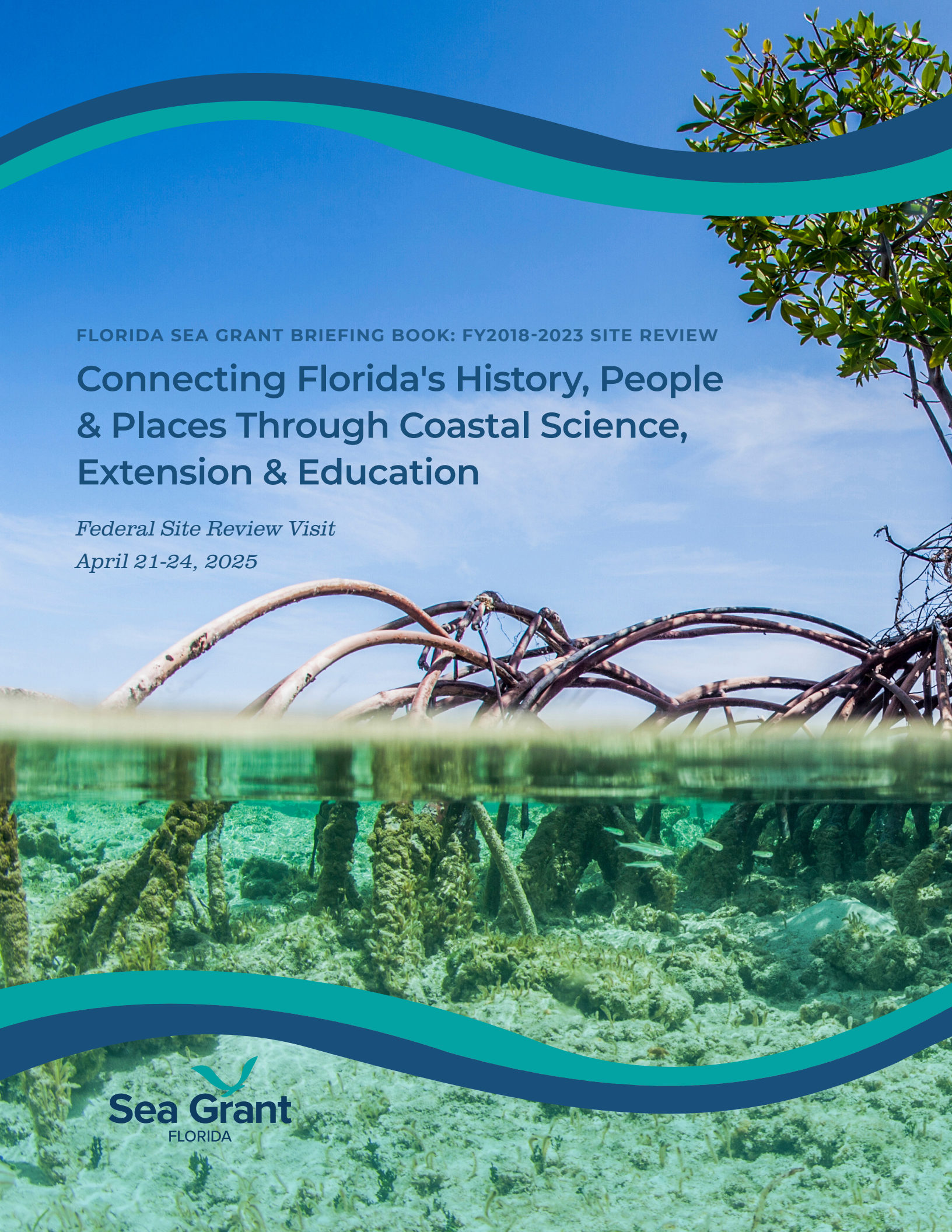


FLORIDA SEA GRANT BRIEFING BOOK: FY2018-2023 SITE REVIEW

Connecting Florida's History, People & Places Through Coastal Science, Extension & Education

Federal Site Review Visit

April 21-24, 2025

Sea Grant
FLORIDA

FLORIDA SEA GRANT FY2018-23 SITE REVIEW

AGENDA-AT-A-GLANCE

VIRTUAL MEETING

Monday | 21 April 2025

1:00 – 1:40 PM — **Introduction**

NSGO/FSG Program Officer

2:00 – 4:00 PM — **Program Management & Organization (PMO)**

Previous SG Program Reviews (2019 Site Review & Midcycle Review)

Panel: "FSG's Strategic Management Approach"

4:00 – 5:00 PM SRT Closed Session (60 minutes)

Tuesday | 22 April 2025

9:00 – 10:00 AM — **Engagement**

Panel: "How FSG Operates with Stakeholders"

10:20 – 11:20 AM — **Collaborative Network Activities**

Panel: "How FSG Works with Partners "

11:30 – 12:00 PM — **Performance**

Evidence of Leadership and Productivity

Panel: "FSG at the University of Florida (UF) and UF's Senior Leadership"

12:00 – 1:00 PM Lunch | SRT Closed Session (60 minutes)

1:00 – 3:40 PM — **Sustainable Fisheries and Aquaculture (SFA)**

SFA Panel I: "Fisheries and Seafood Goals" (G2.1 and G2.3)

SFA Panel II: "Aquaculture and Environmental Goals" (G2.2 and G2.4)

SFA Panel III: "Student Education and Training" (ELWD Goals)

3:40 – 4:00 PM — **Summary and Discussion: SRT & FSG Senior Leadership**

4:00 – 6:00 PM SRT Closed Session (120 minutes)

Wednesday | 23 April 2025

9:00 – 10:00 AM — **Healthy Coastal Ecosystems (HCE)** including Panel

10:20 – 11:20 AM — **Resilient Communities and Economies (RCE)** including Panel

11:30 – 1:00 PM Lunch | SRT Closed Session (90 minutes)

1:00 – 2:00 PM — **Environmental Literacy and Workforce Development (ELWD)** including Panel

2:20 – 3:00 PM — **Wrap-up**

3:00 – 5:00 PM SRT Closed Session (120 minutes)

Thursday | 24 April 2025

9:00 – 12:00 PM SRT Closed Session (180 minutes)

12:00 – 1:00 PM Lunch | SRT Closed Session (60 minutes)

1:00 – 2:30 PM — **SRT Report Out:** FSG Senior Leadership

FSG Senior Leadership

UF Administration & FSG Senior Leadership

3:00 – 5:00 PM SRT Closed Session (120 minutes)

Thank you!

PROLOGUE

Connecting Florida's People & Places

Florida--the Sunshine State--occupies an enviable geographic setting with abundant resources and a mild sub-tropical climate that drive exponential human population growth. According to the U.S. Census, of all coastal or Great Lakes States, Florida has the second largest coastal population (16.2 million people or 74% of the state's population). These numbers reflect a tapestry of political jurisdictions spanning urban and rural settings (Fig. 1) and a microcosm of intertwined social, environmental and economic systems that underpin resource management issues facing the Nation.

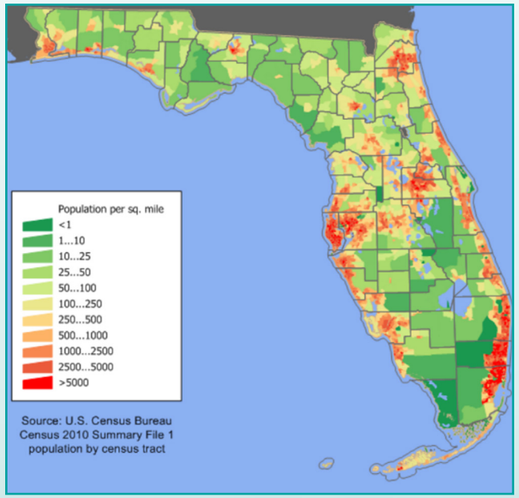


Figure 1. Florida population per square mile.

Florida's population and communities are as varied as its natural environments, spanning heavily urbanized cities including Miami, Jacksonville, and Tampa/St. Petersburg to small water-dependent communities along the Gulf (e.g., Cortez, Cedar Key, Steinhatchee) and Atlantic coasts (e.g., Fernandina Beach and Sebastian), which are home to many of Florida's family-operated fishing and shellfish aquaculture businesses.

Florida's numerous natural, historical and cultural assets have led to the naming of several distinct coastal regions such as the Emerald Coast, Sun Coast, First Coast, and Treasure Coast. Florida's coastal areas--encompassing 8,436 miles of shoreline--boast abundant yet fragile environments including sandy beaches, salt marshes, mangrove forests, seagrass beds, and coral reefs (along with at-risk sea turtles, manatees and whales) making Florida one of the most complex coastal regions in the Nation.

Florida's ecological assets and unique geography underpin $33B outdoor recreation and $127B tourism industries--second in the nation behind California.

Connections, a book first published by James Burke in 1978, posited that even small events are essential components of a larger interconnected chain.

Florida Sea Grant works to build a network of relationships across people and places. These connections–whether educating local fishermen about sustainable practices or collaborating with coastal planners on resilience strategies–form a chain of actions leading to innovation that ultimately contributes to healthier ecosystems and stronger communities.

Connecting Florida's Past & Present

Florida was settled by Paleo-Indians roughly 15,000 years ago. These first people gave rise over millennia to Apalachee, Seminole, Timucua, Miccosukee and Calusa tribes that settled different regions by the time the Spanish explorer Juan Ponce de Leon reached *la Florida* in 1513. The first permanent European settlement in the continental United States was formally established in St. Augustine in 1565. The Spanish colonial period ended in 1821 with the acquisition of Florida by the United States.

During the mid-19th century, referred to as Florida's Gilded Age, the state's economy was propelled through the growth of large-scale commercial agriculture, cattle production, industry, and tourism. Florida's economic prosperity during the 19th and early 20th century was driven by the expansion of the railroad and The Big Dig, referring to the development of the intracoastal waterways that served as key transportation links for the shipment of agricultural goods--and people. These waterways deepened and connected Florida's shallow coastal bays and estuaries transforming its coasts into commercial hubs and motivating a nascent tourism industry, which exploited the rich diversity of Florida's coastal flora and fauna.

Burke's *Connections* speaks to the need for understanding historical context in addressing present and predicting future challenges. This concept is encapsulated in FSG's motto: *Science Serving Florida's Coast* as we help communities understand how past actions, such as overfishing or coastal development, have shaped current environmental conditions. Burke's attribution in the preface, "change comes most from the unvisited no-man's land between the disciplines" (p, ix), is where local Extension agents identify needs, often as members of multi-disciplinary teams, and develop targeted solutions.

Today, while agriculture remains a prominent economic force in the state, tourism and water recreation have grown tremendously. This growth contributed to the transformation of coastal lands, through extensive dredge and fill projects, into large-scale water-accessible residential canal communities.

Florida's popular coastal lifestyle has not come without challenges from and to its natural environment. Coastal communities are habitually subjected to catastrophic weather events, including the effects of four major hurricanes (Irma, Michael, Ian, and Idalia) during this review period, and increasingly chronic "sunny day" flooding events from warming and rising seas.

Florida's coastal waters frequently harbor harmful algal blooms (HABs) fueled by agricultural and urban nutrient runoff affecting residential canal communities, coastal tourism, shellfish production, fisheries, and their habitats. Nowhere is this confluence of impact more prominently exposed than in Southeast Florida where a lethal coral disease threatens reef systems worldwide and North America's most biologically-diverse estuary--the Indian River Lagoon--has experienced persistent hypoxia events and recent seagrass die-offs, triggering manatee starvation. Florida's long human history has forged the present suite of coastal issues that require economic, biological, and cultural expertise.

The Florida Sea Grant Nexus

For nearly 50 years, Florida Sea Grant (FSG) has leveraged scientific and Extension expertise to address Florida's challenges and opportunities, serving its 23 million residents and over 140 million annual visitors.

FSG's strategic positioning within the University of Florida (UF)--as both a statewide center and integrated with UF/IFAS Extension--helps our program fulfill our cross-cutting and cross-disciplinary mandate and reflects the robust support we received from UF.

The success of FSG programming arises from a business approach that motivates "innovation to application," turning research and scientific knowledge into practical solutions for timely challenges--solutions that support a suite of beneficial coastal activities and uses for society and the economy (**FSG's Vision, FY 2018-23 Strategic Plan, p. 1**). By adhering to FSG's core values--Innovate, Engage, and Strategically Prioritize--we are drawn to James Burke's *Connections* (1978, 2007) that examines how seemingly disparate ideas, inventions and actions culminate in major advances, which only result from an investment in "social infrastructure," which is epitomized by the fully integrated research, extension and education that is the Florida Sea Grant College Program.

Program Response to FY2014-17 Site Review

FSG received just one recommendation during the previous site review:

> *The SRT discussed with the University leadership the success that Sea Grant has had reporting directly to the Provost and Senior Vice President for Academic Affairs [Provost] and the Senior Vice President for Agriculture and Natural Resources [SVP UF/IFAS] and the team would like to see that continue. Being one of only a few statewide centers helps the University maintain its preeminence. The current structure is ideal for serving the University of Florida mission while tapping into the expertise of the rest of the Statewide University System.*

Beginning January 1, 2025, FSG reports to the Vice President of Research. This change better matches the functionality of the program, preserves campus and statewide autonomy, and provides additional resources and support from UF (discussed later).

The program also responded quickly to several suggestions and was pleased that its effective programming and management garnered the identification of 7 Best Management Practices, well above the 3.2 average, and many that have been adopted by other programs.

Unless otherwise specified, page numbers throughout are referring to FSG's PIER 2018-2023 Site Visit Report (PIER).

Mangrove trees stabilize coastlines, protect communities, and support marine life, symbolizing the vital connection between oceans and shores.

PROGRAM MANAGEMENT & ORGANIZATION

By the Numbers

Staffing & Funding Summary

- Sea Grant staffing–individuals and FTEs by functional area (p. 2) reflects strategic changes in Administration and Communications
- Number of pre, full, and funded proposals: **189, 74, and 33** (p. 3) awarded to **21, 15, and 9** unique institutions, respectively
- Research project title and last name of Project Investigator, PI (including competitive):
  - core funded: **56** (p. 3-5)
  - NSI, pass-through, and enhancement funded: **13** (p. 6)
- Total funds (i.e., appropriated + non-federal match + pass-through): **$41.5 million**, including **$9.2 million** pass-through, by functional area (p. 8)
- Distribution of core funds (i.e., base + merit + non-federal match), by functional area (p. 10):
  - **$23.8 million** (p. 10) of which **34%** selected via the competitive process (p. 11)

Organization

Florida Sea Grant (FSG) is a statewide center within the State University System (SUS) of Florida, hosted by the University of Florida (UF). UF is the state's 1862 Land Grant University and one of the 12 universities that comprise the SUS (See **About Us**). UF is also the #7 ranked public university in the U.S., a preeminent institution in the state and within the Sea Grant network of host institutions.

In addition to annual evaluations, UF conducts five-year reviews of its centers and center directors. In 2023, FSG was recertified for 5 years and in 2024 FSG's director was reappointed.

During the Sea Grant period of review, FSG was functionally supervised by the Provost and also FSG's director was mentored by the SVP of UF/IFAS, her college of tenure. Due to FSG's partnership with shared Extension faculty positions, UF/IFAS includes FSG's director with other "unit leaders" as part of the UF/IFAS management team. In addition to joint positions, UF/IFAS also provides office space, building maintenance, and support for IT, communications, and Advancement efforts.

FSG is guided by a management team, several Advisory Councils, and integrated programmatic teams.

Burke's idea that the network of connections between things is not just a chain, it is a web, is a metaphor for FSG's team-oriented approach to management. Rather than working in isolation, Florida Sea Grant brings together a "web" of experts–scientists across disciplines, resource managers, policymakers, community leaders, and the public–to tackle challenging issues, sustain coastal environments and fisheries, and strengthen resilience. These diverse teams, working together across sectors, create a collaborative environment that mirrors the interwoven nature of Burke's idea of how interconnected systems operate.

Management Team

Sherry Larkin, Ph.D. (Economics), Director. Dr. Larkin ensures fiscal and programmatic performance, guiding FSG's activities through weekly administrative meetings. She supervises and mentors Fellows and staff, and advocates for the program. She maintains contact with UF-based faculty, advisory committees, and external partners.

Charles Sidman, Ph.D. (Geography), Associate Director of Research. Dr. Sidman manages research competitions, including efforts to link new researchers with FSG Extension faculty, and compiles FSG's annual report. He also maintains an extensive email listserv of Campus Coordinators, a curated list of the best points of contact at each SUS institution, private institution, and research organization with relevant programs.

Maia McGuire, Ph.D. (Marine Biology), Associate Director of Extension and Education (0.5 FTE). Dr. McGuire oversees Extension specialists, agents, in-service trainings (ISTs) and Work Action Groups (WAGs) comprised of UF Extension and Research faculty that have identified an applied research need (e.g., Fisheries, Aquaculture, Harmful Algal Blooms, or Climate Change). She mentors Extension faculty through tenure and promotion. She fosters collaboration between the Land Grant and Sea Grant programs of the university.

Rod Venegas, Assistant Director of Fiscal Operations. Mr. Venegas manages FSG's financial and human resources functions, liaising with UF's Office of Research and UF/IFAS Extension to ensure compliance with funding and spending, including NOAA's Special Award Conditions (SACs) and 2 CFR Part 200. He monitors spending and builds grant management capacity among new program partners, especially as it relates to budgeting for match from partners and indirect costs.

Donielle Nardi, Creative/Art Director. Ms. Nardi leads the Communications Team, creating digital content, maintaining brand guidelines, and overseeing branded products. Her team also supports programmatic activity through a robust and timely social media presence, maintaining contact with stakeholders and fostering a network of communicators at institutions, organizations, and agencies. Responsibilities include ensuring ADA compliance, Spanish translation, and evaluation of social media content and campaigns.

Advisory Council (AC)

FSG's AC is comprised of leaders from diverse sectors who are actively engaged in issues related to the sustainable management of Florida's coastal and ocean resources and economies. They provide their time, knowledge, and ideas to help FSG address acute and emerging issues. The organizations with **members serving** during FY18-23, grouped by type, include:

AGENCIES:

FWC Fish and Wildlife Research Institute
NOAA's National Marine Sanctuary Program

ORGANIZATIONS:

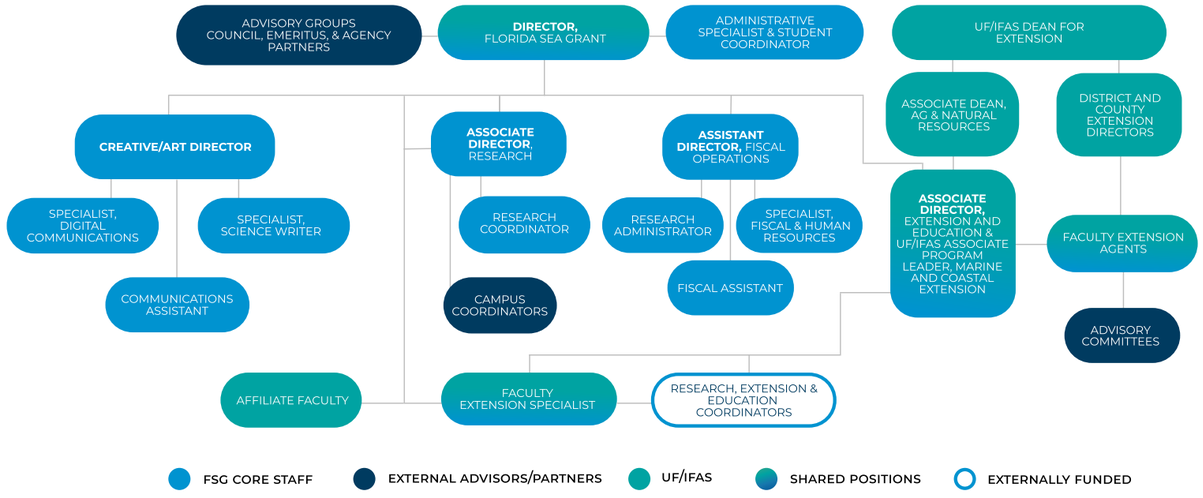
Charlotte Harbor National Estuarine Program
Florida Keys Commercial Fishermen's Association
Guy Harvey Foundation
Mote Marine Lab & Aquarium
Mahogany Youth
Organized Fishermen of Florida
The Nature Conservancy
Victory Consulting

STAKEHOLDERS:

Akerman Law
Acme Sponge & Chamois Company
Aylesworth's Fish & Bait
Carnival Cruise Lines
Saucy Lady Oyster Company
Southern Cross Clams
Quirch Foods

These members were in place in early 2019 when the previous director passed; to preserve continuity during the transition to a new director, the group decided members would serve concurrent with the timeline of the strategic plan.

Florida Sea Grant Organizational Chart



The AC meets annually, alternating between Gainesville, on the UF campus, and hosted by an AC member--with the exception of during COVID when the meeting was online. In addition, a meeting was scheduled during the transition to a new director in 2019-20. The director also meets individually with AC members as opportunities arise at meetings around the state.

Upon the appointment of and at the request by the new director in March 2020, AC members were interviewed by the Florida Survey Research Center to obtain anonymous feedback regarding the organization, duties, and responsibilities of the AC.

The survey revealed that the AC:

- preferred meetings being led by FSG versus a Council member;
- wanted to serve as program ambassadors, but not fund raising; and
- were eager to support the program by reviewing proposals/applications, making recommendations or ground truthing ideas, and establishing new connections.

As a result, the following AC recommendations were pursued:

- explore new programming for visitors (see p. 156 and new partnership with Innisfree Hotels);
- work more closely with state agencies to diversify and stabilize funding (see p. 129 for new clean boating, p. 116 for coral restoration, and p. 140 for coral rescue efforts); and
- despite the administrative burden, continue seeking funding for rapid response projects to address marine and coastal emergencies.

Extension Agent Advisory Committees

FSG extension agents are integrated within UF/IFAS's **Cooperative Extension System**. Every extension agent has an advisory committee comprised of 8-20 local stakeholders that represent businesses, resource managers, association leaders and resource users. These committees meet regularly for discussion of planned activities and any emerging issues. They are also the front lines in galvanizing support for continued Congressional support for National Sea Grant College funding (e.g., see **current map** with testimonials).

A total of 187 individuals comprised the collective advisory committees of FSG UF/IFAS Extension Agents at the time of the development of the **FY 2024-27 Strategic Plan**. Their feedback served to identify regional priorities to help ensure that programs address, to the extent possible, coastal needs that span 8,436 miles of shoreline.

Director's Operating Advisory Panel

The DOAP is comprised of former Sea Grant faculty and staff--individuals with a wealth of institutional knowledge regarding Sea Grant in general and past programs in Florida. This group was created in 2021 to harness these invaluable insights to help advance the impact of FSG and Sea Grant nationwide.

The DOAP chair is an ex-officio member of the AC. Several other members have been **recognized for their Sea Grant service** by the Sea Grant Association), making them ideal DOAP members for their credible insights, historical context and knowledge. Members and their former Sea Grant roles include:

- *Dr. Jim Cato, Director,* **FSG (chair)**
- *Dr. Jim Murray,* **Deputy Director of the National Sea Grant office (NSGO) and member, National Sea Grant Advisory Board (NSGAB)**
- *Dr. Anders Andren,* **Director, Wisconsin Sea Grant and NSGAB member**
- *Dr. John Woeste,* **UF/IFAS Extension Dean and NSGAB member**
- *Dr. Charles Adams,* **FSG Extension Specialist**
- *Mr. John Stevely,* **FSG Extension Agent**
- *Ms. Dorothy Zimmerman,* **FSG Communications Director**

This group allows for the input of individuals who are not only well-versed with FSG but also engaged at the NSGO level. The information provided by this group has been crucial as a source of institutional memory for the current FSG program faculty and staff.

Programmed Team Approach

FSG's leadership team ensures priorities and stakeholder needs are addressed (obtaining funding where necessary), maintains and develops new partnerships, and collectively integrates work and decision-making across functions.

The structure of FSG reflects the fundamental partnership with US/IFAS Extension, allowing statewide coverage, efficiencies in shared positions, and greater capacity for external funding. All FSG Extension agents are considered UF faculty and more than half have or are working toward a Ph.D.

As all of the FSG Extension faculty and Affiliate Researchers (e.g., WAG members) are located around the state (Fig. 2)--some nearly 500 miles from Gainesville--annual in-person WAG and FSG Extension meetings are crucial to discussing and debating collaborative efforts. FSG is committed to funding these meetings, which may be organized in coordination with an industry or professional meeting. In addition, FSG helps organize and participate in regional meetings of both the Gulf and South Atlantic Sea Grant programs, which have resulted in several collaborative projects.

Extension agents serve as "boots-on-the-ground" to provide a trusted source of information and catalysts for change at the local level. They set SMART (Specific, Measurable, Achievable, Relevant, and Timebound) objectives and use a logic model to facilitate evaluation of program activities. Partnering with Cooperative Extension also allows FSG to equitably reach coastal residents. Over the course of this review period, Extension agents tracked audience demographics as required for Cooperative Extension's civil rights reporting. Data for 147,477 contacts show FSG Extension reached audiences representative of the state's population--e.g., 18% of the audiences were Hispanic and 10% were Black compared with 15% and 11% of the state's population, respectively.

Extension agents work with Extension specialists, FSG's Communications Team, and FSG Research Affiliates--UF Faculty who conduct research addressing FSG's Strategic Plan and agree to identify such projects to support FSG's role as a center--on larger regional projects.

Setting Research Priorities

FSG's **FY2018-23 Strategic Plan** (SP) was first developed in 2017 to guide programming through January 2022. Input was gathered from workshops, Research Affiliates, Campus Coordinators, agency representatives, and members of Extension agent's advisory committees. When the planning horizon was extended two years, a series of surveys and virtual meetings helped to update the goals and outcomes (see SP p. 1 for additional detail).

The revision to the strategic plan included aggregating a few closely related goals (deleting three) and redefining two national performance measures to better align with the guidance provided by the National Sea Grant Office (NSGO):

- The number of Sea Grant products that are used to advance environmental literacy and workforce development (ELWD) were previously reported under program specific metrics defined for each focus area (i.e., ELWD-HCE, ELWD-RCE, and ELWD-SFA).
- The number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities was expanded to record the number of individuals that benefitted from the use and/or application of the information rather than counting only the agency.

Strategic Growth

The increase in staff after 2020 (p. 2) is attributed to FSG's success in three areas: (1) opportunities to develop new initiatives through funding managed through the NSGO, (2) development of long-term cooperative agreements with state agencies, and (3) new county Extension partners who are funding FSG UF/IFAS Extension agents.

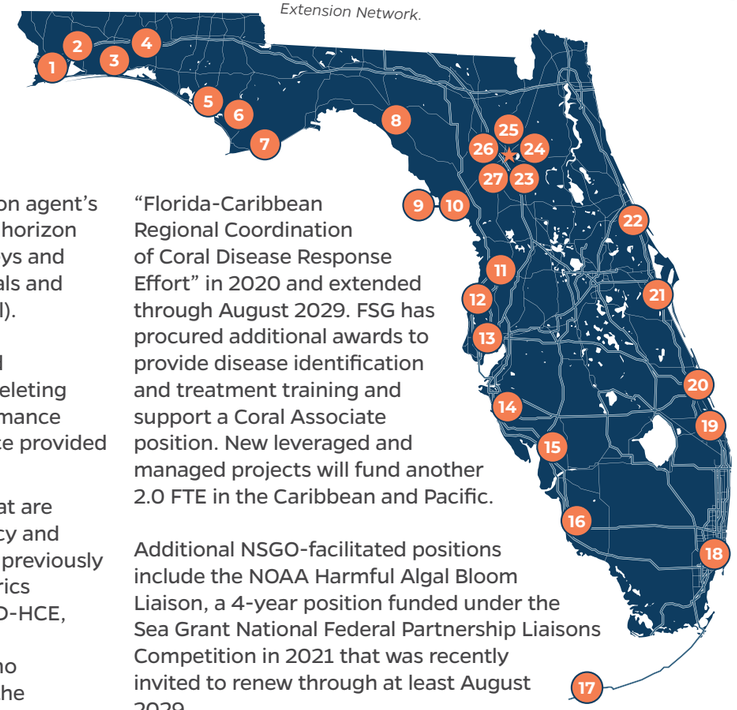
The first of several NSGO-facilitated positions focused on combatting the spread of a deadly coral disease. Multi-year NSGO support for a Florida Coral Disease Response Coordinator started in 2018 and is now funded by Florida's Department of Environmental Protection (FDEP). This was soon complemented by support from NOAA's Coral Conservation Program as FSG successfully responded to the Special Project Competition "Florida-Caribbean Regional Coordination of Coral Disease Response Effort" in 2020 and extended through August 2029. FSG has procured additional awards to provide disease identification and treatment training and support a Coral Associate position. New leveraged and managed projects will fund another 2.0 FTE in the Caribbean and Pacific.

Additional NSGO-facilitated positions include the NOAA Harmful Algal Bloom Liaison, a 4-year position funded under the Sea Grant National Federal Partnership Liaisons Competition in 2021 that was recently invited to renew through at least August 2029.

Efforts to combat coral diseases and harmful algal blooms help FSG address goals and outcomes envisioned under the Healthy Coastal Ecosystems (HCE) Focus Area (SP p. 3-4).

With respect to the Sustainable Fisheries and Aquaculture focus area (SP p. 5), the 2020 Sea Grant-NOAA Collaborative Activities opportunity funded a grant for "Promoting Sustainable Angling and Barotrauma Reduction in the Gulf of Mexico using Fish Descending Devices." This award employs 3 FTEs and funds the development of a branded marketing campaign known as ***Return 'Em Right***--a program now on its fourth award with commitments for funding through March 2028. This project created a strong partnership between the NOAA Restoration Center, NSGO, FSG, and other partners (e.g., see **Guy Harvey testimonial**), and a patent-pending trademark for NOAA and the University of Florida Research Foundation. The planned total investment of $16.8 million allows FSG to continue a legacy of providing sustainable angling extension and education in support of ELWD (SP p .11).

Figure 2. FSG's Statewide Extension Network.



Finally, under the Institutional Opportunity "2022 Sea Grant Coastal Adaptation and Resilience" FSG welcomed a new programmatic coordinator to expand and upscale our living shorelines and green infrastructure program, and support our Resilient Communities and Economies focus area (SP p. 9). This position has support through the current omnibus (January 2028) and--like the previous project discussed--also encompasses programming in support of ELWD (SP p. 11-12).

The development of long-term collaborative staffing positions with support from the Florida Fish and Wildlife Conservation Commission (FWC) and FDEP are the second way that FSG's FTEs have increased. These positions reflect a new era of engagement to address critical, interrelated water quality issues in Florida and were advanced with the 2019-21 COVID-19 support that FSG used to "Formalize a Coalition for Coastal and Ocean Science and Outreach in Florida"--efforts that have ensured FSG is the trusted and immediate point of contact for at least 6 distinct FWC or FDEP programs. Two new positions manage grants and projects and 2 more coordinate coral restoration, protection, and propagation. Two FSG water-quality coordinators in South Florida now support FDEP's management of aquatic preserves. FSG further supports improved coastal water quality through 5 positions funded by FDEP through the Clean Vessel Act. These positions work with marinas and advocate for using pumpouts in support of the goals and action outcomes identified in the Resilient Communities and Economies (RCE) focus area (SP p.9) and ELWD.

An additional mechanism for programmatic growth has been the creation of new FSG UF/IFAS Extension agent positions in Pasco and Okaloosa Counties, positions created at the request of and primarily funded by the counties.

The program growth generated by these leveraged positions and associated activities necessitated additional staff; during this review period FSG added 4 positions--a research coordinator, a science writer, a social media specialist and a grants management specialist with returned indirect costs (IDC).

Support

Funding Sources and Trends

During this period of review, the distribution of core funding table (p. 10) shows a 6-year total of $23.5 million inclusive of match (i.e., federal omnibus funding averaged $2.6 million per year.

FSG's federal awards totaled $41.2 million (p. 8)--$16.8 million (71%) above core funds (p. 10), including $9.2 million in pass-through funding (p. 7) and $8.5 million in additional National Strategic Investment (NSI) or enhancement funding from the NSGO (including match)--see 13 titles (p. 6). Most notably, the visible trend in pass-through funding from $575,906 in 2018 to $4 million in 2023, a nearly 6-fold increase in external funding, speaks to the growth trajectory in leveraged managed funding that is reflective of dedicated efforts by FSG's senior management team to capitalize on known competencies, the expertise of FSG, and address all four focus areas through activities and outcomes identified in the SP.

Research Competitions

FSG implemented 4 competitive research competitions during this review period, 3 for two-year $200,000 projects and a new $25,000 graduate research fellowship. Each competition adhered to the NSGO's National Competition Policy (Policy). The requests for proposals (RFPs) were posted on FSGs website and social media accounts and sent by email to relevant listservs (e.g., Florida Institute of Oceanography, Florida Ocean Alliance, Gulf and Caribbean Fisheries Institute), FSG's Campus Coordinators, and FSG-affiliated research faculty. The RFPs contained contact information for questions about potential topics and for fiscal and submission issues. The accompanying emails and posts included information about upcoming webinars and offers to help new applicants with the online forms and their budget (e.g., challenges with providing and documenting matching funds). For efficiency and consistency, FSG adopted the eSeaGrant platform for submission of letters of intent (LOIs), and submissions of full proposals, and the review process.

Aside from minor changes in the process necessitated by updates to the Policy, the basics have remained unchanged. FSG utilizes a multi-stage process that begins with a relevance review of LOIs by program staff, advisory committee members, WAG members, and Extension agents with subject matter expertise. At this point in the process projects are vetted for their topic of investigation and their planned integration with Extension. In each cycle, investigative teams associated with 21-24 of the highest rated LOIs per the stated review criteria were encouraged to submit a full proposal. The full proposals received written reviews that were quantitatively and qualitatively analyzed to match the criteria and FSG's FY 2018-23 Strategic Plan. A technical review panel (TRP) ranked proposals and identified those recommended for funding.

Over the review period, these competitions used 19 TRP members affiliated with 19 different organizations, agencies, and institutions, aligning with the Policy that *"The review process must include significant input external to the Sea Grant Program."* Panelists all possessed advanced degrees in their area of expertise and knowledge of the science and issues pertaining to the submitted proposals.

The graduate fellowship competition received 17 applications from 9 academic institutions, of which 10 were awarded: 8 from core funding and an additional 2 for UF students from UF Research representing $50,000 in additional institutional match.

Research project titles are listed in PIER (p. 3-5) and abstracts are available **online**. Information on the number of proposals and institutions associated with these four competitive research competitions is summarized in PIER (p. 2-3).

FSG's competitive research program was supplemented through a collaboration with FDEP's Coastal Partnership Initiative (CPI) program that allowed FSG to benefit from FDEP's rigorous evaluation process, address FDEP priorities, and address priorities associated with FSG's RCE focus area. Program development funds were used to support 13 coastal community focused projects (titles included on p. 3-5).

Program Development Funding

Biennial research competitions were complemented by the solicitation and selection of 63 shorter duration research, industry-oriented and student learning projects using program development funding capped at $10,000 per project. This enabled FSG, its partners, and its stakeholders to respond quickly and opportunistically to address emerging coastal issues. These funds supported pilot field and laboratory investigations, technical demonstrations, conferences/workshops, and helped upscale the HARVEST (Helping Aquaculture Reap Value and Extend Student Training) program for students (SP Goal 4.2) and aquaculture businesses (SP Goal 2.2).

The reach of FSG's core program development grants was extended at UF through supplemental funding ($35,000/year) provided by the UF Office of Research beginning in 2020, allowing for an additional 14 projects. The following selected projects collectively leveraged results to obtain $1,225,087 in additional funding, over 6 times the investment, and showcases the diversity of FSG's research portfolio:

- Identifying drivers of seagrass ecosystem net carbon storage in Florida's Big Bend.
- Boat-traffic impact on Florida coastal ecosystem and waterway health.
- Pilot study to evaluate sargassum composting applications in municipal landscaping.
- Pilot study of sponge enhancement and restoration in the Tarpon Springs region.
- Managing toxic cyanobacteria bloom biomass impacting coastal ecosystems.
- Use of chemical algaecides for the control of *Karenia brevis* blooms.
- Engaging coastal communities in land-use planning discussions.
- Inventing a new multi-function reef fish barotrauma reduction tool.

PHOTO: S. MEILING

ENGAGEMENT

By the Numbers

- FSG sponsored/organized meetings, workshops, conferences with attendees: **1,507** presentations with **117,324** attendees and **671** events with **18,030** attendees (p. 12)
- FSG volunteer hours: **61,751** hours valued at **$1.7 million** (p. 12)
- Students supported: **202** students and **150** degrees (undergraduate and graduate) (p. 12)
- K-12 students reached: **1,074** educators and **10,986** students (p. 12)

Relevance

FSG is relevant to stakeholders, as illustrated by requests for assistance or identified needs, often resulting in new education or training programs. Such efforts necessarily involve partners, who are identified in relation to additional impacts and accomplishments (I&As) or leveraged funding in PIER (Section C).

Florida Sea Grant is a program predicated on generating *Science Serving Florida's Coast*--a slogan first created by FSG's long-standing director Dr. Jim Cato--and now adopted throughout the Sea Grant network. Examples of how FSG leadership follows this dictum to be relevant to different stakeholders:

1. Procuring additional program development funding for UF for **researchers** to address timely issues such as listed in the previous section.
2. Addressing impacts to the **environment** with 3 NOAA Rapid Response grants: retrieval of damaged/derelict oyster gear following Hurricane Michael (2019); identifying the source of *Diadema* die-off (2022; **Hewson et al. 2023** in *Science Advances*); and Hurricane Ian's impact on the geomorphology of Southwest Florida's "impact zones" (2023).
3. Developing innovative solutions to economic crisis, such as a clam buyback program in support of estuary restoration and **clam farmers** during COVID-19.
4. Adding Florida to the **Pumpout Nav** mobile application for **boaters** through proactive needs assessment and working with the web developer.
5. Enhancing the professional development of **students** by funding undergraduates with returned IDC from Affiliate Researchers at UF, establishing a new student-led newsletter (**Sea Scholars**), and transforming scholarships into fellowships with outreach training through collaborations with the Guy Harvey and Aylesworth Foundations (e.g., blogging, social media posts, and tabling). It is now standard operating procedure to invite all students to connect with us on social media platforms, especially LinkedIn, to track progress toward degrees and career placement.

Extension and Advisory Services

FSG supports a network of 27 faculty who participate in FSG's WAGs and are often guided by stakeholders. Notable WAG outcomes include:

- **Fishermen's** concerns over macroalgae on seagrass beds in Charlotte Harbor led to the development of the **Eyes on Seagrass** citizen science monitoring program in 2019, just in time to be useful for evaluating the impact of the Piney Point sewage spill.
- **HAB Task Force** needs to identify research priorities for strategic investments, led to FSG organizing the State of the Science Symposia I (**2019**) and II (**2023**) for consensus on red tide and blue-green algae research priorities, respectively. Symposium III in April 2025 will focus on the role of nutrients.
- **Fishing guides** and then **anglers** requested a way to identify and promote good stewardship practices. By partnering with FWC, FSG developed the **award-winning** Florida Friendly Fishing Guide (FFFG) program in 2019, followed by Florida Friendly Angler (FFA) in English and Spanish in 2022 and 2024.

Additional programs are highlighted under the ELWD focus area later in the document.

Signature Citizen Science Programs

EYES ON SEAGRASS

GREAT GOLIATH GROUPER COUNT
Sea Grant

FLORIDA HORSESHOE CRAB WATCH
Linked with Limulus

Education and Training

FSG addresses all levels of education as well as stakeholder and agency needs for workforce training as evidenced by:

- FSG's **Mangrove Trimming** Workshops help ensure professional **landscapers** maintain FDEP certification.
- FSG offers several Hazard Analysis and Critical Control Point **(HACCP) courses** leading to Seafood HACCP Alliance certifications and maintains and distributes current versions of required manuals to **seafood businesses**.
- FSG conducts marine education inside and outside the classroom reaching thousands of K-12 students annually (e.g. by teaching a marine science **summer camp** with UF/IFAS 4-H in Volusia County).
- FSG's law-related workshops (now administered by The Florida Bar) address sea-level rise and climate change, reaching 456 members of the **legal community** and providing continuing education credits for attorneys, floodplain managers, planners, and engineers, p. 125.

A central premise of Burke's *Connections* is that no event, no matter how small, stands alone. Everything is part of a chain, and the links in the chain often lead to something unexpected. Likewise, every action taken by Florida Sea Grant, from educating local communities about sustainable fishing practices to developing research on sea level rise, is part of a larger chain of efforts aimed at sustaining Florida's natural resources and the coastal communities and industries that depend on them. Even the smallest research, Extension, or educational effort can have ripple effects, leading to policy advancement, broader community engagement or unexpected advances in technology innovation and application.

COLLABORATIVE NETWORK ACTIVITIES

By the Numbers

- Program partners in projects, I&As: **264** (p. 13)
- List of program partners (p. 25-29)
- Sources and amounts of leveraged funds: **$78.8 million** (p. 13)
- Lists of sources and amounts of leveraged funds by year (p. 30-31):
  $8.3 million managed from **15** projects and **$70.5 million** influenced from **51** projects

Of the 264 reported partners (p. 13), the majority operate at the local (35%), state (31%), or regional/federal level (30%). Of the unique partners associated with FSG's 174 I&As, organizations were grouped into 3 tiers based on degree of collaboration as summarized in the table below.

Unique Partners by Collaboration Fequency

FREQUENT (48%)	Coastal communities
	University of Florida (Institute of Food and Agricultural Sciences; Levin College of Law; Nature Coast Biological Station; Whitney Lab for Marine Bioscience)
	FWC (including Fish and Wildlife Research Institute)
	FDEP (Chief Science Officer, Regulatory Programs, Ecosystems Restoration)
	NOAA (National Marine Fisheries Service; Coral Conservation Program; Restoration Center; Office of Coastal Management; National Estuarine Research Reserves)
	Other Institutions of Higher Education (public and private, and Minority Serving)
REGULAR (17%)	Gulf of America/Mexico Sea Grant Programs; South Atlantic Sea Grant Programs
	Aquaculture associations businesses
	Florida Department of Agriculture and Consumer Services (Division of Aquaculture)
	East Central Florida Regional Planning Council
	Gulf and Caribbean Fisheries Institute; Caribbean Regional Fisheries Mechanism
	Foundations (Guy Harvey, Aylesworth, Cantonis, Carnival Cruise Line)
OCCASIONAL (7%)	Puerto Rico Sea Grant; Hawaii Sea Grant
	Gulf States Marine Fisheries Commission; Atlantic States Marine Fisheries Commission
	Environmental NGO's (Ocean Conservancy, The Nature Conservancy)
	Florida's Water Management Districts
	Mote Marine Laboratory & Aquarium
	Association of Food and Drug Officials
	Environmental Protection Agency (National Estuary Programs)

● ACADEMIC, RESEARCH & EDUCATION ● GOVERNMENT AGENCIES/PROGRAMS ● NGO'S/INDUSTRY ASSOCIATIONS

Multi-Program Projects and Activities

Notable Sea Grant network collaborations, in addition to regional meetings of the South Atlantic (2021) and Gulf (2023) programs, led by or contributed to by FSG, include:

Healthy Coastal Ecosystems

- Regional Islands Initiative (2018): PR, HI, GU
- Coordinating inter-agency response to Stony Coral Tissue Loss Disease (2020-24): PR, HI, GU.
- Improving knowledge, use and support of NOAA HAB forecasting tools (2021-27): TX, LA, MS-AL, MD, NY, OH, WA, MI
- Gulf of Mexico Oil Spill Science Outreach Team trains the next generation of responders (2014-19): TX, LA, MS-AL

Sustainable Fisheries and Aquaculture

- Stakeholder visioning for Greater Amberjack stock assessment (2020-22): NC, SC, GA, LA, MS-AL, TX
- Reducing barotrauma through increasing adoption of fish descending devices (i.e., *Return 'Em Right*™) (2020-28): TX, LA, MS-AL
- Know thy Oyster: Evaluating the Effectiveness of Seafood Server Training (2021-23): VA, NC, GA, MS-AL, LA, TX
- Food from the Sea Forum to respond to workforce gaps in the commercial fishing and seafood industries in the Gulf of Mexico (2022): TX, LA, MS-AL
- Connecting Sea Grant, NCCOS, and coastal stakeholders to improve sustainable aquaculture siting and development--regional workshop lead (2021-25): ME, MD, NC, TX, CA, AK

Resilient Communities and Economies

- Regional hazard resiliency for transportation infrastructure (2019-23): NC, SC, GA
- PLACE-SLR (Program for Local Adaptation to Climate Effects (2019-23): MS-AL
- Gulf Resilience Community of Practice helping communities adapt to rising seas: MS-AL, TX, LA

Environmental Literacy & Workforce Development

- The Seafood HACCP Alliance of AFDO, Presentation Working Group, and the Aquatic Foods Conference (2020-present): Sea Grant programs whose Seafood Specialists offer trainings: LA, GA, FL, NY, RI, VA
- NERRS Science Collaborative Science Transfer project (Virginia Scientists and Educators Alliance, VA SEA, and Partners, 2022-23): VA, NJ

FSG HEADQUARTERS

PERFORMANCE

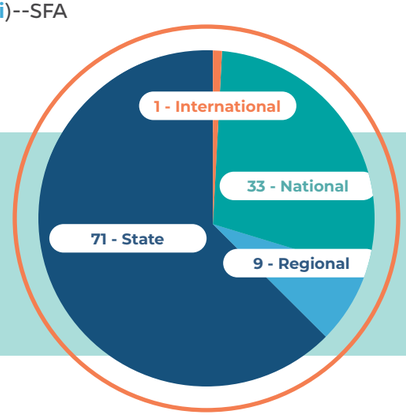
Leadership

FSG encourages and supports the participation and leadership opportunities afforded to faculty and staff on planning, professional, and organizational committees. These activities help build and strengthen FSG's connections and relationships with partners, increase the visibility of FSG's programs, and cement FSG's reputation as a programmatic leader. FSG's supported faculty and staff served in a variety of leadership positions, such as members of subcommittees/councils, boards, and events that are either elected or appointed in addition to traditional leadership roles, including support for 14 Sea Grant network committees. These professional activities spanned organizations that operate at all geographic levels: 49 international/national; 32 regional/multistate; and 99 state/local during the review period (180 in total). A selection of FSG leadership roles with associated focus area where applicable (listed alphabetically by organization) during the review period are below with a full **leadership list** on the website.

- American Fisheries Society (AFS), Florida Chapter President (**Collins**)--SFA
- City of Key West Sustainability Advisory Board, Chair (**Krueger**)--RCE
- Florida Association of Natural Resource Extension Professionals (FANREP), Southeast District Director (**Encomio**), Secretary (**Kovacs**)--ELWD
- Florida Coral Reef Resilience Program (FCRRP) Water Quality Team, Lead (**Morgan**)--HCE
- Florida Institute for Saltwater Heritage, Secretary (**Collins**)--SFA
- Florida Marine Science Educators Association (FMSEA), West Central Regional Director (**Scharf**)--ELWD
- Florida Ocean Alliance (FOA), Board of Directors (**Larkin**)--All focus areas
- Florida's Red Tide Task Force, Governor appointed (**Larkin**)--HCE
- Florida Society of Ethical Ecotourism, Education Committee Co-chair (**Sipos, Rose, Kovacs**)--ELWD
- Friends of the Apalachicola National Estuarine Research Reserve, Board Vice-president (**Lovestrand**)--HCE
- Aquaculture Economics & Management, Editorial Board (**Ropicki**)--HCE, SFA
- Gulf and Caribbean Fisheries Professional Development Program, Director (**Sidman**)--ELWD
- Gulf Shellfish Institute, Marine Extension Advisor (**Collins**)--SFA
- Marine Resource Economics, Associate Editor and Board of Directors (**Larkin**)--SFA, RCE
- North American Association of Fisheries Economics and Trade, President (**Larkin**)--SFA
- Natural Resources Leadership Institute, Team Lead (**Hazell**)--HCE
- Sarasota Bay Estuary Program, Grant Program Chair (**Ubeda**)--HCE
- Sea Grant Association, Treasurer (**Larkin**)--All focus areas
- Sea Grant Marine Debris Community of Practice, Leader (**McGuire**)--RCE
- US Coral Reef Task Force, Coral Disease & Disturbance Working Group, Co-Chair (**McLaughlin**)--HCE
- USDA Multistate: Marketing, Trade, and Management of Aquaculture and Fishery Resources, Chair (**Ropicki**)--SFA

From 2018-2023, FSG Faculty and Staff received **114 awards & recognitions**:

- 79% of awards for excellence of communications products; 27% for programs; and 8% for individual leadership
- 25% to individuals & 75% to teams



Productivity

During this review period, FSG's research and fiscal teams managed **297** projects from pre-award through post-award including monitoring, evaluation and reporting:

- **39** legacy projects
- **61** student training from all sources
- **159** core funded other projects
- **38** pass-through or add-on funded
- **43** externally funded leveraged-managed

FSG's projects generated significant advances in scientific knowledge:

- Publications (p. 21)--**269** total (**250** unique peer-reviewed articles)

Selected impacts and accomplishments in the PIER report (i.e., 80 of 174 total) epitomize the broad array of learning and action outcomes anticipated in FSG's FY 2018-2023 Strategic Plan. These summaries identify the year reported and are listed in order of the primary focus area and goal as numbered in the strategic plan. If secondary goals are addressed, they are indicated in parentheses at the end of each statement. Where reported, the quantified impacts were calculated according to the economic valuation guides developed and validated by the National Sea Grant Office. To reinforce research productivity, selected statements include reference to resulting publications in peer-reviewed literature.

By the Numbers

- Level of effort by Focus Area (p.14)-- federal and match only:
  19% HCE, 44% SFA, 18% RCE, 19% ELWD
- National Performance Measures by Focus Area including Cross Cutting (p. 12, 20):
  2,313 jobs supported
  550 businesses supported
  $133.4 million economic benefits
  61,751 volunteer hours (estimated value of **$1.7 million**)
- I&As (titles p. 21-24, statements p. 112-160): **80** selected

Burke's notion that the search for connections between things is not so much about finding the right path, but about discovering how the twists and turns of past events and innovation have created an entirely new set of circumstances is apropos. FSG doesn't necessarily present a 'right' path but helps communities explore creative, multi-dimensional solutions that consider the many variables at play–whether it's enhancing coastal habitats, promoting community resilience or ensuring sustainable fisheries.

Selected I&A Statement Summaries

1 HEALTHY COASTAL ENVIRONMENTS (HCE)

As a result of FSG's HCE activities (p. 15-19):

- **844** *resource managers* used ecosystem-based approaches to manage land, water, and living resources
- **16 million** *acres of coastal habitat* were protected, enhanced, or restored (including Florida's coral reef track and NCAP)
- **52** *tools, technologies and information services* were used by partners to improve ecosystem-based management

GOAL 1.1 – INFORMATION

2019: FSG's support of the UF Coastal Legal and Policy Center enabled the town of Crystal River to gain jurisdictional rights over submerged lands adjacent to Three Sisters Spring, allowing for the management of boating and mooring activities to preserve seagrass meadows for healthy manatee and sea turtle populations (& RCE 3.3), p. 114.

2019: FSG's regional water quality Extension agent partnered with The Ocean Conservancy to conduct a statewide survey of over 1,400 extension professionals and their advisory committees regarding knowledge of and perceptions of harmful algal blooms (HABs). The data collected informed a State of the Science Symposium and findings are being used by two HAB Task Forces appointed by the governor to prioritize efforts, p. 142.

2022: FSG was integral to the development of the first 10-year Nature Coast Aquatic Preserve (NCAP) Management Plan, facilitating the input of over 200 stakeholders, which lead to the expansion of the Tampa Bay Estuary Program and the FDEP's management of 454,786 acres of near-shore habitat, p. 115. By 2023, FDEP transferred responsibility for NCAP monitoring to FSG with two new positions valued at $107,810 annually (& HCE 1.2), p. 76.

GOAL 1.2 – ENGAGING THE PUBLIC

2018: FSG conducted 20 training workshops for 465 volunteers who contributed 8,554 hours during 1,123 citizen science events, collecting data for goliath grouper, gag grouper, horseshoe crabs, common snook, and bay scallops managed by the FWC or ASMFC. These data, for example, justified 2 management decisions to protect 17 acres of coastal habitat (& HCE 1.1, SFA 2.1), p. 144. In 2021, a FSG agent co-authored an article published in the peer-reviewed journal *Citizen Science: Theory and Practice* affirming the value of citizen science data that has received 1,878 views (**Heres et al. 2021**).

2023: FSG's Eyes on Seagrass monitoring program recruited and trained volunteers to collect data from 117 sites for management of more than 65,000 acres in Florida's panhandle and Southwest regions--data that enabled the documentation and evaluation of impacts from the Piney Point sewage spill and underpinned a collaborative restoration project (& HCE 1.1), p. 117.

GOAL 1.3 – APPROACHES

2018: FSG's multi-year study revealed that certain Everglades peat soils are more vulnerable to saltwater exposure due to sea level rise. The published results informed a new Everglades restoration salinity threshold, now monitored by the South Florida Water Management District (**Wilson et al. 2019**), p. 138.

2022: FSG's Restoration Aquaculture Workshop engaged over 50 experts (farmers, associations, researchers, agencies, and extension faculty) to identify key bottlenecks for using aquaculture to restore coastal habitats affected by warming water and develop a community of practice (CoP).

As a result, the Florida Aquaculture Review Council was expanded to include a representative of this new industry sector (& RCE 3.1), p. 139. FSG also created an Aquaculture Outreach and Communications Fellowship with a specialization in Restoration Aquaculture to support the CoP by holding another workshop to address permitting challenges, p. 5.

BEYOND CORE EXPECTATIONS

2022: FSG's new **NOAA HAB Liaison** trained 22 managers and 150 practitioners on data used by NOAA's CoastWatch program and involved staff in 8 other Sea Grant programs and 6 IOOS regional associations. The Liaison also worked with FSG Extension faculty to improve Florida's HAB communications through improved social media, signage, and development of an inter-agency communications team. Results have been used by the Center for Disease Control's HAB One Health Communication Working Group to improve national HAB communication efforts. Outputs during this period include a communications toolkit; a bulletin and HABscope training videos; and a US HABs Symposium workshop for the National Center for Coastal and Ocean Science (& RCE 3.1), p. 137. The **final report** notes that researchers named a newly discovered algal species after the liaison, Betty Staugler (i.e., **Sirenicapillaria stauglerae**). Due to exceptional performance, the NSGO recently awarded a 4-year extension to 2029.

> "Betty, THANK YOU so much for being a valuable asset to the team. You truly show how our state Sea Grant partners are a force multiplier in our quest to maximize the impact of NCCOS science. Thank you for your thought leadership, time, and effort in making this workshop series a success!"
>
> —Dr. Lonnie Gonsalves, Division Chief, NOAA/National Ocean Service

2023: FSG's new Regional Coral Disease Coordinator, who serves all 7 of the nation's coral reef jurisdictions, focused and galvanized efforts to combat the spread of Stony Coral Tissue Loss Disease (SCTLD) through a suite of efforts including co-authoring two critical NOAA Strategy documents: "**NOAA's Surveillance Guidelines for the Indo-Pacific**" and "**An Implementation Plan for Response and Prevention**" (p. 56). The Coordinator has also received support from NOAA's Southeast and Caribbean Regional Team (SECART) for a Coral Associate position, procured funding for several workshops and trainings to enhance preparedness in Florida, the Caribbean, and the Pacific (including with Puerto Rico Sea Grant), and led a national resolution by the U.S. Coral Reef Task Force to mitigate disease transmission to the Pacific and enhance restoration, p. 116.

Due to exceptional performance, the U.S. Coral Reef Conservation Program continued support for this position through 2028. With external support from two new competitive grants, capacity and programming will expand in the U.S. Caribbean and Pacific with 2 new FTEs.

PRE-EMINENT SCIENCE & COMMUNICATIONS

One of four FSG-led NOAA Sea Grant Rapid Response projects (totaling nearly $250,000) allowed FSG researchers to collaborate and leverage EPA funds to solve an immediate and mysterious threat to coral ecosystems. The research identified the cause and findings were published by **Hewson et al. (2023)** in *Science Advances* (11.7 two-year impact factor, 14,668 downloads, and 10% acceptance rate). FSG's Communication Team then helped disseminate this timely science to the public with a media release: **Scientists Discover Cause of Sea Urchin Die-offs in the Caribbean: A Protozoan Parasite**.

2 SUSTAINABLE FISHERIES AND AQUACULTURE (SFA)

As a result of FSG's SFA activities (p. 16):

- **44,570** *fishers, seafood processors, aquaculture industry personnel or seafood consumers* modified their practices using knowledge gained in fisheries sustainability and seafood

GOAL 2.1 – FISHERIES

2019: FSG organized 3 regional planning workshops for 154 resource managers and county-based artificial reef coordinators. FSG was integral in the permitting, deployment, and monitoring of 25 new artificial reefs intended to support recreational fishing. This project added $25.8 million to the state's economy and supported 325 jobs (& HCE 1.1), p. 121. FSG's support of FWC's artificial reef programming includes education (e.g., 2022 series on "**Artificial Reefs in Florida 101**") and engagement through a **citizen science monitoring program**.

2022. FSG researchers co-produced a harvest strategy and model to better estimate the abundance of stone crab. FSG Extension agents engaged 65 crabbers during five workshops held over two summers to foster trust in management decisions needed to sustain jobs valued at $3.6 million (& SFA 2.3), p. 119.

2023: **FSG's Florida Friendly Angler (FFA) certification program**--created based on feedback from the **Florida Friendly Fishing Guide (FFFG) program** (p. 123)--reached over 2,300 recreational anglers, improved knowledge by 89% and led to a 92% adoption of sustainable practices. Both programs have been promoted by FWC. The FFFG program was adapted by Ohio Sea Grant for implementation in the Great Lakes region. In 2024, FSG received its third Superior Outreach Program Team Award (SOPA) for FFA and FFFG programs from the Sea Grant Extension Assembly, and the FFA was released in Spanish (& ELWD 4.1), p. 132.

2023: FSG's quarterly Individual Fishing Quota (IFQ) Pricing Reports--now included in the "Marine Economists' Corner" of the Southeastern Fisheries Association Hotlines Newsletter--have been accessed 130 times to improve understanding of quota and fish prices, with 91% of commercial fishermen surveyed gaining new insights and 89% intending to use this knowledge in their IFQ investment strategies (& SFA 2.3), p. 147.

GOAL 2.2 – AQUACULTURE

2021: FSG has supported a two decade long finfish aquaculture research program at the University of Miami. The research advanced high-value finfish production, including cobia, red snapper, and Nassau grouper leading to a $58.3 million investment in Open Blue Sea Farms. CEO Brian O'Hanlon praises the collaboration's "enormously important" impact on seafood production and environmental sustainability, contributing to Open Blue's growth, which employs 135 people and generates $163 million in revenue (*2024 Research to Application Award* nomination). Research initiated during this review cycle included a focus on commercial scale production and a new species (i.e., hogfish), p. 123

2021-23: FSG's Helping Aquaculture Reap Value and Enhance Student Training (HARVEST) program uniquely addresses industry bottlenecks. The program has addressed a variety of industry needs ranging from production through marketing with student interns that are mentored by FSG Extension agents (& ELWD 4.2), p. 146. A HARVEST intern and FSG Offshore Aquaculture Communications Fellow supported Ocean Era to successfully obtain permits to deploy the first experimental offshore aquaculture venture in the Gulf, including the Facility National Pollutant Discharge Elimination System (NPDES) permit. The process was documented in the Manual for Aquaculture Permitting Pathway (MAPP) providing companies with a regulatory roadmap for future offshore aquaculture investments (& ELWD 4.2), p. 150. In 2023, an FSG HARVEST intern was asked to help Atlantic Sapphire--the largest land-based RAS (recirculating aquaculture system) salmon producer--seek access to the USDA's Agricultural Marketing Service commodity-buying programs. The resulting work directly supports 177 jobs valued at $6.8 million, p. 75.

A **StoryMap** highlights the evolution of numerous cross-function connections resulting from FSG's expansion of a 2018 project "Velella Epsilon: Pioneering offshore aquaculture in the southeastern Gulf of Mexico" (p. 6), including the HARVEST program, a NOAA eeBLUE supported educational display at Mote Marine Lab and Extension support of the new "**Women of the Water" conferences**.

2023: FSG's Online Resource Guide for Florida Shellfish Aquaculture is an economic tool for potential and current oyster farmers that has been downloaded over 500 times. This tool helps farmers evaluate startup costs and profitability, fostering growth in Florida's emerging oyster culture industry, and is now a widely used resource by growers to participate in the USDA's Noninsured Crop Disaster Assistance Program, p. 147.

GOAL 2.3 – SEAFOOD

2018: An FSG social media campaign to highlight Florida's aquaculture industry during National Seafood Month created posts and live sessions that reached 52,537 viewers across three digital media platforms. The campaign complemented aquaculture outreach and extension programming, raised awareness and engagement with Sea Grant by receiving 13,629 impressions and 3,423 engagements, driving 413 unique webpage views during the month (& ELWD 4.1), p. 143. See example **story**.

2020: FSG conducted an innovative clam buy-back program with the Cedar Key Aquaculture Association in response to COVID-19. The program purchased 300,000 unsold clams and farmers contributed an additional 150,000 for habitat restoration in the Indian River Lagoon. The program provided much-needed income to 23 clam growers in the Gulf and highlighted the potential for clam businesses to support restoration aquaculture initiatives. Issues learned paved the way for the Restoration Aquaculture conference in 2022, see G 1.3 (& SFA 2.2), p. 120.

2020: Due to COVID-19, seafood education was delivered virtually through two programs: (1) **Bite-Sized Science** included 69 30-minute webinars (57 in English and 12 in Spanish), and (2) the production of 28 **Seafood at Your Fingertips** Facebook Live cooking demonstrations that showed viewers techniques for cooking seafood safely at home and provided information on making local and sustainable choices, reaching 58,880 viewers, p. 159.

2023: The "Know Thy Oyster" project with Oyster South convinced one restaurant (Harry Roy's) to establish a raw bar. The project educated staff on oyster production techniques, safe preparation, and quality differences that they can use to confidently answer customer questions. Over the course of a year, this activity generated 1 new job and a total economic benefit of $164,800 (& RCE 3.3), p. 75.

GOAL 2.4 – ENVIRONMENTAL DISTURBANCES

2018: FSG scientists investigated how new culture techniques (i.e., off-bottom), water temperature, salinity, and seasonal harvests affect oyster health and survival. The results indicate that location and season significantly impacted parasite prevalence, helping to maximize the viability and profitability of 150 oyster culture businesses valued at $269 million--6th in the U.S. (& SFA 2.2), p. 145.

2019: FSG evaluated heat-tolerant clam species, red-tide toxin clearance rates in clams, and new seed production methods during HABs. Information

led to revised national shellfish harvesting regulations and helped boost the profitability of 56 participating clam-growing operations (& SFA 2.2), p. 143. See papers published in *Journal of Shellfish Research* (**Heekenda et al. 2020**) and *Aquaculture Research* (**Simon and Yang, 2018**).

BEYOND CORE EXPECTATIONS

2022: FSG partnered with Organized Fisherman of Florida and Gulf Sea Grant programs to address seafood industry challenges in workforce recruiting by identifying training needs and navigating regulations. Funded under the Food from the Sea Careers Program, surveys and focus groups representing 12 industry sectors revealed a consistent set of capacity needs that resulted in streamlining regional Extension and educational support, p. 148.

2023: As reported earlier, with support from the NOAA Restoration Center, FSG developed and implemented an initiative that to date has provided 40K anglers with novel web-based education and fish descending devices to sustainably release fish exhibiting barotrauma, p. 118. Due to exceptional performance, the initial $4 million project was extended with additional support and now is awaiting a supplement, raising the total to over $16 million.

PRE-EMINENT SCIENCE & COMMUNICATION

One of 9 research projects funded under National Strategic Initiatives (NSIs) in Aquaculture sought to address the role of China in seafood markets (p. 6). This research resulted in a peer-reviewed journal article published in Science (**Asche et al. 2022**), 44.1 impact factor, 4,028 downloads, and 6.1% acceptance rate). Dr. Asche is an FSG Research Affiliate who was profiled recently by FSG following his selection as **Fellow** into the International Institute of Fisheries Economics & Trade (IIFET). His efforts also serve to highlight FSG's work on seafood markets and trade intended to complement a strong portfolio of production-focused projects.

3 RESILIENT COMMUNITIES AND ECONOMIES (RCE)

As a result of FSG's RCE activities (p.17):

- **112** *communities* adopted/implemented sustainable economic & environmental development practices and policies
- **150** *communities* adopted/implemented hazard resilience practices to prepare for and respond to or minimize coastal hazard events

GOAL 3.1 – PLANNING AND POLICY

2019: FSG developed an online mapping application with living shorelines and permitting layers for the City of Cedar Key that was used to develop a **Shoreline Management Master Plan**, which has been accessed 2,000 times by practitioners working to combat coastal erosion (& RCE 3.2), p. 127. The output from the model is available as a **storymap**.

2022: FSG helped the City of Satellite Beach address flooding and sea level rise challenges by developing a resilience ordinance. Adopted in 2022, Ordinance no. 1221 allows the city to limit infrastructure maintenance and facilitate managed retreat from vulnerable areas--the first of its kind in Florida, p. 124.

GOAL 3.2 – ENGINEERING TOOLS

2022: FSG's research at the NSF-funded Wall of Wind (WOW) Experimental Facility at FIU led to changes in wind load provisions in American Society of Civil Engineer's (ASCE/SEI) 7-22, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," which are updated every 6 years to improve nationwide design standards for elevated structures and retrofitting of existing homes (& RCE 3.1), p. 128.

2023: FSG supported a multi-disciplinary team to explore a suite of practical design solutions for Florida's complex urban coastal flooding challenges. Cape Canaveral used a geospatial tool to identify lands for green stormwater infrastructure (GSI), leading to the development of a 15-acre regional stormwater park and improved flood resilience (& RCE 3.1), p. 130.

GOAL 3.3 – WATERFRONTS AND WATERWAYS

2019: FSG led Taylor County stakeholders in the development and implementation of a Waterway Improvement Program, culminating in the replacement of 46 waterway markers to support safe boating navigation and reduce impacts within 2,500 acres of nearshore waters, p. 127. FSG's contribution was valued at $1.1 million, p. 61.

2022: FSG research on the amount of arsenic leaching from Sargassum seaweed resulted in the City of Fort Lauderdale adding a 120-day post-harvest waiting period to their composting program protocols and using a maximum of 25% Sargassum content when applying the seaweed to its municipal landscaping projects. Project investigators were awarded $423K to investigate alternative uses of Sargassum, including for HAB control, p. 153.

GOAL 3.4 – INFORMING THE PUBLIC

2022: FSG trained 37 UF/IFAS Extension agents on the Climate Smart Floridians (CSF) program. Subsequent trainings were offered in Palm Beach, Volusia, Escambia and Monroe Counties. Extending the train-the-trainer approach, at least one local government offers CSF and motivated residents have obtained funding for outreach activities. A follow-up survey found that 80% of participating residents adopted sustainable behaviors (& ELWD 4.1), p. 152.

2022: An FSG researcher created "**Salty Urbanism**," a design manual that illustrates resilient waterfront designs and corresponding zoning revisions. The manual is being used within Broward County, including for public outreach, and was selected by the Venice Architecture Biennale, which exhibits the greatest global achievements in urban design research (& ELWD 4.1, 4.3), p. 154.

BEYOND CORE EXPECTATIONS

2020: Led by FSG, the South Atlantic Sea Grant programs partnered with NOAA's Office of Coastal Management (OCM) to reduce the effects of flooding in four coastal communities. Researchers published a legal policy assessment for at-risk transportation corridors and one project reduced insurance premiums by 35% for over 14,000 National Flood Insurance policyholders in Monroe County, Florida, saving $7.5 million annually, p. 129.

2022: FSG facilitated Hurricane Michael recovery with a $3 million NFWF grant that removed 2.3 million pounds of debris (including 38 vessels) from 3 Northwest Florida counties and restored 28 acres of habitat for coastal wildlife. The project also provided over $1.1 million for marine contractors to restore waterfront access for residential property owners, p. 126.

2023: With funding from FDEP, FSG supported Florida's Clean Vessel Act program with one educator and four regional Clean Boating Coordinators. These positions help marinas become Clean or Clean and Resilient Marinas, designations that reduce submerged land lease fees, and saved 144

marinas $400,458 in 2023. After Hurricane Idalia, the Coordinators helped 89 marinas obtain grants to repair damaged pumpout facilities, p. 129.

PRE-EMINENT SCIENCE & COMMUNICATION

The NOAA OCM funded project included a legal component led by FSG and Georgia Sea Grant. "Roads to Nowhere in Four States: State and Local Governments in the Atlantic Southeast Facing Sea-Level Rise" (**Jones et al. 2019**) was published in the *Columbia Journal of Environmental Law* and was selected as one of the top four environmental law articles of the year by the *Environmental Law and Policy Annual Review*, and one of the top 15 environmental law articles for the year by *Land Use & Environment Law Review*, a prominent annual anthology of land use and development legal articles. This article was also broadly shared in social media and the popular *Florida Trend* magazine.

4 ENVIRONMENTAL LITERACY & WORKFORCE DEVELOPMENT (ELWD)

FSG's productivity from ELWD activities (p. 18):

- **191,507** *people* engaged in informal education activities
- **191** *supported students* got jobs related to their degree
- **88** *products* advanced ELWD

FSG's students supported (p. 12):

- **222** *students* supported and **175** *degrees* awarded
- **1,074** *K-12 educators* participated and **10,986** *K-12 students* reached

FSG's workforce development trainings led to (p. 12):

- **127** newly certified *Clean Marinas*
- **754** new seafood safety staff or students with *HACCP certifications*

GOAL 4.1 – INFORM RESIDENTS

2018: After developing three new core courses, FSG continues to foster environmental awareness and coastal conservation by serving as instructors for the Florida Master Naturalist Program––a series of 11 certificate courses ranging from 24-40 hours of classroom learning, field trips, and practical experience––training 1,569 participants in coastal systems and restoration techniques that support their community and provide professional development, p. 157.

2018: FSG developed and delivered the Florida Microplastic Awareness Program (FMAP) that taught 1,480 with 38% pledging to make an average of 3.8 behavioral changes to reduce plastic waste, p. 114. FSG continues to report the number of participants in this popular program.

GOAL 4.2 – WORKFORCE DEVELOPMENT

2023: FSG built and deployed reef prisms to showcase the **Plastic-free Restoration of Oyster Shorelines (PROS)** initiative and upscaled efforts to increase the use of nature-based solutions with support from FDEP to create a **Living Shorelines Training for Marine Contractors** course, attracting 165 registrants. The course has supported $16.5 million associated with contracting jobs. Living shoreline installations resulted in a 16-25% reduction of hurricane-induced wave energy in Cedar Key, thereby bolstering resilience (& HCE 1.3, RCE 3.3), p. 131.

2022: FSG's HARVEST program, introduced earlier, helps both the aquaculture industry and students. In 2022, 6 students were added and trained in aquaculture practices through internships with 6 new aquaculture partners; to date, FSG has trained 17 interns. This successful program has motivated several interns to continue in the field and resulted in FSG funding two more cohorts (& SFA 2.2), p. 151.

GOAL 4.3 – YOUTH/STEM EDUCATION

2019: After receiving a Best Management Practice for a partnership with Mahogany Youth Corporation, FSG continued to offer hands-on marine education, including shark-tagging with scientists, to under-performing inner-city students. A study of 579 participants showed significant improvement in academic performance and reduced risk factors such as unexcused absences and tardiness. Many students are reaching academic levels comparable to their peers (& ELWD 4.1), p. 134.

2020: FSG supported the Natural Geography in Shore Areas (NaGISA) program at Niceville High School, one of 14 field projects of the Census of Marine Life (CoML), which has helped 60-80% of participating students (94 during 2020-21) pursue STEM fields, with alumni working at prestigious organizations like Oak Ridge National Laboratory, p. 158.

2020 & 2023: FSG developed video adaptations of several of its elementary curriculum materials, including a closed-captioned narration of ***One in a Thousand: Those Amazing Sea Turtles***, co-authored by FSG's Extension Leader, Dr. McGuire. In 2020, these video adaptations were presented to teachers during the virtual Florida Association of Science Teachers conference. In 2023, one teacher used the curriculum with 768 elementary school students in St Johns County, saying, "I could spend all year modifying what is available for all grade levels--I really appreciate the thought that went into lesson plans and the loaner materials," p. 48 and 53.

BEYOND CORE EXPECTATIONS

2021: FSG's Hazard Analysis and Critical Control Point (HACCP) program provides curriculum and essential training that helps seafood processors and importers meet federal food-safety regulations. Through its participation in the National Seafood HACCP Alliance, and in cooperation with the Association of Food and Drug Officials, the program--consisting of 2 manuals, 4 worksheets, 16 training modules, and 2 slide decks (all available in both English and Spanish)--serves over 100 seafood industry workers each year, providing an annual savings of $25,000 in course costs and generating nearly $4.2 million in economic benefits from the jobs supported. Moreover, trainings were provided to 19 students at the College of the Florida Keys and FSG has continued to support students at smaller colleges statewide, p. 121.

2023: FSG led the Sea Grant Regional Islands Initiative that included the Georgia, Puerto Rico, Hawaii, and Guam programs to sponsor 24 professionals recruited through the Gulf and Caribbean Fisheries Institute to attend university courses, boosting their skills and confidence in marine resource management. Through the enhanced capacity generated from this program, FSG helped launch a $46 million marine spatial planning project in the Caribbean, p. 158.

2018-23: FSG has invested core resources via staff time to submit quality applications from Florida students boosting their success in state and national research and policy competitions, resulting in **$2.26 million** in support for **76** students:

Competition	Submissions	Selected
Knauss	102	22
NMFS	30	2
Coastal zone	7	1
QUEST	2	2
Alyesworth	130	16
Guy Harvey	176	35
Total	**447**	**76**

Student support also includes career and professional development efforts described earlier.

PRE-EMINENT SCIENCE & COMMUNICATION

One way that FSG benefits Research Affiliate faculty is by using returned IDC to fund undergraduate summer research internships. If the planned project has additional expenses, a program development project may also be awarded. This strategy enabled an undergraduate to work with 2 Ph.D. students and WAG members to embark on a study of virtual education programs. In addition to fostering mentoring skills, the resulting paper, “Restore the Shore: Online STEM Engagement Impacts on Youths’ Conceptualizations of Living Shorelines and Connection to Water” (**Loizzo et al. 2023**) was published in *Applied Environmental Education & Communication* and served to introduce K-12 students to FSG’s RCE portfolio of nature-based solutions.

EPILOGUE

The theme of this review, "Connections," is inspired by James Burke’s concept of innovation, where diverse ideas, efforts and events converge to create significant advancements. FSG embodies this idea by viewing each research, Extension, or education project or activity as a vital part of a broader, interconnected strategy. FSG's approach leverages an extensive network of local, regional, and state partnerships, motivating collaborative science and decision-making across academia, management agencies, citizen groups, and the private sector driving long-term, impactful solutions. During the six years covered by this review, FSG has demonstrated its ability to innovate and far exceed minimum excellence standards through effective program management, engagement, and performance--integrating programmatic leveraging and partnership building as foundational to our growth and success. By bringing together scientists, policymakers, industry leaders, and environmental organizations, FSG creates platforms for ongoing dialogue and the development and application of new ideas.

FSG’s growing cadre of staff, agents, specialists, coordinators, liaisons and affiliates--connected to an expanding network of stakeholders--creates a dynamic environment where these intersections catalyze innovation and often lead to sustainable solutions. Ultimately, FSG’s model emphasizes that connections are key to meaningful progress, driving Florida’s Blue Economy and ensuring that Florida’s coastal ecosystems and communities thrive together through *Science Serving Florida’s Coast*.

Dr. Sherry Larkin, Director
Florida Sea Grant College Program

Signature SFA Programs

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Signature Environmental Literacy Programs

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BITE-SIZED SCIENCE

Signature Workforce Development Programs

NRLI — FLORIDA NATURAL RESOURCES LEADERSHIP INSTITUTE

HELPING AQUACULTURE REAP VALUE & ENHANCE STUDENT TRAINING — HARVEST Internship

REEF PRISMS — PLASTIC-FREE RESTORATION OF OYSTER SHORELINES UNIVERSITY OF FLORIDA

Notes


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