Division of Biological Infrastructure Support for Marine Labs

National Association of Marine Laboratories
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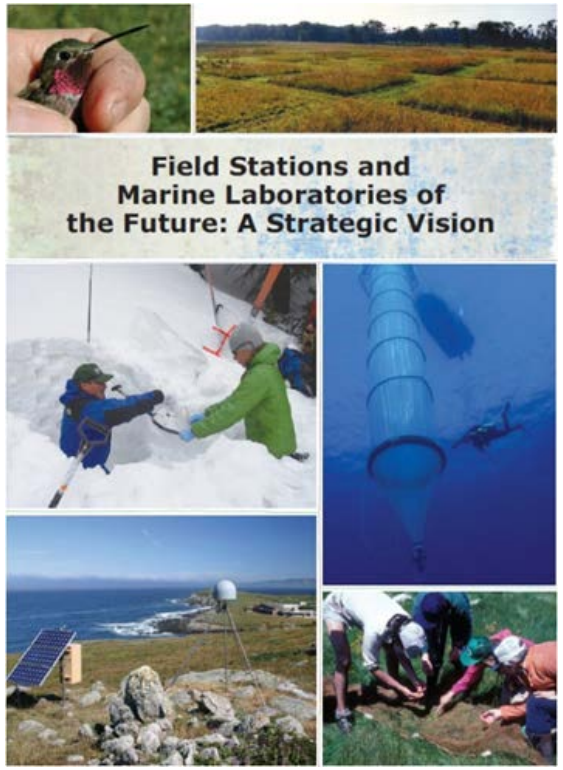
Input from the community



National Association of Marine Laboratories
Position Paper: Marine and Great Lakes Laboratory Infrastructure
October 2021

Issue: Modernizing and enhancing the aging infrastructure of marine and Great Lakes laboratories to increase capacity to support research, education and training, extension and outreach, local economic growth and resilience, and opportunities for currently underrepresented groups of researchers and students.

Self Study Recommendations

- Goal 1: Increase the value to society of the science done at FMSLs, as well as the public understanding of that value.
- Goal 2: Increase the scientific value of FSMLs by increasing the flow of information, both between FSMLs and scientists and among FSMLs themselves.
- Goal 3: Enhance the synergies between research and education.
- Goal 4: Promote the flow of scientific information for environmental stewardship by ensuring appropriate access by scientists and students to terrestrial, aquatic, and marine systems.
- Goal 5: Increase the operational effectiveness of FSMLs.

NAS Study Recommendations

In 2014, the National Academy of Sciences released a report acknowledging the current value of field stations to science and society, and made the following recommendations to guide their future sustainability.

1. enhance science, education, & public engagement

Develop their unique assets and qualities, prepare the next generation of scientists, and empower the public by

- encouraging multidisciplinary, "convergent" studies,
- expanding opportunities for active learning activities and independent, collaborative research,
- exploring a wide range of approaches to engage the public,
- guiding the development of activities that effectively promote public understanding of science, and,
- engaging with citizen science programs to improve scientific understanding.

2. network for discovery & innovation

Continue to build and further establish networks and partnerships by

- expanding opportunities for networking, and,
- looking to universities, National Science Foundation, and other funding agencies for networking incentives.

3. build & maintain a modern infrastructure

Create modern infrastructures in a networked world by

- evaluating its own infrastructure needs,
- including internet connectivity and cyberinfrastructure in all infrastructure management plans, and,
- converting long-term data sets into digitally accessible formats.

4. strategize for financial sustainability

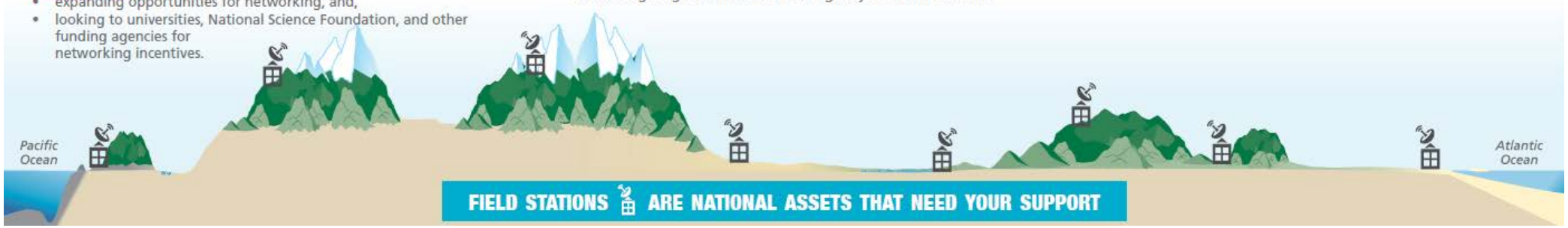
Seek financial security for a modern infrastructure by

- developing business plans that describe their unique value,
- creating mechanisms to establish reliable base funding,
- diversifying approaches to obtain supplemental funding,
- recruiting station leaders with management and entrepreneurial skills, and,
- asking host institutions to mentor station leaders in management, business planning, and fundraising.

5. develop metrics for demonstrating impact

Measure performance and impact by

- working together to develop common performance and impact metrics,
- encouraging universities, host institutions, and funding organizations to use innovative ways to collect, aggregate, and synthesize performance information to document stations' contributions, and,
- developing new mechanisms and funding to collect performance data and translating them into metrics and information.

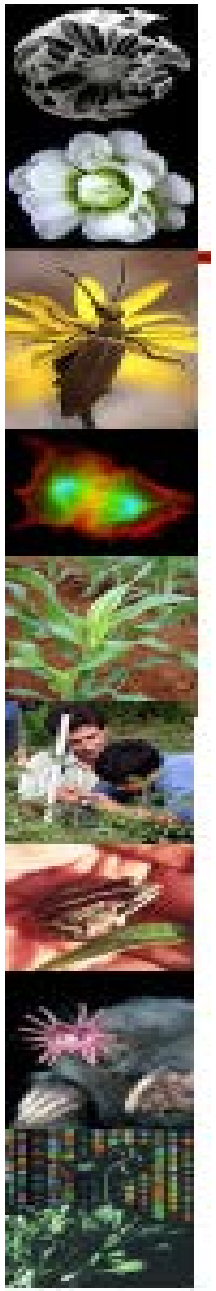


NAML Position Paper

…Field Stations and Marine Labs program at NSF now require that grant requests focus on novel purposes, i.e., not generally for replacement or repair of aging facilities. With universities unable or unwilling to provide funds for such basic needs, and private donors generally being less interested in requests for funds for "unglamorous" work like replacing septic pipes or lab roofs…

NAML recommends significant expansion of [*funding programs*] to include projects aimed at major infrastructure repair and replacement at marine and Great Lakes laboratories. This expansion should include items like piers, docks, upgrades for coastal research vessels, underwater operational equipment, and both seawater and freshwater systems …also consider support for bringing facilities up to code … increasing the resilience ….to increased sea level rise, and storm frequency and intensity

Simply put: More support and expanded support for maintenance, compliance, and sustainability needs.

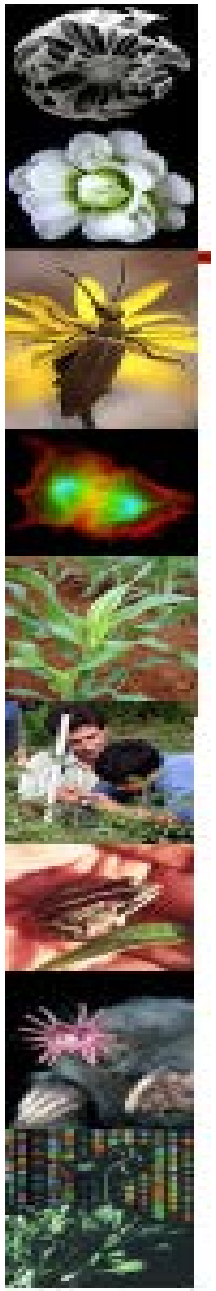


Infrastructure Capacity for Biology (Capacity)

- **Synopsis**:

  Support the implementation of, scaling of, or major improvements to research tools, products, and services that advance contemporary biological research.

- **Programmatic Areas:**
  - **Capacity: Cyberinfrastructure**
  - **Capacity: Collection**
  - **Capacity: Field Stations & Marine Labs (FSML)**
- Anticipated Budget: $18M to $20M
- Proposals accepted anytime
- NSF 21-501
  https://www.nsf.gov/pubs/2021/nsf21501/nsf21501.htm

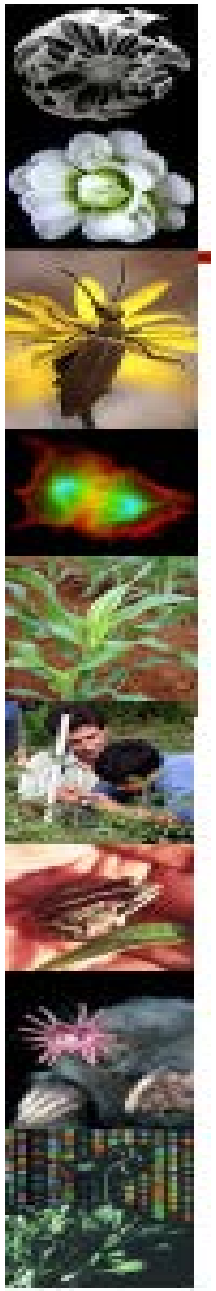


Capacity: Biological Field Stations and Marine Laboratories (FSML)

- **Goal**

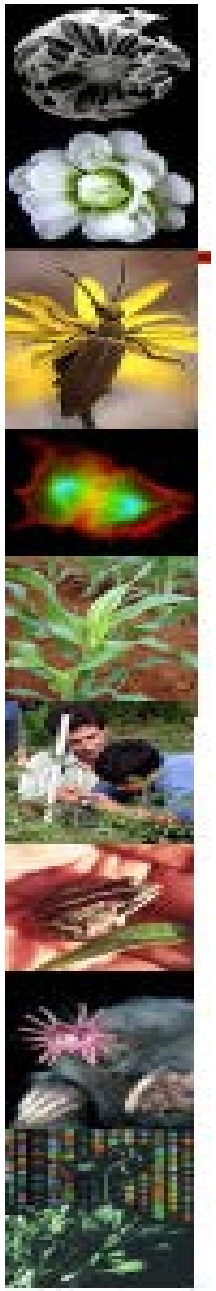
  Supports major improvements to biological field stations or laboratories in any terrestrial, marine, estuarine, or freshwater environment for research and education.

- Proposals should focus on well-defined and significant efforts rather than a compilation of small improvements.
- **Improvement Grants:**
  - Improvements in the physical plant of a field station or marine laboratory.
- **Planning Grants:**
  - Strategic planning for advancing science and education activities at a site or network of sites.



Major Research Instrumentation(MRI)

- **Goal**
  - Support the acquisition of major state-of-the-art instrumentation
  - Foster the development of the next generation of major instrumentation, .
- Two tracks:
  - Track 1 - $100K – just under $1.0M;
  - Track 2 $1.0M - $4.0M.
  - Institutions are limited to 3 proposals. If submitting a 3rd proposal, it must be a Track 2 proposal.
- **Budget**- $100,000-$4 million , smaller requests considered from non-Ph.D.-granting institutions.
- **Cost-sharing** at the level of 30% of the *total project cost* is required for Ph.D.-granting institutions and non-degree-granting organizations. *Cost-sharing is not required for non-Ph.D. granting institutions.*
- **Information:**
  - **NSF 18-513 Major Research Istrumentation (MRI) https://www.nsf.gov/pubs/2018/nsf18513/nsf18513.htm** .



Research Coordination Networks (RCN)

- **Synopsis**:

  To advance a field or create new directions in research or education by supporting groups of investigators to communicate and coordinate their research, training and educational activities across disciplinary, organizational, geographic and international boundaries.

- Support for activities and expenses associated with community building, coordination, and networking.
- Budgets are typically around $500K over 5 years.
- NSF 17-594
  https://www.nsf.gov/pubs/2017/nsf17594/nsf17594.htm

Why NSF Invests in FSMLs

Natural conditions for experiment, observation, and collection leading to new discovery in biology.

Environments for training the next generation of biologists, through exposure and participation in field research.

Venues for the translation of basic science into actions that are beneficial to society.

Portals for communication of science to the general public.

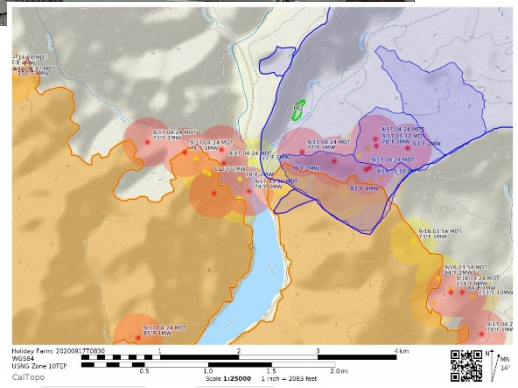
Program Priorities

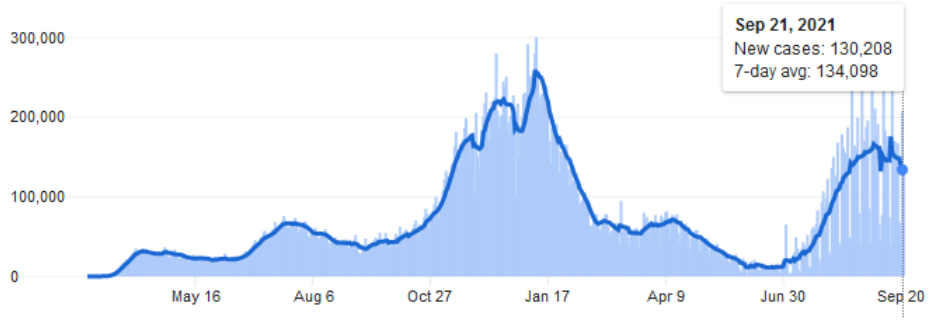
- Advance capacity for basic research in biology with potential for new discovery
- Enable research funded by NSF's science programs
- Promote shared resources accessible to a broad and collaborative community
- Contribute to nation’s research infrastructure capacity
- Broaden the participation in, exposure to, and impacts of biological sciences across the entire social spectrum

That being said…

In the context of the previous priorities, we also take into account:

- Expectations for energy efficiency, green and sustainable design, and long-term fiscal management.
- Loss of infrastructure due to weather, fire, and other forces
- Expiration of infrastructure use life through deterioration or obsolescence.
- Pandemic impacts





Sample Awards from Last Decade

FSML: Expansion of Small Boat Dockage Facility at the Center for Marine Research; University of North Carolina

A Reconstructed Boat Landing for California Polytechnic State University's Center for Coastal Marine Sciences Pier Facility; California Polytechnic State University Foundation

Research Vessel for Everett Community College Award Number; Everett Community College

FSML: Expansion of Small Boat Dockage Facility at the Center for Marine Research, University of North Carolina at Wilmington

Acquisition of a Small Boat by the Large Lakes Observatory; University of Minnesota Duluth;

Upgrade of Sanitation and Communication Systems at Shoals Marine Laboratory; Cornell Univ - State

Construction of a Waste Water System at the RMBL; Rocky Mountain Biological Laboratory

A Seawater System for Enhancing Nature Coast Biological Station's Research and Education Programs; University of Florida

Hatfield Marine Science Center Experimental Seawater Facility; Oregon State University

RUI: Experimental Seawater Laboratory at the Coastal Studies Center, Bowdoin College; Bowdoin College

An upgraded seawater system for the University of Georgia Marine Institute on Sapelo Island; University of Georgia

Modernization of the Humboldt State University Marine Laboratory Seawater System; Humboldt State University Foundation

Acquisition of Unmanned Surface Vehicle for High-Resolution Mapping of the Shallow Seabed and Water Column; North Carolina State University

FSML: Gulf of Alaska Dive and Marine Research Support Infrastructure Project; SITKA SOUND SCIENCE CENTER INC

Moorea Coral Reef Scientific Diving Upgrade; University of California-Berkeley

SSSC Plumbing and Energy Reliability Improvements; :SITKA SOUND SCIENCE CENTER INC

VIERS the next 50 years: rebuilding resilient research infrastructure at the Virgin Islands Environmental Resource Station (VIERS); University of The Virgin Islands

FSML: Improved research infrastructure to monitor ecosystem dynamics under ongoing climate change at the La Selva Research Station, Costa Rica; Organization for Tropical Studies Inc

RAPID: The Virtual Field: Educational mitigation for the Covid-19 Pandemic; Sonoma State University

Planning Grant: Building Women Leadership at field stations and marine laboratories; University of California-Riverside

Award Data Last Five Years

Year	Amount	Number
2017	$4,093,197	23
2018	$4,018,705	23
2019	$1,500,001	9
2020	$2,040,768	9
2021	$2,172,945	7

What does this mean?