

Final Report

to the U.S. Environmental Protection Agency (Region 1)

New England Aquarium/ New England Ocean Science Education Collaborative

“Summer on the Marsh – Citizen Science Goes to Camp”

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December 31, 2015

a) A brief abstract or overview of the project, including its goals and objectives as stated in the agreed-upon work plan,

The New England Ocean Science Education Collaborative (NEOSEC) project “Summer on the Marsh: Citizen Science Goes to Camp” consisted of citizen science monitoring by campers through a regional network of summer camps, support and training for informal science center staff and partner scientists, and opportunities for participants to share findings with peers at regional forums. *Summer on the Marsh* built upon NEOSEC’s previous *Summer Science* project, which established a regional network of summer camps grounded in ocean science. *Summer on the Marsh* expanded that education-based citizen science regional and national model to a new ecosystem (salt marshes), a younger audience (summer campers ages 9 to 12), and an additional focus (human health impacts). The underlying framework – pairing scientifically-trained informal educators with scientists trained to guide youth in field-based education proved to be a robust model for educator-scientist partnerships and education-based citizen science programs.

The goal of the project was to enhance the capacity of marine science centers to engage youth ages 9-12 in field-based citizen science for protection of coastal waters. The project sought to achieve the following objectives:

1. develop/disseminate a replicable model for education-focused citizen science;
2. facilitate mutually-beneficial collaboration between scientists and educators;
3. provide young people with context, preparation, tools and follow-up to understand the significance of salt marsh monitoring, especially as it relates to human health;
4. provide career development to scientists and educators through joint professional development, and to participating youth through contact with those practitioners; and
5. increase awareness of connections between human health and the environment.

b) A comparison of actual accomplishments with anticipated outputs/outcomes specified in the original work plan. This should include revised budget information if deviations from the agreed-upon work plan occurred.

The majority of the work planned in *Summer on the Marsh* was accomplished as budgeted. The table below compares the anticipated outcomes as submitted in the work plan of the proposal with the actual accomplishments and any budget deviations. Despite a few budget deviations, all the original objectives were accomplished.

Anticipated Outcomes	Actual Accomplishments	Budget Deviations
Planning		
Planning workshop (Project Director, PI, Leadership team)	Meeting held at Waquoit Bay NERR	None
Prepare for educator-scientist workshop (Project Director, Assistant)	Kickoff meetings held in years one and two with project partners	None
Match ocean scientists with camp programs (Project Director)	Job description developed and shared among partners	None
Protocol Development		
Adapt protocol for youth implementation (Deschenes/Trott/Neckles)	Done in 2014, improved from feedback in 2015	None
Develop protocol sampling handbook (Deschenes, Project Director)	Marsh Sampling Protocol (see attached)	None
Training		
1.5-day Educator-scientist training workshop (Partner institutions)	Two pre-season trainings held in June of 2014 and 2015	None
Refine summer programs to include monitoring, EPA priorities (Partners)	Guidance included at training and in training handbook	None
Data collection and Data Management		
Establish procedures for data entry/quality control (Trott/Badger/GMRI)	Data entry done by each site into form that matched the datasheets. Checked by both Badger and Trott/Gonneea	None
Implement salt marsh monitoring protocol (Partner institutions)	6 camps in 2014, 8 camps in 2015. Some changes in original partners, but same outcome.	Some camp specific deviations. See narrative.
Visits to partner sites (Project Director, Deschenes)	Done by Bursky in 2014, and Bursky and Bonanno in 2015	None
Validate and upload data (Partner scientists, Badger, Trott)	Partner scientists checked data collected by their camp and then entered it to excel and sent it to Badger and Trott/Gonneea for further review.	None
Adapt online data management tool (GMRI)	Project Site established at www.citsci.org	Permission was granted to reallocate \$4,500 planned for the online data tool to staffing costs.
Virtual Youth Summit		
Upgrade Gregg Interactive Learning Center (Seacoast Science Center)	Done in first half of 2014. Used for Youth Summits in Fall 2014 and Fall 2015	None
Prepare for Virtual Youth Symposium (Seacoast Science Center, Project Director, Assistant)	Done, peer group established to do this in Year two	None
Virtual Youth Symposium (Campers, Leadership team, Partners)	Held in October year one and in September year Two	None
Evaluation		

Diagnostic formative evaluation (Project Director, Leadership team)	Done. Protocol, Data Sheets, Scientist-Educator partnerships, and Youth Summit were all directly improved in Year Two.	None
Review, revise field and data protocols (Leadership team)	Done. Improved before Year two training workshop.	None
Camper pre/post surveys (RMC Research)	Done. See Report.	None
Partner/scientist surveys (RMC Research)	Done. See Report.	None
Summative evaluation (RMC Research)	Done. See Report.	None
Dissemination		
NEOSEC Biennial Ocean Literacy Summit (All participants)	Successful, engagement with 200+ attendees	None
Present at conferences (Partner institutions, Leadership team)	CSA, ACA, NMEA, and NEOSEC meetings	Travel expenses were lower than expected

Budget deviations occurred in some partner budgets, online data expenses, staff salaries, and in travel expenses. Travel expenses and four subcontracted partners came in under budget, while staff salaries were higher than originally budgeted. Online data expenses were transferred to staff salaries to accomplish the original outcome and are explained below.

Four subcontracted project partners did not fully spend their budgets. Seacoast Science Center did not fully spend their year one budget. This was due to not fully spending their scientist stipend because they hired a graduate student at a lower rate. Mystic Aquarium had money left in their travel budget because it did not cost as much as anticipated to get to their field sites. NBNERR had the most substantial amount remaining due to one week of camp being cancelled due to unforeseen circumstances. Buttonwood Park Zoo had money left in their budget because their scientist, who was a Professor emeritus and a board member of the Zoo, donated his time as cost share.

Due to a change in staffing at NEOSEC during the project period, salaries and wages were higher than expected. This was accommodated by reducing funds spent on travel and consultants without affecting the actual accomplishments and outcomes.

c) If applicable, reasons why established outputs/outcomes were not met and/or why you deviated from the original work plan.

All established outcomes were met for this project. One deviation came from a change in the development and implementation of the online data management tool. In the beginning Project leads Deschenes and Bursky convened numerous meetings and conversations regarding the adaptation of a data tool developed by Hilary Neckles. The original plan was to have Gulf of Maine Research Institute (GMRI) update and adapt this software, given the need for a regional platform for data submission, storage and manipulation. However, staff at GMRI eventually determined that the software developed for the original tool was now obsolete, and that it did not make sense to try to adapt it. GMRI and the NEAq project team then explored expanding the education-focused citizen science tool that GMRI hosts, *Vital Signs*. However, GMRI determined that the technology budget in this grant was too small given the staff time needed for

alterations and ongoing maintenance of this level of expansion. GMRI proposed inaturalist.org as a potential platform. NERACOOS also explored hosting the data as part of their much larger online databank, but determined that the dataset was too different from their existing databanks. In year two, Bonanno joined the discussion and explored online data portals for citizen science. Many of the online citizen science data portals are set up for species specific data, as was the case with iNaturalist.org, and would not accommodate the biotic and abiotic dataset of *Summer on the Marsh*. Two web sites were identified as being able to accommodate our dataset, www.CitSci.org and www.Aneccdata.org. CitSci.org was chosen as the best fit. Because this was a free online portal that required customization on the user's end, money was transferred from the Online Data Management budget category to staff salary to cover the cost of customization. As this was not done until all of the data had already been collected and entered elsewhere, it took considerable staff time to get the online data portal at www.CitSci.org to match the data sheets already used for the project.

Planned project partners changed during the project; however resources were reallocated with no net change in budget. We contracted with six partners in year one. Downeast Institute was unable to start as anticipated so Waquoit Bay NERR exchanged places and became a two year partner. As planned, two new partners joined the project for year two, though there was a shift in participating institutions. Ocean Explorium (OE) in New Bedford, MA, closed its doors in 2014, and Buttonwood Park Zoo (BPZ) took over a number of its educational programs; BPZ was interested in growing its camps and its marsh programming and was glad to become a year two partner on the project. Downeast Institute informed project managers that it could no longer participate in year two due to capacity issues, and Maritime Gloucester in Gloucester, MA took this spot. Tom Trott, science advisor, informed project managers that University commitments prevented him from participating in year two; Meagan Gonnee, scientist at Woods Hole Oceanographic Institution, who served as partner scientist in year one for Waquoit Bay NERR, agreed to replace Tom Trott as overall project science advisor for the project.

Program Manager Bursky accepted another position in January 2015, but stayed on as Project Manager of *Summer on the Marsh* until October 2015. Aimee Bonanno took over general NEOSEC management responsibilities in January 2015 and assumed responsibility for identifying an online data storage solution, attending trainings, conducting site visits, coordinating the 2015 youth summit, and final reporting.

d) A description of how activities were performed (i.e. give detailed methodologies used).

Planning

The New England Ocean Science Education Collaborative (NEOSEC) started work on the project, *Summer on the Marsh: Citizen Science Goes to Camp* in the beginning of 2014. Work started with conversations and a meeting among science advisor Hilary Neckles (USGS), project science advisor Dr. Tom Trott (Suffolk University), and research coordinators from the Narragansett Bay National Estuarine Research Reserve and Waquoit Bay National Estuarine Research Reserve (WBNERR) to inform and draft the salt marsh protocol for the program. In March 2014, NEOSEC Program Manager Sarah Bursky and project lead Heather Deschenes, Youth Development Programs Manager at the New England Aquarium (NEAq), held a kick-off meeting with year one project partners at NEAq, during which time partners met with the evaluation team from RMC Research, reviewed the draft protocol, shared information about their

field sites with one another, and discussed their desired approach for the training in June and the youth summit in the fall.

Project leads Bursky, Bonanno and Deschenes held a kick-off meeting with year two project partners at NEAq on March 3rd, 2015 during which time partners met with the evaluation team from RMC Research, reviewed feedback from year one regarding the educational program and data collection protocols, and discussed their desired approach for the training in June and the youth summit in the fall. Some of the overarching feedback from year one was a desire to share more educational curriculum with each other, to make data sheets more user friendly for the children, and to shorten the field sampling protocol slightly if feasible. At this meeting partners also discussed how to find the best science partner for their field site and to improve engagement with partner scientists. Following the Year two kickoff meeting, Bursky formed two groups of peers to work on the training agenda and the fall youth summit event. These two groups met by phone twice each.

Project leads were supported in the process of connecting camps with science partners. Following discussion at the year two kick-off meeting one organization shared their job announcement paragraph with the group and evaluation showed improved engagement between educators and scientists in year two.

Protocol Development

The salt marsh investigation protocol was developed through the spring of 2014, based on feedback generated from the above meetings, and taking into account the age of the campers and the amount of time available in the field. Dr. Tom Trott, Suffolk University, developed the protocol, with input from the lead project partners. Deschenes, Bursky, Danny Badger (NEAq Youth Development Programs Supervisor) and New England Aquarium camp science advisor Juliet Simpson, MIT Sea Grant, met in the field at the marsh site in Scituate, MA to field test the protocol and make additional suggestions. Significant consideration was given to finding the right balance of robust data and educational experience. The protocol was adapted to reduce the number of temperature and salinity measurements after feedback from year one to shorten the protocol. Science Advisor Meagan Gonnee looked at the data to confirm that this was not a loss to the data set. The protocol was also modified to reduce trampling pressure by spatially separating sequential transects used at frequently visited sites. The final protocol contains abiotic and biotic components as well as considerations for pre-sampling, and a reflection component that is well matched to the 9-12 year old abilities.

Data Collection and Management

Data sheets were developed in year one to match the protocol components, but these were also revised in year two by Danny Badger to be simpler and more kid-friendly. They were also reviewed by a project partner from Narragansett Bay NERR (See attached protocol and data sheets). An equipment list was defined as part of the protocol, and each camp reviewed and purchased the necessary equipment. "Sippers," equipment enabling salinity testing of water deep in the marsh, were built by the NEAq project leads for each camp, based on the recommendation of Hilary Neckles.

In the summers, camp programs were implemented, with youth collecting citizen science data in the field alongside trained educators and partner scientists. Scientists advised youth on the protocol and helped youth understand the ecosystem, even the parts they may not have liked at first, such as insects and the mud. Campers took a pre-and post-survey as part of the evaluation plan for the program. Site visits were made by Bursky, Bonanno, and the evaluators. A media push in year one by New England Aquarium public relations staff led to coverage by local media in all of the regions in which the program was implemented.

Data was submitted by each camp program using NEOSEC's online communication portal, reviewed by Danny Badger (NEAq project team), and then reviewed by Dr. Tom Trott (year one) and Dr. Megan Gonnee (year two). Overall, only minor changes needed to be requested from the vast amount of data collected. Badger compiled the data into cumulative Excel spreadsheets for each year.

Bonanno evaluated 9 different online data portals as possible places for the data. As reported above, the original plan for GMRI to expand their data tools did not work out. Starting from the suggestion of iNaturalist, Bonanno quickly realized that many of the portals would not accept both the biotic and abiotic data. Two sites, citsci.org and anecdota.org, were identified that would accept our dataset. Because anecdota.org was in the beta stages and did yet not have all of its functionality, Bonanno chose to create the *Summer on the Marsh* online project at www.citsci.org. [Citsci.org](http://citsci.org) was the most customizable and allowed for the project manual and data sheets to be downloaded by future users. It took considerable time to design the data sheets in the portal to match those that Badger had created for the project. It also took considerable time for the Excel spreadsheets of data from each year to be transformed into a compatible format for upload. Users who continue to use the protocol, or who would like to start using it, can now enter their data directly into the project page. A link to the data can also be found on the Summer on the Marsh project page on NEOSEC's website, www.neosec.org.

Training

Trott, Bursky and Deschenes developed the content of the Summer on the Marsh 1.5 day training workshop for year one, which was held as planned at Seacoast Science Center on June 9 and 10, 2014. Twenty-three staff were in attendance from each of the 6 partner institutions – 16 educators and 7 scientists. The training was a rich balance of content and practice with the protocol in the field, in addition to networking time and sharing of resources. Juliet Simpson gave an overview of salt marsh science. Research scientist Dave Burdick, University of New Hampshire, a regional expert on marshes, was invited to present on human influences on marsh ecosystems, and led a discussion of our understanding of the impact of climate change on marshes. Simpson, Trott and partner scientists were available in the field to teach identification of salt marsh plants and species.

The year two pre-season training was held on June 15th and 16th, 2015 and hosted by Mystic Aquarium. Twenty-eight staff attended from the 8 partner institutions – 19 educators, 7 scientists, and 2 NEOSEC leads. The year two training agenda was adapted to include several peer-led team-teaching opportunities, including a curriculum share-a-thon and team-taught stations in the field, but again was a rich balance of content and practice of the protocol in the field. Juliet Simpson gave an overview of salt marsh science, which she has provided to the

camps for their use in teaching campers. Gonnee led partners through this year's protocol, and Badger engaged partners in using the data sheets. Partner scientists had the opportunity to meet as a group and discuss their roles in working with the kids, and educators met to review how best to make the field engaging for youth. Partners also had the opportunity to explore Mystic Aquarium and connect collegially about their programs. All attendees completed the training evaluation. (Training agendas are attached)

Virtual Youth Summit

The first Summer on the Marsh Youth Summit was held on October 19th, 2014. This was a virtual summit, during which youth participated in programs at their sites as well as virtually with other youth across New England from the other sites. The event ran from 12:15-3:30 pm. All 6 partner sites participated at 5 physical locations. Evaluators and Trott were also present to participate. Seacoast Science Center's technology upgrades allowed for them to moderate and serve as the bridge to University of New Hampshire's "Connect New Hampshire" technology.

Highlights of this event included:

- Camp youth reviewed their individual data sets from their summer sampling, looked at trends identified by Trott and discussed questions regarding the various metrics.
- Youth then presented to each other via the video feed, presenting short skits about what was unique about their sites. Youth were able to ask each other questions about similarities and differences between their sites.
- Partner scientist Dr. Tom Trott spoke about trends he saw in the compiled data, and thanked youth for their participation.
- WBNERR scientist Meagan Gonnee discussed her ongoing research, and how the youth might pursue their interests in science into the future.
- Youth brainstormed with parents about human impacts on the marshes.
- Evaluators from RMC attended the event.
- Partners reflected that this new virtual event was a success and that campers both enjoyed it, and left with a sense of their contributions and appreciation for the marsh ecosystem.
- Having parents at the event provided insight into the extension of learning that reached the family at home.

The 2015 virtual youth summit was held on September 20th with participants from all 8 summer camps at 7 locations. Again, youth participated in programs at their sites as well as virtually with other youth across New England from the other sites. We even had one camper join us from her home in Wyoming. Project Manager Bursky worked with the peer planning group established during the year two kick off meeting to improve the summit based on feedback from year one. Changes that were made included shortening the time and replacing the skits from each camp with a group Jeopardy game. The Jeopardy game was a success and campers started interacting with other sites by using props available at each of the science centers. Evaluators and Gonnee were also present to participate. Partner scientist Dr. Meagan Gonnee spoke to trends she saw in the compiled data, thanked youth for their participation and encouraged them to pursue their interests in science. Seacoast Science Center's technology allowed for them to moderate and serve as the bridge to University of New Hampshire's "Connect New Hampshire" technology. According to evaluation, the year two summit activities were more thoughtful and better developed and staff connected better with campers and families. (Agendas are attached)

Evaluation

Deschenes and Bursky worked closely with RMC Research to develop the evaluation plan for the project. The evaluation team surveyed staff (scientists and educators) and campers with pre and post surveys. A summative evaluation was also done at the end of each year. Deschenes and Bursky met with the RMC evaluation team to discuss findings at the end of year one. RMC evaluators were present at the year two kick off meeting, which helped to integrate their results into changes in protocol for year two. RMC slightly modified the camper evaluation for year two to better assess camper attitudes towards the protocol (“doing science”) and added a parent survey at the youth summit.

Project leads Bursky, Bonanno, and Deschenes held a debrief meeting at October 15th, 2015 at Buttonwood Park Zoo. Ten staff attended from 8 institutions including project scientist Gonnee. This time was used for project partners to reflect on what worked well, what could have been done better, and how to continue this work into the future. Partners were thanked with a small memento. (Agenda attached.)

Dissemination

On November 6th and 7th, NEOSEC hosted its 5th biennial Ocean Literacy Summit in Woods Hole, MA, an event focused on bringing together scientists and educators across New England to explore the latest research and practice in science and education related to marine resources. The event had record attendance, with 220 scientists, educators and administrators registered for the event. The event featured presentations by leading scientists and educators on multiple topics related to Ocean Literacy Principle “The Humans and the Oceans are interconnected,” as well as networking time, a keynote by Smithsonian Ocean author Deborah Cramer, a graduate student poster session, and an exhibition gallery. The Summer on the Marsh project was featured as one of the workshops on November 7th; project leads Heather Deschenes and Sarah Bursky presented about the project, following a presentation by partner scientist Neil Ganju from USGS about his research in the marsh (he replaced Juliet Simpson, MIT Seagrant, due to a family emergency).

Though bad weather in Boston prevented Deschenes and Bursky from attending the National Citizen Science Association conference in San Jose, CA, NEOSEC partner Cassie Stymiest filled in at the conference and shared aspects of the Salt Marsh program to a national audience. Deschenes and Bursky presented at the New England conference of the American Camping Association in March about how to engage camp audiences in citizen science. This workshop was full to capacity (approximately 30 people) and participants asked many questions about implementation and resources. Additionally, four partner institutions presented a workshop at the 2015 National Marine Educator Association’s annual meeting in Newport, RI on June 29th, 2015. Educators from Seacoast Science Center, Narragansett Bay National Estuarine Research Reserve, Waquoit Bay NERR, and New England Aquarium shared the Summer on the Marsh protocol with teachers, informal educators and an evaluator, providing each of the participants with hands-on training on how to use the equipment and data sheets for field sampling. Participants expressed excitement at how this project design could be employed with their groups and that it seemed accessible and straight-forward.

e) In what ways were these activities successful and how do you know they were successful? If applicable, what problems were encountered and how were they overcome? How do you recommend improving the project if someone else were to do a similar one?

Overall, we consider the project a success. Feedback from educators was positive, campers changed their outlook to be more systems focused, scientists enjoyed working collaboratively with educators and directly with campers, and over 2500 square meters of New England salt marsh has been studied with a replicable model for education-focused citizen science.

Planning

Planning activities were successful in connecting the core staff from each partner institution and provided the foundation for the successful project. Creating a strong sense of connection was noted as one of the four key findings by the external evaluator, RMC Research.

Protocol Development

The team started with a rapid assessment format recommended by Hilary Neckles, and were able to modify this to be age appropriate while maintain the right balance of robust data and educational experience.

Training

Successful program training was also noted as one of the key findings by RMC Research. The training was done in a day and a half, providing time to learn salt marsh ecology, plant identification, and how to use the tools with time in the field conducting the protocol and a practice summit. Having an overnight where participants could share a meal and evening activity served to increase the sense of connectedness that a one day meeting could not have accomplished. This was a very important piece in the successful follow through of the protocol by the camps and in creating a sense of enthusiasm among the educators and scientists. We would highly recommend an overnight training structure with both classroom and field components, involving both scientists and educators, if someone else were to do a similar project.

Data Collection and Management

Much work was put into design of age appropriate data sheets. This culminated in a camper version of the data sheets with few instructions and a teacher version with more detail on how or why measurements are needed. This served to help the campers get the data in the correct locations on the sheets and let camp counselors answer questions about the data more confidently.

The data was checked and verified many times through the data entry process. First by the partner scientist who was in the field with the campers and then by the data manager, and finally the project scientist reviewed the data to make sure the data all fit expected parameters. This served to give credibility to the data set even though the purpose of collecting this data by the campers was more to increase environmental stewardship and leave a positive impression of science in their young minds.

Adapting the GMRI tool as originally planned was not successful. However, in the end, we ended up with a data location that will increase the opportunity for the protocol to continue to be used by a wider audience. In the future, available online portals should be evaluated in advance,

or more money should be allocated if a separate data host or platform is required. Data portals should be set up before data is collected to save time and effort.

Virtual Youth Summit

The first virtual youth summit in 2014 was in October, and the timing was thought to be too long after the end of camp. The 2015 Summit was held a month earlier in September. However, the same percentage of campers (16%) attended youth summits in both years. Some partners suggested trying to have the summit be part of the week at camp, yet the camps ran at various times over the summer and only a few occurred at the same times. Convening campers months after camp ended demonstrated that we had been successful in encouraging actions to prevent pollution, respect nature, and advocate behavior changes to friends and family. The summits reinforced the regional collaboration of the science in the project. During camp, campers were focused on their own site, but at the summit they could see and interact with other campers which made the collaboration much more concrete for this age group. Parents that attended expressed gratitude for being able to glimpse a window into their children's lives and should be included in evaluation efforts in the future when evaluating environmental stewardship or behavior changes in minors. Their feedback was not originally part of the plan, but proved invaluable.

Evaluation

Internal and external evaluation conducted during and after year one of the project proved fruitful in making changes that resulted in an even more successful project in year two. The external evaluators at RMC Research did not see much differences from camp to camp or year to year, so the results can be easily summed up. Parent surveys were not part of year one, but were added for the second Summit. As mentioned above, they were very helpful to note behavior changes seen in campers. One way to be more successful in evaluation of similar future projects is to give pre-surveys the very first day of camp, prior to any teaching. Both years there was only a slight increase in knowledge of the campers from pre and post surveys. Both surveys showed a high amount of salt marsh knowledge and evaluators were unsure if this were due to pre surveys being administered after some teaching had occurred, or if the camps attracted a population that already knew quite a bit about salt marshes.

Dissemination

Audiences at our dissemination destinations varied widely and were hard to predict. We did present the information to a wide variety of audiences. We presented a poster at a national citizen science meeting, as well as hands-on workshops at a national marine educator's conference, a regional camp association meeting, and NEOSEC's Ocean Literacy Summit. Aside from meetings and conferences, we also were successful in disseminating information from the project through discussion at our regional NEOSEC meetings and through articles in our newsletter.

f) How will the project information and work products be effectively disseminated to and used by other environmental educators?

The placement of the data and protocol online at CitSci.org makes the protocol and data sheets available to anyone who wants to use them. It also creates a place for a long-term data set to be established and maintained.

We are also currently engaging with a citizen science course at Brandeis University in which project manager Bonanno will engage with two education students and one science student who

will work to create curriculum to surround the protocol and link it to NGSS standards. We hope this will adapt the protocol to help it become more useful to classroom teachers and not just summer camps. This will greatly expand its reach. The 2016 Ocean Literacy Summit will host a science education fair aimed at helping teachers identify NGSS linked activities. This project, with the additional work done by the Brandeis students, will fit perfectly for that audience.

NEOSEC has also submitted another proposal to expand on the Summer on the Marsh protocol. Citizen Science Hubs in New England (CSHINE) was submitted in December 2015 to a call for proposals from Institute of Museum and Library Services. The CSHINE proposal would create a model to triple the impact of Summer on the Marsh by creating regional hubs. It would also provide an example for using the protocol and hub system outside of New England.

g) How many people did you interact with directly (face to face) and how many indirectly (by mail or word of mouth)?

Year	Number of Camps	Staff (Scientists and Educators)	Campers	Youth Summit	
				Youth	Parents
2014	6	24	257	42	56
2015	8	31	290	47	59
Totals	8	45	547	89	115

During the two years of the project, we involved 8 camps and 707 people. Additional contact was made with 89 of the campers and their families at the youth summits. It is estimated that we reached another 400 individuals through our dissemination efforts. Indirectly we reached audiences through NEOSEC’s newsletter (400), website (100), and word of mouth (estimated at 20% of participants or 118). This brings our total contact to approximately 1725 people, without considering those who may learn about our project going forward on www.CitSci.org.

h) How did the project support environmental stewardship (improve environmental behavior through non-regulatory means, raise the public's awareness of actions it can take to prevent pollution prevention, or promote voluntary commitment, behavior, and accomplishments that result in environmental protection or improvement)?

Feedback from year one played an important role in improving the project in many ways. As mentioned already, the protocol and data sheets became easier to use, relationships between educators and scientist were more rewarding, and the health of the salt marsh benefitted from attention to trampling effects.

The Summer on the Marsh project sought to increase awareness of connections between human health and the environment as one of its five objectives. Below are several ways in which the Summer on the Marsh project supported environmental stewardship:

- As part of ongoing partner meetings in the spring, partners discussed their understanding of human impacts on the salt marsh, and brought questions to meetings. Deschenes shared several articles for partners to read and discuss.
- The training at Seacoast Science Center in Rye, NH, included information about salt marsh science and human impacts on marshes, particularly via Dave Burdick’s talk. This was significant in raising awareness among camp counselors, who will then be the first

point of contact among campers. By engaging in this discussion as educator-scientist teams, partners were able to align their understanding before heading into the field with children.

- Significant time was allowed for discussion of how to reduce trampling of the marsh by youth during the sampling in the field. The protocol was designed to minimize ongoing trampling. This was also a point of discussion with the National Estuarine Research Reserve System (NERRS) Research Coordinators at the February meeting.
- The protocol was designed to increase appreciation of the marsh in children, as well as to develop a data set that is useful to scientists in the future, as they measure human impact. To that end, the Research Coordinators at the NERRS shared their research on marsh die-back and it was agreed that the children would measure marsh 'pannes' as part of contributing to this particular body of research.
- When partners met in March, they reviewed evaluation data from 2014 showing that the campers better understood the significance of the marsh as a result of the program; they discussed with evaluators how to improve this aspect of the program going into year 2's field season.
- The training at Mystic Aquarium in Mystic CT, included information about salt marsh science and human impacts on marshes. There was a great exchange among highly engaged partner scientists about how to understand changes to the Northeast's marshes. This was significant in raising awareness among camp counselors, who will then be the first point of contact among campers.
- Year 2's protocol reflects changes to better reduce trampling of the marsh by youth in the field. Partners reflected together during the training about whether their marsh site from 2014 had rebounded from the camp program; in most cases it had, but in one or two the impact was still evident. Gonnea and Simpson used this as a teaching tool during the training, and practiced the protocol in a modified way to reduce the impact of the training itself. Developing this consciousness in staff, and then in campers, will affect behavior change and awareness of one's actions.
- The dissemination activities involved discussion among workshop participants about the overarching goals of the program, and how partner sites teach children about the sensitivity of this unique ecosystem. In this way, understanding of stewardship of the marsh has reached national audiences.

Because environmental stewardship was an objective, RMC Research designed surveys to see if the project did increase awareness of connections between human health and the environment. Evaluators noted a change in the use of descriptive words. Pre surveys noted campers using words like buggy, muddy, smelly and wet to describe the marsh, whereas the post surveys recorded campers describing marshes as barriers, food sources, and filters, as well as fragile, home, important, and useful. The campers changed their view from being self-focused to an ecosystem focus. The awareness of marsh functions will likely lead to increased environmental stewardship. In fact, the results from the parent surveys at the youth summits showed that a majority of the campers had taken action to protect the environment.

- i) **Compare funds spent during the project period against planned expenditures and provide an explanation of any discrepancies or cost overruns.**

The budget followed what was planned per the grant narrative. Total federal funds spent were \$216,000 and matching funds exceeded 25% of the budget, for a total project cost of \$300,702.32.

	Budget	Expenses	Remaining Budget
Salaries and Wages	41,446.00	52,394.25	(10,948.25)
Fringe Benefits	10,416.00	13,909.08	(3,493.08)
Supplies	750.00	390.75	359.25
Licenses & Fees	600.00	250.00	350.00
Conference/Meeting Expense	11,706.00	11,927.69	(221.69)
Travel	6,300.00	1,019.09	5,280.91
Consultants	7,200.00	4,743.73	2,456.27
Contractual	90,091.00	84,574.05	5,516.95
Outside Services	0.00	75.00	(75.00)
Overhead	47,491.00	46,716.36	774.64
Total Expenses	216,000.00	216,000.00	0.00

Total matching funds budgeted: \$72,804

Total matching funds expended: \$84,702.32

In July 2015, permission was obtained from EPA to allocate \$4500 originally budgeted in outside services for salaries and wages. This was done to provide staff salary to obtain the outcome of an online data management tool.

In November 2015, we notified EPA that some of our subcontractors did not fully spend their budgets and asked for permission to use the funds for salaries and wages. Four subcontracted project partners did not fully spend their budgets. Seacoast Science Center did not fully spend their year one budget. This was due to not fully spending their scientist stipend because they hired a graduate student at a lower rate. Mystic Aquarium had money left in their travel budget because it did not cost as much as anticipated to get to their field sites. NBNERR had the most substantial amount remaining due to one week of camp being cancelled due to unforeseen circumstances. Buttonwood Park Zoo had money left in their budget because their scientist, who was a Professor emeritus and a board member of the Zoo, donated his time as cost share.

Due to a change in staffing at NEOSEC during the project period, salaries and wages were higher than expected. This was accommodated by reducing funds spent on travel and consultants without affecting the actual accomplishments and outcomes, and by unspent contractor funds.