MEMORANDUM FOR FILE

SUBJECT: PRE-CONSTRUCTION SURVEY AT P-102 POWER UPGRADE, Harmon to AAFB, Guam

INTRODUCTION:

In accordance with the cultural and natural resources conservation measures related to the Marine Corps relocation from Okinawa to Guam (US Fish and Wildlife Service 2015 Biological Opinion (BO) and the Reinitiation of the 2015 Biological Opinion, 2017), the Department of Navy (DON) conducted pre-construction surveys on August 07, 2017 to August 25, 2017 for the Power Upgrade project (P-102) from Harmon to Andersen Air Force Base (AAFB). Survey was conducted by Marine Corps Activity Guam (MCAG) staff: Gerard Aguon and Wien Winner. The purpose of this survey was to identify, tag, and document all federally protected Endangered Species Act (ESA) listed species and culturally important high value tree (HVT) species.

BACKGROUND:

The P-102 project is located along Route 3 and Route 9 from Harmon substation to AAFB.

METHODS:

Biological survey was conducted to document any existence of ESA listed species within P102 construction footprint. Distance variance between survey lines were developed to account for forest understory density and line of sight distances; forest canopy (7-10m) and open developed areas (10-40m). Reconnaissance transects were navigated using Trimble GPS units (Figure 1 to 5). Line of sight observations were recorded on each side of the survey transects. All survey transects were mapped and stored as line layers and all recorded species as point layers. GPS data was loaded onto the GIS computer after survey.

The attributes that were collected in the Trimble data dictionary for ESA listed plant species included: *Tuberolabium guamense* (host plant, orchid location on host plant, direction which orchid is facing). Generic points were to be taken for any incidental observations of ESA listed species; bats, butterflies, snails/snail shells and skinks.

RESULTS:

Flora composition: Due to the linear shape and ten mile length of the project located adjacent to Route 3 and Route 9, the P-102 vegetation community is broken into five distinct vegetation habitat categories: (1) along Route 3 the disturbed grassland/shrubland consists of the pioneer species *Hibiscus tiliaceus, Pennisetum purpureum,* and *Nephrolepis hirsutula* (Fig. 1), (2) along Route 3 the disturbed limestone Vitex forest consists of a dominant canopy of the invasive *Vitex parviflora* with an understory of *Guamia mariannae* (Fig.2), (3) along Route 9 near Potts Junction the disturbed limestone forest consists of *V. parviflora* and *H. tiliaceus* dominants and the epiphytic endangered *Tuburolabium guamense* orchids (Fig. 3), (4) along Route 9 the disturbed native limestone forest is punctuated with the native emergent tree species *Elaeocarpus joga* and *Artocarpus mariannensis* and a dominant canopy of *Hibiscus tiliaceus* and *Premna serratifolia* with an understory *Piper guamense* dominance (Fig.4) and (5) along roads in AAFB are regularly maintained habitats composed of a mixture of cosmopolitan non-native weeds and mowed landscapes (Fig 5).

ESA listed Species: There was one ESA listed species that was recorded within P102 construction footprint *Tuberolabium guamense* (Table 1).

High value trees: 44 high value trees were located within P102 construction footprint (Table 1).

Coconut rhinoceros beetle (CRB) and Little Fire Ant (LFA) presence: There was evidence of CRB presence observed in the survey area but no LFA presence.

Table 1. ESA listed species and HVT recorded at the P-102 Power Upgrade.

ESA listed species	**Quantity**
Tuberolabium guamense	105
High Value Trees	
Elaeocarpus joga	7
Artocarpus mariannensis	37

REFERENCES:

1. Fosberg, F.R. The vegetation of Micronesia: 1. General descriptions, the vegetation of the Mariana Islands, and a detailed consideration of the vegetation of Guam. Bulletin of the American Museum of Natural History 119:76 pp. New York. 1960.

Figure 1. Route 3 disturbed grassland/shrubland

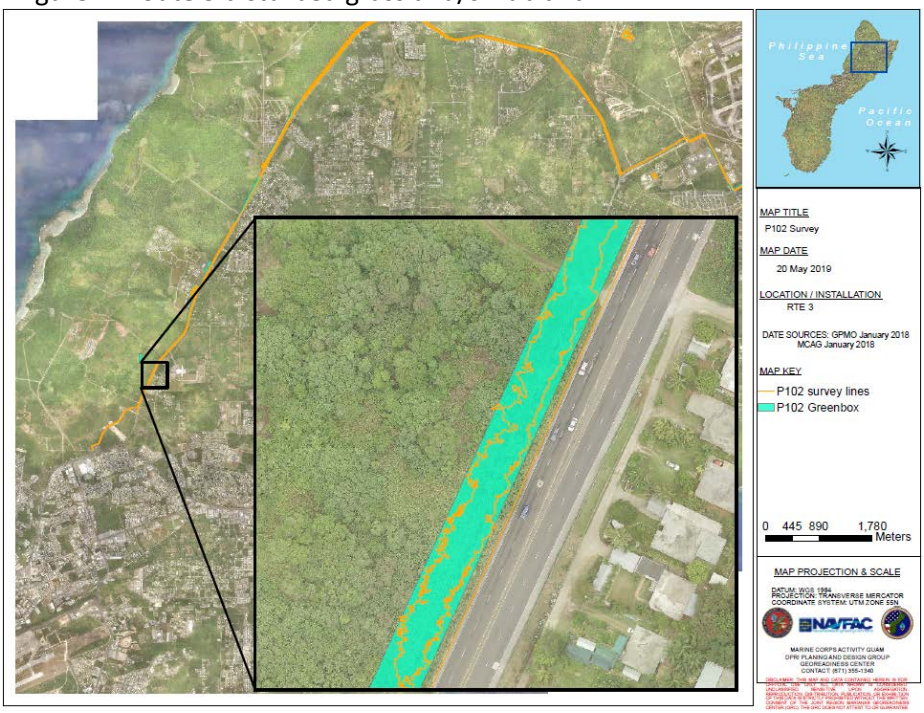


Figure 2. Route 3 Vitex forest

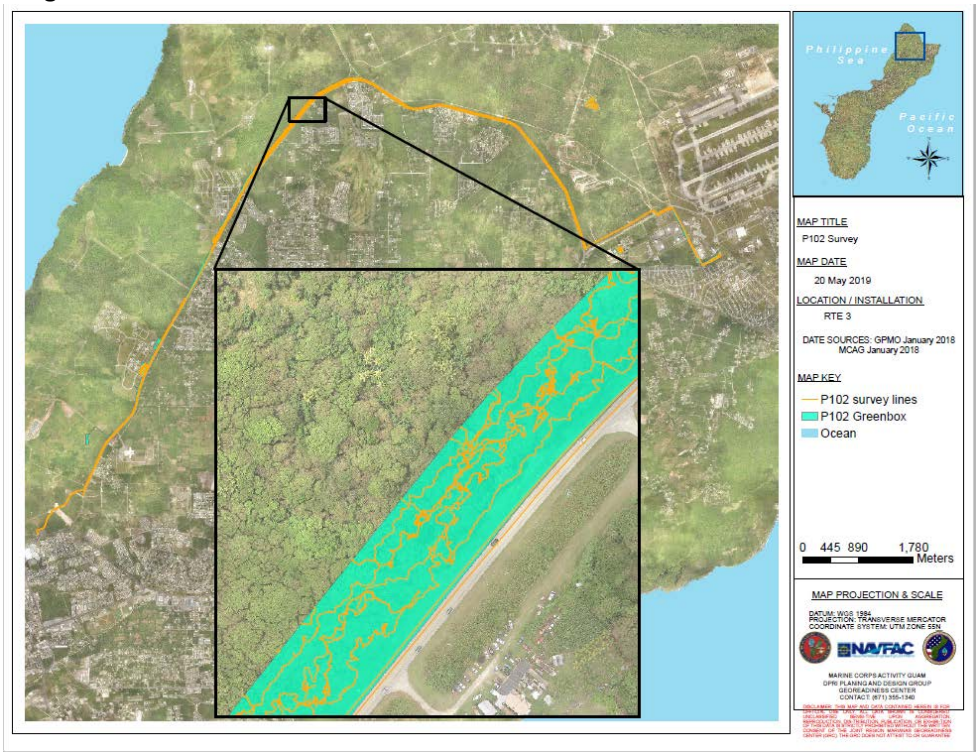


Figure 3. Along Route 9 Potts Junction ESA listed Species (*Tuberolabium guamense*)

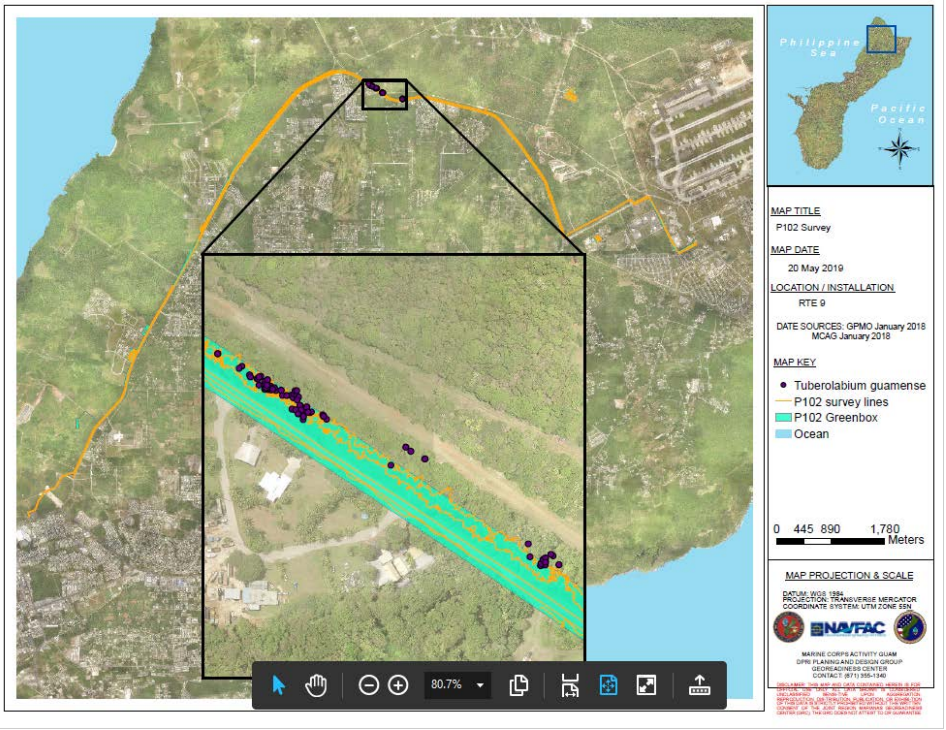


Figure 4. Along Route 9 disturbed limestone native forest

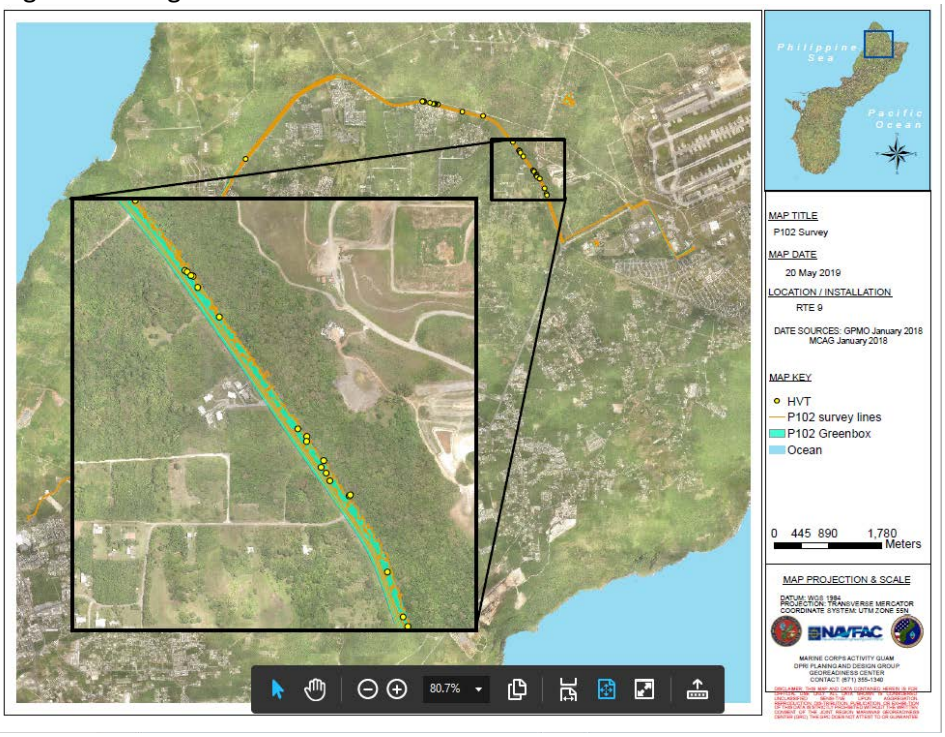
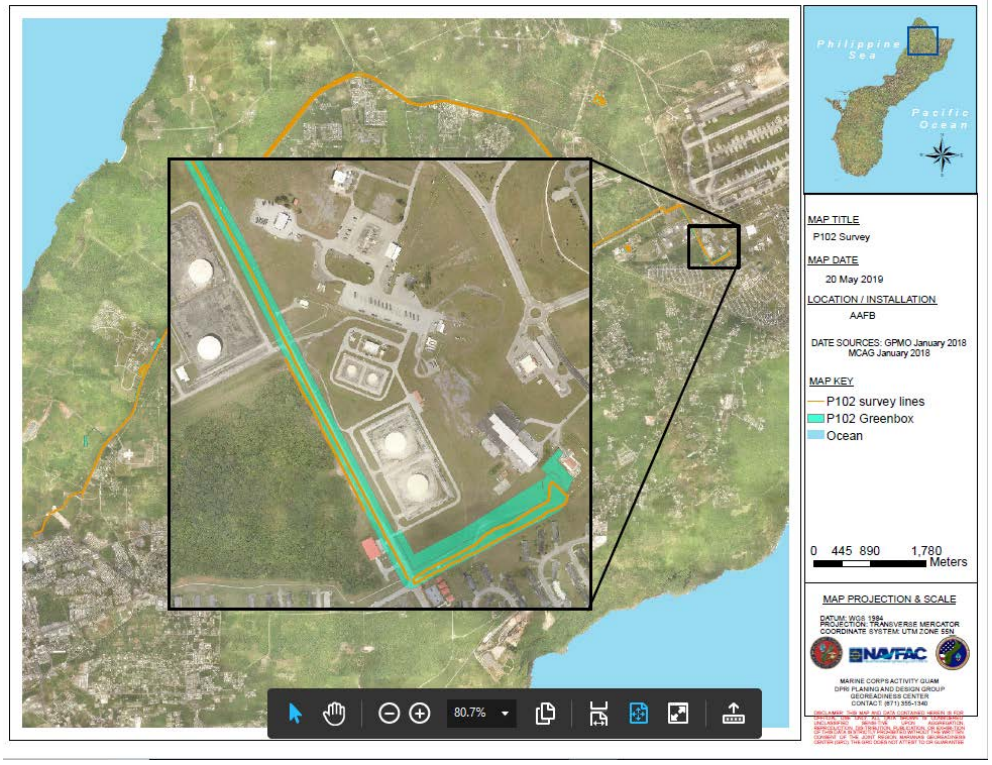


Figure 5. Along roads on AAFB, regularly maintained grassland landscape



MEMORANDUM FOR FILE
SUBJECT: PRE-CONSTRUCTION SURVEY AT P-290 EARTH COVERED MAGAZINE, AAFB, GUAM

INTRODUCTION:
In accordance with the cultural and natural resources conservation measures related to the Marine Corps relocation from Okinawa to Guam (US Fish and Wildlife Service 2015 Biological Opinion (BO) and the Reinitiation of the 2015 Biological Opinion, 2017), the Department of Navy (DON) conducted pre-construction surveys on October 12, 2017 to April 03, 2018 for the Earth Covered Magazine project (P-290) located at Andersen Air Force Base (AAFB). Continued biological surveys were also conducted from February 20, 2019 to March 01, 2019 to reflect modification of the project site boundaries. Surveys were conducted by Marine Corps Activity Guam (MCAG) staff: Lauren Gutierrez, Christiana Quinata, Joshua Salas, Kathleen Plaza, Sheeka Tareyama, Bertina Mendiola, and Wien Winner. The purpose of the surveys was to identify, tag, and document all federally protected Endangered Species Act (ESA) listed species and culturally important high value tree (HVT) species.

BACKGROUND:
The P-290 project is located within Munition Storage Area (MSA) on AAFB.

METHODS:
Biological surveys were conducted to document the presence/absence of ESA listed species within the P-290 construction footprint. Distance variance between survey lines varied from 5m to 30m depending on vegetation density and landscape habitats. Reconnaissance transects were navigated using Trimble GPS units. All survey transects were mapped and stored as line layers and all recorded species as point layers. GPS data was loaded onto the GIS computer after survey.

Attributions collected in the Trimble data dictionary for ESA listed plant species included: Cycas *micronesica* (height, reproduction (buds, fruit, flowers)), *Tuberolabium guamense* (host plant, orchid location on host plant, direction which orchid is facing), HVT (diameter at breast height (DBH), and phenology (flowers, fruit).Generic points were taken for any incidental observations of ESA listed species; bats, butterflies, snails/snail shells and skinks.

RESULTS:
Flora composition: The P-290 vegetation community is described as a disturbed mixed moist limstone forest that contains an even mix of canopy species (Fosberg.1960). The dominant emergent canopy consisted of the native species: *Elaeocarpus joga.* Overstory canopy contained the predominant invasive tree *Vitex parviflora*. The native understory was dominated by *Guamia mariannae.* Forest ground cover lacked diversity due to extreme ungulate pressure consisting of deer grazing and pig rooting. Exposed, disturbed and landscaped areas were dominated by a variety of cosmopolitan non-native weeds.

ESA listed Species: Two ESA listed species were recorded within the P-290 construction footprint (Table 1, Fig. 1).

High value trees: *Intsia bijuga, Artocarpus mariannesis* and *Elaeocarpus joga* were recorded within the P-290 construction footprint (Fig. 1).

Coconut rhinoceros beetle (CRB) and Little Fire Ant (LFA) presence: There was evidence of CRB presence observed in the survey area but no LFA presence.

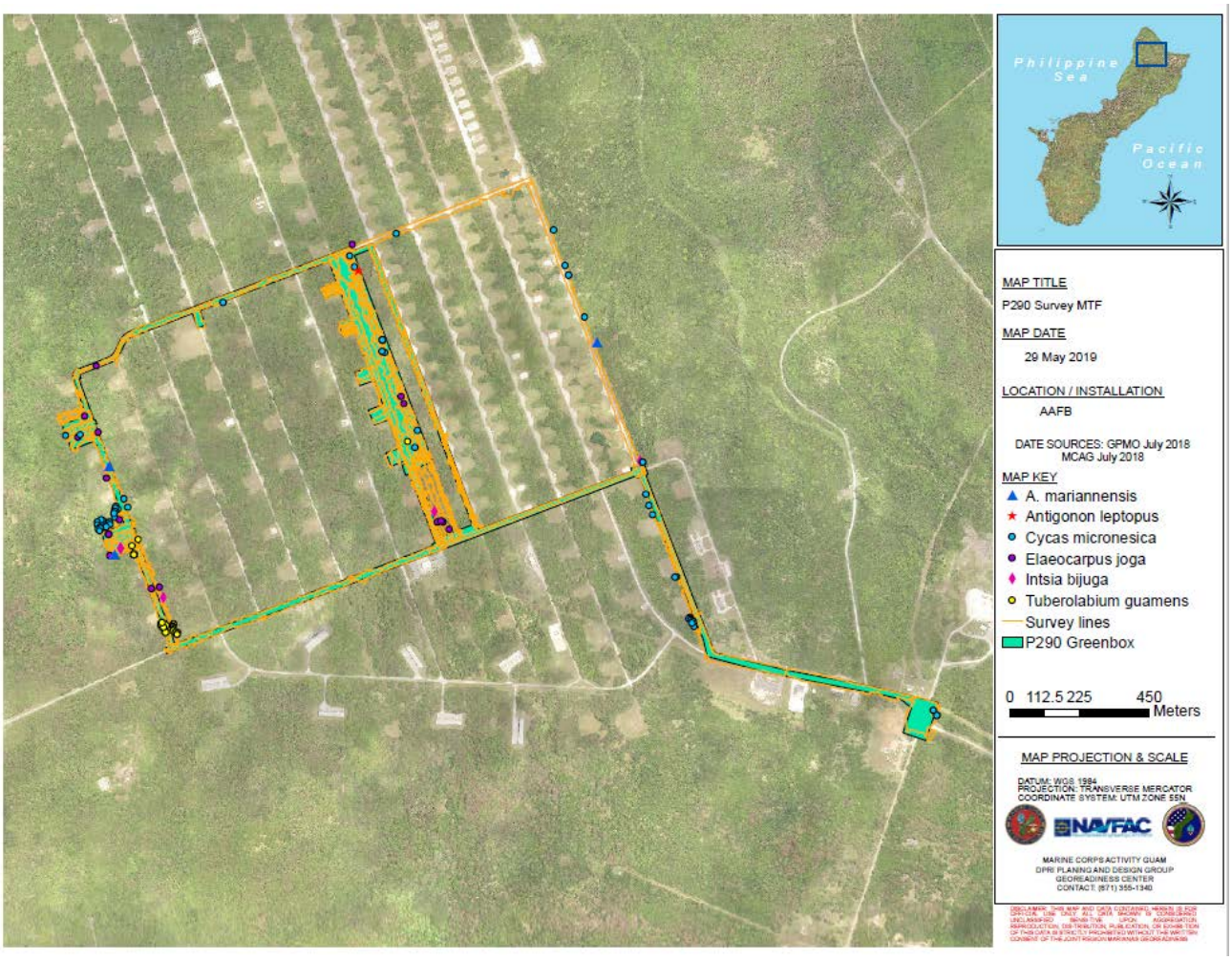
Table 1. ESA listed species and HVT recorded at the P-290 Earth Cover Magazine.

ESA listed species	**Quantity**
Cycas micronesica	66
Tuberolabium guamense	**56**
High Value Trees	**Quantity**
Artocarpus mariannesis	3
Elaeocarpus joga	17
Intsia bijuga	5

REFERENCES:

1. Fosberg, F.R. The vegetation of Micronesia: 1. General descriptions, the vegetation of the Mariana Islands, and a detailed consideration of the vegetation of Guam. Bulletin of the American Museum of Natural History 119:76 pp. New York. 1960.

Figure 1. Recorded ESA listed species and high value trees.



MEMORANDUM FOR FILE
SUBJECT: PRE-CONSTRUCTION SURVEYS AT P-296 Ordnance Operations Administrative Building, AAFB, Guam (Revised: July 2019)

INTRODUCTION:
In accordance with the cultural and natural resources conservation measures related to the Marine Corps relocation from Okinawa to Guam (US Fish and Wildlife Service 2015 Biological Opinion and the Reinitiation of the 2015 Biological Opinion, 2017), the Department of Navy (DON) conducted pre-construction surveys on April 11, 2018 and following construction footprint expansion in July 17, 2019 for the Ordnance Operations Administrative Building project (P-296) located at Andersen Air Force Base (AAFB). Survey was conducted by Marine Corps Activity Guam (MCAG) staff: Joshua Salas, Kathleen Plaza, Josepha Munoz, Wien Winner, and Sheeka Tareyama. The purpose of the surveys was to identify, tag, and document all federally protected Endangered Species Act (ESA) listed species and culturally important high value tree (HVT) species.

BACKGROUND:
The P-296 project is located on AAFB. The base occupies a mostly flat, uplifted limestone plateau containing rubble karst in the northern portion of the island of Guam. The majority of the northern interior of the island, including the immediate area of the proposed P-296 project, is comprised of Mariana Limestone.

METHODS:
This biological surveys were conducted to document the existence of ESA-listed species within the P296 construction footprint originally consisting of 1.39 acres and then expanded to 2.69 acres. Distance variance between survey lines were developed to account for forest understory density and line of sight distances; forest canopy (7-10m) and open developed areas (10-40m). Reconnaissance transects were navigated using Trimble GPS units (Figure 1). Line of sight observations were recorded up to five-10 meters on each side of the survey transects within vegetation. All survey transects were mapped and stored as line layers and all recorded species as point layers. GPS data was loaded onto the GIS computer after survey.

Attributes collected in the Trimble data dictionary for ESA-listed plant species included: *Cycas micronesica* (height, reproduction (buds, fruit, flowers)) and HVT species included: *Instia bijuga* (height, stem diameter, phenology (seeds, flowers)). Generic points were to be taken for any incidental observations of ESA-listed species; bats, butterflies, snails/snail shells and skinks.

RESULTS:
Flora composition: The P-296 vegetation community is described as a disturbed mixed moist forest that contains an even mix of canopy species (Fosberg.1960). Canopy contained a predominant native mix of *Aglaia mariannensis*, and *Ochrosia mariannensis*. The native understory included *Guamia mariannae* and *Hibiscus tiliaceus.* Forest ground cover lacked diversity due to extreme ungulate pressure consisting of deer grazing and pig rooting resulting in a sparsely vegetated strata of *Pteris tripartita and Pandanus tectorius.* In the west section of the project footprint a small cluster of *Cocos nucifera* observed. Exposed, disturbed and landscaped areas were dominated by a variety of cosmopolitan non-native weeds.

ESA-listed Species: One ESA-listed species was recorded within the P296 construction footprint (Table 1). No listed-snails were found within the project footprint.

High value trees: One high value tree was located within the P296 construction footprint (Table 1).

Coconut rhinoceros beetle (CRB) and Little Fire Ant (LFA) presence: There was evidence of CRB presence observed in the survey area. No LFA presence observed.

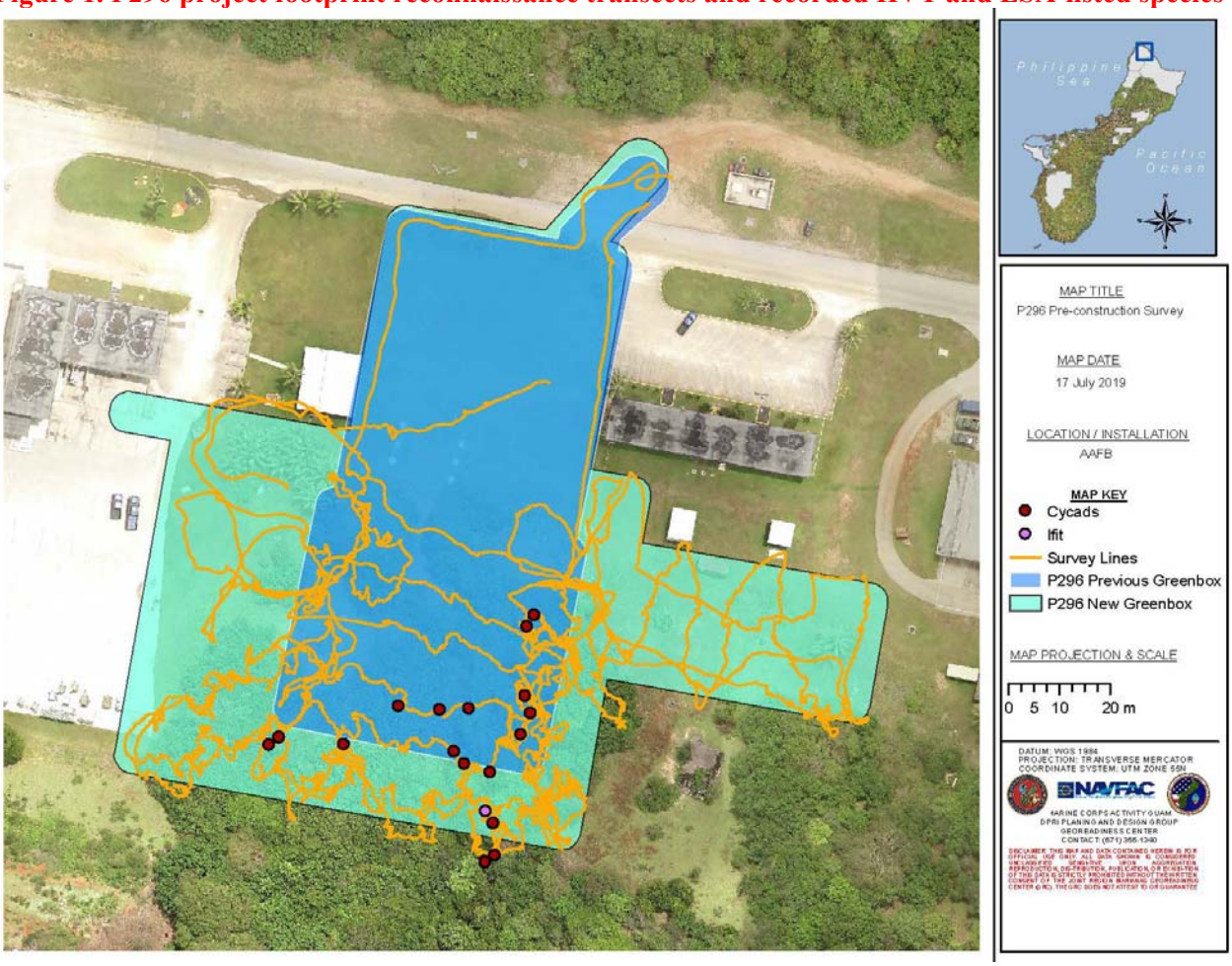
Table 1. ESA-listed species and HVT recorded at the Ordnance Operations Administrative Building.

ESA-listed species	**Quantity**
Cycas micronesica	**15**
HVT	
Instia bijuga	1

REFERENCES:

1. Fosberg, F.R. The vegetation of Micronesia: 1. General descriptions, the vegetation of the Mariana Islands, and a detailed consideration of the vegetation of Guam. Bulletin of the American Museum of Natural History 119:76 pp. New York. 1960.

Figure 1. P296 project footprint reconnaissance transects and recorded HVT and ESA-listed species



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MEMORANDUM FOR FILE
SUBJECT: PRE-CONSTRUCTION SURVEY AT P-735 MACHINE GUN RANGE, NORTHWEST FIELD ANDERSEN, GUAM (revised June 2019)

INTRODUCTION:
In accordance with the cultural and natural resources conservation measures related to the Marine Corps relocation from Okinawa to Guam (US Fish and Wildlife Service 2015 Biological Opinion (BO) and the Reinitiation of the 2015 Biological Opinion, 2017), the Department of Navy (DON) conducted pre-construction surveys between September 7, 2016 to January 5, 2017 and on April 18, 2019 for the Machine Gun Range project (P-735) located at Andersen Air Force Base (AAFB). Surveys were conducted by Marine Corps Activity Guam (MCAG) staff: Christiana Quinata, Lauren Gutierrez, Maria Cruz, Nicole Olmsted, Wien Winner, Adrienne Loerzel, Sheeka Tareyama, Sine Foster, and Bertina Mendiola. The purpose of this survey was to identify, tag, and document all federally protected Endangered Species Act (ESA) listed species and culturally important high value tree (HVT) species (Figure 1 and Figure 3). Butterfly host plants were also surveyed for *Hypolimnas octocula marianensis* (Mariana eight spot butterfly) presence (Figure 2).

BACKGROUND:
Land usage and disturbance located on the predominately vegetated project site include a section of ungulate exclusion fence, an AAFB 2006 BO conservation measure related to the Intelligence, Surveillance, Reconnaissance, and Strike Capability (ISR Strike) project. A formal ungulate eradication program for Philippine sambar deer (*Rusa marianna*) and pigs (*Sus scrofa*) within the fence has not been initiated although at present recreational hunting is managed and conducted by the Volunteer Conservation Officers (VCOs) through AAFB. Additionally an unpaved road utilized by AAFB security forces crosses through the south west sector culminating at the overlook tower at Ritidian Point. Historically a former Explosive Ordnance Disposal (EOD) range MRS UXO 4A is located in the south east sector and was primarily used for the burning and explosive destruction of bomb fuses between 1959 and 1981 (CH2M.2018).

METHODS:
Using a geographic information system (GIS) transect lines were spatially delineated three to ten meters apart within the P735 project boundaries and were then imported into handheld Geo7x GPS units to be utilized as survey guidelines. Distance variance between survey guidelines were developed to account for karst morphology and line of sight distances; pinnacle karst (3-5m), honeycomb karst (5-7m) and open understory forest (7-10m). Transects were navigated using Trimble GPS units following the survey guidelines (Figure 2). Line of sight observations were recorded up to five meters on each side of the survey guidelines. All survey transects were mapped and stored as line layers and all recorded species as point layers. GPS data was loaded onto the GIS computer after each field day.

Attributes that were collected in the Trimble data dictionary for butterfly host plant observations included: location, quantity, type of butterfly presence (adult, larvae, chrysalis, eggs), stage of plant development (seedling, juvenile, mature) and host plant damage type (caterpillar, slug, ungulate and insects). Attributions collected in the Trimble data dictionary for ESA listed plant species included: cycas (height, reproduction (buds, fruit, flowers)), HVT (diameter at breast height (DBH), and phenology (flowers, fruit). Generic points were taken for any incidental observations of ESA listed species; bats, butterflies, snails/snail shells and skinks.

Survey transects were not employed in the Explosive Ordnance Disposal (EOD) range MRS UXO 4A area located in the middle sector due to safety concerns (Figure 2). This area contains no trees and is vegetated only with non-native invasive *Cestrum diurnum* shrubs and a sparse ground cover of sedges and grasses.

RESULTS:

Flora composition: The P735 vegetation community is described as a mixed moist forest that contains an even mix of canopy species (Fosberg.1960). The dominant emergent canopy consisted of the native species: *Ficus prolixa, Ficus microcarpa var. saffordii, Macaranga thompsonii, Tristiropsis obtusangula, Intsia bijuga* and *Pisonia grandis* while as the typhoon pruned overstory canopy contained a predominant mix of *Aglaia mariannensis*, *Ochrosia mariannensis*, *Eugenia reinwardtiana*, *Guamia mariannae* and *Premna serratifolia.* The native understory was dominated by *Cycas micronesica, Eugenia palumbis* and *Cynometra ramiflora.* Ground cover strata was poorly developed due to extreme ungulate pressure consisting of deer grazing and pig rooting. Native ground cover species found in karst pockets or inaccessible karst features were vegetated with *Procris pedunculata* and *Elatostoma calcareum.* Gap and edge species were almost exclusively dominated by the non-native invasive shrub species *Cestrum diurnum* and *Triphasia trifoliata* and the native shrub *Wikstroemia elliptica.* Exposed cliff edges were dominated by *Casuarina equisetifolia*, *Eugenia bryanii* and *Excoecaria agallocha.* Disturbed forest edges and open field gaps were dominated by the grass Saccharum *spontaneum,* ground cover sedge *Fimbristylis cymosa* and invasive *Cestrum diurnum* shrubs.

ESA listed Species: Seven ESA listed species were recorded: two orchids, three trees, and seven Mariana eight spot butterflies and their growth phases. (Table 1).

High value trees: Two HVT species were recorded: *Elaeocarpus joga* and *Intsia bijuga.* Both species of butterfly host plants were recorded on site: *Elatostema calcareum* and *Procris penduculata*

Coconut rhinoceros beetle (CRB) and Little Fire Ant (LFA) presence: No evidence of CRB or LFA presence observed in the survey area.

Table 1. ESA listed species and HVT recorded at the P-735 Machine Gun Range.

ESA listed species	**Quantity**
Cycas micronesica	*1423
Dendrobium guamense	6
Heritiera longipetiolata	10
Tabernaemontana rotensis	173
Tuberolabium guamense	21
High Value Trees	
Elaeocarpus joga	2
Intsia bijuga	*80
Hypolimnas octocula marianensis	
adult	7
chrysalis	9
eggs	19
larvae	69
Butterfly host plants	
Elatostema calcareum	14
Procris penduculata	93

* updated to include species recorded during survey conducted on April 18, 2019.

REFERENCES:
1. CH2M. Contract N62470-16-D-9000. Task Order: 0108. Work Plan Removal Action for Munitions Response Site UXO 4A.Andersen Air Force Base, Guam. March, 2018.
2. Fosberg, F.R. The vegetation of Micronesia: 1. General descriptions, the vegetation of the Mariana Islands, and a detailed consideration of the vegetation of Guam. Bulletin of the American Museum of Natural History 119:76 pp. New York. 1960

Figure 1. Recorded ESA listed species and high value trees.

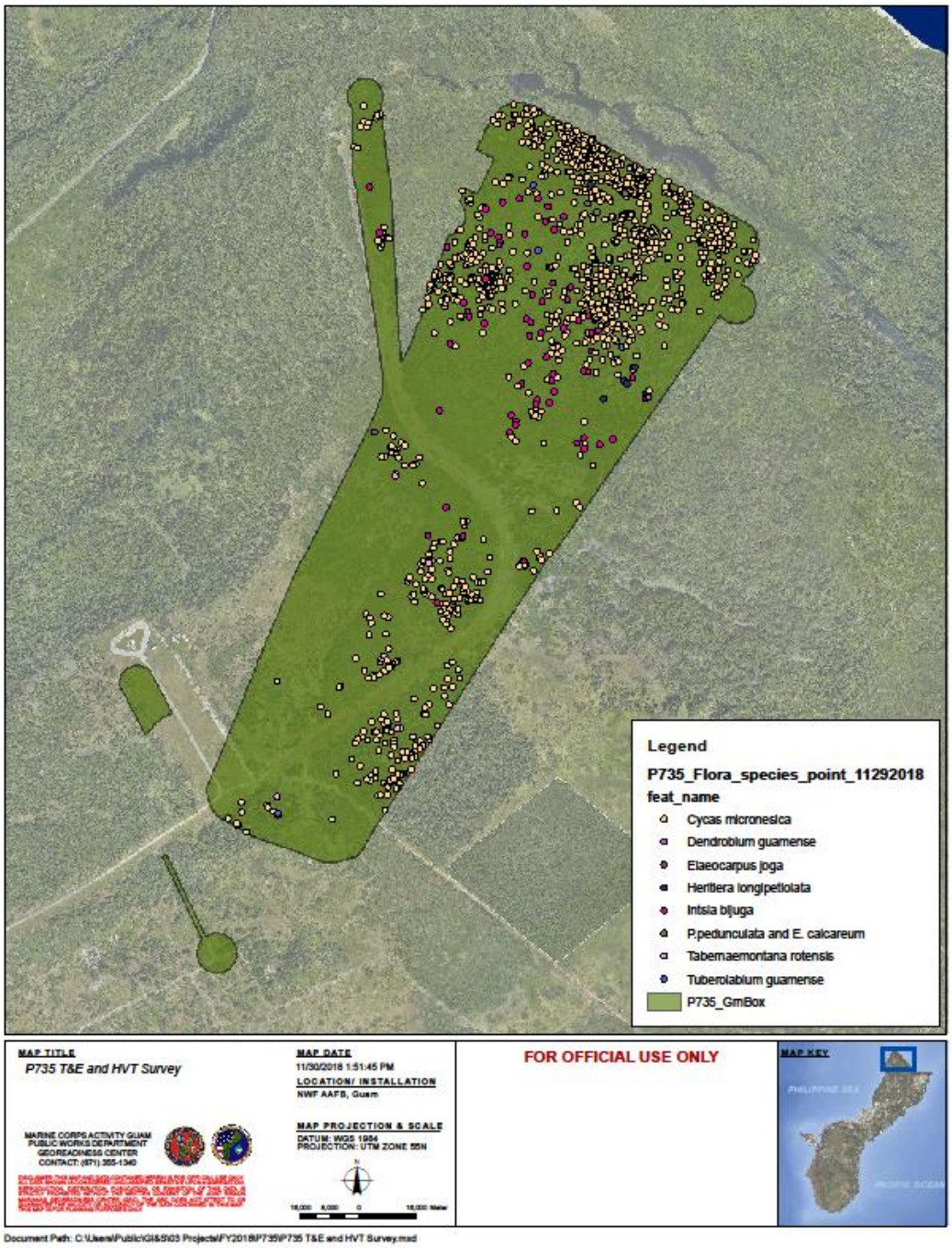

Figure 2. Recorded butterfly host plants overlaid on surveyed transect lines.

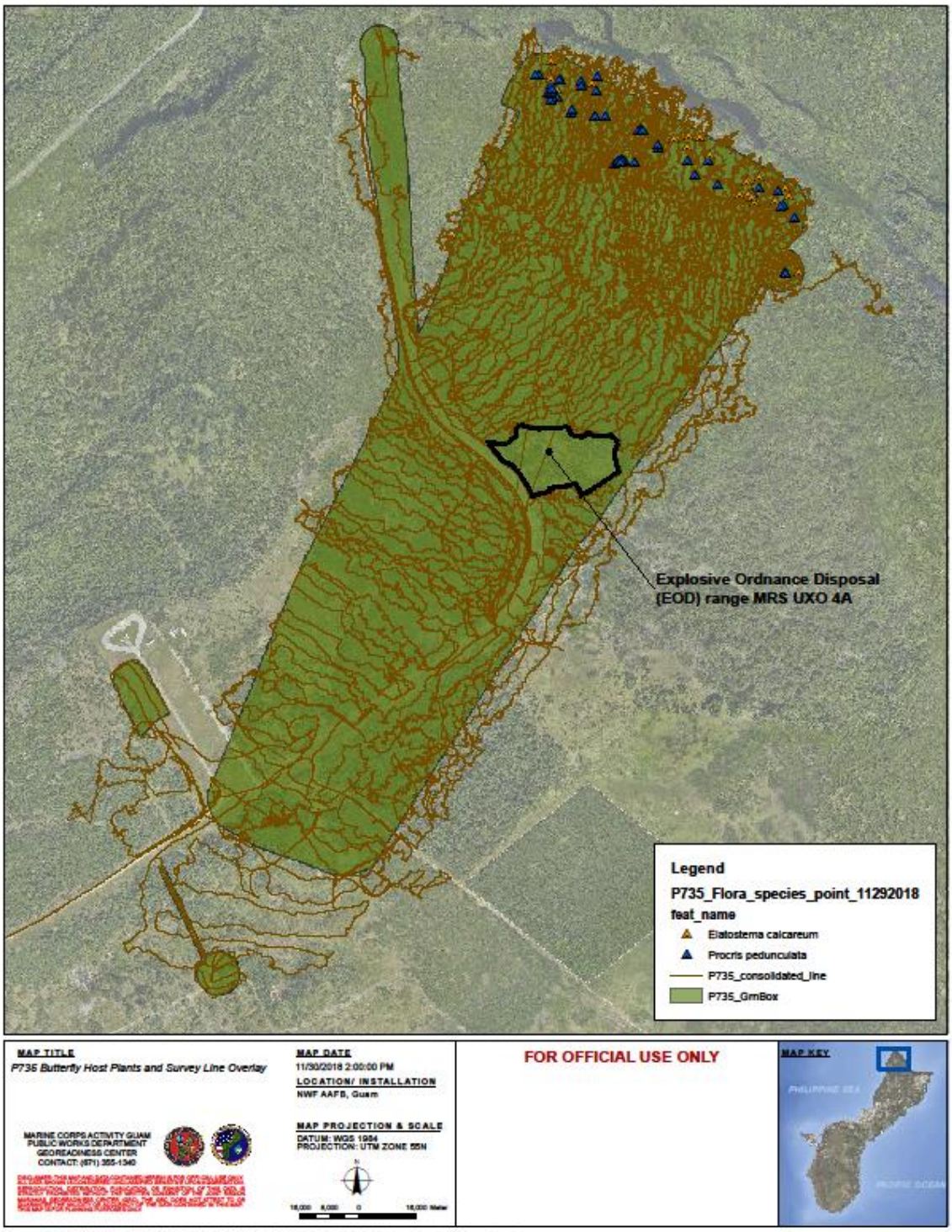
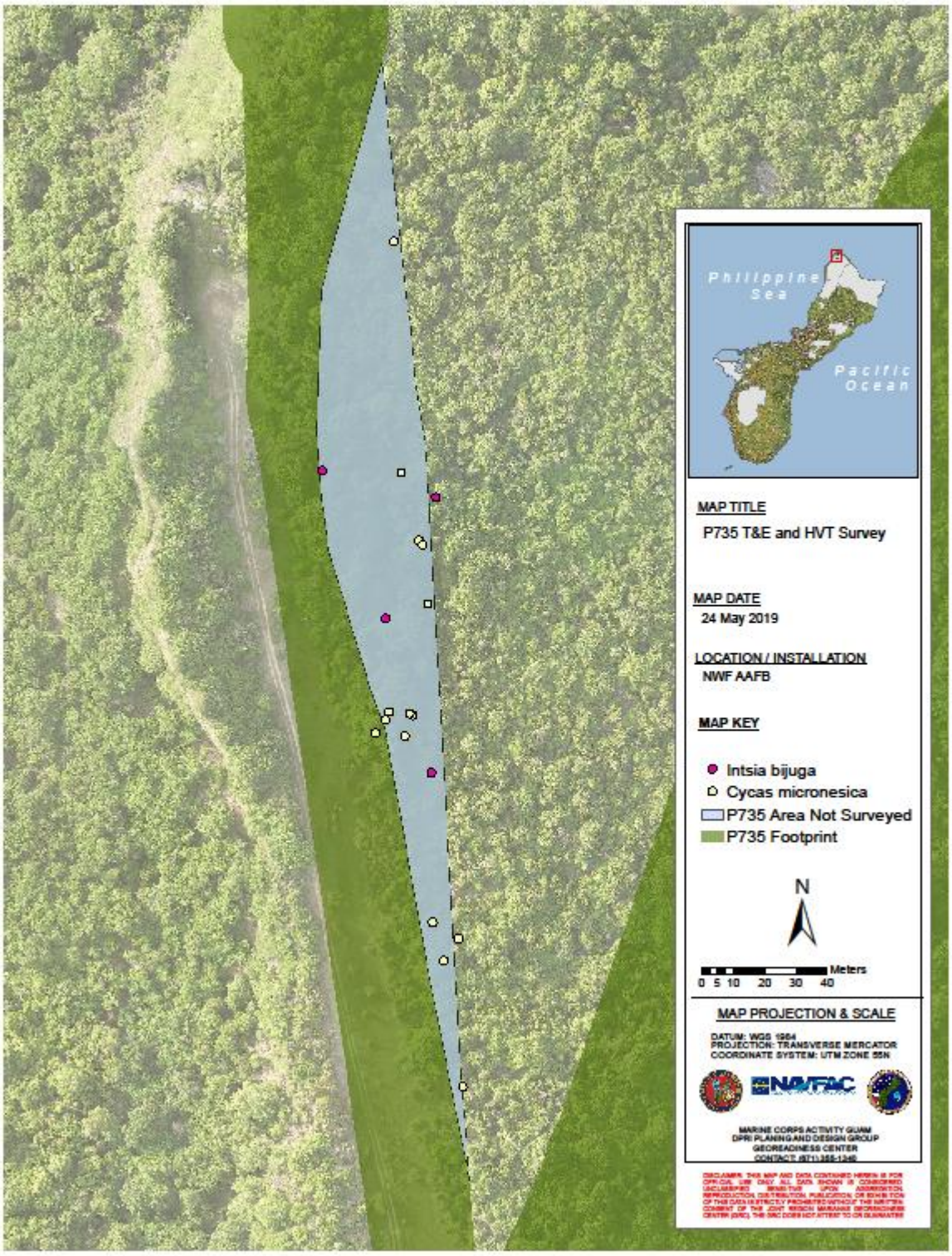
Figure 3. Additional recorded ESA listed species and high value trees on April 18, 2019.