U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
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Honolulu, Hawaii 96818
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FC 2018-0003

Edwin Reyes, Administrator
Guam Coastal Management Program
Bureau of Statistics and Plans
P.O. Box 2950
Hågatña, Guam 96932

October 19, 2017

Subject: Coastal Zone Management Act (CZMA) Consistency Determination for the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam

Dear Mr. Reyes:

This letter is to inform you of the transmittal of the completed Guam Coastal Management Program Assessment Format Form and the CZMA Consistency Determination for the Implementation of Watershed Restoration Projects in the Manell Watershed on Guam. This project is funded by the Coral Reef Conservation Program and is being implemented by the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) Pacific Islands Regional Office (PIRO).

The overall objective of implementing watershed restoration projects in the Manell Watershed is to stabilize steep slopes and create riparian buffers with the intent of reducing sediment loads entering downstream coastal waters. This project will utilize watershed assessment and design plans developed through previous watershed restoration projects and implement two types of erosion control projects to reduce sediment loads in the Manell Watershed, as follows:

1. Slope stabilization using vegetative methods, natural fibers, or other appropriate methods as approved;

2. Riparian buffer strips using vegetative methods and/or natural fibers or other appropriate methods.

The goals of this project are to:

1. Reduce sediments entering the streams and,

2. Test lower cost, low maintenance erosion control options that can be used in other locations as funding becomes available.

This project includes implementation of watershed restoration at six (6) sites in the Manell Watershed. Ideally, the projects will include installation and maintenance tasks that could be completed by community volunteers and coordinated by government or non-government organizations.

The Guam Coastal Management Program Assessment Format Form and the CZMA Consistency Determination are being provided to assist in the review for consistency of the proposed project with Guam's Coastal Management Program.

We appreciate your support in working with NOAA/NMFS, PIRO to obtain the approved Coastal Zone Act Consistency Determination. If you have any questions or comments regarding the completed Guam Coastal Management Program Assessment Format Form or the CZMA Consistency Determination for the proposed project, please do not hesitate to contact Ms. Valerie Brown by phone at 671.646.1904 or by email at valerie.brown@noaa.gov.

Sincerely,

Valerie Brown
Fishery Biologist

Correspondence Address:
NOAA Fisheries
Guam Field Office
770 E. Sunset Blvd. Ste. 170
Tiyan, GU 96913

Attachments:
- Guam Coastal Management Program Assessment Format Form for the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam
- CZMA Consistency Determination for the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam
- Work Plan for the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam

Coastal Zone Management Act (CZMA) Consistency Determination

This document provides the Guam Coastal Management Program with the National Oceanic and Atmospheric Administration (NOAA) Consistency Determination under CZMA § 307(c) (1) and 15 CFR part 930, subpart C, for the NOAA Design and Implementation of Watershed Restoration Projects in the Manell and Geus Watersheds on Guam. The information in this Consistency Determination is provided pursuant to 15 CFR § 930.39. This activity includes:

1.) Slope stabilization by hand-installing vegetation and natural fibers;

2.) Riparian buffer strip installation using vegetation and/or natural fibers or other appropriate methods. The goal is to test lower cost, low maintenance erosion control options that can be used in other locations as funding becomes available. Ideally, project designs will be scalable and include installation and maintenance tasks that could be completed by community volunteers.

NOAA has determined that the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam affects the land or water uses or natural resources of Guam in the following manner:

The primary objective of this project is to implement projects to stabilize eroding areas and create riparian buffers in the Manell Watershed in Southern Guam. The project's intent is to demonstrate practices which improve slope and stream stability and reduce the amount of sediment entering downstream coastal waters, reducing impacts to coastal benthic habitats and coral reef health. This project will assess steep slopes, streams and riparian zones for feasibility of erosion control projects and design two types of erosion control projects mentioned above to reduce sediment loads in the Manell Watershed.

The Guam Coastal Management Program contains the following applicable enforceable policies:

- Guam Environmental Protection Agency (GEPA) Section 401 Water Quality Certification [401(b)- discharge to or withdrawal from inland surface waters and 401(c) discharge of dredged material or fill in wetlands and other inland surface waters.
- Wetlands Permit - Chapters 61 & 62 of the Government Code of Guam and Executive Order No. 91-27
- Pollution Discharge Permit - "Water Pollution Control Act," Title 10, Chapter 47, Guam Code Annotated; and 22 GAR Chapter 10
- Erosion Control Permit - "Water Pollution Control Act," Title 10, Chapter 47, Guam Code Annotated; and "Soil Erosion and Sedimentation Control" Regulations, 1985. 22 GAR Chapter 10
- Section 106 - National Historic Preservation Act, "Historical Objects and Sites," Title 21, Chapter 76, Guam Code Annotated, PL 12-126
- Floodplain Management Ordinance – Government of Guam, Department of Public Works, Subsection (a), Subsection 66116, Article 1, Chapter 66, Building Law, 21 Guam Code Annotated

Based upon the following information, data and analysis NOAA finds that the Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam is consistent to the maximum extent practicable with the enforceable policies of the Guam Coastal Management Program. This project will not adversely affect the ability:

- to determine the extent to which Guam's natural resources limit urban and rural development;
- to plan for the preservation of the natural charm and character of Guam within the framework of a growing population and modern technology;
- to plan for a high quality environment essentially free from pollution with adequate well-kept open space throughout Guam's varying activity centers; and,
- to recommend creative legislation regulating the use of land for protection of future generations.

Pursuant to 15 CFR § 930.41, the Guam Coastal Management Program has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR §930.41(b). The Territory's concurrence will be presumed if the Territory's response is not received by NOAA on the 60th day from receipt of this determination.

The Guam Coastal Management Program response should be sent to:

Valerie Brown
NOAA Fisheries
Guam Field Office
770 E. Sunset Blvd. Ste. 170
Tiyan, GU 96913
Email: Valerie.brown@noaa.gov
Phone: 671-646-1904

GUAM COASTAL MANAGEMENT PROGRAM
ASSESSMENT FORMAT

DATE OF APPLICATION: September 19, 2017

NAME OF APPLICANT: National Oceanic and Atmospheric Administration (NOAA)

ADDRESS: 770 East Sunset Blvd, Suite 170, Tiyan, GU 96913
TELEPHONE NO. 671-646-1904 Fax No. 671-646-1906 E-Mail Address: Valarie.brown@noaa.gov

TITLE OF PROPOSED PROJECT: Implementation of Watershed Restoration Projects in the Manell-Geus Watersheds in Guam

COMPLETE FOLLOWING PAGES

FOR BUREAU OF STATISTICS AND PLANS ONLY:

DATE APPLICATION RECEIVED: _____

OCRM NOTIFIED: _____ LC. AGENCY NOTIFIED: _____

APPLICANT NOTIFIED: _____ PUBLIC NOTICE GIVEN: _____

OTHER AGENCY REVIEW REQUESTED: _____

_____

_____

DETERMINATION: ( ) CONSISTENT ( ) NON-CONSISTENT ( ) FURTHER INFORMATION REQUESTED

OCRM NOTIFIED: _____ LIC. AGENCY NOTIFIED: _____

APPLICANT NOTIFIED: _____

ACTION LOG:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

DATE REVIEW COMPLETED: _____

GUAM COASTAL MANAGEMENT PROGRAM
ASSESSMENT FORMAT

DEVELOPMENT POLICIES (DP):

DP1. Shore Area Development

Intent: To ensure environmental and aesthetic compatibility of shore area land uses.

Policy: Only those uses shall be located within the Seashore Reserve which:
- enhance, are compatible with or do not generally detract from the surrounding coastal area's aesthetic and environmental quality and beach accessibility; or
- can demonstrate dependence on such a location and the lack of feasible alternative sites.

Discussion: *The project area is not located within or in proximity to the Seashore Reserve, but it is upstream of and connected to the shore area by drainages in the watersheds. Policy DP 1 does not directly apply to this project, but the project will result in an enhancement in the quality of waters entering the Seashore Reserve area by reducing sediment loads associated with runoff from actively eroding areas in the Manell Watershed.*

DP2. Urban Development

Intent: To cluster high impact uses such that coherent community design, function, infrastructure support and environmental compatibility are assured.

Policy: Commercial, multi-family, industrial and resort-hotel zone uses and uses requiring high levels of support facilities shall be concentrated within appropriate zone as outlined on the Guam Zoning Code.

Discussion: *This project is not located near urban development areas and urban development areas will not be affected by the project. Policy DP 2 does not apply to this project.*

DP3. Rural Development

Intent: To provide a development pattern compatible with environmental and infrastructure support suitability and which can permit traditional lifestyle patterns to continue to the extent practicable.

Policy: Rural districts shall be designated in which only low density residential and agricultural uses will be acceptable. Minimum lot size for these uses should be one-half acre until adequate infrastructure including functional sewering is provided.

Discussion: *The Proposed Action is located in the Manell Watershed on Government of Guam property that is bordered on the south by privately owned land. The watershed is characterized primarily by savannah habitat with limited forested habitat occurring in association with ravines and drainages. The watershed is sparsely developed mostly in flat lying areas adjacent to the coast. The project is compatible with the existing traditional rural lifestyle patterns and will not affect the existing infrastructure.*

This project is consistent with the intent of Policy DP3.

DP4. Major Facility Siting

Intent: To include the national interest in analyzing the siting proposals for major utilities, fuel and transport facilities.

Policy: In evaluating the consistency of proposed major facilities with the goals, policies, and standards of the Comprehensive Development and Coastal Management Plans, Guam shall recognize the national interest in the siting of such facilities, including those associated with electric power production and transmission, petroleum refining and transmission, port and air installations, solid waste disposal, sewage treatment, and major reservoir sites.

Discussion: *This project is not associated with major utilities, fuel or transport facilities. There are no existing structures or above ground utilities in close proximity to the Manell project sites. Policy DP 4 does not apply to this project.*

DP 5. Hazardous Areas

Intent: Development in hazardous areas will be governed by the degree of hazard and the land use regulations.

Policy: Identified hazardous lands, including flood plains, erosion-prone areas, air installations' crash and sound zones and major fault lines shall be developed only to the extent that such development does not pose unreasonable risks to the health, safety or welfare of the people of Guam, and complies with the land use regulations.

Discussion: *The project goals are to stabilize currently unstable hazardous areas (erosion-prone areas). Therefore, this project is consistent with the intent of Policy DP5.*

DP 6. Housing

Intent: To promote efficient community design placed where the resources can support it.

Policy: The government shall encourage efficient design of residential areas, restrict such development in areas highly susceptible to natural and manmade hazards, and recognize the limitations of the island's resources to support historical patterns of residential development.

Discussion: *This project does not include development of residential areas or structures and residential areas will not be affected by the project. Policy DP 6 does not apply to this project.*

DP 7. Transportation

Intent: To provide transportation systems while protecting potentially impacted resources.

Policy: Guam shall develop an efficient and safe transportation system, while limiting adverse environmental impacts on primary aquifers, beaches, estuaries, coral reefs and other coastal resources.

Discussion: *This project does not involve the development of transportation systems and will not result in the creation of vehicle traffic at the site. The site is accessed by foot. This project is consistent with the intent of Policy DP7.*

DP 8. Erosion and Siltation

Intent: To control development where erosion and siltation damage is likely to occur.

Policy: Development shall be limited in areas of 15% or greater slope by requiring strict compliance with erosion, sedimentation, and land use regulations, as well as other related land use guidelines for such areas.

Discussion: *The intent of the project is to stabilize areas that are currently undergoing erosion in the headwater areas of the Manell Watershed and to reduce the off-site transport of sediment that is resulting in siltation in downstream aquatic habitats. Temporary and permanent erosion and sediment control best management practices will be constructed and/or installed to divert storm water from exposed areas and prevent sediment from moving offsite, if necessary. The project site will be minimally impacted by use of hand tools and a plant auger to implement erosion stabilization practices. Increased storm water runoff resulting from project implementation is not expected. Best management practices that could be implemented to stabilize soils that might be temporarily exposed to erosion during project implementation could include:*

- *Installation of vegetation (sedimentation) barriers where needed depending on site drainage*
- *Use of mulching on areas that will be exposed for extended periods (i.e., longer than 10 days)*

This project is consistent with the intent of Policy DP8.

RESOURCES POLICIES (RP):

RP1. Air Quality

Intent: To control activities to insure good air quality.

Policy: All activities and uses shall comply with all local air pollution regulations and all appropriate Federal air quality standards in order to ensure the maintenance of Guam's relatively high air quality.

Discussion: *Dust emission control measures will be implemented if determined necessary during field activities. The field activities will take place during the rainy season and no generation of dust is anticipated. Exposed soil will be sprayed with water to minimize the generation of dust if it is determined to be necessary. This project is consistent with the intent of Policy RP1.*

RP2. Water Quality

Intent: To control activities that may degrade Guam's drinking, recreational, and ecologically sensitive waters.

Policy: Safe drinking water shall be assured and aquatic recreation sites shall be protected through the regulation of uses and discharges that pose a pollution threat to Guam's waters, particularly in estuaries, reef and aquifer areas.

Discussion: *The project will improve the quality of the surface and receiving waters by stabilizing currently unstable steep slopes and stream reaches. This project is consistent with the intent of Policy RP2.*

RP3. Fragile Areas

Intent: To protect significant cultural areas, and natural marine and terrestrial wildlife and plant habitats.

Policy: Development in the following types of fragile areas including Guam's Marine Protected Areas (MPA) shall be regulated to protect their unique character.

- historical and archeological sites
- wildlife habitats
- pristine marine and terrestrial communities
- limestone forests
- ravine forests
- mangrove stands and other wetlands
- coral reefs

Discussion: *Implementation of the project would not be expected to result in direct or indirect impacts to terrestrial resources (vegetation communities or wildlife) or benthic and marine resources, including sensitive species occurring on or in the vicinity of the site. There may be a slight benefit, as the proposed action will restore native plants to areas that have been severely impacted by wildfires and erosion.*

Surveys for listed plant species were conducted on the site on July 20, 2017. Phyllanthus saffordii, a federally endangered plant species that occurs in savannah badlands, was observed to be common in association with the edges of grassed habitat adjacent to erosion scars at several locations in, and adjacent to, the project area. The locations of P. saffordii were recorded in the field and located on a site map so they can be avoided during project activities. The locations and boundaries of the six stabilization and restoration plots were modified to ensure that P. saffordii would be not affected, or impacted by proposed project activities. Prior to the initiation of the project activities, sites will be resurveyed to ensure that no new P. saffordii plants have become established. If new plants are found, the project site boundaries will be modified to ensure that no P. saffordii are affected by the project activities.

No other listed flora or fauna species were observed on, or in proximity to the project sites. Listed fauna species are not expected to occur on or in proximity to the project sites due to a lack of suitable habitat. A Section 7(a)(2) of the Endangered Species Act (ESA) Correspondence Letter and a Threatened and Endangered Species Report was submitted to the United States Fish and Wildlife Service for concurrence on the findings of the surveys.

Correspondence with the Guam Historic Preservation Office is being conducted to ensure that activities associated with the watershed restoration project will not result in adverse effects to cultural resources. Cultural artifacts are most likely not to be found within the six project sites. Archaeological surveys of the site will be conducted if required. Stabilization of actively eroding sites in the project area would be expected to result in long term beneficial effects to cultural resources that might occur downslope of the erosion sites, as a result of stabilizing the actively eroding areas.

The project would not be expected to result in impacts on cultural or historic resources on and in the vicinity of the sites during or as a result of project implementation. If an inadvertent discovery of a cultural resource occurs during implementation activities, the work where the discovery is made will immediately cease, and the Guam Historic Preservation Officer Point of Contact (POC) will be immediately notified. An archaeologist (or designee) and/or the Guam Historic Preservation Officer POC may stop work to allow investigators to inspect the area and to protect the artifacts. The perimeter of the find, as determined by the archaeologists, will be delineated and access to the area will be restricted. No intrusive work will proceed without consultation with the archaeologist (or designee).

This project is consistent with the intent of Policy RP3.

RP4. Living Marine Resources

Intent: To protect marine resources in Guam's waters.

Policy: All living resources within the waters of Guam, particularly fish, shall be protected from over harvesting and, in the case of corals, sea turtles and marine mammals, from any taking whatsoever.

Discussion: *No impacts to the marine resources and mangrove habitat would result from implementation of the proposed project.*

The intent of the project is to stabilize and restore areas of actively eroding soils in the headwater areas of the Manell Watershed. Implementation of the project would result in a reduction in the amount of sediments being transported from the actively eroding project sites. A reduction in the amount of sediments entering Guam's waters will result in an improvement in habitat conditions for all associated living resources. The project does not involve any harvesting of marine resources or activities within the waters that could otherwise adversely impact marine resources. This project is consistent with the intent of Policy RP4.

RP5. Visual Quality

Intent: To protect the quality of Guam's natural scenic beauty

Policy: Preservation and enhancement of, and respect for the island's scenic resources shall be encouraged through increased enforcement of and compliance with sign, litter, zoning, subdivision, building and related land-use laws. Visually objectionable uses shall be located to the maximum extent practicable so as not to degrade significant views from scenic overlooks, highways and trails.

Discussion: *The project includes the installation of native vegetation in an area that has historically been subjected to frequent fires and subsequent recruitment of non-native grasses. Implementation of the project will improve the diversity of native vegetation at the project sites resulting in an improvement in the natural scenic beauty of the site.*

This project is consistent with the intent of Policy RP5.

RP6. Recreation Areas

Intent: To encourage environmentally compatible recreational development.

Policy: The Government of Guam shall encourage development of varied types of recreational facilities located and maintained so as to be compatible with the surrounding environment and land uses, adequately serve community centers and urban areas and protect beaches and such passive recreational areas as wildlife, marine conservation and marine protected areas, scenic overlooks, parks, and historical sites. Developments, activities and uses shall comply with the Guam Recreational Water Use Management Plan (RWUMP).

Discussion: *The project site is not located on or near any recreational areas and will not have any effects on recreational areas. Policy RP 6 does not apply to the Proposed Action.*

RP7. Public Access

Intent: To ensure the right of public access.

Policy: The public's right of unrestricted access shall be ensured to all non-federally owned beach areas and all Guam recreation areas, parks, scenic overlooks, designated conservation areas and their public lands. Agreements shall be encouraged with the owners of private and federal property for the provision of releasable access to and use of resources of public nature located on such land.

Discussion: *This project is not located on or near public access areas and it will not affect access to public areas. Policy RP 7 does not apply to the Proposed Action.*

RP8. Agricultural Lands

Intent: To stop urban types of development on agricultural land.

Policy: Critical agricultural land shall be preserved and maintained for agricultural use.

Discussion: *The project does not involve urban development on agricultural land and will not preclude surrounding properties from being used for agricultural purposes in the future. Policy RP 8 does not apply to the Proposed Action.*

WORK PLAN

Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam

NOAA/ National Marine Fisheries Service
Pacific Islands Regional Office,
Habitat Conservation Division

Prepared for:

National Oceanic and Atmospheric Administration,
National Marine Fisheries Service,
Pacific Islands Regional Office,
Habitat Conservation Division

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC

September 2017

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WORK PLAN

Implementation of Watershed Restoration Projects in the Manell-Geus Watershed in Guam
NOAA / National Marine Fisheries Service
Pacific Islands Regional Office, Habitat Conservation Division

September 2017

Prepared for:

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Contract Number: WC133F-11-CQ-0004 Task Order 0008

EA Project No. 62543.08

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Acronyms and Abbreviations

CLTC	Chamorro Land Trust Commission
CZMA	Coastal Zone Management Act
EA	EA Engineering, Science, and Technology, Inc., PBC
ESA	Endangered Species Act
GHPO	Guam Historic Preservation Office
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
PIRO	Pacific Islands Regional Office
PM	Project Manager
POC	Point of Contact
SHSO	Site Health and Safety Officer
WP	Work Plan

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1.0 INTRODUCTION

This Work Plan (WP) presents the approach, rationale, and field procedures for the Implementation of Watershed Restoration Projects in the Manell Watershed in Southern Guam (Figure 1). The WP presents the technical and quality aspects of the project's field and reporting activities.

The overall objective of implementing watershed restoration projects in the Manell Watershed is to stabilize stream banks and create riparian buffers with the intent of reducing sediment loads entering downstream coastal waters. This project will utilize watershed assessment and design plans developed through previous watershed restoration projects and implement two types of erosion control projects to reduce sediment loads in the Manell Watershed, as follows:

1.) Streambank stabilization using vegetative methods, natural fibers, or other appropriate methods as approved;

2.) Riparian buffer strips using vegetative methods and/or natural fibers or other appropriate methods.

The goals of this project are to:

1.) Reduce sediments entering the streams and,

2.) Test lower cost, low maintenance erosion control options that can be used in other locations as funding becomes available.

The permitting process to implement these practices is ongoing. Ideally, the projects will include installation and maintenance tasks that could be completed by community volunteers and coordinated by government or non-government organizations.

This project includes implementation of watershed restoration at six (6) sites in the Manell Watershed.

1.1 Project Key Elements

The intent of this project is to implement restoration actions to stabilize streambanks and create riparian buffers in the Manell watershed in Southern Guam. This project is funded by the Coral Reef Conservation Program and contracted under the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) Pacific Islands Regional Office (PIRO), and is comprised of the following key components.

- Notifications and Permits
- Mobilization and Setup
- Preparatory Activities

- Field Activities and Design Implementation
- Monitoring and Maintenance
- Demobilization

The details of these project components are discussed in Section 3.0 (Methods and Procedures) of this WP.

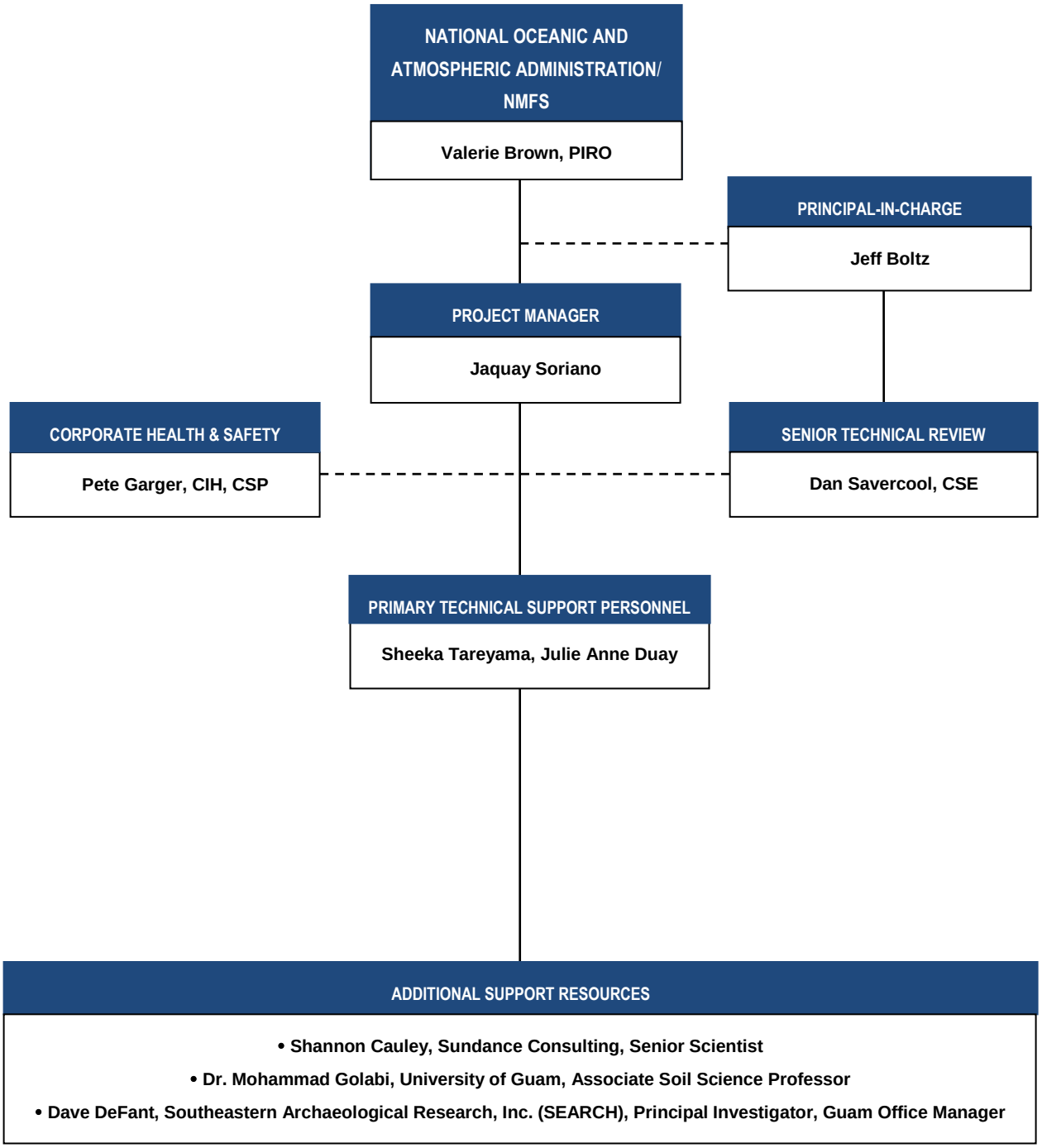
1.2 Project Organization

The project organizational chart (Table 1) presents the list of project personnel and their responsibilities related to the implementation of field activities described in this WP.

1.3 Schedule

The project schedule is included in Appendix A.

Table 1. Project Organizational Chart



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2.0 BACKGROUND INFORMATION

The following section presents background information including a description of the site and the physical setting.

2.1 Watershed Description

2.1.1 Manell Watershed Project Area

The Manell watershed is located in southern Guam in the Village of Merizo (Figure 1). The headwaters of the watershed are located on Government of Guam property while most of the areas transitioning into the coastal plain are privately owned. The Liyog River flows to the south approximately 0.5 miles to the south of the project sites and the Sumay River flows to the south approximately 0.02 miles to the west of the sites. The highest elevation in the watershed is in its northern area and is approximately 1,122 feet above mean sea level. The watershed is characterized primarily by savannah habitat with limited forested habitat occurring in association with ravines and drainages. The watershed is sparsely developed mostly in flat lying areas adjacent to the coast.

The dominant soil mapping unit in the watershed in proximity to the project area includes the Agfayan-Akina outcrop association. The Agfayan series consists of very shallow to shallow, well drained and moderately slowly permeable soils that developed on volcanic uplands in residuum derived from marine deposited tuff, tuff breccia and tuffaceous sandstone. The soil overlies strongly weathered tuff (USDA 1988). The Akina series is characterized by very deep, well drained and moderately slowly permeable soils that developed on volcanic uplands in residuum derived from tuff and tuff breccia (USDA 1988).

2.2 Project Area Description

The watershed restoration project area consists of six (6) individual project sites located in the eastern section of the Manell watershed (Figure 1). The combined area encompassing the project sites includes approximately 6,496 square feet of undeveloped and unoccupied land characterized primarily by grasses associated with savanna habitat. There are no existing structures or above ground utilities in close proximity to the Manell project sites. The project sites are accessed through a private land owner's property that borders the main access road. Access onto the Manell sites to perform the survey and implement the watershed restoration demonstration projects was granted by the private landowner. The historical and existing land use at the Manell watershed project sites is unimproved land.

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3.0 FIELD METHODS AND PROCEDURES

The following section describes the methods and procedures to be used during the field implementation activities.

3.1 Notifications and Permits

Prior to field activities, EA will coordinate with applicable review agencies and secure needed clearance and permits for the project.

EA will provide data to the PIRO Point of Contact (POC) at NOAA as necessary to meet commitments stipulated under the National Environmental Policy Act (NEPA), Magnuson-Stevens Act, and Endangered Species Act (ESA) reviews, including cultural resources investigation of project area and sediment sources. EA will indicate in the preliminary Restoration and Planting Plan drawings any areas of culture resources that will be avoided.

EA will identify all governing codes, regulations, and required permits applicable to the project and shall ensure the preliminary Restoration and Planting Plans conform to all applicable federal, Territory of Guam, and local codes, and shall identify and resolve, where necessary, conflicts among federal, territorial, and local codes and ordinances.

The following notifications and permitting may be required for project execution:

- Formal consultation under Section 7 of the Endangered Species Act of 1973;
- Formal consultation under Section 106 of the National Historic Preservation Act; and,
- Coastal Zone Management Act (CZMA) consistency.

These items will be coordinated with the PIRO POC as necessary. Additional permits, or notification requirements, if any, will be coordinated with the PIRO POC prior to commencing fieldwork.

3.2 Mobilization and Setup

Upon acceptance of the final WP, permitting/notifications, and receipt of notice to proceed for field work from the POC, personnel and equipment will be mobilized for site work. The work will be conducted in accordance with applicable federal, state, and local laws and regulations, utilizing personnel as identified in the organizational chart.

Equipment

No heavy equipment will be required for this project. The mobilization of the following equipment to the project site is anticipated.

- Hand tools, such as shovels, picks, spades, machetes, etc.
- Portable plant auger

3.3 Preparatory Activities and Restoration and Planting Plan Development

3.3.1 Vegetation Clearing

All six of the proposed watershed restoration sites are currently accessible without the need for vegetation clearing. An existing two track and foot trails provide access to the sites. No vegetation clearing will be necessary for access to the sites over the extent of the project, but the removal of isolated undesirable invasive plant species might be required prior to planting activities. Undesirable plants may be physically removed. Natural vegetation growth occurs rapidly on Guam; therefore no vegetation restoration will be performed within the foot trail areas. Disturbed areas within the foot trails will be left to revegetate naturally.

3.3.2 Survey

Six sites have been identified for restoration and planting. A site survey of the six restoration sites will be completed using a handheld global positioning system instrument. Coordinates will be recorded for the site locations, and field data will be collected for each of the six sites. The data will include measurements of study site slopes, dimensions of study sites, proximity to drainages and streams, visual evaluation of canopy cover and root density or ground cover, and presence of topsoil. Notable geologic features, the composition of existing vegetation, and the presence of invasive species will also recorded for the sites. A threatened and endangered species survey was conducted at all six sites and the immediate surrounding areas discussed in Section 4.2.

3.3.3 Restoration and Planting Plan Development

A Preliminary Restoration and Planting Plan for the six identified sites will be prepared and submitted to the PIRO POC for review and comment. The report will contain the following, at a minimum:

1. Recommended project features (i.e. dimensions and placement of plantings, specific methods to be used, etc.);
2. Detailed map indicating the limits of the project implementation areas;
3. Preliminary restoration and planting plan drawings;
4. Results of data analysis review;
5. Planting schedule; and,
6. Results of supplemental investigations/analyses.

EA will arrange and lead a meeting with representatives of NOAA and other project participants as determined by the PIRO POC to discuss the preliminary Restoration and Planting Plans. EA will take notes and produce minutes of the meeting.

EA will incorporate government comments into the Preliminary Restoration and Planting Plan, Preliminary Drawings and Specifications and Cultural Resources Report and resubmit the report for review.

EA will incorporate all additional government comments into the report and will prepare the Final Restoration and Planting Plan Report, Drawings and Specifications, and Cultural Resources Report.

3.4 Field Activities and Design Implementation

3.4.1 Project Sites

Restoration and planting activities at the six identified sites will include vetiver (*Chrysopogon zizanioides*) filter strip installation and a combination of riparian and understory enhancements as detailed in the Restoration and Planting Plan.

3.4.2 Species to Implement

A variety of native and one non-native plant species have been selected in consultation with Guam Forestry and NOAA for planting in the restoration sites due to their ability to stabilize soils. Table 2 provides a summary of species and planting locations in the six Manell project sites. Any additional species added will be approved by NOAA and Guam Forestry and will conform with the planting plan.

Table 2. Proposed Plant Species List and Planting Locations

Scientific Name	Common or Chamorro Name	Planting Site Locations
Woody shrubs		
Glochidion marianum	Abas duendes	1, 3, 5, 6
Hibiscus tiliaceous	Pago	1, 3, 6
Morinda citrifolia	Lada	1, 3, 5, 6
Grass		
Chrysopogon zizanioides	Vetiver grass	1, 2, 3, 5, & 6
Trees		
Artocarpus mariannensis	Dukduk	3, 5
Cocos nucifera	Niyok (3 year)	1, 3, 6
Neisosperma oppositifolia	Faggot	3
Pandanus tectorius	Kafu	1, 3, 5, 6

3.4.3 Planting Methods

The plant species mix represents a combination of woody, herbaceous, and canopy tree species. They are intended to be implemented as container-grown stock of at least 1-gallon size, as shown in the Restoration and Planting Plan. The following sections provide general descriptions of the planting methods. Detailed spacing, installation notes, and planting schedules will be included in the Restoration and Planting Plan.

3.4.3.1 Container-Grown Stock

Container-grown stock should be well-tended, non-root-bound stock, installed in prepared holes with the root ball opened and expanded through careful work by hand. For each plant, a hole will be dug at least 50% wider than the container. If root-bound plants are encountered, the root system will be slitted and flared out over the planting hole, and roots will be pruned before planting. If more than 20% of the root system is cut off, the same amount of leaf area will be removed (proportionately). Root balls will be planted level to, or just below the natural ground level. Each hole will be backfilled with soil and packed well to remove air pockets (NRCS, 2010).

3.4.3.2 Vegetation Slips

Vetiver grass may be installed in slips. This will involve use of a nursery spade or other tool to

dig a shallow trench. Each vetiver slip will be placed in the trench at the same depth as grown in the container. Each trench will be backfilled with soil and packed well to remove air pockets (NRCS, 2010). Slips will be placed at 4-inch spacing and then heeled-in carefully by field personnel.

3.4.4 Protection of Installed Vegetation

Plantings will be protected from weeds and animals or other organisms as necessary to ensure suitable plant establishment. Applying organic mulch around trees or shrubs may help to conserve moisture and control weeds. Individual tree protection or fencing of the entire test plot may be utilized as determined necessary in the field to best protect the plantings. This may vary based on individual site conditions and the size of test plots.

3.5 Monitoring and Maintenance

Following successful installation of plantings and installation of fencing and tree protection (if applicable), and within the first month after installation, the plantings will be inspected for proper establishment. Any damage, distress, insect infestations, or disease will be recorded.

The ultimate survivability of test plots will be measured approximately one year following installation by NOAA and/or volunteers. A count of living stock will be performed and compared to as-built recorded installation counts.

Periodic maintenance of new plantings will include the removal of unwanted vegetation and debris, which could inhibit planted species growth. Watering will occur if unexpected dry weather is encountered; otherwise, the rainy season should be sufficient for watering of new plant stock. If reduced plant growth is observed, a periodic application of fertilizer may be warranted to expedite plant establishment.

3.6 Demobilization

After completing the planned field activities, the equipment and supplies used will be demobilized from the project site. All materials and equipment used during the monitoring activities will also be removed from the project site following the revegetation of the project sites.

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4.0 ENVIRONMENTAL PROTECTION PLAN

The following sections describe the environmental protective measures that will be used to control and correct conditions that may develop at the project site during fieldwork associated with this project. Protective measures for this project will include erosion and sediment controls and work practices that minimize damage to site features and adjacent vegetation. It is expected that archaeological and cultural resources will not be encountered.

4.1 Archaeological and Cultural Resources Preservation

EA has teamed with Southeastern Archaeological Research, Inc., (SEARCH) to perform the archaeological survey/investigations in compliance with the requirements of Guam Title 21 GCA Chapter 76; Guam Executive Orders 89-9 and 89-24; and Section 106 of the U.S. National Historic Preservation Act of 1966.

Prior to initiating field activities, SEARCH will consult with the Guam Historic Preservation Office (GHPO) regarding survey scope and methods and will prepare a detailed Draft Archaeological Research Design for review by the GHPO. A Final Archaeological Research Design will be prepared based on GHPO comments. Field activities will include execution of systematic pedestrian transects throughout each of the six project sites and along access trails leading to plots. Shovel test excavations will be completed at identified prehistoric sites and at select non-site areas within each of the six project sites. Identified archaeological sites and features will be recorded. Any identified artifacts will be properly recovered. Identified site types and associations will be assessed and evaluated for significance. An end of Fieldwork Letter Report and Draft and Final Reports including background research, survey results, site significance evaluations, and recommendations for additional work (if needed) will be prepared.

Project personnel will be briefed on recognition and reporting of archaeological features. If any archaeological resources are encountered, measures will be taken to carefully preserve and immediately report these findings to the NOAA POC. If archaeological resources such as artifacts (e.g., stone tools), features (e.g., stone walls), deposits (e.g., sea shells and charcoal-stained soil), human bones, and other cultural remains are encountered, that portion of the work will immediately cease, and the NOAA POC will be immediately notified. An archaeologist (or designee) and/or the NOAA POC may stop work to allow investigators to inspect the area and to protect the artifacts. The perimeter of the find, as determined by the archaeologists, will immediately be delineated with caution tape (if needed) to restrict access to the area of the find. No intrusive work will proceed without consultation with the archaeologist (or designee).

4.2 Threatened and Endangered Species

A threatened and endangered species survey was conducted at all six sites on 20 July 2017. *Phyllanthus saffordii* was observed in areas adjacent to the identified project sites. Project sites were thoroughly surveyed and implementation measures were carefully selected to avoid impacts to *P. saffordii*. All project personnel that will be present during implementation activities will be briefed on the recognition of *P. saffordii* to ensure threatened and endangered species will not be

impacted during all stages of the project activities.

4.3 Erosion and Sediment Control

Temporary and permanent erosion and sediment control best management practices will be constructed and/or installed to divert stormwater from exposed areas and prevent migration of sediment offsite, if necessary. The project site will be minimally impacted by use of hand tools and a plant auger. The potential for increased offsite stormwater drainage from the project sites is anticipated to be minimal.

Erosion and sediment controls may include:

- Installation of vegetation (sedimentation) barriers where needed, depending on site drainage;
- Use of mulching on areas that will be exposed for extended periods (i.e., longer than 10 days), and;
- Installation of coir logs (mulch or coir fiber-filled photodegradable logs).

During maintenance activities, disturbed areas and sediment controls will be inspected to ensure the controls are in place and adequately functioning. If sediment inspections indicate that a control is not functioning properly, the control will be replaced or modified promptly.

4.4 Dust Emission Control

Dust emission control measures will be implemented when deemed necessary during field activities. The field activities will take place during the rainy season, and no dust emissions are anticipated during the duration of the project implementation activities. If dust controls are deemed necessary, the soil will be sprayed with water.

5.0 FIELD DOCUMENTATION

5.1 Field Notes

This section discusses recordkeeping in the field, which will include the use of field logbooks and photographs.

5.1.1 Field Logbooks

Field logbooks will document dates, plant species planted, field planting procedures, and names of field personnel responsible for conducting the implementation activities. Logbook entries will also include descriptions of the field activities. Logbooks will be bound with consecutively numbered pages. Each page will be dated and the time of entry will be noted in military time. All entries will be legible, written in ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions.

5.1.2 Photographs

Photographs will be taken to document field activities.

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6.0 FIELD VARIANCES

As conditions in the field may vary, it may become necessary to implement minor modifications to planting as presented in this plan. When appropriate, the NOAA POC will be notified and a verbal approval will be obtained before implementing the changes.

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7.0 FIELD HEALTH AND SAFETY PROCEDURES

A Corporate Safety and Health Program Manual and a Site-Specific Addendum for the Manell Watershed have been prepared to minimize the threat of serious injury to workers engaged in field activities while performing site work. The Corporate Safety and Health Program Manual and the Site Specific Addendum are presented in Appendix B.

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8.0 REFERENCES

United States Department of Agriculture (USDA), 1988. *Soil Survey of Territory of Guam*. United States Department of Agriculture, Natural Resources Conservation Service (formerly Soil Conservation Service) in cooperation with the Guam Department of Commerce and the University of Guam.

Natural Resources Conservation Services (NRCS), 2010. *Plant Establishment Procedures*, PI Vegetative Technical Note No. 7.

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Figures

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Legend

- Previously Established Trail
- River in Watershed
- Road
- Project Area

920 460 0 920 1,840 Feet

N

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N

EA Engineering, Science, and Technology, Inc., PBC 1001 Army Drive, Suite 103, Barrigada, 96913-1402 Telephone: (671) 646-5231 Facsimile: (671) 646-5230	Implementation of Watershed Restoration Projects in the Manell-Geus Watershed In Guam NOAA/ NMFS- Contract No. WC133F-11-CQ-0004 **Figure 1 Vicinity Map**

Drawing No. NOAA_ Fig 1 Manell Watershed Vicinity Map	Date: 08/29/17	Drawn By: JSoriano	EA Project No.62543.08

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Site 2
Site 1
Site 4
Site 3
Sumay River
Site 5
Liyog River
Site 6

Legend

- Site 1 Location
- Site 2 Location
- Site 3 Location
- Site 4 Location
- Site 5 Location
- Site 6 Location
- Previously Established Trail
- River in Watershed

140 70 0 140 280 Feet

N

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N

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Figure 2
Manell Watershed Site Location Map

Drawing No. NOAA_ Fig 2 Manell Watershed Site Location Map	Date: 08/17/17	Drawn By: JSoriano	EA Project No.62543.08

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Site 2
Site 1
Site 4
Site 3
Sumay River
Site 5
Liyog River
Site 6

Legend

- Site 1 Location
- Site 2 Location
- Site 3 Location
- Site 4 Location
- Site 5 Location
- Site 6 Location
- Previously Established Trail
- River in Watershed

bare earth (2 meter)

Value

High : 254

Low : 0

140 70 0 140 280 Feet

N

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N

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NOAA/ NMFS- Contract No. WC133F-11-CQ-0004

Figure 3
Manell Watershed -Lidar Map

Drawing No. NOAA_ Fig 3 Manell Watershed -Lidar	Date: 08/17/17	Drawn By: JSoriano	EA Project No.62543.08

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