

# Paddlefish Reintroduction Education Initiative

## Today Foundation

### Project Summary

#### Organization and Partnerships:

The Today Foundation (Foundation), applicant and fiscal agent for the Paddlefish Reintroduction Education Initiative (Paddlefish Project), was formed in 1983 as a 501(C)3 organization with a mission to support and create effective educational programs that set our young people on a trajectory for success in life. The Foundation made a major commitment to education in East Texas with the creation of Collins Academy (Academy) located in Jefferson, Texas in 2007. The Academy's long-term goal is to develop a model where education drives economic revitalization in rural communities by delivering high-quality formal and informal instruction, critical workforce skills; and place-based, issue driven, experiential learning that results in an able and engaged citizenry where effective environmental stewardship is commonplace. The Academy's educational enrichment offerings include adult basic education and professional development for teachers, and natural science, historic preservation, and conservation projects involving teachers, students, scientists, and the public.

Through its Academy in Jefferson, Texas, the Foundation offers study in environmental science and the ecology of Caddo Lake and Big Cypress Bayou, Caddo Lake National Wildlife Refuge and the community of Jefferson. Working in partnership with the City of Jefferson and the U.S. Army Corps of Engineers, the Foundation recently helped complete the Big Cypress Fish and Wildlife Habitat Restoration Project and is its contracted outreach provider. This restored preserve includes 50 acres of terrestrial enhancement, new public access trails along the City's historic riverfront, and 1500 feet of gravel bar upstream to benefit the reproduction of fish, especially the American Paddlefish (*Polyodon spathula*). The Academy's educational outreach programs delivered at the park are collectively known as Port Jefferson History & Nature Center.

The Paddlefish Project will be managed by Today Foundation's consultants stationed at Collins Academy in Jefferson. Its primary partner and a cadre of area volunteers will help implement projects. All project activities will take place at or near Caddo Lake, Caddo Lake State Park and Wildlife Management Area, Caddo Lake National Wildlife Refuge, along Big Cypress Bayou, and at or near participating public and private schools across Northeast Texas and Northwest Louisiana. This is the same area where the Foundation seeks Congressional designation for a new national heritage area based on its historic end environmental significance. By connecting to previous work in this way, the Paddlefish Project offers enormous returns on investment by producing a common educational template for schools within the proposed Caddo National Heritage Area and the expanded East Texas region.

The Foundation's primary partner, Caddo Lake Institute (CLI), is a non-profit scientific and educational organization founded in 1992 with the goal of protecting the ecological, cultural, and economic integrity of the unique Caddo Lake ecosystem. To accomplish this goal, CLI seeks to develop model projects that can be replicated elsewhere. CLI's work to restore healthy environmental flows in the Big Cypress Bayou watershed, on-going since 2004, is the scientific basis for Paddlefish reintroduction, which is part of an exemplary scientific effort now being used in many parts of Texas and other states.

CLI took an early lead in wetland education in East Texas based on its work in obtaining designation of Caddo Lake as a "Wetland of International Importance" under the Ramsar Convention,

# Paddlefish Reintroduction Education Initiative

## Today Foundation

now signed by over 160 nations. That action by CLI, as the flows work does now, provided an opportunity to use a local, environmental science project to support the efforts of area schools to provide exciting natural science classes that build stewardship capacity. Through its collaborative efforts, CLI will provide technical assistance and professional scientific support for the Paddlefish Project. Our volunteers will be certified Texas Master Naturalists and Texas Master Gardeners from surrounding counties in East Texas and Northwest Louisiana. This group of able adults are already engaged with habitat restoration and environmental education outreach at Caddo Lake, along Big Cypress Bayou in association with the Port Jefferson History and Nature Center Project, and with school recruitment, teacher training, and pilot activities related to this proposal. Their sponsoring organizations, Texas Parks and Wildlife Department and the Texas A&M University AgriLife Extension Service have a long history of collaboration with both the Today Foundation and CLI.

### Summary:

Today Foundation has never submitted a proposal or received a grant award of any kind from the U.S. Environmental Protection Agency.

The Paddlefish Project is an environmental science enrichment program that networks scientists with stakeholders to address local issues of importance. It will effectively serve as a model for creating behavioral change that benefits the environment by providing elementary, secondary, and postsecondary students, their teachers and professors, volunteers, and youth and adult event attendees with content knowledge, scientific process skills, and real-world practice to make informed environmental decisions and to take responsible actions. Behavioral change will occur as participants acquire knowledge, apply their understandings while implementing investigations, and as they organize, differentiate, characterize, and evaluate data. It addresses EPA's educational priorities for community projects by involving preK-postsecondary students and the public in local issues of environmental importance related to the reintroduction of the American Paddlefish and improving habitat for other aquatic species and terrestrial plants and animals. EPA's environmental priorities for protecting water are addressed by monitoring surface water quality and analysis of the effectiveness of previous aquatic and land-based habitat restoration work. Even though this environmental education proposal is based on CLI's development and implementation of an experiment for reintroducing the Paddlefish to its native waters, this project could be used as a template for the reintroduction of any native organism to its historic place by utilizing the same approach, the same activities, the same type investigations, and a similar culminating event. In addition, the Paddlefish Project provides a template for community projects emanating from previous, existing, and new scientific investigations of important environmental issues as no other education project has done.

The use of paddlefish reintroduction as a platform or "hook" to teach ecological principals and environmental inquiry is the purpose of this proposal. Educational targets are: (1) to improve stewardship, the public's ability to pro-actively engage with issues affecting the health of Caddo Lake and the Big Cypress Bayou Watershed, and (2) to improve student performance in specific areas of the statewide science assessment. These goals fully meet the definition of environmental education presented in Section 1 (B) of the proposal guidelines because all proposed activities involve formal or informal learning experiences for teachers and students, preK-postsecondary, volunteers, and the general public. Although agency and other professional scientists participate, no funding for technical training activities for environmental management professionals or activities directed toward the support of non-educational research and development is involved.

# Paddlefish Reintroduction Education Initiative

## Today Foundation

### Implementation/Delivery Method:

In March 2014, the U.S. Fish & Wildlife Service will release 50 two-foot long paddlefish with radio transmitters into Big Cypress Bayou downstream of Lake O' the Pines as a test of the value of recent habitat restoration work. This release will provide an opportunity for schools to be heavily engaged with ecological studies and environmental education. Student-teacher groups will augment the work of scientists by conducting their own age appropriate, standards aligned, environmental testing and issue investigations. When the released paddlefish appear ready to utilize in-stream habitat improvements for spawning, a large stocking of up to 10,000 small paddlefish will be introduced triggering the implementation of high-quality environmental studies for participating schools, volunteers, and the public for which this proposal is written.

Proposed outputs of the Paddlefish Project include recruitment meetings, professional development workshops and a summer camp for teachers and college professors, school-based projects for preK-Grade 2 students, field-based investigations for Grades 3-5, field inquiry and problem-based investigations for Grades 6-postsecondary students, optional summer day camps for students, and special events commemorating national/international days of service. An annual culminating event, the Paddlefish Festival, will be conducted during May of each year for student project reporting and celebrating new contributions toward a healthier environment for native plants, animals, and humans alike. In addition, certain other special events will be conducted to help assure recruitment and retention of volunteer and school participants. This includes continuing education certifications, stipends, and sub-grants for teachers, a volunteer banquet associated with National Public Lands Day in September for volunteers, and an evening reception for school Superintendents and Curriculum Directors in March of each year.

### Audience:

Primary target participants are teachers and students of public and private schools in Northeast Texas and Northwest Louisiana. Qualified volunteers and the general public are also targets. The initial service area will include six counties in Texas and two parishes in Louisiana, all located within or adjacent to the Big Cypress Bayou system, contiguous with one another, and within or very near to the proposed Caddo National Heritage Area. This geographic area contains over 650,000 people of which 34% are minorities and 20-34% of those 18 years or younger live at or below the poverty level.

County/Parish	Population	White	Other	Below Poverty	BP Under 18 yrs.
Cass, TX	30324	24177	6147	20%	29%
Marion, TX	10546	7830	2716	21.90%	34.40%
Harrison, TX	65631	48546	17085	16%	23.80%
Morris, TX	12934	9399	3535	19.70%	34.20%
Upshur, TX	39309	34793	4516	14.30%	22.40%
Gregg, TX	121730	89554	32176	16.90%	24.90%
Caddo Parish	254969	127852	127117	19.30%	30.10%
Bossier Parish	117742	87563	30179	13.40%	19.50%
<b>Totals</b>	<b>653185</b>	<b>429714</b>	<b>223471</b>		

Public response indicates the service area may expand in year two due to interest expressed from more distant schools, several of which are urban containing higher concentrations of Hispanic students. Use of the paddlefish as the program icon appears to be wildly popular with students and adults alike.

# Paddlefish Reintroduction Education Initiative

## Today Foundation

### Costs:

The total federal project costs is \$197,233 for the proposed two-year funding cycle. Thirty-eight percent of the amount is for inquiry project supplies and 27% is for consultant costs. The \$87,000 match is made up of personnel costs directly related to the delivery of high quality environmental science.

### Project Description

The Paddlefish Project will provide a model of quality methods, practices and techniques, which help to create a vision of how to inspire behavioral change through non-regulatory means while raising public awareness of actions that can be taken to advance environmental stewardship. It will integrate these methods, practices and techniques into school curriculum providing a standards aligned way of raising student performance by creating problem-solving and critical thinking skills in locally meaningful ways.

### What:

The EPA educational priority most addressed by the Paddlefish Project is (3) Community Projects, because all outputs are formal or informal experiential learning opportunities directly linked to solving a long standing environmental issue related to surface water quality and quantity. Outdoor place-based and problem-based service learning is the teaching tool of choice for Grades 3 and up. PreK-Grade 2 students conduct investigations close to their classrooms for reasons of safety. Older grades and postsecondary students conduct field inquiry to answer questions they deem important.

The EPA environmental priority focus is (4) Protecting Water. The reason behind the need to reintroduce the Paddlefish is aquatic habitat demise due to the upstream installation of Lake O' the Pines Dam in 1960. The impounding of Big Cypress Bayou's waters drastically reduced flows and changed hydrologic regimes eliminating the environmental niche of the paddlefish, other wildlife, and many wetland plants. Additionally, Dallas-Fort Worth is looking to acquire Northeast Texas water for the continued expansion of its urban footprint. Rural citizens need to understand and respond to plans of large cities to the west to take Northeast Texas' and Northwestern Louisiana's surface water. Due to actions of the 83rd Texas Legislature and a much larger voting population, Dallas-Fort Worth will eventually win this on-going battle. Therefore, there exists an urgent and critical need for assuring water quality and that enough quantity remains for biologic flows necessary to maintain habitat health for native flora and fauna, to support economic and recreational activities, and to answer human health needs.

The specific goals of the two-year project are:

1. Increase stewardship - the public's ability to pro-actively engage with issues affecting the health of Caddo Lake and Big Cypress Bayou Watershed (or a participants home watershed), and
2. Improve preK-12 student performance in specific areas of the statewide science assessment.

Paddlefish Project goals will be achieved through the implementation of a series of outputs designed to:

- Engage and hold the attention of the target audience (Paddlefish as marketing icon),
- Provide effective recruitment and knowledge of best practice (professional development),
- Utilize standards aligned, inquiry and problem-based curricula for preK-postsecondary participants (constructivist approach with scaffolding & scaling up in 2nd year),

# Paddlefish Reintroduction Education Initiative

## Today Foundation

- Establish quality interaction between the scientific community and target audience (web site, Paddlefish Festival & other events),
- Conduct a community-based stewardship project (reintroduction of Paddlefish),
- Entrain the public (Media, Paddlefish Festival & other events), and
- Model, facilitate, and celebrate behavioral change (conduct stewardship projects & publicize).

The paddlefish Project will create behavioral change by directly involving the target audience in quality stewardship activities based on sound science. It will demonstrate to the public the power of common understanding and focused action. The richness of community-based events and the constant stream of publicity via print and electronic media planned will reinforce the desired message. Scaling up in year two will broaden and diversify the audience by involving urban schools and locations to the west where an historic minority (Hispanic population) is now a majority race.

### Why:

The project location, Caddo Lake and Big Cypress Bayou, represents a very high quality and unique environment. The U.S. Fish and Wildlife Service has prioritized the area based on the high-quality habitat. Today, however, more than 40 of the native species at Caddo Lake and Big Cypress Bayou are endangered, threatened or rare, including the American Paddlefish. Big Cypress Bayou is classified as an impaired river by the Texas Commission on Environmental Quality and the Texas Department of State Health Services maintains a fish consumption advisory for Caddo Lake and Big Cypress Bayou.

Like the internationally important wetlands and their extraordinary floral and faunal communities that can provide an economic basis for fishing, boating and other nature-based recreation, the region's human resource base is threatened. As revealed by student performance scores on the state's annual science assessments, area students experience difficulty answering higher cognitive skills questions related to how adaptations help organisms survive in their environments, how organisms interact with their environment, interdependence among organism and their environments, and how environmental changes affect organisms. In most of these cases, underfunded public schools are simply not able to provide relevant, real-world learning experiences to address the problems and meet the state's expectations for math and science. The Paddlefish Project drills in on specific weak points in student performance by providing targeted professional development for teachers and customized, in-depth content, field inquiry, and information communications experience for students.

### How:

The Paddlefish Project will meet its goals by delivering effective outputs: meetings, workshops, inquiry learning opportunities, and events; and by broadly disseminating relevant information via a culminating event, print and electronic media, and a robust web site. A pilot project is now underway that is field testing the design and implementation plan, which is funded by the Foundation and presented here. Four rural school districts, McLeod ISD, Hughes Springs ISD, Jefferson ISD, Karnack ISD, and one urban district, Hallsville ISD, are now rolling out preK-Grade 12 pilot projects. These districts, along with Panola Community College, East Texas Baptist University, and Texarkana College, make up the beginning preK-postsecondary pilot cadre.

After a successful recruitment effort, teachers and college professors were presented professional development training that provided content information about the American Paddlefish, its habitat an

# Paddlefish Reintroduction Education Initiative

## Today Foundation

niche requirements, how the upstream impoundment changed in-stream and riparian habitat health, what working scientists are doing to document and reintroduce the paddlefish, and how to select and modify existing curricula to deliver high-quality classroom and field inquiry lessons.

Currently, with the help of Academy staff, all participating schools are planning their own environmental science inquiry modules composed of at least 10 sessions whereby students ask questions, develop investigations, collect and analyze data, draw conclusions, and report findings and recommendations. The development of all prescribed curricular materials and programs are from previously funded EPA projects. PreK-Grade 2 teachers are using Growing Up WILD to select and modify appropriate lessons to fit the Paddlefish Project design and their particular needs. For example, organisms and environment is the primary school content area while life cycles is the connecting concept. Grades 3-5 teachers are building their study units by adapting lessons from the existing Aquatic WILD and Junior Master Gardener programs related to the concepts of adaptations and niche. Citizen Science protocols for Texas Stream Teams and Invaders of Texas groups are being utilized by middle school, high school, and college instructors to fashion appropriate field inquiry that will deliver important data relative to both stream side conditions and the aquatic habitat of the Paddlefish.

<u>Activity</u>	<u>Materials</u>	<u>Delivery Mode</u>
Primary Module (preK-Gr 2)	Growing Up WILD	Structured classroom & school yard lessons
Elementary Module (Gr 3-5)	Aquatic WILD, Junior Master Gardener	Structured inquiry, classroom, school yard, & Port Jefferson History & Nature Center
Middle School (Gr 6-8)	Texas Stream Team	Field Inquiry, lab & field
High School (Gr 9-12)	Invaders of Texas	Field Inquiry, lab & field
Summer Camp	All of above	Day camps and overnight camp out

Content delivery includes hands-on, outdoor education delivered in multi-sensory modalities where descriptive inquiry moves quickly to field inquiry. This transition corresponds to a right-hand shift toward the higher order cognitive skills of Bloom's Taxonomy as the grade levels increase. Similarly, students move from conducting descriptive investigations in PreK-Grade 2 to planning/conducting field inquiry at Grade 6. In the same way, the sophistication of scientific materials and equipment used by students increases with grade level whereby students begin with simple tools such as a magnifying lens and progress through water test kits to electronic field probes. After each class conducts its research, field investigations and other scientific inquiries, an evaluation, analysis, and synthesis of the class's work will be provided in a report that will be presented at the culminating event, the annual Paddlefish Festival. These products may be of any format appropriate for the topic, the audience, and the presenter.

As proposed, the Paddlefish project is a two-year program beginning in September 2014 with recruitment of additional public and private schools. Newly recruited schools will join the pilot group in the initial year, which will focus on districts nearest to the resource - Big Cypress Bayou and Caddo Lake. The second year of recruitment will expand the service area outward with no limit on geographic location. It is anticipated that many Cohort 2 schools will be from urban locations with even higher percentages of underperforming and underrepresented students than in Cohort 1.

After recruitment of participants, teachers, volunteers, and partners will be trained in a professional development workshop where teachers receive continuing education credits. Training is followed by collaboration between a schools participating teachers, consulting project specialists, volunteers and partners to select and refine problem-based, service learning investigations. Learning modules are made up of at least 10 sessions and yield a report that is shared during the culminating event, the Paddlefish Festival.

# Paddlefish Reintroduction Education Initiative

## Today Foundation

Interspersed within the student project period are stewardship events such as National Public Lands Day and World Wetland Day where Paddlefish Project participants will be invited to conduct short-term community stewardship activities with the public. Summer camps with stipends will be offered to teachers for in-depth content and skills development while day camps will be offered to students in June of each year. The Paddlefish Project web site, which will facilitate adoption, naming, and following the movements of electronically tagged paddlefish, will promote high quality communications between students and scientists via a blog, an information repository containing scientific study reports, project news stories, and a video-photo gallery. The applicant and partnering organizations will deliver presentations to statewide audiences on two occasions, in October at the Conference for the Advancement of Science Teachers and at the Texas Environmental Education Advisory Committee Annual Meeting in January.

Except for the match requirement, the sub-award program will utilize the same eligibility criteria and guidelines as EPA's EE Program including support for EPA's Strategic Plan and an outcome of environmental improvement. A solicitation period will commence on September 1, 2014 with each participant school district receiving guidelines and an invitation to submit by a November 28, 2014, deadline. A second similar solicitation will follow on September 1, 2015 to completely deplete the sub-award amount of 25% of the EPA funds awarded. The second sub-award grant cycle will be limited in this way to the amount remaining from the first sub-award cycle. Each sub-awardee will be held to the same design specifications and reporting requirements as the prime recipient. In addition, site visits-as many as needed-by the Evaluation Team that granted the sub-award will be conducted to make sure EPA priorities are addressed and that awardees implement activities that improve behavior through non-regulatory means.

Who:

Students and teachers in six Northeast Texas counties and two parishes in Northwestern Louisiana, our partners and volunteers for this project, and the citizens who attend project events comprise the target audience. The population for this area is more than 600,000 with almost 150,000 students enrolled in public schools. The Paddlefish project seeks to serve 10 school districts in year one of the grant program and to add 10 additional districts in year two. Assuming a mix of large and smaller districts, as many as 15,000 students could be served over a two-year award period. Many thousands more form the ranks of our volunteers, partners, and participating citizens would be impacted through copious media outreach, and our rich event schedule.

As previously stated, the needs of this audience relate directly to maintenance of surface water quality and its quantity, maintenance and improvement of habitat health, and the widespread creation and use of new knowledge and skills to support proactive stewardship activities through non-regulatory means. Fortunately, means of transferring the new knowledge and skills needed to the target audience are easily aligned with learning standards and will improve student performance on high stakes accountability tests. The ability to coalesce and focus existing resources across the region to impede the loss of water quality and quantity, improve habitat health, and to maintain human wellbeing is at hand. A grant award here will create a new paradigm where empowered citizens work together for the fair distribution of environmental benefits and burdens.

Three incentives will be used to attract and retain science teachers. All encourage professional development of content knowledge along with inquiry and service learning skills. First, teachers will be

# Paddlefish Reintroduction Education Initiative

## Today Foundation

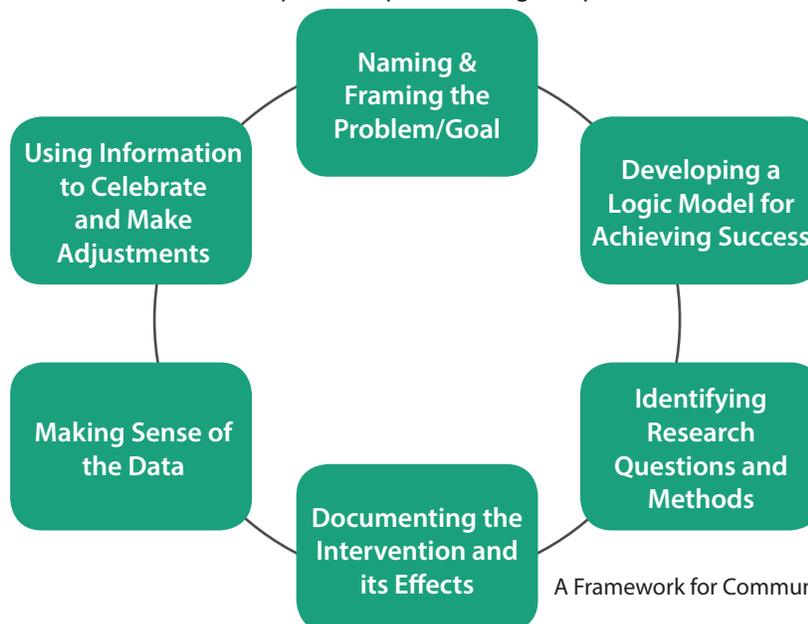
provided with continuing education credits for professional development workshops. Secondly, cash stipends will be awarded for time and effort during professional development summer camps offered each June. Finally, teachers can receive sub-grant awards for project supplies and materials.

Four characteristics of the Paddlefish Project make it unique and innovative and will play large roles in its success: (1) use of the American Paddlefish as a project icon, (2) the large amount of scientific study conducted in the watershed and the availability of scientists and applicable data, (3) the strong connections proposed activities have with science educational standards and identified shortcomings in student performance, and (4) the volunteer base necessary to support widespread service learning across the region is already in place. All this will be needed to facilitate environmental justice for an underserved area where habitat continues to be degraded, surface water is up for grabs, and 20-34% of children 18 years and younger live in poverty.

### Project Evaluation:

Participatory evaluation modeled after “Participatory Evaluation. What is it? Why do it? What are the Challenges” by Zukoski and Lulaquisen, will be used to assess how well project goals are met, because this approach not only allows stakeholders to identify locally relevant evaluation questions and to speak with a single voice, but improves program performance, builds capacity, develops leaders and sustains organizational learning and growth. Fundamentally, participatory evaluation is about sharing knowledge and building the evaluation skills of program beneficiaries and implementers, funders, and others. It is a process composed of Identifying locally relevant questions, reflection, and applying lessons learned along the way. It is empowering because it claims the right for local people to control and own the process of making evaluation decisions and implementing them (Zukoski & Lulaquisen, 2002).

A published tool kit for planning and implementing participatory evaluations from The Community Toolbox of the Work Group for Community Health and Development at the University of Kansas will be used as a guide for the evaluation of the Paddlefish Project. An experienced participatory evaluation consultant will be contracted to work with the community evaluation team over the project period. The evaluation team will be selected and trained by the evaluation consultant as a first step toward beginning the project. Evaluation will follow the steps in the process diagram presented below.



A Framework for Community-Based Participatory Research