COUNTY OF SANTA CRUZ

FISH AND WILDLIFE ADVISORY COMMISSION

701 OCEAN STREET, ROOM 312, SANTA CRUZ, CA 95060
(831) 454-3154 FAX: (831) 454-3128

AGENDA
November 2, 2017
7:00 PM
Board of Supervisors Chambers, Fifth Floor, 701 Ocean Street

1. CALL TO ORDER
2. ROLL CALL
3. INTRODUCE KRISTEN LEE, DISTRICT III COMMISSIONER (5 minutes)
4. PUBLIC PROPOSAL PRESENTATIONS
   A. Classroom Aquarium Education Program (CAEP)/Trout in the Classroom (TIC)- Santa Cruz-Monterey Bay Area Student Subunit of the American Fisheries Society
   B. Big Basin Nature Museum and Research Center Interpretive Exhibits- Mountain Parks Foundation
   C. Scott Creek Habitat Education and Trash Removal for Wildlife Protection- Save Our Shores
   D. Transportation for Ocean Stewards- O'Neill Sea Odyssey
   E. Wildlife Rehabilitation- Native Animal Rescue
   F. Conservation Outreach Program- Santa Cruz Predatory Bird Research Group, Long Marine Laboratory
   G. The Secret Life of Larval Fish- Katherine Dale, UCSC Ecology and Evolutionary Biology Department in conjunction with Seymour Marine Discovery Center
   H. Understanding Scott's Creek Hydrology- Cal Poly Corporation
   I. Exploring the San Lorenzo River- Santa Cruz Museum of Natural History and Coastal Watershed Council
   J. Engaging Strategic Partners in Community Ocean Conservation Outreach- California Marine Sanctuary Foundation
   K. Ivy Removal at Santa Cruz Long-Toed Salamander Ecological Reserve- CDFW
   L. Marine Science After-School Program- Pinniped Cognition and Sensory Systems Laboratory, UCSC Institute of Marine Sciences
   M. Sempervirens Watershed Curriculum Development- Exploring New Horizons
   N. Salmon and Trout Education Program (STEP)- Monterey Bay Salmon and Trout Project
   O. Watershed Conservation Hallway Display- Environmental Health Division of County of Santa Cruz Health Services Agency
5. APPROVAL OF MINUTES
6. BUSINESS MATTERS
   A. Discuss paying for indirect costs for Public Grants Program (10 minutes)
   B. Report on Cannabis Cultivation Ordinance draft EIR comments (15 minutes)
   C. Report on joint meeting with Commission on the Environment and Water Advisory Commission and discuss Climate Change priorities for FWAC (10 minutes)
   D. Update on Environmental Code Compliance (5 minutes)

7. PRESENTATIONS AND ANNOUNCEMENTS BY COMMMISSIONERS (10 minutes)
8. STAFF REPORTS/ANNOUNCEMENTS (5 minutes)

9. CORRESPONDENCE

A. Notice of proposed regulatory action re: recreational abalone regulations
B. Notice of proposed regulatory action re: use of Dogs to Pursuit/Take Mammals
C. Notice of proposed regulatory action relative commercial take of sea urchin
D. Notice of proposed regulatory action relative to sport fishing regulations

10. ADJOURNMENT

The County of Santa Cruz does not discriminate on the basis of disability, and no person shall, by reason of a disability, be denied the benefits of its services, programs, or activities. The Planning Department Conference Room is located in an accessible facility. If you are a person with a disability and require special assistance in order to participate in the meeting, please contact Kristen Kittleson at (831)454-3154 or TDD number (454-2123) at least 72 hours in advance of the meeting in order to make arrangements. Persons with disabilities may request a copy of the agenda in an alternative format. As a courtesy to those affected, please attend the meeting smoke and scent free.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. **Project name**
   Classroom Aquarium Education Program (CAEP)
   Also known as Santa Cruz Trout in the Classroom (TIC)

2. **Amount of funding requested**
   $2000

For each of the following sections, give a brief description:

3. **Project Description**

   Through a classroom experience of hatching fish eggs and coordinated activities, students experience first-hand the value of aquatic environments, the balance that must be met to maintain and preserve California's fisheries and aquatic habitats, and how their personal actions affect these valuable resources.

   Instructors and their students set up an aquarium in the classroom, receive fish eggs under a special CDFW permit, and observe the fish as they hatch and develop. The experience may culminate in a field trip to a local stream or river where the fish are released. This is a hands-on, interdisciplinary project for grades K-12.

   The Classroom Aquarium Education Project is offered statewide in partnership with regionally-based community organizations who serve as sponsors, in this case, the Santa Cruz-Monterey Bay Area Student Subunit of the American Fisheries Society (SCMBAS). SCMBAS will provide volunteer and financial support to the teachers, so they can focus on teaching watershed related concepts. SCMBAS will provide all the equipment needed and assign a "coach" who is responsible for assisting the teacher with permitting, tank set-up and operation, delivering eggs to the classroom, troubleshooting, and other help as needed.

   More information can be found at www.classroomaqurium.org.

   There is a 9-minute video, which provides an overview of the program. Commissioners are encouraged to watch this informative, fun, and heartwarming video as it provides an excellent overview of the values of this project.

4. **Project objectives and goals**
   - Inspire students to care about their local watersheds and native fauna.
   - Teach students observational science skills and about the biology of trout and salmon.
   - Help students recognize the contributions of hatcheries and wild fish programs to enhancement of the state's fisheries.

- Expose students to working "professionals" (SCMBAS members, City of Santa Cruz staff) who have pursued a career in fisheries biology.
- Provide teachers the opportunity to facilitate their own curriculum and experience due to the support of SCMBAS on equipment, egg delivery, and release.
- Allow teachers to benefit from local support from SCMBAS within the framework of CDFW's larger TIC program with ample resources.
- Promote public awareness of the need to maintain and protect aquatic habitats.
- Specifically,
    - Provide a teacher training workshop for how to successfully hatch and raise fish in the classroom with a certification system recognized statewide.
    - Provide access to program materials for the classroom and student use (either directly given or opportunities for reimbursement).
    - Prevent spread of disease to wild and hatchery trout populations.
    - Deliver eggs to classrooms.
    - Collaborate with teachers on in classroom teaching.
    - Help with release of eggs into local lake.
    - Deliver and store aquarium equipment.

5. Background and history of the problem

One of the most successful ways to inspire environmental stewardship is through hands-on experiences. The problem is that these hands-on experiences tend to be logistically and financially limited for many. The "Fish in the Classroom" programs are a solution that combines resources available at the agency level (fish hatcheries, permits, etc.) with teachers and classrooms via a local sponsor organization. In this way, students benefit from a vivid experience of raising trout eggs and releasing fry in their local watershed, which is made possible by the logistic and financial support of local sponsors and agencies.

"Fish in the Classroom" programs originated in British Columbia in the late 1970's. As a part of the new "environmental movement," classes hatched and released salmon as an educational endeavor. The success of the program allowed it to "migrate" south through Washington, Oregon and into California.

In the 1980's, a group of educators established the first programs that allow students to hatch fish in California. The program enjoyed explosive growth in the early days and has grown steadily since then spawned by the energy and enthusiasm of community partners, most of them fly-fishing clubs. The methods and technology have changed over the years but the basic premise of the program remains the same: students study local aquatic habitats and the life history of the chosen salmonid, operate a chilled aquarium in their classroom, and receive eyed-eggs from CDFW hatcheries to raise to the fry stage. The fish are released under permit into appropriate bodies of water within weeks.

Throughout the state, rainbow trout are the most commonly used fish, although salmon and steelhead are used where appropriate.

Santa Cruz County hosted a vibrant and growing program hosted by the Monterey Bay Salmon And Steelhead Education Program (MBSTEP) until a combination of the drought and hatchery related issues made it impossible to utilize steelhead from a local hatchery. While native rainbow trout eggs were made available through the Department of Fish and Wildlife, the local sponsor opted to not support any teacher hatching rainbow trout and eventually ended their participation in this program in 2015.

The student-run American Fisheries Society Subunit in Santa Cruz (SCMBAS) stepped in in 2016 to fill the sponsor role serving Santa Cruz County teachers. SCMBAS helped deliver eggs to the two remaining classrooms participating in the TIC program.

In 2017, SCMBAS, in conjunction with the City of Santa Cruz and CDFW, is hoping to expand the program to support up to 10 new local teachers and their classrooms. To achieve this, we are requesting funding to obtain the necessary aquarium equipment to provide to the teachers at no cost. Materials include an insulated tank, chiller, filters, and related equipment along with curriculum, posters, and other support materials. In addition, we would like to have funds available to offer each teacher the opportunity be reimbursed for up to $100 for classroom materials to enhance their class study of fish and habitats.

6. How will the project be accomplished (design specifications or plans, if applicable)

All teachers (2) currently certified in this program in Santa Cruz will be allowed to participate.

In addition, a certifying workshop will be offered early winter in Santa Cruz to train new teachers. This workshop will meet the minimum training standards set by CDFW to allow a teacher to apply for a permit to hold, transport, and release fish (form 772 permit).

SCMBAS will act as a sponsor providing direct service to classes including equipment and egg delivery, assistance with fish care, and educational collaborations. The City of Santa Cruz staff at Loch Lomond Reservoir provides additional coordination and educational programs for the release of fry.

The requested funding will provide support for 10 new teachers to participate in the program.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Incubation tanks (complete set) detailed list of components available upon request	$3000 *($300 per tank set up x 10 new teachers = $3000)*		$3000
Classroom educational materials	$1000 *($100 x 10 new teachers=$1000)*		$1000
Teacher time (teaching lessons, maintaining aquaria, etc.)		$11,250 *($1125 x 10 teachers = $11,250)*	$11,250
AFS member time (deliver eggs, teach in classroom, release eggs)		$1000 *($20/hr x 10 hrs x 5 members = $1000)*	$1000
City of Santa Cruz Loch Lomond staff (release eggs)		$1200 *($30/hr x 2 hrs x 10 classrooms x 2 staff = $1200)*	$1200
City of Santa Cruz Funding contribution	-$2000		
TOTAL AMOUNTS	$2000	$13,450	$17,450

8. Timeline for completion

January 2018	AFS members purchase and assemble aquarium equipment
February 2018	Teachers set up tanks in classrooms
February 2018	Teachers begin implementing watershed curriculum
March 2018	AFS members deliver eggs to classrooms
May 2018	Teachers release fry in local waterbodies (AFS members and City of Santa Cruz assist in release)
May 2018	AFS members help teachers return permits to CDFW

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

9. Background or history of your organization

The Santa Cruz-Monterey Bay Area Student Subunit (SCMBAS), is a student-led chapter of the larger organization of the American Fisheries Society (AFS). Our student subunit was founded in 2015, and has engaged in a variety of professional development, outreach, and service activities. For example, SCMBAS has led San Lorenzo river clean ups, participated in invasive species removal at Loch Lomond, supported travel to fisheries conferences, hosted speakers, and developed and executed education programs on watershed health and seafood fraud with Harbor High School. Our group is comprised of graduate students and other local fisheries professionals.

We are very excited to be involved with Trout in the Classroom because it provides us the opportunity to connect with local teachers, CDFW, and the City of Santa Cruz to cumulatively get to share our passion for fish and the aquatic environment. SCMBAS is looking forward to bringing our personal experiences as biologists and researchers to local students that may be considering similar careers, and additionally we are excited to pursue ways to incorporate actual scientific research and the scientific method into curriculum!

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name

   Big Basin Nature Museum and Research Center Interpretive Exhibits

2. Name of organization or individual submitting the proposal

   Mountain Parks Foundation

3. Amount of funding requested

   $2,000

For each of the following sections, give a brief description:

4. Project Description

   We believe the best way to encourage environmental stewardship is to offer an interactive natural education experience in which visitors can learn about Big Basin's unique ecosystem first-hand. Our new exhibits will utilize interactive technology and contemporary design in order to more effectively engage today's museum audience.

   Visitors will be invited to assume the identity of a native park animal, plant or tree and venture through the interactive exhibits, learning about their alter ego's habitat, food sources, natural predators, and current chances for survival. Guests will learn about scientists who have studied and protected Big Basin for over a century, as well as the latest research currently sponsored in the park, including studies on the effects of climate change on redwood trees, the effects of the drought on the area's fern population and the diet of the native jays of the forest. Additional research will be presented about the threatened species of the park, such as the Marbled Murrelet and California mountain lion and the management and protection of native plant species including the many delicate wildflowers that grow in the park.

   In addition, visitors will share their own learning experiences through the "Citizen Science Lab" component, helping to solidify personal ownership of their newfound knowledge. As a result of both of these experiences, visitors will have a much deeper awareness of the park environment and how they can impact the ability of a species to thrive.

   The museum will house a Wi-Fi hotspot in the park and, as such, will attract many visitors seeking to use their personal electronic devices. The Wi-Fi component will give them an opportunity to interact with the park and natural history of the area via their devices.

   The Big Basin Nature Museum and Research Center hosts everyone from toddlers to seniors—multi-generational families and K-12 students participating in 51 school

programs. In 2016, over 25,000 visitors entered the museum and/or visitor center and 1,200 students attended on-site school programs.

5. Project objectives and goals

   Our first goal is to inspire visitors to become stewards of the great biodiversity within the Santa Cruz Mountains through an immersive and interactive educational experience centered on the wonders and vulnerability of Big Basin's unique ecosystem. Upon completion of the new interpretive exhibits, we expect that users concluding their tour of the museum will have gained a better understanding of and interest in the park's natural environment, and how they can impact the ability of a species to survive and thrive.

   Another goal of the renovated museum is to better serve all user groups by showcasing new exhibits in ways that will engage and build relevancy with the changing needs and interests of the next generation. The project will include integrated amenities, such as a public Wi-Fi hotspot, in order to encourage visitors to linger and socialize while gaining a deeper knowledge of the park's resources and stewardship goals.

   Whether our guests are stimulated to acquire knowledge through technology, hands-on learning experiences, new scientific studies, or prefer to contribute their own empirical findings, we seek to engage them at every level in order to drive their desire toward further exploration and discovery of the park's environment. As a result, we expect visitors will become more aware of the need for environmental preservation and be more apt to become stewards of their parks, as well as the great biodiversity within the Santa Cruz Mountains and beyond.

6. Background and history of the problem

   In 2013, the California Association of Museums (CAM) and partner organizations identified several "critical issues" for the state's museums including: "the lack of opportunities to collaborate on marketable, high quality exhibits and programs, expansion of engagement and public access to respond to changing demographics, restraints on education affecting museum and school learning programs, and the lack of infrastructure and know-how to participate fully in the digital world," among others.

   According to a Big Basin Nature Museum Visitor Survey conducted in 2015, visitors said they would like the museum to have a brighter atmosphere, more animal-related content, and more hands-on opportunities with varied information delivered via media such as videos, audio and device applications. 62% of respondents expressed a desire for on-site internet access to connect with more information about things they'd learned at the museum. More than three-quarters of the respondents stated they would like to learn more about how to "make a difference" in preserving and protecting nature and the environment.

   In an effort to resolve the issues addressed above, the primary purpose of creating new interpretive exhibits at the Big Basin Nature Museum and Research Center is to entice

visitors into an immersive experience that engages and stimulates their interest in a way that appeals to them. As a result of the new interactive exhibits and technology designed to enhance education and deepen understanding of the flora and fauna of Big Basin, visitors will gain a new awareness of the need for environmental conservation and the important role they play in determining the futures of the park's inhabitants.

7. How will the project be accomplished (design specifications or plans, if applicable)

The Museum exhibit upgrade project will be executed in accordance with planning efforts underway since 2014. Planning related to the exhibit design, fabrication and installation, includes the following:

- A needs assessment, including site visits, collections assessments and public surveys, was conducted to determine deficiencies with the current exhibits and the improvements desired for design, fabrication and placement of the upgraded exhibits.
- The criteria for the core project management team was identified and California State Park and Mountain Parks Foundation staff members were selected according to their experience and expertise related to the needs of the project in order to successfully oversee all aspects from planning through completion. A separate exhibit design committee was assembled to shape the exhibit design guidelines and craft the exhibit fabrication and installation Request For Proposal.
- A detailed assessment of financial capacity was completed along with a comprehensive project budget, verifying currently available financial resources and adequate cash flow, identifying additional funding sources, and initiating the hiring of a consultant needed to help build a solid fundraising plan to raise the additional funds required.
- A timeline was produced based on experience with previous projects of comparable size and scope and the project manager was tasked with tracking all project activities and their attendant costs in order to meet each milestone toward completion.
- An exhibit fabrication and installation vendor will be selected and contracted based on a thorough evaluation of vendor proposals in order to ensure competent design, craftsmanship, and ability to meet project specifications, timeline and costs. A specific and detailed cost projection will be created based on the selected vendor’s estimates and will not exceed the project budget.
- Throughout the design, fabrication and installation of the exhibits, exhibit committee members and the project management team will review designs, make adjustments, and monitor work in progress to ensure adherence to the project’s specifications and planning documents.
- After completion of the installation of the exhibits, a series of final inspections will occur and any necessary modifications will be made, followed by the project’s public unveiling and completion celebration.

Grant funding will be directed exclusively toward the design, fabrication and installation of new Museum exhibits.

8. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

   See Attached "EXHIBIT A — BBNMRC Project Budget"

9. Timeline for completion

   See Attached "EXHIBIT B — BBNMRC Project Timeline"

10. Background or history of your organization

    Founded in 1973, Mountain Parks Foundation (MPF) is one of the first Cooperating Associations to work in partnership with California State Parks. MPF began by supporting educational and interpretive programs at Big Basin and Henry Cowell Redwoods State Park and, in 1974, implemented a comprehensive training program for new State Park docents.

    Robust growth throughout the 1980s resulted in increased funding for new programs and cultural history events (including Ohlone Day which is now in its 31st year) and a new Nature Center at Henry Cowell. MPF also renovated Henry Cowell's concessionaire's building, a structure previously slated for demolition. This building now houses the Nature Store, MPF administrative offices, and State Park work spaces.

    MPF, which is a non-profit, 501(c)(3) organization, signed a concessionaire's contract in 2008 to operate the Nature Store at Henry Cowell. In this expanded role, MPF continues to leverage community support to provide funding to sustain educational and interpretive programs at Big Basin and Henry Cowell.

EXHIBIT A

Big Basin Nature Museum & Research Center Interpretive Exhibits
Project Budget
January 1, 2017 through May 31, 2019

Project Element	Project Expenses	Amount Requested from County of Santa Cruz FWAC	
Project Management (salaries & benefits)	$ 136,547		
Planning (visitor survey)	$ 6,500		
Exhibit Design	$ 132,000		
Exhibit Fabrication & Installation	$ 311,000	**$ 2,000**	
Donor Recognition Signage	$ 1,500		
Contingency Fund	$ 40,000		
TOTAL EXPENSES	**$ 627,547**	**$ 2,000**	
Revenues	**Committed**	**Pending**	**TOTAL**
Contributions, Gifts, Grants, & Earned Revenue			
CA State Parks	$ 139,047	$ -	
Mountain Parks Foundation	$ 117,500	$ -	
California State Parks Foundation	$ 3,000	$ -	
Sempervirens Fund	$ 10,000	$ -	
Clif Bar Foundation	$ 3,500	$ -	
Save the Redwoods League	$ -	$ 41,000	
Joseph & Vera Long Foundation	$ 40,000	$ -	
Monterey Peninsula Foundation	$ 20,000	$ -	
Dean Witter Foundation	$ 25,000	$ -	
Hastings/Quillin Fund	$ 73,500	$ -	
CA Natural Resources Agency CCHE Museum Grant	$ -	$ 100,000	
Lagunitas Brewing Company		$ 5,000	
County of Santa Cruz FWAC	**$ -**	**$ 2,000**	
Individuals	$ 41,600	$ -	
In-Kind Support	$ 6,400	$ -	
TOTAL REVENUES	**$ 479,547**	**$ 148,000**	**$ 627,547**

EXHIBIT B — BBNMRC Project Timeline

BENCHMARK 1 – PLANNING. ADMINISTRATION & PRE-CONSTRUCTION ACTIVITIES				
Activity	**Task**	**Entity Performing Task**	**Start**	**Completion**
Needs Assessments, Surveys, Planning	Confirm Project Commitment / Priority with Santa Cruz District	California State Parks	1/2014	**COMPLETED** 1/2014
	On-Site Project Scoping Meeting	California State Parks and Mountain Parks Foundation	5/2014	**COMPLETED** 5/2014
	Collections Assessment	California State Parks	8/2014	**COMPLETED** 8/2014
	Obtain Cost Estimate: Exhibit Design, Fabrication & Installation	California State Parks	8/2014	**COMPLETED** 1/2015
	Interpretive Exhibit Planning & Concept Level Design	California State Parks and Mountain Parks Foundation	11/2016	**COMPLETED** 6/2017
	Obtain Cost Estimate: Historic Building Improvements	California State Parks	8/2014	**COMPLETED** 1/2015
	Obtain Additional Cost Estimate: Historic Building Improvements	California State Parks / Mark Plainfield Construction, Inc.	4/2015	**COMPLETED** 4/2015
	Retain consultant to build fundraising capacity for project	Mountain Parks Foundation	2/2014	**COMPLETED** 11/2015
Develop Project Goals, Objectives, and Action Steps	Create Project Vision Statement	California State Parks and Mountain Parks Foundation	2/2014	**COMPLETED** 3/2014
	Create Project Budget	California State Parks and Mountain Parks Foundation	1/2015	**COMPLETED** 8/2015
Stakeholder Meetings and Public Outreach	Conduct Visitor Survey #1	Mountain Parks Foundation	7/2014	**COMPLETED** 9/2014
	Create Public Communications & Outreach Plan	Mountain Parks Foundation	6/2015	**COMPLETED** 12/2015
	Conduct Visitor Survey #2	California State Parks	7/2015	**COMPLETED** 12/2015
Develop architectural	Create 30% schematic drawings	California State Parks	8/2014	**COMPLETED** 1/2015

plans, design specifications, property appraisal, etc.	Create 100% Architectural Plans	Brett Brenkwitz, Architect, Franks Brenkwitz & Associates	6/2016	**COMPLETED** 6/2017
	Complete Mechanical Design	Airtec Service	1/2017	**COMPLETED** 4/2017
	Create Electrical Plan	Electrical Contractor	10/2018	12/2018
	Develop RFP for Exhibit Design	California State Parks	7/2017	**COMPLETED** 11/2017
	Hire contractor for Exhibit Design	California State Parks	11/2017	1/2018
	Exhibit Design: Preliminary Plan Phase	Contractor for Exhibit Design	2/2018	5/2018
	Exhibit Design: Working Drawing Phase	Contractor for Exhibit Design	6/2018	9/2018
Complete Environmental Review	Complete CEQA and Provide Compliance Documents	California State Parks	5/2015	**COMPLETED** 6/2016
Secure / Finalize all funding	Verify Match Funding is Secured	Mountain Parks Foundation	7/2017	**COMPLETED** 7/2017
	Finalize Project Fundraising Plan	Mountain Parks Foundation	2/2015	**COMPLETED** 12/2015
	Fully Execute Fundraising Plan	Mountain Parks Foundation	1/2016	2/2018
Finalize all Agreements, MOUs	Finalize Project Partnership Agreement	California State Parks and Mountain Parks Foundation	4/2015	**COMPLETED** 9/2015
State review of the above	Install Temporary Grant Recognition Signage	California State Parks	8/2018	10/2018
	Install Permanent Grant Recognition Signage	California State Parks	1/2019	4/2019
BENCHMARK 2 - CONSTRUCTION & IMPLEMENTATION				
Activity	**Task**	**Entity Performing Task**	**Start**	**Completion**
Bid and Award Contracts	Hire Contractor for Building Improvements	California State Parks	9/2017	2/2018
	Hire Contractor for Exhibits Fabrication & Installation	California State Parks	6/2018	7/2018
	Hire Contractor for Electrical Work	California State Parks	9/2018	10/2018
Demolition and Site Preparation	Remove old exhibits, carpeting, T-Bar ceiling panels, forced air heating, lights	Contractor for Building Improvements	1/2018	4/2018

Construction, Fabrication, Acquisition Escrow, etc.	Complete interior construction; finish flooring, ceiling, walls, trim & baseboard	Contractor for Building Improvements	4/2018	1/2019
	Fabricate museum exhibits	Contractor for Exhibit Fabrication & Installation	9/2018	1/2019
Installations	Install outlets, HVAC and associated materials, lighting, windows & doors	Contractor for Building Improvements	12/2018	3/2019
	Install museum exhibits	Contractor for Exhibit Fabrication & Installation	1/2019	4/2019
	Complete finish work/touch-ups	Contractor for Building Improvements	3/2019	4/2019
Inspections	Items on final checklist completed and signed off.	California State Parks	2/2019	4/2019
BENCHMARK 3 - COMPLETION & CLOSEOUT				
Activity	**Task**	**Entity Performing Task**	**Start**	**Completion**
Completion of the Project, Celebration Event	Grand Opening Reception; Ribbon Cutting Ceremony Photos; Media Coverage; Donor Recognition.	California State Parks and Mountain Parks Foundation	4/2019	5/2019
Closeout Site Visit and Final Documentation to State	Prepare Documentation of Completion; Site Visit.	California State Parks	4/2019	6/2019
BENCHMARK 4 - OPERATIONS & MAINTENANCE				
Activity	**Task**	**Entity Performing Task**	**Start**	**Completion**
Ongoing Operations and Maintenance	Develop and Implement Housekeeping & Ongoing Maintenance Plans	California State Parks	1/2019	5/2019

County of Santa Cruz Fish and Wildlife Advisory Commission
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1. Project name

   Scott Creek Habitat Education and Trash Removal for Wildlife Protection

2. Name of organization or individual submitting the proposal

   Save Our Shores

3. Amount of funding requested

   $2,000

For each of the following sections, give a brief description:

4. Project Description

   With Funding from the County of Santa Cruz Fish and Game Advisory Commission, Save Our Shores will conduct a comprehensive trash removal project at Scott Creek. Scott Creek lagoon is an important habitat and hatchery for threatened Steelhead and endangered Coho Salmon and a wintering population of the threatened Western snowy plover. The salmon populations there was critically impacted by four years of drought, but saw a resurgence in 2015 as the result of a collaboration between NOAA, California Fish and Wildlife and the Monterey Bay Salmon and Trout Project. The collaboration's primary outcome was altering the juvenile release practice that was in place at Scott Creek from a once a year event to weekly releases at intervals from late March to early May. This pattern more closely mimics historical patterns and spreads the risk of mortality by increasing the likelihood that more juveniles enter the ocean when conditions are most favorable for their survival and growth.

   This modification increased survival rates during the spawning and release phase of the fishes' life cycle, however, when the Steelheads and Coho Salmon return to Scott Creek they still encounter multiple natural predators, which continue to affect the species' recovery rates. Given Scott Creek's proximity to the Santa Cruz Landfill and Año Nuevo Island, there is a relative abundance of and pressure from gulls, ravens, and skunks who regularly feast on both the fish and plovers. These generalist predators are attracted to the area by the volume of trash that builds up in the recesses of the Creek and its lagoon. The pressures from these predators are likewise felt on the dunes and sandy beach habitat of Scott Creek by a modest population of Western snowy plovers; a population which has not seen a successful nesting pair at Scott Creek in years.

   Save Our Shores conducts periodic cleanups of Scott Creek. Over the past nine years

we've involved 100 people in over 11 cleanups and removed 167 combined pounds of trash and recycling. This level of effort is not sufficient to deal with the impact. Funding from the County of Santa Cruz Fish and Game Advisory Commission will allow us to conduct at least four comprehensive cleanups of Scott Creek in a one year period. We will schedule the cleanups in collaboration with the Salmon and Trout Project group to ensure optimal timing and therefore optimal results.

Additionally, we will collaborate with the Pacific School in Davenport, CA to conduct marine ecology, fish/bird habitat, and specifically endangered trout and salmon life cycle education sessions to be followed by hands on experiential field trips to Scott Creek. The field trips will be conducted in conjunction with the cleanups to provide local students a firsthand opportunity to understand fisheries and shorebird conservation and the role trash and plastic pollution plays in endangering key species. We plan to work with the Pacific School as students from the Scott Creek watershed and surrounding areas are among the student population.

5. Project objectives and goals

Save Our Shores' primary objective for this project is to positively impact Steelhead, Coho Salmon, and Western snowy plover habitat and increase the survival rate of species by removing accumulated trash from the Creek. The trash attracts concentrated numbers of avian and mammalian predators whose population in the area is subsidized by the Dimeo landfill and human use and garbage at local beaches. A secondary, although equally important goal, is to educate local students about the importance of Scott Creek as fish and bird habitat and the impact trash has on threatened trout and plover and endangered Coho. Specific goals include:

1. Remove all visible and accessible trash from the Creek, beach, and surrounding watershed to decrease the trash attraction to predators.
2. Educate over 100 students about Scott Creek's value as a functioning ecosystem, a trout and salmon spawning ground, a sandy beach habitat for shorebirds, and the impact trash can have on the environment and the survival of species.
3. Connect students to their local landscape and watershed to inspire backyard stewardship among the students, families, and staff/faculty of Pacific Elementary.
4. Collaborate with staff from National Marine Fisheries Service, Carleton Eyster of Point Blue Conservation, Portia Halpert of CA State Parks, etc. to meet and speak to students on field trips about these different ecosystem dynamics and important role of trash abatement, coastal stewardship, predator management, etc.
5. Utilize our data collection process (discussed in Section 6) to measure results of the project and share information with local and regional scientists and policy makers.

6. Background and history of the problem

Scott Creek flows through redwood groves and meanders past stands of alder and willow on its way to meet the Pacific Ocean. The shady stream is home to populations of Steelhead and Coho Salmon, which are federally listed as threatened and endangered, respectively. To better conserve these populations, scientists have taken a keen interest in how the fish use their habitat. They've found that the estuary at the mouth of Scott Creek, while making up just 5% of the total stream area, plays an oversized role in contributing to steelhead survival, and likely may have historically benefited Coho as well. As the creek makes the connection with the Pacific it snakes through sandy beach and coastal dune habitat where a modest population of Western snowy plovers reside.

Fish that rear in this lagoon, where the water is warm and the feeding is quality, bulk up much faster than their counterparts that rear upstream in the watershed. Estuary fish nearly double in size during their summer in the lagoon, and enter the ocean at a larger size than upstream-reared fish, giving them an edge in the ocean's fish-eat-fish world. Although less than half of the steelhead juveniles migrating downstream take advantage of the estuary for rearing, these fish make up the vast majority (87-95%) of the survivors that return to the watershed as adults.

According to Sean Hayes, a co-investigator on a recent Sea Grant project studying the effects of predators on endangered fish species in California central coast streams and estuaries, an unusual high number of birds and other wildlife predators are making the 200 or 300 meters leading to the Scott Creek estuary more dangerous to trout and salmon than the dangers found in the open ocean. The fish are literally being scooped out of the Creek before they enter the ocean.

Gulls, ravens and skunks, in particular, are feasting on fish and plovers as they rummage and consume abandoned trash. Tagging and tracking studies show these predators make frequent trips to the Santa Cruz landfill. This virtually endless supply of easily accessible human-waste appears to be artificially increasing predator populations and, by extension, opportunistic predation on young Steelhead, Salmon, and Plovers. As Point Blue Conservation ecologist Carleton Eyster asserts "the Common raven population associated with increasing human use and garbage has been largely responsible for effective extirpation of breeding on the northern Santa Cruz County coastline".

Jon Ambrose, a NOAA Fisheries biologist who is involved with Central California Coho Salmon recovery and familiar with the Sea Grant project referenced earlier, has concluded that although "it is not sexy, trash management could be a good thing for salmon." Trash management coupled with educating local youth, who will become the next generation stewards of California central coast's creeks, streams and other waterways which serve as critical habitat for endangered fish species, is precisely what the Save Our Shores project is all about.

7. How will the project be accomplished (design specifications or plans, if applicable)

   Save Our Shores has more than a decade of experience removing trash from California's central coast and the rivers, streams, and creeks that flow into the Monterey Bay National Marine Sanctuary. We also have decades of experience delivering high quality, alternative marine ecology education programs in schools across Santa Cruz and Monterey Counties. These programs almost always include an experiential learning such as field trips that involve exploration of our natural resources, wildlife habitats, shorelines, and/or watersheds. Many of these field trips incorporate educational cleanups that teach students the impact that trash and debris can have on the natural environment and wildlife.

   Before conducting any shore or watershed cleanup, Save Our Shores staff ensures volunteers and students are familiar with the landscape of the designated cleanup site. This includes information about species habitat and threats to those habitats. Safety is another critical factor and we ensure all volunteers and particularly students are aware of potential hazards such as sneaker waves along the coast, debris dams along river and creek beds, poison oak growth, bacterial growth, etc. All volunteers and students on fieldtrips are provided safety gloves and instructed not to remove sharps and other hazardous materials, which only Save Our Shores staff and trained stewards handle. Cleanup volunteers and students are also provided with trash grabbers and separate containers for landfill materials and recyclables. Students are carefully monitored by staff and adult volunteers and we ensure an adequate adult to child ratio. Post cleanup, volunteers and students are asked to reflect on the experience, compile cleanup data, and discuss lessons learned.

   Save Our Shores also conducts comprehensive data collection during cleanups. Traditionally we've used a customized data card to record type and quantity of items found. More recently we've launched a mobile app that automates the process and improves data tracking as the data uploads directly to our database vs. being manually entered by staff or interns with greater potential for human error.

   Data collected during Scott Creek cleanups conducted during this project will be reported to County of Santa Cruz Fish and Wildlife Advisory Commission and can be disseminated to community members, agencies, and organizations as requested or needed.

8. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Staff Time including student education sessions and trash removal fieldtrips, reaching 100 students	$1,500	$750 from donor support	$1750
Supplies and education materials	$300	$300 from donor support	$600
Overhead (primarily IT services, phones and printing)	$125	$200 from donor support	$325
Mileage to and from Pacific Elementary/Scott Creek Beach	$75	$75 from donor support	$150
TOTAL AMOUNTS	$2000	$1325	$2825

8. Timeline for completion

   Save Our Shores anticipates completing this work over a six to nine month period. Best start date would be March 2017, but we can adjust the schedule based on date of award. All work should be able to be completed in the 2017 calendar year. We will conduct education programs and cleanups approximately every six weeks.

9. Background or history of your organization

   Save Our Shores is a 501(c)3 nonprofit marine conservation organization in Santa Cruz, California. Our mission is caring for the marine environment through ocean awareness, advocacy, and citizen action. Over the last 30 years, Save Our Shores has been responsible for key accomplishments such as preventing offshore oil drilling in Central Coast waters, helping to establish the Monterey Bay National Marine Sanctuary, preventing local cruise ship pollution, and bringing together diverse stakeholders to find common solutions to ocean

issues.

In 2017 we launched our Vision 2025, which focuses on creating and stewarding the three most critical conditions for a thriving Monterey Bay National Marine Sanctuary (MBNMS), i.e., Clean Shores, Healthy Habitats and Living Waters. Strategies for accomplishing our vision include:

- Educating youth about our watersheds
- Tackling plastic pollution on our beaches and rivers
- Managing Annual Coastal Cleanup Day in Santa Cruz and Monterey counties
- Running our nationally renowned Dockwalker program
- Celebrating the diversity of wildlife that make the MBNMS home
- Promoting understanding of the MBNMS' critical habitats, collaborating on habitat restorations programs and educating our local communities and visitors about the impact climate change is having on our Sanctuary including ways we can all make better everyday decisions to decrease our carbon footprint
- Providing our community with educated and inspired Sanctuary Stewards

The following graphic depicts how we pursue and accomplish our mission.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name: Transportation for Ocean Stewards.

2. Name of organization or individual submitting the proposal: O'Neill Sea Odyssey.

3. Amount of funding requested: $2,000.

For each of the following sections, give a brief description:

4. Project Description: Transportation for Ocean Stewards will enable Santa Cruz County classes that want to participate in O'Neill Sea Odyssey (OSO)'s free, ocean-going science and environment field trip can in fact do so by receiving support for bus transportation from their school to OSO's facility at the Santa Cruz Harbor.

5. Project objectives and goals: The goal of this project is to support at least two Santa Cruz County classes with bus transportation funding. O'Neill Sea Odyssey engages 4th - 6th grade youth with an education program in navigation, sailing, conservation, and marine science on a 65-foot catamaran sailing Monterey Bay, and in a shore-side education center. Along with free, ocean science curriculum for their classroom. The program is free, and each group completes a community service project. *Our mission is to provide a hands-on educational experience to encourage the protection and preservation of our living sea and communities.* Over 94,000 youth have been served.

6. Background and history of the problem: Although O'Neill Sea Odyssey's field trip itself is free of charge, the cost of bus transportation has become an obstacle to participation in OSO by many schools. School classes that would receive bus scholarships are selected based on their income status as determined by their eligibility for USDA's free and reduced cost lunch program, their ability to pay for a bus, and whether they will actively seek the best possible price for one. Bus transportation is effective in the recruitment of classes to participate in our program, and in removing a barrier to ocean-going, environmental learning for youth. In the 2015-16 school year, 78 bus transportation scholarships were provided out of 205 classes served, for a total cost of over $41,000. The pressure on OSO's transportation fund continues. O'Neill Sea Odyssey has been successful at encouraging classes from the same school to come on the same day and share a bus, saving money.

7. How will the project be accomplished: Education Coordinator Walker schedules 200-210 classes per year. To qualify for the scholarship, the school class will be required to send a letter or email to the Education Coordinator showing evidence that: 1) the teacher will in fact be required to pay for the bus needed to transport students and how much the bus will cost, 2) the teacher will actively make an effort to keep the cost as low as possible, and 3) there are no other sources of funding for bus transportation available to that class. Based on these factors, the classes to receive scholarships will be selected.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total
Transportation for Ocean Stewards	$ 2,000	$ 5,200	$ 7,200
TOTAL AMOUNTS	$ 2,000	$ 5,200	$ 7,200

Funds requested are for bus transportation. The match contribution is the operational cost for OSO to serve 2 school classes, or up to 70 students.

8. Timeline for completion: Between March 1, 2018 and March 1, 2019.

9. Background or history of your organization: O'Neill Sea Odyssey (OSO) engages 4th - 6th grade youth with an ocean-based educational field trip and curriculum for their classrooms to achieve educational standards using ocean concepts, while teaching youth about watersheds that flow to the sea and their responsibility to protect them. Classes apply online at http://oneillseaodyssey.org. The program is free and each class completes a community service project. The area of service includes the Monterey and San Francisco Bay areas. Founded in 1996, in 2004 OSO received the California Governor's Environmental and Economic Leadership Award, in 2005 US Senator Barbara Boxer provided her Environmental Champion award and in 2013 the Silicon Valley Business Journal bestowed its Community Impact Award. In 2009, OSO's Adam Webster Memorial Fund received the Community Spinners award for its work with special needs youth. Having served a total of 94,281 students, OSO is on track to achieve a total of 100,000 total served by the end of 2018, pursuant to our 2013-2018 Five Year Strategic Plan. O'Neill Sea Odyssey is currently undertaking its "100,000th student campaign" to increase social media and online involvement, at https://www.oso100k.org/.

County of Santa Cruz Fish and Game Advisory Commission

GRANT APPLICATION 2017

1. Project name

   Wildlife Rehabilitation

2. Amount of funding requested

$2,000 (7.4% of Direct Costs for Wildlife Rehabilitation)

For each of the following sections, give a brief description:

3. Project Description:

   Treatment and rehabilitation of injured, sick and orphaned native animals of Santa Cruz County, with the ultimate goal of release back into the wild.

4. Project objectives and goals:

   NAR provides the community with a place to bring injured and orphaned wildlife. Experienced rehabbers care for the animals (around the clock when necessary) until the animals are ready to be released back to their natural habitat. NAR strives to have a high release rate.

5. Background and history of the problem:

   Native animals are injured and orphaned mainly by the actions of people and their pets. When people find an animal that needs help, they are glad to know they can bring it to NAR where experienced rehabbers will take care of it. Rescue volunteers also pick up distressed animals and transport them to our center.

6. How will the project be accomplished (design specifications or plans, if applicable):

   NAR provides an emergency room/intake center open 7 days a week from 8am to dark. Since animal technicians live on the property, animals are often received after hours as well. Animals are evaluated on arrival and their injuries treated. The animal's care and treatment plan is determined, including a specialized diet specific to their species and age. Many animals are cared for at our intake center, while some receive care offsite by rehabbers knowledgeable about a specific species. The animals are cared for until they are deemed capable of living in the wild, and then are released to a suitable habitat. Several veterinarians provide services to NAR when needed, for free or for a nominal cost. We do have to pay for vaccinations and medications. NAR works directly with 911 emergency, local law enforcement, lifeguard, animal services and park personnel, who bring animals in response to phone calls.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Food costs for wildlife	1,525	19,075	20,600
Medication and vet service	295	3,705	4,000
Wildlife Supplies	180	2,220	2,400
TOTAL AMOUNTS	$2,000	$25,000	$27,000

Native Animal Rescue appreciates the support we receive from the Santa Cruz County Fish & Wildlife Advisory Committee. As costs continue to go up it's great to receive additional funding to support our work. As in years past, food is our greatest expense. We have seen an increase in baby mammals from last year and powdered formula is expensive, especially since each species requires its own specialized type. Frozen rodents for our raptors is also a big expense. The public has supported us with fruit over the summer when we post appeals but we still need to purchase bird seed and meal worms for our huge number of orphaned songbirds and nuts and cat food for our juvenile mammals.

Three veterinary centers donate exams to our most seriously wounded patients but we pay for X-rays and medications. Antibiotics are of great importance in treating cat-caught animals.

We constantly need consumable products such as cardboard transfer boxes, laundry & cleaning supplies, and paper products such as TP & paper towels.

Where our match contribution comes from:

Vincent J. Coates Foundation Grant	$8,000
New Leafe Markets (enviro-tokens for bags)	$4,000
City of Santa Cruz	$3,600
City of Capitola	$1,200
General Public donations	$8,200
Total	**$25,000**

8. Timeline for completion

   Requested funding is for one year.

9. Background or history of your organization

   Since 1980, Native Animal Rescue (NAR) has treated between 1,300-2,700 animals every year. NAR is the only organization in Santa Cruz County licensed by the CA Department of Fish and Wildlife, and the U.S. Department of Fish and Wildlife to rehabilitate wild animals from this area. Trained staff and volunteers answer phone calls, rescue, intake, assess, and rehabilitate animals, both at our main intake center and several offsite foster homes. NAR also provides educational displays and talks at events and in classrooms, stressing how we can coexist peacefully with the wildlife in our area. NAR has training workshops on both rescue and rehabilitation procedures. We are actively engaged in media outreach through e-newsletters, Facebook and our website: www.nativeanimalrescue.org. Our website gives instruction on handling of distressed wildlife, as well as other wildlife resources. NAR produces two printed newsletters a year (see attached newsletter) and other informative flyers. NAR receives funding form the general public, foundations, trusts, local and state governments.

and the success of the project. If the grantee submits a new request for funding, a progress or completion report must be submitted by August 15th of that year. If the grantee does not plan to request other funding, a progress or completion report must be completed within a year of receiving the funds.

1. Project name

Santa Cruz Predatory Bird Research Group Conservation Outreach Program

2. Name of organization or individual submitting the proposal

Zeka Glucs, UC Santa Cruz Predatory Bird Research Group

3. Amount of funding requested

We respectfully request **$1000** from the County of Santa Cruz Fish and Wildlife Advisory Commission in support of the UC Santa Cruz Predatory Bird Research Group (via the UC Santa Cruz Foundation).

For each of the following sections, give a brief description:

4. Project Description

Environmental sustainability and the conservation of nature are important topics in schools, universities, and among members of the public via news accounts. We provide a concrete example of conservation success in the restoration of the Pacific States peregrine falcon population. It shows how a group of young, dedicated university students, faculty, and staff members used scientific methods to repair environmental damage and save a species from extinction, and essentially, to change the world. We support that story by visiting schools, providing live nest cameras, and participating in an on-going question and answer commentary to explain what students, teachers, and members of the public see on the nest camera as the season progresses. And we support and update the story with current research on the success of the California peregrine falcon population.

5. Project objectives and goals

Baseline Research: Long term monitoring allows us to identify trends over time in the peregrine falcon population.

Provide Link between Members of the Public and the Scientific Community: We interpret science for volunteers and members of the public through our nest cams, online presence, and speaking engagements.

Connecting People to Nature: Our nest cams provide easy access to observe the natural process of falcon reproduction from anywhere in the world. We recruit students and citizen scientists to join us on site to monitor peregrine falcons in their natural habitats.

Promoting Careers in Science: Through our university course and internship program we provide aspiring raptor researchers with foundational wildlife monitoring experience and skills.

6. Background and history of the problem

The need among children and adults for a very positive example of conservation success has probably never been greater. Our planet faces sustainability issues and schools have many economic hurdles standing in the way of teaching success. The adult population needs to make an increased commitment to environmental stewardship. We connect people to wild peregrine falcons in a way that is both free and accessible thanks to help from partners like the Santa Cruz Fish and Wildlife Commission. We have seen how an initial interest in peregrine falcons can soon translate into an interest in birds in general and the associated conservation of nature.

7. How will the project be accomplished (design specifications or plans, if applicable)

University students and public volunteers make repeated visits to nest territories to discern nesting status by observing adult behaviors and interpreting those behaviors according to our protocol. Peregrine falcon nesting success is considered to be a useful indicator of ecosystem health. It is our goal to provide an annual accurate record of nesting success at a sample of Greater San Francisco Bay Area peregrine falcon territories (~ 25) for scientific reviews of long term trends.

We deliver lectures to Santa Cruz County schools, community groups, and corporate audiences that explain the concept of conservation biology and provide examples of conservation biology work by pointing to the peregrine falcon population recovery. Peregrine falcon nesting locations in the local area help to personalize the story. In additional to natural cliff nest sites, the falcon is now nesting on buildings, harbor cranes, bridges, and towers thanks to our successful program of recovery. We discuss endangered species conservation in general and examine the emergence of predatory bird territories in our urban communities. There is no charge to the audience for this service thanks to grant underwriting.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Travel reimbursements for student visits to nest sites and staff visits to local schools for educational presentations ($0.535/mile)	$1,000.00	$4,000.00 (inc. travel to academic conferences 2018-2019)	$5,000.00
Researcher/Coordinator Stipend		$25,000.00	$25,000.00
Office, Outreach, and Research Supplies		$5,000.00	$5,000.00
TOTAL AMOUNTS	$1,000.00	$39,000.00	$40,000.00

The Predatory Bird Research Group has received matching contributions from The Ahmanson Foundation to cover 2018 administrative costs, bird banding equipment, staff stipend, a subset of travel expenses and the launch of our new educational podcast. PG&E provides funding for nest camera maintenance and supports our peregrine banding efforts at their San Francisco Headquarters rooftop nest. Requested funds would fulfill our need for student reimbursement for regular travel to peregrine falcon nests sites in the greater Bay Area.

8. Timeline for completion

Requested funds for student travel to nest sites, and staff visits to local schools for educational presentations will be allocated for use in the 2018 nesting season (February-June). Falcon population monitoring and educational outreach projects are ongoing.

9. Background or history of your organization

Formed in 1975, the UC Santa Cruz Predatory Bird Research Group worked under state and federal permits along with cooperation from the Pacific States Peregrine Falcon Recovery Team to save the peregrine falcon from the brink of extinction. Our pioneering work led to the bird's removal from the federal list of endangered species in 1999 and from California's list of endangered species in 2009.

The Santa Cruz Predatory Bird Research Group also led or initiated successful breeding and release efforts for elf owls, aplomado falcons, harris's hawks, and bald eagles. We also undertook significant studies of prairie falcons, bald eagle migrations, goshawks, and golden eagles. In all, more than forty years of conservation biology have been funded primarily by private sector gifts and grants and supported by a robust volunteer effort.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. **Project name**: The Secret Life of Larval Fish: Combining a traditional museum exhibit with geocaching

2. **Name of organization or individual submitting the proposal**: Katherine Dale, University of California, Santa Cruz (*in conjunction with the Seymour Marine Discovery Center*)

3. **Amount of funding requested**: $1,000

For each of the following sections, give a brief description:

Project Description: Part I – Museum exhibit at the Seymour Marine Discovery Center: The museum exhibit portion will concentrate on fish species that are commercially or culturally important to California (i.e., salmonids, rockfish, tunas, serranids). There will be three major elements to the display:

1. A text-based discussion of why studying larval fish is important in terms of fisheries, specifically focusing on the high rate of mortality experienced during this period, how fish disperse, and the importance of protecting spawning grounds
2. An exploration of adaptations common to fish larvae that help them stay afloat and avoid predation, such as spines, well-developed eyes, transparent bodies, etc. Larval samples preserved and fixed in place in vials (with attached magnifying lens) will accompany text.
3. A "guess who" activity where visitors can try and match the larvae with its associated adult, part of an effort to communicate the disparity between larval and adult forms.

Through these three parts, the museum exhibit will feature three types of learning: Reading text, playing a simple interactive matching game, and viewing actual specimens. I am working with curators at the Seymour Center to design additional interactive aspects.

Part II - Geocaching: Geocaching is a GPS-based scavenger hunt in which participants find hidden containers ("caches"). Geocaching has been shown to be an effective form of informal, mobile learning (*1*) that can be paired with other activities to encourage critical thinking, teamwork, and navigational skills. Additionally, well-maintained caches can remain in place for multiple years, allowing learning to continue over time and reach a wider audience than a single outreach event. This project aims to create a series of linked, interactive caches around the Coastal Science Campus. Associated with the exhibit will be a set of five questions relating to larval fish, with a focus on California species and locations. Ideally, the cache topic will relate to its physical location (i.e., a cache on the early life history of tide pool fish may be placed in view of tidepools). Answers and/or secondary information needed to answer the questions will be placed in five geocaches hidden around the Center. Caches will primarily be placed in conjunction with new informational signs, part of the recent Coastal Science Campus expansion. In addition, each cache will contain a logbook and an inkpad/stamp. Museum visitors will be able to pick up a geocaching "passport" at the Center, in which they can record cache answers and stamps as proof of visiting the cache. A completed passport will qualify the visitor to receive a commemorative

trackable coin. All geocaches will be officially posted on Geocaching.com (Groundspeak, Inc.), the most popular interface for geocaching in the world. Museum visitors with smartphones can either download one of twelve apps supported by Geocaching.com (most of them free) or plug coordinates directly into a mapping application (i.e., Apple Maps, Google Maps, Verizon Navigator). Visitors who use a geocaching-specific app will be able to access location, past logs, hints, and photos immediately. Each geocache will range in size from 6"x6"x3" (small plastic container) to a 1-gallon metal "ammo" can. Geocaches will be clearly marked and larger containers will be chained/tied to natural features such as trees to avoid theft or vandalism. Total walking distance will be <1.5 mi. Caches will be maintained by UCSC students; at the end of the conclusion of the exhibit, caches may be officially archived. References: 1. M. Ally. 2009. Athabasca University Press.

4. **Project objectives and goals**

   Learning Outcomes: After participating, visitors should be able to:
   1. Define the words *plankton* and *larvae*
   2. Understand that many species of bony fish arrive at new places ("disperse") via their larvae
   3. Understand that larval fish look and act differently than their adult forms
   4. Understand that larval fish are specially adapted to life in the plankton

   Project Outcomes: Through this project, we hope to:
   1. Provide an interactive, long-lasting opportunity for learning in Santa Cruz
   2. Communicate the importance of larval fish to the public
   3. Raise awareness of overlooked aspects of California fish species

5. **Background and history of the problem**: The early life history of fish remains a mysterious topic to both the public as well as many fisheries scientists. For the majority of bony fishes, the highest rate of mortality may occur during the first few months of life (*1*), making this a crucially important period in a fish's life. Additionally, dispersal of many marine organisms to new locations is accomplished via their planktonic larvae (*2*). Some species have larvae that remain planktonic for only a few days while others migrate thousands of kilometers before transforming into their adult form. Additionally, fish larvae are fascinating due the wide range of unique adaptations developed for life in the plankton. Icthyoplankton (eggs and planktonic larvae of fish) are a small but vital part of the ecosystem, performing roles as predators, prey, and nutrient transporters. Yet larval fish remain generally understudied and overlooked, due in part to the considerable effort required to sample them and the inability to tag/track individuals. Consequently, it is rare to see museum or aquarium exhibits focused entirely on the early life history of fish. References: 1. R. C. May. 1973. (Springer Berlin Heidelberg, Berlin, Heidelberg, 1974), pp. 3–19. 2. A. L. Shanks. 2009. Biol. Bull. 216, 373–385.

6. **How will the project be accomplished (design specifications or plans, if applicable):** I am working closely with curators at the Seymour Marine Discovery Center to design both portions of this project, with hopes to implement the geocaching portion by December of

this year. The museum exhibit will be built using typical methods employed by the Seymour Center, in which they design the exhibit in-house but contract the production of exhibit pieces elsewhere.

7. **Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.**
We have received $500 from the Western Division of the American Fisheries Society to cover the geocaching portion of this project for the first several years. If received, funds from this current grant will be primarily used to design and build the educational museum exhibit.

Item	Funds Requested	Match Contribution	Total Amount
Museum exhibit – primarily will be used to pay for the construction of exhibit materials	$1000		$1000
TOTAL AMOUNTS			$1000

8. **Timeline for completion:**
We are currently implementing the geocaching portion of the project, with a tentative completion date of mid-December, 2017. The museum exhibit, if funded, would see a design and build period of roughly 9-12 months, with the finished exhibit likely in place by the spring of 2018.

9. **Background or history of your organization:** The Ecology & Evolutionary Biology (EEB) department at the University of California, Santa Cruz is "devoted to the study of ecological and evolutionary processes in marine and terrestrial and freshwater environments." I am a second-year graduate student in EEB working with Drs. Rita Mehta and Tim Tinker. My research focuses on the movement and transport of larval fishes, with a focus on eels. I have experience working with larval fishes in the Atlantic (mostly Atlantic bluefin tuna, *Thunnus thynnus*) and with juvenile salmonids in Oregon. The diversity of larval forms has never ceased to amaze me.

The Seymour Marine Discovery Center is a UCSC-affiliated educational facility located on the same campus as our laboratory. The Seymour Center is "dedicated to educating people about the role scientific research plays in the understanding and conservation of the world's oceans." Additionally, it plays a key role in communicating and showcasing the innovative work being completed at UCSC's Coastal Science Campus, a consortium of governmental, nonprofit, and academic facilities, of which our lab is a part.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

GRANT CONTACT INFORMATION
This information will not be posted on-line as part of the public notification process.

A. Application Date: October 20, 2017

B. Name of organization or individual submitting the proposal

Cal Poly Corporation for work to be performed on California Polytechnic State University's Swanton Pacific Ranch

C. Contact Person – Name, address, phone and email

Technical Contact:
Dr. Brian Dietterick
125 Swanton Rd, Davenport, CA, 95017
831-458-5415
bdietter@calpoly.edu

D. Fund Recipient: Name on the check and mailing address:

Cal Poly Corporation

Financial Contact:
Jodi Block
Contracts and Grants Operations Manager
Cal Poly Corporation – Sponsored Programs
One Grand Avenue 038-103
San Luis Obispo, CA 93407
805-756-1123
sponprog@calpoly.edu

E. Have you received a grant from the Fish and Game Advisory Commission previously?

No.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name

   "Understanding Scotts Creeks Hydrology: Developing baseline knowledge to inform fish restoration in a highly-prioritized watershed."

2. Name of organization or individual submitting the proposal

   Cal Poly Corporation

3. Amount of funding requested

   $2,445

For each of the following sections, give a brief description:

4. Project Description

   This project is essential to understanding streamflow dynamics, a major variable affecting the recovery of steelhead and Coho Salmon in Scotts Creek. As various agencies work together to restore fish populations and fish habitat in this stream, researchers are trying to understand the factors limiting recovery. To help with this effort, Swanton Pacific Ranch installed and has maintained a streamflow gage in lower Scotts Creek since 2010; a principal use of the data from this gage is to aid in the interpretation of both fish population dynamics as well changing physical habitat conditions. Further, the data adds to our understanding of how flow dynamics and stream discharge change over time and influence watershed management variables, such as residential and agricultural water use and stream restoration. This new record is of particular importance given the historic and now defunct USGS streamflow gages known as "Scotts below Little Creek" (1936-1940) and "Scotts above Little Creek" (1958-1973).

   Swanton Pacific Ranch (SPR) collaborating with NOAA National Marine Fisheries Service is dedicated to ensuring the continued operation of the stream gage on Scotts Creek in order to provide an accurate, long-term streamflow record. There are several tasks that are needed to accomplish this goal. This proposal is to perform two initial tasks of this long-term endeavor: 1) evaluating the adequacy and accuracy of the discharge rating curve using historic and current stream gage data and 2) updating the rating as needed.

   Project partners Swanton Pacific Ranch and Freeman Hydrologic Data Services will review and correct historic data where needed and develop the stage-discharge relation ("rating") for the Scotts Creek stream gage.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

5. Project objectives and goals

Objective 1: Review stage record and streamflow measurements for the Scotts Creek below Archibald stream gage operated by SPR

- Review and correct stage record
- QA/QC discharge measurements
- Review each discharge measurement to ensure match with corrected stage record and their adequacy for use in rating curve development

Objective 2: Review historic ratings and develop new rating

- Review and evaluate historic rating curve design and upper-end rating extension(s)
- Define new rating using current streamflow measurements
- Compute new rating

6. Background and history of the problem

For a little more than a decade, personnel at Swanton Pacific have worked with numerous researchers and partners to restore and better understand ecological challenges of endangered steelhead and Coho Salmon within the Scotts Creek watershed. Scotts Creek has been designated as an area of high priority for salmonid restoration efforts South of San Francisco. A great deal of information has been obtained from monitoring efforts within the upper and lower reaches of the main stem of Scotts Creek, as well as two of the three main perennial tributaries (Mill Creek and Big Creek). NOAA NMFS Researchers have been investigating migration timing, physiology, abundance, survivorship, growth and age of juvenile and adult salmonids (Hayes et al. 2008). At the same time, many organizations have worked extensively to maintain and restore steelhead and Coho Salmon including the use of genetic conservation and rearing at the Big Creek Hatchery and habitat restoration along lower Scotts Creek. However, much of the work restoring these fish populations would benefit from an improved understanding of the hydrologic processes in Scotts Creek.

Developing and maintaining the stage-discharge relation (rating), is one of the principal tasks necessary for computing a continuous stream discharge record. Scotts Creek is a natural channel. For natural channels where the gage site is not subject to variable backwater, the rating is the relation between gage height and discharge. The rating can change for a variety of reasons. Storm events can cause long-term changes in channel morphology. During low flows, short-term rating shifts can be caused by variable accumulation of leaves and small debris, or growth of algae on the section control of the gage pool. All of these occur in Scotts Creek and require continual effort to make streamflow measurements to define shifts, and either verify or develop a new rating. New ratings are also needed when a stream gage is relocated, or when the gage datum is otherwise changed. Streamflow records for natural channels are typically computed using the shifting control method, and software designed for rating development and time series record computation. SPR has used an equation-based approach to rating curve development and discharge computation for stage and streamflow data collected through Water Year 2013. Subsequent data show that the rating has changed substantially. A new Rating has

not been developed. SPR will use the expertise of Freeman Hydrologic Data Services to evaluate the methods used to develop previous ratings, the accompanying discharge records, and develop a new rating to compute the discharge record to current.

Accurately defining the upper end of a rating curve is an important and often challenging task. For example, flood frequency analysis is based on annual computed peak discharges. If the upper end of a rating is flawed, then computed peak discharges are erroneous, hence the frequency analysis is flawed. In addition, making enough high-flow measurements can be difficult. Peak flows are flashy in coastal watersheds. This fact limits the number of opportunities to physically measure them. Making high-flow streamflow measurements also presents significant safety concerns. Indirect measurements of peak flow are often used to extend the upper end of ratings where high flow measurements are lacking or if flow measurements do not reflect the range in stage experienced during the period of discharge record being computed. Procedures for the development, evaluation, modification, and application of ratings, and methods for surveying and computing indirect measurements of peak discharge are described in several USGS publications (see references). The importance of this work will allow us to translate higher flow stages to discharge and improve our understanding of limitations affecting use of refuge habitat off-channel in alcoves or on the floodplain. It also will improve our understanding of performance of constructed large wood features as compared to our design assumptions.

7. How will the project be accomplished?

   a. Task: Evaluate rating curve design and upper-end rating extension(s) and develop new rating. Rating extension techniques are used to "draw" the upper end of a rating curve when there is a lack of actual flow measurements or Indirect Measurements. Typically, a rating curve is developed using a log/log axis. The rating curve can be linearized using one or more log scale offsets that optimize rating curve extension for the range not defined by discrete discharge measurements. Rating curve design should reflect transitions in channel cross-section shape, for instance, the transition from flow being confined to a single channel to flood channels or overbank flow would cause a change in slope of the rating curve at these stages. Task d can be performed after tasks a through c are completed.

   b. Task: Evaluate discharge record computations through the end of the 2017 Water Year. The record has been computed by SPR for the period of Jan. 2010 through Sep. 2013. SPR would like an independent review of the discharge record for this period. Streamflow measurements for the subsequent period (Oct. 2014 through Sep. 2017) show a substantial change in the rating occurred at some point in time. A complete rating and record evaluation will be needed for this period.

   c. Task: Summarize the findings for items above in a final report, with presentation to all partners working on restoration projects in the Scotts Creek system.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

8. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Brian Dietterick, PI Project Oversight (no compensation)	$0	N/A	$0
Watershed and Forrest Apprentice, CPC SPR: 35 hours effort	$0	$776	$776
Consultant Service: Freeman Hydrologic Data Services	$2,099	$0	$2,099
16.5% MTDC	$346	$128	$2,875
TOTAL AMOUNTS	$2,445	$904	$3,349

Salaries and wages: The salary rates are based on the California Polytechnic State University (CPSU) and Cal Poly Corporation (CPC), jointly Cal Poly, established salary rates paid during the 2017-2018 Fiscal year (July 1 – June 30). The rates shown are for budgetary purposes; the rates in effect at the time the work is performed will be charged to the project.

Fringe benefits & employer payroll taxes: Full time benefits for CPC employees include a benefit package consisting of FICA, State Unemployment Insurance (SUI), Worker's Compensation, non-industrial leave including vacation and sick leave, medical, dental, and life insurance benefits, and retirement benefits (PERS). The DHHS pooled rate of 61.3% is used for budgetary purposes. The rates in effect at the time the work is performed will be charged to the sponsor.

Indirect costs: Cal Poly's federally negotiated indirect rate is 38.5% for on-campus and 16.5% for off-campus of modified total direct costs, effective July 1, 2015. Modified total direct costs exclude equipment, capital expenditures, charges for patient care, tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as that portion of each sub-grant and subcontract in excess of $25,000.

8. Timeline for completion (reformatted – edit as needed)

Timeline assumes grant award date of January 1, 2018

Task a: Review stage record and streamflow measurements
Task a completion: 3/01/2018

Task b: Evaluate rating curve design and upper-end rating extension(s), develop new rating
Task b completion: 5/01/2018

Task c: Report and presentation

Task c completion: 8/01/2018

9. Background or history of your organization

Swanton Pacific Ranch (SPR) has long provided opportunities for multidisciplinary approaches to conservation, research and education. SPR is located in the Santa Cruz coastal mountain range, 15 miles northwest of Santa Cruz, CA. The property is located in the 30-square mile Scotts Creek watershed and consists of approximately 100 acres of cropland, 1,435 of redwood/Douglas-fir forest, and 1,500 acres of coastal grassland. Over the past 20 years, since the ranch was donated to Cal Poly, SPR has rapidly become a model for the practice of informed and sustainable land management. Today, the ranch is devoted to providing students and faculty from Cal Poly and other institutions unique learning and research opportunities for understanding the physical and biological conditions found only in the coastal Santa Cruz Mountains.

Please note that there is a distinction between the Cal Poly awardee institution and the performing institution. The awardee institution is the Cal Poly Corporation, a 501(c)(3) non-profit auxiliary organization established in 1940 to aid the University in its educational and extracurricular missions. The Performing Institution is the California Polytechnic State University.

Selected references:

Kennedy, E.J. 1984. Discharge ratings at gaging stations. Report prepared by U.S. Geological Survey. Series title: *Techniques of Water-Resources Investigations*. Washington, D.C.: U.S. Govt. Print. Office. Book 3, Chapter A10: Applications of Hydraulics. 65 pp.

Benson, Manuel A., and Tate Dalrymple. 1967. General field and office procedures for indirect discharge measurements. Report prepared by U.S. Geological Survey. Series title: *Techniques of Water-Resources Investigations*. Washington, D.C.: U.S. Govt. Print. Office. Book 3, Chapter A1: Applications of Hydraulics. 30 pp.

Hayes, S., Bond, M., Hanson, C., Freund, E., Smith, J., Anderson, E., Amman, A., MacFarlane, B. 2008. Steelhead Growth in a Small Central California Watershed: Upstream and Estuarine Rearing Patterns. Transaction of the American Fisheries Society. v. 137-1. Pp. 114-128.

Benson, Manuel A., and Tate Dalrymple. 1967. Measurement of peak discharge by the slope-area method. Report prepared by U.S. Geological Survey. Series title: *Techniques of Water-Resources Investigations*. . Washington, D.C.: U.S. Govt. Print. Office. Book 3, Chapter A2: Applications of Hydraulics. 12 pp.

G.L. Bodhaine. 1968. Measurement of peak discharge at culverts by indirect methods. Report prepared by U.S. Geological Survey. Series title: *Techniques of Water-Resources Investigations*. Washington, D.C.: U.S. Govt. Print. Office. Book 3, Chapter A3: Applications of Hydraulics. 60 pp.

H.F. Matthai. 1967. Measurement of peak discharge at width contractions by indirect methods. Report prepared by U.S. Geological Survey. Series title: *Techniques of Water-Resources Investigations*. Washington, D.C.: U.S. Govt. Print. Office. Book 3, Chapter A4: Applications of Hydraulics. 44 pp.

Brian C. Dietterick, Ph.D., PH
Director, Swanton Pacific Ranch
College of Agriculture, Food, and Environmental Sciences

Natural Resources Management and Environmental Sciences Department
California Polytechnic State University
San Luis Obispo, CA 93407
805.756.6155
bdietter@calpoly.edu

Professional Preparation:

1. Penn State University, University Park, PA. Ph.D. 1994, Forest Resources, Forest Hydrology concentration, School of Forest Resources
2. Arizona State University, Tempe, AZ. (August 86 - May 87) Department of Geography
3. University of Arizona, Tucson, AZ. MS 1982, Watershed Management, Watershed Hydrology concentration, School of Renewable Natural Resources
4. Bloomsburg University of Pennsylvania, Bloomsburg, PA. BA 1980, Earth Science, Department of Geography and Earth Science

Professional Appointments:

1. California Polytechnic State University, College of Agriculture, San Luis Obispo, CA. April 2004-present. Director, Swanton Pacific Ranch. Responsible for directing Ranch operations, and educational and research programs. Additional responsibilities include directing usage and maintenance activities for all Ranch facilities, oversee the Ranch internship programs, and facilitate educational and research involvement by Cal Poly and other educational institutions.
2. California Polytechnic State University, Natural Resources Management and Environmental Sciences Department, San Luis Obispo, CA. January 1994-present. Professor of Hydrology, Watershed Management and Geographic Information Systems. Responsible for teaching Watershed Management, Advanced Watershed Hydrology, and Geographic Information Systems. Research interests include the effects of climate change on water resources, hydrologic modeling, monitoring and modeling the effects of land management activities and best management practices on hydrologic systems, and watershed and channel restoration/rehabilitation for aquatic habitat and channel stability purposes. Completed many projects in the capacity of a research or consulting hydrologist.
3. Penn State University, Environmental Resources Research Institute, University Park, PA. November 1987 - December 1993. Research Assistant in Forest Hydrology. Operated and maintained hydrologic instrumentation on the Leading Ridge Experimental Watersheds. Responsible for the implementation, operation, and maintenance of a project to determine the episodic response due to acidic precipitation. Perform chemical analysis on streamwater and precipitation samples. Collect weekly precipitation samples for a National Atmospheric Deposition Program (NADP) network site. Aid in research proposal development and writing.

Significant Research and Project Summary:

1. Principal Investigator, 1999-present. Long-term water quality and geomorphic evaluation following selection timber harvesting activities on Little Creek, Swanton Pacific Ranch. Evaluate the effectiveness of California forest practices to protect from adverse water quality impacts.
2. Assistant Project Director, 1994-2002. Nonpoint Source Pollution and Treatment Measure Evaluation for the Morro Bay Watershed. Evaluate the effectiveness of a set of selected rangeland management measures to improve water quality using a paired watershed study design.
3. Principal Investigator, 2000-present. Evaluation of watershed and channel characteristics using LIDAR-generated high resolution altimetry.

4. Principal Investigator, 2003. Channel Survey and Classification of the Andrews Reach, San Luis Obispo Creek. Land Conservancy of San Luis Obispo, County. Field survey of channel characteristics used to prescribe and design instream restoration features.
5. Principal Investigator, 2000-present. Scotts and Queseria Creeks restoration project. Channel design and implementation for fluvial, hydrologic, and habitat purposes.
6. Principal Investigator, 1995-2000. Dairy Creek Golf Course water quality and habitat evaluation. Monitor surface and ground water, and macroinvertebrates to evaluate the effectiveness of BMPs.

Recent Publications:

1. Surfleet, C., Skaugset, A., Dietterick, B. 2014. Change detection of storm runoff and sediment yield using hydrologic models following wildfire. Canadian Journal of Forest Resear. 44:572-581 doi: http://dx.doi.org/10.1139/cjfr-2013-0328
2. Dietterick, B., R. White and R. Hilburn, 2012. Comparing LiDAR-generated to ground-surveyed channel features in a forested mountain stream Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
3. Johnson, K., N. Finnegan, and B. Dietterick, 2012. Geomorphic mapping of a redwood-forested watershed, including recent post-fire mass wasting. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
4. Loganbill, D. and B. Dietterick, 2012.Evaluation of changes in sediment production the first year post-fire in Little Creek watershed. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
5. Niebrugge, L., L. Moody, and B. Dietterick, 2012. Assessment of post-fire rill erosion using soil physical properties to determine factors controlling surface runoff. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
6. Perkins D. and B. Dietterick, 2012. Evaluating geomorphic change in a small coastal tributary with repeated channel surveys. Proceedings: 2011 Redwood Science Symp., Santa Cruz, CA.
7. Skaugset, A., A. Simmons, C. Surfleet and B. Dietterick, 2012. The effect of selection logging in a redwood forest on watershed hydrology and sediment yield in a coastal California watershed. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
8. Surfleet, C., A. Skaugset and B. Dietterick, 2012. An approach to study the effect of harvest and wildfire on watershed hydrology and sediment yield in a coast redwood forest. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
9. White, R. and B. Dietterick, 2012. Use of LiDAR and multispectral imagery to determine conifer mortality and burn severity following the Lockheed Fire. Proceedings: 2011 Redwood Science Symposium, Santa Cruz, CA.
10. White, R.A.; Dietterick, B.C.; Mastin, T.; Strohman, R., 2010. Forest Roads Mapped Using LiDAR in Steep Forested Terrain. *Remote Sens.*, *2*, 1120-1141.
11. Dietterick, B. C., Moody, L.E., Daly, J.P., Smidt, R.K. and K. McNeill. Draft manuscript prepared for submission to the Journal of the American Water Resources Association. A Paired Watershed Evaluation of Rangeland BMP Effectiveness in Reducing Suspended Sediment Export in the Morro Bay Watershed.
12. McNeill, K., Moody, L., Dietterick, B., Hallock B, Beckett, J., Worcestor K., Paradies D., and J.H. Davis. November 2003. The Morro Bay National Monitoring Program a ten-year study of rangeland BMPs. NWQEP Notes, North Carolina State University.A U.S.EPA publication distributed to over 2000 professionals in the U.S. and 26 other countries.
13. Dietterick, B.C. , Mastin, T. and M. Gaedeke. 2003. Channel Survey and Classification of the Andrews Reach, San Luis Obispo Creek (Submitted to Land Conserv. of San Luis Obispo, Co.)
14. Central Coast Regional Water Quality Control Board. Morro Bay National Monitoring Program: Nonpoint source Pollution and Treatment Measure Evaluation for the Morro Bay Watershed. Final Report 2003. Contributor. Submitted to the U.S. EPA.

15. Dietterick, B.C., et al. 2001. Rangeland BMP effectiveness in reducing sediment export on the paired watersheds, Morro Bay, CA. Proceedings for the National Nonpoint Source Pollution Workshop, Hartford, CT, Sept. 2000.
16. Dietterick, Brian C. 2001. Water Quality and Habitat Monitoring for the Dairy Creek Golf Course – 1995-2000. Submitted to the Co. of San Luis Obispo and State Water Board.
17. Dietterick, B. C., J.A. Lynch, and E.S. Corbett. 1999. A calibration Procedure using TOPMODEL to determine suitability for evaluating potential climate change effects on water yield. Jour. of the American Water Resources Assn. 35(2):457-468
18. Dietterick, B.C. and L. Moody. 1999. Evidence of BMP effectiveness for the paired watershed study; Nonpoint source pollution and treatment measure evaluation for the Morro Bay watershed. In proceedings (abstracts): 7th Annual National Nonpoint Source Monitoring Workshop, Morro Bay, September 12-17, 1999.
19. Dietterick, B.C., R.Strohman, R.P. Thompson. 1999. Threading GIS throughout a Forestry and Natural Resources Curriculum. On-line proceedings: ESRI International User Conference, San Diego, July 26-30, 1999
20. Dietterick, B.C., Brannigan, M.R. and D.I. Yun. 1998. San Luis Obispo Urban Tree Analysis: A GIS demonstration project using CITYGreen. Prepared for the California Department of Forestry and Fire Protection.
21. Strohman, R., B. Dietterick, W. Mueller, J. Phillips, and E. Seims. 1998. Developing a Geographic Information Systems for Agriculture Minor. In proceedings ASAE Annual International Meeting, July 12-16 1998, Orlando FL.
22. Rice, T.J. Jr., B.C. Dietterick, C.K. Lo, L. E. Moody. R.K. Smidt, K.W. Worcester and D. Paradies. 1997. Paired watershed study of nonpoint source pollution sources in the Morro Bay Watershed, California. Abstracts of the International Symposium on Soil Erosion and Dryland Farming, Sept. 15-19, 1997; Soil and Water Conservation Society of America.

Collaborators

a. Associates: Sean Hayes, NOAA Fisheries, Joseph Kiernan, NOAA Fisheries, Kelli Camara, Santa Cruz RCD, Arne Skaugset, Professor of Forest Engineering, Oregon State University, Walter Mark, Professor of Forestry, Cal Poly-SLO, Jeff Rose, Engineer, USFWS, Thomas Lisle, USDA Forest Service PSW Research Station, Norman Pillsbury, Professor of Hydrology and Watershed Management, Cal Poly-SLO, Lynn Moody, Professor of Earth and Soil Science, Cal Poly-SLO, Glenn Wilcox, USDA NRCS, Brent Hallock, Professor of Earth and Soil Science, Cal Poly-SLO, Michael Hall, Professor of Animal Science, Cal Poly-SLO, Robert Smidt, Professor of Statistics, Cal Poly-SLO, Marvin Pyles, Professor of Forest Engineering, Oregon State University, Pete Cafferata, CalFire, Charlotte Ambrose, NOAA Fisheries, Curt Babcock, California Department of Fish and Game, Ken Cummins, Humboldt State University, Cajun James, Sierra Pacific Industries, Gaylon Lee, State water resources Control Board, Gary Nakamura, UC Cooperative Extension, Sara Sommarstrom, Watershed consultant, Kate Sullivan, Humboldt Lumber Company, William Trush, Biological consulting, Michael Wopat, California Geological Survey, Thomas Spittler, California Geological Survey.
b. Graduate Advisors: Martin Fogel, University of Arizona, Lloyd Gay, University of Arizona, John Thames, University of Arizona, Davis DeWalle, Penn State University, John Peterson, Penn State University, Larry McCormick, Penn State University, James Lynch, Penn State University

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN:

DATE:08/08/2017

ORGANIZATION:

Calif Polytechnic State Univ, San Luis Obispo
and Cal Poly Corporation
Building No. 15

San Luis Obispo, CA 93407

FILING REF.: The preceding agreement was dated 01/24/2017

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

	EFFECTIVE PERIOD				
TYPE	**FROM**	**TO**	**RATE(%)**	**LOCATION**	**APPLICABLE TO**
PRED.	07/01/2014	06/30/2015	39.00	On-Campus	All Programs
PRED.	07/01/2014	06/30/2015	18.00	Off-Campus	All Programs
PRED.	07/01/2015	06/30/2018	38.50	On-Campus	All Programs
PRED.	07/01/2015	06/30/2018	16.50	Off-Campus	All Programs
PROV.	07/01/2018	06/30/2019	38.50	On-Campus	All Programs
PROV.	07/01/2018	06/30/2019	16.50	Off-Campus	All Programs

*BASE

Modified total direct costs, consisting of all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel and up to the first $25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs and the portion of each subaward in excess of $25,000. Other items may only be excluded when necessary to avoid a serious inequity in the distribution of indirect costs, and with the approval of the cognizant agency for indirect costs.

ORGANIZATION: Calif Polytechnic State Univ, San Luis Obispo and Cal Poly Corporation

AGREEMENT DATE: 8/8/2017

SECTION I: FRINGE BENEFIT RATES**

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
FIXED	7/1/2017	6/30/2018	61.30	All (1)	Regular Employees
FIXED	7/1/2017	6/30/2018	10.00	All (2)	Intermittent Employee
FIXED	7/1/2017	6/30/2018	4.50	All (3)	Students
PROV.	7/1/2018	6/30/2020		(4)	

** DESCRIPTION OF FRINGE BENEFITS RATE BASE:

(1) Salaries and wages including vacation, holiday and sick leave pay and other paid absences of regular employees.

(2) Salaries and wages including vacation, holiday and sick leave pay and other paid absences of intermittent employees.

(3) Salaries and wages of students.

(4) Use same rates and conditions as those cited for fiscal year ending June 30, 2018.

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

California Polytechnic State University San Luis Obispo: The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The following fringe benefits are treated as direct costs: FICA, NDI, SUI, Worker's Compensation, Medical/Life/Dental/Vision Insurance/Cash in Lieu of Health, Short-term Disability, and Retirement.

Cal Poly Corporation: The fringe benefits are charged using the rate(s) listed in the Fringe Benefits Section of this Agreement. The following fringe benefits are included in the fringe benefits rates(s):

Regular Employees: FICA, Medicare, Unemployment Insurance, Retirement Plan, Medical/Dental/Vision/Life Insurance/Cash in lieu of Health, Short-term Disability, Tuition Remission, Worker's Compensation, and OPEB/VEBA.

Intermittent Employees: FICA, Medicare, Unemployment Insurance, Retirement Plan, Medical/Dental/Vision/Life Insurance, and Short-term Disability.

Students: FICA, Medicare, Worker's Compensation, and Unemployment Insurance.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s) the off-campus rate will apply. Grants or contracts will not be subject to more than one F&A cost rate. If more than 50% of a project is performed off-campus, the off-campus rate will apply to the entire project.

DEFINITION OF EQUIPMENT: Equipment means tangible personal property (including information technology systems) having a useful life of more than one year and a per-unit acquisition cost which equals or exceeds $5,000.

This rate agreement updates the fringe benefits only.

NEXT PROPOSAL DUE DATE
An indirect and fringe benefit rate proposal based on actual costs for fiscal year ending 06/30/17 will be due no later than 12/31/17.

ORGANIZATION: Calif Polytechnic State Univ, San Luis Obispo and Cal Poly Corporation

AGREEMENT DATE: 8/8/2017

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted: such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

Calif Polytechnic State Univ, San Luis Obispo and Cal Poly Corporation

(INSTITUTION)

(SIGNATURE)

Lorlie Leetham

(NAME)

Executive Director

(TITLE)

8/21/17

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

Arif M. Karim -A

Digitally signed by Arif M. Karim -A
DN: c=US, o=U.S. Government, ou=HHS, ou=PSC, ou=People, cn=Arif M. Karim -A, 0.9.2342.19200300.100.1.1=2000212895
Date: 2017.08.14 12:03:50 -05'00'

(SIGNATURE)

Arif Karim

(NAME)

Director, Cost Allocation Services

(TITLE)

8/8/2017

(DATE) 1736

HHS REPRESENTATIVE: Cora Coleman

Telephone: (415) 437-7820

Freeman Hydrologic Data Services
Qualifications statement
Updated October 11, 2017

To Members of the County of Santa Cruz Fish and Wildlife Advisory Commission

Dear Commissioners

I am extremely pleased to have this opportunity to work with the management, staff and partners of Swanton Pacific Ranch and provide my expertise. The accuracy of the long-term record provided through operation of the Scotts Creek streamgage is vital to a variety of activities in the watershed. The tasks outlined in this Grant Proposal will continue to enhance efforts by SPR and others to establish and maintain high-quality, long-term Hydrologic Monitoring records on Scotts Creek. I respectfully submit the following overview of my qualifications for your review.

Summary of Qualifications

Larry Freeman is the owner of **Freeman Hydrologic Data Services**. **FHDS** provides consulting services and technical training using USGS protocols specializing in stream gage, sediment and water quality network installation and operation and records computation. He brings to the table a unique set of technical and program management skills gained during his 35-year career with USGS. He is regarded as an expert in streamflow and sediment monitoring, and records computation. He has decades of experience with streamflow monitoring site selection, station design and installation, and operation of long-term monitoring networks. As a USGS Field Office Chief, he collaborated with numerous Bay Area agencies and organizations to develop and implement long-term monitoring stations and programs, and is intimately familiar with the variety of hydrologic conditions present in Bay Area watersheds.

Qualification Details

Prior to starting his consulting business in 2015, he had a notable 35-year career with the USGS. He was repeatedly recognized by the USGS and collaborative partners for providing high quality hydrologic information to the public, local, state and federal agencies, academia, and non-profit organizations. Throughout his USGS career he was actively engaged in streamflow and sediment monitoring, policy development, and testing of new monitoring methods and technologies. He continues to offer similar services through FHDS.

Over his career, Larry has used his technical expertise to implement new methods and technologies for hydrologic monitoring. He frequently played key roles in testing new sensors and instrument technologies, and published criteria for field applications. His published articles, abstracts and reports include experience using suspended sediment surrogate technology such as turbidity and LASER backscatter to obtain continuous records of estimated sediment concentration and particle size.

For the final 18 years of his USGS career he managed the Salinas, Marina and Santa Cruz Field Offices. As one of eight California Field Office Chiefs, he was responsible for training and supervising the staff in surface water, sediment and water quality data collection and records computation. He also supervised the USGS California Sediment Lab. In addition, he was responsible for water data program development and operations in nine counties in the Central Coast region of California, collaborating with approximately 30 local, state and federal agencies and organizations. He routinely selected, designed and constructed monitoring sites, and along with his staff, operated them to support this region's long-term hydrologic monitoring network.

As Field Office Chief, Larry necessarily became very familiar with the diverse hydrologic conditions and basin characteristics found in San Francisco Bay Area streams (large and small watersheds, urban and un-urbanized, with regulated and non-regulated flows). He has worked with numerous local agencies and organizations to establish or expand streamflow monitoring and flood warning networks, and along with his expertly trained support staff, performed data collection and records computation for those sites. A list of the agencies and organizations he collaborated with is shown in **Table 1**. He also worked with peers in the U.S. Forest Service, U.S. Bureau of Reclamation, and private consultants to develop sediment-monitoring plans for the Trinity and San Joaquin River Restoration Programs where he was also responsible for verifying that USGS QA/QC protocols were used in streamflow and sediment data collection, records computation, and sediment lab analysis.

Most recently (from March to August 2016) he contracted with a well-known instrument company to perform field-testing and evaluation for their newest multi-parameter water quality Sonde. The testing was performed in the intertidal zone of Soquel Creek and Monterey Bay. In addition, he is working for the City of Watsonville Water Department on the Corralitos Creek streamflow-monitoring program to help them meet requirements of a Streambed Alteration agreement with California Department of Fish and Wildlife. He has also worked intermittently for SPR, providing advice on streamgage site location and installation.

FHDS has active contracts with the following entities:

City of Watsonville Water Department. Compliance and Effectiveness Monitoring Plan-Stream Gaging and Reporting.

Cal Poly San Luis Obispo, Swanton Pacific Ranch. Streamflow monitoring advisor.

In-Situ Inc. Technical Advisory Board member.

Table 1: List of past and present USGS and FHDS hydrologic monitoring programs in the Bay Area. Listed in order of program size.

Name	Program	Purpose of program	Watershed(s)
Santa Clara Valley	Streamflow, daily	Flood warning, Contaminant	Coyote Creek,

Water District	sediment discharge, Bedload measurement	load estimates (Hg, PCBs, VOCs), Salt pond restoration and sedimentation, South Bay sediment modeling	Guadalupe River, Llagas Creek, Pacheco Creek, San Mateo Creek, Saratoga Creek
San Francisco Public Utilities Commission	Streamflow, Continuous water temperature monitoring	Water rights, fish habitat, Daily Suspended Sediment discharge, Bedload discharge estimates, Flow diversion and reservoir inflow, stage and outflow.	Alameda Creek, Calaveras Creek, Pilarcitos Creek,
Alameda County Flood Control and Water Conservation District	Streamflow, daily sediment discharge, continuous water quality monitoring	Flood warning, Daily Suspended Sediment discharge, Bedload discharge estimates, Sedimentation rates in flood channels and reservoirs, South Bay sediment modeling, Fisheries, Tide gage	Alameda Creek, San Lorenzo Creek, Castro Valley Creek, San Francisco Bay
Alameda County Water Agency	Streamflow	Flow diversion management	Alameda Creek, Dry Creek
San Mateo County RCD	Streamflow	Coast-side streamflow, Watershed restoration efforts	Pilarcitos Creek, San Gregorio Creek
City of Watsonville	Streamflow	Flow diversion management, Flow diversion management.	Corralitos Creek and Browns Creek
City of Santa Cruz Water Department	Streamflow	Flow diversion management, Reservoir bathymetry and Sedimentation rate	San Lorenzo River
Santa Cruz County Department of Public Works	Streamflow	Flood warning	San Lorenzo River, Soquel Creek, Corralitos Creek
San Francisco District US Army Corps of Engineers	Streamflow	Flood warning, levee management	Pilarcitos Creek
San Francisco Estuary Institute	Daily sediment discharge	Contaminant load estimates (Hg, PCBs, VOCs)	Guadalupe River
City of San Jose, Environmental	Streamflow	Treatment plant operations	Coyote Creek

Services			

Midpeninsula Regional Open Space District	Streamflow	Flow diversion management	San Gregorio Creek
Soquel Creek Water District	Streamflow	Groundwater recharge monitoring, Surface water/Ground water interaction	Soquel Creek
San Mateo County Flood Control	Streamflow	Flood warning	San Francisquito Creek
City of Capitola and In-Situ Inc.	Continuous Water Quality record	Soquel Creek Lagoon 2016 seasonal monitoring	Soquel Creek

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
Fisheries Ecology Division
110 Shaffer Road
Santa Cruz, California 95060

October 13, 2017

County of Santa Cruz - Fish and Wildlife Advisory Commission
701 Ocean Street, Room 312
Santa Cruz, CA 95060

Re: Grant Applicant Cal Poly State University

To Whom It May Concern:

I am writing to express my support of the proposal being submitted by Cal Poly State University's Swanton Pacific Ranch (SPR) titled, *Understanding Scotts Creek's hydrology: developing baseline knowledge to inform fish restoration in a highly prioritized watershed.*

As you are likely aware, the Scott(s) Creek watershed supports sympatric populations of coho salmon (Central California Coast Evolutionarily Significant Unit) and steelhead trout (Central California Coast Distinct Population Segment), which are listed as endangered and threatened species, respectively, under the U.S. Endangered Species Act. The Scott Creek coho salmon population is of special management concern because it represents the southernmost extant population of this species in North America, and the only persistent population south of San Francisco Bay. Consequently, NOAA Fisheries has been intensively monitoring the status and trends of salmonid populations and their habitats in the Scott Creek basin since 2003.

The stream gage maintained by SPR on mainstem Scott Creek is an indispensable data source that directly informs research and monitoring efforts conducted by NOAA Fisheries and our conservation partners. For nearly six years, the time series of discharge data generated at the Scott Creek gage has been used to study relationships between the natural flow regime (e.g., the magnitude, frequency, and duration of surface flow events) and the distribution, abundance, and performance of salmonids at all life-stages. These data have been especially valuable during the recent drought, and have provided insight into the resiliency and viability of salmonid populations during extreme climatic events.

Establishing and maintaining a relationship between stream stage and discharge is a task fundamental to the generation of a robust time series. For gages in dynamic stream systems, this relationship requires periodic reassessment and modification to ensure accuracy. The work proposed by SPR will substantially improve the existing rating curve, particularly at the upper end of the curve where the existing relationship suffers from a dearth of physical measurements.

Given the overwhelming importance of the Scott Creek watershed to regional salmonid recovery efforts, NOAA Fisheries strongly supports projects that advance understanding of potential limiting factors in the basin. The proposal being submitted by SPR is important and timely work that will directly improve fisheries management and conservation in the Scott Creek watershed and elsewhere. I highly recommend this project to the Commission for funding.

Respectfully,

Joseph D. Kiernan, Ph.D.

Research Ecologist
NOAA Fisheries
Southwest Fisheries Science Center

MONTEREY BAY
SALMON & TROUT PROJECT

October 2, 2017

Benjamin J. Harris, Executive Director
Monterey Bay Salmon and Trout Project
101 Cooper St.
Santa Cruz, CA, 95060

To Whom It May Concern,

I am writing in support of the application for funding you will be receiving to facilitate hydrologic research in partnership with the Swanton Pacific Ranch (SPR). SPR's evaluation of current watershed data on Scotts Creek and the development of an accurate discharge rating curve contribute directly to the fisheries conservation objectives of the Monterey Bay Salmon and Trout Project (MBSTP). Our Program's mission is to support the restoration of native salmon and steelhead populations throughout watersheds overseen by the Santa Cruz County Fish and Wildlife Commission, including Scotts Creek.

The response of all aquatic wildlife to watershed variables such as flood frequency and peak discharge requires a fundamental understanding of these processes in order to facilitate sound management. Scotts Creek is historically one of the more productive and habitat-rich streams for fish compared to other relatively developed watersheds throughout central California. A better understanding of the natural hydrologic processes in action on Scotts Creek would help to facilitate more informed fisheries restoration objectives on the part of MBSTP and other resource management agencies.

Investment in the continued operation of the Scotts Creek stream gage will contribute to long-term environmental monitoring and conservation goals. Continuous stream flow records are one of the primary tools in identifying the localized and watershed-scale impacts of global climate change. Through continued and accurate operation of the Scotts Creek streamflow gage, this station can contribute information to a global framework of hydrologic and climatological data. Investment in studying the continued, localized impact of climate change is additionally compatible with Santa Cruz County's mission to protect public health and the environment.

In summary, SPR's application for funding is supported by our Program due to its direct contribution to our knowledge of local watersheds and their aquatic habitats. MBSTP relies greatly upon accurate environmental data regarding the status of local watersheds. SPR's objectives to provide analysis of current and continuous hydrologic variables will support the mission of MBSTP while also contributing to the understanding and conservation of aquatic resources in Santa Cruz County.

Sincerely,

Benjamin J. Harris

Benjamin J. Harris

County of Santa Cruz Fish and Game Advisory Commission

GRANT APPLICATION 2017

1. Project name: **Exploring the San Lorenzo River**

2. Name of organization or individual submitting the proposal

Santa Cruz Museum of Natural History AND Coastal Watershed Council

3. Amount of funding requested

$3,460

For each of the following sections, give a brief description:

4. Project Description

The Santa Cruz Museum of Natural History (SCMNH) and the Coastal Watershed Council (CWC) respectfully request $3,460 to continue the popular Exploring the San Lorenzo River series in Spring 2018. The series provides free, all ages, educational tours along the San Lorenzo River and a culminating BioBlitz event to engage citizen scientists and inspire stewardship in this important ecosystem.

The Exploring the San Lorenzo River series is comprised of weekly tours for families and nature enthusiasts. Bridging our organizations' combined experience in environmental education, the series provides unique educational experiences that integrate best practices such as hands-on exploration, student-led learning, and opportunities to apply knowledge.

Each tour is led by by expert birders, wildlife specialists, fisheries biologists, and water quality scientists that guide participants in interactive studies of the wildlife of the San Lorenzo River ecosystem. Past tour topics include bird identification and calls of migratory and local species; coho salmon genetics and hatchery science; anadromy and the life cycles of steelhead; benthic macroinvertebrates of the lower river; seining surveys of the fishery; and scorpions and arachnids of the San Lorenzo River watershed. Participants learn to identify animal and plant species, life cycles, habitats and behaviors while gaining context for human impacts on the watershed. Each participant leaves with a better understanding of their own role in protecting and preserving this important ecosystem and specific actions they can take to do so.

CWC and SCMNH staff work with tour leaders to integrate on-site learning with activities and games that help participants of all ages have fun learning about the tour topic and retain knowledge. For example, to demonstrate how spawning salmonids smell their way back to their native creek, staff set up a simplified San Lorenzo River watershed map with yarn and rocks. Cotton balls infused with different smells were placed at the confluences and in higher reaches of the watershed. Blindfolded participants had to smell their way from the San Lorenzo River

mouth up the main stem to a tributary and eventually their spawning grounds. In another example, participants enjoyed creating onomatopoetic songs to remember bird calls as they learned to identify hidden birds or fast-flyers that couldn't be spotted with binoculars. It is during these activities that CWC and SCMNH staff shared best management practices or stewardship actions that support the habitat or lifecycle of the animals that participants were getting to know. Following the steelhead game, staff led a discussion of the barriers or challenges a steelhead can face and the human impacts on their journey to natal streams such as human obstructions, sediment or low flows. Staff shared a simple stewardship tip: reduce your water usage to support in stream flow for steelhead.

In its second year, the Exploring the San Lorenzo River series will continue to take place along the lower San Lorenzo River and will also expand into San Lorenzo Valley. Funding from the County of Santa Cruz Fish and Game Advisory Commission will allow us to continue this program along the lower river, while funding secured from the San Lorenzo Valley Water District will allow us to expand this programs along the upper river. By providing tours in both the upper and lower San Lorenzo River, this program will engage more residents and allow for the exploration of a greater diversity of topics and riparian habitats.

This year we aim to refine and improve on the program incorporating feedback from last year. For example, timing of each tour will be adjusted to better accommodate families on weekends. Additionally, the format of each tour will be adjusted to be more inclusive of a wide range of ages. Tours will balance activities for young or novice participants with opportunities for more skilled or knowledgeable naturalists to learn more in-depth content. Certain tours will be catered specifically to school-aged youth and will be promoted accordingly.

Also new this year, tours will provide "Action Cards" to participants in order to make stewardship actions more accessible. These magnetic cards will feature everyday opportunities to make a direct, positive impact on the river ecosystem including picking up your pet's waste, conserving water, sharing the ecosystem with a friend, and volunteering.

The final event in the series will be a BioBlitz on the morning of Earth Day. Using the California Academy of Sciences' popular free data collection program, iNaturalist, participants will conduct a biological survey along the San Lorenzo River and apply the ecosystem knowledge and ID skills they have acquired during the series. Tour participants and Earth Day attendees will be encouraged to participate and join a global community of citizen scientists.

5. Project objectives and goals

Goals:

1. Reconnect a healthy San Lorenzo River watershed to a vibrant community.
2. Educate the residents throughout the watershed of the river's integral role in the health of our community and the ecosystems it supports.

3. Reframe the San Lorenzo River as a space for community gathering and recreation, and inspire regional pride in this ecosystem and community resource.
4. Inspire and equip participants to take action to steward the San Lorenzo River ecosystem.

Objectives:

- Provide 250 participants of all ages with opportunities to connect with experts and to explore and discover the riverine ecosystem by April 2018.
- Host ten bird, fish and wildlife tours and one culminating BioBlitz along the San Lorenzo River from February to April 2018.
- Provide 250 "Action Cards" for participants to promote ongoing stewardship projects that directly impact the river ecosystem by April 2018.

6. Background and history of the problem

The San Lorenzo River is an integral part of Santa Cruz's history, public health and local economy and is the primary source of drinking water for nearly 100,000 people. It is home to threatened steelhead trout and endangered Coho salmon and local and migratory bird species. Yet Santa Cruzans have a mixed relationship with the San Lorenzo River and its riverfront parks.

Some residents have specific concerns of public safety and accessibility of the river for positive uses. Some residents commute over the river every day without thinking twice about this critical natural resource. Tourists who visit downtown Santa Cruz don't realize that the river is just a block away. It's this lack of connection to our environment and lack of understanding that can perpetuate land-based nonpoint source pollution and other human activity that negatively impacts the riparian corridor and water quality. Notably, the San Lorenzo River is listed on California's 303(d) impaired water bodies list for pathogens, nutrients, and sediment.

To better make informed decisions and to take daily actions that support the mutual health of humans and wildlife, we must build a positive association with this habitat.

The Santa Cruz Museum of Natural History and the Coastal Watershed Council have been working together for a healthy San Lorenzo River in direct partnership since the formation of the San Lorenzo River Alliance in 2013. Both organizations do so by engaging youth and adults in place-based educational programming at the San Lorenzo River that excites and inspires Santa Cruzans' connection to the ecosystem. SCMNH annually serves over 3,000 students and their parents through its Science In Nature Experiences field trips alone, plus thousands more visitors to the Museum only half a mile away from the San Lorenzo River. CWC engages hundreds of volunteers each year in habitat restoration and water quality monitoring along the San Lorenzo River and teaches 3,000 students and their parents about the San Lorenzo River watershed.

Last year the Exploring the San Lorenzo River series provided nine unique and immersive wildlife experiences to 132 youth and adults in the heart of Santa Cruz, the most urbanized area in the County. In its first year the series built understanding and appreciation for this resource.

By bringing more people to the river and its surrounding park to exercise, view wildlife and socialize, we empowered them and taught them how to interact with the river in low-impact ways. The result are watershed residents who know more about the San Lorenzo River and feel comfortable and safe spending more time there.

Based on participant feedback, including a handmade card from a young participant, CWC and SCMNH understood that the tours were influential and shaped positive memories of the San Lorenzo River for participants. From our conversations with participants we also perceived an ongoing need for programming and events that model how to enjoy the San Lorenzo River, Santa Cruz Riverwalk and the surrounding green spaces. Many participants shared that they were curious about the San Lorenzo River and wanted to learn more but were unsure how to do so until they connected with the tour series. Last year numerous participants expressed that it was their first time visiting the lower San Lorenzo River.

7. How will the project be accomplished (design specifications or plans, if applicable)

Program planning will occur in January 2018. CWC and SCMNH will work together to schedule experts to lead tours and secure permits for site access. Based on tour topics, CWC and SCMNH will work with experts to develop activities and curriculum appropriate for engaging intergenerational audiences.

Exploring the San Lorenzo River tours will be formatted so they are attractive and engaging for diverse constituencies. Tours will emphasize participant engagement throughout, with activities such as participating in bird counts, using a model to understand how the watershed connects us to the river, and passing around artifacts that show animal adaptations. While every tour will have family-friendly options and activities, specific tours will be identified as ideal for young explorers. These opportunities will be promoted to youth groups and family centers in addition to broader promotional efforts.

Each program will create associations of having fun in nature that incentivize further participation in river-centric events. For those that participate repeatedly, the tours are formatted as a series with multiple exposures that have greater cumulative learning benefits than one-off interventions. In tour planning, special attention will be paid to integrating stewardship actions. SCMNH, with support of CWC, will develop take-away “Action Cards” that provide stewardship tips relevant to each tour topic.

CWC and SCMNH will utilize promotional tools similar to last year, including: print advertisements; a web page specific to the series; social media and email engagement with each organization’s networks and mailing lists, the Cal Academy of Science network and with students, parents and teachers participating in CWC and SCMNH educational programs.

In its first year, the Exploring the San Lorenzo River series was successfully promoted by non-environmental partners, like Growing Up in Santa Cruz who published an article about family

fun at the Riverwalk, highlighting the series, and Arts Council Santa Cruz County whose arts-focused membership received notifications of upcoming tours along the San Lorenzo River. CWC and SCMNH will maintain these unique partnerships and cultivate new connections in order to reach beyond "the choir" and bring new audiences. New this year, promotional efforts will include a special focus on the the neighborhoods closest to the San Lorenzo River. Participants will be able to sign up for tours on either organization's website and both groups will work together to manage enrollment and data collection.

SCMNH and CWC will then lead ten weekly tours February through April 2018 (except for the week of Spring Break), culminating at the Santa Cruz celebration of Earth Day. The tours will alternate between the upper watershed through the San Lorenzo Valley and the lower San Lorenzo River watershed in Santa Cruz. Staff from SCMNH and CWC will support experts during the tour by facilitating activities and games that engage youth and support the lessons provided by these experts. Staff will provide support and assurance for positive learning experiences for families and ensure safety of participants during each tour. After the tour, staff will check in with attendees to assess learning outcomes then share further opportunities to engage with the San Lorenzo River.

CWC and SCMNH will record participants throughout the tour series and track how many people return for more than one tour. Participation data from 2018 will also be compared to that of the Exploring the San Lorenzo River Series in 2017.

8. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution*	Total Amount
Santa Cruz Museum of Natural History			
Staff Time – Museum Education Manager (50 hours)	$230	$1170	$1400
Staff Time – Museum Programs Coordinator (40 hours)	$1000	$400	$1400
Transportation (Mileage)	$30	$100	$130
Printing (Action Cards)	$0	$400	$400
Online Services (surveys, etc.)	$0	$30	$30
Santa Cruz Museum of Natural History Total	**$1260**	**$2100**	**$3360**
Coastal Watershed Council			
Staff Time – River Scientist (50 hours)	$1570	$1680	$3250
Mileage	$30	$0	$30
Coastal Watershed Council Total	**$1600**	**$1680**	**$3280**
Shared Expenses			
Honoraria for Expert Guides	$250	$250	$500
Program supplies (binoculars, microscopes, name tags, signage, educational activity materials)	$250	$150	$400
Advertising (print, radio, online)	$100	$500	$600
Shared Expenses Total	**$600**	**$900**	**$1500**
PROGRAM TOTAL	**$3460**	**$4680**	**$8140**

*The San Lorenzo Water District Education Grant for $3,000 was awarded to SCMNH in July 2017 to fund upper river program components. Funding from the Clif Bar Family Foundation will provide $1,680 matching grant for CWC portion of the program.

9. Timeline for completion

Task	**Completed by**
Expert recruitment	January 2018
Obtain necessary permits	January 2018
Launch marketing campaign	January 2018
Conduct programs	February-April 2018
BioBlitz Event	Earth Day 2018
Final project report	June 2018

10. Background or history of your organization

The Santa Cruz Museum of Natural History seeks to connect people with nature and inspire stewardship of the natural world. Established in 1905, the Santa Cruz Museum of Natural History is one of the oldest institutions in Santa Cruz. The Museum can trace its beginnings to the collection of local naturalist Laura Hecox, who, in the previous year, gifted her specimens and artifacts to the City of Santa Cruz for the establishment of its first public museum. In 1929, a large collection of Native Californian artifacts was bequeathed to the City of Santa Cruz. These artifacts together represent significant foundational collections for the Museum and are housed at the Santa Cruz Museum of Natural History within an historic Andrew Carnegie library located in Tyrrell Park in the Seabright neighborhood of Santa Cruz.

The Coastal Watershed Council (CWC), a 501(c)(3) nonprofit, was formed in 1995 in response to the declining health of watersheds connected to the Monterey Bay. CWC's mission is to preserve and protect coastal watersheds through stewardship, education and monitoring. Over the past 22 years, CWC has educated thousands of students and trained thousands of volunteers to protect the natural resources along California's Central Coast. CWC's technical experts follow state and federal protocols to generate scientifically valid data that inform key decision-makers. CWC's history has positioned us as well-respected leaders in watershed protection.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name
   Engaging Strategic Partners in Community Ocean Conservation Outreach the Santa Cruz

2. Name of organization or individual submitting the proposal
   California Marine Sanctuary Foundation

3. Amount of funding requested
   $1,500.00

For each of the following sections, give a brief description:

4. Project Description

   The California Marine Sanctuary Foundation proposes hosting and coordinating a collaborative marine conservation themed exhibit booth for the Santa Cruz Earth Day Celebration on Saturday April 21, 2018 at San Lorenzo Park. This family friendly celebration engages many families from Santa Cruz County and we anticipate it will be a great opportunity for education and outreach for local organizations working to protect our coasts and oceans. Santa Cruz is a leader in ocean conservation, with many elected officials, city and county leaders and NGOs taking bold actions to make our small city a model of sustainability. While local NGOs focused on protecting our lands and resources participate in Earth Day, there is a noticeable absence of ocean and marine conservation organizations in past years. This is because many of these organizations are small and lack the resources to staff and reproduce exciting interactive materials for display and use. This proposal will support the coordination and reproduction of ocean conservation resources and activities from many local partners. Those that will be engaged include Save Our Shores, ReefCheck, Save the Waves, Monterey Bay National Marine Sanctuary, Slow Coast, Friends of Santa Cruz State Parks, UCSC, National Marine Fisheries Service, Fish Wise, Reel Good Fish and the Marine Mammal Center. Topics designed to engage visitors of all ages and knowledge levels will be presented including marine protected areas, marine debris, local fish and wildlife species identification (marine mammals, fish, invertebrates, algae), sea level rise, sustainable seafood, and ocean acidification. Additionally, opportunities for the public to get involved with the work of partners will be showcased. A small grant to support planning for this event has been submitted for funding to OPC, but additional resources are needed to reproduce displays, exhibits, and printed materials and activities to make this a fun, interactive event.

5. Project objectives and goals

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

Goals:

- Increase awareness of the bold steps Santa Cruz is taking as a leader in marine conservation.
- Educate underserved and diverse audiences about Santa Cruz's local organizations working in support of California's coast and ocean.
- Provide educational tools for coastal and marine conservation outreach.

Objectives:

- Coordinate a one-stop marine conservation booth with interactive and fun family activities for the Santa Cruz Earth Day Celebration.
- Create an exhibit filled with materials, games and engaging activities that showcase Santa Cruz ocean conservation programs.
- Provide opportunities for the public to get involved with local ocean conservation initiatives including opportunities for citizen science and kids' events.
- Promote coordination among Santa Cruz marine conservation organizations to work collaboratively to infuse Earth Day with coastal and ocean activities.

6. Background and history of the problem

   The first Earth Day on April 22, 1970, activated 20 million Americans from all walks of life and is widely credited with launching the modern environmental movement. Today, over 1 billion people participate in Earth Day activities worldwide. Earth Day Santa Cruz is an annual event to raise environmental awareness; address local concerns; showcase solutions; and present balanced modes of living for the wellbeing of each individual, the community, and the planet. Specifically, it is a day to celebrate our natural resources, to network with the community and to educate, motivate, and activate everyone that attends. In past years, a large number of the ocean conservation organizations in Santa Cruz County have been absent from the highly attended event. Santa Cruz, a gateway to the Monterey Bay, is ripe for outreach and there are numerous local organizations with existing educational activities and materials that would help inform the public of the issues facing their local oceans and offer ways for them to get involved.

7. How will the project be accomplished (design specifications or plans, if applicable)

   CMSF would be in charge of coordinating local partner organizations and facilitate planning and set-up of the exhibit booth and associated activities at the 2018 Santa Cruz Earth Day Festival.

8. Budget (include sufficient detail to explain use of grant monies). *Specify if there are any*

sources of other funds committed to the proposed project.

The requested budget for this project is $1500.

Item	Funds Requested	Match Contribution	Total Amount
Exhibit Booth Space	$200		
Creation of Collaborative Exhibit Display	$300		
Materials for Activities	$400		
Printing of Brochures and Flyers	$375		
Management and Administration Fee (15% of Total)	$225.00		
TOTAL AMOUNTS	$1500.00		

9. Timeline for completion
   May 2018

9. Background or history of your organization

The California Marine Sanctuary Foundation (CMSF), established in 1995, has played a crucial leadership role in supporting California's statewide network of marine protected areas (MPAs), and the Monterey Bay and Channel Islands National Marine Sanctuaries. We focus our efforts on community outreach, education, research, and resource protection for conserving and protecting the extraordinary environment and resources of coastal protected areas, marine sanctuaries, and reserves in California. By adhering to our strict policy to maintain a very high ratio of program expenses to management, administration, and fundraising fees, we have been able to ensure more unity across units, better integration of information, and greater impacts. Our successes are often attributed to the private/public innovative partnerships that we cultivate. This proposal would allow CMSF to build upon previous investments in Santa Cruz County and fill a missing niche at the 2018 Santa Cruz Earth Day Celebration by providing ocean conservation outreach involving the work of many local organizations to locals and visitors at the highly attended event.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name

   Ivy Removal to Prevent Loss of Live Oaks at Santa Cruz Long-toed Salamander Ecological Reserve

2. Name of organization or individual submitting the proposal

   California Department of Fish and Wildlife (CDFW)

3. Amount of funding requested

   $2000

For each of the following sections, give a brief description:

4. Project Description

   CDFW owns and manages the Santa Cruz Long-toed Salamander Ecological Reserve in Aptos. Oak woodland habitat is a key component to the habitat and life history requirements of the Santa Cruz long-toed salamander (SCLTS). Many oak trees within the Reserve are overgrown with English ivy (*Hedera helix*) which have grown up the trunk of the trees, are now producing seed, and are starting to kill the oaks. In order to preserve and prevent further damage to the oak trees, CDFW proposes to work with Calfire Ben Lomond Fire crews to cut the ivy away from tree trunks and pull ivy at least 5 feet away from the trunks.

5. Project objectives and goals

   To maintain suitable oak woodland habitat for SCLTS at the Reserve. Removal of exiting growth around the trunks of trees and thus preventing ivy from continuing to grow up the trunks and into the crowns of these trees will prevent the loss of many old oak trees that are providing valuable habitat.

6. Background and history of the problem

   Habitat disturbance from housing developments in and around the Reserve have likely contributed to the spread of ivy throughout the Reserve over the years. CDFW funding for habitat management is extremely limited and thus the spread of this invasive weed has been neglected for many years. It has come to a critical point in the management of the Reserve as oak trees are showing many signs of stress from the ivy and beginning to die. Many of these oak trees are growing near and adjacent to local residence and threaten to fall creating a safety hazard.

7. How will the project be accomplished (design specifications or plans, if applicable)

   The Calfire Ben Lomond crew will be hired to help complete the project on the ground. The appropriate CEQA document will be completed by CDFW along with sponsorship and oversight of on the ground work. CDFW staff will also complete long term monitoring of project effectiveness and complete follow up treatment as needed to prevent ivy from establishing itself on oak trunks again. CDFW requests the County issue the grant award directly to the Ben Lomond Fire Crew to make the project more streamlined.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Calfire Ben Lomond Crew ($250/day)	$2000		
CDFW staff time ($50/hr)		$2500	
TOTAL AMOUNTS	$2000	$2500	$4500

8. Timeline for completion

   Project will be completed during two weeks of the summer of 2018 depending on Ben Lomond Fire Crew availability.

9. Background or history of your organization

   CDFW's mission statement is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. To meet this objective CDFW owns and manages numerous Ecological Reserves throughout the state.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name: Marine Science After-School Program

2. Name of organization or individual submitting the proposal: Regents of the University of California/ Pinniped Cognition & Sensory Systems Laboratory, Institute of Marine Sciences, UC Santa Cruz

3. Amount of funding requested: $4,302

For each of the following sections, give a brief description:

4. Project Description

We have developed an after-school program that educates students (grades 2-8) on the local marine environment and the importance of protecting and reserving ocean health. This program is currently being taught at Mission Hill Middle and The Downtown boys & Girls Club of Santa Cruz. The program will be offered a second time to both groups, and has potential to be taught at other schools in the area, with appropriate funding.

The after-school program is 12 weeks in duration, with six classroom based sessions and three special field trips. In the classroom, students will learn and explore topics through engaging, hands-on activities. The students will apply their classroom work in two visits to the Long Marine Lab facility to work hands-on with the marine mammals, and one visit to Año Nuevo State Reserve to thoughtfully observe marine mammals in their natural habitat. Last, the program will be completed with a field trip to the beach to complete a beach clean-up, and to enjoy the local marine environment.

Through classroom encounters and behind-the-scenes visits to Long Marine Laboratory and Año Nuevo State Reserve, local students (grades 4-8) will interact with our team of scientists and university students, exposing them to new perspectives that may encourage them to pursue careers in science. This unique program provides an opportunity to help young students become enthusiastic, well-informed, and aware ocean stewards.

5. Project objectives and goals

Objective 1: Create well-informed and aware ocean stewards among local students
By pairing cooperative human-animal interactions with engaging classroom activities we will provide students with a long-lasting understanding of the importance of ocean preservation. We believe that enabling students to examine the second and third order effects that their own actions have on our coastal marine environment will translate to increased pro-environmental behavior.

Objective 2: Nurture a deeper respect and empathy for marine animals
In today's digital world, it is difficult for educators to instill an indefinable sense of awe for the marine environment that translates to empathy and respect the ocean and wildlife. A recent study showed that there is a significant, direct relationship between sense of connection to animals and pro-environmental behavior [Grajal, et al, 2017, Conservation Biology]. Our program combines teaching through classroom-based activities with novel learning opportunities based on interactions with marine mammals living in human care and thoughtful observations of wild animals.

Objective 3: Improve students' observational skills by teaching science as active inquiry
We aim to inspire students to ask questions and make hypotheses about their surrounding environment by providing a rich setting for students to learn based on personal experiences. In the classroom, students will learn the tools used to study animal behavior, followed by opportunities to apply these new skills through interactions with living animals in zoological and field settings.

6. Background and history of the problem

Because of the marine lab's demanding research schedule, we are unable to open up the lab to the general public on a daily basis, and as a result, some of our work and contributions to marine research and conservation may not be fully understood in the Santa Cruz community. However, we see great benefit to opening up the lab for an educational purpose, allowing young students in the community to become engaged and involved in science that is happening in their own backyard. As a coastal community, it is important for people of all ages to respect the ocean and be inspired to take action to preserve ocean health and protect marine wildlife.

In today's electronic age, so much exposure to science comes in the form of digital media. While these tools have provided incredible access to information, personal connections to nature are declining. Although very close to the coast, many K-12 schools in Santa Cruz County do not have the resources to provide students with opportunities to directly interact with and observe the ocean environment. This especially holds for after-school programs that are most often used by the children of working families. These programs often lack the resources to support off-campus activities. While learning about the ocean environment solely through presentations and digital media in the classroom has value to students, it is difficult for educators to instill that indefinable sense of awe for the marine environment that translates to empathy and respect for the ocean and the animals living in it. Here, we propose a pilot program for students, grades 4-8, that combines teaching through classroom-based activities and digital media with novel learning opportunities based on one-on-one interactions with marine mammals living in human care and thoughtful observations of wild animals in their coastal environments.

Although Santa Cruz lies in the heart of the Monterey Bay there are few—if any—after-school programs that provide students of all backgrounds access to similar STEM-experiences at no cost. This unique opportunity will build experiences that can foster scientific curiosity. The proposed program would provide scientific mentorship as an alternative to the traditional model of after-school caregivers.

7. How will the project be accomplished (design specifications or plans, if applicable)

We currently have after-school programs running with Mission Hill Middle School and The Downtown Boys & Girls Club of Santa Cruz. We plan to establish long-term relationships with these groups, and to continue offering the program twice a year. After the pilot year, we aim to grow the program to be able to accommodate other groups.

Please see attached table at the end of this document for an outline of the current Mission Hill Middle School after-school program. All programs will cover similar topics on a similar timeline.

At the start of the program, we will give the students a re survey to evaluate their baseline knowledge about the marine environment, and to assess interest in science and respect and empathy that they may have for the environment. At the conclusion of the program we will give students the same survey, which will show increased knowledge about the marine environment, a deeper excitement for science, and increased respect and empathy for marine life.

In addition, we will ask the parents of the students in the program to complete a survey at the comletion of the program. The survey will evaluate the organization/structure of the program and its staff, their child's enjoyment of the program and the overall success of the program. We will encourage any and all feedback to assist us in making improvements to the program for the following years.

8. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Operational costs for Science Education Coordinator at $16.43/hr, 50% time	$3,092		$3,092
Classroom materials such as student workbooks, activity materials, etc.	$222		$222
Animal program supplies including training materials, and personal protective gear	$100		$100
University Indirect Costs (26%)	$888		$888

TOTAL AMOUNTS	$4,302		$4,302

In addition to this grant, we are in the middle of a 30-day Crowdfunding campaign to raise money to support this program. The donation period has not ended, however we anticipate raising $3,000-$5,000.

9. Timeline for completion

The education programs will be 12-weeks in duration, with one session per week. The timeline may be different for each school/group, but will roughly be 8 January 2018- 30 March 2018. In a school year, we aim to offer each group the program twice a year.

10. Background or history of your organization

UC Santa Cruz is a leading research university with a tradition of innovation in the education of students—built on values of social and environmental responsibility. Within the University, the Pinniped Cognition and Sensory Systems Laboratory is one of the most well-known and enduring research programs on our campus. The Cognition and Sensory Systems Laboratory has been based at UC Santa Cruz since 1985. Our mission is to investigate several aspects of marine mammal biology and behavior. We have a special interest in the amphibious marine mammals, including seals, sea lions, walruses, and sea otters—because of the unusual constraints imposed on their information gathering and processing capabilities. In the specialized marine facilities of the Coastal Science Campus, we work cooperatively with trained animals to ask and answer questions that cannot easily be explored with free-ranging animals. We also study the complex behavior of animals in natural environments in order to understand how these animals survive and thrive in the sea. While the focus of our team centers on scientific research, we want to expand our influence outside the walls of the research laboratory and the university. We are dedicated to educating the public about the importance of these animals in our local ecosystems and sharing our research and contributions to conservation efforts within our local community.

A pillar of our program is public education. Although we have limited resources for outreach, we currently conduct various educational programs, including science presentations and research demonstrations at the laboratory facility. In addition, in partnership with the Seymour Marine Discovery Center, we teach a hands-on marine science summer program for children, ages 8-14, on marine conservation, using marine mammal research to capture and maintain the interests of children in an increasingly digital, hands-off world. We are currently in the middle of our pilot after-school education programs with Mission Hill Middle and the Downtown Boys & Girls Club of Santa Cruz.

Week	Session type	Topics	Activities
1	classroom	Our Marine Ecosystem & Marine Mammals - What is the Pinniped lab and what are we trying to learn about marine mammals and their environment? - Marine mammal adaptations - What are pinnipeds and how do we identify different species? - Introduction of students' scientific journals	Complete student pre-surveys Introduce & fill out essence cards Marine mammal adaptations- pelts, skulls, vibrissae, etc. introduce students' scientific journals
2	classroom	Basic Animal Behavior & Husbandry - How do we study animal behavior? - What is the importance of "knowing your animal"? - General animal health & husbandry in human care - What is enrichment & why is it important for animals in human care? - Types of enrichment & enrichment safety	Watch video about animal behavior Role-play animal behavior and researchers: practice making behavioral observations (done outside) Design enrichment for the pinnipeds in teams
3	laboratory	Lab Visit I: Animal Health & Husbandry - Meet the marine mammals - Evaluate animal health - Observe animal enrichment sessions	Meet and learn the history and characteristics of our animals Assist with animal health assessments Animal behavior observations during enrichment sessions with enrichment items created in previous classroom session
4	classroom	Arctic Ice Seal Research - What type of environment is the arctic and why is it challenging to survive here? - What marine mammals live here? - What is our arctic ice seal research project and why is it important?	Life in the Cold adaptation game Blubber Game Introduction to ice seal research: watch videos of current projects
5	classroom	Sensory Systems & Cognition Research - Marine mammal sensory systems overview - What is cognition? - Current sensory systems & cognition laboratory research projects - The importance of field and laboratory research- Año Nuevo State Reserve overview	Marine mammal senses exploration game Watch videos of signal detection & rhythmic entrainment Intro to elephant seals and Año Nuevo
6	field	Visit To Año Nuevo State Reserve: Field Research - Northern elephant seal natural history - History of Año Nuevo State Reserve - Animal behavior observations in the field - Exploration of field research methods	Walk to viewing point- scavenger hunt on the way Animal ethogram Research talk & activity

7	classroom	Psychology of Working with Marine Mammals - What is operant conditioning? - What are tools for cooperatively working with marine mammals? - What makes a good animal and a good trainer?	Training tool exploration game Watch videos of animals in training sessions and make behavioral observations Human training games
8	laboratory	Lab Visit II: Working with Animals in a Research Setting - Assistance and participation in various animal training sessions - Observe and participate in various research projects - Research data collection	Run students' acoustics tests Observe and collect data for cognition and/or ice seal research projects Participate in animal training sessions Introduce trash jar "homework" for next week
9	classroom	Watersheds & Marine Debris - What is a watershed? Why are they important? - Types and sources of marine debris - Decomposition of marine debris - What can we do to reduce marine debris?	Trash jar sorting activity Marine Debris Activity Marine debris decomposition timeline activity
10	classroom	Stranded Marine Mammals - Identify sick/injured vs. healthy animals - Marine mammal entanglements and other anthropogenic causes to distress - Marine mammals in distress: what do you do when you see a sick or injured animal in the wild? - How can we prevent these?	Photo ID game- healthy vs sick animals Entanglement game Animal rescue role-play (outside)
11		Program Wrap-Up - Ocean Stewardship- what can you do to protect the ocean? - Careers in Marine Science - Program wrap up: what did we learn?	Trivia game to review what students have learned Complete student post-surveys Marine Science Careers Game Promises to the Ocean: how can we be ocean stewards
12	beach	Beach Day Fun!!	Scavenger Hunt Team building games Sculpture Contest Beach Clean-Up

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. **Project name**
   Sempervirens Watershed Curriculum Development

2. **Name of organization or individual submitting the proposal**
   Exploring New Horizons Outdoor Schools

3. **Amount of funding requested**
   $1,500

For each of the following sections, give a brief description:

4. **Project Description**

Exploring New Horizons is an established environmental education organization that has been providing residential programming to 5th and 6th grade students since 1979. For the past 17 years we have had the opportunity to operate our Sempervirens campus in Big Basin, alongside Boulder Creek. Due to changes within California State Parks, we have to relocate our program to a new facility at Camp Krem. Camp Krem has a creek running through the property that would allow Exploring New Horizons to strengthen the lessons we provide to students around watershed education, restoration and conservation.

Support from the Santa Cruz Fish & Wildlife Advisory Committee would allow our Sempervirens Program Director, the Exploring New Horizons Executive Director and Education Naturalists to take the time to carefully research different curricula surrounding creek and watershed restoration and conservation, and subsequently have the means to purchase it. This generous support would ensure that we would have the adequate means to provide long-term education to the countless students that visit the San Lorenzo Valley for Environmental Education.

5. **Project objectives and goals**

Our objective is to have a watershed curriculum, specific to the San Lorenzo Valley, and subsequent lesson plans ready to present to students who come to the new Sempervirens facility starting April 1, 2018.

Our goal is for students to realize the importance a healthy watershed has in their community and their environment. We host four schools from Salinas, and a majority of Salinas families work in agriculture, which directly impacts their area with agricultural runoff that empties into the Pacific Ocean. These students learn how Steelhead are threatened due to over pumping of water from the Salinas River (and this species is a part of the San Lorenzo Valley Watershed, too). Observing a real creek will connect with students on how that affects their community directly.

By providing hands-on watershed lessons with an actual creek, we intend to show our students, and their larger school communities, how non-point source pollution and runoff directly affects

communities, species and ecosystems. We'll also show how to ensure a watershed is a clean resource for the community.

Between January 9, 2018 and our last day of program for this school year, 24 schools with 1,385 students will have had the opportunity to engage in a new, hands-on creekside watershed lesson. Funds provided by the Santa Cruz Fish and Game with have an exponential impact annually. This partnership will continue to empower students, school and communities for years to come. This spring it will be 1,385 students, but within 5 years these funds will have touched the lives of over 11,000 students, their school population and families throughout the greater San Francisco Bay Area.

6. Background and history of the problem

Exploring New Horizons (ENH) at Sempervirens has had to move to a new location beginning January 2018. Our new location at Camp Krem has a creek that we'd like to utilize in our lesson plans. Here's what happened.

Early this summer, after 17 years, State Parks notified ENH that they would not be renewing our lease at the Saddle Mountain facility which houses our Sempervirens campus. After receiving the notification, ENH staff worked with California State Parks and Santa Cruz Mountain Sector Staff to negotiate a contract termination date to December 31, 2017. This news has been highly upsetting as we have called Santa Cruz Mountains, and the San Lorenzo Valley home for all this time. While uncertain, we began the work to find a facility that would allow us to complete the 2017/18 school year and ensure that there would be no interruption to the schools and students already booked. After a thorough search, ENH has entered into an agreement with Camping Unlimited at their Camp Krem property starting January 1, 2018.

Moving an established program is a significant challenge. We are working to ensure buildings are adequate to house our students, homes are secured for our staff, and we want to ensure the same high caliber programming that our students have come to associate at Sempervirens. Camp Krem has a new topography and biological diversity than we are accustomed to.

Located alongside the Peavine Creek, the students and teachers that visit each week will have opportunities to engage with this creek other tributaries within the San Lorenzo Valley Watershed. While ENH at Sempervirens is utilizing the Camp Krem facility, students should have access to the creek on the property and take advantage of hands-on learning about watershed conservation and restoration.

7. How will the project be accomplished (design specifications or plans, if applicable)

During this time of transition, the ENH Staff are working to understand the rich diversity of flora and fauna that we will be working with starting in 2018. This is an exciting time for environmental education within California. The State Department of Education is working to implement the Next Generation Science Standards, an innovative set of tools and pedagogy that empowers students to become investigators and engage deeply with their local

environments.

Watershed education is a powerful tool to connect students to the importance of a sense of place, and gives students an opportunity to make a direct impact in the health of the ecosystem. Exploring New Horizons at Sempervirens takes a students from the trees to the sea each week. We aim to provide a well-rounded experience for the students helping to experience first-hand how the oceans are impacted by the health and biodiversity of the creeks, rivers and tributaries that feed directly into it.

The education and program staff at Exploring New Horizons will research new watershed curriculum that will support education at our new home at Camp Krem. Located along Peavine Creek, each week students will have an opportunity to participate in lessons creekside before following the water down to where it meets the sea at Natural Bridges State Beach.

It would be our goal to find a curriculum that supports students in learning about:

- Indicators of creek health
- Macro Invertebrates Investigations
- Lifecycle of Steelheads and other Fish that live within the San Lorenzo
- Point and nonpoint source pollutants that impact the health of our watershed.

Once we select a new curriculum, ENH will ensure that staff have opportunity to participate in training, and procuring the appropriate educational supplies, equipment and materials for presentations and lessons. This project has an immediate need and will have direct impact upon the students that will be attending our program starting in 2018.

7. **Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.**

(Please see the ENH detailed budget attached)

8. **Timeline for completion**

December 2017- March 2018 – Compare and contrast different watershed curricula. Meet with ENH staff for feedback and select a curriculum best suited for our students.

March 2018 – Observe ecology around and in Peavine Creek within the new Sempervirens location at Camp Krem to possibly customize curriculum. Prepare watershed lessons.

April 2018 – A curriculum is selected and lessons prepared. Students arrive for spring programs, ready for environmental education including an impactful lesson about watershed.

Exploring New Horizons Program Budget

Organization: Exploring New Horizons Outdoor Schools
Program Title: Sempervirens Watershed Curriculum Development
Program Period: 12/1/2017 - 11/30/2018

Income				
		Fish and game	**ENH / Matching**	**Total**
Santa Cruz Fish and Game	***This proposal - pending***	***$1,500***		***$1,500***
Save the Redwoods League	Education Enrichment Development		$500	$500
ENH Individual Donors	Pending / Ongoing		$2,000	$2,000
Total Potential Income		***$1,500***	**$2,500**	**$4,000**

Expenses				
Item	**Rate**	**Fish and game**	**ENH / Matching**	**Total**
Sempervirens Program Director	Content Research, NGSS Curriculum Est. 10 hours @ $130/hr		$1,300	$1,300
Curriculum Purchase	Purchase Use of Watershed Cirruclum	$500	$250	$750
Staff Training and Enrichment	InService Education for All Sempervirens Staff	$500	$390	$890
Teaching Supplies & Copies	Equipment and Materials for Installation	$350	$350	$700
Administrative Costs & Evaluation	Grant Administration & Finance Tracking	$150	$200	$350
Total Expenses		**$1,500**	**$2,490**	**$3,990**
Total Direct Costs		**$1,500**	**$2,490**	**$3,990**
Total Indirect Costs		$0	$0	**$0**
Total Costs		**$1,500**	**$2,490**	**$3,990**

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

1. Project name

   Salmon and Trout Education Program (STEP)

2. Name of organization or individual submitting the proposal

   Monterey Bay Salmon & Trout Project

3. Amount of funding requested

   $3,360

For each of the following sections, give a brief description:

4. Project Description

The Monterey Bay Salmon & Trout Project runs an experiential learning program, the Salmon & Trout Education Program (STEP) in the greater Monterey Bay region. Our curriculum supports salmonid conservation and recovery by educating, engaging, and motivating students to undertake activities that benefit local threatened Salmon and Steelhead Trout populations. Our curriculum aligns with the new Next Generation Science Standards and provides K-12 teachers with exciting ways to engage students and boost learning. In addition to classroom lessons and pre-field study briefings, students visit rivers to conduct field studies, gather data, collect benthic macroinvertebrates and carry out in-stream surveys. Back in the classroom, students set up model River Ecosystems in 37-gallon tanks with the goal of maintaining the tank ecosystem with parameters as closely matching their collection river as possible so that the macroinvertebrates will survive and thrive, ultimately going through their lifecycles from larvae to adult.

5. Project objectives and goals

1) Set up and test pilot River Ecosystem tank.
   - deliverable: functioning tank able to support benthic macroinvertebrates.
2) Complete a teacher training on the river.
   - deliverable: at least five teachers trained who will pilot test STEP in their classrooms during 2018-19 to serve at least 500 k-5 students in Santa Cruz County.
3) Add at least 3 new lesson plans for the River Ecosystem component.
4) Make any revisions necessary to the lesson plans after receiving teacher feedback from the training.
   -deliverable: a newly revised and complete STEP curriculum ready to launch in Fall of 2018.

6. Background and history of the problem

The STEP program at one time had a classroom component that included incubating and hatching steelhead trout eggs, then releasing the fry into the river as the conversation and restoration classroom and associated in-stream culmination of the STEP curriculum. However, because of regulatory changes and the threatened status of steelhead, their eggs are no longer allowed to be given out and incubated in classrooms. It is hoped that in the future, permitting will allow Monterey Bay Salmon and Trout project to resume the classroom incubation and recovery component. To keep the highly popular and comprehensive STEP program supporting science teachers, a new classroom/in-stream project is being developed to engage students and link their learning with in-stream collection and field studies. To compound the urgency, new Next Generation Science Standards have been approved for classroom use as of 2014, however at this time, the teachers in Santa Cruz County have not been supplied with science textbooks that support the new standards. Our STEP curriculum lesson plans have been recently modified to support the new standards, with the supported standards identified in each of the 27 lesson plans. Teachers have been contacting us, eager to utilize STEP in their classrooms. It is therefore incumbent upon us to provide an engaging classroom project to replace the discontinued steelhead egg incubation project.

7. How will the project be accomplished (design specifications or plans, if applicable)

Two of the co-founders of STEP will work to design a conflated river ecosystem model suitable for classroom use, most likely using a 37-gallon long aquarium to achieve a simulated river flow. The education coordinator for MBSTP will notate steps needed to set up the tank and translate these into simple instructions for science teachers. The education coordinator will work in collaboration with one of the co-founders of STEP to design at least three new lesson plans that support the NGSS standards and create engaging science activities for the students utilizing a classroom river ecosystem tank. The education coordinator will work in collaboration with one of the co-founders of STEP to create a benthic macroinvertebrate collection protocol for teacher and student use so they can populate their tanks once the tanks are up and running. The lead teacher/trainer for MBSTP will host a training for those teachers who have signed up for the pilot test. They will receive a training on a weekend during the summer and supply feedback to the MBSTP education coordinator and STEP founders for any adjustments needed to the tank set up, population, and lesson plans.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

STEP Budget

Item	Funds Requested	Match Contribution	Total Amount
Executive Director 10% FTE		$12,000	$12,000
Program Director 30% FTE	$500	$22,000	$22,500
Lead Teacher/Trainer $25 hr + stipend (500 hrs total)	$1,500	$12,500	$14,000
Benefits ED & PD @ 23%		$7,935	$7,935
Program supplies: binders, printing, dissolved oxygen/temp sensors, specimen bottles, buckets, clipboards, nets, 37 gal aquaria, pumps, filters, hoods, lights, thermometers	$770	$12,710	$13,480
Postage & Office supplies		$1,023	$1,023
Insurance		$604	$604
Transportation of students to field sites	$590	$14,160	$14,750
TOTAL AMOUNTS	$3,360	$82,932	$86,292

8. Timeline for completion

2/18	Set up test tank and populate.
3/18	Write lesson plans & tank set-up instructions.
7/18 – 8/18	Teacher training for pilot & feedback, revision of lesson plans & instructions.
8/18	Grant report to County of Santa Cruz Fish & Wildlife Advisory Council.*

* end of project period for County of Santa Cruz Fish & Wildlife AC grant.

9/18 – 6/19	Classroom pilot test
7/19	Reporting to other funders
7/19	Make further revisions in lesson plans & tank set-up as needed.
8/19	Full teacher training
9/19	Classroom launch.

County of Santa Cruz Fish and Wildlife Advisory Commission
GRANT APPLICATION

9. Background or history of your organization

Founded in 1976, the Monterey Bay Salmon and Trout Project (MBSTP) is a non-profit organization whose mission is to preserve and recover genetically native populations of Salmon and Steelhead Trout in streams and rivers with outlets in the Monterey Bay; to educate and engage students in environmental conservation and habitat restoration through STEM experiential learning, and to enhance Salmon fishing in the Monterey Bay by acclimating and releasing Chinook Salmon (King) fingerlings in collaboration with hatcheries on the Feather and Mokelumne Rivers.

The STEP education project began as a 4-H project in the 1970's, and due to the drought, expanded. Teachers contributed lesson plans already developed (eg. from the Baltimore Aquarium) found to be valuable. With the assistance of a grant from the David & Lucile Packard Foundation, the STEP curriculum was formalized in 1986. During a retreat, the 27 lesson plans were finalized and the steelhead egg classroom incubation component added. By 2010, STEP was running in 109 schools in three counties. In 2013, with regulatory changes, the steelhead incubation component was dropped with no replacement classroom component. Teachers and other informal educators in the community lamented the blow. Many teachers who had gone through the STEP training and owned the curriculum have continued utilizing the STEP lessons in their science classes. Due to continuing demand and now increased resources, the Monterey Bay Salmon & Trout Project is undertaking the planning of the new classroom River Ecosystem component and will be ready to test it in the Spring of 2018.

The MBSTP genetic conservation hatchery and rearing facility supplements the natural population of threatened Coho Salmon, which has drastically declined due to habitat degradation, damming of rivers, and drought. Our spawned and reared fish are of the local wild genotype, and migrate up the San Lorenzo and Scott Creek watersheds. Recovery of the local population would not happen without our hatchery program.

Our local King Salmon fishing season on the Monterey Bay has been shortened due to a declining Salmon population. The dramatic decline of King Salmon drastically affects the livelihood of a great many Santa Cruz County recreational and commercial fishermen, fish businesses, stores, restaurants, and consumers. Our Enhancement Program releases hatchery-raised juvenile salmon in the Monterey Bay to increase the numbers of salmon available for harvest.

In collaboration with local conservation non-profits, we educate the public, so they understand the historic size of the salmonid population in the San Lorenzo River and why these fish have received a federal listing under the Endangered Species Act. Santa Cruz County students who became active and engaged through our K-12 STEP program frequently choose environmental and scientific careers.

Our volunteer opportunities bring out the best in Santa Cruz residents who altruistically lend a hand to restore the San Lorenzo River ecosystem, support our native fish populations, and get some exercise and fresh air in the process. Events such as our Annual Sand Crab Classic Perch

Derby provide an opportunity for parents and kids to fish together and socialize with friends and neighbors as a community.

County of Santa Cruz Fish and Game Advisory Commission
GRANT APPLICATION 2015

1. Project name
   Riparian Corridor Enhancement Project

2. Amount of funding requested
   $5,000

For each of the following sections, give a brief description:

3. Project Description

This project would purchase native, locally grown riparian plants to enhance riparian corridors on private property. Riparian plants would be given only to property owners who are interested in improving their riparian corridor habitat or improving bank protection over the long term. Owners would agree to plant and water plants for the first few years until they are well established. In addition, owners would be expected to change land management (for example, stop mowing or move development back) near the new plants to allow them to mature.

In Santa Cruz, fall and early winter are considered the best times to establish new plants. If approved, this project would provide funding to start the program in time for the Fall 2017 planting season.

4. Project objectives and goals

The goal of the project is enhance riparian habitat by providing native, locally grown riparian plants with planting and care instructions to streamside property owners. This project complements existing efforts to educate streamside property owners about riparian protection and new efforts to improve riparian habitats through voluntary or regulatory means.

The project is not intended to fully restore the riparian corridor on any specific property. The goal is to motivate streamside property owners to consider their land management and use within the protected riparian corridor and to provide an easy way to encourage riparian corridor enhancement. Many of the trees that fall within riparian areas will not be replaced by natural recruitment, so this project is an investment in long-term riparian habitat viability.

An added benefit of the program will be to introduce property owners to native plant nurseries. Since they will be required to pick up the plants, property owners will be exposed to the great variety of native plants available in Santa Cruz County.

5. Background and history of the problem

As part of the Stream Wood Program, the County's Fishery Resource Planner visits streamside properties where owners have concerns about fallen trees or stream wood. Many of these property owners are unaware that the County has a Riparian Corridor Protection Ordinance that protects 50' on either side of the bankfull channel. While addressing concerns about stream

wood, there are often opportunities to either replace the tree or trees that fell or to improve riparian corridor habitat by adding some vegetation, especially at the top of the bank when riparian habitat is lacking.

Over the past year, the County's Fishery Resource Planner has been asking property owners if they would be interested in either replacing the tree or trees that fell and/or enhancing the riparian corridor to provide habitat and long-term bank protection for their property. Several property owners expressed interest in participating in a project to either replacing trees or enhance the riparian corridor. The funding proposal is based on these interested property owners.

Riparian habitats in Santa Cruz County are often degraded in rural residential areas. These reduced riparian corridors often provide a bare minimum of habitat and protection for stream ecosystems. Many of these property owners are unaware of the County's ordinance and continue to use or expand pre-existing disturbance such as clearing, yard space, paths, gardens, driveways and more.

In addition, clearing and development of riparian areas can make the property more vulnerable to bank erosion. When one of the few remaining trees between the stream and the developed property falls, there are limited opportunities for natural recruitment that will replace that tree and the functions it provides.

Enhancing the riparian corridor will have multiple benefits to both streamside property owners and stream habitats. Riparian plants provide shade, organic material, and structure to the stream ecosystem. In addition, more robust riparian corridors provide a visual and physical buffer between residential use and the stream habitat which allows for natural processes such as the accumulation of stream wood and meandering to occur.

6. How will the project be accomplished (design specifications or plans, if applicable)

   The County's Fishery Resource Planner will coordinate the project. Property owners from the Stream Wood Program will be contacted and informed about the project. Appropriate types and number of plants will be selected for each property. It's expected that property owners will elect to plant 2-12 plants on their property for this project. Depending on interest and locations, purchase orders will established at 2-4 local native plant nurseries. As a show of commitment to the project, property owners will be asked to pick up the plants at the nursery and send back photos showing the plants in the ground with a plan for caring for them.

   Environmental Health staff will provide assistance by preparing mailing labels for sending out letters and with setting up Purchase Orders for the native plant nurseries.

7. Budget (include sufficient detail to explain use of grant monies). Specify if there are any sources of other funds committed to the proposed project.

Item	Funds Requested	Match Contribution	Total Amount
Project Coordination		$ 5,000	$ 5,000
Project Assistance		$ 400	$ 400
Riparian Plants	$ 5,000		$ 5,000
Stream Care Guides and Mailings		$ 100	$ 100
TOTAL AMOUNTS	**$ 5,000**	**$ 5,500**	**$ 10,500**

$5,000 will provide about $300 for 15-16 properties or $200 for 25 properties. Depending on the interest, the project expects to enhance the riparian corridor on 15-20 properties.

8. Timeline for completion

The project is expected to take 18 months. The project will start in fall 2017 and is expected to be completed by January 2019. Depending on the interest, either the entire amount will be expended in the Fall 2017 or half will be expended in Fall 2017 and half in Fall 2018.

9. Background or history of your organization

Environmental Health has an extensive history of managing and completing grant projects

COUNTY OF SANTA CRUZ

FISH AND WILDLIFE ADVISORY COMMISSION

701 OCEAN STREET, ROOM 312, SANTA CRUZ, CA 95060
(831) 454-3154 FAX: (831) 454-3128 TDD: (831) 454-2123

Fish and Wildlife Advisory Commission

MINUTES

Santa Cruz County Governmental Center
Fifth Floor
Santa Cruz, California

September 7, 2017

1. CALL TO ORDER. The meeting was called to order at 7:08 PM
2. ROLL CALL.

   Present: Commissioners Berry, Robin, Baron, Frediani, Wise, Freeman, Parmenter
   Excused: Shikuma, Johnson
   Absent: none

3. PUBLIC COMMENTS. None
4. APPROVAL OF MINUTES. Commissioner Freeman made a motion to approve the June 1, 2017 minutes with minor corrections. Commissioner Frediani seconded the motion. All aye, the motion passed.
5. New commissioners, Mathew Wise (District IV) and Ross Parmenter (District V), introduced themselves.
6. PRESENTATIONS AND ANNOUNCEMENTS BY COMMISSIONERS.

7. BUSINESS MATTERS
   A. Discuss current legislation or policy to change environmental protection laws. Commissioner Frediani made a motion to send a letter to the Board of Supervisors asking them to send a letter to Governor Brown asking his support for SB49. Commissioner Baron seconded the letter. All aye, the motion passed.
   B. Discuss Public Grants Program priorities, scoring and Request for Proposals. Commissioners agreed to try a 10-point scoring system that will be sent out with the Request for Proposals.
   C. Discuss Classroom Aquarium Program Grant Proposal. Commissioner Freeman made a motion to consider the proposal for the Classroom Aquarium Education Program during the regular Public Grants Program cycle. Commissioner Robin seconded the motion. All aye, the motion passed. Staff will contact the applicant about the decision.
   D. Report on Cannabis Cultivation Ordinance draft EIR and Sept. 6 public study session and discuss draft EIR comments.

E. Discuss agenda and goals for the upcoming joint commission meeting with Commission on the Environment and Water Advisory Commission September 27, 2017.
F. Update on Environmental Code Compliance.
G. Discuss County's Stream Wood Program and conflict with boating and swimming. Commissioners voiced opinions that boating and swimming access should not determine that stream wood will be modified.

8. STAFF REPORTS/ANNOUNCEMENTS. Ms. Kittleson will be making a presentation at the Riparian Summit conference October 17-19 in Davis. The County of Santa Cruz partnered with the California Dept. of Fish and Wildlife and the Monterey Bay Salmon and Trout Project
9.
10. CORRESPONDENCE
    Commissioners would like to get a follow up report on response to Benjamin Potkin's letter

11. ADJOURNMENT – 9:00 PM.

NOTE: The next meeting is scheduled for November 2, 2017.
Submitted by K. Kittleson; Water Resources/Fish and Wildlife/2017 FWAC Meetings

COUNTY OF SANTA CRUZ

FISH AND WILDLIFE ADVISORY COMMISSION

701 OCEAN STREET, ROOM 312, SANTA CRUZ, CA 95060
(831) 454-3154 FAX: (831) 454-3128

October 31, 2017

Cannabis Comments % Matt Johnston
Santa Cruz County Planning Department
701 Ocean St.
Santa Cruz, CA 95060

RE: Comments on the Draft Environmental Impact Report (DEIR) for Commercial Cannabis Cultivation and Manufacturing Regulations and Licensing.

Dear Mr. Johnston,

Thank you for the opportunity to comment on this DEIR. As you know, the Fish and Wildlife Advisory Commission (FWAC) is charged with advising the Board of Supervisors on policy matters as they regard protection of our County's great biodiversity. Therefore we take this matter very seriously. Given the existence in the baseline condition of a virtually unregulated, illegal industry and the state vs. federal legal status discord, this is obviously an incredibly complicated policy matter requiring a unique CEQA strategy. While there are many aspects of the document that we are supportive of, we will limit our comments to those issues which we feel warrant further clarification or analysis:

1. Mapping/GIS analysis. Many of the figures have inappropriately identified parcels for their respective role in a future licensing program. For example, public lands on Newell Creek are identified as being eligible for cultivation in Figure 2-6 and federal land in Bonny Doon is also identified as eligible for cultivation in other figures.

Mappy errors should be corrected and, if the impacts analysis in this DEIR is GIS-based, then it should also be reviewed in preparation of the FEIR.

2. Land use. Commercial cannabis cultivation and the related concentrates manufacturing activities would be no different than other industrial agribusiness activities if not for its federally illegal status and the associated culture which has grown around illegal cultivation since the

1970s. Trying to impose rigorous licensing conditions upon operations that are inherently ill-suited to their current locations, primarily in the mountains (which the County plainly admits in this document), is likely to be less successful than desired. Limiting this commercial activity to areas already dominated by agribusiness seems more appropriate. The existing infrastructure for cannabis-related activities is located in the mountains not only because the growing conditions are favorable there, but also because the illegal status and subsequently inflated value of cannabis over the decades has required covert, defensible and secure cultivation locations.

With cannabis now coming out of the legal shadows and the relatively new found ability to openly cultivate in greenhouses, an alternative would be to consciously move this activity into existing agribusiness – dominated areas of the County (including coastal areas) and out of mountainous areas, which provide other important functions for the County like water supply, cold water fisheries, recreation, etc.

Specifically with regard to zoning, this DEIR does not include an environmental review of the proposed zoning changes on parcels zoned RA, TP, and SU (Appendix C Proposed SCCC Section 13.10 amendments, pages 1 - 6). According to CEQA (and upheld by the courts), enactment and amendment of zoning ordinances are considered projects subject to CEQA. The zoning changes that are recommended in this EIR clearly "has potential for a direct physical change or a reasonably foreseeable indirect physical change in the environment".

These zoning changes will affect over 100,000 acres (Table 2-10 page 2-40), and almost 200,000 acres in the "Environmentally Superior most Permissive Alternative" (Table 4.4, page 4-37), while the DEIR only reviews the potential environmental effects on less than 300 acres (Chapter 3, page 3.9).

The DEIR also states that any future increase in the number of cultivation licenses (or canopy increases) would be subject to further environmental review (Chapter 2, page 2-34). However, this future environmental review will take place in a legal context where the zoning has already been changed to allow such use. And, as stated in the DEIR notes (Appendix G, LCP policy 5.1.6): enforcing the County Sensitive Habitat Ordinance is limited by the landowner's legal rights to use their land. The right to cultivate commercial cannabis will have a strong legal basis once the zoning is changed. Zoning limitations are one of the most effective means of limiting activities on private land.

Also, further project-specific review will always be evaluating incremental increases and will likely find that such impacts are less than significant, even as total cultivation area grows. This DEIR only looks at impacts for less than 300 acres (DEIR Chapter 3, DEIR Assumptions for the Program, Section: Calculating the Projected New and Expanded Cannabis Activities Beyond the Baseline Page 3.9). That is why most impacts are found to be less than significant or less than significant with mitigation.

Cumulative impacts are also found to be less than significant even though there is no real review of cumulative impacts. This DEIR does not evaluate the cumulative loss of wildlife habitat, wildlife habitat fragmentation, native plant community losses, stream sedimentation, and water use that will occur if even a small percentage of the total acres in the Santa Cruz mountains zoned to allow it are eventually cultivated. Cumulative impacts are not seriously considered in the two program alternatives and are dismissed in Sec. 3.4.6.4 by stating that there is no way to measure potential or actual habitat loss from the landscape. While all of the predictions in this document are based on presumptions and incomplete data, there is no real prediction of future cumulative impacts (particularly for Alternative 2). There are ways to examine potential cumulative impacts. For example, by looking at a few scenarios where a percentage of eligible habitat is cultivated and extrapolating that across the County. The Final Environmental Impact Report (FEIR) should include a more rigorous evaluation of cumulative impacts.

A more thorough review of the full extent of impacts related to the proposed zoning changes should be conducted for the FEIR. Alternatively, the zoning changes could be removed and the County could develop a new mitigation that includes granting waivers to the small number of pre-existing (yet compliant) sites covered by this DEIR. Any future expansion of the program requires further environmental review, and zoning changes can be revisited with new information on the effectiveness of the currently-proposed mitigation measures.

We also ask for a more thorough review of cumulative impacts beyond the initial 300 acres considered in the FEIR.

3. Alignment with state policies. Several of the standards in the County cultivation regulations are less stringent than policies already in place in other areas of the state. It is unclear to us what requirement the County has for conformance with these standards, but it seems rational that the County regulations ought to be at least as stringent as state standards. For example, mitigations for riparian buffer widths, water diversion forbearance season limits, and the need for farm or water resource management plans are not well aligned with currently proposed state standards.

SWRCB standards can be reviewed in more detail at the following links:

https://www.waterboards.ca.gov/board_info/agendas/2017/oct/101717_6_final_draft_cannabis_policy_with_att_a_clean_version.pdf

http://www.waterboards.ca.gov/centralvalley/water_issues/cannabis/general_order/r5-2015-0113_att_a.pdf

http://www.waterboards.ca.gov/northcoast/board_decisions/adopted_orders/pdf/2015/15_0023_Cannabis_Order.pdf

Assuming the SWRCB will ultimately adopt relatively consistent standards statewide, mitigations regarding riparian buffer widths, water diversion and water resource management or farm management plans should be modified to be as protective as their respective current state standards in the North Coast and Central Valley SWRCB regions.

Additionally, the State of CA has published that under MAUCRSA, Senate Bill 94 The Medicinal and Adult-Use Cannabis Regulation and Safety Act: 6 Compliance with Local Authority "Applicants are no longer required to demonstrate local authorization as a prerequisite to obtaining a state license." Therefore even though the grower is supposed to have a county permit there will be times when a state permit is procured without a county permit. Local enforcement, especially without the zoning restrictions, will be difficult when someone with a state license feels empowered to go ahead and grow without a local permit.

A deeper analysis of the relationship between SB 94 and County regulations and their relative effects on the environment should be conducted prior to completion of the FEIR.

4. Market branding. Development of a market branding program similar to those used elsewhere would be a "value-added" or incentives method of protecting both the legacy of small "mom and pop" mountain grows and the natural resources potentially threatened by them in the mountain locations where they have historically farmed. While many of the standards already proposed in the County's proposed regulations are equal to or superior to certified and branded cannabis from other jurisdictions, Santa Cruz County Certified branded cannabis could be developed as a mitigation and include more rigorous environmental protection standards than more traditional cultivation methods. These standards could include, but not be limited to:

- Organic only pest control methods, including prohibition on rodenticide use
- Solventless concentrate manufacturing
- Educational requirements for licensees such as the "Master Gardener" program http://mbmg.ucanr.edu/Learn_To_Be_A_Master_Gardener/
- Enhanced forest preservation, water use, erosion control and related standards

Furthermore, this program would be an obvious "plug in" for third party certification by private parties or an agency like the Resource Conservation District. Some examples of similar programs can be found at the following links:

https://www.cleangreencert.org/

http://www.humboldtsfinestfarms.com/sungrown/

https://www.certified-kind.com/certified-kind-rules

5. Allowance for trucked water. Trucked water should not be allowed for any commercial cultivation activities. Not only does trucked water open up substantial amounts of new acreage to cultivation that might not otherwise be possible, the ability of the County (not to mention water purveyors) to oversee a trucked water program is highly speculative when consideration is given to the nuances of water rights, use tracking and related issues. Furthermore, we are not aware of any water purveyors who have analyzed this issue at a level of complexity that would allow for thoughtful accommodation for this new system demand through their Urban Water Management, drought contingency and other related plans. Finally, trucked water will exacerbate rural road problems that already plague our streams with excessive amounts of sediment. It is not practical to assume that - in spite of newly proposed road standards - increasing the density and frequency of use of rural roads by heavy equipment can be maintained on a long term scale without additional impacts to Santa Cruz County streams.

6. Impact AT-3. Considering all the environmental services that forestlands provide regarding retention of runoff, wildlife habitat, carbon sequestration and overall watershed functions and the fact that many of our watersheds support special status species and water supply for the majority of County residents, the impact of forest conversion or rezoning of TPZ lands is likely to be significant. Furthermore, vegetation community shifts due to climate change predicted by Point Reyes Bird Observatory[1] indicate that redwood forests may be severely limited in the County in the future, thereby exacerbating this issue.

Therefore we request more rigorous mitigation for this impact such as prohibiting rezoning of TPZ parcels for commercial cannabis cultivation, prohibiting expansion of the agricultural use of TPZ zoned parcels for commercial cannabis cultivation beyond what is initially allowed or prohibiting all commercial cannabis operations on TPZ zoned parcels if timber production and active forest management is not maintained on such parcels.

7. Impacts BIO-1 and BIO-1.1. Although this DEIR only evaluates the impacts on a very limited number of cultivated acres, the program could have "adverse effects on unique, rare, threatened, or endangered plant or wildlife species", and, "Impacts would be less than significant with mitigation." Impacts have also been identified for "non-sensitive upland habitats" which according to the DEIR "represent a very small proportion of the upland habitats that support these species regionally. Thus, loss of regionally common habitat is not expected to result in a substantial effect on these species' populations."

Too many acres of our diverse native plant habitats in the Santa Cruz mountains are put at risk under this plan, and the limited scope of the DEIR doesn't give a true picture of the future expansion of the program that is set in motion by proposed zoning changes on RA, TP, & SU properties. These "common habitats" include large connected areas used by wildlife, yet there is

no review of potential habitat fragmentation. Further analysis of the loss and fragmentation of "non-sensitive" habitats is needed to fully understand biological impacts.

The identified biological impacts all require complex and costly mitigations (that have limited likelihood of success). Evaluation of the costs associated with these mitigations (both to the licensee and the County) is necessary to determine if these mitigations are feasible.

8. MM BIO-1.1a Special Status Species Habitat Assessment. Relocating special status species (especially plants, and many animals) may not be a viable method of conservation according to many studies. While we acknowledge that this is standard practice in environmental regulatory permitting and CEQA contexts, it is not always biologically defensible and should be evaluated more critically.

Also, in this same section - enhancing the mitigation site can include "removal of invasive species in adjacent suitable but currently unoccupied habitat". This can be a good tactic, but only if non-natives are monitored and managed over many years.

"The permanent protection and management of mitigation lands shall be ensured through an appropriate mechanism, such as a conservation easement or fee title purchase." Please explain funding sources for this critical component.

All mitigations require that the licensee either hire a biologist, or request the County to do biological assessments, and if necessary, develop and implement mitigation and long-term monitoring plans. It is hard to imagine that the County staff will be able to fulfill these commitments, especially as the program grows in scale. Please analyze the projected revenue and costs associated with implementation of this program, as that will help determine the likelihood of their successful implementation and their indirect effects on bolstering the illegal cannabis market.

9. MM BIO-1.1b. Habitat Compensation. Many permitting authorities use a 3:1 ratio for mitigation rather than a 1:1 ratio. Consideration of a more rigorous mitigation bank concept seems appropriate given the scale of impacts associated with this project. Implementation of any such program will obviously be very challenging and success may be a speculative, remote possibility. That said, leveraging this mitigation to provide improvements on other public lands, which currently have insufficient resources to do so (State Parks, County Parks, etc.) and habitat mitigation banking criteria that have some flexibility may help facilitate the success of this mitigation.

10. MM BIO B-1.1d Prevention and Spread of Non-Native Invasive Plants. Update language to not require planting with native seed or nursery stock if a there is a local native seed bank on the property or on adjacent properties. In that case let there be a requirement for

weeding non-natives during native recruitment with a requirement to plant native seeds if recruitment is not satisfactory.

11. MM BIO-1.1h. Water Draw Restrictions. We strongly support this mitigation, however it is not entirely consistent with state standards, nor will it necessarily be entirely protective of instream flows and related aquatic biota. The SWRCB is currently proposing a surface water forbearance period of April 1 – October 31. If it is determined that groundwater diversions have the potential to significantly affect surface water supply, forbearance periods may extend to groundwater diverters as well. In Santa Cruz County there are also instream flow problems during the winter period in some creeks, particularly during drought periods. This could be especially problematic for early winter run salmonids such as coho salmon - which are currently on the verge of extinction.

Therefore we request that the FEIR further consider alignment of this mitigation with state standards. Protecting non-forbearance period instream flows during drought (at a minimum) would make this mitigation more rigorous. Of course, water rights validated by the SWRCB and Streambed Alteration Agreements that include instream flow requirements for any surface water diversions will also be necessary to make this mitigation meaningful.

12. MM BIO 4.2. No Cannabis Activities allowed within Sandhills Habitat or Salamander Protection Zone. It is notable that this mitigation may also serve as mitigation for hydrologic impacts by reducing the groundwater pumping associated with the project in overdrafted groundwater basins such as the Santa Margarita groundwater basin. As such, it provides benefits to impacts on water supply and also instream flow. Many of the streams in the Santa Margarita groundwater basin area support salmonids such as coho salmon, therefore we strongly support this mitigation. In addition, should new habitat protection zones be required in the future to protect our County's biodiversity, a mechanism for phasing out commercial cannabis cultivation and manufacturing activities in those areas should also be included in this mitigation.

13. MM BIO-4.1. Avoidance of Conflict with an Approved HCP. It is likely that the City of Santa Cruz will have an approved Anadromous Salmonid HCP that includes instream flows for the San Lorenzo River, Newell Creek, Laguna Creek, Liddell Creek and Majors Creek within the next two years. Any licenses granted subsequent to that time in these watersheds should not include allowance of activities which affect instream flows or otherwise affect aquatic habitat to the extent that there are conflicts with implementation of this HCP.

Please clarify how the ordinance will be implemented in the case of future HCP's.

14. Impact HYDRO-1 and Impact HYDRO-4. Commercial cannabis cultivation/manufacturing under the Program could introduce sediment and other pollutants to surface flows and groundwater, which would cause water resource

contamination. With mitigation, this impact would be less than significant/less than significant with mitigation. Karst groundwater systems can make important contributions to instream flow in streams that support anadromous salmonids like endangered coho salmon - particularly in Laguna Creek, San Vicente Creek and on the east side of Ben Lomond Mountain.

Including karst protection standards in the relevant mitigations would not only make help mitigate Hydro - 1 and Hydro - 4 impacts but also strengthen biological mitigations.

These standards could include but not be limited to:

- Site-specific geologic investigations
- Setback for any structures, roads and manufacturing from sinkholes or other karst features
- Routing drainage away from karst features

See the following link for more information on this issue:

https://www.americangeosciences.org/sites/default/files/karst.pdf

The County is already considering karst protection language for several existing regulations and inclusion of karst protection standards in commercial cannabis cultivation and manufacturing regulations and inclusion of karst protection standards mitigation measures in this DEIR seems appropriate as well.

http://santacruzcountyca.iqm2.com/Citizens/Detail_LegiFile.aspx?ID=2578&highlightTerms=karst

15. Impact HYDRO-2. Commercial cannabis cultivation under the Program could adversely affect groundwater supplies and groundwater recharge. This impact would be less than significant with mitigation. The additional water demand posed by allowance of tankered water, groundwater pumping and diversion of surface water, particularly during drought during both the wet and dry seasons, are not exhaustively analyzed in this document, nor have they been analyzed by local water purveyors. Therefore the impacts cannot be well-understood at this time. Furthermore, new greenhouse construction could potentially increase runoff rates and reduce groundwater recharge, though it is not clear what analysis has been conducted to characterize this issue and provide commensurately appropriate mitigation in the DEIR. This has been a significant issue in other groundwater basins, particularly the Oxnard Plain, where greenhouse-based cultivation practices have replaced row crops or other agricultural practices that do not result in development of landscape-scale impervious surfaces. Given the existing dire situation with water supply in the County and the mitigations currently proposed, it seems speculative to say that the impact is less than significant with mitigation.

Further analysis of the demand posed by the program would facilitate a more rigorous discussion of the true impacts on water utilities in the FEIR.

16. MM-HYDRO-2.1. Water Efficiency for Cannabis Cultivation. While we strongly support this mitigation, implementation success of the mitigation will take an ongoing, long term commitment and significant resources. The success of such a mitigation may be enabled by the involvement of a third party such as the Resource Conservation District. Again, RCDs have a long history of success with such programs. Furthermore, this mitigation measure would be much more successful if it included a requirement for metering groundwater pumping.

17. MM HYDRO-2.3. Water Tank Supply Management. It is not clear if this mitigation applies to water used for irrigation as well as water used for firefighting purposes. However, as previously mentioned, we support the surface water forbearance period water diversion and tank filling due to its intent to protect dry season anadromous salmonid rearing flows. However, there may be non-forbearance period flow issues to consider and the aforementioned consistency with SWRCB standards that need further consideration in development of this mitigation. Obviously, the standards for the County's program will need to parallel the state standards, if only because state permits are required for water diversions.

18. Impact UE-1. The Program could increase demand or result in the expansion of facilities for water, wastewater, or solid waste services within the County due to licensing of commercial cannabis cultivation and product manufacturing activities. This impact would be less than significant with mitigation. The additional water demand posed by allowance of tankered water, groundwater pumping and diversion of surface water (particularly during drought during both the wet and dry seasons) are not exhaustively analyzed in this document, nor have they been analyzed by local water purveyors. Therefore the impacts cannot be well-understood at this time. Given the existing situation with water supply in the County and the mitigations currently proposed, it seems speculative to say that the impact is less than significant with mitigation. Further analysis of the demand posed by the program would facilitate a more rigorous discussion of the true impacts on the water supply and thereby allow a better understanding of the indirect effects on instream flows and impacts on anadromous salmonids and other aquatic biota that may precipitate from this added demand.

19. Sustained (and enhanced) Enforcement Program. Unfortunately, the DEIR examines how restrictions will lead to unregulated grows, but does not examine how the program's unwieldy requirements and opening up new zones to cultivation and manufacturing could also lead to more unregulated grows. The most permissive alternative may be the most expedient way to get some operations into the licensing program, but it seems like a logical stretch to say that it is therefore the environmentally superior alternative. The County will have serious challenges with program implementation on licensed grows and especially with enforcement on unlicensed

grows with any project alternative. As the DEIR itself states, it is quite likely that, even with the most permissive project, illegal grows will be rampant due to the complexity of the license process, perceptions of excessive taxation, temptation of illegal out of state markets and related issues. These illegal grows operating in the shadows of legal grows will be even more difficult to enforce if they are scattered county-wide and the standards for legal grows are so low that differentiating between legal and illegal grows is challenging. Furthermore, while our recent experience with County Code Compliance has been mostly positive, it has also been our experience over the years that frequently there have been times when there were insufficient resources for Code Compliance to be adequately responsive to enforcement needs. At the very least, dedication of cannabis licensing and sales - related tax revenue should be implemented to help ensure some long-term viability of an enforcement program that is commensurate with the scale of the industry in the County, be it legal or not. Without this assurance, given the history of Code Compliance, the complex nature of the cultivation regulations and the scale of potential illegal cultivation under any project scenario, it seems somewhat speculative to conclude that impacts will be mitigated to a "less than significant with mitigation" level by a sustained and enhanced enforcement program.

20. Alternative 2, The Most Permissive, is identified in this DEIR as the Environmentally Superior Alternative. This alternative gives county licensing officials discretion on minimum parcel size and setbacks (Section 4.2.3, page 4-33) which are as of yet undetermined. There is no way to estimate how such discretionary rules will impact natural resources, and no way to determine how the program will be administered.

We request that the FEIR and code clearly state how the program will be administered, that enforcement be prioritized and that the County reject the Most Permissive Alternative should the FEIR not provide more assurance that the impacts posed by it can be mitigated to a less than significant level with more certainty.

Thank you for your consideration of these important issues. Please do not hesitate to contact the FWAC if you have any questions or concerns about these comments.

Sincerely,

Chris Berry
Fish and Wildlife Advisory Commission Chair

cc: WAC, COE, Kristen Kittelson

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[1] http://data.prbo.org/cadc2/index.php?page=154