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| ***1. Project Title*** | Shad in the Classroom |

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| ***2a. Primary Contact or Project Manager1*** | | | | | |
| Name | Melissa Dowland | | | | |
| Title | Coordinator of Teacher Education | | | | |
| Organization Name | NC Museum of Natural Sciences | | | | |
| Organization Tax ID Number | 56-1240806 | | | | |
| E-mail address | [Melissa.dowland@naturalsciences.org](mailto:Melissa.dowland@naturalsciences.org) | | | | |
| Mailing Address | 11 West Jones Street | | | | |
| City | Raleigh | State | NC | Zip | 27601 |
| Telephone | 919-707-9898 | Fax Number | | 919-715-6439 | |

**1****A paragraph or Statement of Qualifications must be provided in Section 4 of the application form to confirm that**

**anyone designing, installing, or monitoring the proposed project is qualified to do so.**

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| 2b. Execution Address (where contract will be mailed for signature) | | | | | |
| Name | Angela Baker-James | | | | |
| Title | Executive Director | | | | |
| Organization Name | Friends of the NC Museum of Natural Sciences | | | | |
| E-mail Address | angela.baker-james@naturalsciences.org | | | | |
| Mailing Address | 11 West Jones Street | | | | |
| City | Raleigh | State | NC | Zip | 27601 |
| Telephone | 919-707-9847 | Fax Number | | 919-715-6439 | |
| Federal Tax ID Number | 56-1240806 | | | | |

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| 2c. Payment Address (where invoice payments will be mailed) | | | | | |
| Name | Deb Boysen | | | | |
| Title | Finance Assistant | | | | |
| Organization Name | Friends of the NC Museum of Natural Sciences | | | | |
| E-mail Address | friends.accounting@naturalsciences.org | | | | |
| Mailing Address | 11 West Jones Street | | | | |
| City | Raleigh | State | NC | Zip | 27601 |
| Telephone | 919-707-9962 | Fax Number | | 919-715-6439 | |

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| ***3. Project Description (provide a short summary of the project).*** |
| The Shad in the Classroom project, which highlights the APNEP region and careers in science, is seeking funding in order to continue to engage students in hands-on learning about American Shad and North Carolina’s river basins. In spring of 2022 we plan to have 25-35 classrooms raising shad from egg to fry. We expect to reach at least 15 counties (4 – Tier 1, 6 – Tier 2, and 6 – Tier 3) and about 2,000 students (we have reached an average of 2,058 students per year over the last four years). More than half of these schools participated in previous years; new schools will be selected to fill the remaining slots. We will be repairing and refurbishing existing tanks and redistributing them from schools that leave the program to schools that join. We will also be constructing new tanks with higher quality materials that let students more readily observe the hatching process. Participating classrooms are selected based an application process to bring new schools to the program that will be invested in the program and effective in raising the fish. For new school selections, Tier 1 and 2 counties in the APNEP region will be prioritized. Many schools in Tier 1 and 2 counties have limited resources to engage in environmental programs or to have field trips to natural resource areas. By focusing on adding new schools from these tiers, students get a hands-on and real-life connection with learning about their environment that they may not normally get in these schools.  All schools are invited to send teachers (both new to the program and those who want a refresher) to a training session at the Museum (provided Covid restrictions are lifted) where they will be introduced to the natural history of shad, the process of raising and releasing fish, and classroom activities to introduce these concepts to their students.  Based on their training, teachers will facilitate classroom learning about water quality, American Shad ecology, riverine and coastal ecosystems, and careers in science. More than 14 activities will be provided to teachers covering topics ranging from the shad life cycle to determining fish hatchery parentage based on genetic markers, from examination of coastal food webs to traditional fish art (gyotaku). Multiple videos will be available that provide instruction on several aspects of the program, teach about American Shad biology and management, and showcase pathways to science careers through interviews with a diverse group fisheries biologists. In 2022, we plan to update and add to our video series.  We will also provide funds to allow students to travel to release sites; the release of the fry is an important point of connection for students to truly appreciate the value and scope of the project. Should there be any Covid travel restrictions in place for schools, we will encourage teachers to release the fry themselves and to provide an online experience for their students to experience the release virtually. If teachers are unable to release their own fry, we will retrieve them and release them ourselves.  We will offer one to two Educator Treks (provided Covid restrictions are lifted) which will allow participating educators the chance to experience and learn about coastal habitats. Destinations and topics might include the Roanoke River and the bottomland hardwood ecosystem and/or coastal habitats on the Albemarle peninsula. Each Educator Trek would reach 10-14 educators with science content, classroom activities, and first-hand experience in the natural world.  Through all aspects of this program we hope to foster an appreciation and understanding of the natural world, and to inspire the next generation of biologists and conservationists. |

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| ***4. Statement of qualifications (provide a brief explanation of your organization’s qualifications to complete the project)*** |
| As the most visited attraction in the state with over 1,000,000 visitors per year (pre-pandemic), the North Carolina Museum of Natural Sciences is proud to be a central location for informal science learning with a state-wide footprint and an established reputation as a leader in science education. The NCMNS present-day mission is to illuminate the natural world and inspire its conservation. NCMNS is admission free and open year-round.  In addition to interactive science exhibits and hands on learning experiences inside the physical museum building, the Museum offers a continuum of onsite and offsite programs for audiences of all ages: Virtual Programs: Interactive classes via the Internet to schools statewide; Girls In Science: Mentorship program encouraging sixth grade girls' interest in science; Educator Workshops: Curriculum-correlated workshops to help K-12 teachers animate the sciences by using hands-on, experiential strategies; Special Events: Free, family-friendly, science-themed festivals that highlight particular science topics- from entomology to astronomy; Science Cafes: Casual discussions presented by local scientific experts about timely science topics offered in the Museum's Daily Planet Café. |
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| ***5. Project Start Date*** | 9/1/2021 | ***Project End Date*** | 8/31/2022 |

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| **6. Project Location: Important to submit as completely as possible, especially the Lat/Long coordinates. Only projects which take place within or primarily impact areas in APNEP’s management boundary will be considered for funding.** | |
| Project Location | No specific location – schools across NC, field trips to multiple sites along the Neuse River, NC Museum of Natural Sciences in Raleigh |
| River Basin(s) | Neuse and Roanoke |
| Position coordinates of project location | Latitude                  Longitude |

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| **7. List which CCMP Actions will be addressed and how the proposed activity will address them:** |
| Link to [**APNEP Comprehensive Conservation and Management Plan**](https://apnep.nc.gov/resources/publications-and-reports/ccmp) **(CCMP)**  D1.1 Communicate the importance of stewardship and offer opportunities for volunteerism to further APNEP’s mission.  The Shad in the Classroom program provides students with the opportunity to act as stewards of their river basin by participating in the restoration of American Shad. This project operates in cooperation with the NC Wildlife Resources Commission and the US Fish and Wildlife Service to ensure that the educational efforts are in line with conservation efforts. Additionally, undergraduate and graduate students volunteer in classrooms to provide enrichment activities for students (this will be virtual if Covid affects classroom visitation).  D2.1 Provide and promote opportunities for outdoor experiences that connect individuals with the Albemarle-Pamlico ecosystem.  We will provide funding to ensure that students participating in the Shad in the Classroom program have the opportunity to release their American Shad fry into their natal river if their schools are permitted to take field trips this year. If possible, we will also provide a field experience for educators on the Roanoke River and/or Albemarle Peninsula, immersing them in coastal ecosystems and providing content and ideas for teaching coastal concepts in the classroom.  D2.2 Provide environmental education training opportunities for educators in the region.  We will provide training for 25-35 teachers on American Shad and the Shad in the Classroom program. This may be supplemented by an optional visit to the Watha State Fish Hatchery. If possible (due to Covid restrictions), we will also provide a field experience for educators on the Roanoke River and/or Albemarle Peninsula, immersing them in coastal ecosystems and providing content and ideas for teaching coastal concepts in the classroom. |

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| **8. Brief explanation of linkage to APNEP priority areas (1)water quality, (2)submerged aquatic vegetation, (3)coastal habitats, (4)increasing resiliency:** |
| Water quality: Teachers and students learn the importance of water quality to aquatic organisms, with a focus on American Shad, and this is a focus of their care for the embryos as they are required to measure water quality parameters twice a day at least one week before and during their shad week. Many classes also measure water quality parameters at their releases at the river. In addition, students can further their understanding of the importance of good water quality through an additional optional educational component learning about and sampling for aquatic macro-invertebrates.  Submerged aquatic vegetation: SAV have been found to be one of the preferred habitats for migrating adult American Shad in the river runs and important habitat for juvenile American Shad. Students learn about SAV and other habitat in the Shad Life Cycle activity. The importance of SAV with also be addressed in 1-2 Educator Treks in the APNEP region.  Coastal habitats: coastal habitat is important to the life cycle of American Shad and student learning of this habitat is included in in multiple program activities and overall program learning. Additionally, educators will learn about coastal ecosystems in 1-2 Educator Treks within the APNEP region. |

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| ***9. List activities that will be used to monitor or indicate the success of the proposed activity/project by listing one or more output and/or outcome metrics that will be measured, documented, and reported after project completion, as well as the expected target for each metric. Please also include a short explanation for how each listed metric assists in measurement of a CCMP Action being implemented by the project. Please see the proposal guidelines RFP*** [***output/outcome example document***](https://apnep.nc.gov/documents/engagement-outputsoutcomes-guidance) ***for details.*** |
| We will track the number of teachers and students impacted by the Shad in the Classroom program. The program has reached 266 classrooms between the years 2009 and 2021 and over 17,000 students between 2013 and 2021. In spring of 2022 we plan to have 25-35 classrooms raising shad from egg to fry. We expect to reach at least 15 counties (4 – Tier 1, 6 – Tier 2, and 6 – Tier 3) and about 2,000 students (we have reached an average of 2,058 students per year over the last four years). For new school selections, Tier 1 and 2 counties in the APNEP region will be prioritized.  We will reach at least 10 educators from across North Carolina via at least one Educator Trek experience in the APNEP region; the expected impact of those 10 educators is at least 200 students in the first year.  Evaluations are required for all classrooms participating in the Shad in the Classroom program. Evaluations assess teacher understanding and satisfaction and student learning and changes in behavior and interest, as well as collect data on hatching success and survival of fry. A final report summarizing these results will be delivered to APNEP upon completion of the 2022 Shad in the Classroom program.  Teachers are evaluated after the training workshop to determine how well they were taught American Shad restoration, management, and life history, and how to raise shad from an embryo to the larval stage. Targets: ≥80% reporting very to extremely (confident, sufficient, well, or satisfied) when responding to the evaluation. At the end of the season, teachers are evaluated to determine the educational usefulness and/or enhancements provided by the multiple activities and lessons that were created for the program and are available to them. Targets: ≥80% reporting useful/enhancing (for those using each activity). Response variables for both evaluations are quantitative, provided on a graded scale, and reported in percentages in table format. Qualitative responses are also used to help improve the program. These evaluations address CCMP D1.1, D2.1, and D2.2 and assist in APNEP’s measurement of these CCMP actions by showing if there is a change in knowledge and skill in all teachers and behavior in new teachers. The survey metrics also contribute to the assessment of APNEP’s priority areas (water quality, SAV, and coastal habitats) as there are specific questions in the evaluation addressing these areas, particularly related to the life history of the American Shad. These metrics help us understand how well and to the extent we achieved these goals and help us to continue to improve the program.  We analyze before-and-after surveys of students participating in the Shad in the Classroom program, including control groups of classrooms not participating in the program. Students are evaluated to determine whether there is an increase in knowledge on American Shad ecology based on set questions. Behavioral and interest changes for pre- and post-evaluation are also examined. Demographic questions about race, gender, age, and grade level are included. Statistical analysis is used to determine not only an increase in knowledge, but also whether there are differences based on gender and race. Target: statistically significant (p<0.05) increase in learning. Data on the percent increase in knowledge and behavior and interest changes are presented in the form of graphs and tables for easier understanding. These evaluations address CCMP D1.1 and D2.1 and assist in APNEP’s measurement of these CCMP actions by showing if there is a change in knowledge, skill, and behavior. The survey metrics also contribute to the assessment of APNEP’s priority areas (water quality, SAV, and coastal habitats) as there are specific questions in the evaluation addressing these areas, particularly related to the life history of the American Shad. These metrics help us understand how well and to the extent we achieved these goals and help us to continue to improve the program. |

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| 10. Description of funds (Combined APNEP and leveraged funds. | | | | |
| Description of Service | APNEP | Contract Applicant  (Cash, In-Kind, Other)  (e.g. In-kind - staff assistance 5hrs/wk\*$13/hr\*10wks=$650) | Other Contributions  (Organization, Cash, In-Kind, Other)  (e.g. NC DMF - In-kind – staff assistance 5hrs/wk\*$13/hr\*10wks=$650) | Total |
| Personnel/Salary | $9,625.00 ($17.50/hr)  Shad in the Classroom Program Specialist:  Classroom program coordination 460 hours = $8,050;  Educator training 40 hours = $700;  Evaluation and reporting 50 hours = $875 | $7,513.58  Coordinator of Teacher Education: 6 hrs/wk\*39wks\*$23.47/hr=$5,491.98  Museum Operations staff: 40hrs\*$27.07/hr=$1,082.80  Museum delivery/release assistance 40hrs\*23.47/hr=$938.80 | $4,902.00  NCWRC staff collection, husbandry, educational enrichment 200hrs\*$24.51/hr=$4,902.00 | $22,040.58 |
| Fringe Benefits | $737.00  7.65% FICA | $3,543.71  44.27% of salary + $2.93/hour (FICA, retirement, leave, health) | $2,242.20  44.27% of salary + $2.93/hour (FICA, retirement, leave, health) | $6,522.91 |
| Project Supplies | $2,820.00 (tank refurbishment, WQ chemicals) |  |  | $2,820.00 |
| Equipment |  |  |  |  |
| Transportation/Travel | $3,000.00 (Educator Trek transportation, lodging, meals @$1000; travel for egg delivery and releases) |  |  | $3,000.00 |
| Sub-contract Services | $2,000.00 (video updates) |  |  | $2,000.00 |
| Other Direct Costs |  |  |  |  |
| Total Direct Cost | $18,182.00 | $11,057.29 | $7,144.20 | $36,383.49 |
| \*Indirect Cost (F&A) (not to exceed 10%)  (e.g. 10% of the total direct costs $10,000 = $1,000) | $1,818.00 | $1,105.73 | $692.78 | $3,616.51 |
| Total Cost | $20,000.00 | $12,163.02 | $7,836.98 | $40,000.00 |

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| ***11. Describe leveraging of funds from project partners (Optional):*** |
| \*Check with Heather Jennings for more information at 919-707-8632  In the past three years, we have received in-kind project support from NCMNS staff, USFWS staff, NCWRC Staff, NCSU staff and students, and ECU students. This level of support is anticipated to continue with this proposal.  American Shad are a priority species to the USFWS and the NCWRC and are managed by the NCWRC for in-land waters. They are integral partners to the success of the program. Even though the NCWRC are not stocking American Shad currently, they contribute significant resources to the collection and husbandry of the broodstock to provide the program with American Shad embryos. The USFWS provides assistance with delivery and release. NCSU and ECU provide educational enrichment to participating students.  In addition, a new partner, Triangle Fly Fishers have already donated $250 in support of the 2022 Shad in the Classroom Program. |

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| 12. Project Partners (may add more if needed) | | | |
| Agency Name | NC Wildlife Resources Commission | | |
| Agency Address | 1751 Varsity Dr, Raleigh, NC 27606 | | |
| Role/contribution to Project | Collecting American shad broodstock, preparing eggs for delivery to schools, attendance at releases | | |
| Contact Person | Christian Waters | Phone No. | 919-707-0221 |
| E-mail address | christian.waters@wildlife.org | | |
| Agency Name | US Fish and Wildlife Service | | |
| Agency Address | Raleigh Field Office | | |
| Role/contribution to Project | Shad egg delivery, shad release participation | | |
| Contact Person | Mike Wicker | Phone No. | 919-856-4520 |
| E-mail address | mike\_wicker@fws.gov | | |

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| ***13. Project Milestone Schedule*** |

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| **Time Period / Date** | **Activities (List specific outputs or activities that will be achieved during each quarter.)** |
| First Quarter  July-Sept 2021 | Communication with interested teachers for 2022 program  Developing additional activities |
| Second Quarter  Oct-Dec 2021 | Applications distributed  Supply inventory |
| Third Quarter  Jan-Mar 2022 | Applications received, reviewed; selections made  Tank refurbishment  Supplies purchased  Virtual teacher training planned and facilitated  Shad weeks scheduled with USFWS, NCWRC, classrooms  Extension educational activities coordinated |
| Fourth Quarter Apr-Jun 2022 | Shad delivered to classrooms/teachers, raised, released  Extension education activities coordinated  Coastal Educator Trek(s) offered (pending any COVID restrictions)  Evaluations returned from classrooms  Summary of program completed |

**Note: All projects must submit a detailed Final Project Report that is due by the end of the contract for APNEP review and approval. Supplemental information should include (when relevant) a file containing data collected during the project, GIS Data, brochures, outreach tools, photographs or videos taken during the project, and a summary of survey results.**

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| ***14. References and Literature Cited (if applicable)*** |
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