

**REQUEST FOR STATEMENTS OF INTEREST
NUMBER W9132T-16-SOI-0008
PROJECT TO BE INITIATED IN 2016**

Project Title: Proposed Research for Natural Resources Monitoring Navy Region Southwest

Responses to this Request for Statements of Interest will be used to identify potential investigators for a project to be funded by the Engineer Research and Development Center – Construction Engineering Research Laboratory (ERDC-CERL). ERDC-CERL is working in cooperation with the Department of Navy – Space and Naval Warfare System Center Pacific (SPAWAR) in the execution of research interests.

The proposed research will increase the knowledge of ecosystem system management protocols on DoD lands. Ecosystem management is key to achieving overarching land management goals, as well as program specific goals and objectives. A dominant theme of ecosystem management is adaptive management, where management decisions are informed by the results of quantitative findings that require the development and implementation of long-term, quantifiable, repeatable, and comparable monitoring data that inform resource managers of important population and ecological changes over time. Such data help evaluate the success or failure of management actions and decisions and contribute to a feedback loop of useful information and are vital to ensuring that natural resources management programs are cost effective.

Approximately \$136,000 is expected to be available to support this project for a period of twelve (12) months after the initial award. Additional funding at approximately \$150,000 a year is expected to support effort continuation for up to 2 years after initial performance period. **Below Tasks are marked according to the year (initial or optional) they are to be performed and duration.**

Background:

The Department of the Navy (DoN) is responsible for compliance with a suite of Federal environmental and natural resources laws and regulations, including the Endangered Species Act (ESA), Clean Water Act (CWA), and the National Environmental Policy Act (NEPA)/Executive Order 12114 (EO 12114), Invasive Species Management (EO 13112) and the Sikes Act (16 USC 670). Together they require management of natural resources on DoN Bases.

SPAWAR conducts a program of developing and implementing monitoring programs in support of adaptive management for botanical resources in support of natural resources management on Navy and Marine Corps Bases in the Southwest. The program focuses on habitats including native communities, invasive species and rare and endangered species, invasive species and understanding of drivers of population and community dynamics such as wildland fire, historic land uses and climate change.

Description of Anticipated Work:

Task 1 – Coastal sage scrub and chaparral monitoring protocol development and pilot data collection on Camp Pendleton and Detachment Fallbrook.

The overall purpose of this task is to develop a rapid method for coastal sage scrub and chaparral integrity monitoring that incorporates invasive plants, wildfire, and biodiversity. The goal of the protocol is to support annual assessments of ecosystem integrity and develop a more detailed understanding of how disturbance and weather interact to drive community integrity.

Task 1a (Year 1 only)- The cooperator will assemble available data sets and data from published literature and develop parameter estimates for coast and inland sites for shrub cover, invasive grass cover, shrub density and seedling density and variation in both long fire-free periods and post-fire recovery periods. The cooperator will evaluate existing data sets and an 18 year spatial data set <http://tenaya.ucsd.edu/~rclemesha/data.html> on the intensity of Fog and Low Cloud Cover to evaluate the contribution of FLCC to the vital rates. Work on the fog data set will involve summarizing hourly data into useful predictor variables, for example number of foggy hours per month and/or season. The cooperator will analyze existing data sets to establish defensible preliminary thresholds between high, medium and low integrity shrub stands. The cooperator will collaborate on a review paper on the ecological effects of fog as part of this project. **The cooperator will lead the development of a 2nd manuscript on a mutually agreed upon topic. Work completion date on this sub-task is December 30, 2016.**

Task 1b (Year 1, 2 and 3) – The cooperator will lead field data collection for pilot coastal sage scrub on 32 previously established transects on Detachment Fallbrook. In previous sampling of these plots 4-person field crews completed approximately 2 transects per day. The timing will be after the first 2016/7 fall or winter rains to capture the entire summer drought but occur prior to seedling establishment. The cooperator will lead field data collection, enter and proof data, create metadata for the data set and prepare initial data summaries and draft methods and results write-ups. Work completion date on this sub-task is June 15, 2017

Task 2 - Invasive Species Adaptive Management. This effort involves development of adaptive management and modeling framework for invasive plant species and implementation of adaptive management framework for barbed goatgrass (*Aegilops triuncialis*) on Detachment Fallbrook. The cooperators tasks include literature reviews for three species or functional groups that include and field data collection for the barbed goatgrass adaptive management and monitoring program.

Task 2a (Year 1 only) -The cooperator will create extensive literature reviews, including expert opinion where the literature is insufficient to parameterize population demographic models. The literature reviews shall include information on: distribution and life history, control and management, vital rates for different life stages including seed, seedlings, juveniles, and adults. It shall also identify any natural catastrophes. It shall specify the anticipated effect of management on the specified vital rates. It shall include a proposed mapping protocol designed for implementation by pesticide applicators. It shall include testable hypotheses to fill knowledge gaps identified in the review. The cooperator will go to the field with Navy biologists and pest controllers to learn more about the species as needed. The cooperator will participate in 2- half day working group meetings to discuss the adaptive management framework and population models. Work completion date on this sub-task is 12 months after award.

Task 2b (Year 1 and 2) – Barbed goatgrass field data collection. The cooperator will conduct bi-monthly monitoring of treatment site and seedbank longevity study plots from October through June collecting data on seedling emergence and phenology and soil erosion and submit reports of key findings the next business day. In addition the cooperator will conduct vigilance surveys inside and outside the treatment area in June 2017. This effort is anticipated to amount to 3 field

days of effort plus report and data submissions. Work completion date on this sub-task is September 30, 2017.

Task 3 – Wildland fire -fuel moisture monitoring in shrubland habitats on Camp Pendleton. Camp Pendleton is currently developing methods for fire danger fuel moisture analysis. This task will collect and analyze fuel moisture and associated climate data and look for correlations between them and wildfire ignitions and fire size. Work completion date on this task is March 15, 2017.

Task 3a (Year 1, 2 and 3) - Collect fuel moisture data bi-monthly from October through March (year 1), April through March (year 2 and 3). The cooperator will conduct sampling efforts at four established fuel moisture sites on Camp Pendleton and process the samples in Computrak fuel moisture analyzers. The weekly fuel moisture data will be submitted in a spreadsheet report no later than the next business day.

Task 3b (Year 1,2, and 3)- Analyze data to see if fuel moisture and/or associated climate, soil moisture and ground water data are useful in prediction numbers of ignitions and fire size.

Task 4 – Remote automated weather station (RAWS) monitoring, and maintenance on Camp Pendleton and Detachment Fallbrook. This will involve pre-fire season and rainy season visits.

Task 4a (Year 1, 2, and 3) - The cooperator shall monitor and maintain 6 RAW stations on Camp Pendleton. The RAWS data are used to help interpret patterns in fuel moisture and project wildland fire hazard (task 3b above). In addition temperature and relative humidity are used to calculate atmospheric water potential, a surrogate for fog which is an important factor in wildland fire hazard. The data collected includes hourly temperature, dew point, relative humidity, solar radiation, fuel temperature, and fuel moisture. Work completion date on this task is March 15, 2017.

Task 4b (Year 1, 2, and 3) - The cooperator shall monitor and maintain 1 RAW stations on Detachment Fallbrook. The RAWS data are used to correlate with data collected in task 1b and 2b as well as livestock forage production on the installation. The data collected includes hourly temperature, dew point, relative humidity, solar radiation, fuel temperature, and fuel moisture. Work completion date on this task is 12 months after award .

Task 5 (Year 1 only) – Fairy shrimp monitoring using eDNA on Marine Corps Airstation Miramar. Environmental DNA (eDNA), a new technique for detecting target organisms from DNA in water and soil samples, has been shown to be a highly sensitive and efficient tool for inventory and monitoring of aquatic species in a variety of freshwater and marine systems.. Collect 4 water samples and 1 field negative biweekly during the wet season from each of 10 vernal pools and a single time during the wet season for 20 additional pools at MCAS Miramar. Samples will be collected according to protocols developed under Legacy Project 12-616 (Goldberg & Strickler, 2014) using sterile filter funnels with 0.45 um cellulose nitrate filter membranes. Water samples will be 250 mL each and will be collected in replicate so that detection probabilities can be assess and the minimum number of samples required to achieve >95% detection probability can be determined. Clean practices will be used in the field to ensure that no extraneous eDNA contaminates the field sample. We will record data on potential covariates of eDNA damage, such as canopy closure, water temperature, and pH at each site.

Dry process soil samples from 10 vernal pools to separate fairy shrimp cysts from soil that will be processed for eDNA. Reporting will include photographs of each pool each time it is sampled (water and soil samples) and in addition photographs shall be taken to document each step of the methods. Work completion date on this task is September 30, 2017.

Task 6 (Year 1 only). This project will tailor that general adaptation guidance for application in DoD INRMP planning processes. The cooperator shall review approximately 10 INRMPs and interview installation natural resources managers in order to identify the elements of the climate-smart framework that are most relevant to DoD resource managers, and specifically identify where in the INRMP process those elements can best be integrated. Work completion date on this task is 12 months after award.

Task 7. (Year 2 and 3) (Habitat Adaptive Management and Monitoring Support) - Oak Woodlands and Gold Spotted Oak Borer (GSOB) monitoring. The GSOB is an invasive exotic species in accordance with Executive Order 13112. It is very destructive posing a massive threat to oak woodland ecosystems in California. Natural enemies from its native range do not occur in California and control options have not been developed making it imperative to develop strategies to prevent its introduction to Camp Pendleton and provide for a rapid control response should it be detected. This project will survey for GSOB in Camp Pendleton's woodlands and provide baseline data on population growth and/or expansion.

- 1) Conduct field surveys for the GSOB and associated species (fall 2016) at sites established in the Base's early detection rapid response plan for the GSOB. Identify insects captured in sticky traps.

Substantial Government involvement is anticipated for this project. The Government's participation efforts include:

General Involvement:

1. The Government will coordinate access for all installation lands involved in this effort. Additionally, the Government will provide location information for all pre-determined field sites indicated in the Tasks.
2. The Government will lead in the development of study methodology
3. The Government will write final project reports
4. The Government will approve of project activities
5. Computrak fuel moisture analyzers and RAWS equipment is provided by the gov't for this effort.

Period of Performance:

The period of performance will be 12 months from the date of award.

Materials Requested for Statement of Interest/Qualifications:

Please provide the following via e-mail attachment (Maximum length: 2 pages, single-spaced 12 pt. font).

1. Name, Organization and Contact Information
2. Brief Statement of Qualifications (including):
 - a. Biographical Sketch,
 - b. Relevant past projects and clients with brief descriptions of these projects,
 - c. Staff, faculty or students available to work on this project and their areas of expertise,
 - d. Any brief description of capabilities to successfully complete the project you may wish to add (e.g. historic datasets, equipment, laboratory facilities, field facilities, etc.),

Special Qualifications:

- e. Qualifications for task 3 and optional task 1 include a minimum of a MS degree in Entomology with 5 years of experience surveying for insects with a focus on beetle identification. Three of the 5 years shall be in the San Diego area.
- f. Personnel doing GIS work must be proficient using ARCGIS with formal training using ARCGIS.
- g. Personnel working on task 4 must have a bachelor's degree in a natural resources related field and have course work in statistics and experimental design.
- h. Personnel working on tasks 1, and optional tasks 1 and 2 must have at least 2 years field experience in southern California where native plant identification is required.
- i. Personnel maintaining weather station must have successfully completed XYZ course

Note: A proposed budget is NOT requested at this time.

Review of Statements Received: Based on a review of the Statements of Interest received, an investigator or investigators will be invited to prepare a full study proposal. Statements will be evaluated based on the investigator's specific experience and capabilities in areas related to the study requirements.

Please send responses or direct questions to:

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Timeline for Review of Statements of Interest: Review of Statements of Interest will begin **10 ten days** after posting of SOI.