

STATEMENT OF OBJECTIVES (SOO)
NATURAL RESOURCES SUPPORT
BARRY M. GOLDWATER AND LUKE AFB

Article III, (D) of the Applicable Cooperative Ecosystems Studies Unit (CESU)

1. GENERAL:

- 1.1.** The Barry M. Goldwater Range (BMGR) and Luke environmental program ensures military mission activities are conducted in compliance with all applicable environmental laws, regulations and policies with cooperation and assistance from the Air Force Civil Engineer Center's (AFCEC). Article I B of the master agreement states the objectives of the CESU are to: provide research, technical assistance and education to federal land management, environmental and research agencies and their potential partners; develop a program of research, technical assistance and education that involves the biological, physical, social sciences needed to address resource issues and interdisciplinary problem-solving at multiple scales and in an ecosystem context at the local, regional, and national level; and place special emphasis on the working collaboration among federal agencies and universities and their related partner institutions.
- 1.2.** The objectives of the work to be performed under this task order are to conduct natural resource tasks on the federal lands belonging to BMGR and Luke (AFB), and to prepare reports detailing the results of this work for submission to the USACE Omaha Project Manager (PM), AFCEC Installation Support Section (ISS) POC, and BMGR and Luke Natural Resource POCs.
- 1.3.** Any modifications to Cooperative Agreement activities as outlined by this SOO must be channeled through the Grants Officer's Technical Representative (GOTR) and Grants Officer (GO) prior to Non-Federal Entity (NFE) implementation.

2. AUTHORITY:

Authority to enter into a Cooperative Agreements (CA) for the work: Section 670c-1, Title 16 United States Code, Sikes Act.

- 2.1.** In agreement with the above stated goals, the recipient/cooperator agrees to provide the necessary personnel, equipment, and materials required to implement, in part, the BMGR and Luke AFBs responsibilities pursuant to the Endangered Species Act (16 USC 1531 et seq.), the Sikes Act Improvement Act, the Migratory Bird Treaty Act (16 USC 1361 et seq.), the National Environmental Policy Act (42 U.S.C. 4321 et seq.), and applicable implementing regulations, such as Air Force Instruction 32-7064.

2.2. In accordance with section 6305 – *Using cooperative agreements of the Federal Grant and Cooperative Agreements Act of 1977* (31 U.S.C. § 6301 et seq.), all CESU projects must carry out a public purpose of support or stimulation, instead of acquiring goods or services for the exclusive direct benefit of the United States Government. Examples of carrying out a public purpose may include, but are not limited to, the following:

- Project results are made available to a wide audience (including nonfederal entities, NFE)
- Project results/outputs add to the scientific literature/knowledge base, with applicability and utility beyond the scope of the project footprint/study area
- Academic and other nonfederal partner institutions (and their personnel) gain professional experience, increase knowledge, and develop skills and abilities
- Students benefit from direct interaction with federal scientists, program and technical staff, and field unit managers

2.3. In accordance with section 6305 – *Using cooperative agreements of the Federal Grant and Cooperative Agreements Act of 1977* (31 U.S.C. § 6301 et seq.), substantial involvement is expected between the Department of Defense and the recipient when carrying out the activity contemplated by the cooperative agreement. The DoD agrees to participate at a national level in support of the CESU program as accepted in the Master MOU for the establishment and continuation of the CESU program Article II 1-4 and Article VI 1-7.

The installation further (hence DoD) agrees to provide substantial involvement as directed under the appropriate master agreement to include, but are not limited to, the following:

- BMGR, Luke and AFCEC ISS are involved in development of study methodology, data gathering, analysis, and/or report writing
- BMGR, Luke and AFCEC ISS are active participates and collaborates in carrying out the project plan of work, reviews and approves activities, helps train or select project staff or trainees

3. General Requirements:

The PI is responsible for providing all materials, equipment and supplies used in this project. The PI shall be responsible for the selection, development and implementation of all control and monitoring techniques/methods. The PI shall use methods and equipment in accordance with Federal and State laws.

The PI is responsible to provide all transportation, meals, and lodging for himself/herself and his/her personnel as well as all equipment and analysis necessary to complete the work. Government furnished equipment/support is as follows: gate keys and range radios. All equipment is subject to inspection by and approval of the Installation safety officer.

The PI is responsible to visit the project area as often as necessary and within the time limits stated below to accomplish the purposes of the Agreement as detailed further in this SOO. It is the PI's responsibility to obtain security and entrance clearances and camera passes for himself/herself and his/her personnel onto the Installation. The PI must comply with all security rules, regulations, requirements, and day-to-day operational changes thereto. Unannounced changes to day-to-day operational procedures may, at times, prohibit the PI access to project sites. While on the Installation, the PI shall abide by all applicable rules and regulations issued by the Commanding Officer. The PI may be subject to inspections for contraband while on Government property.

The PI will adhere to all safety, security and other requirements delineated by the 56 RMO (BMGR East) and/or MCAS Yuma (BMGR West). Personnel access will be strictly controlled at all times and closely coordinated with the designated representative for the Installation. The PI may use volunteer field assistants provided that all personnel are under the direct control of the PI and meet the safety, security and citizenship requirements discussed above.

The PI is responsible to manage the total work effort and assure fully adequate and timely completion of services required under this Agreement. Included in this function shall be a full range of management duties including, but not limited to, planning, scheduling, inventory, analysis, quality control, and for meeting professional industry standards for conducting project activities.

Due to the fact that the Installation is an active military range, all personnel requiring access will be required to view a range safety video annually, hold a valid Special Use access permit, and adhere to all safety procedures, and make prior coordination with the IR for entrance onto the BMGR East.

Unexploded ordnance may be encountered while conducting fieldwork. The PI shall not touch or attempt to pick-up any suspected ordnance. If necessary, the PI should flag off and avoid any areas where metal objects are discovered and field work must continue in the area.

Prior to accessing the Installation, the PI is responsible to meet with the Installation Representative to review the guidelines for conducting research on the Installation. This meeting can be conducted as part of the kick-off meeting if one is scheduled.

The PI is responsible to conduct literature reviews, field investigations and interviews with experts and authorities as necessary to accomplish the work described within this Agreement. The PI shall, in particular, attempt to contact and utilize information from the local 56th RMO Environmental Science Management office and other professionals who are experienced with the type of project to be implemented by this Agreement. This shall include review of pertinent files at the Installation and past research conducted at the Installation.

All parties involved in this Agreement agree to comply with all applicable laws and regulations pertaining to the provisions of a safe and respectful workplace and to provide a work environment free of harassment and intimidation for such party's own employees and third parties.

The PI is responsible to ensure that all project personnel conduct their activities in a manner that ensures the safety of field crew members and any others and that avoids damage to vehicles, existing structures, natural resources, or any other resources or property.

All work conducted in support of this Agreement shall comply with all state and federal laws applicable to the Installation including, but not limited to, the Endangered Species Act, the Clean Water Act and the Migratory Bird Treaty Act. Any necessary permits shall be obtained by the PI at no cost to the Government. All permits obtained must be reviewed by the IR prior to the start of field activities.

The PI and all personnel must possess a valid state driver's license to operate motorized vehicles on the Installation, and shall provide evidence of insurance, required by Arizona state law, for each non-government vehicle used at the Installation.

Vehicle operators may not use cell phones unless the vehicle is safely stopped or the cell phone employs a "hands free" device. Drivers may not hold, dial, text or adjust the phone while the vehicle is in motion. Hands free systems such as ear buds, blue tooth, OnStar and other voice activated or speaker phone systems are authorized. Installation Security personnel can issue military motor vehicle citations to operators in violation of this policy. These citations result in a three-point penalty assessed to the violator's driving record and if a driver accumulates twelve points within a twelve month period or eighteen points within a twenty-four month period he/she is subject to suspension of Installation driving privileges for one year.

All field notes, field data forms, electronic storage of field data, photographs, etc. collected and produced as part of this Agreement will only be released by the PI, subcontractors, or employees on temporary duty with the written approval of the Installation Representative as detailed in section K below. Legible copies of the field notes, data forms and other information shall be provided to the Installation Representative upon request.

All methods of data collection and analyses shall be standardized with previous studies conducted under past Agreements for this type of work, or when appropriate, analyzed using acceptable new or improved methods as determined in current scientific literature(s). If changes in analyses make results unfit for comparison with previously collected data, the PI shall reanalyze all appropriate data sets for comparison. The Installation Representative shall approve in advance any changes to previously used experimental designs, methods of data collection and/or analyses, which shall be provided in the PI's Work Plan (if required). The

Installation Representative, at his discretion, may subject draft work plans, draft reports or draft manuscripts to external peer review.

In order to avoid impacts to federally listed, rare, or endemic plants the PI must coordinate all vegetation and ground disturbing activities with the Installation Representative. Under no circumstances are any federally protected plants to be disturbed and/or destroyed when completing the work required in this Agreement. The PI shall ensure that all footwear, backpacks, clothing, vehicles and equipment transported to the Installation are clean of weed seed. In addition, under no circumstances shall the PI violate the Archeological Resources Protection Act. If any objects are found that appear to be cultural or archeological resources, the PI shall leave those items undisturbed. If the PI accidentally disturbs an archeological and/or cultural resources site, the PI shall leave the site immediately (and as intact as possible) and contact the IR.

The PI shall manage any generated hazardous material, hazardous waste, and hazardous waste residues in accordance with Federal, State, and local regulations. Transport and disposal of hazardous wastes (i.e., batteries) shall be conducted in accordance with Federal, State, local and applicable Installation requirements.

The PI shall inform the IR via e-mail of any unusual activity observed while conducting surveys in the field (e.g. trespassers or persons in unauthorized areas). Information should include (a) location, (b) date, (c) time, and (d) any detailed facts regarding the activity. However, the PI is not obligated to monitor trespass in the study area.

The PI shall inform the IR via e-mail of any unusual animal or plant species observed while conducting surveys in the field (e.g. species which are federally listed or are State of Arizona Species of Concern). Information should include (a) location, (b) date, (c) time, and (d) any detailed facts of the sighting.

Throughout the term of this Agreement, the IR shall be afforded the opportunity by the PI to periodically observe the PI's field activities, to review computer or paper files of raw data, prepared data (such as data analyses, summaries, maps, figures, tables, etc.), or any record deemed appropriate by the Installation Representative in establishing the PI's performance in fulfilling the requirements of this Agreement.

Sections of this Agreement may be added to, deleted, or modified during the year to reflect project changes or new information, such as program cost increases requirements. Any management activities not specifically provided for within this Scope of Objectives that are deemed necessary to carry out this Agreement shall be discussed with and mutually agreed to by the PI and Installation Representative prior to implementation by the PI. Changes to this Agreement will be made effective only through an Agreement Amendment signed by the appropriate signatory authorities.

4. DESCRIPTION OF OBJECTIVES:

The objectives of the work to be performed under this delivery order are to conduct natural resource tasks on the federal lands belonging to BMGR and Luke to prepare reports detailing the results of this work for submission to the USACE Omaha District point of contact (POC), AFCEC Nellis Installation Support Section (ISS) POC, and BMGR and/or Luke Natural Resource POC.

Coordination should be made with the Base NRM, AFCEC Nellis ISS and USACE PM at a Task Order review meeting at a mutually set schedule. All work shall be IAW this SOO and be consistent with the Project Schedule & Work Plan approved by the USACE PM and Base NRM. Schedule changes and trade-off decisions can be jointly made by the USACE PM, Base NRM and AFCEC Nellis ISS and align with the Sikes Act compliant INRMP. Schedule should account for a government review period NTE 30 days. **The USACE Grants Officer must approve any changes in scope or cost.** All coordination with state and federal regulators will be by the Base NRM or AFCEC ISS only. All NFEs conducting work under the Task Order should aim to attend scheduled meetings.

Coordination: Coordination should be made with BMGR and/or Luke AFS NRM, AFCEC ISS and USACE PM at a monthly Task Order review meeting. All work shall be IAW this SOO and be consistent with the Project Schedule & Work Plan approved by the USACE PM and Base NRM. Schedule changes and trade-off decisions can be jointly made by the USACE PM, Base NRM and AFCEC Nellis ISS and align with the Sikes Act compliant INRMP. Schedule should account for a government review period NTE 30 days. **The USACE Grants Officer must approve any changes in scope or cost.** All coordination with state and federal regulators will be by the Base NRM or AFCEC ISS only. All NFEs conducting work under the Task Order should aim to attend the monthly meeting.

Table 1.

	Section	Task	Title	Location
AFCEC Project No.				
NURDA53206119	3.1	Task 1	MGT, Habitat, Avian protection plan	BMGR
NURDOS3920 / NURDA53206120	3.2	Task 2	MGT, SPECIES, Migratory birds	BMGR
NURDA53206119	3.3	Task 3	MGT, HABITAT	E BMGR-
NUEXA53206121	3.4	Task 4	MGT INVASIVES	Luke AFB

4.1. Task 1: MGT, HABITAT, AVIAN PROTECTION PLAN (AVIAN PROTECTION PLAN FOR THE BARRY M. GOLDWATER RANGE EAST & GILA BEND AUXILIARY FIELD, ARIZONA MGT, HABITAT, NURDA53206119)

The Barry M Goldwater Range (BMGR) East is located in southwest Arizona and consists of over 1.05 million acres in Maricopa, Pima, and Yuma counties. The Gila Bend Air Force Auxiliary Field (AFAF) is located 3.5 miles south of Interstate 8 within the northern boundary of BMGR East and serves as the support headquarters for the range.

An Avian Protection Plan (APP) is a proactive, system-specific document to address avian interactions with power lines and presents management options to address bird mortalities and other avian issues within an electrical system. In 2005, the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) developed Avian Protection Plan Guidelines to assist entities in creating an APP that will best fit their needs while furthering the conservation of avian species.

BMGR East and the AFAF are operated and managed by the 56th Range Management Office (56 RMO) at Luke Air Force Base. Power lines at the Gila Bend AFAF and within the BMGR East are currently maintained by a USAF contractor with the exception of lines and substations located parallel to and within the right-of-way of State Route 85. These lines are managed and maintained by Arizona Public Service (APS) utility company.

Scope of Fieldwork

The objective of this task is to develop an APP for BMGR East and the Gila Bend AFAF, including an avian Risk Assessment. The APP shall be developed using the most recent APLIC and USFWS guidelines. To achieve this objective, available data will be examined and field investigations conducted in order to develop the APP.

In order to accomplish the work specified in this task order, it shall be necessary for the cooperator to complete the following tasks:

Task 1: Review Existing Data

Conduct literature review of relevant studies on the range. Through this literature review and working with the 56 RMO geographer, compile relevant GIS data for the range (e.g. topographic, hydrologic, land-use, avian use, power line, and vegetation).

Task 2: Conduct Avian Risk Assessment

Develop avian risk maps for potential avian electrocution risks on the BMGR system; develop and conduct an avian Risk Assessment.

Task 3: Draft/Final Avian Protection Plan

The APP format and contents will be approved during the initial project meeting by the government project managers and will follow established APLIC and USFWS guidelines. The plan should include specialized training for Air Force power line maintenance personnel and technical support to on the purchase of bird protection hardware for poles.

Initial Meeting

Within 30 days of award of this task order, the NFE will schedule an initial project kick off meeting with all parties involved (BMGR, AFCEC/Nellis ISS, NFEs, etc) to develop a

project work schedule to implement the SOO. All deliverables/tasks will be submitted within the required timeframes as identified.

The NFE shall work with the BMGR-NRM to establish priority areas of survey. This determination should be made based on mission priority, range access, or by habitat priority as determined by the BMGR-NRM. Due to BMGR mission and training prioritization schedules and access restrictions, implementation of fieldwork activity/schedules may be required to be changed, as agreed upon as necessary by the NFE, AFCEC/Nellis ISS, and the BMGR-NRM.

Fieldwork

Required field work must be completed during biologically accepted seasons (breeding, migratory, wintering, nesting) as delineated for each type of survey listed below, based on range access availability. Surveys may be required to be conducted outside of the normal seasons if stipulated by various land/wildlife managing agencies and as approved by the BMGR-NRM. Protocols for surveys will be coordinated with the BMGR-NRM during the initial meeting and submitted prior to the start of field work. Approved survey protocols will be followed where possible, while ensuring compliance with Range access/restrictions. Adjustments to the protocols will be documented and submitted with data sheets to the BMGR-NRM.

Surveys will be conducted for specific species as approved by the BMGR-NRM. This determination should be made based on mission priority, range access, or by species priority as determined by the BMGR-NRM. Seasonal timing and locations of surveys will be approved on a case by case basis.

Government Furnished Information or Equipment

The Government will not furnish any supplies or manpower in support of this agreement. The Government may furnish some sensitive equipment for use during field surveys as available and appropriate for specified field work. Sensitive equipment furnished may include GPS, binoculars, and digital cameras in an effort to standardize data collected as well as comply with sensitive equipment rules/restrictions while on the BMGR.

MATERIAL AVAILABLE FOR REVIEW

The 56 RMO maintains a library of natural resources information that has been collected on the BMGR East that will be made available to the cooperator. The cooperator will need to contact the NRM to discuss the information needs for the project and to make arrangements to access the material. The cooperator shall pay for or replace any items borrowed that are damaged or lost. Items that may be of interest:

- GIS data for the BMGR East and surrounding area, including road network, intersections, Air Force-maintained power poles, and high resolution imagery.
- Photos of power pole types leading to Manned Ranges 1, 2, 3, and 4 and a subset of pole types at the AFAF. These photos were taken by the NRM in 2019.

Data Collection and Geographic Information System Database Requirements

Original data sheets will be delivered to the BMGR-NRM no later than seven (7) days after the completion of each field event. Data sheet format will be approved by the NRM prior to first field event.

GIS Data: Any GIS data created for this project shall be provided as a deliverable. Vector data shall be delivered as Feature Classes (FC) in ESRI's file geodatabase format – version 10.6. Unless exception is made, all final GIS datasets must comply with the latest version of Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) available from the SDSFIE website: <http://www.sdsfie.org/>. Currently the USAF is using SDSFIE version 3.1.1. The work plan / bid shall specify which SDSFIE FCs will be used in the final delivery. Contact a 56 RMO Geographer or the 56 RMO Project Manager if no appropriate SDSFIE feature class exists.

GPS Data: Unless exception is made, all features collected via GPS shall be differentially corrected to a horizontal accuracy of 1 meter, or better. Additionally all raw GPS data files shall be provided.

Coordinate System: Final deliverable GIS datasets shall be provided in the following coordinate system:

Projection: UTM

Datum: WGS-84

Zone: 12 North

Units: Meters

Metadata: All final GIS data layers shall contain metadata consistent with the Federal Geographic Data Commission (FGDC) requirements. This metadata must include the lineage of the dataset - how it was collected (including a discussion of accuracy), what processes were run on it, etc. For GPS collected data the metadata will document what type and model of GPS units were used – including use of any external antennas, as well as what GPS software and post processing software were used.

Delivery Method: All GIS data shall be provided digitally via electronic file transfer (i.e., DOD SAFE). Alternately, at the discretion of 56 RMO, file transfer may be accepted on CD, DVD, or external hard drive.

Meeting and Deliverables

Kickoff Meeting: The Recipient will provide support for one (1) kick-off face-to-face meeting involving BMGR, the USACE and technical support to include meeting minutes. The kickoff meeting will clarify the requirements of the agreement, points of contacts (POCs) will be identified at the meeting and any additional information will be given to the cooperator. Additionally, the meeting will discuss a variety of programmatic issues; agree on the word processing software that will be used (i.e., text in Microsoft Word, pdf version of deliverables, tables in MS Word or Excel, and shape files for all graphics used in the deliverables); resolve any schedule discrepancies; numbers of hard copies and CDs of Draft and Final deliverables, and address any concerns. The cooperator shall arrange the meeting within 30 days of notice to proceed (NTP) and shall be responsible for preparing meeting minutes and submitting them within five (5) working days following the meeting.

Work Plan & Schedule: The Recipient shall submit a work plan & schedule within 10 days of award of this cooperative agreement and finalized with first monthly progress report. Schedule changes shall be presented as appropriate with subsequent progress reports.

Monthly Progress Reports: The Recipient shall provide monthly progress reports summarizing activities as follows:

- Number of days, locations, and activities, including travel status.
- Plans, reports, and briefings prepared or reviewed.
- Meetings attended including purpose/objective and attendees.
- Action items, support, and tasks accomplished.
- Project progress, problems identified, solutions implemented, and schedule adjustments, if appropriate.
- Critical communications.

Draft/Final Project Reports:

A copy of a draft APP for review by the NRM will be submitted within 90 days of the conclusion of the risk assessment/survey field season. BMGR East review and comments on the draft will be conducted within 60 days. Upon receipt of comments/corrections, on the draft report, a copy of a final draft report will be submitted within 45 days for final review. BMGR East review and comments on the final draft report will be conducted within 30 days. A hard copy and electronic copy of the final report will be due within 30 days upon receipt of BMGR East comments on the final draft report.

4.2. Task 2: MGT, SPECIES, MIGRATORY BIRDS

Arizona encompasses more of the Sonoran Desert than any other U.S. state. Thus, land managers in Arizona have a responsibility to monitor and sustain wildlife populations that depend on this unique habitat. Over 60 species of birds breed in the Sonoran Desert; at least 9 are Department of Defense (DoD) priority species and 28 are AZ Species of Greatest Conservation Need (SGCN).

One cause of concern for these at-risk species is a lack of data. For example, data from the Breeding Bird Survey, a continental-scale long-term monitoring effort, are insufficient to confidently estimate population size and trend for many of these species. Another cause for concern is that populations of desert species often are naturally low in number and density. As a result, these species may be particularly vulnerable to growing threats including climate change, and habitat loss and fragmentation. It is imperative to focus attention on these at-risk species and develop proactive strategies to understand their population trends, sustain populations, and reduce the risk of federal listing.

In 2012 a working group of the AZ Bird Conservation Initiative (ABCI) adopted and implemented a statistically robust monitoring strategy to generate information needed to more effectively manage and conserve bird populations across the Sonoran Desert. The *Sonoran Desert Breeding Bird Survey* established area search surveys, to obtain data to

determine population and density estimates of birds that breed in Sonoran Desert habitats, as well as explore their spatial distribution, and habitat preferences. A long term objective is to detect population trends over time, which can be obtained through repeated surveys conducted on a multi-year rotational schedule. The first round of surveys were conducted in 2012-2014 and ABCI is gearing up to implement a second round of surveys.

Scope of Fieldwork

The purpose of this task is to conduct *Sonoran Desert Breeding Bird Surveys* on BMGR East. The NFE must have experience and knowledge to administer all aspects of the environmental work and administrative aspects described under this statement of work. The NFE shall have adequate experience in working with Sonoran Desert birds in the southwestern United States. The period of performance will be 18 months from date of award. Based on access restrictions and mission training activities, field work will often be required to be conducted on weekends and holidays, in addition to normal weekdays. Required field work must be completed during biologically accepted activity seasons. Surveys may be required to be conducted outside of the normal seasons if stipulated by various land/wildlife managing agencies and as approved by the NRM (NRM). The NFE shall provide all the necessary labor, facilities, equipment, materials, transportation, and supplies necessary to perform the services depicted in this SOO. The NFE shall visit the installation, as well as Federal, state, and local agencies as necessary to acquire the information to complete the tasks listed below. The NFE shall perform all necessary travel as part of the task requirements, and the costs thereof shall be included with the estimate.

Review Survey Plots:

Review survey plots and data from the 2012-2014 survey on the BMGR East. Determine total number of plots that can be surveyed on BMGR East per breeding season based on available funding.

Sonoran Desert Breeding Bird Surveys on BMGR East:

In coordination with the NRM, the NFE will select and stratify plots on BMGR East as described in Corman et al 2018 and conduct bird surveys using an area survey protocol (Corman et al. 2018). Surveyors will document territories on field plot maps and attempt to find the first season's nest for each pair. The majority of Sonoran Desert bird species attempt their first breeding activity during late winter and spring. Therefore, all plots will be surveyed using a rapid survey method (i.e., two visits) during February through May. Surveys will begin 30 minutes before sunrise and last 3.5 to 4.5 hours in order for surveyors to monitor the entire plot. Surveyors will assign birds they detect to zones as either "desert" or "wash" habitats, and designate them as "breeding" or "incidentals" if they believe the birds are migrants or breeding outside the plot. Intensive surveys (similar to rapid surveys), but including more visits (i.e., 6-12 times in the Lower Sonoran Desert and 8-16 times in the Upper Sonoran Desert) may be conducted in a sub sample of plots.

Data management at the conclusion of the field season will consist of updating the Arizona Game and Fish Department's Coordinated Bird Monitoring database and providing results to

the Department's Heritage Data Management System. A technical report summarizing the results of surveys will be produced at the conclusion of the multi-year surveys.

Initial Meeting

Within 30 days of award of this task order, the NFE will schedule an initial project kick off meeting with all parties involved (BMGR, AFCEC/Nellis ISS, NFEs, etc) to develop a project work schedule to implement the SOO. All deliverables/tasks will be submitted within the required timeframes as identified.

The NFE shall work with the BMGR-NRM to establish priority areas of survey. This determination should be made based on mission priority, range access, or by habitat priority as determined by the BMGR-NRM. Due to BMGR mission and training prioritization schedules and access restrictions, implementation of fieldwork activity/schedules may be required to be changed, as agreed upon as necessary by the NFE, AFCEC/Nellis ISS, and the BMGR-NRM.

Fieldwork

Required field work must be completed during biologically accepted seasons (breeding, migratory, wintering, nesting) as delineated for each type of survey listed below, based on range access availability. Surveys may be required to be conducted outside of the normal seasons if stipulated by various land/wildlife managing agencies and as approved by the BMGR-NRM. Protocols for surveys will be coordinated with the BMGR-NRM during the initial meeting and submitted prior to the start of field work. Approved survey protocols will be followed where possible, while ensuring compliance with Range access/restrictions. Adjustments to the protocols will be documented and submitted with data sheets to the BMGR-NRM.

Surveys will be conducted for specific species as approved by the BMGR-NRM. This determination should be made based on mission priority, range access, or by species priority as determined by the BMGR-NRM. Seasonal timing and locations of surveys will be approved on a case by case basis.

Draft/Final Project Reports:

A draft technical report summarizing the results of *Sonoran Desert Breeding Bird Surveys* on BMGR East will be submitted to the 56 RMO NRM and Nellis ISS POC by Nov 1st following the conclusion of the previous breeding season. Government review and comments on the draft will be conducted within 15 days. Upon receipt of comments/corrections, on the draft project report, a copy of a final draft project report will be submitted within 30 days. The report format and contents will be approved during the initial project meeting by the government project managers. The report will include but is not limited to an executive summary, survey methods, results, population estimates, trend data where applicable, discussion and management recommendations, and military mission implications. Maps and drawings will be provided. In general the report will follow the format of the Corman et al 2018 report.

Government Furnished Information or Equipment

The Government will not furnish any supplies or manpower in support of this agreement. The Government may furnish some sensitive equipment for use during field surveys as available and appropriate for specified field work. Sensitive equipment furnished may include GPS, binoculars, and digital cameras in an effort to standardize data collected as well as comply with sensitive equipment rules/restrictions while on the BMGR.

Data Collection and Geographic Information System Database Requirements

Original data sheets will be delivered to the BMGR-NRM no later than seven (7) days after the completion of each field event. Data sheet format will be approved by the NRM prior to first field event.

GIS Data: Any GIS data created for this project shall be provided as a deliverable. Vector data shall be delivered as Feature Classes (FC) in ESRI's file geodatabase format – version 10.6. Unless exception is made, all final GIS datasets must comply with the latest version of Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) available from the SDSFIE website: <http://www.sdsfie.org/>. Currently the USAF is using SDSFIE version 3.1.1. The work plan / bid shall specify which SDSFIE FCs will be used in the final delivery. Contact a 56 RMO Geographer or the 56 RMO Project Manager if no appropriate SDSFIE feature class exists.

GPS Data: Unless exception is made, all features collected via GPS shall be differentially corrected to a horizontal accuracy of 1 meter, or better. Additionally all raw GPS data files shall be provided.

Coordinate System: Final deliverable GIS datasets shall be provided in the following coordinate system:

Projection: UTM

Datum: WGS-84

Zone: 12 North

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Metadata: All final GIS data layers shall contain metadata consistent with the Federal Geographic Data Commission (FGDC) requirements. This metadata must include the lineage of the dataset - how it was collected (including a discussion of accuracy), what processes were run on it, etc. For GPS collected data the metadata will document what type and model of GPS units were used – including use of any external antennas, as well as what GPS software and post processing software were used.

Delivery Method: All GIS data shall be provided digitally via electronic file transfer (i.e., DOD SAFE). Alternately, at the discretion of 56 RMO, file transfer may be accepted on CD, DVD, or external hard drive.

DELIVERABLES

The NFE shall submit the following deliverables to the USACE POC and 56 RMO NRM summarizing activities outlined in the task section above and as follows:

- Project schedule & Work Plan
- Brief quarterly updates during the field effort (i.e., monthly)
- Technical report summarizing results of *Sonoran Desert Breeding Bird Surveys*

4.3. Task 3: MGT, Habitat, VEGETATION COMMUNITY MAPPING

FINAL COMPLETION OF VEGETATION COMMUNITY MAPPING ON THE BARRY M. GOLDWATER RANGE EAST (BMGR EAST), ARIZONA MGT, HABITAT (NURDA53206119)

The purpose of this Scope of Objectives (SOO) is to complete the remaining portions of a comprehensive vegetation association mapping effort for the BMGR East. This will be accomplished by reviewing previous mapping efforts, ensuring each effort was completed using established protocols, revisiting any incompatible work, and creating a complete and comprehensive map. Completion of the vegetation mapping effort on BMGR East will provide for a seamless map combining the efforts of various federal land management entities across southwestern Arizona in support of the Desert Southwest Cooperative Ecosystems Studies Unit (DSCESU). The completed vegetation map will be useful for managing the vegetation communities on the BMGR East and would provide an excellent baseline for ecosystem management decisions. The Cooperator's efforts will be focused on field work and data manipulation required to compile data necessary to complete the BMGR East vegetation map. In addition to the completed vegetation maps, the Cooperator will provide 56th Range Management Office (56 RMO) personnel with a GIS database that integrates all data meshed with existing, up-to-date information that comprises of all of the vegetation maps produced for BMGR East. The Cooperator will continue to provide 56 RMO representatives with access to an invasive species monitoring application suitable for use with Android and iOS operating systems used in various smartphone models. This system is currently used by representatives of Marine Corps Air Station – Yuma and BMGR East with data maintenance functions being served by the Cooperator. Finally, the Cooperator will provide 56th RMO with a synthesis report of the work conducted under this Scope of Objectives (SOO) containing data and photos supporting the research efforts. This vegetation survey and mapping effort will be conducted in support of the Barry M. Goldwater Range Integrated Natural Resources Management Plan (INRMP) dated October 2018 and the Desert Southwest Cooperative Ecosystem Studies Unit.

The vegetation survey and mapping efforts will be conducted on BMGR East and may include any portion of the BMGR East that, as determined by the Principal Investigator in coordination with 56 RMO, requires revalidation of previous vegetation mapping (FIGURE 1).

Specific Requirements:

The purpose of this effort is to complete a comprehensive vegetation map and GIS database for the BMGR East. Specifically, this SOO allows for field work within any portion of BMGR East in which previous mapping efforts need to be revisited or revalidated (FIGURE 1). Revalidation of previous vegetation mapping efforts will allow for a comprehensive vegetation map to be

completed as required by this SOO. This agreement is to perform fieldwork necessary to collect the data needed to support that effort, synthesis of these field data into seamless GIS shapefiles integrating the new vegetation association data compiled via this SOO and previous vegetation association data collection efforts performed by the University of Arizona for the BMGR East and its adjacent lands. The results of this effort will be geospatial data depicting the previously missing or incomplete vegetation associations and all related attributes. In addition, all information, field methods, field data and GIS techniques and descriptions will be synthesized into a detailed summary of all efforts encompassed by this SOO.

The PI shall become familiar with the range of vegetation types, available imagery, and existing vegetation on the BMGR East. Based on this effort, the PI shall develop a detailed work plan for the project in consultation with the IR. In a preliminary effort, selected areas should be sampled, mapped, and evaluated in order to refine the work plan and establish reasonable goals.

Vegetation field sampling and mapping shall follow the protocol established for lands on the Cabeza Prieta National Wildlife Refuge (CPNWR) and the BMGR East. The protocol for the CPNWR is described in the report titled "Vegetation of the Cabeza Prieta National Wildlife Refuge, Arizona" dated December 2003. The protocol for the BMGR East is described in the report titled "Vegetation of the North and South Tactical Ranges, Luke Air Force Base, Barry M. Goldwater Range, Arizona". The PI shall use these protocols as modified by new developments or innovations in desert vegetation field sampling and mapping methodologies. Any modifications to these protocols shall be first presented and approved in the work plan prior to implementation in the field. The following is a summary of the two protocols described in the reports.

Each vegetation sampling site will be designated by the first letters of the name of the 7.5 minute quad sheet, sequentially numbered (e.g., the first sample from the Raven Butte quad will be RB-1). For each sample, record the location, environmental description, and vegetation description, including the mean height of the most common species, estimated to the nearest 10cm, with the exception of trees, whose height will be estimated to the nearest 0.5 m. All data shall be entered into the database initiated by Malusa (2003).

At each vegetation sampling site, the PI shall photograph the representative vegetation and record the coordinates and azimuth (compass heading) of the photograph. The photographs will be delivered as (1) DVD with file names indexed to the sample site, and photograph date along with any other necessary/relevant information.

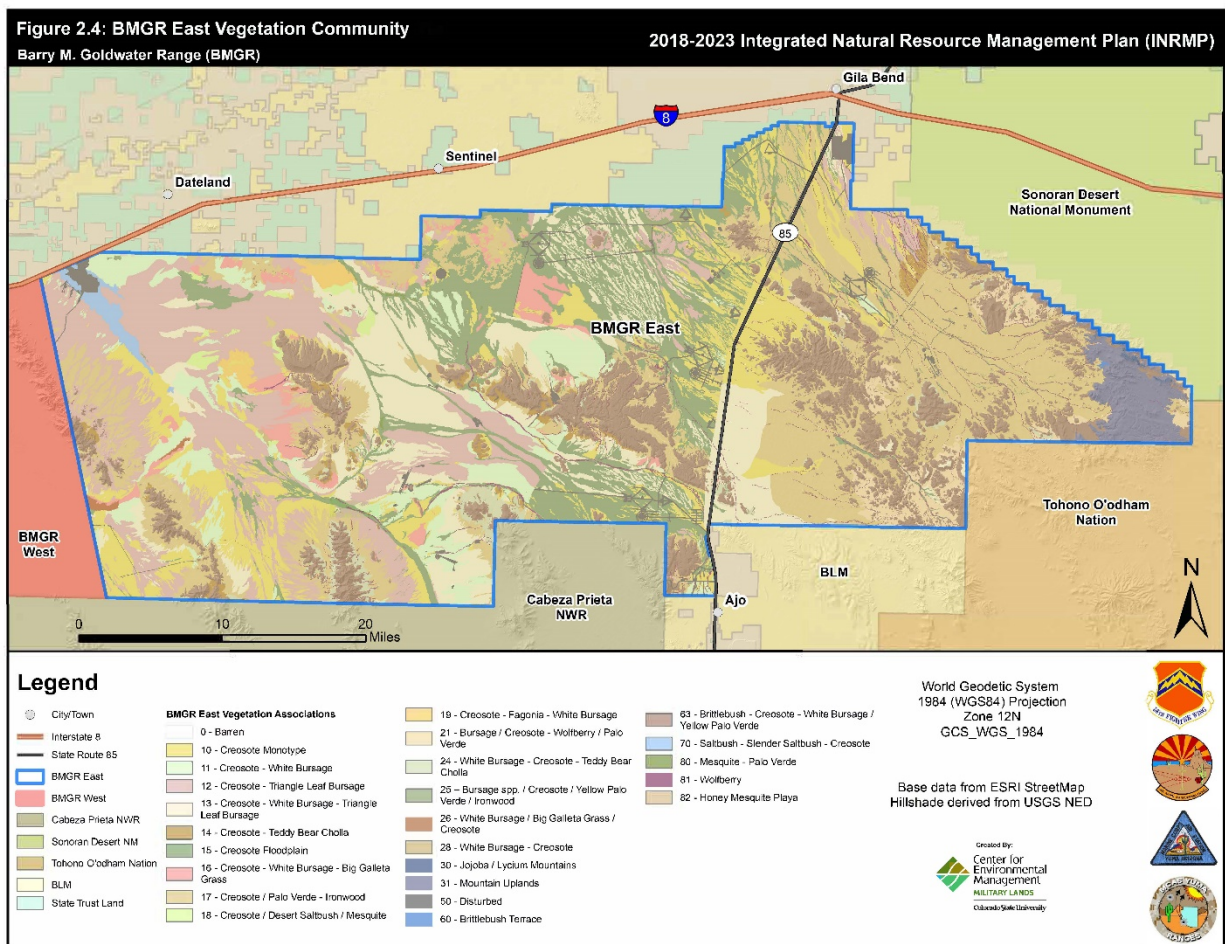
For the vegetation mapping effort, the PI shall become familiar with the National Vegetation Classification Standard (NVCS). An example of methods for vegetation mapping using a combination of field plots and photo-interpretation is available online at <http://biology.usgs.gov/npsveg/nvcs.html> (1996) for Tuzigoot NM.

The PI shall classify vegetation types to the association level. Stand delineation shall be based on floristic, physiognomic, and habitat homogeneity. The classification shall include a hierarchy delineation of vegetative physiognomic within the attributes of each polygon of a feature class. The minimum mapping unit of 1.0 hectare shall be mapped to a standard 1:24,000 scale USGS topographic quadrangle. Each stand shall be designated as a polygon feature in a GIS feature class. Stands less than 1.0 hectares, if deemed important, may be mapped as point or linear features.

The PI shall identify boundaries between vegetation stands by using a combination of photo-interpretation and field study. Routes traveled during the study should be recorded in the GIS database as a separate layer.

The PI shall also map the locations of invasive plant species when possible. Of special interest is *Brassica tournefortii*, *Cenchrus ciliaris*, and *Citrullis colocynthis*.

Funds permitting, all vegetation associations found on the BMGR East shall be submitted to the NVCS using the NatureServe Explorer interface.



Initial Meeting

Within 30 days of award of this task order, the NFE will schedule an initial project kick off meeting with all parties involved (BMGR, AFCEC/Nellis ISS, NFEs, etc) to develop a project work schedule to implement the SOO. All deliverables/tasks will be submitted within the required timeframes as identified.

The NFE shall work with the BMGR-NRM to establish priority areas of survey. This determination should be made based on mission priority, range access, or by habitat priority as determined by the BMGR-NRM. Due to BMGR mission and training prioritization schedules and access restrictions, implementation of fieldwork activity/schedules may be required to be changed, as agreed upon as necessary by the NFE, AFCEC/Nellis ISS, and the BMGR-NRM.

Fieldwork

Required field work must be completed during biologically accepted seasons (breeding, migratory, wintering, nesting) as delineated for each type of survey listed below, based on range access availability. Surveys may be required to be conducted outside of the normal seasons if stipulated

by various land/wildlife managing agencies and as approved by the BMGR-NRM. Protocols for surveys will be coordinated with the BMGR-NRM during the initial meeting and submitted prior to the start of field work. Approved survey protocols will be followed where possible, while ensuring compliance with Range access/restrictions. Adjustments to the protocols will be documented and submitted with data sheets to the BMGR-NRM.

Surveys will be conducted for specific species as approved by the BMGR-NRM. This determination should be made based on mission priority, range access, or by species priority as determined by the BMGR-NRM. Seasonal timing and locations of surveys will be approved on a

Meeting and Deliverables:

Kickoff Meeting: The Recipient will provide support for one (1) kick-off face-to-face meeting involving BMGR, the USACE, and Nellis ISS, and provide technical support to include meeting minutes. The kickoff meeting will clarify the requirements of the agreement; points of contacts (POCs) will be identified at the meeting and any additional information will be given to the cooperator. Additionally, the meeting will discuss a variety of programmatic issues; agree on the word processing software that will be used (i.e., text in Microsoft Word, pdf version of deliverables, tables in MS Word or Excel, and shape files for all graphics used in the deliverables); resolve any schedule discrepancies; numbers of hard copies and CDs of Draft and Final deliverables, and address any concerns. The cooperator shall arrange the meeting within 30 days of notice to proceed (NTP) and shall be responsible for preparing meeting minutes and submitting them within five (5) working days following the meeting.

Work Plan & Schedule: The Recipient shall submit a work plan & schedule within 10 days of award of this cooperative agreement and finalized with first monthly progress report. Schedule changes shall be presented as appropriate with subsequent progress reports.

Monthly Progress Reports: The Recipient shall provide monthly progress reports summarizing activities as follows:

- Number of days, locations, and activities, including travel status.
- Plans, reports, and briefings prepared or reviewed.
- Meetings attended including purpose/objective and attendees.
- Action items, support, and taskers accomplished.
- Project progress, problems identified, solutions implemented, and schedule adjustments, if appropriate.
- Critical communications.

Submittal Schedule:

<u>DOCUMENT/PRODUCT</u>	<u>NUMBER OF COPIES</u>	<u>DUE DATE</u>
Detailed Study Proposal (Work Plan)	1 digital copy via Email	60 days after Agreement award
Field Survey Schedule	1 digital copy via Email	30 days prior to the beginning of field survey activities

Draft Project Report	1 digital copies via Email	90 days following the end of the field season
Final Project Report	3 hard copies (1 unbound and 2 bound) and 2 digital copies (.PDF and .DOC)	30 days after receipt of Government comments on the draft project report

Study Proposal (Work Plan). The PI shall submit one (1) digital copy of the study proposal, formatted as a work plan, to the Installation Representative via E-mail for approval prior to implementation in the field. The study proposal shall be submitted no later than sixty (60) days following Agreement award. The study proposal submittal shall provide sufficient detail to understand the specifics of the field efforts. Specifically, the PI shall submit a study proposal to include a description of the methods for field vegetation sampling and mapping and vegetation classification system. The proposal shall include a short summary of the field survey schedule for reference.

Field Survey Schedule. The PI shall submit one (1) digital copy of the field survey schedule by month in table format to the Installation Representative via-E-mail for approval 30-days prior to the beginning of field survey activities

Invasive Species Monitoring Smartphone Application and Data Management Services for Subsequent Gathered Data. The Cooperator will continue to provide 56 RMO personnel with support and instruction for the use of an invasive species monitoring application suitable for use with Android and iOS operating systems used in various smartphone models. This system is currently used by representatives of Marine Corps Air Station – Yuma and BMGR East. The Cooperator will manage data gathered to ensure accuracy and availability via GIS Cloud at www.editor.giscloud.com. Continued use of a single account costs \$200/year (discounted rate), with annual subscription costs to be borne by 56 RMO.

Draft Project Report. The draft project report shall document all data collected during the field survey effort and shall include the preparation of summary data tables. The Government shall submit comments to the PI no later than thirty (30) days following the receipt of the draft project report for incorporation into the final project report.

Final Project Report. The PI shall submit three (3) bound and two (1) digital copies to the Installation Representative within 30 days following receipt of Government comment. The final report will be submitted with all of the information contained in the draft project report as modified by submitted comments.

Maps. All maps created for this Agreement shall be incorporated in both the printed and digital copies of the draft and final project reports. Digital copies of all maps shall also be provided. Additionally, the spatial data used to generate any maps shall be provided and shall be in ESRI ArcGIS shape file format. Also, a metadata file shall be produced for each shape file created and these metadata files shall be included with the GIS database. Metadata should follow the Federal Geographic Data Committee (FGDC).

Photographs. All electronic images taken while performing work for this Agreement shall be submitted with the final project report and shall become U.S. Government property. All images will

be labeled with the plot identification, and accompanied by the Access database to reference plot data. All images will be georeferenced, with an .exif header containing GPS coordinates, azimuth, elevation, and date of photograph. Such imagery shall be compatible with ESRI's ArcPhoto application. Photographic documentation of all methods used to complete the requirements under this Agreement shall be provided in the final project report.

Delivery Method: All final deliverables shall be provided in digital format on a CD or DVD. The comprehensive final deliverables CD/DVD shall include (at minimum) the final report (Word & PDF format), GIS files, database files and raw data (MS Access or MS Excel format), and project photographs (photos shall be labeled with at minimum the location, subject, and date).

Government Furnished Information or Equipment

The Government will not furnish any supplies or manpower in support of this agreement. The Government may furnish some sensitive equipment for use during field surveys as available and appropriate for specified field work. Sensitive equipment furnished may include GPS, binoculars, and digital cameras in an effort to standardize data collected as well as comply with sensitive equipment rules/restrictions while on the BMGR.

MATERIAL AVAILABLE FOR REVIEW

The 56 RMO maintains a library of natural resources information that has been collected on the BMGR East that will be made available to the cooperator. The cooperator will need to contact the NRM to discuss the information needs for the project and to make arrangements to access the material. The cooperator shall pay for or replace any items borrowed that are damaged or lost.

Data Collection and Geographic Information System Database Requirements

Original data sheets will be delivered to the BMGR-NRM no later than seven (7) days after the completion of each field event. Data sheet format will be approved by the BMGR-NRM prior to first field event.

GIS Data: Any GIS data created for this project shall be provided as a deliverable and must be reviewed and approved by a 56 RMO/ESM Geographer prior to going final. All final GIS data sets shall be compatible with the existing geographic information system currently used by the 56 RMO. Vector data shall be delivered as Feature Classes (FC) in ESRI's file geodatabase format. The 56 RMO follows the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) (<http://www.sdsfie.org/>). All final GIS datasets will use the appropriate SDSFIE FC for the type of features being collected. The SDSFIE data model may be expanded, if needed, with concurrence from the IR. A 56 RMO/ESM Geographer will be available to provide technical assistance in navigating the SDSFIE data model and expanding that model.

The final vegetation association dataset for each block shall include the vegetation association spatial data for all completed work on the BMGR East, Cabeza Prieta NWR, BLM, and BMGR-W along with any other available data of comparable quality for adjacent lands. Where a new block is adjacent to a completed survey, edge matching shall be conducted to assure a smooth and accurate transition between the new and old survey. The methodology for this edge matching shall be proposed by the PI and approved by the IR. The end result of this will be a seamless regional vegetation association dataset.

GPS Data: All features collected via GPS will have an accuracy of 5 meters, or better. Features to be collected by GPS include the location of the sample plots (relevés), and the routes taken by the PI. The GPS files will be converted in the ESRI shapefiles to facilitate viewing.

Coordinate System: Final deliverable GIS datasets shall be provided in the following coordinate system:

Projection: UTM

Datum: WGS-84

Zone: 12 North

Units: Meters

Metadata: All final GIS data layers shall contain metadata consistent with the Federal Geographic Data Commission (FGDC) requirements. This metadata must include the lineage of the dataset - how it was collected (including a discussion of accuracy), what processes were run on it, etc. For GPS collected data the metadata will document what type and model of GPS units were used – including use of any external antennas, as well as what GPS software and post processing software were used.

Delivery Method: All GIS data shall be provided digitally via electronic file transfer (i.e., DOD SAFE). Alternately, at the discretion of 56 RMO, file transfer may be accepted on CD, DVD, or external hard drive.

4.4. **Task 4: MGT, HABITAT, INVASIVE PLANT SPECIES**

The objectives of the work to be performed under this task order are to manage invasive weeds on federal lands belonging to Luke AFB (Luke main installation & Fort Tuthill Recreation Area), and Arizona state lands for which Luke AFB has a special land use permit (AUX-1).

Reports detailing the results of this work will be submitted to the USACE Omaha District GOTR, AFCEC/Nellis Installation Support Section (ISS) NRPM and the Luke AFB NRPM.

The influence of invasive plant species introduction and colonization within native biotic communities has been a major concern to biologists and land managers, due to the potential for negative and lasting influences on native flora and fauna (Hohmann, et al. 2013, Marler 2013, Blossey 1999, Enserink 1999, Dickson, et al. 2015). Military installations are also affected by invasive species, where invasive plants and the management of them can affect mission readiness as well as the local ecology (Cofrancesco 2004). While the effects of invasive plants include competition for resources and changes in habitat characteristics and soil chemistry, modification to natural fire regimes is perhaps the most immediate threat to natural desert environments, where most plant species are not adapted to fire (Esque and Schwalbe 2002, Keeley 2006). Some invasive species such as buffleggrass (*Pennisetum ciliare*) are also an increasing hazard in urban areas and the urban wildlands interface due to the highly flammable characteristics of this plant. Without intervention and use of control

measures, such as mechanical removal and herbicide use, the proximity of large patches of invasive plants to residential, military and commercial properties and infrastructure create the potential for property losses due to fire. In addition, other invasive species with an affinity for low-lying areas where moisture is retained for extended periods may block culverts and drainage ways creating increased maintenance costs and the risk of water damage during storm runoff.

Military bases are particularly vulnerable to invasive species introductions due to the high volume and wide variety of passenger, commercial and military vehicles entering and exiting the facilities from all areas of the state and many parts of the country as well as from around the world. In addition, maintenance, storage and training activities often create disturbed areas where conditions are favorable for invasive plant seed collection and germination. Military lands can be impacted from invasive species through 1) negating realistic conditions for training and testing operations or limiting training activities and available lands; 2) increasing training and operations costs due to invasive species management; and 3) creating safety and security risks (US Army Corps of Engineers 2014) .

The purpose of this project is to manage non-native, invasive and/or noxious weeds and prevent the future spread of these plants at Luke AFB, Auxiliary Field 1 (AUX 1), and the Fort Tuthill Recreation Area (FTRA), Arizona. Noxious weeds including globe chamomile/stink net (*Oncosiphon piluliferum*) fountain grass (*Cenchrus setaceus*), Sahara mustard (*Brassica tournefortii*), and salt cedar (*Tamarix sp.*) provide unnatural fuel for wildfires and crowd out native flora, which leads to an alteration of habitats and a non-professional appearance in otherwise non-vegetated managed areas around buildings across base. Continual management efforts are needed to ensure invasive weeds do not continue to spread. Luke AFB is especially concerned with the spread of stink net to the Barry M. Goldwater Range – East.

The NFE must have experience and knowledge to administer all aspects of the environmental work and administrative aspects described under this statement of work. The NFE will be a qualified biologist with adequate experience in working with unique habitat and rare plants and in identifying noxious and invasive species in the southwestern United States. All personnel will be approved by AFCEC/Nellis ISS NRPM and the Luke AFB NRPM prior to award of the task order. NFE personnel must be able to obtain clearance for Luke AFB and at times may be required to be escorted by a government employee.

The NFE will provide all the necessary labor, facilities, equipment, materials, transportation, and supplies necessary to perform the services depicted in the SOO. All specialized equipment must be cleared for use prior to start of the project. The NFE will use rental or company vehicles. The NFE will visit the installation, as well as federal, state, and local agencies as necessary to acquire the information to complete the tasks listed below. The NFE will perform all necessary travel as part of the task requirements, and the costs thereof will be included with the proposal cost.

Required fieldwork must be completed during biologically accepted activity seasons. However, surveys may be required outside of the normal seasons if stipulated by various land/wildlife managing agencies and as approved by the AFCEC/Nellis ISS NRPM and the Luke NRPM. Areas to be surveyed will also be determined based on scheduled activities and base access.

The purpose of this project is to manage non-native, invasive and/or noxious weeds and prevent the future spread of these plants at Luke AFB, Auxiliary Field 1 (AUX 1), and the Fort Tuthill Recreation Area (FTRA), Arizona. Noxious weeds including globe chamomile/stink net (*Oncosiphon piluliferum*) fountain grass (*Cenchrus setaceus*), Sahara mustard (*Brassica tournefortii*), and salt cedar (*Tamarix sp.*) provide unnatural fuel for wildfires and crowd out native flora, which leads to an alteration of habitats and a non-professional appearance in otherwise non-vegetated managed areas around buildings across base. Continual management efforts are needed to ensure invasive weeds do not continue to spread. Luke AFB is especially concerned with the spread of stink net to the Barry M. Goldwater Range – East.

The NFE must have experience and knowledge to administer all aspects of the environmental work and administrative aspects described under this statement of work. The NFE will be a qualified biologist with adequate experience in working with unique habitat and rare plants and in identifying noxious and invasive species in the southwestern United States. All personnel will be approved by AFCEC/Nellis ISS NRPM and the Luke AFB NRPM prior to award of the task order. NFE personnel must be able to obtain clearance for Luke AFB and at times may be required to be escorted by a government employee.

The NFE will provide all the necessary labor, facilities, equipment, materials, transportation, and supplies necessary to perform the services depicted in the SOO. All specialized equipment must be cleared for use prior to start of the project. The NFE will use rental or company vehicles. The NFE will visit the installation, as well as federal, state, and local agencies as necessary to acquire the information to complete the tasks listed below. The NFE will perform all necessary travel as part of the task requirements, and the costs thereof will be included with the proposal cost.

Required fieldwork must be completed during biologically accepted activity seasons. However, surveys may be required outside of the normal seasons if stipulated by various land/wildlife managing agencies and as approved by the AFCEC/Nellis ISS NRPM and the Luke NRPM. Areas to be surveyed will also be determined based on scheduled activities and base access.

Objective 1 -- Initial Meeting

Within 30 days of award of this task order, the NFE will schedule an initial meeting with the AFCEC/Nellis ISS NRPM and the Luke AFB NRPM to develop a project work schedule to implement the SOO. All deliverables/tasks will be submitted within the required timeframes as identified.

The NFE will work with the Luke AFB NRPM to establish priority of survey areas to evaluate occurrence of invasive plant species on Luke AFB. Due to Luke AFB mission training prioritization schedules and access restrictions, implementation of fieldwork activities/schedules may be required to be changed, as agreed upon as necessary by the NFE and the AFCEC/Nellis ISS NRPM and the Luke AFB NRPM.

Within 10 business days of the Initial Meeting, the proposed work schedule will be submitted for review/approval by the AFCEC/Nellis ISS NRPM and the Luke AFB NRPM.

Objective 2 – Review Existing Data:

The NFE will review historic vegetation data, species data, and habitat use on Luke AFB, AUX-1, and the FTRA, based on independent research and documents provided by the Luke AFB NRPM. Documents provided will include the 2012 F-35A Training Basing Final Environmental Impact Statement, the 2019 update to the Luke AFB Integrated Natural Resources Management Plan, and the 2019 Vegetation Classification and Mapping at Luke Air Force Base report.

All researched data will be adequately cited in any reports or documents produced under this SOO.

Objective 3 -- Fieldwork:

Required field work must be completed during biologically accepted seasons. Surveys may be required outside of the normal seasons if stipulated by various land managing agencies and as approved by the AFCEC/Nellis ISS NRPM and the Luke NRPM.

Prior to initiating any fieldwork, the NFE will coordinate dates and confirm base access requirements with the Luke AFB NRPM.

Fieldwork required:

- Conduct kickoff meeting, coordinate dates and confirm base access requirements with all parties.
- Conduct post-winter rain invasive species surveys on Luke AFB and Aux-1.
- Conduct spring invasive species survey on FTRA.
- Conduct post-winter rain mechanical removal of invasive species in selected priority areas, as determined by the Luke AFB NRPM in consultation with Luke AFB staff. Provide report of materials used in accordance with Objective 3 below.
- Spring mechanical removal of invasive species around activity areas on FTRA, as determined by the Luke AFB NRPM in consultation with FTRA staff. Provide report of materials used in accordance with Objective 3 below.
- Conduct late summer/post-monsoon invasive species surveys on Luke AFB and Aux-1.
- Conduct late summer/post-monsoon mechanical removal and herbicide applications on invasive species in selected priority areas, as determined by the Luke AFB NRPM in

consultation with Luke AFB staff. Provide report of materials used in accordance with Objective 3 below.

- Conduct post-monsoon invasive species surveys at FTRA.
- Conduct post-monsoon mechanical removal and herbicide applications on invasive species around activity areas on FTRA, as determined by the Luke AFB NRPM in consultation with FTRA staff. Provide report of materials used in accordance with Objective 3 below.
- Develop geospatial database and map invasive plant distribution
- Prepare and submit final report and datasets as described below in Deliverables.

This task order does not include work on the active airfield at Luke AFB. It does include all other areas of the installation, particularly those with improved or semi-improved landscaping. The NFE will provide all management, licenses, laboratory testing, tools, supplies, equipment, transportation, and labor to develop and implement an integrated invasive weed management plan (Plan) for the areas covered by this task order, to be provided via maps from the Luke AFB NRPM, in a manner that will ensure the health and general well-being of installation personnel. The NFE will provide the Plan to the COR at the post-award conference and at each change in growing/non-growing season at least 10 days before implementation.

The weeds listed at the Arizona Department of Agriculture Noxious Weeds site (<https://agriculture.az.gov/pestspest-control/agriculture-pests/noxious-weeds>) include Class A, Class B and Class C weeds. These are the plants that the NFE will focus on for their abatement.

The NFE will control noxious or invasive species control through execution of a specific weed control program appropriate for the area and landscaping/improvement level to maintain a professional appearance. Grounds made barren where weeds are removed will be restored to the level of care of the surrounding area (i.e. improved, semi-improved, etc.).

The Installation Pest Management Coordinator (PMC) must approve all herbicides and pesticides prior to use; therefore, the NFE will furnish the Luke AFB PMC with labels and Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS), in accordance with the current OSHA Hazard Communications Standard, for all intended pesticide materials 25 days prior to the start of the contract.

Herbicides and pesticides must be on the installation-approved inventory list and applied by certified personnel. All pesticides on the base approved list will also be on the current Armed Forces Pest Management Board (AFPMB) Standard Pesticides List available to DoD components and agencies listing also known as the 'DoD Approved Pesticide List': <http://www.afpmb.org/pubs/standardlists/dod%20pesticides%20list.pdf>. If not on the base approved list or the AFPMB list, pesticides must be approved prior to use by the Command Entomologist (submit list with intended uses via the Luke AFB NRPM).

The quantity of allowable herbicide/pesticide may be reduced and/or disallowed at any time. Additionally, allowable quantities are not guaranteed. The NFE will use methods that are most effective and do not contribute to non-point source pollution. Chosen pesticides will have the lowest toxicity, the least negative environmental impact, rapidly degrade in the environment, and minimize exposure to non-target organisms.

Weeds in decomposed granite (DG) areas will be controlled by chemical and/or mechanical means. Once weeds have been sprayed and given time to die off, they will be removed mechanically, and the area dressed up to present a neat and professional appearance. All areas on the Luke main installation that are dressed with DG will be treated with pre-emergent herbicide twice yearly: in spring and in the fall.

Areas seeded with wild-flowers will be identified by the Luke AFB NRPM and will not be treated with pre-emergent herbicide.

The NFE will submit a pesticide application report to the Luke AFB NRPM within 10 working days following each month for the prior month's applications. The report will record daily use of all pesticide products that are consumed/applied. The report will include the following information: Date, Location, Type of Operation, Target Pest, Pesticide Used, EPA number, % Concentrate, Amount of Concentrate, Amount of Finished Product, Units of Measure in SF, and Applicator's Initials. A DD Form 1532, Pest Management Report, will be provided on request to facilitate record keeping. The NFE will maintain historical documentation on all pesticide applications. If requested by the Air Force, the NFE will provide a copy of the DD Form 1532 within 2 working days of receipt of the request. All records will remain the property of the Government.

Objective 4 – Data Collection / GIS:

Original data sheets will be delivered to the AFCEC/Nellis ISS NRPM and the Luke NRPM no later than seven days after the completion of each field event. Data sheet format will be approved by the NRPMs prior to first field event.

GPS waypoints will be submitted electronically using any ESRI compatible GIS format or Garmin GPS exchange format (.gpx).

All GIS data must be accepted and approved to be compatible by the 56 CES/GIS office to ensure compliance with AF GIS format. Data for this project will be collected using in compliance with SDSFIE. The latest version should be used for data collection. Maps generated from GIS data will be reduced and included in reports. Data collection will be accurate enough to ensure reasonable accuracy on large scale maps. The collected data will be made available in layers as agreed by the NFE and the natural resource manager.

The data will be delivered in PGDB format.

Objective 5 – Draft/Final Project Reports:

One copy of a draft project report for review by the AFCEC/Nellis ISS NRPM and the Luke NRPM will be submitted within 60 days of the conclusion of the field season. Government review and comments on the draft will be conducted within 30 days. Upon receipt of comment or edits on the draft project report, one copy of a final draft project report will be submitted within 30 days for final review. Government review and comments on the final draft project report will be conducted within 20 days.

Two hard copies and two electronic copies of the final project report will be due within 30 days upon receipt of comments on the final draft project report. The project report format and contents will be approved during the initial project meeting by the NRPMs. The report will include but is not limited to an executive summary, site characterization, survey methods, field notes and data sheets, results, population trend data where applicable, discussion and management recommendations, and military mission implications. Maps and drawings will be provided.

An annual project summary report will be prepared for inclusion into Luke AFB's Natural Resources Program Annual Progress Report. The project summary report format and contents will be approved during the initial project meeting by the government project managers. All photographs, data, and original data forms will be provided to the Luke NRPM.

Task 4 DELIVERABLES

Prior to implementation of this task order, the NFE will provide resumes of staff for this project to the AFCEC/Nellis ISS NRPM and the Luke NRPM and a statement demonstrating experience to conduct this study.

The NFE will submit a proposed work schedule for review/approval by the AFCEC/Nellis ISS NRPM and the Luke NRPM within 10 business days of the initial meeting.

During the field season, original data sheets will be delivered to the NRPM no later than seven days after the completion of each field event. Data sheet format will be approved by the NRPMs prior to first field event.

Upon completion of work for this task order, the NFE will provide all draft/final reports in both Microsoft word and PDF formats. Two comb-bound hard copies and two electronic copies of the final report will be provided to each NRMP and to the GOTR. All electronic copies will be provided to the Government on CD/DVD in a Microsoft Word multi-version compatible format as well as an unlocked Adobe PDF format. No reports or project information/data collected are to be released to the public unless permission is obtained from the Air Force in advance.

Prior to project completion all GIS data must be reviewed and approved by the Luke AFB 56 CES GIS office to ensure compliance with AF GIS compatibility.

5. GOVERNMENT FURNISHED INFORMATION OR EQUIPMENT

See specific sections within each Task above.

6. OPTIONS: four (4) optional years/periods are anticipated to support this project.

7. PERIOD OF PERFORMANCE

BASE PERIOD: The base period of performance is 18 months from date of award (*12 month technical period for conducting field work, followed by 6 months administrative for completion of reports only with no new work*).

OPTIONAL PERIODS: In general, these projects recur annually though the specific locations may vary. Four optional periods are anticipated to continue this effort in future years. Each optional period will be for 18 months and will begin at the conclusion of the previous 12-month technical period of performance (Overlap in POPs is strictly administrative for the completion of reports after the conclusion of all fieldwork).

8. GOVERNMENT POCS:

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9. Data and Publication:

This Cooperative Agreement is subject to, and the cooperator shall comply with, 32 CFR Subpart 32.6 concerning "Intangible Property," which includes use of research data. Any information or data protected by federal law will be identified by the Government prior to being provided to the PI and the Government will notify the PI in advance of applicable limitations on such information. Except as to information so identified and limited, there are no restrictions on reporting or publishing reports based upon the fundamental research that is the subject of this Cooperative Agreement.

The Federal Government has the right to obtain, reproduce, publish or otherwise use the data first produced under this Agreement and authorize others to receive, reproduce, publish, or otherwise use such data for Federal purposes. The United States Air Force acknowledges and agrees that the PI's fundamental consideration in performing the research under this Agreement shall be PI's right to publish the results of such research for academic and scientific purposes. The PI shall submit, for

review and comment, any proposed professional, scientific or non-scientific report, paper or note published or unpublished or be part of any technical or non-technical presentation or be provided to anyone not a party to this Agreement to the United States Air Force thirty (30) days prior to the submission of the work mentioned above.

The acknowledgements for any paper or presentation resulting from this work shall include the following statement: "This research was funded by the United States Air Force on behalf of the Installation [Insert Installation Name]."

Any publications resulting from this work shall be provided at no cost to the United States Air Force in quantities jointly determined by the responsible United States Air Force representative and the PI at the time of publication.

The PI shall be responsible for ensuring all personnel participating in activities under this Agreement have read and acknowledged the DATA AND PUBLICATION provisions of this Agreement.

RELEASE OF INFORMATION

The PI shall not respond to any inquiries about this Cooperative Agreement from the news media or non-governmental organizations or other persons during the term of this Cooperative Agreement unless it has first consulted with the Government and a determination appropriately made by the cognizant Government representative concerning release of information pursuant to the authority (Federal or State) cited by the requester. All inquiries shall be directed to the Public Affairs Officer through the Installation Representative.

- 10.** This cooperative agreement may be administered through a CESU only upon mutual agreement and official authorization by both parties of the acceptance of the application of the CESU Network IDC rate (17.5%).

Any resulting cooperative agreement will be subject to and recipient/cooperator shall comply with 2 CFR 200.313 "Equipment", 200.314 "Supplies", and 200.315 "Intangible Property" which includes use of research data.

[End of SOO]