

the
RESEARCHER

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New Tools
for Predicting Land Use
in the Treasure Valley



TREASURE
VALLEY
WATER
ATLAS

Photo credit: Boise State University

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University of Idaho



BOISE STATE UNIVERSITY

Idaho State UNIVERSITY



Message from the Director



Janet Nelson
Interim Project Director

We often hear the term “sustainability” in the context of ways to maintain a healthy environment for future generations. This is certainly one important aspect of Idaho’s NSF EPSCoR Research Infrastructure Improvement (RII) Track-1 award, *Managing Idaho’s Landscapes for Ecosystem Services (MILES)*. However, sustainability has an even more specific meaning for EPSCoR as a program, and it is crucial to the EPSCoR mission.

“The mission of EPSCoR is to advance excellence in science and engineering research and education to achieve **sustainable increases** in research, education, and training capacity and competitiveness...” – NSF 18-558

NSF EPSCoR RII Track-1 programs are catalytic, statewide investments in research and education. Idaho is just completing its fifth year of the *MILES* award. From the launch and throughout the entire five years of the award, our strategy has been to provide a solid base for the continued long-term growth of nationally recognized centers of research excellence in Idaho, i.e., sustainability.

There are many pieces to sustainability. These include, for example, the 11 new faculty researchers recruited to Idaho; the diverse research teams; the integration across social and physical sciences; the shared vision and collaboration across all Idaho universities; and the strong engagement with so many Idaho communities. Perhaps the most visible aspect, which embodies all of these other examples, is the research center – an organizational focal point for high-impact academic research.

The *MILES* award has specifically helped transform, strengthen, or establish four unique and complementary research centers: 1) The Human-Environment Systems initiative (HES) at Boise State University, 2) the Center for Resilient Communities (CRC) at the University of Idaho, 3) the Lake Social Ecological Systems lab (LaSES) at the University of Idaho in Coeur d’Alene, and 4) the Center for Ecological Research and Education (CERE) at Idaho State University.

Each of these centers will advance the legacy of the *MILES* program beyond the NSF EPSCoR award with science-based decision support (i.e., new fundamental discoveries and new techniques) to help address complex issues faced by growing communities and urban areas across our State and Nation.

This issue of *The Researcher* highlights one of these centers – CERE at Idaho State University. It is just one example of how our highly visible research centers advance and sustain the national and international recognition catalyzed by the NSF EPSCoR investments in Idaho.



Idaho Research

Decision Support Tools Help Predict Land Use in the Treasure Valley

By Max Bartlett

A team of Idaho researchers, led by Boise State University professors Shawn Benner and Jen Schneider, and postdoctoral researcher Jillian Moroney, developed a new website to forecast urban expansion in Idaho's Treasure Valley – one of Idaho's most important urban and economic regions – through the year 2100.

The Treasure Valley Water Atlas (TVWA) is a website featuring a collection of narratives with insight from local water users and experts, biophysical data, maps, and graphics to address important questions concerning water in the Treasure Valley. The website is a resource for decision makers, educators, and water users who care and wish to know more about the water in the Boise River Basin.

Treasure Valley is home to Boise, Idaho's capitol and largest city. It is home to companies vital to the state's economy, including Albertson's, Micron, and J.R. Simplot. Historically, it has seen periods of rapid urban expansion. From 1990-2000, the Boise metropolitan area saw 45 percent growth. It is currently the fastest growing metropolitan area in the United States.

These TVWA predictions will help inform decision makers in Idaho for urban planning and land use to best meet the needs of the state's citizens and environment. This study will help Idaho make decisions regarding water use from the Boise River. It will also help characterize population density, agricultural needs, and development in Idaho's forests and wetlands.

As the researchers have noted, "Humans are notoriously bad at visualizing future scenarios and engaging in long-term planning." With this study, the team hopes to give Idaho new decision-support tools for sustainable development of mid-sized cities.

The TVWA website (<https://cid.boisestate.edu/tvwa/>) was officially launched at the Andrus Conference, "Idaho Water: Supply and Demand in a Time of Growth," hosted on April 17 by the Andrus Center for Public Policy and co-sponsored by the Idaho EPSCoR MILES award.

Idaho Science Journal on Idaho Public Television aired a feature on "Treasure Valley Water Atlas" which can be viewed at: <https://video.idahoptv.org/video/treasure-valley-water-atlas-p6ng3a/>



Understanding Tribal Sovereignty

By Max Bartlett

This winter, the University of Idaho, Boise State University, and Idaho State University hosted workshops for the academic community on the topic of Native American tribal sovereignty. Led by Coeur d'Alene Tribe lake managers Laura Laumatia and Caj Matheson, along with Associate Director of the Idaho Water Resources Research Institute Mark Solomon, the workshops presented information on conducting ethical research with and related to Native American tribes.

The day-long workshops covered federal policies affecting tribal water and land management, the value of indigenous knowledge to scientific research, and partnerships between academic institutions and the tribes.

It wasn't the first time Idaho EPSCoR has worked to further knowledge of tribal sovereignty in the state. Since 2015, Laumatia and Solomon have taught tribal sovereignty classes at the University of Idaho.

"There's really nowhere to learn about tribal sovereignty, so unfortunately it's vastly misunderstood. It is something that affects tribal members daily, so this is really a unique opportunity for students to learn more about the policies that affect tribes in Idaho," Laumatia says.

The classes examine the history and modern realities of tribal law in America. They are open to university students and Coeur d'Alene tribal members.

The Tribal Sovereignty workshops were recorded, and the content is currently being used to develop online learning modules that can be easily accessed by the academic research community.

Idaho State University Center for Ecological Research and Education (CERE) Extends the Legacy of Idaho's NSF EPSCoR MILES Award

By Max Bartlett

Idaho State University is currently leveraging the NSF EPSCoR Track-1 RII MILES award to transform the Center for Ecological Research and Education (CERE). CERE was established in 1989 to facilitate individual research in ecology through shared instrumentation and to provide a framework for collaborative, interdisciplinary teaching and research focused on ecological principles and problems.

The expansion of CERE's mission embraces social as well as ecological sciences and community stakeholder partnerships. It sets the foundation for new discoveries, funded research and education grants, and continued community involvement in the research agenda to inform the management and use of Idaho's landscapes.



Workshop participants use the iNaturalist crowdsourcing tool on field trip in southeastern Idaho

As an example, CERE recently hosted a series of workshops that exemplify the ongoing efforts to foster and sustain diverse and lasting partnerships. Topics included: 1) crowdsourced and citizen science data, 2) water conservation for the Portneuf watershed, and 3) planning, design, and deployment of educational and interpretative signs to aid in the Portneuf River Vision program in Pocatello.

The **Crowdsourced and Citizen Science Data Workshop** focused on online citizen science portals designed to collect and share biodiversity and environmental data. Participants included 23 people from a variety of organizations. The workshop featured presentations from Tony Iwane (California Academy of Sciences) who discussed “Successful Crowdsourcing through iNaturalist,” and Duncan Bailey (MDI Biological Laboratory in Maine), who presented on “Powering your citizen science project with Aneccdata.org.” Presenters also included Rebecca Hale (ISU faculty) and Rick Williams (Idaho Museum of Natural History).

The Sagebrush Steppe Land Trust (SSLT) co-hosted a **Community Water Conservation Planning workshop** designed to bring those in the water resources community together to discuss first steps in creating a collaborative water conservation plan for the Portneuf watershed. Forty-two people attended the workshop. Scientists associated with the MILES project participated, along with representatives from over 15 different stakeholder groups.

Finally, CERE partnered with the City of Pocatello and Idaho’s Department of Environmental Quality in design and implementation of **interpretative signage along the Portneuf River** to assist in education and awareness associated with the communities “Portneuf River Vision,” an effort in which Idaho’s university scientists have been major partners and participants over the past several years. The signs have been designed and will soon be deployed along the Portneuf River in Pocatello.

WHY MONITOR WATER QUALITY?

We need clean, healthy water for people, agriculture, recreation, and the environment. What we do on land can influence the water quality in our lakes and streams. The Portneuf Watershed Partnership monitors this site in conjunction with volunteers and water scientists. Monitoring water helps protect Idaho’s aquatic resources.

WATER TEMPERATURE...
starts out cold due to snow melt high in the mountains. Rivers naturally warm as they move down stream. Trees along the river provide shade to help keep the water cool.

DISSOLVED OXYGEN...
is the concentration of oxygen molecules dissolved in the water (not the air bubbles). Fish and aquatic insects use their gills to absorb this form of oxygen underwater.

TOTAL SUSPENDED SEDIMENTS...
are soil particles in the water that drains from the land. These vary by soils, land use, and amount of runoff from the watershed. High levels of sediment make the water look like chocolate milk.

Water Quality Monitoring Device
This instrument measures temperature, dissolved oxygen and suspended sediment.

Water Use: We use most of the water in the Portneuf River for agriculture and recreation. Water that is too muddy makes the river less desirable for swimming and harms aquatic insects that fish eat.

ISU Water Quality Extension and Maggie Clark - City of Pocatello

PORTNEUF WATERSHED PARTNERSHIP | CERE | IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY | Pocatello | Street Wise River Wise | IDAHO EPSCoR

For more information and graphs of these data, scan the QR code.

Example of an interpretative sign designed to be posted along the Portneuf River in Pocatello, Idaho.

National Recognition

Laird Noh, Idaho EPSCoR State Committee Chairman, Receives Prestigious Danek Award



Laird Noh, Danek Award Recipient

By Max Bartlett

The national Idaho EPSCoR/IDeA Coalition and Foundation boards have named retired Idaho state senator Laird Noh the Danek Award recipient for 2018. Noh, an Idaho businessman, received the award for nearly three decades of service on the Idaho EPSCoR Committee, including his current role as Chairman.

The Danek Award recognizes extraordinary individuals who develop the best ideas to resolve research disparity and who have established a long-term commitment to the ideals and goals of EPSCoR.

Senator Laird Noh received his B.S. in Business and Agriculture from the University of Idaho, and an MBA from the University of Chicago. He also received an honorary Doctorate of Natural Resources from the University of Idaho.

Senator Laird Noh is a Magic Valley sheep rancher. He taught economics for two years at Boise Junior College (now Boise State University). He served in the Idaho Senate from 1980-2004 and was continuously a member of the Education Committee and the Resources and Environment Committee, which he chaired from 1982-2004. Noh was involved in the establishment of the Idaho EPSCoR Program and has served on the Committee since 1989. He is currently chairman of the Rocky Mountain Sheep Marketing Association; a member of the Liaison Committee, Northwest Irrigation, Soils Research Laboratory, USDA, Agricultural Research Service, Kimberly, Idaho; a member of the Dean's Advisory Committee, College of Agriculture and Life Sciences, University of Idaho; and a member of the Executive Committee of the Idaho Nature Conservancy. In 2005, he was the recipient of their national Lifetime Achievement Award.

In 2015, the boards of the EPSCoR/IDeA Coalition and the EPSCoR/IDeA Foundation created the Danek Award, named after Dr. Joe Danek, a long-time supporter and "revolutionary" individual recognized for his work in addressing research disparity across the United States.

Often referred to as the "Father of EPSCoR," Dr. Joe Danek is known for his commitment to building a program that improves the research infrastructure in states that receive low amounts of federal research funding.

"What an honor to receive the award named for our remarkable, inspirational mentor, leader and friend. No other individual has so altered for the better the scientific capacity of the smaller states through the EPSCoR program," said Noh.

"While my name may be on the award, it is in reality shared by the superb staff and leadership of the Idaho program, leadership at our universities, and an excellent broad-based Idaho EPSCoR Committee."

Idaho Students Exemplify Excellence in Research and Education

By Max Bartlett

Idaho EPSCoR offers many opportunities for undergraduate and graduate students to hone their research skills. It also provides unique opportunities for students such as Paula Aubrey and Graham Meese to communicate the benefits of their research to the public. In February 2018, both Paula, an undergraduate at the University of Idaho, and Graham, a graduate student at Idaho State University, joined other Idaho researchers and academic leaders from around the Nation in Washington D.C. to highlight how EPSCoR programs positively impact people and communities.

Paula grew up on the Yurok Reservation and is registered with the Tolowa Dee'ni Nation. Paula came to the University of Idaho because of the educational opportunities it offered. Paula has been involved in the MILES Undergraduate Research and Internship (MURI) program during the 2017/18 academic year under the direction of Dr. Mark Kimsey. Her research involves forest metrics and analysis for management and ecological impacts on forest productivity.

"I find great pleasure in learning more about the environment," Paula stated. "My goal for this information is to be able to use the gathered data to look at how Douglas fir encroachment can be managed on the Yurok Reservation in California."

Graham's story of the new opportunities that Idaho provided him as a graduate student is similar.

The focus of his graduate education and research at Idaho State University has been to learn about how people have altered aquatic systems, and how we can restore



EPSCoR Story winner, Graham Meese, and MURI student, Paula Aubrey

the physical and ecological function and benefits of rivers and their floodplains.

His research, directed by Dr. Ben Crosby, has focused on a historical analysis of restoration and water quality data from Marsh Creek, a tributary to

the Portneuf River in Pocatello, Idaho. This research has been critical in advising agency personnel on future conservation actions in Marsh Creek. Through a collaboration of Idaho EPSCoR and Idaho Public Television, the Marsh Creek research is featured in the *Outdoor Idaho: Restoring Rivers*, which aired on May 24, 2018.

According to Graham, “getting to be part of the EPSCoR meeting in Washington D.C. was an honor, and I had so many wonderful and unique experiences throughout the trip. I was there to learn, to explore, and to share the research I have done as an EPSCoR student in Idaho. I have shared my research in the local community and at multiple academic conferences, collaborated with other researchers in political science and biology, and worked on a project that has directly impacted the future efforts to improve water quality in our local rivers.”

Graham also stated, “When I was in D.C. I was able to share these success stories face to face with our congressmen, connecting the decisions they make at the national level directly to the impacts they are having in the communities which they represent.”

Paula also added, “Going to Washington D.C. was never something I thought I would have the opportunity to do. I enjoyed speaking with our Idaho Representatives about how important research is to small states like Idaho. I feel honored to have been selected to participate in this life changing experience, and thank you to everyone who makes this program a reality!”

BSU Faculty Gain High Visibility with Multidisciplinary Publication

Two MILES researchers, **Dr. Vicken Hillis** and **Dr. Katie Demps**, co-authored a publication featured in *Behavioral and Brain Sciences* (2016) titled, “Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence.” The publication has already been cited almost 100 times and even though it is still relatively new, it is the most highly cited publication by Boise State faculty from 2016.

MILES, with its focus on interdisciplinary research, was able to bring together these two researchers from different fields. Dr. Hillis is part of the Human Environment Systems program at Boise State University, where he uses social network analysis and complex systems theory to understand environmental decision making. Dr. Demps is an anthropologist focused on the evolution and biology of human behavior.

Along with a team of other researchers, the two synthesized their knowledge to tackle important questions around how people work together to address environmental issues. These are issues which, they say, “represent collective action problems, involving a conflict of interest between individuals and society overall.” Understanding how people come together to resolve environmental dilemmas is a perfect question for Demps and Hillis, who have both dedicated themselves to understanding collective behavior through different lenses.

“Transdisciplinary collaborations, like this one, involve researchers from different academic departments working on related problems, enabling them to tackle projects that can’t be solved by a single researcher alone, and that often have important real-world implications,” Hillis and Demps wrote.

Demps and Hillis say they’re excited about the collaboration because of the value of interdisciplinary work. Working together has allowed them to integrate diverse perspectives and gain a broader understanding of environmental cooperation.



Vicken Hillis



Katie Demps

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Kudos

Kudos to former MURI student, **J. Tyrell Styhl**, who has been selected as a National Science Foundation Graduate Research Fellowship recipient. Styhl, originally from Idaho Falls, graduates this May with a Bachelor of Science in Ecology and Conservation Biology with minors in Wildlife Resources and Statistics. He starts graduate school in Fall 2018 with an emphasis on studying changes in the diet of Southern Idaho sage grouse from chicks to adults.

Idaho EPSCoR's own **Maria Horta Vorse** is leading an entrepreneurial, multi-discipline student team with the development of an innovative portable shower named The Forever Shower™. Their innovation seeks to solve global environmental issues. It earned 2nd place at the 2018 Draper Competition for Collegiate Women Entrepreneurs in Massachusetts. <https://www.smith.edu/academics/conway-center/entrepreneurship/competitions/draper>

University of Idaho Associate Professor and member of MILES Executive Leadership Team, **John W. Anderson**, will be honored at the **GAA Foundation's Venice Design 2018 Exhibition** hosted by the **European Cultural Centre** in the context of the Venice Architecture Biennale. His work "Suspension of Disbelief" is an abstraction of current SES research within the Coeur d'Alene watershed that studies the social impacts related to water quality.



"Suspension of Disbelief" is a point-cloud sculpture that from one angle reveals the ghosted profile of Coeur d'Alene Lake, and then from an alternative it becomes the ghosted image of a cutthroat trout. It is composed of hanging lead weights on fishing line tied with silver cap ends.