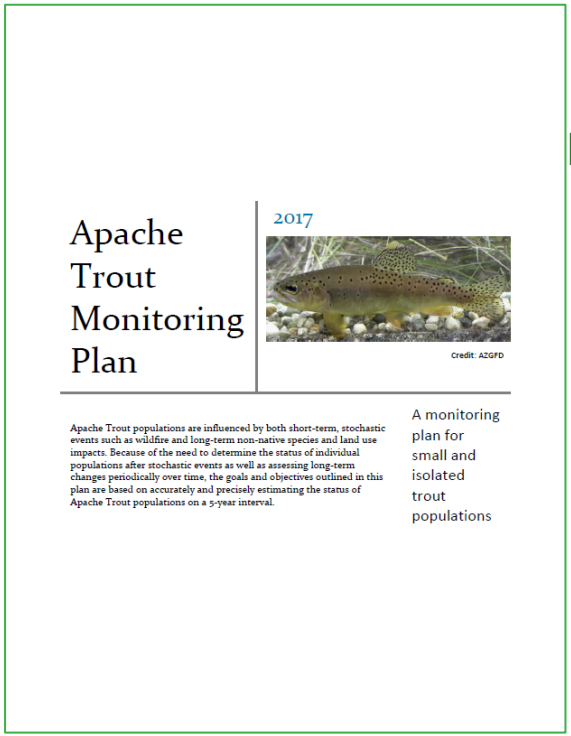
150 pages of comprehensive science synthesis and analyses

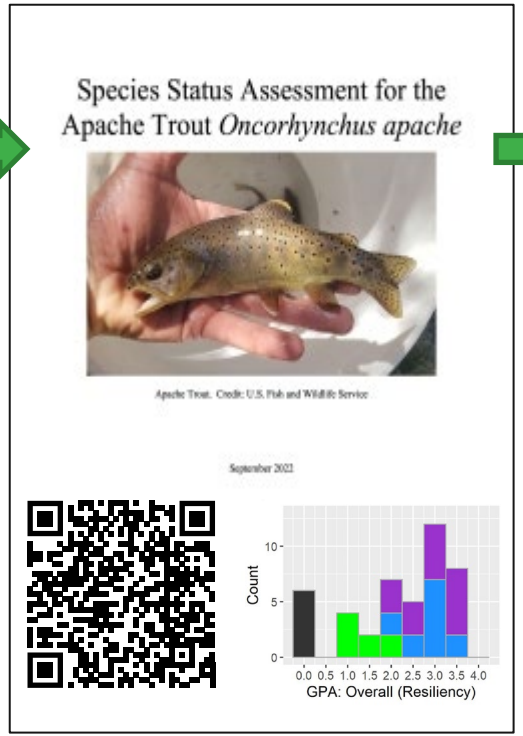
Apache threats

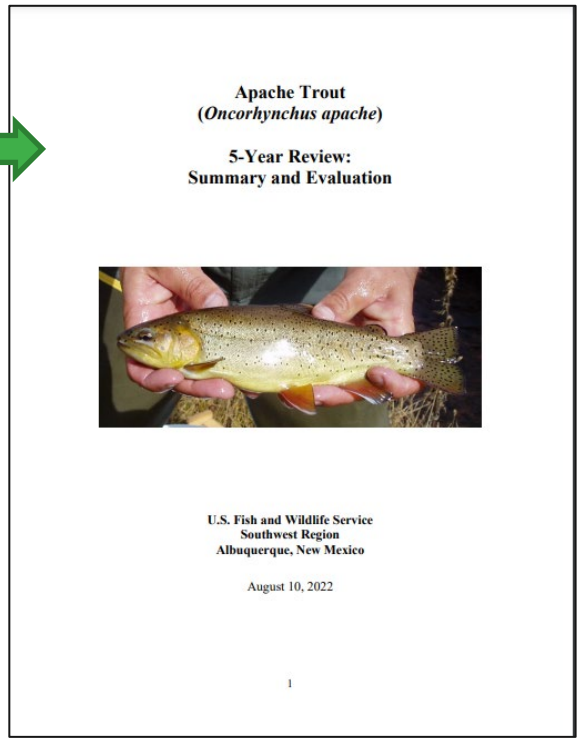




Species Status Assessment: Science to Inform Policy







Proposed Delisting of Apache Trout

PRESS RELEASE

U.S. Fish and Wildlife Service announces recovery of Arizona's ESA-protected state fish, prompting delisting proposal

Climate Resiliency

Received: 17 March 2022 | Revised: 22 February 2023 | Accepted: 24 February 2023

DOI: 10.1002/tafs.10410

ARTICLE

Resiliency of Apache Trout habitats in a warmer and drier climate future

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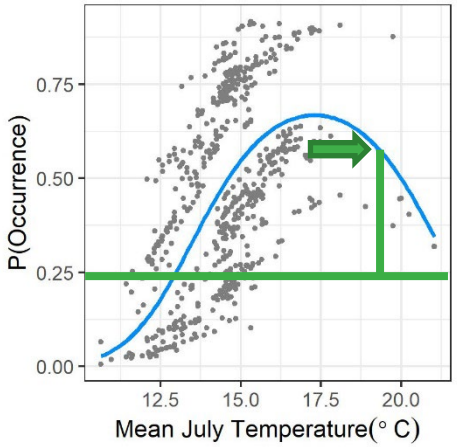
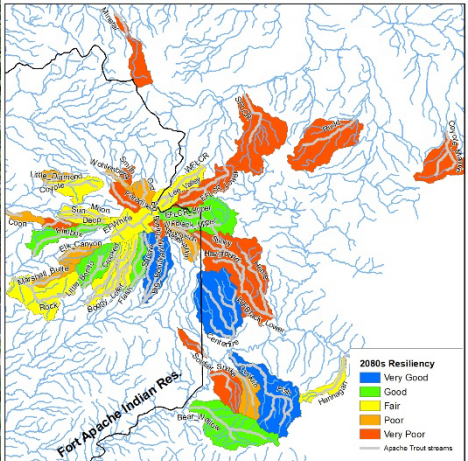
Abstract

Objective: The Southwest has the hottest and driest climate in the United States, and projections show that it will only get hotter and drier into the 2100s. The Apache Trout *Oncorhynchus apache* is native to the Southwest and is currently listed as threatened under the U.S. Endangered Species Act. Our goals were to understand how climate factors influence the distribution of juvenile Apache Trout (<125 mm TL) and how climate change will influence the suitability of Apache Trout habitat into the 2080s.

Methods: We used a species distribution model to evaluate how climatic and other factors influence the distribution of juvenile Apache Trout. We used predictions from the model to evaluate how climate change might impact the suitability of streams designated for recovery of the species into the 2080s.





Publishing builds our credibility in freshwater science:

(= past two years)

TROUT UNLIMITED

Canadian Journal of Fisheries and Aquatic Sciences

OPEN ACCESS | Article

Thermal tolerance in cutthroat trout of the southern Rocky Mountains

Kevin B. Rogers[a], Brendon J. Sucher[a], Brian W. Hodge[a], and Christopher A. Myrick[d]

Western North American Naturalist 82(4), © 2022, pp. 660–676

Physical habitat complexity partially offsets the negative effect of Brook Trout on Yellowstone Cutthroat Trout in the peripheral Goose Creek subbasin

Interns!

Daniel C. Dauwalter[1]*, Michael A. Baker[2], Sarah M. Baker[3], Richard Lee[1], and John D. Walrath[4]

Global Change Biology

REVIEW | Open Access

Closing the gap between science and management of cold-water refuges in rivers and streams

Francine H. Mejia, Valerie Ouellet, Martin A. Briggs, Stephanie M. Carlson, Roser Casas-Mulet, Mollie Chapman, Mathias J. Collins, Stephen J. Dugdale, Joseph L. Ebersole, Danielle M. Frechette, Aimee H. Fullerton, Carole-Anne Gillis, Zachary C. Johnson, Christa Kelleher, Barret L. Kurylyk, Rebecca Lave, Benjamin H. Letcher, Knut M. Myrvold, Tracie-Lynn Nadeau, Helen Neville, Herve Piégay, Kathryn A. Smith, Diego Tonolla, Christian E. Torgersen ... See fewer authors

Canadian Journal of Fisheries and Aquatic Sciences

OPEN ACCESS | Article

Poor downstream passage at a dam creates an ecological trap for migratory fish

Haley A. Ohms[a,b], Dereka N. Chargualaf[a,b], Gabriel Brooks[c], Cory Hamilton[a], Eric P. Palkovacs[a,e], and David A. Boughton[b]

water

Article

Spatial Conservation Assessment for Native Fishes in the Lahontan and Central Nevada Basins, USA

Daniel C. Dauwalter [1]*, Eric Miskow [2] and Chris Crookshanks [3]

ORIGINAL ARTICLE

FISH and FISHERIES — WILEY

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Michael J. Malick[1] | James P. Losee[2] | Gary Marston[3] | Mickey Agha[3] | Barry A. Berejikian[1] | Brian R. Beckman[4] | Matthew Cooper[5]

ORIGINAL ARTICLE

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Population genomic monitoring provides insight into conservation status but no correlation with demographic estimates of extinction risk in a threatened trout

William Hemstrom[1] | Daniel Dauwalter[2] | Mary M. Peacock[3] | Douglas Leasure[4] | Seth Wenger[5] | Michael R. Miller[1] | Helen Neville[2]

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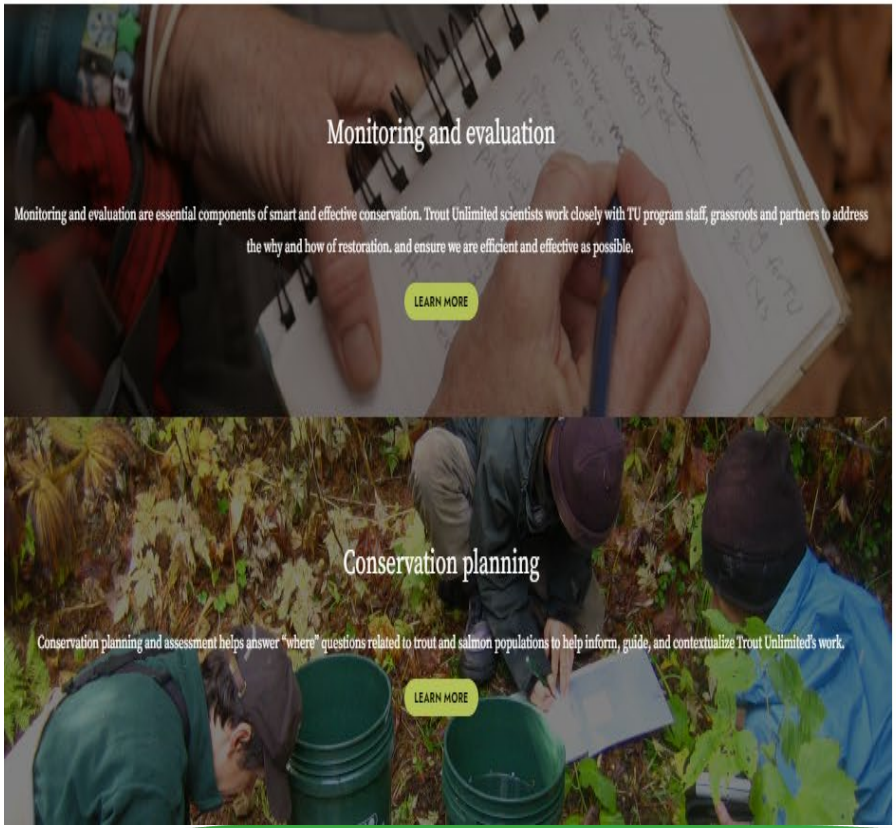

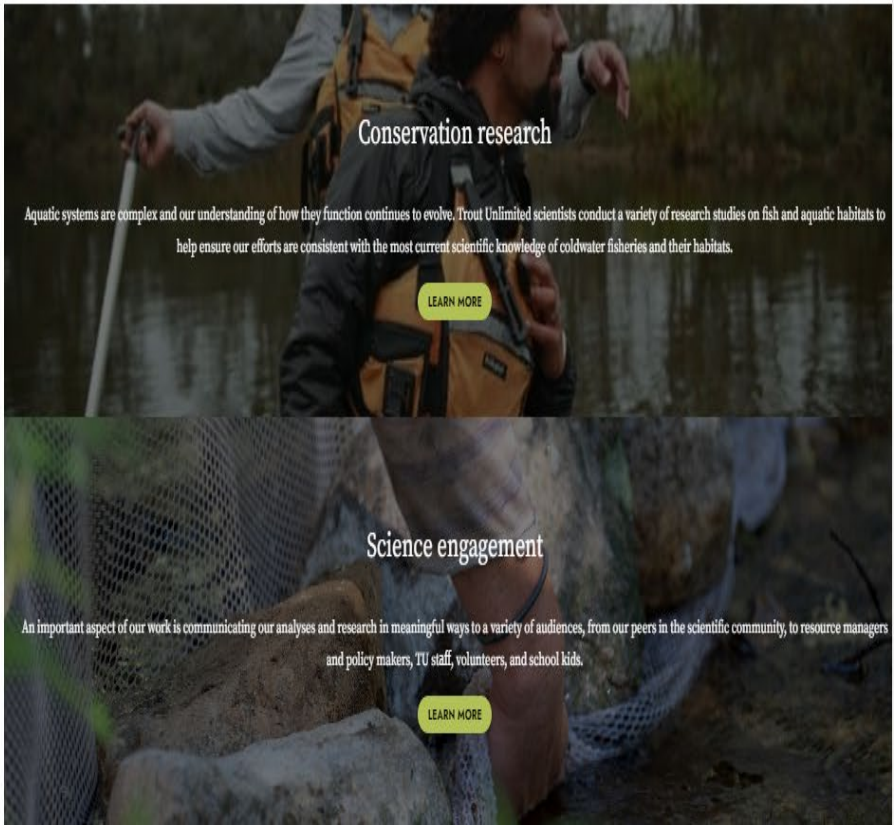

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We believe TU's conservation impact is maximized when we are all inspired by the natural aquatic world and when our conservation objectives, practices, and policies are enabled and guided by the best available science. TU Science provides the framework for this practice.

Thank you!