Integrated Fisheries, Aquaculture and Seafood for a Sustainable and Resilient Future

Sea Grant

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10-YEAR NOAA SEA GRANT
INTEGRATED FISHERIES, AQUACULTURE AND SEAFOOD VISION

AUGUST 2018

NOAA Sea Grant's 10-Year Integrated Fisheries, Aquaculture and Seafood Vision:
Sea Grant's research, outreach and education will be instrumental
in increasing the environmental, economic, and social sustainability
of U.S. ocean and Great Lakes communities through increased understanding of
and capacity in recreational and commercial fisheries, aquaculture and
post-harvest seafood sectors.

PHOTO: JOE TYBURCZY, CALIFORNIA SEA GRANT

INTRODUCTION

Since its inception in 1966, the National Sea Grant College Program (NSGCP) has been working with U.S. residents to identify, design and implement projects that enhance the economic, ecological and social well-being of coastal and Great Lakes communities. In particular, through collaborative partnerships with many diverse groups and individuals, Sea Grant resources have been leveraged to address fisheries, aquaculture and seafood issues. These efforts have helped to develop and maintain community businesses that contribute to local, state and national economies while conserving the ecosystems they rely upon and that others enjoy.

Recognizing the continued importance of fisheries, aquaculture and seafood to coastal economies and communities, the cross-cutting nature of these topics, and the continued and anticipated increased engagement and investment of the Sea Grant Network in these areas, there was a call for developing a visioning plan to guide future efforts. In May 2018 representatives from 25 Sea Grant programs convened in New Orleans, Louisiana to develop a 10-year vision for integrated fisheries, aquaculture and seafood (FAS) activities that support a sustainable and resilient future for U.S. coastal and Great Lakes communities (See Final Note on page 27).

This document builds upon the 2016 10-year Aquaculture Vision Plan. It outlines current efforts by the Sea Grant Network and identifies the network's vision for furthering these efforts to increase their impacts through an integrated FAS approach over the next 10 years.

Note: Fisheries, Aquaculture, and Seafood (FAS) refers to activities associated with commercial fisheries, aquaculture, seafood processing and distribution, commercial charters, and recreational and subsistence fishing in marine, brackish, and freshwater.
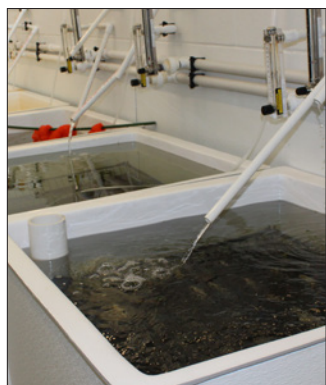
BACKGROUND

Fisheries, aquaculture and post-harvesting seafood sectors have long contributed to the economic and social well being of U.S. residents, being particularly important in coastal and Great Lakes communities. In 2015, the ocean economy, which includes the oceans and Great Lakes, grew twice as fast as the U.S. economy as a whole and contributed $320 billion to the Nation's gross domestic product (GDP). Of this amount, more than $120 billion came from two sectors, living resources (fisheries, aquaculture and seafood) and tourism and recreation, areas that Sea Grant contributes to (See Table 1 below).

Looking more closely, commercial fisheries landed 9.7 billion pounds with an ex vessel-value of $5.2 billion. A total of 61 million recreational angling trips were recorded, landing over 62 million pounds of fish, with an estimated dockside value of more than $148 million[1, 2]. The aquaculture industry produced 607 million pounds valued at $1.3 billion. The post-harvest sectors of the seafood industry employed 62,846 people at the 3,283 facilities around the country[3]. In addition to providing employment opportunities for residents, nearly half of FAS workers are self employed – an important characteristic of this sector. Many of the individuals and industry partners involved in these activities partner regularly with Sea Grant programs and rely on them for technical assistance and problem solving through research and knowledge transfer.

With changing environmental, economic and social conditions, however, aquatic ecosystems and businesses that rely on them are facing new challenges. Such is occurring at a time when demand for U.S. seafood products and interest in ocean and lake ecosystems have substantially increased. Commercial and recreational fisheries remain important to coastal and Great Lake communities, with aquaculture expanding and expected to

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PHOTO: LOUISIANA SEA GRANT

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	Establishments (thousands)	Employment (thousands)	Wages (billions $)	GDP (billions $)
Living Resources	6.1	62.2	2.6	7.6
Tourism & Recreation	125.4	2,295.0	55.2	115.7

Table 1: Ocean and Great Lakes Economy Highlights[1], NOAA's Office of Coastal Management.

be integrated within more and more communities in the next 10 years. Seafood consumption is also increasing nationwide, as more residents recognize the nutritional benefits, and the local food movement has increased interest and demand for U.S. seafood products even inland. Sea Grant's involvement moving forward will be integral to ensuring FAS sectors continue to grow and prosper through changing, social, environmental and political climates.

The NSGCP is uniquely situated to assist communities with adapting to changes including maintaining valued habitats and resources. It remains a trusted neutral source of information with an on-the-ground team and bottom-up approach in research, education and extension. Their directed research programs are valued for contributing to problem-solving that supports local economies and conserves, enhances, and protects aquatic resources. The educational opportunities that NSGCP provides help to ensure continued societal commitment to U.S. aquatic resources through recognition of their value. Further, Sea Grant Extension programs play a pivotal role in not only identifying community needs, but also facilitating and implementing collaborations in research, synthesizing and extending information, and providing trainings that are critical for assisting communities with issues as they arise.

PARTNERSHIPS

Partnerships are an essential component of the Sea Grant Network. Federal funding and support is leveraged with monies, in-kind support, and volunteer time from many other groups and individuals, providing a high return for every federal dollar spent. Work in the areas of FAS has been, and continues to be, a collaborative effort involving many programs such as:

> National Ocean and Atmospheric Administration (NOAA) Office of Aquaculture
> National Marine Fisheries Service (NMFS)
> U.S. Fish and Wildlife Service (USFW)
> U.S. Food and Drug Administration (USFDA)
> U.S. Department of Agriculture (USDA)
> State fish and wildlife agencies
> State and local health agencies
> National, regional and local industry associations

Often Sea Grant research and/or extension plays an integral role in building and/or implementing the collaborations required to address FAS topics, most of which are multijurisdictional and involve diverse stakeholders. Partnerships will remain critical for achieving this integrated FAS vision.

Priority Focus Areas and Investments

The IFAS visioning team
identified five primary focus areas,
with 1-4 priority topics within each.
These priorities,
associated goals and current efforts are reviewed
and future efforts and investments are outlined
to facilitate a sustainable and resilient future
for FAS in the U.S.

FOCUS AREAS

1. COMMERCE: THE FAS ECONOMY

2. REGULATORY HURDLES

3. CURRENT AND EMERGING SPECIES, TECHNOLOGIES, AND PRACTICES

4. PRODUCTIVE AND RESILIENT SYSTEMS

5. SEAFOOD SAFETY AND QUALITY

PHOTO: LOUISIANA SEA GRANT

FOCUS AREA 1:
COMMERCE: THE FAS ECONOMY
PRIORITIES:
(A) Understanding current markets and developing new ones; and
(B) Creating tools and infrastructure to support fishing, farming, and production operations.

BACKGROUND: WHAT IS SEA GRANT DOING?

Enhanced knowledge of business development, direct marketing, seafood processing, and education of and marketing to end users directly impacts the economic viability and sustainability of FAS businesses. Programs across the network address each of these through research, workshops, publications, websites, and consultations. Programs continue to actively assist with educating, training, and researching the development of joint marketing organizations and programs, processing and marketing cooperatives, other collaborative arrangements and the development of new fisheries and aquaculture products to assist these businesses. Many programs are also involved in the development of ecotourism opportunities focused on coastal resources and seafood.

With increased competition, the downsizing of U.S. fisheries, the slow food movement and the call for collaborative management of resources by federal and state legislation (e.g., Magnuson-Stevens Act, Marine Life Management Act), the majority of Sea Grant programs are now evaluating consumer needs

PHOTO: NORTH CAROLINA SEA GRANT

PHOTO: ANDREW MUIR, MICHIGAN SEA GRANT

with regard to FAS through community, consumer, and industry surveys and assessments. They are working primarily with small scale businesses to identify ways to market FAS products and services through direct and alternative marketing opportunities, assist with business planning through education and trainings, and educate the public about FAS more generally.

Understanding the economic impact of FAS activities, including determining income from state parks, sport fisheries, and ecosystem services; shoreline damage assessments after flooding events; economic impact studies of the charter fishing industry; development of programs for determining the economic impact of marine industries in the state; and tools such as the "FishBiz" spreadsheets will allow individual businesses and agencies to evaluate the economic impacts of their decisions. Several programs conduct research to assess these impacts in their states.

(A) UNDERSTANDING CURRENT MARKETS AND DEVELOPING NEW ONES

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Assess and enhance the capacity to meet the demand for seafood products and services through research, outreach and education efforts.

RESEARCH

Increase understanding of markets for small-scale seafood businesses to reveal the needs and expectations that shape product selection, participation, and use of services. Information should include consumption habits, preferences for ready-to-cook and ready-to-eat seafood products, meal kits, other value-added seafood products, species preferences (underutilized, emerging, invasive and by-products), and price selection. This information should help to develop products that meet identified consumer needs.

PHOTO: DAN O'KEEFE, MICHIGAN SEA GRANT

Investigate consumer needs and preferences that would increase participation in and use of services for recreational fishing activities.

Facilitate research to aid in development of direct marketing initiatives and regulatory guidance.

Evaluate the effects of natural disasters on seafood businesses and resources along with opportunities for resiliency to aid in ensuring sustained business viability.

OUTREACH

Facilitate dissemination of and access to market research results and data.

Create strategies to engage stakeholders and public in our current programing and development of new initiatives (e.g. stimulate interest in recreational fishing through incentives programs).

EDUCATION

Educate consumers on seafood fraud and how they can discern integrity in the marketplace.

Provide essential business trainings for new and established seafood business personnel (see Business Training Topics below).

Develop and provide general consumer education resources and trainings to increase awareness of existing and potential new seafood businesses and show how to cook a variety of seafood. Communicate the benefits of seafood consumption with outreach materials and programs targeted specifically for food service, health professionals, and public and elected officials who regularly interact with and inform consumers.

(B) CREATING TOOLS AND INFRASTRUCTURE TO SUPPORT FISHING, FARMING, AND PRODUCTION OPERATIONS.

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Develop capital and social infrastructure that is both tangible and knowledgeable to maintain and grow domestic seafood businesses.

BUSINESS TRAINING TOPICS

- Topics: accessing, analyzing and interpreting market data (e.g., Market Maker and FishBiz trainings);
- Direct marketing classes (virtual and in person);
- Market Your Catch info;
- Business planning education to provide new and existing businesses with capital requirements and cost analysis;
- Information on obtaining and managing loans and equity;
- The permitting process; guidance for business expansion and startup requirements;
- Preliminary market analysis and consumer validation.

RESEARCH

Develop no or low waste, mobile processing technology and treatment that increases efficiency and thus profitability in seafood operations.

Identify disease pathways and treatment methods to enhance production success and efficiency.

OUTREACH & EDUCATION

Develop and maintain demonstration facilities to increase the ability to run and general understanding of seafood operations.

Facilitate training of professionals, teachers, and students in existing and new seafood processing tools, technologies and treatments.

Disseminate information to the public about advances in seafood technology that support sustainability.

AREAS FOR INVESTMENT & RESOURCES

Create and support a Sea Grant Extension exchange program and professional development funds to provide social science, market research, and economic trainings and resources to staff. Invest in regional experts in applied economics and market analysis, similar to our regional program coordinators, to provide expertise and assistance to programs as they conduct both internal and external measurements.

Develop partnerships to better implement and assess Sea Grant impacts and provide funding for expertise, research, and training on non-monetary valuation, and communication of both monetary and non-monetary values of Sea Grant programs nationally.

Implement a more streamlined grant application process, with access to external funding for tool and process development and demonstration facilities coupled with an extension focus to ensure applicable and accessible outcomes.

Increase the capacity to conduct business and finance workshops and connect citizens with U.S. seafood through the development of alternative (more direct) markets and new products (e.g., value-added, new species).

PHOTO: PAT KNIGHT, OREGON SEA GRANT

Increased information sharing (via websites and social media) across the Sea Grant network and internal coordination to do regional and national projects.

OPPORTUNITIES FOR INTEGRATION

Economic impacts span all sectors and are important for all stakeholders, and therefore, should be integrated across other Sea Grant visioning efforts (e.g., DEI, Aquaculture Communication, Citizen Science) to ensure accurate and relevant impacts are identified and reported.

Integration with Sea Grant communications personnel to standardize and coordinate outreach impact and promotion efforts locally and regionally.

Maintain relationships and enhance outreach to local, state and federal regulators as well as new partners (e.g. small-business development centers) to ensure collabor ation on new initiatives and to target new audiences.

Develop multi-use facilities, equipment, and resources to provide support and infrastructure to all sectors to assist with integration of FAS.

Economic valuation: Maintaining trust as a neutral broker

The network should provide internal training for Sea Grant personnel on how to best assess the economic impacts of our work to improve our valuation estimates for individual industries, activities, and ecosystem services. This can be complemented by the development of standard methods for sharing this information (e.g., infographics, one pagers etc. that are shared network wide). By effectively addressing these priorities we can expect: an increase in stakeholders trust in the economic numbers we use; congress and others will better understand the value of their investment in Sea Grant; prioritization of our work and that of management agencies is informed by economic impact numbers; more consistent information is used to inform policy decisions; and non-monetary values to our work are acknowledged.

PHOTO: ROBERT RAY, LOUISIANA SEA GRANT

FOCUS AREA 2:
ADDRESSING REGULATORY HURDLES

PRIORITIES:
(A) Regulatory hurdles surrounding business development and distibution and marketing of U.S. seafood; and (B) Multiple uses of ocean and coastal space with changing access.

BACKGROUND: WHAT IS SEA GRANT DOING?

Stakeholder assistance with identifying regulatory entities for a particular sector, the required permits for various activities, and accurate data collection that informs new and existing regulations are necessary to support a functional FAS regulatory framework. Sea Grant programs work with industry partners to overcome a variety of regulatory hurdles. For example, they assist stakeholders with public comment periods on newly promulgated regulations by providing a roadmap and web resources on the various steps involved in the rulemaking process. They act as facilitators of aquaculture permitting and spatial planning processes, and gather data, information, and input from stakeholders to inform these processes. Additionally, Sea Grant programs are key contributors to "Working Waterfronts," efforts to respond to changing uses and issues surrounding access to public waterfronts.

Confusion among regulatory bodies about newly forming marketing initiatives, (direct marketing, community supported fisheries, etc.) can hinder their potential for success. Many Sea Grant programs have identified this problem and have set goals to assist seafood businesses and agencies with clearly defining roles and requirements for the new markets. They are taking the lead in developing seafood marketing information to inform decisions about alternative markets, inefficiencies, and costs of seafood processing and transportation.

Likewise, compliance with seafood safety regulations is integral to the success and sustainability of seafood processors

and distributors. The Sea Grant network conducts research and synthesizes data to address questions regarding seafood safety, while providing Seafood Hazard Analysis and Critical Control Points (HACCP) training and one-on-one consultations to seafood processors. The network facilitates

PHOTO: LOUISIANA SEA GRANT

the development of measures for ensuring compliance with seafood regulations through collaborative processes to assist the industry in complying with USDA, USFDA, state public health departments, and other associated requirements.

PRIORITY (A): REGULATORY HURDLES SURROUNDING BUSINESS DEVELOPMENT AND DISTRIBUTION AND MARKETING OF U.S. SEAFOOD.

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goals: Bridge the gaps to develop new and maintain existing relationships between regulators and industry and facilitate collaborative relationships among industry stakeholders.

Increase distribution and marketing of U.S. seafood by addressing regulatory hurdles.

Facilitate a future forward (preventative) approach to direct marketing and regulatory guidance to identify and address potential issues before they become a hindrance.

RESEARCH

Identify regulatory hurdles and assist with the collaborative development of scientifically informed regulation and enhanced compliance.

Evaluate the economics of regulations that govern seafood businesses.

OUTREACH

Facilitate business development based on informed decision making that considers both opportunities as well as constraints limiting the viability of seafood businesses.

Serve as neutral brokers of information and facilitate communications between industry and regulators to assist with existing and new markets. Provide resources for guiding stakeholders through the regulatory process.

PHOTO: LOUISIANA SEA GRANT

Facilitate discussions regarding streamlining current processes and effectively integrating new markets (alternative markets, international markets) into regulatory processes.

Assist with infrastructure needs that support seafood marketing and distribution.

Continue to provide trainings on regulatory compliance (Seafood HACCP) and develop new trainings to assist growing and emerging sectors (e.g. Aquaculture HACCP).

EDUCATION

Develop standard federal guidance documents outlining the various agencies and general permits required of the various sectors (Fishers, farmers, processors, distributors etc.), along with consistent state by state resources that can assist in business expansion within and across states.

Build on existing seafood marketing educational materials and provide those materials through a centralized website (e.g., Sea Grant Library, seafoodhealthfacts.org, Market Your Catch)

Educate those outside of the seafood industry (e.g., consumers and public) about how seafood is regulated both pre- and post-harvest (e.g., fishery and aquaculture regulations, HACCP, inspections) to support better informed purchasing decisions and enhance connections of U.S. residents with seafood.

PRIORITY (B): MULTIPLE USES OF OCEAN AND COASTAL SPACE WITH CHANGING ACCESS

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Decrease conflict and promote collaboration among aquatic resource stakeholders. Structure programming efforts in this area to ensure regulatory security and certainty for new and existing users as access and uses evolve.

RESEARCH

Evaluate new and existing uses of aquatic areas, including aquaculture, recreational fisheries, commercial fisheries, and renewable energy to identify sustainable practices.

Lead or facilitate comprehensive assessments of current uses in aquatic habitats, as requested by stakeholders, to ensure the processes are transparent, inclusive, and informed by the best available science.

Note: It is not Sea Grant's role to initiate spatial planning efforts, and the role should be clearly defined when engaged in and/or funding such efforts. It could be appropriate for Sea Grant programs to initiate spatial assessments of existing uses if there is stakeholder or regulatory interest.
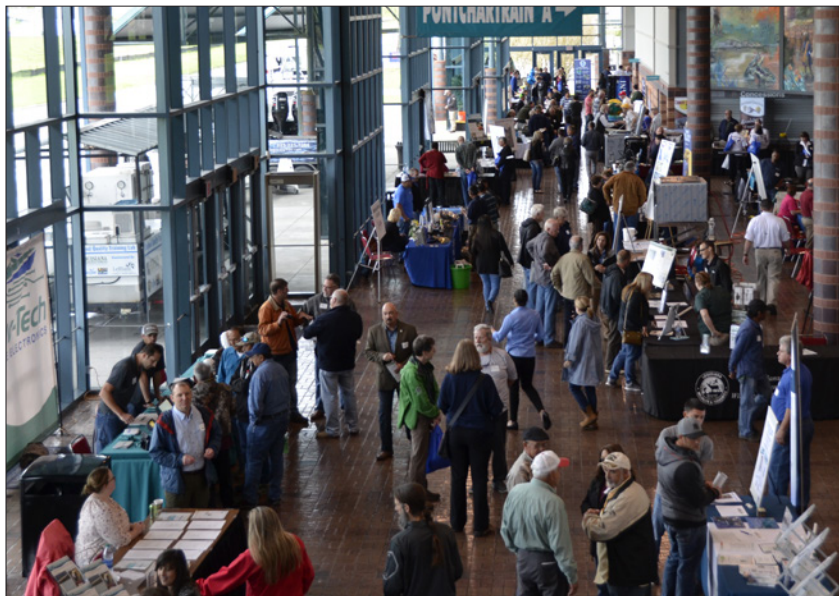
OUTREACH

Disseminate information about new uses of aquatic areas to stakeholder groups to enable informed decision making about associated practices and operations.

Facilitate increased collaboration (and decreased conflict) among users.

EDUCATION

Educate stakeholders on permitting and regulatory processes to ensure the permitting process and access to aquatic areas and resources is transparent and inclusive.

AREAS FOR INVESTMENTS & RESOURCES

Update the Sea Grant Library to ensure easy access to network resources. More funding for staff to implement changes and ensure continued updates of resources.

Improve and expand on centralized website for seafood marketing information (e.g. Market Your Catch website). Integrate with other existing Sea Grant-produced materials. Expand permitting section and resource section of the website to include information for all coastal states.

Build capacity for assisting with seafood marketing and distribution within and outside of Sea Grant. Develop internships and fellowships in seafood technology and marketing, increase number of seafood specialists, and expand professional training of extension specialists. Support Seafood Extension Network, a subgroup of the Fisheries Extension Network that focuses on post-harvest handling and marketing.

Provide funds to expand outreach to stakeholders to increase knowledge about seafood production, sustainability and regulations. Ongoing facilitation training for extension personnel is needed to ensure they have the skills necessary to address potentially volatile issues.

Conduct a legal review of coastal and shoreline access and space-use laws at a state and national level and develop a best practices guidance document for sharing spatial use assessments with the public. Improved access to mapping technologies and GIS professionals, and legal support from Law Center on land use and access issues is required to support these efforts. Review ongoing state efforts on integration of multiple aquatic space-uses to inform development of template/guidance document.

PHOTO: RHODE ISLAND SEA GRANT

Provide funds for ship time or access to ships for Sea Grant research to enable collection of data to inform spatial assessment and planning processes.

Review seafood education materials produced throughout the network in order to develop templates, materials, and projects that can be shared and implemented network-wide with consistent messaging to educate agencies and the public about seafood. Share knowledge about successful practices and lessons learned across extension programs.

Support regional and national initiatives to create complementary guidance documents for all sectors of the seafood industry to enhance understanding of federal and state regulations and assist with business expansion through vertical integration.

OPPORTUNITIES FOR INTEGRATION

Improve linkages with NOAA by designating a liaison to the Office of Aquaculture and enhance regional cooperation and collaborations for marine and Great Lakes aquaculture. Maintaining and enhancing relationships with states is needed for implementation and integration of aquaculture nationwide.

Facilitate creation of a collaborative national ocean and coastal space-use working group. Such a group would oversee a listserv and host webinars to share knowledge and experiences about integration of multiple aquatic uses. Identifying existing national and state-specific Listservs and groups would be the first step. Partners in such a group on other spatial access issues could also include:

Other federal agencies
Cooperative extension
NGOs
Commercial fishery advisory committees
All other visioning groups

PHOTO: LOUISIANA SEA GRANT

PHOTO: LOUISIANA SEA GRANT

FOCUS AREA 3:
CURRENT AND EMERGING SPECIES, TECHNOLOGIES AND PRACTICES

PRIORITY:
Improving existing fisheries, farms and products while exploring and developing new ones.

BACKGROUND: WHAT IS SEA GRANT DOING?

Increased utilization and value of FAS products can be achieved through the development of safety and quality training programs for manufacturing aquatic products; educating industry, regulators, policy makers, and the general public about the utilization, processing, safety and quality of new products; improving existing fisheries through technology and habitat assessments and improvements; and exploring and developing new fisheries, farms, products and technologies.

The FAS sectors rely on the development and enhancement of culture, harvest and processing methods and technology to ensure viability in changing social and environmental climates. The research, outreach and education

PHOTO: BRANDON SCHROEDER, MICHIGAN SEA GRANT

efforts of the Sea Grant Network address this need, in addition to facilitating and engaging in collaborative efforts focused on emerging species, including new and underutilized species, and reducing discard mortality and losses to benefit recreational and commercial fisheries (e.g., barotrauma, reduced bycatch) and fish farms (e.g., disease management, developing new species). Existing project examples include:

- New product and market development of byproducts and waste.
- Research and trainings that increase business diversification through development of new fisheries and cultured species.
- Extending the shelf life of raw seafood.
- Developing ready-to-cook and ready-to-eat seafood and conducting market research to determine other types of products that increase consumption of U.S. seafood.
- Development of demonstration farms and training programs for disseminating information about new gears and technology.

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> **PRIORITY: IMPROVING EXISTING FISHERIES, FARMS AND PRODUCTS WHILE EXPLORING AND DEVELOPING NEW ONES.**

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Increase the utilization and economic value of aquatic products.

RESEARCH

Increase the incorporation of seafood technology and social science in market research and product development, especially understanding the implications of utilizing new species and the support for new markets.

Identify better ways to apply new technologies that are practical and economically, socially, and ecologically sustainable.

Facilitate collaborations with industry partners and academic departments (e.g. Food Science) to conduct applied seafood research and leverage resources/expertise.

OUTREACH

Create a plan for integrating the use of infra-structure developed or modified as part of a demonstration or pilot project, currently it often reverts back to the state. Explore ways for expanding development and use of the infrastructure where appropriate in other parts of the nation.

Expose a broader audience to Sea Grant species and market development research, outreach, and education efforts through participation in regional and national events and conferences.

Facilitate dialogue between resource managers, public health agencies, and fishers and farmers to increase utilization of new species and markets.

EDUCATION

Work with industry and regulators to develop safety programs for new products and technologies and continue to enhance HACCP and other seafood technology trainings.

AREAS FOR INVESTMENTS & RESOURCES

Fund positions for seafood technologists and specialists, seafood business and marketing specialists, economists and social scientists to develop new programs and trainings.

OPPORTUNITIES FOR INTEGRATION

Create a Sea Grant exchange program within the Fisheries Extension Network (FEN) to support regular interaction and exchange of expertise across the network. Improve the integration of seafood scientists and social scientists into FEN to facilitate information exchange and collaboration and enhance engagement with the Sea Grant Law Center early on in project development.

PHOTO: FLORIDA SEA GRANT

PHOTO: RHODE ISLAND SEA GRANT

PHOTO: VANESSA CHOLEWCZYNSKI, OREGON SEA GRANT

FOCUS AREA 4:
PRODUCTIVE AND RESILIENT SYSTEMS

PRIORITIES:
(A) Sustainable Practices & Policy under Changing Conditions;
(B) Information Needs, Collection and Use;
C) Workforce Development; and
D) Informing the Public on Sustainable Fishing and Farming Practices.

BACKGROUND: WHAT IS SEA GRANT DOING?

Collection, access, and accurate interpretation of data; availability and accessibility of sustainable technologies and sustainability information; an informed public; and access to a skilled and reliable workforce all are key components of viable

PHOTO: LOUISIANA SEA GRANT

FAS industries. The Sea Grant network has been engaged in a variety of efforts to not only collect information needed by a range of partners (e.g., industry, agencies, policy makers), but to assist with its interpretation and use. Programs have been facilitating the development of collaborative projects, including:

- collecting environmental (e.g. water quality), biological (e.g., size, movements, habitat use, behavior, disease), ecological (e.g., bycatch, ecosystem-based) and social science (e.g., factors influencing fishing patterns, economics) data to address specific management questions; conducting research to evaluate management tools (e.g., marine protected areas, at-sea data collection programs), ecological restoration and invasive species management efforts;
- identifying needs, synthesizing existing and collecting new data to assist with siting of aquaculture projects; and
- presenting information on research findings as an independent, unbiased, third party and educating

various groups and citizens about information and data needs, their collection, and use for management of marine resources.

To support the continued success and viability of FAS industries, the Sea Grant Network has developed sustainable practice programs, including:

- resilience and adaptation (e.g., Safe Harbors, Commercial Fisheries Diversification, Creation of new fisheries and markets, Ocean Acidification, Coastal adaptation);
- working with commercial and recreational fishermen, charter vessels, and farmers to enhance sustainability of current and emerging practices (e.g., turtle excluder devices, restoring and maintaining oyster beds, catch and release practices, and farming practices);
- improvement in fisheries management approaches and engagement among stakeholders and the public (e.g. research on specific species and technology [e.g., flounder, shrimp, lobster, crab, halibut], policy implementation, stock assessments and other data driven management strategies, collaborative (co-) management processes); and
- user group conflicts (e.g., landowners and coastal access, addressing not in my backyard issues; commercial and recreational fishermen targeting the same species; aquaculture versus commercial fishermen or other community members; and other ocean uses [e.g. energy]).

The Sea Grant network also has been engaged in building workforce capacity to ensure the industry has access to skilled labor, and developing consumer education at different levels to create and enhance demand for local products and services. A few examples include:

- informal youth programs such as summer camps, school programs, and competitions;
- professional development trainings for industry personnel including Seafood HACCP, Charter Boat Workshops, Safety at Sea workshops and the creation of internship and fellowship programs;
- informal outreach programs aimed at promoting sustainable fishing and farming practices. These programs are geared towards end users such as fishermen or the general public as well as 'train the trainer' efforts where participants (e.g., chefs, artists, reporters, educators, policy makers, guides) gain knowledge that enables them to educate others about sustainable practices; and
- formal education efforts, which include the development of K-12 education, curriculum, and

activities development; the creation of college (for-credit) courses on marine, aquatic, and seafood topics; fellowship programs; and support for graduate students.

PRIORITY (A) SUSTAINABLE PRACTICES & POLICY UNDER CHANGING CONDITIONS

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goals: Increase sustainability and resiliency by working with commercial and recreational anglers, recreational charter vessels, farmers and investors.

Build capacity for and engagement in assessing potential improvements in management, engagement, and approaches to challenges, including fisheries user group conflicts.

RESEARCH

Increase collaborative research between stakeholders and management agencies to improve sustainability and resiliency of coastal communities.

Create future casting models and research (e.g., climate change, HAB events.) to better understand changes occurring in fisheries and aquaculture and identify current and future challenges for fisheries and aquaculture.

Perform collaborative research with fishing and aquaculture communities on a variety of topics including specific species, technology, gear, stock assessments and other management strategies, and best management practices (e.g., minimizing transport and spread of invasive species on gear; reduce impacts on habitats).

OUTREACH

Facilitate dialogue between state level managers and fishers/farmers to increase inclusion and collaboration between them.

Enhance opportunities for community supported and engaged habitat restoration and creation projects.

PHOTO: LOUISIANA SEA GRANT

EDUCATION

Provide fishers and aquaculturists with professional development opportunities such as job shadowing, apprentice programs, other business opportunities, permitting, and seafood safety to enhance their resiliency in changing times.

Educate the industry on the stock assessment process and data collection to help them understand and accept the science.

Provide additional funding to support undergraduate and graduate students going into the field.

PRORITY (B)
INFORMATION NEEDS, COLLECTION AND USE

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goals: Collect, evaluate and access data to develop effective and scientifically sound programs and policies.

Identify data and information needs and facilitate development of integrated collaborative projects that incorporate stakeholders, researchers, and agencies and resource managers early on.

Improve access to and use of existing data to increase and enhance stakeholder confidence and trust in science.

RESEARCH

Identify methods for improving access and use of data from Sea Grant-affiliated research throughout the network.

OUTREACH

Increase Sea Grant's role in assisting with collaborative projects, including facilitating collaborative efforts and providing training in data collection, storage, interpretation and analysis, and integration with management to stakeholders.

EDUCATION

Educate stakeholders about data needs; methods for collecting, storing and analyzing it; and its use in management of marine resources.

PRIORITY (C) WORKFORCE DEVELOPMENT

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goals: Maintain and enhance existing programs for the current and future workforce across the commercial and recreational supply chain with a focus on "Fish to Dish" learning.

Educate the workforce about the intricacies of all seafood sectors to help bridge gaps and create a more cohesive and cooperative industry moving forward.

RESEARCH

Identify barriers to entry and retention of seafood business personnel and ways to address them.

OUTREACH

Facilitate workforce development for seafood businesses by providing information about occupation opportunities and resources for getting started or expanding.

Provide information and trainings in occupational safety and health risks.

Help address mental health and substance abuse issues facing seafood businesses.

EDUCATION

Expose next generation audience to various aspects of seafood businesses (e.g., fishing and aquaculture gear, seafood marketing, processing).

PHOTO: LOUISIANA SEA GRANT

PHOTO: LOUISIANA SEA GRANT

Develop trainings for teachers who can integrate information into curricula and write up existing materials into a curriculum that can be provided to schools.

PRIORITY (D) INFORMING THE PUBLIC ON SUSTAINABLE FISHING AND FARMING PRACTICES

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Prioritize our target audiences and partners, maintain and enhance current educational and outreach programming across the network, and enhance the networks ability to develop and evaluate programs to optimize impact.

RESEARCH

Conduct socioeconomic research to better understand the needs and interests and demographics of our user groups to support more targeted programming.

Conduct comprehensive needs assessments of the network to better identify programming efforts that can be shared and developed across the network including targeted audiences, outreach strategies, key messaging and evaluation methods.

Conduct survey work (e.g. nested survey design) to assess awareness and knowledge regarding seafood products and services, and the impacts of our efforts at the national and state level.

OUTREACH

Increase the presence, visibility, and awareness of our work on U.S. seafood products and services at a national level. Improve Sea Grant engagement with the NMFS, fishing industry groups, and non-governmental organizations etc. at key meetings and conferences.

Better integrate and connect Knauss fellows in key seafood-related positions to ensure Sea Grant is recognized as a viable and reliable partner.

EDUCATION

Continue offering outreach and education programming, while developing key messages that can be used across the network to strengthen the impact of Sea Grant's programming in this area.

Coordinate with Sea Grant education and communication networks to develop and integrate targeted, consistent messaging about sustainable fishing and farming practices into curricula.

AREAS FOR INVESTMENT & RESOURCES

Improve and refine platform(s) to house, search for and share curriculum, programs, and assessment tools at the national level.

Translate publications and other resources to relevant languages (e.g., Spanish, Vietnamese) and hire agents who are bilingual and represent underserved or underrepresented audiences.

Increase funding for research that develops education materials for stakeholders on fisheries and future impacts. Support creation and maintenance of technology that helps Sea Grant offer effective and impactful programming through modern platforms.

PHOTO: GEORGIA SEA GRANT

PHOTO: LOUISIANA SEA GRANT

Offer national and regional conferences and workshops with key partners and audiences to increase capacity in delivering timely and impactful programming.

Facilitate and conduct research on the barriers to entry of seafood businesses. Identify ways to implement nationwide effort in workforce development, including development of seafood-related curricula, internships, and apprenticeship programs.

Provide information about costs and access to capital for starting and expanding seafood businesses. Identify partners for workshops.

Provide information about the Trade Adjustment Assistance Act and experiences of seafood businesses that have used it (e.g. Gulf shrimpers).

Develop a more uniform role across the network for extension advisors, agents, and specialists in research to better facilitate collaborative research. Improve the process for integrating extension into Sea Grant-funded projects when assistance is requested such that extension personnel contribute to the research from the beginning (contribute to proposal development). In addition, have a uniform national policy on Sea Grant personnel involvement on state research proposals.

Fund and provide resources for dedicated data collection, compilation and analysis within Sea Grant. Fund regional Sea Grant positions that serve as go-to data sources and are coordinated with NOAA offices and other agencies. Improve organization, synthesis and use of data obtained from Sea Grant and NOAA projects and state and federal databases.

OPPORTUNITIES FOR INTEGRATION

- Develop and refine the Sea Grant Library to host programming and evaluation resources across the network to improve access and use among different programs and to increase collaboration within the Sea Grant network as well as with external partners.

- Develop peer to peer learning opportunities (e.g. Agent Exchange) to share best practices and strategies for outreach programs. Explore the possibility of co-funded positions through partnerships with agencies to utilize existing data (e.g., expand NMFS Sea Grant fellowship program; develop state-based fellowship programs for collaborative projects that address local, state, federal needs). A more structured role of extension in collaborative research can help integrate the research, outreach, and education efforts across a topic.
- Integrate with other relevant Sea Grant Visioning Plans (e.g., tourism, aquaculture communications, education, citizen science, working waterfronts, and diversity and inclusion) to help enhance programming efforts.
- Expand or introduce recruitment and retention, entrepreneurship development, youth and apprenticeship programs with a broad industry focus that introduces the potential workforce to all aspects and sectors of FAS industries.
- Collaborate with the Sea Grant Education Network.

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PHOTO: LOUISIANA SEA GRANT

FOCUS AREA 5:
SEAFOOD SAFETY AND QUALITY
PRIORITIES:
(A) Seafood Safety, Quality Training and Technical Support for Fishing and Seafood Businesses: and
(B) Consumer Education: Seafood Safety and Nutrition.

BACKGROUND: WHAT IS SEA GRANT DOING?

The FAS sectors rely on research, trainings, and one–on–one enterprise specific consultations on post-harvest practices, seafood safety, quality assurance and control techniques, charter operations, regulatory compliance (e.g. Seafood HACCP and Sanitation Control Procedures (SCP)), and recreational angling safety practices to navigate the complex social, ecological and regulatory networks in which they interact. Sea Grant programs are often at the forefront of such trainings and consultations. They also conduct sector, enterprise, and individual specific technical services such as product sampling, testing and inspection service, and in some cases act as a State's appointed "Processing Authority."

Developing, packaging, and disseminating information about seafood safety, quality, nutrition, and potential risks is an important part of ensuring the success of FAS sectors. Currently programs throughout the network provide this information through a variety of platforms including websites, publications, workshops, fact sheets, demonstrations, and festivals and events

PHOTO: LOUISIANA SEA GRANT

with chefs and seafood producers. The network is also actively involved in conducting research on seafood safety, quality, consumption patterns, consumer perceptions about seafood and aquaculture products and assisting with monitoring of seafood microbial and chemical contaminants (food-borne pathogens, biotoxins) to inform regulatory advisories.

PRIORITY (A) SEAFOOD SAFETY, QUALITY TRAINING AND TECHNICAL SUPPORT FOR FISHING AND SEAFOOD BUSINESSES

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Enhance the networks capacity to conduct trainings in seafood safety and quality (e.g., good post-harvest handling and practices, better seafood processing) to assist in the growth of the seafood industry as a whole. This includes enhancing and expanding current trainings and programs, as well as developing new resources and trainings.

RESEARCH

Support advances in post-harvest practices, seafood safety, and quality enhancement to ensure wholesome products are produced as the industry grows.

Conduct applied research related to seafood technology, processing, safety, and quality in collaboration with industry groups.

Address impacts of increasing seawater temperature and other climate factors on foodborne pathogens (e.g. pathogenic Vibrio spp.) and natural biotoxins (e.g., domoic acid and other HABs biotoxins).

Address emerging concerns associated with microplastics, animal drugs, pharmaceutical and personal care products (e.g., antibiotics and estrogenic compounds), and other contaminants (particularly following natural disasters).

OUTREACH

Maintain and enhance current seafood safety and quality training courses and one-on-one consultations, and continue coordination with regulatory agencies to assist industry with compliance.

Identify new needs, issues, and opportunities in the area of commercial seafood processing by working closely with the industry, regulatory agencies, and policymakers.

Create new training programs and demonstration projects to teach targeted audiences   practices, procedures, techniques, and skills that will ultimately result in behavior change over time.

Increase capacity building by conducting training programs and producing outreach materials in multiple languages (e.g., Spanish, Tagalog, Vietnamese.).

Enhance existing and potential partnerships (e.g. National Seafood HACCP Alliance (SHA) and Association of Food and Drug Officials (AFDO), Interstate Shellfish Sanitation

Conference (ISSC), FDA and USDA) to increase programming capacity and trainings. For example, Sea Grant has rich history of partnering with AFDO to develop and provide Seafood HACCP and SCP trainings through the Seafood HACCP Alliance. The Alliance is now working towards developing a HACCP course for aquaculture sector, providing an opportunity for Sea Grant to work closely with them to bring these programs to the industry.

EDUCATION

Maintain established college level education courses and create new "for-credit" training curricula as needed for college and non-college students associated with seafood science and technology, seafood safety, and quality management.

Expand safety and quality training programs for specific species and to specific industry sectors, while maintaining and expanding quality training and one-on-one consultations in response to specific industry needs.

PRIORITY (B) CONSUMER EDUCATION: SEAFOOD SAFETY AND NUTRITION

WHAT SEA GRANT SHOULD DO MOVING FORWARD

Goal: Address seafood safety in a changing environment, develop consistent seafood messaging across the network, and expand seafood consumer education through research, outreach, and education efforts.

RESEARCH

Identify and fund projects that help to address health benefits and safety of seafood.

Increase involvement of extension personnel in identification of NOAA Sea Grant RFP topics and project selection including both health benefits and safety concerns associated with seafood consumption.

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PHOTO: CALIFORNIA SEA GRANT

OUTREACH

Develop science-based seafood messages through a collaborative process. Work with Sea Grant extension, researchers, communicators, program leaders, industry groups and other knowledgeable entities to update and distribute key science-based messages on seafood benefits and safety acknowledging variability among and within states and habitats. (Need to be effective at keeping things in perspective; consumers remember risks, not benefits.)

Develop and distribute information to consumers to inform their decisions about buying, handling and consuming seafood, the health benefits, and safety practices and precautions. Communicate consistent messages about U.S. and international farmed and wild-caught products. Lead targeted national campaign to increase knowledge about U.S. seafood.

Increase training opportunities and professional development within Sea Grant network.

EDUCATION

Expand on existing K-12 materials, integrate materials into 4-H and other after-school and community-based programs.

Conduct in-service trainings for educators (train the trainers) and provide 'for credit' professional development opportunities to regulators, health professionals and culinary schools, etc.

AREAS FOR INVESTMENT & RESOURCES

Invest in seafood specialists at the regional or state level that have the capacity to conduct research and outreach on post-harvest practices and technology to maintain and improve seafood safety and quality, particularly working side by side with stakeholders on implementation. Many state programs do not have a Seafood Safety and Technology Specialist on staff.

Conduct survey with stakeholders and regulatory agencies to identify needs and requirements for updating current seafood safety and quality training programs, expansion to new programs, and research priorities.

Fund and provide resources to maintain and enhance existing Sea Grant-developed seafood education and training programs, update materials and websites along with the creation of a central repository for this information, and conduct new applied research associated with seafood safety and quality.

Provide support for the development and expansion of materials for K-12 education and associated trainings on seafood nutrition and safety (4-H, after-school and community programs, in-service trainings for educators).

Provide funding for development of new training curricula and courses for college and non-college students, including the industry, regulatory agencies and policymakers, associated with seafood science and technology, seafood safety and quality management.

Increase funding for applied research and emerging issue conferences and workshops that address health benefits of seafood consumption and potential risks resulting from changing ocean conditions. Provide 'for credit' professional development opportunities to regulators, health professionals and culinary schools.

Establish a Sea Grant Seafood Extension Network for Specialists and Agents that focuses on post-harvesting activities to leverage talents and better serve the nation's stakeholders.

OPPORTUNITIES FOR INTEGRATION

Improve connectivity with NOAA and NMFS and facilitate greater inclusion of the Great Lakes programs.

Maintain and enhance interactions with agencies and professional organizations.

Increase access to translators to assist with stakeholder activities that include a multinational workforce.

PHOTO: LOUISIANA SEA GRANT

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IFAS VISION IMPLEMENTATION

Based on the priorities above, the IFAS visioning team developed the following implementation plan. It provides steps that should be taken over the next ten years and expected outcomes for each. By investing in these actions, the NSGCP will be better equipped and connected nationally to effectively meet the FAS research, outreach and education needs of U.S. coastal and Great Lakes communities with benefits to all U.S. residents.

IFAS VISION IMPLEMENTATION PLAN
Numbers in parenthesis correspond to the outcome/goal that will be achieved. See numbers on page 26.

1 – 2 YEARS

RESEARCH

Invest in research that identifies barriers to FAS workforce entry and expansion and evaluates approaches and resources for addressing them (2, 4, 6).

Develop, identify, and apply technology that will enhance the utilization and economic value of aquatic products. Extend shelf-life, enhance quality, minimize by-product loss, and optimize harvest and production of aquatic products through innovative, applied research initiatives (6-7, 13).

Continue to research and develop new technologies and resources to address changing food safety and compliance needs. Create tools and techniques for controlling food safety hazards and facilitating compliance (3, 7, 9, 11, 16).

Identify and develop new research and outreach tools (e.g., consumer surveys, product availability surveys, regulatory guides, food safety apps) (4-5, 7, 9, 16).

Create innovation grant opportunities for stakeholders and implement a more streamlined application process, especially for applied research on emerging issues (18).

EXTENSION & EDUCATION

Build collaborations within the FAS Sea Grant Network (including in person and virtual sharing, professional trainings) to enhance development and application of successful projects on national level, minimize duplication of effort and learn from unsuccessful endeavours. (19-22).

Encourage associations and stakeholders to invite state and federal regulators to meetings and conventions. Engage them more closely so ample opportunity for collaboration and leveraging of funds are identified and utilized to benefit both parties (3, 9, 11, 15).

Develop evaluation tools to measure effectiveness of education and outreach efforts more accurately and efficiently (12, 20).

INTERNAL INVESTMENTS

Increase personnel capacity: including more specialists, fellows and interns. Additional staff, including aquaculture specialists, seafood specialists, social scientists, economists and marketing specialists will enable the programs to better address FAS needs and provide impactful programming for a broad stakeholder base (1-4, 6, 8-11, 13, 15, 19-20).

Conduct networkwide assessment of current efforts, best practices, research and outreach gaps and needs, and lessons learned. Synthesize information about network programs (workforce development, direct marketing, technical trainings, collaborative research, education, etc.) nationwide. Use the information to gain insight from and improve on what didn't work and apply what did work across the network where applicable (1, 3, 7, 10-11,15, 20-22) .

Enhance Sea Grant Library to facilitate sharing of existing resources across the network to expand on state based programs Increase funding to Sea Grant library to make it more user friendly. Develop new formats of materials (e.g., downloadable one pagers, videos, and webinars). Engage stakeholders in development and review of overarching messaging for research, outreach and education efforts (7, 17, 19-21).

Increase professional development (PD) opportunities for staff and funding to support more effective and meaningful programs and evaluation across the network. Effective PD opportunities should include: Sea Grant Exchange program meetings; effective program and research design, communication strategies, facilitation, and program evaluation; and economic evaluations including methods and BMPs for determining economic impact (SG Academy 2.0) (7, 11-12, 15, 19-21).

3 – 5 YEARS	5 – 10 YEARS

RESEARCH
 	
    Conduct properly designed and implemented seafood market research through directed RFPs and increased capacity of social science expertise (3, 5-7, 12, 15-16, 20).
 	
    Conduct studies to ascertain market demand for new species and processed products and associated investment requirements (e.g., infrastructure, permits, equipment). Disseminate information to FAS community to facilitate development of products that support an expressed need (3-7, 16).
 	
    Develop protocols for collecting and interpreting data and methods for housing and sharing data across the network. Establish a data working group to improve access and use of data, including funds for regional data positions (personnel, resources) within Sea Grant Extension (17, 20-21).
 	
    Identify existing data that could be used to address information and research gaps and develop positions or projects to facilitate data analysis (17, 20-21).
 	
EXTENSION & EDUCATION
 	
    Develop outreach and education materials about seafood business opportunities, building on network assessment of existing materials and programs (1-2, 4, 12, 15).
 	
    Develop regional demonstration facilities that integrate research and extension to ensure applicable and accessible, building upon existing programs (1, 4, 6, 12,16, 18).
 	
    Enhance Knauss Fellows involvement with seafood issues as well as Sea Grant's presence and sponsorship at national conferences and meetings associated with FAS (19-21). Integrate discussions of academics with FAS professionals to facilitate collaborations that address FAS research needs (3, 9-10, 15, 19).
 	
INTERNAL INVESTMENTS
 	
    Work with SG communicators to develop messages and stories about Sea Grant's work in collaborative research and associated impacts with communicators including the relevancy of science and highlight trustworthiness of science (11, 15, 19-21).
 	
    Increase capacity of FAS Sea Grant Network through funding and opportunities for in-person meetings, increased virtual collaboration in between meetings. Improve program support of network-wide outreach, research and education efforts (1, 3, 7, 17, 21-22).
 	
    Increase personnel to better reflect underserved and underrepresented audiences. Include multilingual personnel and trainings/resources to help current staff better identify and engage these audiences (1-2, 7-8, 12, 15).
 	
    Increase communications and media relations highlighting Sea Grant activities and resources. Develop consistent communication about the value of the network and its research, outreach, and education efforts nationwide to build trust and recognition (10, 12, 19, 21).
	RESEARCH
	
	    Expand on research efforts initiated in years 1-5. Alter research priorities to address changing social, ecological, and political needs. (2-6, 10, 13-14).
	
	EXTENSION & EDUCATION
	
	    Enhance and build social and capital infrastructure to meet a rising demand for seafood products and fishery services (1-2, 4, 8).
	
	INTERNAL INVESTMENTS
	
	    Sustain funding to support network-wide research, outreach and education efforts promoting sustainable and safe FAS practices and production (1-2, 4, 7-8, 11, 13-14).
	
	    Reassess network needs, messaging, and gaps in research and outreach. Implement a new plan for addressing changing FAS industry needs and explore new opportunities (2, 4, 6, 8, 16, 18, 20).

MEASURABLE OUTCOMES AND GOALS

Successful implementation of the action items outlined in the IFAS Implementation Plan on the previous two pages will result in these 22 corresponding outcomes and goals

1. Increased attendance and more workforce development programs offered throughout the network (increased number of demonstration facilities and trainings).

2. Increased employment in FAS sectors.

3. Increased capacity (within and of Sea Grant) to help address regulatory hurdles faced by FAS businesses.

4. Increased number and size of successful seafood businesses including eco-tourism and recreational fishing businesses.

5. More processes and decision making tools for marketing and distributing U.S. seafood.

6. Increased production of value-added products and profitability and reduced shrinkage and waste of seafood and recreational harvest.

7. Increased delivery of new aquatic products that satisfy documented consumer needs.

8. Increased consumption of sustainably produced U.S. seafood (recreational, commercial, & farmed).

9. Improved clarity about seafood regulations and control of hazards resulting in a decrease in the number of fines for noncompliance in seafood businesses.

10. Increased recognition of seafood regulations and associated public health benefits and risks among agencies and citizens resulting in decreased seafood associated disease outbreaks and increased consumption of U.S. seafood.

11. Improved stakeholder a) understanding of responsible practices and management of fisheries and aquaculture, b) adoption of sustainable fishing and farming practices, and c) participation in the management and decision making process.

12. Increased outreach and education to nontraditional underrepresented audiences as reported by state programs.

13. Enhanced seafood stocks and production through reduction of post-release fish mortality, bycatch, and other sustainable fishing and farming practices.

14. Reduction in the spread of invasive species through fishing and farming practices.

15. Increased communication among fishermen, farmers, agencies, and stakeholders.

16. Increase in the number of tools available to consumers and researchers to address industry needs.

17. Increased and enhanced access and compilation of data across scales.

18. Increase in funding opportunities for stakeholders.

19. Increased visibility and recognition of Sea Grant as a key national partner in addressing sustainable seafood challenges, measured through partnerships and presence at regional and national conferences.

20. Increased ability of the Sea Grant network to offer and evaluate targeted outreach programming that results in more meaningful impacts across the network. Measured through more accurate and impactful reporting.

21. Improved communication and synergy among Sea Grant programs; improved consistency of key messaging about sustainable practices; and better utilization of resources across the network. This can be measured by assessing the number of programs and resources assimilated throughout the network.

22. Increased capacity and productivity of FAS Sea Grant Network.

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    Julie Lively......................Louisiana Sea Grant
    Carolynn Culver.............California Sea Grant
    Catherine Liu..................Maryland Sea Grant
    Jim Berkson.....................National Sea Grant Office/ NOAA

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    Gabriel Dunham ....Alaska Sea Grant
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    Quentin Fong..................Alaska Sea Grant
    Tory Gabriel....................Ohio Sea Grant
    Amanda Gladics.............Oregon Sea Grant
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    Sara Mirabilio ....North Carolina Sea Grant
    Dana Morse.....................Maine Sea Grant
    Barry Nash ....North Carolina Sea Grant
    Elliot Nelson ....Michigan Sea Grant
    Amanda Nichols.............National Sea Grant Law Center
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    Ben Posadas ....Mississippi-Alabama Sea Grant
    Kwamena Quagrainie ....Illinois-Indiana Sea Grant
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    Titus Seilheimer ....Wisconsin Sea Grant
    Evelyn Watts....................Louisiana Sea Grant
    Dorothy Zimmerman....Florida Sea Grant
    Mitchell Zischke.............Illinois-Indiana Sea Grant

FINAL NOTE:

The agenda, list of attendees, and full meeting minutes are available online at *https://seagrantfisheriesextensionnetwork.wordpress.com/previous-meetings/*

REFERENCES

(1) National Oceanic and Atmospheric Administration (NOAA), Office of Coastal Management. 2018. "NOAA Report on the U.S. Ocean and Great Lakes Economy." Charleston, SC: NOAA Office of Coastal Management. Available at: *https://coast.noaa.gov/digitalcoast/training/econrep tml*

(2) National Oceanic and Atmospheric Administration (NOAA), Office of Science and Technology, National Marine Fisheries Service "Commercial Fisheries Statistics: Annual Commercial Landings Statistics" (Commercial dockside value was used to estimate the value of the top 5 recreationally caught finfish species). Accessed Online August 2, 2018 at: *https://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html*

(3) National Marine Fisheries Service (2017) Fisheries of the United States, 2016. U. S. Department of Commerce, NOAA Current Fishery Statistic No. 2016. Available at: *https://www.fisheries.noaa.gov/feature-story/fisheries-united-states-2016*