

SCOPE OF WORK
PROJECT FSPM157217, MGT, WETLANDS/FLOODPLAINS
GREAT BASIN COOPERATIVE ECOSYSTEM STUDIES UNIT
CESU-17-11

Projects for execution under this CA by USACE do not include any functions to be performed that are inherently governmental. This determination is made with the assessment that places emphasis on the degree to which conditions and facts restrict the discretionary authority, decision-making responsibility, or accountability of Government officials using NFE services or work products.

This CA shall not be used for performance of personal services. These tasks provided by the customer for execution under this CA by USACE do not include functions to be performed that are personal services.

Any modifications to Cooperative Agreement activities as outlined by this SOW/PWS must be channeled through the Grants Officer's Technical Representative (GOTR) and Grants Officer (GO) prior to Non-Federal Entity (NFE) implementation.

NFE personnel shall also wear a distinctive NFE furnished security (ID) badge/lanyard readily identifying the individual as a NFE employee. The badge shall be worn in a conspicuous place at all times when performing work under the Cooperative Agreement including attendance at Government meetings and conferences that take place outside of the Government facility.

NFE personnel shall identify themselves as an NFE employee when answering or placing calls on a Government telephone and when leaving outgoing or incoming messages on voice mail. Use of acronyms in this identification is insufficient to meet this requirement.

All NFE email signatures shall identify them as such and will include their employer's name.

PERIOD OF PERFORMANCE: 12 months

GOVERNMENT POCs:

1. USACE Omaha District POC: Mr. David Leptien PM, (402) 995-2742, david.b.leptien@usace.army.mil
2. USACE Omaha District POC: Ms. Kali Evans, GOTR, (402) 995-2295, kali.l.evans@usace.army.mil
3. USACE Omaha District POC: Ms. Stephanie Rostermundt, Grants Officer, (402) 995-2083, stephanie.a.rostermundt@usace.army.mil

This statement of work addresses the following tasks:

PROJECT NUMBER	TITLE	LOCATION
	Project Management	Edwards AFB
FSPM157217	MGT, WETLANDS/FLOODPLAINS	Edwards AFB

TASK 1: PROJECT FSPM157217 MGT, WETLANDS/FLOODPLAINS EDWARDS AFB, CA

Summary: This project consists of three major objectives:

- a. Update the Mojave Creek Flood Assessment
- b. Assess the health and feasibility of use of Rogers Dry Lake, and
- c. Perform surface flow studies at Rogers Dry Lake and Rosamond Dry Lake.

Objective 1: Mojave Creek Flood Assessment Update

Background: Executive Order (EO) 11988, *Floodplain Management*, requires all federal agencies to provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing or disposing federal lands.

In addition to EO 11988, Federal Emergency Management Agency (FEMA) Part 9, *Floodplain Management and Protection of Wetlands*, as well as other federal, state, and US Air Force (USAF) regulations pertain to the siting of facilities within the floodplain and the level of protection against flood hazard that must be provided at a facility. These regulations are implemented by the USAF through AFI 32-7064, *Integrated Natural Resources Management*.

Late in 2015, EO 11988 was amended by EO 13690, *Establishing a Federal Flood Risk Management Standard (FFRMS)*, which applies to all new or retrofit federal actions and is meant to address the future impacts to Federal actions by the changing nature of flood risk within a dynamic climate system. The new Standard allows for selection of one of three approaches for establishing the FFRMS flood elevation and hazard areas to be used for siting, design, and construction of Federal actions. The three approaches to establish the FFRMS flood elevation are:

1. Use best-available, actionable climate science data;
2. Add two feet of freeboard above the 100-year (base) flood elevation (BFE) for standard projects, or add three feet of freeboard above BFE for “critical action¹” facilities; or,
3. Use the 500-year flood elevation.

Objective: Compare the above three approaches to determine which one, or a combination, is appropriate to provide a conservative method to establishing an appropriate FFRMS floodplain at EAFB.

This project will update the Mojave Creek Flood Assessment work performed at Edwards AFB during the early 2000s by the Desert Research Institute (DRI). The NFE will develop updated regulatory flood hazard maps throughout the main housing areas, as well as along the channelized path of Mojave Creek across EAFB, from the northwestern corner fence line to where the creek discharges to Rogers Dry Lake. Thus, the current study area is inclusive of the original Mojave Creek Flood Assessment study area, the Mojave Creek Extension study area, and the far western side of the base which was not included in previous studies.

Use existing data sets, including the original flood assessments, as the basis of this revised study and incorporate additional meteorological records, new topographic data, remotely sensed imagery, Light Detection and Ranging (LIDAR) data, and other necessary data to perform the new hydraulic analyses. Develop hydrologic models for the current as-built and 10-year base plan conditions for the housing, undeveloped, and channel areas. Incorporate these data into the FLO-2D (or similar) hydraulic model, a two-dimensional, deterministic model, used to perform hydraulic analyses and to develop regulatory floodplain maps for the 100- and 500-year floodplains.

Objective 2: Rogers Dry Lake Health and Feasibility of Use Study

Background: The Rogers Dry Lake lakebed surface is used by both the US Air Force and National Aeronautics and Space Administration's Armstrong Flight Research Center (NASA/AFRC) for mission-critical airfield operations. Land use changes within Antelope Valley surrounding the playa have intercepted or modified surface water flows to the lakebed, which historically have been important in both smoothing and re-establishing the crustal surface of the lakebed. Agricultural groundwater withdrawals have been linked to lakebed subsidence and fissuring towards the southern end of Rogers Lake. In addition, dynamic climate conditions are also likely playing a role in the timing and duration of playa inundation and surficial conditions.

Objective: This study will assess the health and feasibility of continued use of the Rogers Dry Lake surface, including developing an understanding of the importance and development mechanisms of both physical and biological crusts on the dry lakebed surface, wind erodibility issues of this crust, and addressing subsidence and fissuring of the lakebed. The likely impacts of watershed-scale changes to the hydrologic functioning of the lakebed will be assessed and recommendations for mitigation strategies will be provided.

It is assumed that data developed during the proposed Rogers Dry Lake Surface Flow Study, which will leverage existing NASA/AFRC climate change study instrumentation, datasets, and

reporting managed by DRI (to be obtained by the NFE) for use in this project.

Collect microbial samples and analyze for community structure and biomass/biodensity using DNA-based methods and pigment analysis (e.g. chlorophyll), then characterize to determine dominant algal classes by comparing ratios of chlorophyll to phycobillins. Patterns of microbial density and diversity will be compared against satellite (e.g., Landsat, Modis) and on site spectral data.

Measure the shear strength of soil crust samples from different parts of the Rogers Dry Lakebed, such as from undisturbed surfaces towards the northern end, frequently wet but undisturbed surfaces towards the southern end, from an active (disturbed) airfield strip on the lakebed, and from disturbed vehicle tracks on the lakebed. Use methods appropriate to assess the impact of aircraft and vehicle operations on the playa crust to develop an understanding of surface stability. The study shall also evaluate aeolian erodibility and geomorphic changes to the lakebed surface, such as subsidence and fissuring, and potential effects of long-term drought.

Objective 3: Surface Flow Studies at Rogers Dry Lakebed and Rosamond Dry Lake

Background: The lakebed surfaces are used by both the US Air Force (USAF) and National Aeronautics and Space Administration's Armstrong Flight Research Center (NASA/AFRC) for mission-critical airfield operations. Land use changes within Antelope Valley surrounding the playa have intercepted or modified flows to the lakebed, which historically have been important in both smoothing and re-establishing the crustal surface of the lakebed.

Objective: This project will evaluate the surficial flows from Antelope Valley to Rogers Dry Lakebed and Rosamond Dry Lake at Edwards AFB. This task will leverage existing NASA/AFRC climate change study field instrumentation, datasets, and reporting managed by DRI (to be obtained by the NFE), with additional datasets, to make this assessment.

This study will revise and update previous assessments at Rogers and Rosamond Dry Lakes, and will complement the Rogers study described in Objective 2 above. The study will incorporate data from past and present stream gauges, lakebed depth measuring stations, meteorological stations within each watershed, plus relevant remote sensing studies and other available and acquired data.

Deliverables: Deliverables shall consist of a draft, pre-final, and final technical report for each task describing the hydrologic and hydraulic analyses used to develop the 100- and 500-year, as well as the FFRMS, flood hazard maps, and will provide the electronic data files for all hydrologic and hydraulic modeling, as well as the ArcGIS files of the maps.

GIS STANDARDS

The NFE shall comply with all requirements in the most recent version of the *Edwards Air Force Base Standards for Geographic Information System (GIS) Deliveries* document (available from 412 CEG/CEVA Environmental Support Section [412 CEG/CEVA]). This document provides all details required for a successful GIS delivery. A preliminary technical consultation with 412 CEG/CEVA staff shall be accomplished within one week following the task order award. Following consultation, 412 CEG/CEVA will provide the required file geodatabase template to be used for the GIS delivery (if applicable).

The NFE shall deliver GIS data to include all survey data, and data reported in the final report (if applicable) in ESRI file geodatabase format. The NFE shall consult and coordinate with 412 CEG/CEVA staff on the development of table structure, attributes and domains for all delivered data. Data not currently maintained by Edwards Air Force Base (EAFB) will be incorporated into the delivery following the EAFB currently-used Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) version. The currently-used SDSFIE version may be obtained from 412 CEG/CEVA. Deviations from, or additions to, existing SDSFIE objects must be coordinated with, and approved by 412 TW CEG/CEVA in writing prior to the delivery of any GIS product. All delivered data shall be error free (including geometry errors), attributed completely, and include metadata at the geodatabase, feature class, and standalone table level. GPS data accuracy requirements shall be coordinated with 412 CEG/CEVA staff prior to collection and differential correction processes. The NFE shall provide draft electronic copies of the GIS deliverable for 412 CEG/CEVA review and comment. A list of issues will be returned to the NFE for rectification. Following deliverable approval, the NFE shall submit one (1) final electronic copy to 412 CEG/CEVA.

All text documentation shall be delivered in a Microsoft Office 2013 or Adobe Acrobat PDF version 11 compliant format and be searchable. Photographic images shall be TIFF with at least 1,200 dpi resolution. All NFE documents shall be accompanied by a Standard Form 298 Report Document Page (SF 298). This form is available in electronic format at DTIC's web site: <http://www.dtic.mil>. Electronic copies shall be submitted through a preapproved file transfer site, on CD-ROM or DVD. Rewritable CDs and DVDs will not be accepted. CDs or DVDs and the jewel case shall be labeled with the document title, including the spine of the CD or DVD case. The NFE shall consult and coordinate with 412 CEG/CEVA on larger deliverables that require delivery on a portable USB or Firewire hard disk drive (HDD). Electronic files for text, photographs, images, and illustrations shall be in the native software whenever possible. ISO 9660 file names shall be used, with standard extensions that will be recognized on Microsoft Windows platform. Folder names shall be no more than 8 characters, have no extension, and can be no more than eight levels deep. All security, password protection, etc., shall be removed so that there are no access restrictions on any section for any purpose (viewing, printing, and editing).