

Sea Grant Economic Benefits 2022 Examples Digest

Welcome to the 2022 Economic Benefits Examples Digest. The purpose of this digest is to support and enhance future reporting by expanding programs' access to examples written by their colleagues. Each year the diversity of entries and applications of the methodology guides become more robust. Now in its fourth year, the Annual Examples Digest has shared examples from nine Sea Grant programs to help their peers and enhance the story of Sea Grant's economic value to nature and society. Thank you to the programs that have made these compilations possible.

Each year, we select a subset of economic benefits examples from the prior reporting year that reflect recent themes, discussions, and questions raised by programs in the past year. If you are unable to find what you are looking for in this 2022 Digest, we encourage you to check out the following;

- [2019 Digest](#)- included an array of examples that highlighted how to use Sea Grant's methodology guides.
- [2020 Digest](#)- added focus on valuations involving COVID-19 assistance, research to application, and marine debris.
- [2021 Digest](#)- increased examples of resilience activities and their associated valuations, including assistance with securing grants.

For 2022, we've provided the usual variety and built on previous years' focuses with increased examples of climate-ready workforce and outcomes of cross-sector collaborative projects. The entries represent a spectrum of effort, from relatively simple to more detailed and complex. This collection is not intended as a 'best of' list; it is intended as a 'likely to be useful' list. What was chosen or not chosen is not a value judgment on the entries themselves, rather, we chose these examples because they differ from the examples shared in already available [resources for calculating economic benefits](#). It is our hope these entries spark ideas for new valuations or present feedback that can enhance future practice. Ultimately, we hope that this, along with the [methodology guides](#) and the [Sea Grant Economics 101: A Guide for Reporting and Communication](#), will help all programs with their valuation efforts and economic stories.

Economic valuation for program reporting purposes is not an exact science, and our understanding of valuation does evolve and change each year. As an annual digest, this document is designed to reflect continual learning and be representative of themes from the year's annual reporting review. This document is meant to be a helpful tool and we want to emphasize that it is not formal guidance. These examples are meant to support thinking on this topic but do not necessarily provide a road map for a "perfect" valuation.

For those interested, Sea Grant hosts an Economic Valuation Community of Practice whose activities are communicated and coordinated through a listserv. Please reach out to Alison.Krepp@noaa.gov if you would like to join.

Thank you!

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Resilient Communities and Economies

1. Training efforts led by the Mississippi-Alabama Sea Grant Consortium (MASGC) Living Shorelines Program led to the diversification of several marine contractors to include living shorelines as a service. Over the past year, these companies have utilized knowledge gained from MASGC to secure over \$200,000 in living shoreline contracts with private property owners and hired 12 temporary employees to complete that work. (Project A/O-69, PI: Sparks) (See Impact 38720 and 38717 and 38665).

Why we chose this example: The focus with this entry is the benefit realized by several marine contractors that diversified and expanded their business as a result of Sea Grant programming. MASGC is able to quantify this benefit using the **contracts secured as a tangible result of the Sea Grant training** each received in living shorelines. Given that this benefit was a direct result of training, the Sea Grant program can claim 100% of this benefit in the first year. Beyond that, the program needs to determine an appropriate ‘fledge point’ - the point at which the benefit can be realized absent Sea Grant’s involvement. In some cases the fledge point is after 1 year and in other cases this may progress over the course of several years at a discounted rate (100% in year 1; 50% in year 2; 25% in year 3) until fledged.

- Further considerations: To assure that there is no double counting in PIER, this entry could make clear that the funds secured by the contracts in this economic valuation did not also contribute towards its leveraged funding reported in this cycle.

2. Delaware Sea Grant extension staff were instrumental in Sussex County adopting a county-wide Buffer Ordinance, which was the first comprehensive environmental policy passed in Sussex in 30 years. Delaware Sea Grant guided discussions, shared case studies and research with the team, and provided outreach around the topic through writing and in-person meetings and events. The ordinance doubles the size of buffers between new development and tidal wetlands and waterways and it adds a buffer for the first time ever to non-tidal wetlands and intermittent streams.

Per FEMA, the average Expected Annual Loss in dollars, resulting from coastal flooding in Sussex County each year is: \$18,326,234 (<https://hazards.fema.gov/nri/expected-annual-loss>). FEMA and the National Institute of Building Sciences (NIBS, 2020: nibs.org/mitigationsaves) partnered on a landmark study to evaluate Return on Investments (ROIs) for different mitigation efforts. They determined that going above basic code requirements can produce between a \$5:1 (riverine flooding) and a \$7:1 (hurricane surge) return on investment. Based on this study the buffer ordinance likely saved Sussex County residents between 80% (5:1) and 85% (7:1) of the average Expected Annual Loss due to flooding, which is a avoided costs of \$14,660,987 to \$15,577,298. The higher end of this range is the estimated economic impact of this work.

Why we chose this example: This valuation is an example of how to apply nationally available climate change mitigation information at a local scale to perform a **cost-avoidance valuation**. From a climate-readiness perspective, costs-avoided from planning actions such as ordinances preserve economic benefits realized by these communities in other domains. As Sea Grant continues to support businesses and communities adapt and increase resilience to changing

coastal conditions, valuing not only what has been realized, but also projected impacts (like avoided costs) can further help to justify this work.

- Further considerations: This entry provides clear details for its valuation and is transparent in its calculations and assumptions. In the future, the program may choose to include the basis for its decision to claim the high end of expected annual loss valuation to further enhance this robustness. For example, it may be that a predominance of properties in the communities with which the program works would be impacted by hurricane surge rather than riverine flooding.

Healthy Coastal Ecosystems

3. In 2022, through a partnership with the North Shore Community Land Trust (NSCLT), a Hawaii Sea Grant Coastal Community Resilience Specialist oversaw the restoration of a 30-acre coastal wetland agro-ecosystem at Waialeale on the North Shore of Oahu. Formerly used as a livestock experiment station by the University of Hawaii, this parcel contains a 20-acre coastal freshwater wetland traditionally used for wetland taro agriculture and freshwater aquaculture. The specialist utilized trained community volunteers who helped restore 0.2 acres or 809 square meters of wetland for taro cultivation by removing invasive weeds. A study by Bremer et. al. in 2019 (<https://www.mdpi.com/2071-1050/10/12/4502>, table 3) estimated the economic outcome of projected (future) taro cultivation in Heeia, Oahu at a yield ranging from 1.12-1.79 kg/square meter and a farm price ranging from \$5.51-\$10.34/kg. Using the most conservative values from this study, HISG is taking a conservative approach and using the projected value of a taro harvest on this land as a proxy for the restorative value of returning this wetland to traditional cultivation practices. The ecosystem services valuation of restoring wetland for taro cultivation at Waialeale is estimated at 809 square meters x 1.12 kg/square meter x \$5.51/kg = \$4,993.

Why we chose this example: Ecosystem service valuation is one option through which Sea Grant programs may value the economic benefits provided by volunteer activities by looking at the results of those activities rather than the hours the volunteers put in to achieve it. This is helpful because NSGO is unable to accept volunteer hours as part of its economic benefits performance measure since it collects and monetizes these hours separately and would result in double-counting in PIER. Here, HISG is transparent with its creative and conservative approach in using a **projected cultivation value (with citation) as a proxy for the restorative value achieved** in returning the wetland to traditional use.

- Further considerations: This ecosystem service valuation also touches upon the importance of the cultural ecosystem services provided by restored habitats, in this case taro, and the opportunities these activities provide for connecting with traditional cultivation practices and local knowledge systems. While these significant benefits may not be easily quantified, they can help communicate the cultural impacts of restoration activities.

4. Each year dozens of coastal dunes and coastal banks are threatened by projects that could degrade their functions. The WHSG Extension Program provides a no-cost site visit and assessment to towns in

southeastern Massachusetts to help ensure that the natural and beneficial functions of coastal landforms are sustained. In 2022, WHSG staff provided 42 such site visits, which saved the towns from having to hire a private consultant. Based on two comparable contracts in 2021-2022 between towns and local consulting firms, we estimate that an average site visit cost is \$10,775. Therefore, the total economic benefit for this program is 42 visits x \$10,775 per visit or \$452,550.

Why we chose this example: Sea Grant programs provide a range of valuable services to communities by filling critical expertise gaps where municipal budgets may not allow for a full-time staff position to fill the need. In this entry, the program provides clear cost-basis (\$) and references due diligence in its estimation of like services (two comparable contracts for similar services), providing a concise example for valuing the **cost savings** incurred by each town.

- Further consideration: While the entry describes the activity provided by the Sea Grant program clearly, it could be made more robust with a description of staff expertise conveyed to the town (e.g. engineering, planning, floodplain management, etc.).

Sustainable Fisheries and Aquaculture

5. In 2021, the Consortium undertook various commercial seafood workforce development initiatives, including organizing a South Carolina and Rhode Island Commercial Fisheries Learning Exchange where Commercial fishermen from McClellanville and a Clemson Agribusiness Extension Associate joined the S.C. Sea Grant Consortium on a visit to the Commercial Fisheries Development Center in Narragansett, Rhode Island to learn about the center's apprenticeship program and about different forms of commercial seafood business organization options (e.g. co-op models). Based on information learned on this trip and through multiple follow up consultations, the commercial fishermen that went on this trip have now formed an oyster aquaculture co-op in 2022 – creating a new business in South Carolina comprised of five existing commercial fishermen. Based on the average annual salary of aquaculture workers in South Carolina (\$33,260; US BLS, 2022), the Consortium's continued assistance sustained jobs with an associated total annual income of \$166,300 (5 jobs * (\$33,260)).

Why we chose this example: This example spans two focus areas (SFA, ELWD), two states, and two years. By tracking the follow up actions from the Commercial Fisheries Learning Exchange through 2021 and into 2022, SCSGC was able to claim an **economic benefit of business and job creation realized by the participants in its state due to its participation in the SCSGC program**. The program identified both its role and the depth of engagement that led to the creation of the co-op in 2022.

- Further considerations: While the Sea Grant program can defensibly claim 100% of this benefit in the first year, it will need to determine what valuation, if any, is appropriate beyond the co-op's creation. If the Sea Grant program remains actively involved supporting the co-op in subsequent years it is possible that the program could claim an economic benefit at a discounted rate commensurate with the level of support the co-op receives from Sea Grant until a 'fledge point' is identified where Sea Grant's support is no longer essential to co-op's realization of the economic benefit.

6. Maine Sea Grant coordinated Seaweed Week is a food and drink festival celebrating Maine's kelp harvest and seaweed sector. The celebration is a statewide effort that annually engages over 100 businesses and organizations that develops relationships between seaweed producers and local restaurants, and engages consumers in enjoying local seafood products. In 2022, more than 80 restaurants and 20 seaweed farms and businesses participated in Seaweed Week.

Participating businesses earned an average of \$2,000 in additional sales over the 8-day event, per restaurant (80) and seaweed producer/farm business (20) participating, for a total of \$200,000 in additional sales and 100 businesses sustained or expanded. $(100 \times \$2,000)$ in additional sales revenue from Seaweed Week-related sales and events = \$200,000.

Why we chose this example: This valuation outlines the **additional sales generated by participating businesses** during Seaweed Week, providing clear and replicable calculations. Post-covid, Sea Grant programs have been supporting wild-caught and aquaculture businesses through similar events around the country.

- Further considerations: To enhance transparency, the text could include more detail about how the program arrived at the \$2,000 in additional sales as an average, such as through a participant survey or personal correspondence.

7. Louisiana Sea Grant's Seafood Specialist has implemented Hazard Analysis and Critical Control Point (HACCP) trainings for seafood processors, mandated by the U.S. Food and Drug Administration (FDA), and for Sluriformes fish and fish products processors, mandated by the U.S. Department of Agriculture (USDA). These basic HACCP courses are designed to teach the principles of HACCP and enable processors to develop HACCP plans specific to the seafood products they handle or produce. Participants who complete the course fulfill the FDA requirements for seafood HACCP training, which is a specific mandate for starting or continuing their operation.

In 2022, HACCP workshops organized by the Seafood Specialist from Louisiana Sea Grant, 34 people from the seafood industry attended, representing 14 businesses. To measure the impact of these trainings on job creation and maintenance, the Louisiana Sea Grant Seafood Specialist implemented a class evaluation survey asking attendees about the duration of their company's operations and the number of employees in their facility (less than 1 year were deemed "jobs created" and 1 year or older were deemed "jobs maintained").

Based on the survey results, the HACCP training has created 82 jobs, supported and retained 1069 seafood industry jobs, while creating six new businesses, and supporting eight other businesses in 2022.

The estimated median wage from the U.S. Bureau of Labor Statistics (BLS) employment statistics webpage for food processing workers (all other) in Louisiana is \$27,970 per person. Therefore, the HACCP trainings have created \$2,293,940 worth of jobs (82 people * \$27,970 average wage) and helped to support and sustain \$29,066,110 worth of jobs (1069 people * \$27,970 average wage). In total, the HACCP program has created \$31,360,050 worth of economic benefits in 2022. A/EXT-01 - Watts.

Why we chose this example: This example illustrates how **surveying participants of a training or other event** can yield information useful for communicating impact. Here, the reader can clearly understand the impact of mandatory HACCP training on **counting and valuing job creation and retention** within the state's seafood industry. The use of survey data and its explanation in the entry adds rigor and defensibility to the large benefit (\$31M) claimed by the program.

- Further considerations: As Sea Grant continues to provide support to the seafood industry, and does so in common formats such as HACCP training, entries such as this may be useful templates for articulating the workforce training value chain and program impact at industry scale, where appropriate.

8. Florida Sea Grant's aquaculture research and extension affiliate, and product diversification programs help sustain Florida's molluscan shellfish industry valued at \$15.5M (FDACS, 2020). During 2022, extension programming helped Cedar Key aquaculture businesses, many of which remained impacted by COVID-19, sell their oversized clams to support a growing aquaculture restoration initiative in the Indian River Lagoon. FSG-supported researchers also maintained triploid and tetraploid stocks on experimental aquaculture leases for distribution to industry partners, in addition to a program to explain and reduce instances of suspected vandalism to equipment and poaching on aquaculture leases. An online training course on off-bottom aquaculture was attended by 296 growers – 40 have completed the certification. These activities were complemented by a program to Help Aquaculture Reap Value and extend Student Training (HARVEST). During 2022, five aquaculture businesses participated in the HARVEST program, thereby improving their production and competitiveness while addressing issues relevant to the broader industry. A Big Bend Shellfish Trail initiative secured the partnership of 100 seafood businesses who participated to support local seafood tourism. FSG's shellfish aquaculture affiliates contribution to this overall economic impact is estimated at a conservative 10%, or \$1.5M. ($\$15.5M \times 0.10$). This is exclusive of sustaining and improving the profitability of 350 (35 at 10%) small family owned and operated businesses and 600 (60 at 10%) associated jobs (according to the Cedar Key Shellfish Aquaculture Association), with wages valued by the BLS at \$29,630 per year (occupational code 45-2093) for an estimated economic benefit of \$1,776,000. This equates to an estimated economic benefit of $\$1.5M + \$1.78M = \$3.28M$. FSG Projects: A/EEP-22.1003; A/EEP-22.1007; A/EEP-22.1011 and P/FCS-1-HARVEST; PD-22-04; PD-21-17; PD-21-9; PD-21-10; PD-20-17.

Why we chose this example: While many valuations focus on one program activity either singularly or collectively (e.g. HACCP, fellowships), this valuation used an existing and recent (2020) industry-wide report from a state agency, the Department of Agriculture and Consumer Services, to craft a value-chain for how a suite of Sea Grant aquaculture programs can **defensibly claim a conservative 10% of the overall industry's valuation in the state**. In some states, Sea Grant is the predominant resource for these emerging businesses and this program was able to leverage a state agency's valuation efforts to illustrate its contributions to that growth without incurring the high costs of implementing its own valuation study.

- Further Considerations: Sea Grant's economic benefits reporting guidance does not require that a program perform its own valuation studies or impact analyses. This program has taken a practical and conservative approach that uses state agency data to make a reasonable claim with a conservative value. If the program opts to continue this

approach in the future it will need to be mindful of how often the state agency report that anchors this valuation is updated.

Environmental Literacy and Workforce Development

9. The Consortium and partners administer the From Seeds to Shoreline Program. This program engages participating schools with cultivating and transplanting *Spartina alterniflora* (smooth cord grass) to designated areas along the state's coastline, and is South Carolina's only salt marsh restoration program designed for K – 12 students and teachers. Sixteen (16) student events were held this past year, directly engaging 280 elementary, 128 high school, and 588 middle school students in collecting *Spartina alterniflora* seeds, as well as cultivating and transplanting seedlings to marsh areas. For one event (16 attendees), 100% of the funding, resources, logistics, organizing, outreach, etc. is attributed to the Consortium. Attribution factors of 75% (5 events; 444 attendees), 50% (1 event, 16 attendees), and 25% (9 events; 520 attendees) are used for the rest of the events.

Based on Schwarzmann et al. (2017), parents are willing to pay for supplementary marine science education in K-12 schools with evaluated topics including restoration, habitats, energy, recycling, debris, and community involvement. Schwarzmann et al. (2017) received responses from 15 California zip codes in the year 2016. Based on the weighted average median annual household income in these 15 California zip codes in 2016 (\$78,758) and the median annual household income in South Carolina in 2016 (\$46,898) (2016 US Census ACS 5yr estimates), willingness to pay per child values estimated in Schwarzmann et al. (2017) for restoration (\$44.79) and habitat (\$58.52) are adjusted by 60% ($\$46,898/\$78,758$) to \$26.67 and \$34.85, respectively (people make willingness to pay decisions based on their income constraints). Inflation adjusted to 2022 dollars using the Consumer Price Index (\$32.32 for restoration and \$42.49 for habitat), multiplying by the number of participating students, and multiplying by the attribution factors, a total economic benefit of \$27,529 is estimated: $[100\% * ((\$32.32 + \$42.49) * 16)] + [75\% * ((\$32.32 + \$42.49) * 444)] + [50\% * ((\$32.32 + \$42.49) * 16)] + [25\% * ((\$32.32 + \$42.49) * 520)]$.

Why we chose this example: This entry provides an example of how to apply a **willingness to pay valuation** method to Sea Grant work from a published research study. In addition, the entry also incorporates **attribution percentages** into calculations where Sea Grant supports a quantifiable or estimated percentage of the work. While educational programming (e.g. trainings, workshops) for adults can value a worker's time engaged, valuing the educational programming for children is more complex. Willingness to pay studies, such as the one cited in this entry, provide one pathway for valuation of these activities. The program provided clear calculations, including a benefits transfer from CA to SC, a citation, and adjusted values for inflation, resulting in a thorough, rigorous, and defensible valuation.

10. WHOISG develops and implements educators' professional development workshops in marine science. Each Topics in Oceanography (TiO) workshop leverages the expertise of leading oceanographers from the Woods Hole Oceanographic Institution and other research organizations in the surrounding scientific community. In 2022, one workshop was held with participation from 28 teachers who each completed 6 hours of learning. Each teacher earned 6 Professional Development Points (PDPs), which are

used to fulfill the Commonwealth of Massachusetts' requirement for educators to maintain their teaching license. The total cost to teachers was \$30. Teachers may earn equivalent PDPs in oceanography from a local university at a cost of \$282.75 using the Massachusetts Department of Education conversion of 15 PDPs per 1 university credit hour. Therefore, the cost savings of the Sea Grant program PDPs versus the local university is \$252.75 per teacher or \$7077 for the 28 workshop participants. As PDPs are required for maintaining a teaching license, 28 jobs were sustained as a result of the workshop being held. The mean annual wage for secondary school teachers in MA was \$87,071 in 2022. The total wages for the 28 teacher participants was therefore \$2,437,988. In total, the economic benefit of the WHSG Topics in Oceanography workshops in 2022 was \$2,445,065.

Why we chose this example: This entry maximizes the valuation potential resulting from Sea Grant's teacher trainings that meets workforce requirements, such as Professional Development Point (PDP) thresholds. The text provides a thorough yet concise example of **valuing teacher's cost savings** when participating in a Sea Grant training as well as the **jobs maintained**, providing a robust and transparent valuation of benefits resulting from the program's work with educators. Further considerations: The program provides the basis for the cost savings by citing the MA Dept of Education conversion and transparency would be further enhanced with a source citation for the mean annual salary provided for secondary school teachers.

11. Lake Champlain Sea Grant organizes and implements the Champlain Research Experience for Secondary Teachers (CREST) Program, which engages grade 7-12 teachers in an exploration of Lake Champlain Basin research through authentic investigations alongside scientists, graduate and undergraduate students, teachers, and teacher educators. The CREST Program offers teachers opportunities to engage in research experiences and integrate project, proficiency, and place-based teaching practices as they develop a project based on the CREST touchstones to be implemented in their classrooms during the academic year. CREST program activities are aligned with the Next Generation Science Standards (NGSS), the Computer Science Teacher Association Standards (CSTA) and the Common Core State Standards (CCSS) in ELA and Mathematics. The program is a 3-credit graduate course that meets state requirements for relicensure. (<https://education.vermont.gov/sites/aoe/files/documents/edu-state-board-rules-series-5000.pdf>).

In the summer of 2022 12 teachers took the course and earned 3 credits each. Thus, 12 jobs were retained at a salary of \$62,320 each and a benefit rate of 34.1%, totaling \$1,002,853 in value of jobs retained. Because the teachers are in multiple school systems, and not businesses, businesses retained is not reported. Teachers did not need to pay tuition for the CREST program. In-state graduate tuition at UVM was \$678 per credit in 2022, so the value of 12 teachers each taking a 3-credit course at \$678 per credit is \$24,408. The total economic value for the CREST program was thus \$1,027,261.

Salary data used Occupation code 25-2031 for secondary teachers for Vermont (https://www.bls.gov/oes/current/oes_vt.htm) from the Bureau of Labor Statistics Benefits data are also provided by the Bureau of Labor Statistics (<https://www.bls.gov/news.release/eccc.nr0.htm>).

Why we chose this example: While this example is similar to the previous entry from WHOI SG, there are a few differences in the details approached by each program. Here, LCSG provides

a citation for the **re-licensure requirements adding to the robustness of the entry for job retention**. LCSG also uses the host university's in-state tuition rate (per credit hour) as the basis for its **cost-savings** calculation.

12. Florida Sea Grant agents created a Central Force Drone Team and implemented a workforce development program that certified 37 environmental engineers affiliated with the Southwest Florida Water Management District, Brevard Mosquito Control, and Hernando County on how to fly drones for coastal mapping and environmental monitoring applications. These individuals are now equipped to successfully pass their FAA Part 107 drone exam. This training directly supported 37 jobs, which according to the BLS (Environmental Scientists and Specialists category - <https://www.bls.gov/ooh/life-physical-and-social-science/environmental-scientists-and-specialists.htm>) is valued at (\$76,530 per year X 37 jobs) = \$2,831,610.

Why we chose this project: With clarity provided by citation, transparent calculations, and a concise text that justifies Sea Grant's role in the project, this valuation provides an example of valuing jobs created or maintained, **resulting from a professional certification**.

- Further considerations: In addition to valuing jobs created or maintained, there are other aspects of the training which could be valued and claimed as part of the calculation; such as time participants were engaged * known wage, and/or any cost savings associated with the Sea Grant-provided training as it compares to the most likely alternative option for training in the state/ region.