

SoCal Urban Wildlife Refuge Project

Project Proposal

Please respond to each of the areas described below by addressing the stated criteria, and briefly offering any additional, relevant information about the proposed program.

Program proposals should not exceed 10 pages in length, beginning with the current page.

Organization Name:	Zoological Society of San Diego (doing business as San Diego Zoo Global)		
Program Title:	Engaging Underserved Students and Teachers in Hands-on Conservation Science		
Program Timeframe:	July 1, 2017 through June 30, 2018		
Total Amount Requested:	\$78,219		
Contact Person:	Maggie Reinbold, Director of Conservation Education		
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1. Challenge

Describe the challenge, or barrier, to which the program is responding.

Include a brief description of the audience affected (target audience), the challenge or barrier faced by that audience, data that illustrates the need for the program, and information that ties this program to the goals of the SoCal Urban Wildlife Refuge Project.

With science literacy at an all time low throughout the United States, there is a critical need for effective conservation education programs that use hands-on, inquiry-based methods to inspire an interest in science. Data generated by the National Science Board over the past few decades reveal that U.S. students trail far behind their international peers in their knowledge and understanding of scientific concepts and principles. The majority of American students are unable to apply scientific knowledge to a new situation or explain the reasoning behind their answers, as reported by the National Research Council. Documented trends also demonstrate an overall national decline in completion of natural science degrees, in the granting of doctoral degrees in the sciences, in the authoring of scientific papers, and in our share of international patents. California, in particular, remains one of the nation's lowest achieving states in science literacy. Consistently across the last decade, less than half of 10th grade students in Southern California test proficient in science.

Conservation organizations, like San Diego Zoo Global, are especially concerned about lack of science literacy in the United States. We consider a strong understanding of 21st century environmental challenges such as biodiversity loss, implications of genetic research, and other topics as absolutely essential for meaningful, personal involvement in these issues. Many of today's environmental challenges are complex, requiring the collective problem solving efforts of all individuals in locally and globally-connected communities. Effectively addressing these issues will require an informed and environmentally literate public that is willing to translate its knowledge into action. Here in Southern California, we are also in the unique position of living and working in a world-renowned biodiversity hotspot—the California Floristic Province. In fact, San Diego County is the most biologically diverse in the contiguous U.S., encompassing an impressive range of habitats and ecosystems. Unfortunately, our county also holds the dubious distinction of having more threatened and endangered species than any other county in the contiguous U.S. With species being lost at an unprecedented rate, immediate action is required to preserve our region's unique biodiversity.

Equally challenging is the predicament of the American science teacher. National Science Board findings reveal that many science teachers in this country lack full certification and are often forced to teach outside their area of expertise. Teaching is already a challenging vocation, but the job of a **science teacher**, in particular, is markedly more difficult, especially in this age of advanced technology and data acquisition. Scientists around the world now have the capacity to examine entire genomes of species and peer deeper into the universe than at any other time in human history. Because science teachers act as a direct liaison between the broader scientific community and the students they teach, they are charged with continually refining their knowledge and craft to provide relevant information about an ever-changing field of study. Without this ongoing, sustained effort on the part of science teachers to deepen their comprehension as well as acquire new skills and expertise, students are put at a distinct disadvantage in a rapidly changing world.

We believe that science teachers represent an essential ally in the fight against extinction. There are very few jobs in the world that allow for the kind of individual, sustained interaction with young people that teachers are afforded on a daily basis, especially as it pertains to introducing students to the wonders and importance of wildlife and nature. Every day, teachers work tirelessly in shaping the next generation of conservation scientists as well as future business leaders, philanthropists, politicians, educators, land managers, and perhaps most importantly, responsible consumers and voters. We are wholly dedicated to partnering with the U.S. Fish and Wildlife Service again to support science teachers and their students for the benefit of wildlife and wild places. Through the proposed program, we will provide free science-based laboratory and field research experiences to 16 science teachers and approximately 512 students from Title I schools across San Diego and Los Angeles counties.

2. Audience in Detail

Describe the audience(s) that your program will target.

Provide a detailed description of the audience or audiences you will target. This should include key demographics (age, gender, ethnicity, socio-economic status, school descriptions if relevant, etc.). Describe changing demographics, if present, that hasten need for the program. Note: We recommend reviewing the SoCal Urban Wildlife Refuge Project focus, specific to target audiences, for alignment with your proposal.

The proposed program targets students and teachers from Title I high school campuses across San Diego and Los Angeles counties. Title I schools are those with 40% of their student body living at or below poverty level, and are especially important to target as attending students typically have limited opportunities for out-of-school learning. The majority of students and teachers that engage with our conservation science programs visit us from Title I campuses which require financial assistance to participate. There are currently very few conservation-oriented field trips offered in Southern California, most especially at the high school level. There are also very few field trips that involve local science students directly in relevant and innovative research projects.

Additionally, California remains one of the nation's lowest achieving states in science literacy. Last year in San Diego County, less than 50% of students tested proficient in science. In Los Angeles County, less than 30% tested proficient in science (reported by California Department of Education). Students from low-income communities, English language learners, students with disabilities, and other underrepresented student groups often lack access to quality science learning experiences, which has resulted in a wide achievement gap among California's student subgroups. Compounding this alarming situation is the fact that California public schools are under increasingly tight budgetary constraints. For many schools, field trips are limited or have been eliminated due primarily to the high cost of bus transportation.

The proposed program will benefit 16 science teachers and approximately 512 students from Title I schools across San Diego and Los Angeles counties. Both counties have diverse student populations. In San Diego County, 48.2% of the students are Hispanic or Latino, 30.5% White, 6% Asian, 4.9% African American, 4% Filipino, .5% Pacific Islander and .5% American Indian (4.9% two or more races). 51.4% of San Diego students qualify for free/reduced price meals. Los Angeles County reports the following student population: 65.1% Hispanic or Latino, 14.2% White, 7.8% African American, 7.6% Asian, 2.2% Filipino, .4% Pacific Islander and .2% American Indian (1.9% two or more races). 67.6% of Los Angeles students qualify for free/reduced price meals. Our program will target disadvantaged Title I schools with the most critical need for free, high-quality conservation science programming for their students and teachers, with an emphasis on low-income urban areas.

3. Strategy

Describe the strategy your organization will use to address the challenge.

Briefly describe who will be involved in implementing your program, your strategy to effect change, and how this will result in a positive impact on the challenge described above. Provide evidence of past effectiveness with similar efforts.

Since 2006, our Conservation Education team has provided students, teachers, and members of the community with innovative lab-and field-based research experiences that strengthen their knowledge and appreciation of the science behind species conservation. Our programs give students, teachers, and community members the opportunity to apply their textbook knowledge of biology and chemistry to real world scenarios in wildlife conservation. To date, we have connected more than 50,000 Southern California science students to the science of saving species through hands-on, exploratory conservation science field trips to our research headquarters. Additionally, more than 100 community members are earning their Master's degrees with our team through the Advanced Inquiry Program (AIP), a unique conservation and community-focused graduate program co-delivered in partnership with Miami University in Ohio. Through our Teacher Workshops in Conservation Science, we have built a nationally recognized program with a stellar reputation for giving teachers access to information and experiences that no other conservation organization can. To date, more than 900 teachers from all 50 states and six countries have gained innovative knowledge and tools to bring STEM topics to life in their classrooms.

Our Conservation Education team maintains active membership and annual presentation at both the California Science Teachers Association (CSTA) and the National Science Teachers Association (NSTA). Additionally, we were recently accepted into the 100Kin10 Network after being nominated to apply by the Under Secretary of the US Department of Education. 100Kin10 is working to unite the nation's top academic institutions, nonprofits, foundations, companies, and government agencies to train and retain 100,000 excellent STEM teachers to educate the next generation of innovators and problem solvers. We are the first zoo-based partner in the Network, out of nearly 300 national organizations, and will help to reach 100Kin10's ambitious goals through our Teacher Workshops in Conservation Science. We also recently joined the STEM Learning Ecosystems Initiative, which is working to provide the architecture for cross-sector learning, offering all young people access to STEM-rich learning environments so they can develop important skills and engagement in science, technology, engineering and math throughout preK-16. SDZG is on the design team for the San Diego STEM Learning Ecosystem, one of 27 cross-sector partnership communities around the country.

Previously commissioned summative evaluations of our teacher workshop program have documented significant gains in conservation science teaching effectiveness and that nearly 100% of participating teachers use our curricular modules to support the Next Generation Science Standards (NGSS). Additionally, over the past decade, we have consistently documented significant increases in students' learning and retention of science concepts based on the program's unique interactive and hands-on learning elements (average overall increase in student conservation science content knowledge is 40%).

4. Objectives

State measureable objectives to be achieved through this funded effort.

*Please provide both process objectives and outcome statements. **Process objectives** define quantifiable metrics by which progress can be determined. They should describe the key tasks and implementation of your program.*

***Outcome statements** define knowledge, attitudes, beliefs and/or abilities that will be realized by participants as a result of the program. Outcome statements should be defined such that they are measurable by your organization as a component of this funding award. Consider both cognitive (knowledge-related) and affective (values, choices) outcomes for your program.*

Process Objectives:

Provide a 40-hour (four days and three nights) comprehensive professional development workshop to eight science teachers from San Diego County Title I high schools and eight science teachers from Los Angeles County Title I high schools in the summer of 2017.

Provide full packet of ready-to-implement conservation science lessons to all teacher workshop alumni (packet includes all protocols and presentations from the workshop).

Provide free access to mobile conservation science kits for the classroom to all teacher workshop alumni (kits include all materials necessary to implement more costly/sophisticated lessons in the classroom, as well as shipping costs to and from campus).

Provide 16 free exploratory conservation science field trips to 2017 teacher workshop alumni (engaging approximately 512 students) during the 2017-2018 school year (includes bus transportation, admission to the San Diego Zoo Safari Park, and student learning supplies).

Engage students in a public pledge campaign to drive conservation action through behavior change.

Outcome Statements:

Increase participating teachers' conservation science content knowledge by at least 25%, as measured by pre and post-tests.

More than 50% of teacher workshop alumni implement provided conservation science lessons back in their classrooms (especially in support of the NGSS), as assessed by an open-ended digital survey.

Participating teachers use mobile conservation science kits to enhance student experiences in the classroom, as measured by an open-ended digital survey.

Increase participating students' conservation science content knowledge by at least 25%, as measured by pre and post-tests.

More than 50% of visiting students adhere to their conservation pledge, thereby increasing pro-environment behavior, as assessed by a 30-day follow-up digital survey administered by the teacher in the classroom.

5. Program Design

Describe the program's design.

Please describe the program elements, how the program will be implemented, and how you will monitor the program throughout implementation to ensure it is being accomplished as planned—and that adjustments are made to meet your objectives where necessary. Include in your description any rationale for the program's design, and/or examples of the program's past performance. The program design should reflect the objectives stated in the previous section, such that there is reasonable expectation the objectives can be achieved.

Southern California science teachers will first engage with our Teacher Workshops in Conservation Science which are designed to: (1) provide replicable, relevant, standards-based conservation science activities for formal and informal education settings, (2) connect science educators to wildlife conservation through relevant laboratory and field-based experiences that share recent advances in conservation research, and (3) provide a forum for science educators to network and share ideas for weaving conservation themes into their school community and engaging students in conservation. The workshop curriculum addresses a wide range of topics from a multitude of scientific disciplines including spatial ecology, restoration and reintroduction biology, genetic recovery, reproductive endocrinology, global climate change, and the human dimensions of conservation. The curriculum also includes a group project that engages teachers in the full process of open inquiry and teaches them how to guide this important process with their students. As part of the project, participants make scientific observations on the grounds of the San Diego Zoo Safari Park, develop comparative questions, devise investigations to answer their questions, and communicate their results to the cohort. This type of firsthand, experiential learning encourages independent and critical thinking, increasing participants' awareness of and concern for the local environment and its inhabitants.

To extend the workshop experience directly to students, we will invite workshop alumni and their students (approximately 512 students) to engage with our Outdoor Learning Lab (OLL) and associated *Life in a Biodiversity Hotspot* interactive field research curriculum, which is designed to: (1) enhance students' inquiry and critical thinking skills as they discover and monitor native species, (2) increase their interest in STEM careers related to species recovery, and (3) enhance their appreciation of their unique natural heritage and how human activities impact the health and composition of local ecosystems. The field-based research experience in the Outdoor Learning Lab will connect students to nature as they learn about and observe the native plants and animals that are part of the California Floristic Province, our own local biodiversity hotspot. Students will engage with resources that encourage them to critically evaluate how human-mediated change in our environment relates to changes in fire regimes, water usage, and ultimately loss of local biodiversity in Southern California and beyond, with the ultimate goal of inspiring environmental stewardship. They will also visit the San Diego Zoo Safari Park to observe endangered species and current field research projects in action.

Our aim is not only to expand participating teachers' knowledge about conservation science through relevant lab and field-based experiences, but also to prepare them for the role of facilitator in the open inquiry process and how to effectively engage their students in the creation of original questions and methods for answering them. We will provide a meaningful and relevant context for the NGSS so that our teacher partners not only meet their campus/district requirements but also fulfill their commitment to fostering the next generation of science professionals. In addition to pre/post-tests designed to assess increases in conservation science content knowledge (during both the teacher workshops and during the post-workshop school group visits), we also administer formative evaluations during the workshop in order to make continual improvements to the program as well as post-field trip teacher feedback to shape necessary changes in student-centered activities and content. Previously commissioned summative evaluations of our teacher workshop program have documented significant gains in conservation science teaching effectiveness and that nearly 100% of participating teachers use our curricular modules to support the NGSS. Additionally, over the past decade, we have consistently documented significant increases in students' learning and retention of science concepts based on the program's unique interactive and hands-on learning elements (average overall increase in student conservation science content knowledge is 40%).

6. Urban Refuge Standards of Excellence

Please select each of the Fish & Wildlife Service Urban Refuge Standards of Excellence with which your program *significantly* aligns.

For more information on the Standards of Excellence, see <https://www.fws.gov/urban/soe.php>.

1	☐	Know and Relate to the Community Understand not only the geographical boundaries of a community, but know the community intimately enough to become part of the community fabric.
2	☒	Connect Urban People with Nature via Stepping Stones of Engagement Meet urban residents with varying degrees of nature-based skills on their own turf through a wide variety of nature-based programs.
3	☒	Build Partnerships Share resources and build formal and informal community partnerships with the common goals of land stewardship and conserving natural resources.
4	☒	Be a Community Asset Improve the quality of a community by providing expertise, time, space, jobs, and involvement in community-based projects.
5	☐	Ensure Adequate Long-term Resources Make sure that there is adequate and stable funding to support staffing, facilities, maintenance, operations, and changing needs.
6	☒	Provide Equitable Access Reduce barriers to access due to transportation and physical and financial limitations.
7	☐	Ensure Visitors Feel Safe and Welcome Educate visitors about what to expect and how to be safe in natural environments.
8	☒	Model Sustainability Set the standard for the sustainable use of resources and energy conservation, and promote biological diversity through day-to-day decisions and actions.

7. Evaluation

Describe how you will collect and analyze data to document your accomplishment of stated program objectives.

*Please describe how you will track and evaluate both process objectives and outcome statements. Your methods for measuring outcome statements should assess **changes** in program participants, which is typically accomplished through pre/post measures. Copy each objective from section 3 into the first column, and then provide information about how data will be accessed, how often data will be collected, and who will be responsible for data collection and analysis.*

Process Objective	Instrument for, or Approach to Measurement	Frequency of Data Collection	Person Responsible for Collection and Analysis
Provide a 40-hour (four days and three nights) comprehensive professional development workshop to 16 science teachers from Title I high schools across San Diego and Los Angeles Counties in 2017.	Maintain digital (online) database of all teacher workshop applicants prior to workshop, then extensive documentation of each participant during the workshop through photos, video, pre/post assessments, evaluations, and thank you testimonials.	Database maintained throughout the spring months and summer months, including during the workshop. All captured documentation curated for reporting after the workshops.	Project Manager, Kimberly Kutina
Provide full packet of ready-to-implement conservation science lessons to all teacher workshop alumni.	Maintain password-protected online portal for all teacher workshop alumni to access workshop materials including curriculum, protocols, videos, and photos (third party provider is <i>Schoology</i>).	External portal curated throughout the year and updated with workshop materials within two weeks of workshop completion (available to alumni before the start of the school year).	Project Manager, Kimberly Kutina
Provide free access to mobile conservation science kits for the classroom to all teacher workshop alumni.	Maintain digital (online) database of all kit reservations, preparation date, and shipment date.	Database maintained throughout the school year and updated after each kit is returned.	Project Manager, Kimberly Kutina
Provide 16 free exploratory conservation science field trips to 2017 teacher workshop alumni (engaging approximately 512 students) during the 2017-2018 school year.	Maintain digital (online) database of all school group reservations, associated costs and receipts, and number of participants once field trip is completed (also to include teacher contact, grade level, name of course, etc.)	Database maintained throughout the school year (beginning after Labor Day and ending in mid-June), and updated after each field trip is completed and as invoices are received.	Project Manager, Kimberly Kutina
Engage students in a public pledge campaign to drive conservation action through behavior change.	Maintain (and publicly display) class sets of pledges in the Conservation Education Lab.	Pledges collected during the field trip experience.	Project Manager, Kimberly Kutina

Outcome Statements	Instrument for, or Approach to Measurement	Frequency of Data Collection	Person Responsible for Collection and Analysis
Increase participating teachers' conservation science content knowledge by at least 25%, as measured by pre and post-tests.	Workshop-specific assessment created by the project manager and revised annually to reflect changes in curriculum. Multiple-choice test with 30 questions regarding conservation science and open inquiry.	Administered at the beginning of the workshop experience (Monday morning), then again at the end of the workshop experience (Thursday afternoon).	Project Manager, Kimberly Kutina
More than 50% of teacher workshop alumni implement provided conservation science lessons back in their classrooms (especially in support of the NGSS).	Workshop-specific assessment created by the project manager. Open-ended digital survey regarding incorporation of curricular modules back in the classroom.	Sent via email to all teacher workshop alumni at the end of the school year.	Project Manager, Kimberly Kutina
Participating teachers use mobile conservation science kits to enhance student experiences in the classroom.	Workshop-specific assessment created by the project manager. Open-ended digital survey regarding effectiveness and impact of mobile conservation science kit in the classroom.	Sent via email to all teacher workshop alumni after return of the mobile conservation science kit.	Project Manager, Kimberly Kutina
Increase participating students' conservation science content knowledge by at least 25%.	Field trip-specific assessment created by the project manager. Multiple-choice test with 10 questions regarding conservation science (topic varies with curricular module).	Administered at the beginning of the field trip experience, then again at the end of the field trip experience.	Project Manager, Kimberly Kutina
More than 50% of visiting students adhere to their conservation pledge, thereby increasing pro-environment behavior.	Pledge-specific assessment created by the project manager. Open-ended digital survey regarding adherence to conservation pledge.	Administered to students 30 days following their field trip to the Outdoor Learning Lab, by their teacher during class time.	Project Manager, Kimberly Kutina
In addition to the program-specific evaluation you will conduct and report in your annual report, do you agree to administer a subset of no more than 15 questions provided by the SoCal Urban Wildlife Refuge Project's evaluator as a component of your pre/post testing, and submit individual participant responses in a spreadsheet for analysis (template will be provided)? Yes ☒ No ☐			

San Diego Zoo Institute for Conservation Research Budget Request FY17-FY18

Request for Teacher Workshops in Conservation Science (eight science teachers from San Diego County Title I high schools and eight science teachers from Los Angeles County Title I high schools) and 16 Post-Workshop Title I School Group Visits to the Outdoor Learning Lab and Conservation Education Lab at the San Diego Zoo Institute for Conservation Research (eight visits from San Diego County Title I high schools and eight visits from Los Angeles County Title I high schools).

Category	Description	Amount
Personnel	Teacher Workshop Program Labor @ \$500 per participant (all direct and indirect soft-funded program labor)	\$8,000
	Teacher Workshop Participant Stipends @ \$500 per participant (to cover childcare, transportation, etc.)	\$8,000
	Post-Workshop School Visit Program Labor (Direct & Indirect Soft-funded) \$500 per visit (16 school groups with 32 students and three teachers per group)	\$8,000
Travel	Post-Workshop School Group Visit Bus Transportation (within Los Angeles County) for eight groups @ \$1,500 per group	\$12,000
	Post-Workshop Student Visit Bus Transportation (within San Diego County) for eight groups @ \$500 per group	\$4,000
Supplies	Teacher Workshop Supplies for 16 teachers @ \$1,000 per participant (all workshop room & board Mon-Thurs, learning materials, lab consumables, etc.)	\$16,000
	Student Lab Supplies @ \$10 per student (approximately 512 students)	\$5,120
	School Group Visit Costs for Los Angeles County schools @ \$10 per participant (256 students and 24 teachers)	\$2,800
Subtotal		\$63,920
Indirect Charges	Negotiated Indirect Cost Rate of 22.37%	\$14,299
Total Request to the U.S. Fish & Wildlife Service		\$78,219
Matching Contributions	SDZG agrees to match one month benefitted salary for the Director of Conservation Education, Maggie Reinbold	\$11,802