NIWR-USGS Partnership Committee

NIWR Annual Meeting

Feb. 10, 2016

Washington, DC

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Current participants

- Brian Miller (Illinois)
- Jeff Allen (South Carolina)
- Darren Lerner (Hawaii)
- Brian Haggard (Arkansas)
- Sam Fernald (New Mexico)
- Jon Yoder (Washington)
- Lin Deng (Missouri)
- Susan White (North Carolina)

(Sharon Megdal and Rick Cruse for informational pieces)

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NIWR Fact Sheet Areas & Leads

- Watershed Scale Management
  - Illinois, Missouri, Washington
- Harmful Algal Blooms & Hydraulic Fracturing
  - North Carolina
- Water Policy and Management
  - New Mexico
- Next Generation Training
  - Hawaii

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Fact sheet components

Research: Findings/impacts, description of research, tie to USGS research areas

Education: Graduate/undergraduate training & support, K-12 education, public education, level of funding going to students, number of students supported, student awards or accomplishments, installations/implementations of research-directed practices at local schools or in the community, etc.

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Fact Sheet Components

Information Transfer: Decision-support tools, seminars, workshops, training events, conferences, presentations or engagement with decision makers, could also include number of people reached through info. transfer efforts event/info transfer outcomes, special efforts at innovative info. transfer and relevant outcomes.

Impacts: In addition to research findings, policy changes, contribution of information to state advisory boards, leveraged funds, etc.

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Data Sources

- NIWR.net
- USGS databases
- WRRI Directors

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Anticipated Timing

- Draft documents shared with NIWR for feedback: Early-Spring 2016
- Revised documents into USGS for review and formatting: Late Spring 2016
- USGS publication: tbd

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USGS perspective

- Shrinking Workforce – Need Institute Partnership
- National Water Issues Becoming More Complicated
- Institutes Have The Expertise
- Institutes Are Funded With Appropriations

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Examples

- Water Policy and Management
- Harmful Algal Blooms
- Graduate Training

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DRAFT

Important Advances in Water Policy and Management Made Possible by Federal Funding to National Institutes of Water Resources

Alexander G. Fernald, Jesslyn P. Ratliff, Marcus R. Gay, John Tracy/Idaho director, Jon Yoder, Paul Ziemkiewicz, Earl A. Greene

This fact sheet uses three examples to illustrate policy and management successes that stemmed from federal “104B” funding from the Water Resources Research Act to state water research institutes.

1) newly improved water quality regulations in West Virginia;

2) improved conjunctive management of surface water and groundwater in Idaho;

3) new comprehensive policy for water basin integrated planning in Washington.

USGS

Science for a changing world

National Institutes for Water Resources Harmful Algal Bloom Investments in Research and Education Advance USGS Priorities

A NATIONAL NETWORK: DELIVERING IMPACTS AT MULTIPLE SCALES

The National Institutes for Water Resources (NIWR) partners with the USGS to deliver a national network of 54 Water Resources Research Institutes (Institutes) that is federally authorized by the Water Resources Research Act of 1964. The institutes focus on research to support the resolution of state and regional water challenges, development and transfer of technologies and applications resulting from research, and training and educational programs for a variety of stakeholders including academics, industries, and the public. These institutes align strongly with the mission of the USGS. This national network of state-based programs brings an impressive capacity to the nation by leveraging research and outreach products that have impact at the state, regional, and national levels.

NIWR institutions invest in relevant water resource and policy research that address current and anticipated future water issues and priorities for the nation. Nutrient management remains a pressing concern at local, regional and national scales. As a result of NIWR funding, a range of research applications, tools and technologies, and training opportunities have been developed to address water management challenges associated with excessive nutrient enrichment leading to increasing prevalence of harmful algal blooms (HABS) in freshwater as well as marine and estuarine systems. NIWR's national network of state-based institutes present an opportunity to showcase the breadth of research, applications and education initiatives that support USGS mission areas and address local and regional stakeholders needs.

ADVANCES IN HARMFUL ALGAL BLOOM RESEARCH

Understanding and identifying the sources and sinks of nutrients in a waterbody is a critical component for developing nutrient management approaches. Rivers, estuaries, reservoirs, and lakes all present different challenges and opportunities for research and monitoring.

South Atlantic-Gulf: Characterization of the nitrogen cycle of by cataloging the sources and sinks of the nutrient. Information has helped researchers and managers understand contributions to algae blooms and lowered water quality that have plagued the waterbody (*Univ. of NC*).

Additional quantification of nitrogen inputs to the Neuse River system from dry deposition originating from intensive animal production operations was evaluated (*NC State*).

Understanding HABS initiation and potential toxicities within agricultural ponds used for livestock drinking water can support improved prediction models for management needs. Additional remote sensing technology refinements to detect and quantify bloom-forming species can support rapid detection efforts in a cost-effective fashion (*Univ. of Georgia*).

(example photo credit: NC WRRI)

Pacific Northwest: Interactive effects of nutrients and grazing on the control of cyanobacteria blooms: a comparison across a eutrophication gradient in freshwater systems in Washington state (*Washington State Univ.*) in support of lake/reservoir management in temperate systems.

INTERDISCIPLINARY TRAINING POSITIONS STUDENTS FOR SUCCESS

NIWR institutions actively promote and provide capacity building to provide training, relevant skills, and knowledge transfer in support of the development of the next generation of water professionals and an informed public.

USGS

Science for a changing world

Institutes serve the needs of schoolchildren, university students, concerned citizens, academics and professionals by providing opportunities for engagement in water-related activities that promote learning about and caring for our nation's water resources. Institutes convene diverse groups and facilitate problem-solving exercises to explore issues and find common solutions through professional trainings, state and national conferences, and facilitated forums.

(example photo credit: NC Sea Grant)

SHARING TOOLS AND TECHNOLOGIES FOR ACTION

NIWR institutions are committed to increasing their role as a source for, and neutral broker of, timely information about the nation's water resources and associated resource management solutions.

Great Plains: Demonstrating the Nitrogen-Removal Effectiveness of Denitrifying Bioreactors for Improved Drainage Water Management (*South Dakota State*) from agricultural subsurface drainage.

Nutrient driven increases in algal biomass reduce effectiveness of two common disinfection byproduct (DBP)-control measures, results can be used to guide nutrient management strategies for source water protection and by drinking water treatment plants to asses impact of nitrogen and phosphorus enrichments on trichloromethane (TCM) formation and control (*Univ. of Arkansas*).

New England: Developing remote sensing technology to remotely monitor spatial and temporal distributions of algal blooms in Lake Champlain *(UMass Amherst*).

LEVERAGING RESOURCES

NIWR seeks to increase collaborative external research funding through a variety of partnerships, including but not limited to other state Institutes, US Geological Survey, private industries, and non-profits.

(example photo credit: NC WRRI)

NIWR RESULTS

NIWR is committed to supporting timely water resource and policy research and the dissemination of research products, tools, and technologies to state and local decision-makers, industry practitioners and the public to address their water resources informational needs and actions. The overarching objective for NIWR'S investments is to work collaboratively with partners across the state and nation to deliver effective water resource management information for a triple-bottom line accomplishment, where the nation's communities, ecosystems and economies can thrive, both now and into the future.

References Cited

Mash, C.A., et al. Assessing trichloromethane formation and control in algal-stimulated waters amended with nitrogen and phosphorus. *Environ. Sci.: Processes Impacts*, 2014, 16, 1290.

By Susan N. White, Anna A. Martin and John M. Fear

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Alumni/Workforce Development
An Under-used Metric?

NIWR 2016 Annual Meeting

February 8-10, 2016

The Hotel George

Washington, D.C.

Darren T. Lerner

Director, Water Resources Research Center, University of Hawaii &

Director, University of Hawaii Sea Grant College Program

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY
UNIVERSITY OF HAWAI'I AT MĀNOA

UNIVERSITY OF HAWAI'I
MĀLAMALAMA
UA MAU KE EA O KA 'ĀINA I KA PONO
1907

Sea Grant
University of Hawai'i

Workforce development is a key *academic*, *social* and *economic* metric valued by OMB, USGS leadership, Universities and Communities.

- NIWR trained 25,000 students in our first 50 years*
- NIWR currently support/train ~1,000 students each year at >150 Universities*
- NIWR also train/mentor USGS Interns.

(undergraduate and graduate students; data from the NIWR 2015 Executive Summary)

Is there an opportunity to enhance documentation, tracking and utilization of these human resources data?

Current Alumni Data Collection via NIWR.net

Example: University of Hawaii WRRC Annual Report (2014)

Student Support					
Category	**Section 104 Base Grant**	**Section 104 NCGP Award**	**NIWR-USGS Internship**	**Supplemental Awards**	**Total**
Undergraduate	0	0	0	0	0
Masters	2	0	0	0	2
Ph.D.	2	0	0	0	2
Post-Doc.	0	0	0	1	1
Total	4	0	0	1	5

These data are aggregated nationally, but tell only part of our story…

Some additional effort…but must be updated

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WRRC Alumni

Some WRRC "alumni" have become leaders in Hawai'i and elsewhere. Many students have moved from being WRRC research assistants to eminent careers in academia, government, and private enterprise.

Name	Degree/Date	Discipline	Title/Activity	Organization	City	State/Country
Stephanie Bailenson	-	Zoology	Knauss Fellowship, Senate Intern, Senior Policy Advisor	Office of the Under Secretary, National Oceanic and Atmospheric Administration	Washington	DC
Michael J. Chun	M.S. 1968	-	President	Kamehameha Schools	Honolulu	Hawai'i
David R. Hargis	M.S. 1971	-	President	Hargis and Associates, Inc.	San Diego	California
Samuel N. Luoma	Ph.D. 1974	-	Senior Research Hydrologist and Lead Scientist	CALFED Bay-Delta Program, US Geological Survey	Menlo Park	California
Bruce Keswick	Ph.D. 1979	-	Section Head/Microbiology Capability	Proctor & Gamble Company	Cincinnati	Ohio
Dr. Stephen W. Wheatcraft	Ph.D. 1979	-	Professor	Department of Geological Science and Engineering, University of Nevada	Reno	Nevada
June Oberdorfer	Ph.D. 1983	-	Professor	Department of Geological Sciences, San Jose State University	San Jose	California
Kenneth Tenno	M.S. 1985	-	Laboratory Director	Board of Water Supply, City and County of Honolulu	Honolulu	Hawai'i
						Nakhon

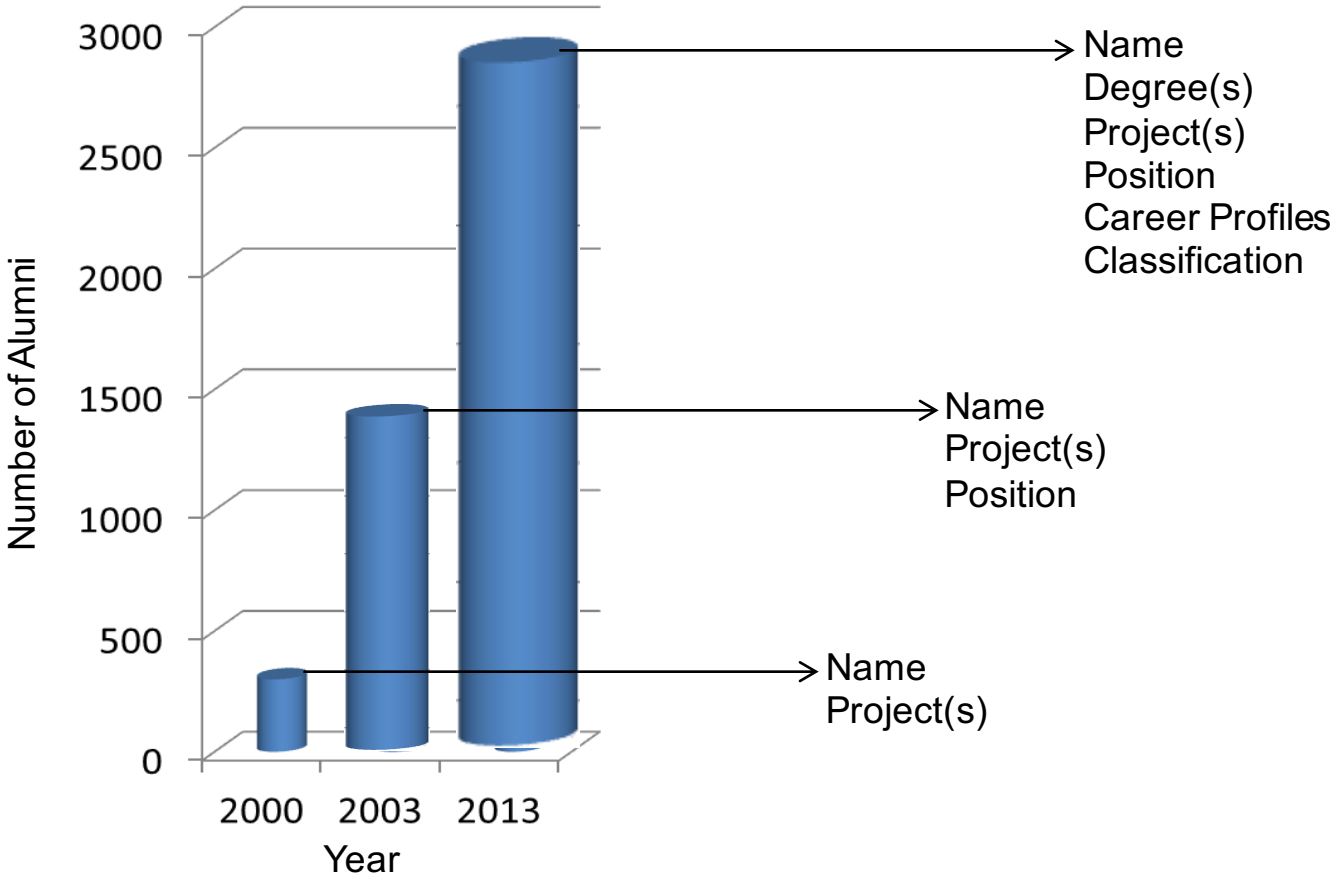
What data might be useful?

- Degrees earned by Institute supported students? Terminal degree?
- Do students identify with and value Institute support?
- Notable achievements of selected students?
- Workforce placement post-degree?
  - Are supported students working in the field?
  - How many NIWR supported students go on to work for the USGS? In what capacity?

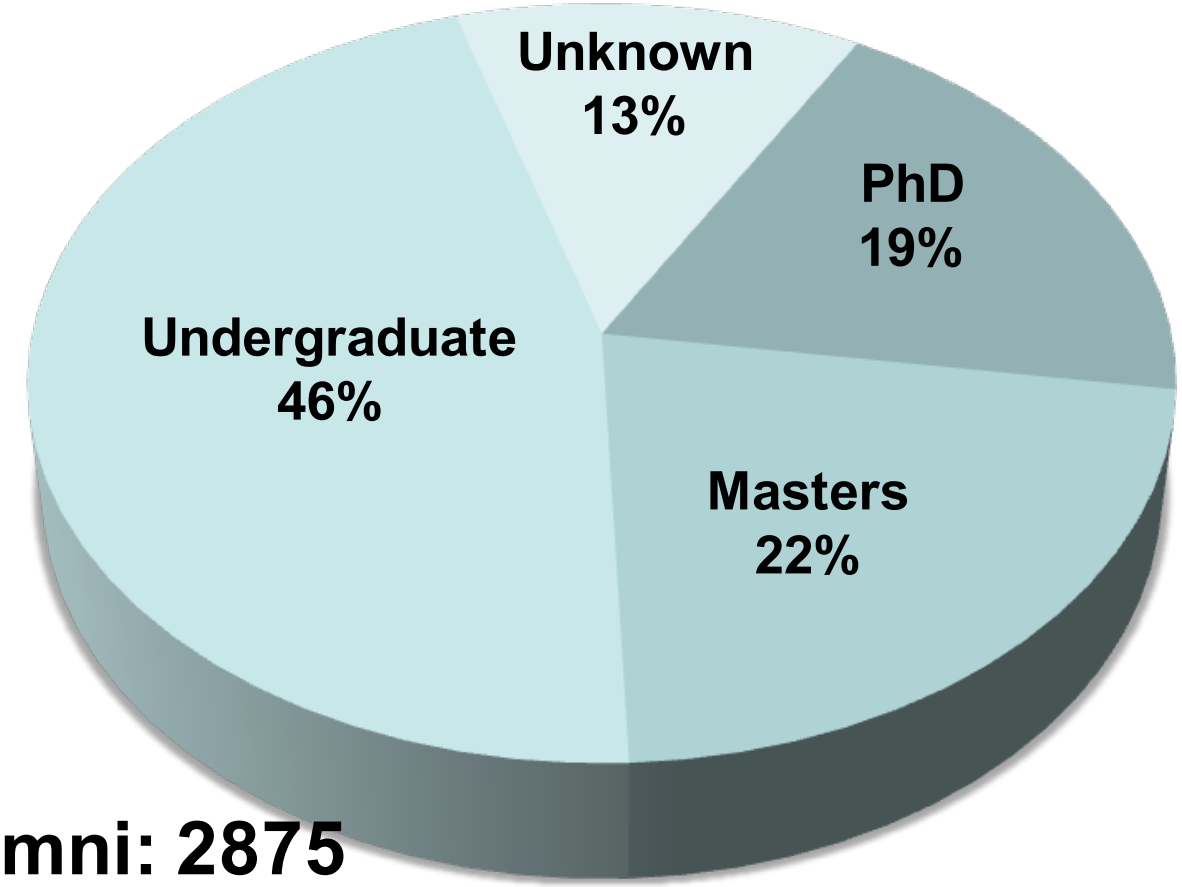
A Case Study

- Individual Program Tracking
  - Varies by program
  - Hawaii Sea Grant example
- 2010 Sea Grant-NOAA workforce Survey

Development of Hawaii Sea Grant Alumni Database

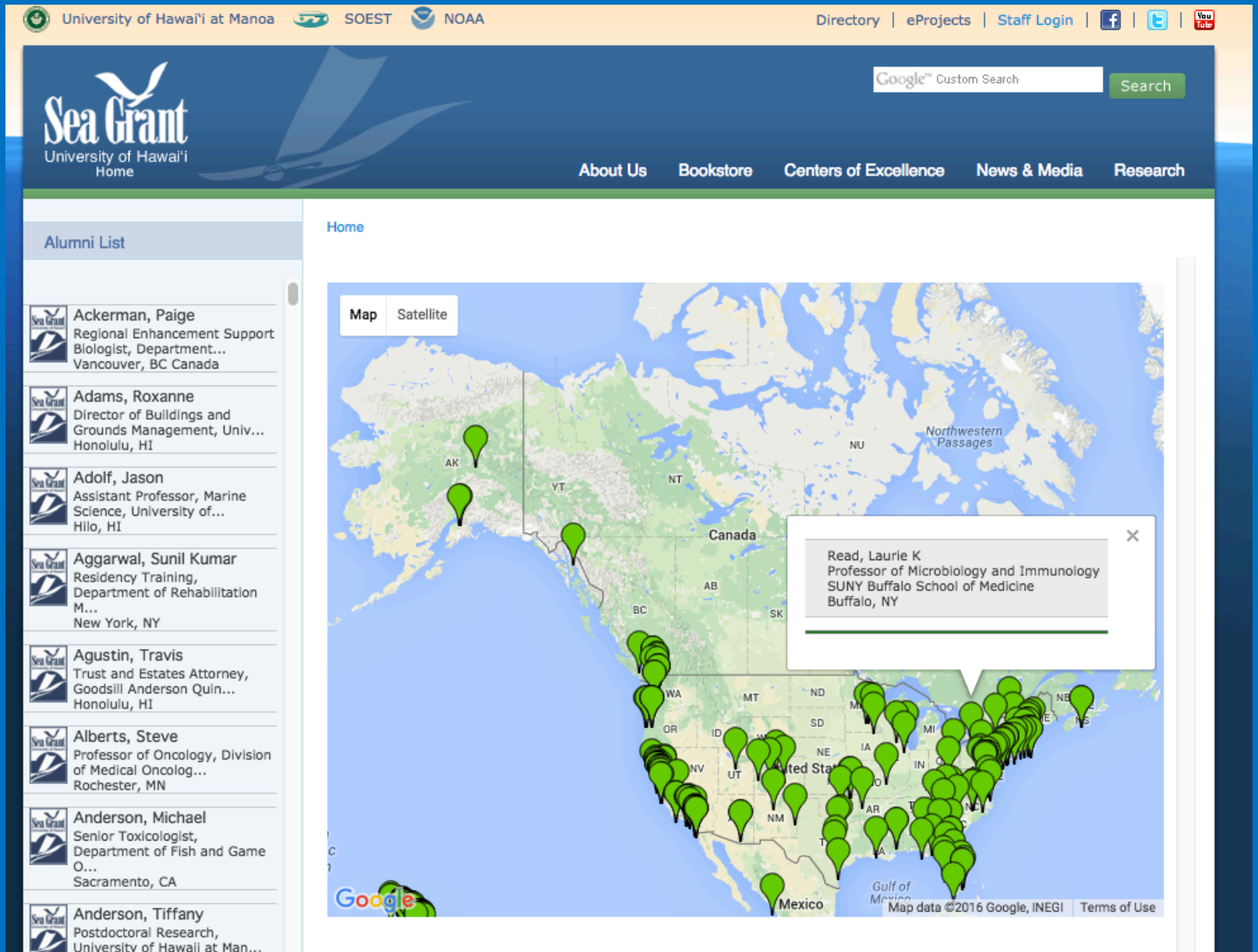


Hawaii Sea Grant Alumni by Degree



Total alumni: 2875
Terminal Degree

Interactive Online Alumni Map



A (Sea Grant) Case Study

- Individual Program Tracking
  - Varies by program
  - Hawaii Sea Grant example
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Sea Grant-NOAA Survey Results

NOAA Sea Grant College Program

"[Sea Grant] introduced me to the nexus of science and politics that has kept me interested in working in the marine policy area for 25 years."

A new survey confirms Sea Grant programs are the training grounds for many who go on to serve our nation as government and academic scientists. Over 1500 employees of NOAA, the agency tasked with the management and stewardship of our nation's coastal and marine resources, responded to a survey asking about their training and education. Sea Grant is NOAA's primary university-based program in support of coastal resource use and conservation through research, extension, and educational activities.

NOAA Sea Grant College Program

22%

More than 1/5 of survey respondents were Sea Grant "alumni," supported or trained by Sea Grant as students, fellows, interns, researchers, or employees in significant ways.

94%

of Sea Grant alumni say their Sea Grant training or support positively influenced their professional development & achievements.

79%

of Sea Grant alumni say their Sea Grant training or support contributed to their seeking employment with NOAA.

82%

of Sea Grant alumni in NOAA believe their Sea Grant experience helped them get their NOAA job.

NOAA Sea Grant College Program

An investment in our nation's Sea Grant College Program is an investment in our future science and technology workforce.

The National Sea Grant College Program is committed to environmental stewardship, long-term economic development and responsible use of America's coastal, ocean and Great Lakes resources. Sea Grant's research, extension and education programs promote better understanding, conservation and use of America's coastal resources with a focus on sustainable coastal development, hazard resiliency, and a safe and sustainable seafood supply, all within healthy and productive ecosystems.

NIWR Human Resource Tracking Effort; First Steps…

- **Explore status of Institutes current alumni (student, intern, employee, fellow) tracking efforts**

  - Tracking is ongoing to some extent in some institutes; though databases might be improved with emerging software, social media, etc.

  - Of programs that do not have tracking or databases, some may document alumni via other means, e.g. annual reports, NIWR.net, external reviews, ad hoc requests, etc.

  - The type of alumni data collected is likely to vary considerably among programs.

- **Explore these data nationally, e.g. via NIWR.net, for a report on students supported;** and, if available, "where they are now."

- **Ask programs to provide information on "NIWR Stars?"**

NIWR Human Resource Tracking Effort; Next Steps…

•Partner with USGS to track NIWR alumni in the USGS workforce --a national survey?

•Gauge interest/support for enhanced human resources (aka alumni) tracking- funding?

• Exploration of an enhanced/expanded NIWR database to meet the alumni tracking needs of the network?

• Further identification of how to aggregate varied state program alumni data meaningfully - do we want to standardize methods/software?

• Strategy for use of alumni metrics, e.g. to document our value on the Hill.

The NIWR has an opportunity to enhance tracking, documentation and reporting of this key academic, social, and economic metric.

Summary

- NIWR is a key educator of future water scientists and managers.
- This workforce development is valued by our funders and “customers.”
- Opportunity exists to enhance tracking, documentation and reporting of this key academic, social, and economic metric.
- Current software, social media, etc. make this an opportune time to embark on such an effort.
- Other state-federal programs have used this metric to increase value ->funding.


Thank you for your attention.

Discussion

- Missing information for documents: components?
- Interested Directors for current focus areas.
- Representation from Mid-Atlantic and New England region needed.

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