

Invasive Plant Species Mapping in the Sweetwater Watershed

Port of San Diego RFP 12-21

Environmental Project Benefiting San Diego Bay



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It is widely accepted that non-native plant species act as a detriment to native ecosystems by siphoning off precious resources and reducing the ability of native plants and animals to compete in their home environments. The proposed project, as described in the following pages, will benefit San Diego Bay by mapping harmful invasive plant species in the Sweetwater Watershed. While this project fits into multiple "Category Specific Criteria" as spelled out in RFP 12-21, we wish to be evaluated under the "Research" criteria. Our project team is requesting \$34,840 of grant funding (total project cost is \$49,840) for this project which will be undertaken over a one-year period; 30% of the project will be funded by matching funds in the form of staff time.

We propose a Two-Phase, One-Year Project as follows:

Phase One - July 01 - August 01, 2013. GIS data compilation/creation, map production.

Phase Two - August 01, 2013, - June 30, 2014. Field-checking, mapping of species.

Project Manager: Ryan Carroll, GIS Specialist 858.633.7447 rcarroll@evarigisconsulting.com

We acknowledge any and all addenda issued for this RFP and are pleased to submit our proposal for your review. Thank you very much for your time and consideration.

Sincerely,

Ryan Carroll, GIS Specialist

Michelle Balk, Botanist/Biologist



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Introduction

Our proposed project will address one of the major impacts to watersheds across our region: the spread of invasive plant species. Non-native, invasive plant species are a recognized threat to the health of ecosystems around the world, and the San Diego Bay is no exception. These intruders are known to out-compete native plant species for soil moisture, space, light, and pollinators while reducing the available habitat for native species. According to the November 2011 Draft San Diego Bay Integrated Natural Resources Management Plan (INRMP):

The southern San Diego Bay “has been designated a Western Hemisphere Shorebird Reserve Network Site, and...is recognized as a Globally Important Bird Area by the American Bird Conservancy. Yet the remaining habitat—especially intertidal mudflats and upland transitional habitats—are degraded and fragmented by a host of factors, including invasion of invasive plants.”

A joint effort by the Port of San Diego and U.S. Navy, the INRMP identifies a list of twenty-four (24) invasive terrestrial plants in and around the San Diego Bay. Several of these species, such as pampas grass (*Cortaderia* spp.), tamarisk (*Tamarix* spp.), fennel (*Foeniculum vulgare*), and castor bean (*Ricinis communis*), are riparian or wetland obligates which pose problems not only in San Diego Bay itself but throughout the watersheds that feed the Bay. Infestations high in a watershed pose a particular problem because they can spread rapidly downstream, particularly in the case of wetland or riparian species. Efforts at removal



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downstream are ultimately in vain if the upstream source of propagules is not extinguished. Pampas grass, tamarisk, and fennel are listed by the California Invasive Plant Council as “high” in invasiveness, and castor bean is listed as “moderate.” These four species are known to occur from the San Diego Bay to the mountains, as high



as 4,600 feet in elevation in the case of tamarisk, 3,300 feet in the case of fennel and castor bean, and 3,200 feet in the case of pampas grass. These locations high in the watershed may be contributing greatly to downstream infestations which in turn infect the San Diego Bay. A single mature pampas grass individual can produce up to 100,000 seeds.

The proposed project focuses on a sixty-four (64) square mile section of the Sweetwater watershed along the Sweetwater River. There are nearly 1,000 acres of wetland habitat and seventy-one (71) miles of drainages found in this section of the Cleveland National Forest (CNF). Our project will focus on an approximately thirteen (13) mile stretch of the Sweetwater River beginning on CNF property in the east to Loveland Reservoir in the west (see Attachment A). Coordination with our project partners at the CNF revealed that the area in question has not been extensively mapped for invasive riparian or wetland plant species. Generation of this mapping data addresses an important data gap in the region and completes a task that other agencies are not required to undertake. Our project will provide CNF management with actionable information as to the location and extent of exotic plant species. Since the area in question is relatively high in the watershed, the benefits gained



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from addressing this issue are magnified since plant seed is prevented from traveling down the watershed to San Diego Bay.

In fulfillment of this project, we plan to use the latest in GIS mapping technology to ensure collection of the most accurate data in the most efficient manner possible. We will be implementing a mobile data access system so that plant location data can be mapped in the field. Using the GPS capabilities of tablet devices, we will accurately map occurrences of invasive plant species. This type of remote, field-editing system has only recently become feasible as a result of advances in software and hardware combined with increasingly robust cellular networks that allow for real-time GIS data management. Traditional hard-copy field maps will also be used to supplement and cross-check data collected in the field. This process will lead to an accurate picture of the extent of invasive plant species propagation within the CNF portion of the Sweetwater watershed.

Data generated during this project will be fully transferable to other agencies and groups while maps will provide concrete, actionable information for CNF management to more effectively deal with the spread of invasive plants. The type of extensive mapping and data creation we are proposing will also increase our understanding of the watershed ecosystem as a whole. Since plant seed flows down the watershed, implementing this project relatively far up the Sweetwater River means that any mapping or removal efforts will have a positive effect downstream. Indeed, beneficial effects from a project such as this are magnified since work occurs farther up the watershed and the problem is dealt with closer to the source.



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Funding this project in the CNF portion of the Sweetwater Watershed also will result in efficient use of funds by the Port District, since multiple land ownerships will not be encountered. No coordination with local landowners will be necessary for access to the project site, which is located entirely on Cleveland National Forest land. This will allow for funds to be applied directly to the on-the-ground mapping of these harmful species rather than coordination of access.



Project Narrative

Our team consists of Evari GIS Consulting (EGC), Balk Biological Consulting (BBC), and our project partners in the Cleveland National Forest (CNF). Our goal is to define the extent of invasive plant species in a subset of the Sweetwater Watershed. This project is important because it solves a key data gap in the region: the lack of an accurate, up-to-date assessment on the extent of invasive plant species present throughout our watersheds. It also fulfills the Port of San Diego’s COMPASS Strategic Goals, specifically Goal Four, which strives for a “Port with a healthy and sustainable bay and its environment”. Invasive plant species have a documented negative effect upon native ecosystems. As part of Goal Four in the COMPASS Strategic Plan, Strategy 4.5 is to “preserve and promote habitat restoration, indigenous wildlife and prevention of invasive species.” Our project as proposed falls directly in line with this strategy.

We are proposing a two-phase, one-year project to effectively and proactively deal with



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the issue of invasive plant species in an important corner of the Sweetwater Watershed.

Phase One *July 01, 2013 - August 01, 2013*

Phase One involves compiling relevant GIS data for our project area including but not limited to stream data, vegetation data, property ownership information (parcel data), and any prior invasive species mapping that may have been completed. This data will provide the basis for our project mapping and a starting point for our survey. We plan on implementing state-of-the-art GIS technology using not only traditional, hard-copy paper maps but also digital, mobile data that can be accessed and edited in the field via tablet hardware. This will allow for more efficient, accurate field mapping and reduces the need to generate large amounts of paper maps. There are two main components to this system: ESRI's ArcGIS software (for hard-copy map and data management) and an ESRI ArcGIS Online for Organizations account (which will allow for mobile data access and remote editing capabilities). A new GIS dataset will be created via ArcGIS Desktop software and published to an ArcGIS Online for Organizations account. A mobile editing application will be configured by EGC to access the plant species dataset and enable real-time editing by BBC staff. We will use tablet hardware (either an Apple iPad or similar Google Android device) where appropriate in the field on this project. Paper maps will be used as a backup to this system where needed.



Phase Two *August 01, 2013 - June 30, 2014*

Phase Two involves field-checking/field mapping invasive species (primarily pampas grass,



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tamarisk, castor bean, and fennel) along the thirteen (13) mile stretch of the Sweetwater River. Any wetlands habitats encountered along the River will be surveyed in their entirety, and as a guideline, a 100-foot buffer (for a total width of 200 feet) along the River channel itself will be used to delineate the survey area. This work will be done in coordination with our project partners in the Cleveland National Forest (CNF). The data collected as a result of these field efforts will be brought into GIS and used to generate useful data and maps that can be shared with other organizations.

Our team is committed to completing this project on time and within budget while maintaining high standards of accuracy.

Qualifying Experience

Our team is uniquely qualified to complete the project as outlined in this proposal. Mapping and biological surveys are our teams' specialties.

Balk Biological Consulting (BBC), headquartered in Encinitas, California, has been providing its expertise to a variety of public- and private-sector clients since 2006. The company is experienced in and regularly performs a full complement of biological consulting services, including: vegetation community mapping, general and special-status floral and wildlife surveys, non-native invasive plant species mapping, wetlands delineation, habitat restoration, environmental compliance monitoring during construction, biological resource impact assessment, and biological document preparation.

Skills in these areas are continually being updated, with Balk Biological regularly



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attending specialized trainings, workshops, and even university-level coursework. In addition, Balk Biological regularly teaches courses on plant groups such as asters or special-status plant species of Southern California and has provided *pro bono* plant identification services for the California Native Plant Society.

Balk Biological Consulting has completed numerous projects similar to the project described herein. On Angeles National Forest land in the San Gabriel Mountains, Balk Biological led field crews in botanical surveys, which included weed mapping in 2010 and 2011, for the Tehachapi Renewable Transmission Project. Trimble Yuma GPS units running ArcPad software were used to map occurrences in the field. On Pacific Gas & Electric's Trilobite Solar Project in 2009 on Bureau of Land Management Lands in the central Mojave Desert, Balk Biological Consulting was a crew leader and participant in special-status plant and non-native invasive plant species mapping with the use of hand-held Trimble GPS units equipped with data dictionaries for data collection. In 2003, Balk Biological conducted invasive plant species mapping along the Oceanside-to-Escondido Rail Project ("Sprinter" light-rail). The full suite of non-native, invasive plants were mapped along the rail alignment using a combination of hard-copy mapping and digital mapping with GPS, for the purposes of mitigation planning for the project.

Tehachapi Renewable Transmission Project Contact: Katie VinZant (Angeles National Forest): 626-383-1626

Trilobite Solar Energy Project Contact: Lynn Hosley (CH2M Hill): 925-270-2555

Oceanside-to-Escondido Rail Project Contact: Megan Enright (Dudek): 760-479-4281



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Evri GIS Consulting (EGC) has a broad range of clients in both the public and private sector, has proven experience with GIS data creation/management, and has provided technical support for professional staff in a variety of fields including Natural Resources Management, Land Use Planning, Surveying, and Engineering. Such support has included tasks such as cartographic document production (in both hard copy and digital formats), Spatial Data Analysis, CAD/GIS Data Integration, Data Import/Export, Image Rectification, etc. EGC also has experience delivering Enterprise-level solutions for the public sector including ArcGIS Server Setup and Configuration, Database Administration, client-side Web Map Development, and mobile GIS data access including real-time editing capabilities.



In terms of the GIS services expected under this proposal, our clearest example of a similar project is the City of San Diego Streetlight Conversion project. Evri GIS Consulting is currently two years through a three-year project aimed at replacing over 35,000 streetlights with new energy-efficient fixtures. Evri is teaming with a local electrical contractor (who's responsible for updating the fixtures) and is tasked with managing a back-end GIS database of the streetlight data. Evri set up a system whereby work crews in the field switching out streetlight fixtures have access to the GIS database via iPads. The work crews are granted permissions to access and edit certain aspects of the database such as conversion status, light voltage, etc. This enables the database to be updated remotely by multiple users simultaneously. This system has proven extremely effective and as a result the project is



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progressing ahead of schedule. EGC plans on implementing a similar system for the Invasive Species Mapping project outlined in this proposal. See below for project contact information.

City of San Diego Project Manager - Lorie Cosio-Azar (858-627-3352)

Southern Contracting Project Manager - Joe Teti (760-744-0760)

Goals and Objectives of Proposal

Our team has two main goals for the proposed project, outlined below.

Goal 1: Estimate the extent of the problem of non-native invasive species in the San Diego Bay's three watersheds by focusing on a knowledge gap area for this subject in San Diego County: the upper Sweetwater River Watershed.

- ▲ *Objective 1:* Compile existing GIS data to be used during the project.
- ▲ *Objective 2:* Create new GIS datasets as necessary to complete project mapping tasks.
- ▲ *Objective 3:* Configure virtual editing environment where the new GIS data can be edited and managed.
- ▲ *Objective 4:* Create field maps to be used during the project.
- ▲ *Objective 5:* Field map occurrences of non-native invasive plant species which are known to affect San Diego Port District lands -- giant reed, castor bean, pampas grass, and tamarisk – along the upper Sweetwater River. The focus area includes approximately thirteen (13) miles of the Sweetwater River on the Cleveland National Forest between Loveland Reservoir and Cuyamaca Rancho State Park. As much of



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the surveys as possible will be completed during the flowering period of tamarisk (April – August) in 2013 or 2014, (depending on timing of award), to maximize the detection of this species.

Goal 2: Publicize results to aid in the planning of targeted removal efforts, so that non-native invasive species spread downstream and into San Diego Port District Lands is reduced.

- ✦ *Objective 1:* Prepare the required survey report for publication on the Port of San Diego’s website.
- ✦ *Objective 2:* Prepare the lobby display for the Port of San Diego.
- ✦ *Objective 3:* Share project results with our project partners at the Cleveland National Forest. The Cleveland National Forest is in the process of completing National Environmental Policy Act documentation for forest-wide weed control efforts, and the work proposed by our team in this proposal is of great interest to this agency.
- ✦ *Objective 4:* Publish project results on Evari GIS Consulting and Balk Biological Consulting websites.
- ✦ *Objective 5:* Balk Biological Consulting will communicate project results to the California Native Plant Society in an oral presentation.
- ✦ *Objective 6:* Any identified, interested “friends of” or local volunteer groups which participate in weed removal efforts will also be notified of the results.



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Cost Proposal

Please see the attached Cost Proposal (Attachment B) for a full breakdown of services expected under this RFP.

Our matching funds for this project will come from staff time and total \$15,000. See below for a complete breakdown of our staff time hours to be contributed to this project:

Evri GIS Consulting 80 total hours = \$7,500

Data Management/Map Creation (\$100/hour) x 75 hours = \$7,500

Balk Biological Consulting 80 total hours = \$7,500

Field Mapping/Field Checking (\$100/hour) x 75 hours = \$7,500

Personnel

Ryan Carroll is the primary contact and Project Manager. Mr. Carroll has over seven years of experience working with the industry-standard ESRI GIS technology stack for use in various disciplines. He is adept at a variety of data management tasks to include data creation, maintenance, and migration processes as well as principles of cartographic presentation. As a full-time Evri GIS Consulting staff member, he provides GIS support on a variety of projects. He has a proven track record of meeting deadlines and working across professions to facilitate effective GIS implementations. Please see Mr. Carroll's resume in Attachment C.

Michelle Balk is the Field Task Manager and Principal Botanist on the project and has



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over eleven years of experience as a biological consultant in California. Project experience includes general and sensitive floral and wildlife surveys, vegetation mapping, wetlands delineation and permitting, mitigation monitoring, construction monitoring, and environmental document preparation. Please see Ms. Balk's resume in Attachment D.

Please see our Organization Chart in Attachment E.

Summary

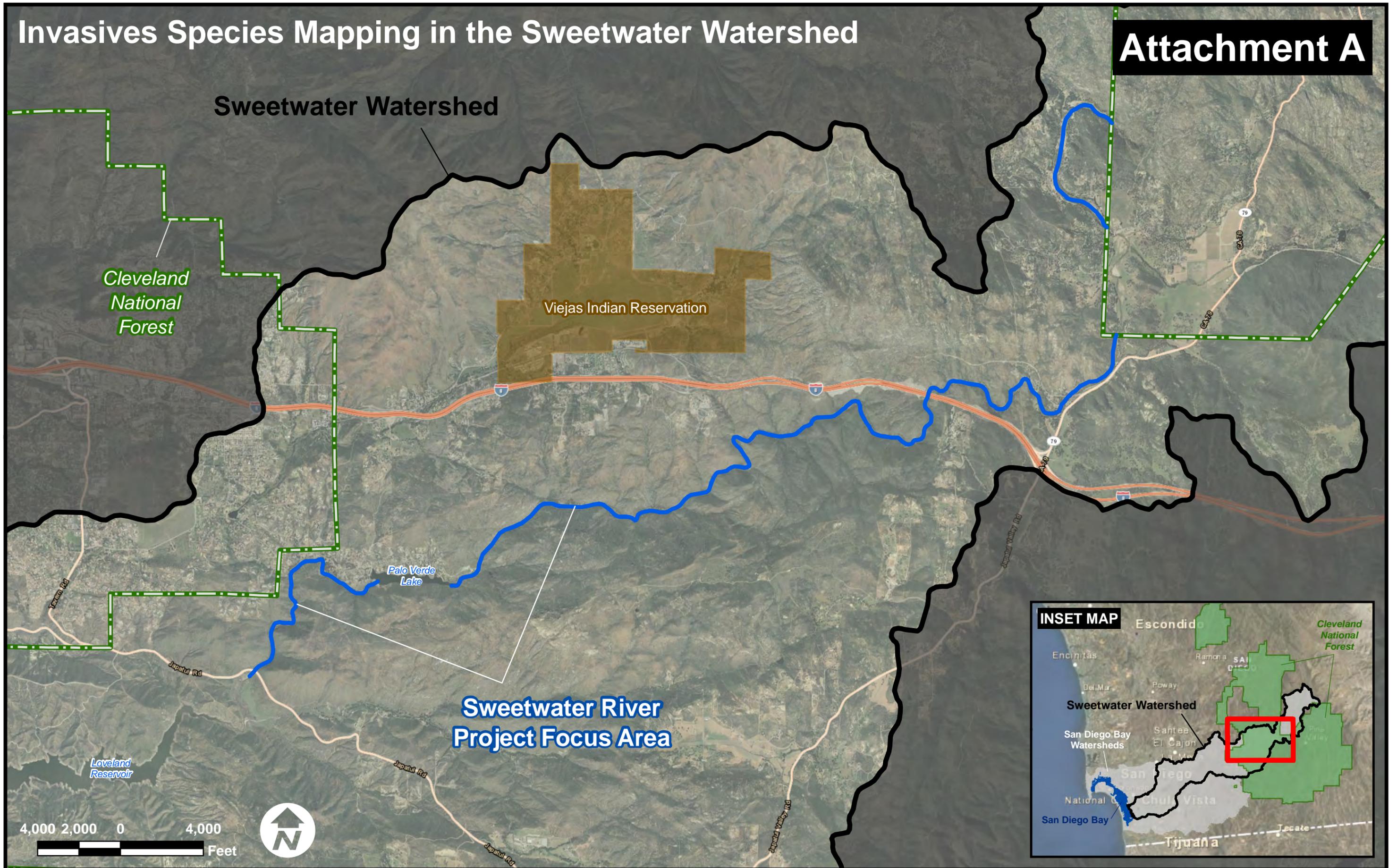
Our project as proposed does not include any subconsultants. Our team has reviewed the Sample Agreement located on the Port of San Diego's website and found it to be acceptable, including the insurance and indemnification clauses. We currently have no conflicts of interest of any kind and, if awarded this project, we agree to not perform any services which would conflict with the proposed project. None of our team members have ever received any citations for environmental violations.

We are excited about the opportunity to submit this proposal and thank you very much for your time and consideration. The spread of invasive species (particularly species like castor bean, pampas grass, fennel, and tamarisk) is a significant threat to wetlands across the region, and the important first step to addressing this issue is understanding the extent of the problem. The mapping project we are proposing begins to address an important data gap in the region and will add to the knowledge base in this field.



Invasives Species Mapping in the Sweetwater Watershed

Attachment A



Port of San Diego RFP 12-21		Sweetwater Watershed Invasives Mapping Project							
		GIS Specialist / Project Manager (R. Carroll)	GIS Server Administration	Principal Botanist / Field Task Manager (M. Balk)	Junior Botanist/Field Mapping	Total Hours	ODCs	Total Cost	
Task #	TASK	\$100	\$150	\$100	\$65				
1	PREPARE PRESS RELEASE	2		2		4		\$400	
2	PREPARE WORK PLAN	8		4		12		\$1,200	
3	INITIAL GIS WORK								
3.1	Data Management/Map Creation	64				64		\$6,400	
3.2	Mobile Data Access/Application Development		40			40		\$6,000	
	Total Task 3	64	40			104		\$12,400	
4	FIELD MAPPING INVASIVE SPECIES			100	250		\$1,000	\$27,250	
5	POST-FIELD MAPPING GIS DATA MANAGEMENT/MAP CREATION	24						\$2,400	
6	PREPARATION OF FINAL REPORT	20		4	4			\$2,660	
7	PRESENTATION OF RESULTS								
7.1	Final Presentation Preparation	8		2	2	12		\$1,130	
7.2	Presentation to Port	2		2	0			\$400	
7.3	Presentation to CNPS	2		2	0			\$400	
	Total Task 7	12		6	2	36		\$1,930	
8	PREPARATION OF LOBBY DISPLAY	16		0	0			\$1,600	
	TOTAL HOURS	146	40	116	256	144		48,640	
	Total ODC						\$1,000		
	TOTAL PROJECT COST	\$14,600	\$6,000	\$11,600	\$16,640			\$49,840	
								<i>-\$15,000</i>	<i>Matching Funds</i>
								\$34,840	Total Grant Amount

Ryan M. Carroll

cartography . GIS . environment

7516 Draper Ave, La Jolla, CA 92037
Phone: (858) 633-7447
Email: rcarroll@evarigisconsulting.com
Linkedin: [RyanCarroll](#)

Job History **May 2010 – Current / Evari GIS Consulting / GIS Specialist** 3311 Boundary Street, San Diego, CA 92104

- Workflow and budget management
- Database creation/management and report-quality cartographic presentation
- Coordinate with clients across disciplines to fulfill GIS project tasks

Summer 2009 - Current / San Diego Surfboard Rentals LLC / Owner 7516 Draper Avenue, La Jolla, CA 92037

- Manage all aspects of web-based business .
- Inventory management.
- Ensure business workflow.

Fall 2008 - Spring 2012/ San Elijo Lagoon Ecological Reserve / Park Attendant 2710 Manchester Avenue, Encinitas, CA 92007

- Park resource management/maintenance; invasive species control
- Provide information and interpretive services to public; staff Visitor Center
- Park patrol/rule enforcement within the 1,000 acre Reserve.

Winter 2003-Spring 2007 / GIS Analyst / HELIX Environmental Planning 7578 El Cajon Boulevard, Suite 200, La Mesa, California 91942

- Produced report-quality maps and graphics
- Created/imported GIS data from a variety of sources
- Managed/compiled vector and raster GIS data
- Georeferenced image files and integrated with GIS
- Imported GPS data into GIS
- Coordinated work with others in group setting
- Assisted in training of new GIS staff
- Met regular deadlines for numerous projects simultaneously

Skills

Technical

ESRI ArcGIS Desktop and ArcGIS Server, AutoCAD

Disciplinary

Natural Resource Management, Land Use Planning, Environmental Remediation, Environmental Consulting Regulatory Support

Education

- San Diego State University, Bachelor of Arts, Geography, May 2003,
Major: Geography, Emphasis in Natural Resource and Environmental Geography
Minor: Political Science, 3.7 GPA

MICHELLE L. BALK
Owner/Principal Biologist
Balk Biological Consulting

SUMMARY

Ms. Balk has over eleven years of experience as a biological consultant in California. Project experience includes general and sensitive floral and wildlife surveys, vegetation mapping, wetlands delineation and permitting, mitigation monitoring, construction monitoring, and environmental document preparation. She has also participated in the development of habitat conservation plans pursuant to Section 10 of the Federal Endangered Species Act, and frequently teaches botany classes and workshops for the California Native Plant Society.

EDUCATION

- M.S., Biology with Ecology and Evolution emphasis, University of Akron (1999)
- B.S., Zoology, Iowa State University (1997)

CERTIFICATIONS

- CDFG Rare, Threatened, and Endangered Plant Voucher Collection Permit
- Balk Biological Consulting has been certified as a Small Business Enterprise through the Coalition of Southern California Public Agencies and as a Small Business/Microbusiness through the State of California Department of General Services. The company is also registered in the U.S. Government's Central Contractor Registration (CCR) database as a Small Business and a Woman-Owned business, and is California Public Utilities Commission-certified as a Women Business Enterprise.

SELECT RELEVANT PROJECT EXPERIENCE

Biological Monitor and Project Lead Botanist, Tehachapi Renewable Transmission Project, Southern California Edison, Los Angeles County, California. January 2010 – August 2011. Served as crew lead and assistant field task lead in 2010, and as construction monitor and project rare plant lead in 2011, for this electricity line upgrade project spanning approximately 160 miles through Kern, Los Angeles, and San Bernardino Counties. Determined appropriate timing for surveys within particular high-potential areas, identified and mapped more than 30 species of special-status plants, coordinated daily work for the rare plant team, QA/QCed the team's GPS mapping and completed data forms, and coordinated daily with both internal staff (the project director, manager, and work package managers; construction monitoring, GIS, and other biology personnel), the client, and the Forest Service. Project traverses diverse vegetation communities including foothills, mountains, and desert.

Project Botanist, Ausra Carrizo Plain Solar Farm Project, San Luis Obispo County, California; Sterling Energy Solutions Solar 1, 2, 3, and 6 Projects (Now Calico Solar and Imperial Valley Solar Projects); San Bernardino and Imperial Counties, California. March 2008 – September 2010. Performed rare plant surveys and vegetation mapping for proposed solar farm projects totaling approximately 40,000 acres. Project sites were located on the Carrizo Plains of San Luis Obispo County, west of the City of El Centro in Imperial County, and east of Barstow in San Bernardino County, California.

Project Botanist, Station Fire Reforestation Project, United States Forest Service, San Gabriel Mountains, California. August – September 2010. Performed rare plant surveys in approximately 3,000 acres of potential conifer reforestation area.

MICHELLE L. BALK
Owner/Principal Biologist
Balk Biological Consulting

Project Botanist, Trilobite Solar Energy Generating Project, Pacific Gas and Electric Company, San Bernardino County, California. March – June 2009. Served as crew leader in the performance of rare plant surveys and vegetation characterization for approximately 6,400-acre proposed solar energy generating site in the central Mojave Desert. Prepared botanical survey report describing results for inclusion into Application for Certification by the California Energy Commission.

Project Biologist, Pole Maintenance Project/Bark Beetle Project, Southern California Edison, San Bernardino and San Jacinto Mountains, San Bernardino and Riverside Counties, California. 2003 – 2006. Conducted botanical surveys and habitat assessments for sensitive plants at pole replacement locations and along electric lines at numerous locations in the San Bernardino and San Jacinto Mountains and the Mojave Desert. Coordinated with tree removal contractors regarding least biologically impactful methods of tree removal and monitored tree and pole removal.

Project Botanist, Parcel D Project, Otay Land Company, County of San Diego, California. 2009. Performed surveys for a variety of rare plant species on mitigation site in the foothills of the Cuyamaca Mountains.

Project Biologist/Botanist, Fanita Ranch Project, Santee, California, Barratt American, Inc. 2004-2006. Performed vegetation mapping, wetlands delineation, rare plant surveys, and Quino checkerspot butterfly surveys on 2,000 acre property and potential mitigation site.

Project Biologist/Botanist, High Meadow Ranch Residential Development Project, Vicar Ventures, LLC, Community of Lakeside, County of San Diego, California. 2004 – 2006. Performed wetlands delineation and prepared wetlands permit applications, including conceptual mitigation plan, for 800-acre residential development project. Coordinated and negotiated with wetlands resource agencies and the U.S. Fish and Wildlife Service regarding sensitive species issues onsite.

OTHER RELEVANT EXPERIENCE

Invited co-presenter for two-day workshop, “Rare Plants of Western San Diego County,” at 2012 CNPS Conservation Conference; January 10-11, 2012.

Co-instructor, “Rare Plants of Western San Diego County”, February 2008; “Survey of the Sunflower Family (Asteraceae): Introduction to the Fall Bloomers”, October 2005 and October 2006; “Survey of the Sunflower Family (Asteraceae): Introduction to the Spring Bloomers”, March 2007; “Southern California Winter Plant Identification For Field Biologists”, February 2006”, Rare Plant Identification and Survey Techniques for Southern California”, March 2006.

Participant, California Native Plant Society (CNPS) workshops: “Vegetation Mapping”, October 13-15, 2009, and “Cyperaceae”, July 22-24, 2008; Jepson Herbarium workshops: “Poaceae (Grass family)” May 7-8, 2005; “Spring Flora across Kern County” May 6-9, 2004; “Summer Annuals and Fall-Blooming Shrubs of the Eastern Mojave Desert” September 2003; “Morphology and Identification of Flowering Plants” March, 2003.

Participant, “Basic Wetland Delineation” presented by the Wetland Training Institute, Inc. August 2-6, 2004.

Organization Chart

Port of San Diego

Environmental and Land Use Management Department



Evari GIS Consulting

Ryan Carroll

Project Manager/GIS Specialist



Balk Biological Consulting

Michelle Balk

Field Task Manager/Principal Botanist



Matt Sparzo

GIS Technician



Cleveland National Forest

Lance Criley

Technical Advisor

