Focus Area Update: Healthy Coastal Ecosystems
March 14, 2016

Introduction

As outlined in the 2014-2017 National Sea Grant Strategic Plan, the Healthy Coastal Ecosystems (HCE) focus area encompasses three main goals:

1. Ecosystem services are improved by enhanced health, diversity and abundance of fish, wildlife, and plants.
2. Ecosystem-based approaches are used to manage land, water, and living resources.
3. Ecosystems and their habitats are protected, enhanced, or restored.

Practically, HCE research, extension, and education efforts generally focus on coastal ecosystem variability and stressors, e.g., nutrient cycling, aquatic invasive species, and other anthropogenic or natural contaminants and disturbances, as well as habitat restoration and conservation.

Strengths

The major strengths of Sea Grant (SG) programs stem from their location within communities and their relationships with community members. For the HCE focus area, the presence of SG within or near coastal ecosystems facilitates outreach and stakeholder engagement, resulting in increased awareness of local problems and priorities. One powerful example of this is a statewide water resources survey funded by Texas SG, which resulted in a voter-approved measure to devote $2 billion towards water infrastructure and conversation projects in 2014.[1] The flexibility, location, and strong community ties of SG programs also allow them to respond quickly to ecosystem disasters, as in the case of the Deepwater Horizon oil spill. Research and outreach topics that are particularly well-represented in 2010-2014 SG program HCE portfolios include water quality (contaminants, harmful algal blooms, nutrient cycling), invasive species and habitat restoration projects.[2] SG programs have developed strong collaborations with other organizations and agencies to address ecosystem degradation. For example, Ohio SG led a subcommittee with representatives from a number of state and federal agencies and other organizations to assess phosphorus loading reduction targets to prevent harmful algal blooms in Lake Erie. These targets were endorsed by the International Joint Commission (US/Canada) and have been incorporated into implementation plans by Michigan, Ohio, and Ontario agencies.[3]

Weaknesses

A common theme in the individual program 2015 HCE Performance Review Panel (PRP) reports is a lack of development and implementation of ecosystem-based approaches (EBA) as required in HCE Goal 2 of the National Sea Grant Strategic Plan. This could reflect a lack of clarity about EBA, a relatively

[1] "Texas Sea Grant helps Texans' voices be heard on water policy issues." 2014 Impact, PIER Database.
[2] Survey of 2015 PRP Reports, keyword search of impacts/accomplishments, PIER database.
[3] "Solving the Harmful Algal Bloom Problem (Ohio Phosphorus Task Force II)." 2013 Impact, PIER Database; 2015 HCE PRP Panel Summary for Ohio Sea Grant.

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recent introduction to the marine policy world, and/or how to frame projects in an EBA context. Another concern repeated in multiple individual program PRP reports is that impacts of some HCE projects are highly localized without major impact on regional or national scales. Such a local focus can be limiting since many threats to ecosystems are not geographically specific (e.g., ocean acidification), and ecosystems are highly interconnected (e.g., nutrient loading in the Midwest leads to hypoxia in the Gulf of Mexico). Coordination between programs within the SG network on HCE projects, particularly outside designated regions, could also be improved. Scientific issues that would benefit from more attention and resources within HCE include ocean (and lake) acidification, climate change, and sea level rise, as well as their impact on other anthropogenic ecosystem stressors (e.g., the effects of climate change on invasive species). While some SG programs have already begun to develop strong portfolios in these subject areas, broader participation/coordination will help communities to prepare for future threats to coastal ecosystem health. Finally, HCE was also the least represented functional area in 2010-2013 social science projects (by funding)[4] even though HCE generally constituted a large portion of SG programs' budgets (average: 33%[5]).

Opportunities

SG programs often have the largest impacts when they serve as a catalyst for collaboration between different organizations. Increased collaboration between individual SG programs and between SG, NOAA partners, and external organizations could thus result in large-scale and effective campaigns on particular HCE issues. For instance, collaborations among SG programs and other organizations within large watersheds could coordinate research and outreach activities to address upstream nutrient loading and downstream effects in coastal regions. The SG network has a built-in connection to USGS Water Resource Institutes (WRI, located in all 50 states and 4 U.S. territories) since five SG directors are also WRI directors. Strengthening this connection represents an exciting opportunity in light of the increased attention to water resources within NOAA and across the country. Next, building up the HCE social science portfolio could help communities to develop ecosystem-based management strategies and to address Goal 2 of the HCE National Strategic Plan. There is also huge potential for SG-driven innovation and outreach in topic areas such as ocean acidification/climate impacts on ecosystems, their interaction with other anthropogenic stressors, and managing coastal ecosystems to promote increased carbon storage (i.e., blue carbon). Finally, continued work in more established areas such as invasive species and harmful algal blooms will bring continued benefits to communities by reducing risk from ecosystem stressors.

Threats

Potential threats to SG HCE work include the ongoing risks of budget reductions and community resistance to ecosystem management. While SG is known for its strong outreach and extension

[4] "Social Science Highlights and Impacts."
http://seagrant.noaa.gov/WhatWeDo/SocialScience/SocialScienceHighlightsandImpacts.aspx
[5] 2015 PRP Reports

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capabilities, ecosystem management (e.g., marine planning) has the potential to stir up strong feelings in different stakeholders. Next, a lack of coordination between SG programs could lead to missed opportunities and possible redundancies within SG HCE portfolios. Moreover, research projects may suffer in quality if a SG program only looks only to its own established/local academic partners instead of drawing upon the depth of expertise within the larger SG network (or outside the network). Finally, environmental disasters (e.g., Deepwater Horizon) could potentially shift focus from slower moving threats to ecosystem health (e.g., climate change). While Gulf State SG programs did continue efforts in other areas after Deepwater Horizon, maintaining the right balance between work on immediate and long-term threats to ecosystems in the future could be difficult amid financial and community pressures.

Conclusions

Considering the strengths and weaknesses of the SG network in the HCE focus area, it is clear that SG programs are well-situated within their communities and are making great strides in a range of ecosystem research and outreach areas. The intersection of SG's strengths and weaknesses with potential opportunities and threats provides some guidance for future efforts in this focus area. First, HCE impacts could be bolstered by improving internal and external collaboration/coordination and better incorporating social science into HCE portfolios. Moreover, careful assessment of all threats to ecosystem health on both shorter and longer timescales will help guide SG programs on how to allocate limited resources. Looking to the future, SG is well-positioned to catalyze innovation and develop effective collaborations to prepare communities for the impacts of ocean acidification, climate change, and the interaction of different anthropogenic stressors on coastal ecosystems. SG programs should therefore actively work towards more fully incorporating these topics into their HCE portfolios while continuing efforts in more established areas. Furthermore, promoting information/idea exchange across the network will help to ensure high quality of all HCE research, education, and outreach projects. Finally, a combination of strong local community ties and a strong national network will help to safeguard against threats such as budget limitations or different political, commercial, or community pressures (for instance, resistance to ecosystem management plans).

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