NOAA SEA GRANT: ASSESSING THE MARKET AND NON-MARKET VALUE AND ECONOMIC IMPACTS OF COASTAL ENGAGEMENT PROGRAMS

FINAL NATIONAL SEA GRANT OFFICE RECOMMENDATIONS

SUBMITTED TO:
NOAA Sea Grant
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1. Introduction

For over 50 years, Sea Grant programs across the country have conducted research and delivered science-based information to solve complex coastal problems. This work can result in economic benefits and impacts in the coastal communities where Sea Grant operates. Sea Grant programs communicate these benefits and impacts to different audiences with outreach pieces such as newsletters and fact-sheets as well as their annual reporting commitments to the National Sea Grant Office (NSGO). In this project, ERG has developed a toolbox of resources to support the spectrum of communication and reporting done by the NSGO and the Sea Grant programs to increase the overall capacity of the Sea Grant network in this area. This report is one of these tools and is focused on recommendations to NSGO for investments that can systemically improve performance measure reporting of programs' economic benefits and impacts across the network.

Each year, Sea Grant programs report on specific performance measures for each of the four focus areas outlined in the *2014–2017 National Sea Grant Strategic Plan*—healthy coastal ecosystems, sustainable fisheries and aquaculture, resilient communities and economies, and environmental literacy and workforce development. The recommendations in this report have a primary focus to increase clarity and improve program's abilities report their activities on a cross-cutting performance measure that relates to all four focus areas: economic impacts (market and non-market; jobs and businesses created or sustained) derived from Sea Grant activities.

These report recommendations aim to help the National Sea Grant Office (NSGO) and—by extension—the 33 Sea Grant programs improve reporting on the economic benefits and impacts performance measure across the network.

Sea Grant programs and the NSGO face several key challenges when reporting this important performance measure. Chief among these is how to consistently and defensibly estimate and communicate a program's market and non-market economic impacts and economic benefits, often without the expertise of an economist. The programs also lack clarity about the performance measure criteria applied to the benefits and impacts they submit to the NSGO. Increasingly, Sea Grant programs seek to understand the circumstances under which they should quantitatively or qualitatively report this information to the NSGO. To date, Sea Grant programs use a variety of methodologies to quantify market and non-market economic benefits. These approaches vary in terms of economic defensibility and replicability, which makes it challenging to compare benefits and impacts across the diverse Sea Grant network at the national level. Additionally, Sea Grant programs have requested more clarity in NSGO guidance and tools to support reporting on this measure. To address these challenges, ERG worked with the NSGO over the course of this project to develop a suite of monetization methodologies for reporting and more general outreach communication that:

- Support reliable and consistent reporting of economic impacts from Sea Grant programs.
- Build on best management practices and tools that effectively quantify and communicate both market and non-market values of coastal engagement activities.
- Can be implemented by non-economists.

ERG took the following steps to generate this report's recommendations:

- Examined Sea Grant reporting data from fiscal year (FY) 2014 to FY2016.

- Reviewed papers by the Sea Grant Gulf of Mexico Economics Working Group[1] and Maine Sea Grant[2] on measuring economic impacts.
- Conducted five listening sessions with stakeholders and key Sea Grant personnel, such as economists and others in the network.
- Identified priorities for monetization methodology development.
- Conducted a targeted literature review (see Attachment 2) to identify existing monetization methodologies.
- Convened and outside expert panel of economists to discuss benefits and monetization methodologies.
- Selected benefits for valuation methodology development.
- Ground-truthed selected methodologies by pilot testing guides with 16 volunteer Sea Grant programs.
- Finalized methodology guides, which will be presented at Sea Grant Week 2018.

For a more in-depth overview of our methods, please see the Final Scoping Study available as Attachment 1. Section 2 of this report provides general guidance information for reporting and communicating about program's economic activities, while Section 3 provides a series of recommendations for NSGO to improve clarity and the capacity of programs to report on the economics performance measure in PIER. Finally, Section 4 discusses the overall approaches to the methodology guides developed as tools for the programs, their recommended valuation methods, and any notable reasons ERG selected these approaches.

2. Key Considerations for Economic Benefits Reporting

The NSGO or individual programs can use the following general guiding principles when quantifying the economic benefits that a particular Sea Grant project or activity generates. The "Primer for Using Economic Valuation Methodology Guides" provides a similar version of these considerations for Sea Grant programs. These are not formal recommendations for the NSGO—those are provided in Section 3 of this report—but are intended to be useful context for the NSGO to better understand concepts that ERG integrated into the methodology guides.

Play an Essential Role to Report Economic Benefits in PIER

Context: Sea Grant programs were confused about a minimum threshold they needed to achieve to report an economic benefit, which is outlined below and included in the primer.

The program must play an essential role to report on this measure. By essential, we mean that 1) stakeholders and partners would describe Sea Grant's role as critical for the project's ultimate success and 2) the economic impact or benefit would not have occurred without Sea Grant involvement. This is a key criterion for reporting economic benefits in the Planning, Implementation, and Evaluation Resources (PIER) database as a performance measure. When a program has a non-essential project role,

[1] Sea Grant Gulf of Mexico Economics Working Group. 2015. The Importance of Gulf of Mexico Marine Dependent Industries and Measuring Sea Grant Programming Benefits on Those Industries. http://texasseagrant.org/assets/uploads/resources/16-206_GOMT16001__web.pdf

[2] Maine Sea Grant. 2012. Report on the Economic Impact Assessment Methods Inventory for the Sea Grant Network http://nsgd.gso.uri.edu/meu/meus12003.pdf

it should describe the project impacts or accomplishments in PIER in narrative form as an impact or accomplishment; it should not report them as part of the program's performance measures and metrics.

Use Stories to Explain How You Bring Value

Context: As we explored what benefits and impacts to monetize, we had multiple conversations with economists and non-economists alike about the purpose of monetizing each benefit. Notably, there are sometimes more effective ways of demonstrating value than monetizing benefits—programs must always consider what will resonate with their audience.

Not everything needs a monetized number and ***sometimes a story is the most effective way to present the value of what Sea Grant does***. Much of this depends on the audience—if the audience will be skeptical of a methodology or conceptually disagree with putting a value on a certain type of benefit, Sea Grant programs should consider whether their audience may have a more positive reaction to hearing about the number of people impacted and the positive impacts of Sea Grant work. Within the methodology guides, ERG has developed guidance on using "value chains" to help programs defensibly link activities to benefits or impacts, regardless of whether their story is or includes monetized values.

When linkages are too complicated or Sea Grant's audience will not react well to monetizing activities, we recommend reporting them as impact or accomplishment statements. In telling the story, we also recommend programs ***count what they can count***—maybe they do not put a dollar value on an activity but try to quantify impacts in other ways (e.g., acres restored, people reached, hours saved). Finally, we recommend programs ***do not seek out or shy away from large numbers***. Larger economic impacts or benefits are acceptable but should be reviewed with a different set of rigor and standards, because they will get scrutinized in more detail. While it is important to use defensible methodologies to come up with values for these large numbers, it is just as important to transparently and honestly document contributions to the value—the wording Sea Grant uses to frame its contribution is important.

Do Not Use Multipliers for Economic Benefits Performance Measure Reporting to PIER

Context: Sea Grant programs occasionally use multipliers for purposes outside of reporting economic benefits as a performance measure in PIER, which is perfectly acceptable; however, multipliers include indirect impacts, and only direct impacts can be reported to the Office of Management and Budget (OMB) for this performance measure.

Sea Grant projects often result in cost savings, increased revenues, or job creation. For reporting economic benefits as a performance measure in PIER (based on guidance from OMB), programs must report those direct impacts. Input-output tools—such as IMPLAN, REMI, and BEA RIMS II—use multipliers to help us understand the ripple effect of the cost savings, revenue, or jobs (e.g., if a program creates more fishing jobs, more boats will be purchased, and the fishermen will spend their income throughout the economy). Simply put, these input-output tools and multipliers **cannot be used for reporting economic benefits as a performance measure in PIER because the performance measure focuses on direct impacts**. The multipliers in these tools aggregate indirect and induced (ripple effect) impacts with direct impacts. This would be very useful when determining the program's overall impact on the regional economy, but **only when calculating the impact for purposes outside of the economic benefits performance measure.** ERG instructs programs to not use values from these tools for performance measure reporting to PIER.

Account for Attribution

Context: Sea Grant programs requested further clarification about attribution and specifically about attribution among partners in the creation/realization of a benefit during the listening sessions. ERG worked with its economists to develop guidance on how to handle attribution for each type of benefit in the economic valuation methodology guides.

Our economists recommend to either 1) calculate the entire benefit but be very transparent about what activities Sea Grant performed (i.e., Sea Grant did X and Y, which contributed to a $Z benefit or impact), or 2) apportion contribution by level of effort or another metric tied to percent contribution. The Sea Grant Gulf of Mexico Economics Working Group paper similarly recommended using clear and transparent language when attributing benefits to Sea Grant programs.[3] In economic benefits reporting, we assume Sea Grant is an essential contributor (and theoretically the benefit would not be achieved without Sea Grant) and should thus report the full benefit to PIER. The caveat here is that **if multiple Sea Grant programs work on a project**, the total value of the benefit should only be reported once. Sea Grant programs need to work together to apportion out the total value of the benefit. We outlined examples in the methodology guides. The other potential caveat is that Sea Grant programs could potentially double count benefits if they collaborate with other organizations on projects and each then reports the full economic value of that project.

Account for Recurring Benefits

Context: Benefits often continue to recur over many years, and Sea Grant programs requested that ERG provide more guidance about the timing for when recurring benefits should no longer be claimed. We worked with our economists to develop recommendations for how to account for recurring benefits when reporting economic benefits to PIER and communicating impacts or benefits for other purposes.

Economic benefits reporting to PIER: When reporting economic benefits performance measures to Sea Grant's PIER database, there are some limitations to tying OMB funding to the year a benefit was realized. Consequently, the methodology guides generally limit reporting to a single year of benefits unless Sea Grant continued to actively work on a project in future years. The community rating system methodology guide is somewhat of a caveat, as we recommend claiming the annual savings through the end of the cycle verification (typically every three years or five years). This is because the savings are concrete for an established time period and because Sea Grant is often actively involved in that type of community resilience work.

Communicating impacts or benefits for other purposes: To measure economic benefits for communication purposes *outside of the economic benefits performance measure*, ERG's economists took a less conservative approach. They agreed that as long as Sea Grant could confirm the benefit was still occurring in future years, it is *generally* defensible to claim it. There are some caveats to this; for example, our panel of economists agreed that Sea Grant should only count jobs created or supported for a single year; even if those jobs still exist in future years, we assume that Sea Grant only created or supported them once (unless Sea Grant continues to work with a company and support or create additional jobs). For the general revenue and cost savings fact sheet, we also noted that programs

[3] See recommendation 2 on page 38 and recommendation 2 on page 30 of: Sea Grant Gulf of Mexico Economics Working Group. 2015. The Importance of Gulf of Mexico Marine Dependent Industries and Measuring Sea Grant Programming Benefits on Those Industries. http://texasseagrant.org/assets/uploads/resources/16-206_GOMT16001__web.pdf

should be careful when claiming recurring benefits, because someone else could claim that the benefit would have occurred anyway by a certain time (e.g., if you help with early adoption of a technology that becomes widespread two years later). The methodology guides, therefore, also provide guidance in calculating recurring benefits for purposes outside of the economic benefits performance measure.

3. Recommendations to the National Sea Grant Office

The following recommendations are provided to the NSGO with a focus on actions and investments that can systemically improve performance measure reporting of programs' economic benefits and impacts across the network. Table 1 summarizes these recommendations, which are described in more detail in the subsections that follow.

Table 1. List of NSGO Recommendations

#	Recommendation Short Description
1	Increase consistency and clarity of economic benefits reporting:
1a	• Use definitions and examples (presented below) to clarify the differences between and explain the appropriate uses of economic impacts and economic benefits.
1b	• Develop a peer work group or community of practice to continue to help increase the capacity of economic impact and benefits reporting and communication.
2	Update Sea Grant's PIER database for economic benefits reporting:
2a	• Update the categories for economic benefits reporting to Sea Grant's PIER database.
2b	• Use the language "jobs (or businesses) supported" or "enhanced" instead of "sustained."
3	Enhance ecosystem service valuation (ESV) economic benefits reporting:
3a	• Invest in an internal or external economist to assist with ESV reporting.
3b	• Invest in primary ESV studies that could expand the capacity to perform a benefits transfer analysis.
3c	• Review libraries of ESV studies to identify studies and values that are most appropriate to use.
4	Implement primary studies on the value of education programs and fellowships:
4a	• Implement a primary study on the careers of fellows supported by Sea Grant.
4b	• Continue to create and accept a methodology that values environmental education programs to use throughout the Sea Grant network.
5	Capture and communicate the economic value of volunteer hours at the national level or activity/project level.

Recommendation 1: Increase Consistency and Clarity of Economic Benefits Reporting

Context: ERG has spoken with various groups and individuals that report and communicate Sea Grant economic benefits. This project provided the NSGO with an opportunity to improve clarity and better communicate economic benefits reporting as performance measures, as impact statements, or as other outreach to Sea Grant programs.

Recommendation 1a: Use the following definitions and examples to clarify the differences between and explain the appropriate uses of economic impacts and economic benefits.[4] The Maine Sea Grant report on measuring economic impacts also emphasized this distinction.[5]

- **Economic impact**: Net change to the economic base of a region. An economic impact creates or keeps revenue in a given economy that would either not exist or leave the region otherwise. Examples include creating jobs, saving an entity money, or helping to generate revenue in a region.
- **Economic benefit**: Net increase in social welfare through market or non-market forces; for example, the value of enhanced recreation, value of increased knowledge or skills, or value associated with improved water quality.

Recommendation 1b: Develop a peer work group or community of practice to help increase the capacity of economic impact and benefits reporting and communication. To ensure reporting continues to become more consistent and reliable and that effective outreach is developed, we recommend creating a group that can actively discuss issues that arise and potential solutions.

Recommendation 2: Update Economic Benefits Reporting to PIER

Context: Before this work, NSGO and Sea Grant programs were summing cost savings, revenue generation, and ecosystem service values into a single value. Based on discussions with economists, ERG recommends creating new categories to avoid adding "apples and oranges" together. We believe this will allow Sea Grant programs to more clearly communicate the value of their important activities. Additionally, our experts found the language "businesses or jobs sustained" to be a threshold that could be easily questioned and potentially difficult to justify or determine.

Recommendation 2a: Use the language "jobs (or businesses) supported" or "enhanced" to minimize the confusion and controversy around whether a job or business was truly sustained.

Recommendation 2b: Include the following new categories:

- Monetary value of ecosystem service values
- Monetary value of increased economic output (revenues generated for some entity or group of entities)
- Number of new businesses created
- Monetary value of businesses created (based on wages of jobs they support)
- Number of existing businesses supported or enhanced
- Monetary value of businesses supported or enhanced (based on job wages they support)
- Number of jobs created
- Monetary value of jobs created (based on job wages)

[4] This is in line with the definitions presented in the following National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service paper, which was recommended by NOAA's Office of the Chief Economist: Watson, P., Wilson, J., Thilmany, D.D., and Winter, S, 2007. Determining Economic Contributions and Impacts: What is the difference and why do we care? Journal of Regional Analysis and Policy, Mid-Continent Regional Science Association, 0(2): 1–7.

[5] Maine Sea Grant. 2012. Report on the Economic Impact Assessment Methods Inventory for the Sea Grant Network http://nsgd.gso.uri.edu/meu/meus12003.pdf. See page 5 discussion.

- Number of jobs supported or enhanced
- Monetary value of jobs supported or enhanced (based on job wages)
- Cost savings or costs avoided
- Other economic value (a catch-all category—this can either be re-assigned later or left in)

Recommendation 3: Enhance Ecosystem Service Value Reporting

One of the most challenging parts of this project was balancing economic defensibility with relative simplicity—especially with regard to ESVs. ERG's economists generally concurred that the benefit transfer method (applying values from other available studies to Sea Grant projects) would be the only cost-effective way to monetize Sea Grant's efforts to restore or enhance ecosystem functions. There are concerns, however, with non-economists performing benefit transfer without the review or consultation of an economist due to pitfalls from double counting; selecting from studies with a large range of values; and accounting for the timing, geography, and differences in ecosystem function. The ESV methodology guide provides step-by-step guidance but recommends that programs only implement it in consultation with an economist.

Recommendation 3a: ***Invest in an internal or external economist to work with programs to report ecosystem service values using the benefit transfer method presented in the methodology guide.*** This could build capacity toward internally implementing the methodology, develop more examples of well-written ESVs, and ensure that inaccurate ESVs are not submitted to OMB. Ultimately, this will help build a library of defensible approaches, a catalogue of useful studies to cite, and help ensure consistency across the programs. It will also encourage more programs to report this value and more accurately capture this economic benefit across all the programs.

Recommendation 3b: ***Invest in research to fund regional ESV studies to equip Sea Grant programs with applicable data to generate more defensible estimates using the benefit transfer method.*** Regionally relevant data are extremely important for defensible benefit estimates, as the dollar value of 1 acre of restored ecosystems may differ dramatically across U.S. regions (e.g., the Northeast and the Pacific Southwest). These primary studies could target ecosystem function and geography combinations that are lacking in the literature.

Recommendation 3c: ***Evaluate currently available ESV studies to identify what data Sea Grant programs may use in benefit transfer.*** Review the Sea Grant Publication Catalog, GECOSERV Database, Ecosystem Services Partnership (ESP) Database, and Benefit Transfer and Use Estimating Model Toolkit to recommend the best studies to use for benefit transfer. The Sea Grant Publication Catalog includes around 20 to 30 ESV studies, GECOSERV includes a filterable database of about 1,400 ESV estimates, ESP contains over 1,350 ESV estimates, and the Benefit Transfer and Use Toolkit includes average values across studies valuing similar services.

This evaluation could help identify studies that generally have more appropriate values and could target recent Sea Grant projects related to ecosystem protection and restoration efforts. This approach would not completely prevent misuse of data (picking just the highest values or the wrong type of study), but it would increase the defensibility and consistency of ESV benefit monetization, as it allows a single entity to select a more appropriate range of values that Sea Grant programs should use based on ecosystem function.

Recommendation 4: Implement Primary Studies for the Value of Education Programs and Fellowships

Many Sea Grant programs expressed the importance of their fellowship programs and other educational programs (e.g., for K-12 teachers). ERG considered developing monetization guides for these programs during this project; however, due to resource constraints, we prioritized other guides (see the reasons outlined on page 11 of the Attachment 1 scoping summary).

***Context for fellowships*:** We reviewed literature to assess whether other program types (e.g., Fulbright, American Association for the Advancement of Science, and Rhodes Scholarships) have implemented quantitative studies on the value of each fellowship. The goal would be to transfer those benefits to Sea Grant fellowships. We found limited information, however, on studies that could be defensibly transferred to Sea Grant fellowships. For example, a U.S. Department of Commerce study showed the average lifetime earnings of someone with a master's degree is approximately $2.5 million compared to $2.1 million for someone with a bachelor's degree. There is evidence that fellowships like those administered by Sea Grant have similar impacts, but we may need more targeted studies to defensibly monetize increased earnings.

Recommendation 4a*: *Implement a primary study on the careers of fellows supported by Sea Grant. This study could assess the increased earnings of fellows compared to a similar population who did not become a fellow (accounting for possible selection bias—i.e., those selected as a fellow are high achievers). Alternatively, the study could assess how much businesses are willing to pay (in terms of salary for a hire) the fellow before and after the fellowship. These results could then be applied/transferred to future-year fellows.

Context for K-12 teachers: Sea Grant enhances teacher skills and knowledge, which translates to students performing better. The economic valuation of environmental education is an emerging field. Dr. Eric Hanushek has been one of the primary researchers advancing the valuation of improved teachers and students based on the potential for increased lifetime earnings. Hanushek estimated the increase in students' lifetime earnings based on increased teacher effectiveness in a National Bureau of Economic Research (NBER) working paper,[6] which was later published in an Economics of Education Review (peer-reviewed).[7]

Recommendation 4b*: *Continue to create and accept a methodology that values environmental education programs to use throughout the Sea Grant network. The defensibility of this valuation methodology rests on 1) the studies by Hanushek and others in the field, and 2) Sea Grant demonstrating and measuring improved teacher effectiveness (as this is the basis for increased student lifetime earnings) and/or student performance. In terms of item 1, a range of economists shared concerns about the defensibility of using an NBER working paper (Hanushek) that the NBER board of directors has not yet approved, but a peer-reviewed journal (Economics of Education Review) accepted the paper—the takeaway is Sea Grant would need to be careful about presenting this as NBER-approved research, and outside audiences could still be skeptical (similar to ESV). In terms of item 2, Sea Grant could implement a primary research study to ***measure the increase in teacher effectiveness*** based on educational programs at select pilot sites. ERG's economists concurred that this cannot simply be

[6] http://www.nber.org/papers/w16606. Note: NBER working papers have not undergone the same review as official NBER publications; in particular, they have not been submitted for approval by the board of directors. They are intended to make preliminary results of NBER research available to other economists to encourage discussion and suggestions for revision before publication.

[7] http://hanushek.stanford.edu/sites/default/files/publications/Hanushek%202011%20EER%2030%283%29.pdf

estimated or assumed without being measured at some sites for defensibility. If these pilot sites reflect similar types of programs throughout Sea Grant, the increase in teacher effectiveness could be assumed to be the same for other similar Sea Grant program offerings.

Recommendation 5: Capture and Communicate the Economic Value of Volunteer Hours

Context: Sea Grant programs report volunteer hours as their own performance metric. However, the economic value of these volunteer hours is not reported as an economic benefit performance measure in PIER because OMB does not allow it. Volunteer hours, however, can be easily and defensibly monetized for other communication purposes. To do so would be a relatively low-hanging fruit, as programs already collect data on volunteer hours. It would be relatively easy for the NSGO to calculate these values at the program, state, or national level using a simple $/hour factor multiplied by the volunteer hours. Economic value can be captured by assuming the volunteer hours are a cost-savings replacement for paying jobs (e.g., cleaning up trash on a beach). Independent Sector has a tool that nonprofits frequently use to calculate the value of a volunteer hour.[8]

Recommendation 5: Convert volunteer hours to an economic value. Because the NSGO already captures volunteer hours, it could calculate the economic value for each Sea Grant program annually and all programs rolled together based on the value per hour for each state (or average over the entire United States) from Independent Sector. One consideration is that some Sea Grant volunteer work involves a high level of expertise. The NSGO may want to consider the relative portion of high-expertise volunteer hours (e.g., water monitoring) versus more generic volunteer work. If a substantial percentage of work involves a higher level of expertise, Sea Grant would underestimate the value of these volunteer hours somewhat substantially. It may thus be worth the additional level of effort to calculate the value of volunteer hours based on the type of work performed. This activity-level economic value could be calculated using wage data from the Bureau of Labor Statistics Occupation Employment Statistics based on the wage of the job that the hours are replacing.[9]

4. Sea Grant Program Toolkit

ERG developed the following suite of tools: a primer, a decision tree, and five economic valuation methodology guides. Below, we discuss the reasons for development as well as changes to the primer and decision tree after pilot testing. Additionally, for each of the methodology guides, we briefly describe the overall approach, recommended valuation method, and any notable reasons why we selected that approach. The report in Attachment 1 documents the reasons ERG selected these tools for development.

Primer: The primer provides a two-page overview of the purpose and various sections of the methodology guides as well as some high-level guiding principles for valuing and reporting economic benefits and impacts. ERG made a conscious choice to test the decision tree and methodology guides on pilot testers without providing much background about how to use them. Pilot testers commented that they needed more context on reporting and more information about how to use (and not use) the various sections of the methodology guides. ERG developed the primer in response to these requests.

[8] https://independentsector.org/value-of-volunteer-time-2018/#sthash.h2pkwT4B.dpbs

[9] https://www.bls.gov/oes/current/oessrcst.htm

Decision Tree: The decision tree helps programs determine which methodology guide to use through a sequence of paths and yes/no questions. The initial decision tree branched out from a single yes/no question and included a couple of loops in rare cases where a user might need to implement two methodologies for a single Sea Grant activity. Based on feedback, we restructured the decision tree to instruct the user to assess whether a number of shorter paths (with no looping back) are applicable.

Methodology Guide: Ecosystem Service Values: As similarly described in Section 3 of this report, one of the most challenging parts of this project was balancing economic defensibility with relative simplicity. ERG's economists generally concurred that the benefit transfer method (applying values from other available studies to Sea Grant's projects) would be the only cost-effective approach to monetize Sea Grant's efforts to restore, enhance, or protect ecosystems. However, there were concerns about non-economists performing benefit transfer without the review or consultation of an economist due to pitfalls from double counting; selecting from studies with a large range of values; and accounting for the timing, geography, and differences in ecosystem function (which was also emphasized in the Sea Grant Gulf of Mexico Economics Working Paper).[10] The ESV methodology provides step-by-step guidance but recommends that Sea Grant programs only implement it in consultation with an economist. Pilot testing revealed that many programs will not be able to easily access an economist; with this in mind, ERG made some recommendations in Section 3 of this report to help improve and operationalize the reporting of this measure.

Methodology Guide: Jobs and Businesses Supported or Created: One noteworthy takeaway from our discussion here was to change the language from "sustained" to "supported" for defensibility reasons. We made recommendations in Section 3 regarding that language in PIER. We also recommended in the methodology guides that Sea Grant programs be particularly vigilant about defending how the job was "created" as opposed to "supported" in their write-ups, as the "created" claim is more likely to be questioned.

The overall approach is to estimate this value based on wages, regardless of whether valuing individual jobs or businesses (i.e., estimating the economic value of supporting or creating the business based on the job wages). This is a very tangible metric that resonates well with audiences. Business revenue is also tangible, but it is potentially very difficult to obtain in most cases; thus, ERG chose to use wages as the core metric for measuring this value.

Methodology Guide: Workshops and Trainings: After pilot testing, ERG revised its methodology guides to capture: 1) the cost savings to attendees for required courses or certifications that Sea Grant offers at no cost or at a discounted price compared to others, and 2) the economic value of the course to the attendee (for all workshops and trainings, not just required ones). The cost savings for attendees is tangible and simple to communicate, and we made minor edits to our approach based on pilot tester feedback.

ERG added the economic value of the course to the attendee after the pilot testers indicated a need to capture a larger range of economic values. Being conscious of the level of expertise needed, we adapted

[10] Page 40 of the Sea Grant Gulf of Mexico Economic Working Group paper also emphasized the importance of using recent publication of the same type of ecosystem and similar geography. Sea Grant Gulf of Mexico Economics Working Group. 2015. The Importance of Gulf of Mexico Marine Dependent Industries and Measuring Sea Grant Programming Benefits on Those Industries. http://texasseagrant.org/assets/uploads/resources/16-206_GOMT16001__web.pdf

a travel cost methodology (frequently used to measure the value of a beach or park, for example, based on what people are willing to pay to go there) and applied it to attending workshops and trainings. The assumption here is that if someone attends a training or certification workshop, either the attendee or their employer is willing to pay the travel cost, registration cost, and opportunity cost of time (employee's lost wages or employer's paid wages that could have gone to doing something else). Thus, the economic value is conservatively ***at least*** equal to these costs and opportunity costs (but not all value is necessarily captured). If NGSO develops other fact sheets in the future to obtain a more complete value for any specific course or workshop types (e.g., a fact sheet on the value of students' future earnings based on teacher improvement from Sea Grant courses), implementing this method as well would likely result in double counting.

Methodology Guide: Federal Emergency Management Agency (FEMA) Community Rating System (CRS): FEMA allows communities to join its CRS program, implement adaptation and planning measures, increase their CRS points, and reduce their CRS score, resulting in community savings on flood insurance. This is a very tangible benefit, but ERG identified and addressed a couple of issues after pilot testing.

One challenge is that CRS scores are reviewed every few years; thus, the savings do not always align with the same year of the work. Because this type of Sea Grant technical assistance is often ongoing, ERG recommends that programs report their CRS work as an impact statement before the CRS review cycle; after the score changes, they should report it as an economic benefit (cost savings) annually for each year until the ***next*** review cycle.

The other challenge is that sometimes Sea Grant helps improve CRS points, but not by enough points to decrease the CRS score and achieve cost savings. That said, Sea Grant has helped the community get closer to the savings, so ERG developed a methodology to estimate "potential savings" based on how many CRS points Sea Grant helped a community achieve. This loosely parallels an option value in economics, as Sea Grant's work improves the community's ability to take advantage of the potential future savings.

Methodology Guide: General Revenue and Cost Savings: This guide serves as somewhat of a catch-all (albeit not a complete catch-all) to capture impacts and benefits that were not monetized in the other guides. It provides a range of examples and some general guidance about attribution and recurring benefits.