

STATEMENT OF WORK (SOW)
N40192-25-2-8012
BIOLOGICAL CONTROL OF CYCAD SCALE, *AULACASPIS YASUMATSUI*, ON *CYCAS*
MICRONESICA
29 MAY 2025

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A. INTRODUCTION

As mandated, under the U.S. Endangered Species Act (ESA), the Department of Defense is required to protect listed species and their habitat. Additionally, the legislative purposes of the Sikes Act (P.L. 86-797, as amended, 16 USC§ 670), includes the requirement that the Secretary of each military department manage the natural resources of each military reservation under their jurisdiction "so as to provide multipurpose uses of those resources." Compliance with the ESA and Sikes Act, allows military operations or exercises, essential to mission readiness and effectiveness, to proceed without delays or restrictions.

Fadang or Micronesian cycad (*Cycas micronesica*), an endemic plant found on the islands of Guam and Rota, was once the most abundant "tree" in Guam's forests in 2000. The invasion of the cycad scale *Aulacaspis yasumatsui* in 2003 and the butterfly *Luthrodes pandava* (formerly known as *Chilades pandava*) in 2005 initiated an epidemic mortality of plant populations such that *C. micronesica* was listed as threatened under the U.S. Endangered Species Act by the US Fish & Wildlife Service (USFWS) in 2015.

The cycad aulacaspis scale (CAS) insect, *Aulacaspis yasumatsui*, was originally described from specimens collected on a *Cycas* sp., in Bangkok, Thailand, in 1972 (Takagi 1977). In Thailand, this armored scale is considered a pest of cycads, but is usually maintained in low densities by parasitoids (Tang et al. 1997). Effective pest control measures are necessary to ensure the preservation of this ESA-listed species, including the introduction of natural enemies (biological control). Annually, 5-8% of the living population dies, mainly due to cycad scale pressure and its indirect effects. If this rate of loss continues, the species ESA status could change from threatened to endangered and warrant additional requirements. Determining an effective biocontrol is a step that could reduce the annual rate of decline and the possibility of changing its ESA status.

Protecting *Cycas micronesica* through strategic pest control is essential to maintaining access to critical training areas and bolstering mission readiness. This project will work towards the establishment of a complex of effective biological control agents to develop a long-term strategy for protecting these plants.

[The following is from Cave, March 2022]

*Efforts to suppress CAS populations with biological control in Guam began in 2004 (Moore et al. 2005b), when about 100 adults of the lady beetle *Rhyzobius lophanthae* (Blaisdell) (Coleoptera: Coccinellidae) were collected in Hawaii and shipped to Guam. This predatory beetle, commonly called the purple scale predator, was selected for introduction in Guam because it was easily collected in Hawaii, where it apparently suppresses CAS populations effectively. Beetles were mass reared and released in Guam National Wildlife Refuge at Ritidian Point beginning in February 2005. By July 2005, adult beetles were found in abundance on cycads at Urunao Beach, 1 km from Ritidian Point. Following establishment of *R. lophanthae* at Ritidian Point, more than 7,000 beetles were released on cycads at 115 sites throughout Guam.*

*Survival of mature *C. micronesica* appeared to improve after establishment of *R. lophanthae*, yet the overall population of the cycad was not recovering because seeds and seedlings were being*

killed by the cycad aulacaspis scale and other causes (Marler and Terry 2011). Marler et al. (2013) showed that predation rates by *R. lophanthae* are significantly lower on plants close to the ground. The preference for mature trees is not completely understood, but Marler and Marler (2018) showed that volatile chemical cues are a contributing factor.

In August 2005, about 500 adults of the parasitic wasp *Coccobius fulvus* (Compere and Annecke) (Hymenoptera: Aphelinidae) (**Figure 4**) were taken from a laboratory colony (original stock from China) in Florida and brought to Guam (Moore et al. 2005b). About 250 of these wasps were placed in a cage with a CAS-infested king sago palm; the remaining wasps were released on *C. micronesica* at Marbo Cave. This site was chosen because *R. lophanthae* was not yet present in the area. An additional 250 *C. fulvus* received in September 2005 were released at Marbo Cave, as attempts to culture the parasitoid in the laboratory were not successful. Unfortunately, *C. fulvus* failed to establish in the field (Moore et al. 2005b).

In a second attempt to establish feral populations of *C. fulvus* in Guam, G. V. P. Reddy of the University of Guam (UoG) imported adults from a laboratory colony in Florida (original stock from Thailand). Attempts to establish a laboratory colony failed again. Several of the imported wasps were released on *C. micronesica* in Talofofo in 2008 (G. Reddy personal communication to Aubrey Moore, 2022), but there was no subsequent indication that the parasitoid became established.

In a third attempt to establish *C. fulvus* in Guam, A. Moore imported specimens collected in Florida by R. Cave in September and October 2014. Creation of a laboratory colony was again unsuccessful. Half of both shipments were released at Ritidian Point, but no evidence was found to verify establishment in the field. Why establishment of *C. fulvus* in the field did not occur after three attempts is unclear. Possibilities are that insufficient quantities of the parasitoid were released, or parasitized scales were eaten by *R. lophanthae*, or the released wasps were not adequately vigorous to reproduce and disperse.

About 100 adults of the parasitic wasp *Aphytis lingnanensis* Compere (Hymenoptera: Aphelinidae), or a cryptic species very similar to it, arrived in Guam in 2012 (A. Moore, personal communication, 2022) from Hawaii where they had been reared from CAS collected from king sago palms. This parasitoid causes high parasitism rates that appear to significantly suppress CAS populations in Hawaii; severely infested king sago palms apparently survive the effect of the pest when the parasitoid is present (M. G. Wright personal communication, 2022). *Aphytis* poss. *lingnanensis* also attacks CAS in southern Texas (Flores and Carlson 2009), but its effect on scale populations is undocumented. In Guam, the wasps were put into a cage with scale-infested *C. micronesica* leaves. All detectable *R. lophanthae* adults and larvae were removed from these leaves, but apparently undetected beetle eggs and tiny larvae beneath scale covers consumed all the scales before any adult *A. lingnanensis* could emerge. Therefore, a laboratory colony was not established, and no field releases were made.

G. V. P. Reddy imported into Guam the parasitic wasp *Arrhenophagus chionaspidis* Aurivillius (Hymenoptera: Encyrtidae) (**Figure 5**) from a laboratory colony in Florida, and field releases were made during 2008 (G. Reddy personal communication to A. Moore, 2022). High - 6 - parasitism rates at Ritidian Point were observed in February 2013 (A. Moore personal communication, 2022).

B. PURPOSE

This Cooperative Agreement (Agreement) includes the following project requirements:

1. The purpose is to develop a long-term strategy for protecting *Cycas micronesica* from *A. yasumatsui*.
2. Collaborate with partners conducting CAS predator surveys in the Marianas to understand what species are currently present and their efficacy and mechanism of controlling CAS.
3. Identify potential biological control agents to combat the *A. yasumatsui* scale insect.
4. The biological control agents shall include a suite of species with life history traits and CAS control mechanisms addressing a range of CAS vulnerabilities and complementary to that of existing control agents (e.g. *Rhyzobius lophanthae*).
5. The Recipient shall identify the procedures needed for rearing and introduction of new biological control agents on Guam and Tinian.

C. LOCATION

The location for the performance of this Agreement are within Joint Region Marianas (JRM) Area of Responsibility (AOR).

D. DESIGNATED REPRESENTATIVES

1. The Grants Officer is Thelman Mark Fontenot, Naval Facilities Engineering Command, Marianas, PSC 455, Box 195, FPO AP GU 96540-2937, email: thelman.m.fontenot.civ@us.navy.mil.
2. The Cooperative Agreement Technical Representative (CATR) is officially designated by the Grants Officer, and is responsible for monitoring the Recipient's performance, in accordance with the terms and conditions of the Agreement. The CATR shall be the first point of contact of the Recipient of the Agreement concerning issues/concerns regarding any of the requirements and specifications of this agreement, including base access and project site issues.
 - i The CATR for this agreement shall be Mr. Mario Martinez, EV2B.4, Natural Resources Specialist, NAVFAC Systems Command Marianas; Telephone: (671) 339-7348; Email: mario.a.martinez149.civ@us.navy.mil.
 - ii The alternate CATR for this agreement shall be Ms. Lauren Gutierrez, Supervisory Conservation Specialist, NAVFAC Marianas Public Works Department at Marine Corps Base Camp Blaz; Telephone: (671) 686-1299; Email: lauren.e.gutierrez7.civ@us.navy.mil

E. PERIOD OF PERFORMANCE

The Government anticipates an initial period of performance for the Agreement to be thirty-six (36) months starting from the date of award. After completion of the initial period of performance, the total performance period may include up to two (2) option periods of twelve (12) months each dependent upon the availability of funds and the unilateral election of the

Government to exercise an option to extend the term of the Agreement. The total duration of this Agreement, including the Option Years and any cost modifications shall not exceed 60 months.

F. MATERIAL FOR REVIEW

Recipient and/or his/her representative(s) will have access to the following materials and/or equipment through the CATR. The recipient shall pay for or replace any items borrowed that are damaged, stolen or lost:

- JRM Integrated Natural Resources Management Plan (INRMP)
- 2020 *Cycas micronesica* 2020 Management Plan for AAFB, April 2020
- Surveys of *Cycas micronesica* on Andersen Air Force Base Field Report; 2014
- All reports for: Conservation and Management of Micronesian Cycads, Navy Leased Land, Tinian, Commonwealth of the Northern Mariana Islands
- *Cycas micronesica* Management Plan For Andersen Air Force Base, Guam. Isla Paraiso (2013)
- Report to the US Fish and Wildlife Service – Pacific Islands Division On A Visit To Guam March 3–17, 2022. Observations, Assessment, and Recommendations For Applied Biological Control of the Cycad Aulacaspis Scale

G. GENERAL REQUIREMENTS

1. It is the Recipient's responsibility to obtain security and entrance clearances and camera passes for himself/herself and his/her personnel and take munitions and explosives of concern training (~1 hour) if access to the Department of Navy lands are planned. The Recipient must comply with all Department of Navy installation security rules, regulations, requirements, and day-to-day operational changes thereto.
2. The Recipient shall solely be responsible for providing all study design, labor, transportation and associated costs, equipment, material, tools, supplies, supervision, and administration services required to complete the requirements of this Agreement. All equipment utilized on the installation(s) is subject to inspection by and approval of the Installation Safety Officer.
3. The Recipient shall conduct investigations and interviews with experts and authorities as necessary to accomplish the work described below. The Recipient may utilize information from local offices and personnel of the USFWS, Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, University of Guam, and CNMI Department of Lands and Natural Resources.
4. The Recipient shall 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 biocontrol introduction and ESA-listed species conservation management.
5. All work conducted under this Agreement shall conform to the requirements of the SOW.

6. Due to the complexity of the work, the Recipient shall provide the following key personnel with the following minimum qualifications:

A. Principal Investigator (PI): Throughout performance of the Agreement, the Recipient shall provide the required natural resources services required by this Agreement.

The Principal Investigator shall have, at a minimum:

- A master's degree in biology, entomology, botany, conservation biology or similar field with three years of experience managing projects as a senior scientist or project manager working with biological studies and any other environmental related work;

B. Project Manager (PM): The Recipient shall assign a PM for this Agreement, who shall be responsible for overseeing on a day-to-day basis necessary activities of the project.

The PM's oversight of the project includes:

- Monitoring and controlling project costs;
- Assigning personnel consistent with the appropriate training and certifications consistent with the Agreement's requirements;
- Understanding and assuring compliance with all applicable local, Federal, DoD, and Navy/Air Force natural resources and environmental laws, policies, regulations, and other requirements;
- Being the first in line of control in ensuring that information/data obtained for the project are of high quality and accuracy; and
- Being responsible in keeping quality control and assurance inspections activities and record keeping of these inspections.

The PM shall have, at a minimum:

- A master's degree in biology, entomology or similar field.
- Two years of experience planning or leading biocontrol program activities using integrated pest management principles.
- Two years of experience with federal and local regulations and permitting processes associated with insect pest control activities such as pesticide applications and biocontrol agent introductions.

C. Entomologist: A professional entomologist shall provide technical expertise to the project team to improve the effectiveness and efficiency of biocontrol program development activities.

The Entomologist shall have, at a minimum:

- A master's degree in biology, entomology or similar field.
- Three years of experience planning or leading biocontrol program activities using integrated pest management principles.
- Three years of experience with federal and local regulations and permitting processes associated with insect pest control activities such as pesticide applications and biocontrol agent introductions.

One person can occupy more than one key personnel position.

7. The Recipient shall provide the Grants Officer (GO) and Cooperative Agreement Contract Specialist (via the co-CATRs) the names of persons and copies of their resumes being considered for work under this Agreement. After resume submission, the Recipient shall not replace or substitute any submitted personnel member without requesting to substitute. The Recipient is expected to provide the name and copy of their resume for the proposed substitution and must receive written approval by Cooperative Agreement Contract Specialist for the substitution.
8. Substantial Involvement by the Government. In reference to this Agreement, substantial involvement is required between the Department of Navy (DON) and Recipient during the period of performance based on the requirements prescribed in the scope of work. The anticipated involvement between the CATR(s) and Recipient PI is deemed appropriate to carry out a public purpose of support to include a direct benefit to the Government. The Government's involvement includes:
 - a) Clarifying DoD policies and objectives;
 - b) Providing relevant maps and information pertaining to study sites, to include data and literature from previous similar natural resource projects;
 - c) Coordinating scheduling with installations and relevant commands to ensure de-confliction with other DoD mission activities;
 - d) Collaborating on presentations and publications, and facilitating authorization of public release of information;
 - e) Assisting with the Work Plan and Plan of Actions and Milestones (POAM) development;
 - f) Accompanying the Recipient during operations as often as necessary, to ensure quality control and efficacy of actions; and
 - g) Conducting meetings with the Recipient to determine if milestones are met and review/approve key personnel. All work conducted in support of this Agreement shall comply with all applicable Federal and Territorial laws, regulations, and requirements.
9. In order to avoid impacts to federally-listed, rare, or endemic species the Recipient must coordinate all vegetation and ground disturbing activities with the CATR. **Under no circumstances are any federally protected species to be destroyed/moved when completing the work required in this Agreement.** The Recipient shall ensure that all footwear, backpacks, clothing, vehicles and equipment transported to JRM areas are clean of weed seed.
10. Any ground disturbing activities shall be coordinated with the CATR and addressed in the work plan. Ground disturbing activities shall comply with the MEC protocols for the installation. The Recipient is responsible for the expenses associated with complying with the MEC protocols.
11. At no cost to the Government, the Recipient shall be in possession of all necessary permits or certifications necessary to conduct the activities stipulated in the Agreement.
12. All parties involved in this Agreement agree to comply with all applicable laws, regulations, and requirements pertaining to the provision of safe and respectful workplace and to provide a work environment free of harassment and intimidation for such party's own employees and third parties.
13. Vehicle and vessel operators shall comply with all federal installation rules, regulations, and laws.

14. All field notes, forms, electronic storage of field data, photographs, etc. collected and produced as part of this Agreement are property of the DON and shall be provided to the CATR upon request.
15. The data obtained during this Agreement shall be scientifically defensible and suitable for publication. All methods of data collection and analyses shall be standardized with previous studies conducted by the Recipient under past cooperative 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 Recipient shall reanalyze all appropriate data sets for comparison. The Grants Officer shall approve (via the CATR) in advance, any changes to previously used experimental designs, methods of data collection and/or analysis and shall be provided in the Recipient's required Work Plan. The CATR at their discretion, may subject draft work plans, draft reports or draft manuscripts to external peer review.
16. Under no circumstances shall the Recipient violate the Archaeological Resources Protection Act. If any objects are found that appear to be cultural or archaeological resources, contact the CATR. If the Recipient accidentally disturbs an archaeological and/or cultural resources site, the Recipient shall leave the site immediately (as intact as possible) and contact the CATR and JRM Cultural Resources Program Manager.
17. The Recipient must comply with the JRM Hazardous Waste Management Plan. The Recipient shall manage generated hazardous material, hazardous waste, and hazardous waste residues in accordance with Federal, State, and local regulations. Transport and dispose of hazardous waste (e.g. batteries) in accordance with Federal, State, local and applicable JRM requirements.
18. The Recipient shall inform the appropriate installation security via phone and 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.
19. Throughout the term of this Agreement the CATR shall be afforded the opportunity by the Recipient to periodically observe the Recipient'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 GO in establishing the Recipient's performance in fulfilling the requirements of this Agreement.
20. The DON, via the GO, may request updated data presented on maps, figures and/or tables whenever the DON's need to obtain this information is before the next report required under Section J of this Agreement. The Recipient shall forward the requested data electronically within ten (10) days from the date of request. If the requested data cannot be provided within this time frame, the Recipient shall forward electronically the most updated raw data to the GO, via the CATR. The DON understands that facilitating the most updated requested data may reduce the amount of work that would normally be accomplished during the period of time required to complete the request. The Recipient shall document the amount of effort and its translated cost estimate that would have been incurred by the Recipient to complete the request for updated data. This document shall be electronically forwarded to the GO (via the CATR) to review so that

the DON will have a firm understanding on the amount of work displaced that would have normally been accomplished during the period of time required to complete the request.

21. Work will be conducted according to the schedule agreed (POAM) during the kick-off meeting. The Recipient shall notify the CATR within two business days of any problems that occur to prevent the scheduled field work. It is recognized that weather conditions, equipment failures and site conditions can interfere with fieldwork and create unforeseen unsafe working conditions. The Recipient will also immediately report any problems or concerns encountered at the field sites.
22. If unforeseen conditions warrant any deviations from these methods the Recipient must consult with CATR.
23. **Substantial Involvement by the Government.** In reference to this Agreement, substantial involvement is required between the DON and Recipient during the period of performance based on the requirements prescribed in the scope of work. The anticipated involvement between the CATR and Recipient is deemed appropriate to carry out a public purpose of support to include a direct benefit to the Government. The Government's involvement includes:
 - a) Advise Recipient, as needed, in preparing *A. yasumatsui* strategy, survey protocol, rearing procedures;
 - b) Provide relevant maps and information pertaining to study sites;
 - c) Assist with field activities and coordination with installation security to ensure safety procedures are met;
 - d) Facilitate access to DoD lands and facilitate any required passes;
 - e) Assist with plan of action and milestones (POAM) development;
 - f) Accompany Recipient during field activities as often as necessary, to ensure quality control, efficacy of actions; and
 - g) Conduct meetings with Recipient to determine if milestones are met and review/approve key personnel.

H. SPECIFIC REQUIREMENTS

This Agreement requires the Recipient to develop and implement one technical requirement and four tasks during the performance period, as follows:

1. Technical Requirement: The Recipient is to identify biological control agents suitable for introduction to Guam and Tinian to combat the *A. yasumatsui* scale insect in the Mariana Islands. The following biological control agents are currently approved for interstate movement:
 1. *Coccobius fulvus*
 2. *Aphytis lignanensis*
 3. *Rhyzobius lophanthae*

Tasks:

Task1– The Recipient shall conduct a literature review of pertinent research regarding *Cycas A. yasumatsui* scale insect, biological control introductions for CAS and other relevant topics in order to identify potential parasitoid and predatory biological control agents.

1. Based on the literature review and field surveys, identify species with the greatest potential for effective biological control. Conduct experimental trials to determine the mechanism of control, assess potential effectiveness, and develop rearing methods. Field releases are not part of this Agreement.

Task 2 - The Recipient shall interview the Guam Territorial Entomologist as well as the authors of the pertinent research on *Cycas A. yasumatsui* scale insect, biological control introductions for CAS to discuss any information that may be relevant to the project that is not include in their publications.

Task 3 - The Recipient shall collaborate with local partners currently conducting field surveys to identify species currently providing some level of CAS control.

Task 4 - The Recipient shall identify the rear and release process for the biological control agents proposed. The process shall explain procurement for the biological control agent(s), transport to Guam, regulatory requirements for transport and release on Guam, captive rearing and release techniques, and methods of monitoring establishment success and efficacy of the agent.

1. Several biological agents have been attempted with varying levels of success. Some species to consider include:

- a. ***Cybocephalus nipponicus***. *C. nipponicus* does not occur in Guam. Due to its specificity to armored scale insects, it is not a threat to native fauna. It is sympatric with *R. lophanthae* in Texas and Hawaii, thus the two species can co-exist, but this needs to be studied experimentally. During exploration in Asia, *A. chionaspidis* and *C. nipponicus* were seen together on plants at multiple localities (Cave *et al.* 2013), giving evidence that these two biological control agents may be able to complement each other's actions.
- b. ***C. fulvus***. Three attempts at establishing *C. fulvus* in Guam have been made, but there are several possible reasons why establishment did not occur. The wasp could be cultured on securely enclosed *Cycas* plants that have a clean colony of CAS. To increase the potential for establishment, organdy bags can be used to enclose well-infested leaves on carefully selected individuals of *C. micronesica* or *C. revoluta*. These organdy bags will exclude predators that would eat parasitized scales, and they will maintain the wasps in proximity to their hosts.
- c. ***Aphytis sp.*** *Aphytis sp.* is a parasitoid that causes high parasitism rates that apparently suppress CAS populations in Hawaii (M. G. Wright personal communication, 2022), but this needs to be studied experimentally. The species of *Aphytis* parasitizing CAS has been tentatively identified as *Aphytis lingnanensis*. This parasitic wasp attacks several species of armored scale insects (Noyes 2019) and has been moved around the world for biological control of armored scales insects on citrus. If considered as a biocontrol agent, the identification of the *Aphytis* species parasitizing CAS in Hawaii should be confirmed with modern genetic analysis. *Aphytis sp.* are much smaller than *R. lophanthae*; it may be able to attack CAS in refuges too small for the lady beetle to access and may do a better job at protecting cycad seedlings.
- d. The Recipient is not limited to the species listed above. The Recipient shall plan at least one trip to the CAS native range to identify potential biocontrol agents. The Recipient

shall identify a minimum of five biological control agents representing a suite of life history traits and CAS control mechanisms to exploit a range of CAS vulnerabilities.

I. MEETINGS/COORDINATION

1. The Recipient shall participate in a kick-off meeting (either on site or via video or teleconference) with the appropriate CATRs and other appropriate parties prior to the start of work to ensure successful execution of this Cooperative Agreement and coordination of activities. The Recipient shall arrange the meetings. The kick-off meeting is designed to discuss the SOW, POAM, scheduling, coordination, and defining channels of communication and points of contact. The kick-off meeting is designed for both the Recipient and Government to discuss the scope of work and general expectations to ensure successful completion of the work.
2. The Recipient shall be responsible for documenting discussions conducted during the kick-off meeting and other status review meetings as described in Section I of this Agreement. The Recipient shall submit the draft meeting minutes within five days from the date when the meeting was held.
3. The Recipient shall be available for coordination meetings with the CATR and other environmental staff, as required.
4. The Recipient should participate in the monthly Fadang Micronesian Cycad Working Group meetings.

J. SUBMITTALS and SCHEDULES

The Recipient shall coordinate and prepare deliverables for the kick-off meeting, Plan of Action and Milestones, Draft/Final Work Plan and other deliverables.

1. Electronic copies of all submittals/schedules/deliverables (examples include, but are not limited to, draft/interim/final reports, progress reports/monthly reports) will be provided to the CATR for retention in the official Agreement file.
 - a) The Recipient shall submit the following: Accident Prevention Plan, Activity Hazardous Analysis (AHA) and Hazard Analysis and Critical Control Plan (HACCP): The Recipient shall develop and maintain a safety program in compliance with Navy Facilities Engineering Systems Command Safety Notices 5100. The Recipient shall prepare and submit a Draft/Final Accident Prevention Plan (APP) and AHA that incorporates Navy and Air Force Safety Regulations that are applicable to the execution of this project. The Recipient shall also prepare an HACCP to ensure that invasive species are not transported or introduced in association with fulfilling the requirements of the Agreement.
 - b) The Recipient shall submit the draft APP, AHA and HACCP seven working days prior to the kickoff meeting. The APP, AHA and HACCP shall include a site specific hazard analysis for all tasks included in the specific requirements of the Agreement. References used to develop the site-specific plan include: 29 CFR 1–910.120 (Hazardous Waste Operations & Emergency Response), EM 385-1-1 US Army Corps of Engineers Safety & Health Requirements Manual, and Local Activity safety plans and standard operating procedures.

- c) The Recipient's personnel shall implement safety measures for all work carried out for the project consistent with the project's Final APP, AHA and HACCP.
- d) The Recipient's personnel shall work in a safe manner in the field and comply with all applicable safety regulations. The Recipient shall make safety records available upon request by the Cooperative Agreement Contract Specialist (via the CATR) or the AAFB Safety and Occupational Health Specialist.
- e) The Recipient shall ensure work is conducted in accordance with EM 385-1-1 US Army Corps of Engineers Safety & Health Requirements Manual, OSHA, local laws, regulations and requirements.
- f) The Recipient shall submit Government reviewed and approved final APP, AHA and HACCP within seven days prior to the initiation of the project's field activities.
- g) The Recipient must certify to the Cooperative Agreement Contract Specialist and CATR that these safety documents have been reviewed with each of the Recipient's employees involved in this project pursuant to the Agreement and sub-recipient of the Agreement's employees (as applicable) prior to mobilization and start of fieldwork activities. The APP shall be immediately accessible to the Recipient's PM at all times during the project, and a copy shall be available in all vehicles utilized for work under this Agreement.

2. **Plan of Action and Milestones (POAM):** The Recipient shall be responsible for developing a Plan of Action and Milestones (POAM). The POAM shall document *all tasks associated with this SOW* as tool to track and account for timely completion of the work. The POAMs will be provided to each CATR at least one (1) week prior to the scheduled kick-off meetings. The CATR will provide input and comment on the POAM and the Recipient will incorporate comments before POAM is finalized. Agreement activities cannot proceed until the final POAM has been reviewed and approved by the CATR.

3. **Draft/Final Work Plan:** The Recipient shall submit a draft/final work plan that will show in sufficient detail the approach (including the project's work schedule milestones with dates) that will be taken to successfully accomplish the requirements and specifications of the Agreement. The draft/final work plan shall include a schedule in table format of field activities and deliverable submittals.

- a) The Recipient shall submit the draft work plan one week after the project's kickoff meeting.
- b) The draft work plan shall refer to the POAM regarding field activities and deliverables.
- c) The Recipient shall submit the final work plan five days after the receipt of Government comments.
- d) The Recipient shall append to the draft/final work plan the list of personnel that will be involved in the project with their respective short version of resume. Personnel date of birth, address and social security number shall **not** be included in the resume. The

maximum number of pages for resume shall be 5 pages with font size no smaller than “11”.

4. **Monthly Progress Reports (Monthly PR):** The Recipient is responsible for providing monthly PR to update the CATRs on project status and schedule as it relates to scope completion and POAM adherence by the 10th of each month for the duration of the performance period. Monthly PR shall be provided via email or other file sharing platform. The monthly PR shall include, at a minimum, implementation accomplishments, budget drawdowns, technical aspects, project coordination difficulties, safety concerns, adaptive management proposals or actions, quality control activities and implementation of the APP, AHA and HACCP. The first monthly PR shall be submitted following the first month after the kick off meeting and every month thereafter. If no work was performed during the reporting period, the monthly PR shall describe the reason and the plan for work resumption.
5. **Draft and Final Report(s):** The Draft Report (DR) and Final Report (FR) shall document all work conducted under this Agreement. CATR will compare monthly reports, knowledge gained during in person oversight of the project, and all other QA actions to determine if DR contains sufficient detail and incorporates all work conducted under the Agreement to date. An annual draft report will be due to the CATR no later than 15 July of each calendar year covering activities in the prior project year. An annual draft and final report is required each year of the Agreement. The project draft and final report shall be cumulative and describe the work conducted from the start of the project.
 - a) Recipient shall prepare and submit a Draft and Final Reports to the CATR. Refer to Section J for specific submittal requirements, including content, format, and delivery.
 - b) The Recipient shall submit the Draft Report 45 days before the end of the performance period. The Government shall review and provide comments.
 - c) The Recipient shall submit the Final Project Report no later than 15 days after receiving comments from the Government.
 - d) The DR shall be submitted to the CATR for review and comment forty-five (45) days before the end of the performance period. The Recipient shall submit electronic copies via email or other file sharing platform. The DR will include all maps, GIS data and appropriate figures/graphics for all work completed.
 - e) The FR will be submitted to the CATR no later than fifteen (15) days after receipt of comments on the DPR from the CATR. The Recipient shall also submit one (1) hard copy and electronic copies of the FR via e-mail or file sharing program. The electronic copies shall include the following: a) the FR in Microsoft Word, b) the FR in Portable Document Format (pdf), c) figures and graphics, d) GIS data layers and/or tabular databases (if relevant) and e) comment matrix or other reviewing format as agreed to by the CATR. For the comment matrix, the Recipient shall take all comments from the Government on all reports and incorporate them into a comment matrix. The comment matrix shall identify how each comment was addressed by the Recipient and where in the document (page number, paragraph, and line) the corrections are to be found. The comment matrix will be used as a quality assurance tool.
 - f) For the DR and FR, the Recipient shall reasonably follow the standards provided in Scientific Style and Format; The CSE Manual Authors, Editors, and Publishers, Seventh

6. All GIS data will contain populated metadata, be SDSFIE compliant, and projected in UTM Zone 55 North, WGS84. All GIS Data must comply with NAVFAC Standards for Geographic Information System (Attachment D) and Specifications for GIS Layers and Attributes (Attachment E). Schedule of Deliverables: The Recipient shall submit the following deliverables:

7. Format for Deliverables:

Hard Copies: All documents shall be submitted on 8 1/2 by 11-inch paper, 11 by 17- inch foldout maps/figures are acceptable. All reports shall be double sided. All original documentation will be reproducible by black and white xerography with heavy paper or hard covers and the original unbound copy with hard covers that will allow pages to be easily removed. Where possible, all reports shall be printed on recycled paper and limit “blank” pages. Bindings will include a label identifying the report, author(s), and the date of completion.

Electronic Copies: The electronic version/file of the draft and final after comments are addressed shall be submitted in both A) Microsoft Word (doc), and B) Adobe Acrobat (pdf). The PDF version of all final deliverables (other than raw analytical and databases) must be a complete, mirror image of the hardcopy, and include appendices, maps, signature pages, etc. At completion of the project with the Final Report submittals, the Recipient will provide an electronic deliverable with a copy of all reports, meeting minutes, point papers, maps and map databases, and briefings. All electronic submittals will be certified “virus free” and include the statement “virus free” on the disk or transmittal message. The Recipient shall verify, with the CATR, the appropriate data management requirements and electronic data deliverables.

PDF files: Final documents shall be provided as one .pdf file. The .pdf file shall have bookmarks for each item identified in the document's table of contents. The bookmark shall use the same description as provided in the table of contents. If the bookmark is lengthy, abbreviate as needed. Bookmark to the second level (i.e., 1.1, 1.2, 1.3, etc.). Do not bookmark signature page, list of acronyms, individual tables, photos, or figures. Each appendix, regardless of size, shall be provided as an individual pdf file. All maps, figures, and pictures shall be provided at a useable resolution. All color maps, figures, and pictures shall be provided in color PDF format.

Photographs: The Recipient will document and record pertinent aspects of the work using color digital imagery. The Recipient will provide camera and all necessary equipment. Photographs of activities documented shall be included as an appendix on CD ROM. All photographs shall become DON property and shall be submitted with the draft and final report. All original photographs shall be appropriately labeled with information to include:

- Date
- Location (specific place and Installation) subject/activity
- Identification of any people in the picture photographed

Submittal/Deliverable Standards: All submittals/deliverables are expected to be of the highest professional quality and may be rejected if any of the following exists:

- There are typographical errors, spelling, or grammar mistakes;

- Results and discussion are not tied directly and continually to natural resource management concerns of the installation;
- The document is not organized in a manner that flows well;
- The document does not provide appropriate context, background, literature review, and comparison to other relevant studies, locations, and similar species; or
- The appropriate style guide is not adhered to (in most cases this is the JWM or CSE).

K. DATA AND PUBLICATION

1. This Agreement is subject to, and Recipient shall comply with, 2 CFR 200.315 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 Recipient and the Government will notify the Recipient 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 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 DON acknowledges and agrees that the Recipient’s fundamental consideration in performing the research under this Agreement shall be Recipient’s right to publish the results of such research for academic and scientific purposes. The Recipient 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 DON thirty (30) days prior to the submission of the work mentioned above.

2. The acknowledgements for any paper or presentation resulting from this work shall include the following statement: “This research was funded by the Department of the Navy on behalf of Joint Region Marianas, Guam.” Any publications resulting from this work shall be provided at no cost to the Department of the Navy in quantities jointly determined by the DON’s representative and the Recipient at the time of publication.
3. The Recipient 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.

L. RELEASE OF INFORMATION

The Recipient shall not respond to any inquiries about this Agreement from the news media or non- governmental organizations or other persons during the term of this 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 JRM Public Affairs Officer at the Region and Public Affairs Officer at NAVFAC Marianas through the CATR.

M. SAFETY

The Recipient will be required to develop an APP following the format in Appendix A of the EM 385-1-1 05 July 2011 or latest edition. A Site Safety and Health Plan (SSHP) is also required if the work is potentially hazardous. Potentially hazardous activities include, but are not limited to:

- soil boring or digging test pits (excludes manual collection of de minimis surface soil samples)
- all field work on hazardous waste or munitions response sites
- work on, in, or near bodies of water where there a danger from drowning
- use of heavy equipment, e.g. backhoes, excavators, bulldozers, etc.
- excavation, backfilling, and compaction
- use of man lifts, ladders, and other climbing apparatus
- use of firearms, or other weapons
- well drilling and/or well pump repair or replacement
- construction, demolition, or repair of site improvements
- remediation of hazardous material or waste, i.e. asbestos, paint with lead, and polychlorinated biphenyl (PCB)
- work within 10 (ten) feet of high voltage lines, or high pressure gas, steam, or water lines

The minimum requirement for the SSHP is in Section 28 of the EM 385-1-1. Include an AHA for all tasks reasonably anticipated to be performed as part of this statement of work. Format and instructions for the AHA is in section 1 of the EM 385-1-1. As a minimum, references used to develop the APP, SSHP and AHA are: EM 385-1-1 US Army Corps of Engineers Safety & Health Requirements Manual, and Local Activity safety plans and standard operating procedures. When developing the APP, SSHP and AHA, address all sections that are deemed appropriate for performing the work in this Agreement, while ensuring a safe work environment for all personnel involved. The draft APP, SSHP and AHA have to be reviewed by the NAVFAC Marianas Safety Office prior to start of field work activities.

NOTE: AHA is an attachment required by the APP. SSHP is also an attachment required by the APP if a project includes potentially hazardous activities. Government PM should verify with the NAVFAC Marianas Safety Office prior to directing the recipient to prepare a SSHP. The APP, SSHP and AHA will provide a safe and healthful environment for all personnel involved as well as personnel working near the sites for the DON. The Recipient shall certify to CATR that the final APP, SSHP and AHA have been reviewed with each Recipient employee working on this Agreement prior to mobilization and start of fieldwork activities.

A Draft and Final APP, SSHP and AHA will be submitted concurrently with the Draft Work Plan but shall be printed under a separate cover from the Work Plan. The final APP, SSHP and AHA shall be immediately accessible to the Site Safety and Health Officer (SSHO) and Project Manager at all times during the project, and a copy shall be available in every vehicle utilized for work under this Agreement. The SSHO is required to have completed the 10-hour OSHA Safety Training. Man-hour reporting is also required by the EM 385-1-1 and the Unified Facilities Guide Specifications (UFGS) -01 35 26, (February 2012) change 2, 08/13. The recipient will provide a Monthly Exposure Report (MER) and attach to the monthly billing request. The CATR will submit a copy of the MER to the NAVFAC Marianas Safety Office.

N. HOLD HARMLESS

1. The Government shall not be responsible for the loss of or damage to property of the Recipient and/or his/her representatives, or for personal injuries to the Recipient and/or his/her representatives arising from or incident to the use of government facilities or equipment. Recipient shall indemnify, hold harmless, defend and save Government harmless and shall pay all costs, expenses, and reasonable attorney's fees for all trial and appellate levels and post-judgment proceedings in connection with any fines, suits, actions, damages, liability and causes of action of every nature whatsoever arising or growing out of, or in any manner connected with, the Agreement and attendant occupation or use of Government Premises including but not limited to JRM AOR, by Recipient, its employees, servants, agents, guests, invitees, and contractors. This includes, but is not limited to, any fines, claims, demands and causes of action of every nature whatsoever that may be made upon, sustained or incurred by the Government by reason of any breach, violation, omission or non-performance of any term, covenant or condition hereof on the part of the Recipient, its employees, servants, agents, guests, invitees, or contractors. This indemnification also applies to claims arising out of the furnishings of any utilities or services by the Government or any interruption therein or failure thereof, occasioned by the negligence or lack of diligence of Recipient or its respective officers, agents, servants or employees. However, this indemnity shall not extend to damages due to the sole fault of the Government or its employees, agents, servants, guests, invitees or contractors. This covenant shall survive the termination of this Agreement.
2. In the event of damage, including damage by contamination, to any Government property by the Recipient, its officers, agents, servants, employees, or invitees, the Recipient, at the election of the Government, shall promptly repair, replace, or make monetary compensation for the repair or replacement of such property to the satisfaction of the Government.

O. INSURANCE

1. At the commencement of this Agreement, the Recipient shall obtain, from a reputable insurance company or companies satisfactory to the Government, comprehensive general liability insurance. The insurance shall provide an amount not less than a minimum combined single limit of \$1,000,000.00 for any number of persons or claims arising from any one incident with respect to bodily injuries or death resulting therefrom, property damage or both, suffered or alleged to have been suffered by any person or persons resulting from or related to the presence or operations of the Recipient, its employees, agents or contractors under this Agreement. The Recipient shall require the insurance company or companies to furnish the Government with a certified copy of the policy or policies, or certificates of insurance evidencing the purchase of such insurance. Each policy of insurance required under this Paragraph shall contain an endorsement reading as follows:

“The insurer waives any right of subrogation against the United States of America which might arise by reason of any payment made under this policy.”
2. All insurance required of the Recipient hereunder shall be in such form, for such periods of time and with such insurers as the Government may require or approve. All policies or certificates issued by the respective insurers for public liability and property insurance shall name the United States of America as an additional insured, and shall provide that no cancellation, reduction in amount or any material change in coverage thereof shall be effective until at least 30 calendar days after receipt by the Government of written notice thereof, regardless of any prior act or

failure to act or negligence of the Recipient or the Government or any other person concerning such amount or change in coverage.

3. The Recipient at its sole cost and expense, may insure its activities in connection with this Agreement by maintaining a program of self-insurance that complies with the requirements of this Section O, including coverages specified in Attachment A hereof. Recipient shall also provide a copy of the exempting statute cited in support of its claim of self-insurance pursuant to Section 2 of Attachment A to this Agreement. (The self-insurance clause is applicable only to appropriate state and local governments and qualifying institutions of higher education who provide evidence of a self-insurance program in accordance with this Section and Attachment A, Section 2.)
4. During the entire period the Agreement shall be in effect, the Recipient shall require its contractors or agents or any contractor performing work at the Recipient's or agent's request on the affected Government Premises to carry and maintain the insurance required below:

“Comprehensive general liability insurance in the amount of 1,000,000.00.”

5. The Recipient and any of its contractors or agents shall deliver or cause to be delivered promptly to the Cooperative Agreement Contract Specialist, a certificate of insurance or a certified copy of each renewal policy evidencing the insurance required by this Agreement and shall also deliver no later than thirty (30) calendar days prior to expiration of any such policy, a certificate of insurance evidencing each renewal policy covering the same risks.
6. In the event that any item or part of the premises or facilities shall require repair, rebuilding, or replacement resulting from loss or damage, the risk of which is assumed under this Section O, the Recipient shall promptly give notice thereof to the Government and, to the extent of its liability as provided in this Section O, shall, upon demand, either compensate the Government for such loss or damage, or rebuild, replace or repair the item or items of the premises or facilities so lost or damaged, as the Government may elect. If the cost of such repair, rebuilding, or replacement exceeds the liability of the Recipient for such loss or damage under this Section O, the Recipient shall effect such repair, rebuilding, or replacement if required so to do by the Government, and such excess of cost shall be reimbursed to the Recipient by the Government. In the event the Recipient shall have effected any repair, rebuilding, or replacement which the Recipient is required to effect pursuant to this Section O, the Government shall direct payment to the Recipient of so much of the proceeds of any insurance carried by the Recipient and made available to the Government on account of loss of or damage to any item or part of the premises or facilities as may be necessary to enable the Recipient to effect such repair, rebuilding or replacement. In event the Recipient shall not have been required to effect such repair, rebuilding, or replacement, and the insurance proceeds allocable to the loss or damage which has created the need for such repair, rebuilding or replacement have been paid to the Recipient, the Recipient shall promptly refund to the Government the amount of such proceeds.

P. PAYMENTS

1. Partial payments equal to the amount of work accomplished may be made monthly after submission of completed schedules and deliverables in Section J. Recipient shall prepare

itemized invoices according to costs incurred during the reporting period and submit the itemized invoices to the Government for payment. Partial payments shall not exceed 85 percent of the total funding for the Agreement for any individual period of performance.

2. The final payment of the balance of the Agreement funds for a period of performance or 15 percent of the period of performance funding for the Agreement, whichever is less, shall be paid when the final report and all other submittals and deliverables listed in Section J have been received and accepted by the CATR.
3. Any requirement for the payment or obligation of funds, under the terms of this Agreement, shall be subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 USC §1341 et seq. Nothing in this Agreement shall be construed as implying that Congress will, at a later time, appropriate funds sufficient to meet deficiencies.
4. Payments will be made in accordance with Defense Federal Acquisition Regulation (DFAR) 252.232-7006 Wide Area Work Flow Payment Instruction. See Attachment C WAWF Instructions for instructions on payment procedures.

Q. EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT REPORTING

1. Section 2(d) of the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. No. 109-282), as amended by section 6202 of the Government Funding Transparency Act of 2008 (Pub. L. 110-252), requires the Contractor/ Recipient to report information on subcontract awards. The law requires all reported information be made public; therefore, the Contractor/ Recipient is responsible for notifying its subcontractors that the required information will be made public.
2. Unless otherwise directed by the Contracting Officer/Grants Officer, by the end of the month following the month of award of a first-tier subcontract with a value of \$25,000 or more, (and any modifications to these subcontracts that change previously reported data), the Contractor/ Recipient shall report the following information at <http://www.fsrs.gov> for each first-tier subcontract:
 - (a) Unique identifier (DUNS Number) for the subcontractor receiving the award and for the subcontractor's parent company, if the subcontractor has one.
 - (b) Name of the subcontractor.
 - (c) Amount of the subcontract award.
 - (d) Date of the subcontract award.
 - (e) A description of the products or services (including construction) being provided under the subcontract, including the overall purpose and expected outcomes or results of the subcontract.
 - (f) Subcontract number (the subcontract number assigned by the Recipient).
 - (g) Subcontractor's physical address including street address, city, state, and country. Also include the nine-digit zip code and congressional district.

- (h) Subcontractor's primary performance location including street address, city, state, and country. Also include the nine-digit zip code and congressional district.
- (i) The prime Agreement number, and order number if applicable.
- (j) Awarding agency name and code.
- (k) Funding agency name and code.
- (l) Government contracting office code.
- (m) Treasury account symbol (TAS) as reported in FPDS.
- (n) The applicable North American Industry Classification System (NAICS) code.

3. By the end of the month following the month of an Agreement award, and annually thereafter, the Recipient shall report the names and total compensation of each of the five most highly compensated executives for the Recipient's preceding completed fiscal year at <http://www.ccr.gov>, if –

A. In the Contractor's/ Recipient's preceding fiscal year, the Contractor/ Recipient received –

- (1) 80 percent or more of its annual gross revenues from Federal contracts (and subcontracts), loans, grants (and sub grants) and cooperative agreements; and
- (2) \$25,000,000 or more in annual gross revenues from Federal contracts (and subcontracts), loans, grants (and sub grants) and cooperative agreements; and

B. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>).

C. Unless otherwise directed by the Contracting Officer, by the end of the month following the month of a first-tier subcontract with a value of \$25,000 or more, and annually thereafter, the Contractor/ Recipient shall report the names and total compensation of each of the five most highly compensated executives for each first-tier subcontractor for the subcontractor's preceding completed fiscal year at <http://www.fsr.gov>, if

(1) In the Subcontractor's preceding fiscal year, the Subcontractor received –

- (a) 80 percent or more of its annual gross revenues from Federal contracts (and subcontracts), loans, grants (and sub grants) and cooperative agreements; and
- (b) \$25,000,000 or more in annual gross revenues from Federal contracts (and subcontracts), loans, grants (and sub grants) and cooperative agreements; and

(2) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the

U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>).

If the Contractor/ Recipient in the previous tax year had gross income, from all sources, under \$300,000, the Contractor/ Recipient is exempt from the requirement to report subcontractor awards. Likewise, if a subcontractor in the previous tax year had gross income from all sources under \$300,000, the Contractor/ Recipient does not need to report awards to that subcontractor.

END

ATTACHMENT A: SELF-INSURANCE REQUIREMENTS FORM

INSURANCE MUST CONFORM TO ALL THE REQUIREMENTS LISTED BELOW PRIOR TO RECIPIENT BEING PERMITTED TO USE OR OCCUPY GOVERNMENT PREMISES OR PROPERTY PURSUANT TO THE COOPERATIVE AGREEMENT

1. PUBLIC LIABILITY AND PROPERTY DAMAGE

a. Required minimum amounts of insurance listed below:

\$ N/A Fire and Extended Coverage
\$ 1,000,000 Third Party Property Damage
\$ 1,000,000 Third Party Personal Injury per Person
\$ 1,000,000 Third Party Personal Injury per Accident

2. SELF-INSURANCE REQUIREMENTS: If your organization is self-insured, please provide evidence of self- insurance which meets or exceeds the insurance liability amounts in Item # 1.

The following information, written on your organization's letterhead, is also required:

- A brief description of your organization's self-insurance program, with reference to statutory or regulatory authority establishing the self-insurance program.
- The name and telephone number of your organization's self-insurance program administrator.
- Reference the appropriate military facility and cooperative agreement number.

3. IF YOUR SELF-INSURANCE PROGRAM DOES NOT MEET THE ABOVE MINIMUM REQUIREMENTS:

- Provide evidence of Excess Liability Insurance in the amount necessary to meet or exceed the minimum requirements in Item #1 above.
- The following endorsements are required for Excess Liability insurance policies:
 - a. "The insurer waives any right of subrogation against the United States of America which might arise by reason of any payment made under this policy."
 - b. "The Commanding Officer, Naval Facilities Engineering Command Marianas, Guam shall be given thirty (30) days written notice prior to making any material change in or the cancellation of the self-insurance program."

ATTACHMENT A: NON SELF-INSURED REQUIREMENTS FORM (CONTINUED)

c. "The United States of America (Department of the Navy) is added as an additional insured in operations of the policyholder at or from the premises licensed/leased from the United States".

d. "This insurance certificate is for use of facilities at Joint Region Marianas, Guam under this Cooperative Agreement, No. N40192-25-2-8012"

4. NOTICE: "RIGHT TO USE" DOCUMENTS WILL NOT BE FULLY EXECUTED UNTIL CERTIFICATE IS RECEIVED WITH PROPER ENDORSEMENTS.

INSURANCE MUST CONFORM TO ALL THE REQUIREMENTS LISTED BELOW PRIOR TO RECIPIENT BEING PERMITTED TO USE OR OCCUPY GOVERNMENT PREMISES OR PROPERTY PURSUANT TO THE COOPERATIVE AGREEMENT

1. PUBLIC LIABILITY AND PROPERTY DAMAGE

a. Required minimum amounts of insurance listed below:

\$ N/A Fire and Extended Coverage

\$ 1,000,000 Third Party Property Damage

\$ 1,000,000 Third Party Personal Injury Per Person

\$ 1,000,000 Third Party Personal Injury Per Accident

2. THE CERTIFICATE OF INSURANCE MUST CONTAIN THE FOLLOWING ENDORSEMENTS:

- a. "The insurer waives any right of subrogation against the United States of America which might arise by reason of any payment made under this policy."
- b. "The Commanding Officer, Naval Facilities Engineering Command Marianas, Guam shall be given thirty (30) days written notice prior to making any material change in or the cancellation of the policy."
- c. "The United States of America (Dept. of the Navy) is added as an additional insured in operations of the policyholder at or from the premises licensed/leased from the United States."
- d. "This insurance certificate is for use of facilities at Joint Region Marianas, Guam under this Cooperative Agreement, No. N40192-25-2-8012."

ATTACHMENT A: NON SELF-INSURED REQUIREMENTS FORM (CONTINUED)

e. Loss, if any, under this policy shall be adjusted with Recipient and the proceeds, at the direction of the Government, shall be payable to Recipient, and proceeds not paid to Recipient shall be payable to the Treasurer of the United States of America.”

**NOTICE: "RIGHT TO USE" DOCUMENTS WILL NOT BE FULLY EXECUTED
UNTIL CERTIFICATE IS RECEIVED WITH PROPER ENDORSEMENTS.**

ATTACHMENT B: DRAFT AND FINAL REPORT FORMAT

The Annual Report shall follow the formats described by Messmer, T.A and M.L. Morrison 2006, in “Unified Manuscript Guidelines for the Wildlife Society Peer- Reviewed Publications in the Journal of Wildlife Management, volume 70, issue 1; pages 304-320, as appropriate, with the following outline:

1. Title page showing the title, date, and CATR representative location and Cooperative Agreement Number

ii. Sub-title page showing:

(a) Title

(b) “Prepared by” listing with affiliations

(c) “Under contract to” listing, and shall include the CATR representative location

(d) Date

(e) Recommended citation

iii. Table of contents, arranged as follows:

(a) Table of contents

(b) List of tables

(c) List of figures (photographs are considered figures)

(d) References/literature cited

(d) List of appendices

iv. Abstract

v. Introduction

vi. Study Area

vii. Methods

viii. Results

ATTACHMENT B: DRAFT AND FINAL REPORT FORMAT (CONTINUED)

- ix. Discussion.
- xi. Acknowledgments
- xii. Appendices
- xiii. Electronic Appendices.

Where JWM Manuscript Guidelines do not provide sufficient direction, as appropriate, follow the standards provided in *Scientific Style and Format; The CSE Manual Authors, Editors, and Publishers*, Seventh Edition, Style Manual Committee Council of Science Editors, <http://www.scientificstyleandformat.org/Home.html>.

ATTACHMENT C: WAWF INSTRUCTIONS

252.232-7006 WIDE AREA WORKFLOW PAYMENT INSTRUCTIONS (JUN 2012)

(a) Definitions. As used in this clause—

Department of Defense Activity Address Code (DoDAAC) is a six position code that uniquely identifies a unit, activity, or organization.

Document type means the type of payment request or receiving report available for creation in Wide Area WorkFlow (WAWF).

Local processing office (LPO) is the office responsible for payment certification when payment certification is done external to the entitlement system.

(b) Electronic invoicing. The WAWF system is the method to electronically process vendor payment requests and receiving reports, as authorized by DFARS 252.232-7003, Electronic Submission of Payment Requests and Receiving Reports.

(c) WAWF access. To access WAWF, the Contractor/Recipient shall—

(1) Have a designated electronic business point of contact in the Central Contractor Registration at <https://www.acquisition.gov>; and

(2) Be registered to use WAWF at <https://wawf.eb.mil/> following the step-by-step procedures for self-registration available at this Web site.

(d) WAWF training. The Contractor/Recipient should follow the training instructions of the WAWF Web-Based Training Course and use the Practice Training Site before submitting payment requests through WAWF. Both can be accessed by selecting the “Web Based Training” link on the WAWF home page at <https://wawf.eb.mil/>.

(e) WAWF methods of document submission. Document submissions may be via Web entry, Electronic Data Interchange, or File Transfer Protocol.

(f) WAWF payment instructions. The Contractor/Recipient must use the following information when submitting payment requests and receiving reports in WAWF for this contract/order:

N40192-25-2-8008

(1) Document type. The Recipient shall use the following document type(s).

NAVY CONSTRUCTION/FACILITIES MANAGEMENT INVOICE

(2) Inspection/acceptance location. The Contractor/Recipient shall select the following inspection/acceptance location(s) in WAWF, as specified by the contracting officer.

ATTACHMENT C: WAWF INSTRUCTIONS (CONTINUED)

(3) Document routing. The Contractor/Recipient shall use the information in the Routing Data Table below only to fill in applicable fields in WAWF when creating payment requests and receiving reports in the system.

Routing Data Table*

Field Name in WAWF	Data to be entered in WAWF
Pay Official DoDAAC	N68732
Select Document to Create:	Grant Voucher
Issue By DoDAAC	N40192
Admin DoDAAC	N40192
Grant Approver	N40192/COREC
DoDAAC/Extension	A

(4) Payment request and supporting documentation. The Contractor/Recipient shall ensure a payment request includes appropriate contract line item and subline item descriptions of the work performed or supplies delivered, unit price/cost per unit, fee (if applicable), and all relevant back-up documentation, as defined in DFARS Appendix F, (e.g. timesheets) in support of each payment request.

(5) WAWF email notifications. The Contractor/Recipient shall enter the email address identified below in the “Send Additional Email Notifications” field of WAWF once a document is submitted in the system.

Christopher.3.santos2.civ@us.navy.mil
mario.a.martinez149.civ@us.navy.mil

WAWF point of contact

(1) The Contractor/Recipient may obtain clarification regarding invoicing in WAWF from the following contracting activity's WAWF point of contact. **NOT APPLICABLE**

(2) For technical WAWF help, contact the WAWF helpdesk at 866-618-5988. (End of clause)

ATTACHMENT D: GEOSPATIAL INFORMATION SERVICE REQUIREMENTS FOR JOINT REGION MARIANAS

Section 1. Overview

All geospatial information shall be generated from spatial data maintained in the most recent version of the Navy Data

Model (NDM) geodatabase and corresponding Data Collection Guide (DCG), provided by the GeoReadiness Center (GRC). The NDM is the Navy Installation Geographic Information and Systems (also known as IGI&S) enterprise geodatabase that stores geographic objects as standard data. The NDM is designed to meet Office of the Secretary of Defense geospatial data requirements, total data quality management guidelines, modern business needs, and Navy policies. The NDM schema uses the DCG to define the set of features, attribution, and metadata for enterprise geospatial data collected by or on behalf of the Navy. The DCG is a complement to the NDM. The NDM defines what data to collect, and the DCG defines how it is collected in respects to normalized procedures and attributes.

Section 2. Minimum Geospatial Information Systems Requirements Minimum requirements for spatial data are:

- a. Submittals, Government Review and Acceptance:
 - i. Failure to adhere to any stated delivery specifications could result in rejection of deliverables and nonpayment.
 - ii. All data, source code (e.g. Python scripts), map files, and other geospatial information under this contract is intellectual property of the U.S. Government, and shall be turned over to the U.S. Navy upon completion of this amendment. All data will be delivered via secured means such as DoD SAFE, or the most recent file transfer methods provided by the NAVFAC Information Technology Center.
 - iii. All submittals shall be reviewed for accuracy, standards, structure and completeness by a GeoReadiness Center representative before acceptance. Contractors shall submit data and documentation at 30%, 60%, 90% and 100% project completion to avoid the rejection of final deliverables.
 - iv. All proprietary data (electronic and paper formats) and generated geospatial data and services may be used under these contract conditions ONLY. Furthermore, all data and information regarding this contract must be removed from contractor equipment and possession and returned to the government before the final invoice is approved.
 - v. Through a GRC Geospatial Data Request Form, the contractor will be provided access to existing Navy GIS data required for the project via secured means such as DoD SAFE, or the most recent methods provided by the NAVFAC Information Technology Center.
 - vi. All data and information generated is limited to only those with a lawful government purpose and only for the initial intended use. In accordance with the clause at DFARS 252.204-7000, the Contractor or Sub-Contractors shall not make public release of any information relating to any

part of this contract, or products/deliverables developed thereunder without prior approval of either the Procurement Contracting Officer or the Administrative Contracting Officer.

- vii. All data must ensure the use complies with Controlled Unclassified Information (CUI) DoD policy when applicable. All involved parties are encouraged to visit www.dodcui.mil for information about safeguarding CUI. Information should be processed on Government Furnished Equipment when the option is available.
- viii. When applicable, a representative of the GRC should attend planning charrettes in order to convey important information regarding the NDM, DCG, geospatial requirements, and discuss work induction.
- ix. Map projects and geospatial information shall be created using Environmental Systems Research Institute (ESRI) ArcGIS software.
- x. Unless approved by the GRC, all geospatial data shall be in the Geographic Coordinate System: GCS_WGS_1984, Datum: D_WGS_1984.
 - b. GIS Data Format: NAVFAC's GIS data is an ERSI Geodatabase format which must be delivered in the most recent version of the NDM and corresponding DCG.
 - i. Geospatial projects (i.e., MXD, MPK): All project files shall be delivered containing all related source files in a specific project file, including extension, graphics, photos, source code (nonencrypted, Visual Basic) based on the version of ArcGIS Desktop specified for the task order.
 - ii. Spatial Data (i.e. geodatabase, datasets, features): Spatial data shall be delivered as an ArcGIS file geodatabase according to the most recent NDM version. File geodatabases are relational databases that contain geographic information. File geodatabases contain feature classes and tables. The names of these geodatabases will reflect the location of the geographic information it contains at the appropriate level of detail (region, special area, activity). The general format of file geodatabase names is as follows; where yyyy(year)mm(month)dd(day) is the date the geodatabase was created and amended:

Location_yyyymmdd.gdb

(Example: NAVALBASEGUAM_20230111.gdb, JRM_20230111.gdb, Polaris Point_20230111.gdb, MEC_20230111_.gdb, BASECOMM_20230111.gdb)

- c. Data Structure: All data shall be structured according to the current version of the NDM and DCG; special circumstances must be approved by the GRC. The contractor shall use the DCG to identify the classification, type, location, ID number, and any other necessary attributes for all new/updated/edited features. Information on the NDM and the DCG will be provided through a GRC representative.

- i. If new geospatial information is created, the GRC shall provide unpopulated features (i.e. empty NDM geodatabase datasets, with the DCG) to the contractor.
- ii. If new data is created and the corresponding data structure does NOT yet exist in the NDM, the contractor shall provide the GRC with a data dictionary identifying all of the NDM entity types, attributes, and/or domain values associated with the new feature(s), the geographic area(s) covered by the data and Spatial extent information prior to the creation/editing of GIS data. New non-spatial data standards compliant attributes (meeting NDM criteria) will require precise schema definitions.
- d. Data Integrity: Data accuracy standards for all deliverables will be in accordance with features found in the DCG. The contractor shall employ data quality management standards to ensure geospatial information is topologically correct, accurate, and complete, to include:
 - i. No erroneous overshoots, undershoots, dangles, or intersections in line work.
 - ii. Point and line features will be snapped together where appropriate to support networks. Line features shall be snapped together where appropriate to support networks. Do not break linear features for labeling or other aesthetic purposes.
 - iii. Lines will be continuous (no self-intersection) and point features will be digitized as points where appropriate. For example, point features, such as manholes, should not be drawn using only a circle (polygon) to represent its location.
 - iv. No sliver polygons, illogical gaps, or overlaps. All area type features shall be closed polygons.
 - v. Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature layer.
 - vi. Geometric network connectivity shall be maintained for utility networks, where specified by the scope of work.
- e. Data Quality: The contractor shall take all appropriate and needed data quality measures to ensure data is complete, topologically correct, accurate, structured correctly, and formatted correctly per the scope of work, to include:
 - i. All data shall be visually inspected before submittal to the government.
 - ii. As part of the 30%, 60%, 90%, and 100% deliverables, the contractor will provide the GRC representative a copy of the Reviewer Batch Job report for each feature.
 - iii. The numbers of records for all joined tables shall match, or the specific unmatched records shall be identified and explained to the satisfaction of the government.

- iv. Per the current DCG, all required and mandatory attributes shall be populated.
- v. All domain constraints shall be adhered to prior to submittal.
- f. Static Map Productions: Static maps will be legible, non-pixelated, professional in appearance (i.e. no hand drawn features) and sized to ANSI A (8.5x11) or ANSI B (11x17), unless otherwise required. Contractors will use a standard template for all static map product submittals with the following elements when creating printed or static digital maps (e.g. PDF, PNG, JPG).
 - i. Map Title
 - ii. Inset Map (if necessary)
 - iii. Decimal Degree coordinates Map Border (or MGRS when required)
 - iv. North Arrow
 - v. Scale Indicator
 - vi. Legend with consistent symbology
 - vii. Contractor Logo with date, Contract Number, and/or Map Author
- g. Metadata:
 - i. Feature Level Metadata: Feature-level (record level) attribute metadata is required to be populated for each GIS feature/record, per the current version of the NDM and the DCG.
 - ii. Layer Level Metadata: Layer level metadata is required for all deliverables, structured according to the FGDC Content Standard for Digital Geospatial Data (CSDGM). Details on the standard can be found at <http://www.fgdc.gov/metadata/geospatial-metadata-standards>.
 - h. Field Collection: Where field data collection is required, the contractor shall utilize conventional and other methods, such as a total station, or Global Positioning System (GPS) in accordance with the applicable Geospatial Positioning Accuracy Standards published by the Federal Geographic Data Committee (FGDC).
 - i. At a minimum, the contractor shall provide resource grade GPS collection at an accuracy level of +/- < 1m and shall use differential correction to target accuracies of +/- .5 m.
 - ii. When required (as stipulated in the contract or as otherwise determined by the Government), the contractor shall use survey grade GPS, at an accuracy level of +/- 3 cm. Global Positioning System (GPS) data collection activities will be based on a post-processed environment using an

accurately sighted base station. Base station files for post processing acquired locally (off-site CORS Continuous Operating Reference Station) will be verified for accuracy.

- iii. All survey-grade data collected shall be provided to the Government in a digital format with an attached Survey Report identifying survey method, equipment list, calibration documentation, survey layout, description of control points, control diagrams, quality control report, and field survey data.
- iv. A digital Survey Control Database (consisting of a survey marker database and a survey traverse database) will be produced for all survey control points established under this contract, including the horizontal and vertical order and coordinate location of each point.
- v. Digitizing/Conversion: Where Digitizing/Conversion is stipulated in the contract, the contractor shall digitize/convert features from designated sources (including remotely sensed data, hardcopy scans, and vector data) to support various GIS applications. Digitizing/conversion routines will ensure that 90 percent of all features will measure within 0.01 inches when reproduced at the scale of original imagery or data source.
- vi. GPS data on the location of line features shall be captured at a minimum at the beginning, end, and at each turn or bend in the line and processed as a line feature type. GPS data on the location of point features shall be captured at the centroid of the feature unless signal obstruction or access prohibits; otherwise points will be captured at a uniform distance and direction from the centroid and the offset captured in the metadata for that feature. GPS data on polygon features shall be collected at every vertex of the feature and processed as a polygon.
- i. Image Collection: Images captured on base must be approved in advance (usually by installation security) of visiting the base. The Contractor shall identify the personnel designated as image collectors (i.e. photographers) for this contract and shall identify the proposed areas/facilities to be collected and provide installation (via COR) with any required equipment information. It is unlawful to capture images outside the intended purpose of this contract. In most cases, image collection will require a 'Camera Pass' from installation security.

All images to be delivered/used in submittals must be geotagged with the UTM of the image location.

REFERENCES

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Tang W, Yang S-L, Vatcharakorn P. 1997. Cycads of Thailand. Nong Nooch Tropical Garden and the Cycad Conservation Company, Bangkok. 34 pp.

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For Applied Biological Control of the Cycad Aulacaspis Scale, University of Florida Indian River Research and Education Center Ft. Pierce, Florida.