

Enhancing the Value and Sustainability of Field Stations and Marine Laboratories in the 21st Century

Public Report Briefing

July 23, 2014

Jerry Schubel, Committee Chair

Twitter: #fieldstations



Lake Erie Field Station

Study Task

- Assess contributions of FSMLNRs to research and innovation, education and training, and public outreach
- Outline strategies for FSMLNRs to fill gaps in knowledge, open new avenues of inquiry, and forge a new convergence of science and engineering
- Outline the infrastructure and logistical needs for FSMLNRs to fulfill their roles
- Explore the potential for broader networking of FSMLNRs; and
- Describe best practices and metrics that will enable FSMLNRs to monitor, assess, and modify their strategies to meet research and innovation, education and training, and outreach and engagement goals

Study Committee

Jerry R. Schubel (Chair), Aquarium of the Pacific, Long Beach, CA

Cathy Conrad, St. Mary's University, Halifax, Nova Scotia

Felicia C. Coleman, Florida State University, Coastal & Marine Laboratory

Diane Debinski, Iowa State University, Ames

Peter M. Kareiva, The Nature Conservancy, Seattle, WA

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Alison G. Power, Cornell University, Ithaca, NY

Mary E. Power, University of California, Berkley

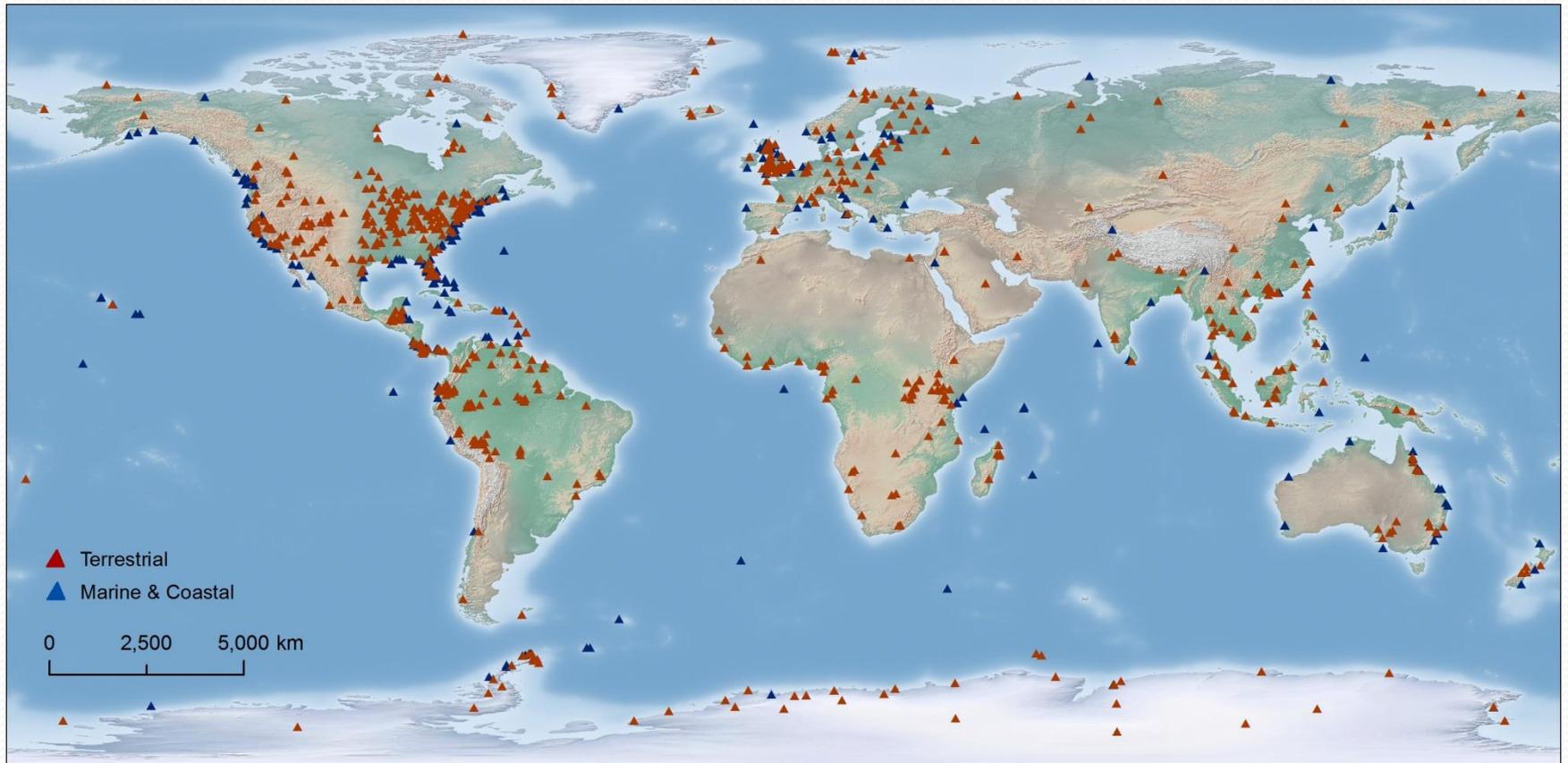
Mark R. Stromberg (retired), University of California, Natural Reserve System

Report Outline

- Contribution to Science and Society
- Enhancing Science, Education, and Outreach
- Networking for Discovery and Innovation
- Building and Maintaining a Modern Infrastructure
- Strategies for Financial Sustainability
- Metrics for Achieving Goals and Demonstrating Impact

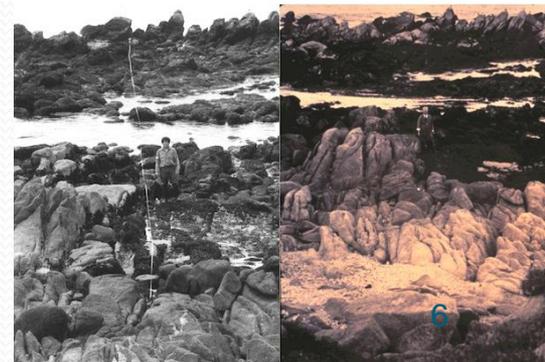
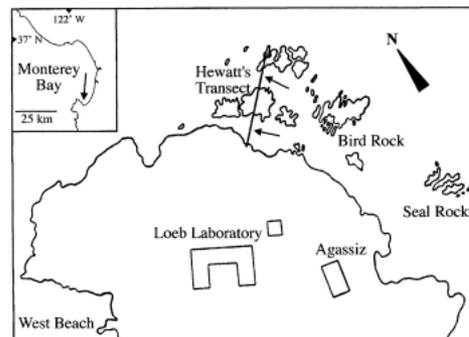


Field Stations: A Critical Asset



Science for an Unpredictable World

- Field observations play critical roles in the sciences
- Field stations are critical assets
- Field stations are repositories of natural history and long-term observations necessary for documenting changes at a variety of scales in time and space.
- **Recommendation:** Each field station leader should identify and support the development of scientific and educational assets that harness his/her station's unique qualities to address local, regional, national, and global challenges by bringing together scientists from a number of disciplines, including the social sciences, through what is now called convergence



Preparing the Next Generation of Scientists

- Field stations are venues for discovery-based learning, which increases STEM career retention.
- Recruiting students into STEM fields has been identified as high priority due to its link to innovation and economic growth.

Recommendation: Universities and other host institutions should expand opportunities at field stations to conduct independent research and learning activities to increase interest and persistence in STEM careers.



Empowerment through Outreach (I)



- Public understanding and participation in science empowers citizen involvement in public policy.
- Field stations support a range of outreach programs and citizen science opportunities, but these often are disconnected from empirically-based approaches.

Recommendation: Field stations should continue to explore a wide-range of approaches to engage the public in science, but select and tailor their activities in a manner that best leverages a field station's location, personnel, infrastructure, and other available resources.

Empowerment through Outreach (II)

- Citizen-science initiatives enable people to learn about science and ecosystem dynamics.
- Citizen science is an emerging trend in general and at field stations.

Recommendations: Field stations should collaborate in, connect with, and formalize citizen science programs by using the latest technologies and networking initiatives [...] thus, offer a coordinated infrastructure for interested members of the public to engage in, learn about, and contribute to science.



Networking for Discovery and Innovation

- Greater networking would be beneficial because it could leverage resources to facilitate discovery and spark innovation.
- Networking would also allow field stations to share best practices, protocols, and responsibilities for data storage and retrieval.

Recommendation: Field stations should seek opportunities for networking that make scientific, educational, and business sense.

Modern Infrastructure for a Networked World

- Infrastructure needs vary with field stations' diversity in scope, size, and purpose .
- Securing long-term funding to repair and upgrade basic infrastructure and technology is a challenge for all field stations.

Recommendation: Each field station should assess and define its own infrastructure needs. However, internet connectivity and cyber-infrastructure should be included in all infrastructure-management plans to allow field stations to facilitate collaborative research and participate in broader networking efforts.

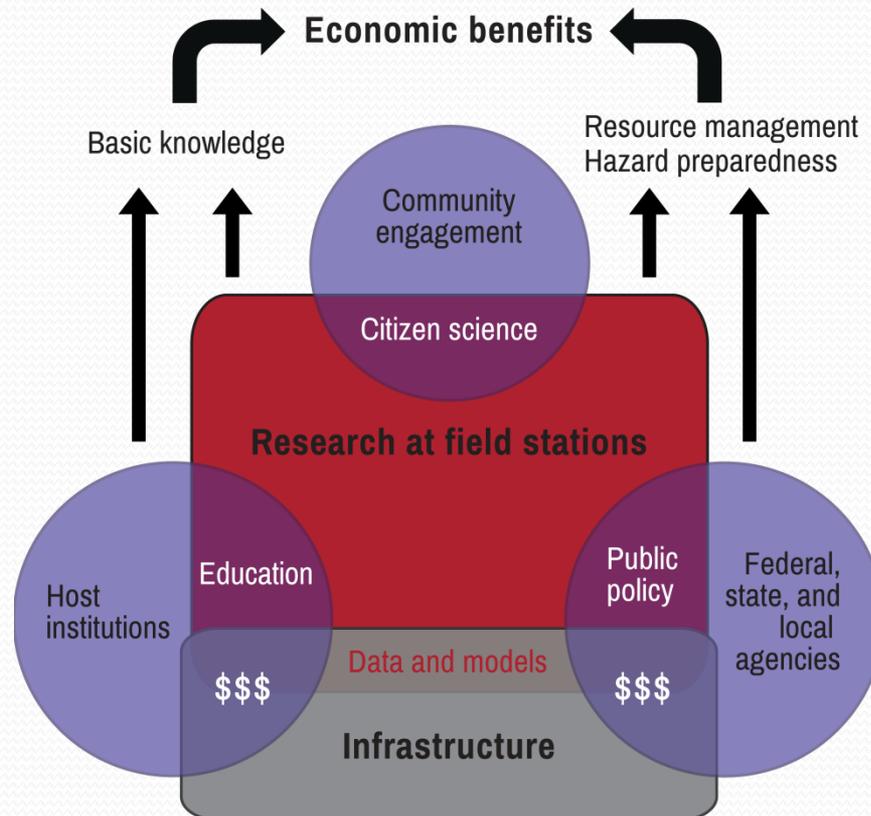


Financial Security for a Modern Infrastructure

- Sustainable funding requires field-station leaders to develop compelling value propositions, strategic plans, and business models for operations.
- Field station leaders too often lack entrepreneurial business skills.

Recommendation: Field stations and their host institutions should develop business plans that include clear value propositions and mechanisms to establish reliable base funding that can be supplemented with funding from diverse sources. Business planning requires that station leaders be recruited not only for their scientific credentials, but also for their leadership, management, and entrepreneurial skills.

Articulating the Value Proposition & Measuring Impact



Measuring Performance and Impact

- The value and impact of field stations is documented unevenly and mostly anecdotally.
- Better collection of metrics would improve outcomes and the ability to demonstrate the field stations value proposition.

Recommendation: Field stations should work together to develop a common set of metrics of performance and impact. The metrics should be designed so that they can be aggregated for regions and the entire nation. Universities and other host institutions and funding organizations should support the gathering and transparent reporting of field-station performance metrics ...

Recommendation: New mechanisms and funding need to be developed to collect, aggregate, and synthesize performance data for field stations, and to translate these data into metrics and information that can be used to document the value of the community of field stations to science and society.

Conclusions

- Field stations are a critical asset to the scientific enterprise but demonstrating their value is difficult due to the lack of aggregated, empirical data.
- Articulating the value proposition allows to build a more financially sustainable future for field stations.
- Field station leaders need to acquire the business skills to articulate the value proposition and business plan and develop the metrics to document performance.

What Two Leaders Said...

“I believe that in the not too distant future a much larger share of biological research, from biochemistry to ecology, will be conducted at field stations that consist of nature preserves and have ready access to laboratories equipped to analyze and monitor processes at every level of biological organization, including the molecular. Field stations will also serve as key centers of education at all levels. Universities and other institutions wise enough to invest in such stations now, even in the face of limited financial resources, will assure themselves of a much larger share in the future action.”

E. O. Wilson, Harvard

What Two Leaders Said...

“Field stations provide the best connection between a growing population and the wonders and mysteries of the natural environment. These institutions educate on what all citizens must do to preserve ocean health, the foundation of the basic ecosystems services that keep our planet habitable.”

Marcia McNutt, Editor-in-Chief, *Science*

Questions?

Prepublication & Final Report:

http://www.nap.edu/catalog.php?record_id=18806

Field Stations Video: <http://youtu.be/LMxQAjc3EXI>

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