Department of Defense
Legacy Resource Management Program

2024-2025 Coordinated Bird, Bat, and Herpetofaunal Inventories on DOD Installations with Focus on Mission-Sensitive Species

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June 2025

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ABSTRACT

The primary objective of this project was to conduct field surveys for Department of Defense (DOD) Mission-Sensitive Species (MSS) on two military properties (Hurlburt Field, Florida and Point Arena, California) where these species have potential occurrence, but have not been confirmed present. Surveys were conducted by representatives from the DOD Partners in Flight, DOD Partners in Amphibian and Reptile Conservation, and the DOD Small Mammal Initiative during 2024 and 2025. Survey methodology varied based on the target species groups, but generally included visual and auditory surveys, area searches, automated acoustic data loggers, and point count surveys. Five MSS (four bird and one reptile) were confirmed present on Hurlburt Field, and two MSS (one bird and one bat) were confirmed present at Point Arena. The data collected from these surveys are essential to enable DOD Natural Resources Managers to prioritize monitoring and management efforts of these species and their habitats to help reverse population declines and prepare installations for potential Endangered Species Act listings. This project was funded by the DOD Legacy Resource Management Program.

2024-2025 Coordinated Bird, Bat, and Herpetofaunal Inventories on DOD Installations with Focus on Mission-Sensitive Species

Coordinated Effort by DOD Partners in Amphibian and Reptile Conservation, DOD Partners in Flight, and DOD Small Mammal Initiative

INTRODUCTION

The Department of Defense (DOD) Partners in Amphibian and Reptile Conservation (PARC), DOD Partners in Flight (PIF), and DOD Small Mammal Initiative (SMI) networks have created lists of DOD Mission-Sensitive Species (MSS); these are species that may be at risk of becoming listed under the Endangered Species Act (ESA) and have high potential to impact the military testing and training missions should they become listed. The DOD MSS lists help DOD Natural Resources Managers prioritize monitoring and management efforts of those species and their habitats to help reverse population declines and/or prepare installations for potential listings.

This report documents the results of 2024-2025 field surveys for reptile, amphibian, bat, and avian MSS at Point Arena Air Force Station (hereafter called Point Arena), and the same (less bats) at Hurlburt Field Air Force installation (hereafter called Hurlburt). The surveys represent the second year of a collaboration between the DOD PIF, DOD PARC, and DOD SMI networks. The primary objective of the surveys was to search for DOD MSS or any threatened or endangered species (TES) that may occur on the two military sites but have not been confirmed present. These data improve the understanding of the distribution of DOD MSS and TES on military lands across the range of each species and, if confirmed present, assist military natural resource managers to plan, prioritize, and implement conservation and management actions that benefit these species.

This project was funded by the DOD Legacy Resource Management Program.

SITE DESCRIPTIONS

Point Arena

The Point Arena facility is in Mendocino County, California, at 2,150–2,350-foot elevation in the coastal mountains (about six miles inland from the Pacific coast) and approximately 100 miles northwest of San Francisco. Only 89 acres in size, Point Arena was previously used as a radar site and communication facility but has been remotely staffed for decades although there is still an active communication tower onsite.

Habitat at Point Arena is largely Mediterranean California mixed evergreen forest and contains some large mature (but secondary growth) California coastal redwood *(Sequoia sempervirens*) forest (Table 1; Figure 1). Besides coastal redwoods, the forest canopy is co-dominated by Douglas fir (*Pseudotsuga menziesii*). There is a small pond on the main site, as well as developed portions (i.e., grassy mowed areas and buildings; Figure 2). Besides the 73-acre main site there are two separate parcels called the Ground Air Transmitter and Receiver (GATR) site (seven acres; 1.2 miles north of the main site) and a pump station site (one acre; 0.6 miles north of the main site). The GATR site consists of Mediterranean California mixed evergreen forest that contains more early- to mid-successional growth than the main site, and the pump station site (which was not accessible for avian surveys due to active logging activity along the access road), is in mature forest.

Table 1. Land cover types acquired from Landfire Existing Vegetation Type (2022) at Point Arena, California with associated acreages.

Land Cover	Acres	Percent
Mediterranean California Mixed Evergreen Forest	43.7	49.1
Developed-Roads	18.4	20.7
Western Cool Temperate Urban Evergreen Forest	6.1	6.9
California Coastal Redwood Forest	4.1	4.6
Developed-Low Intensity	3.5	3.9
Western Cool Temperate Urban Shrubland	2.3	2.6
Western Cool Temperate Developed Evergreen Forest	2.1	2.3
California Northern Coastal Grassland	1.9	2.2
Western Cool Temperate Urban Herbaceous	1.8	2.0
Developed-Medium Intensity	1.5	1.7
Northern California Coastal Scrub	1.4	1.6
Western Cool Temperate Developed Herbaceous	1.0	1.1
Western Cool Temperate Developed Shrubland	0.6	0.7
Mediterranean California Mixed Oak Woodland	0.4	0.4
Western Cool Temperate Urban Mixed Forest	0.2	0.2

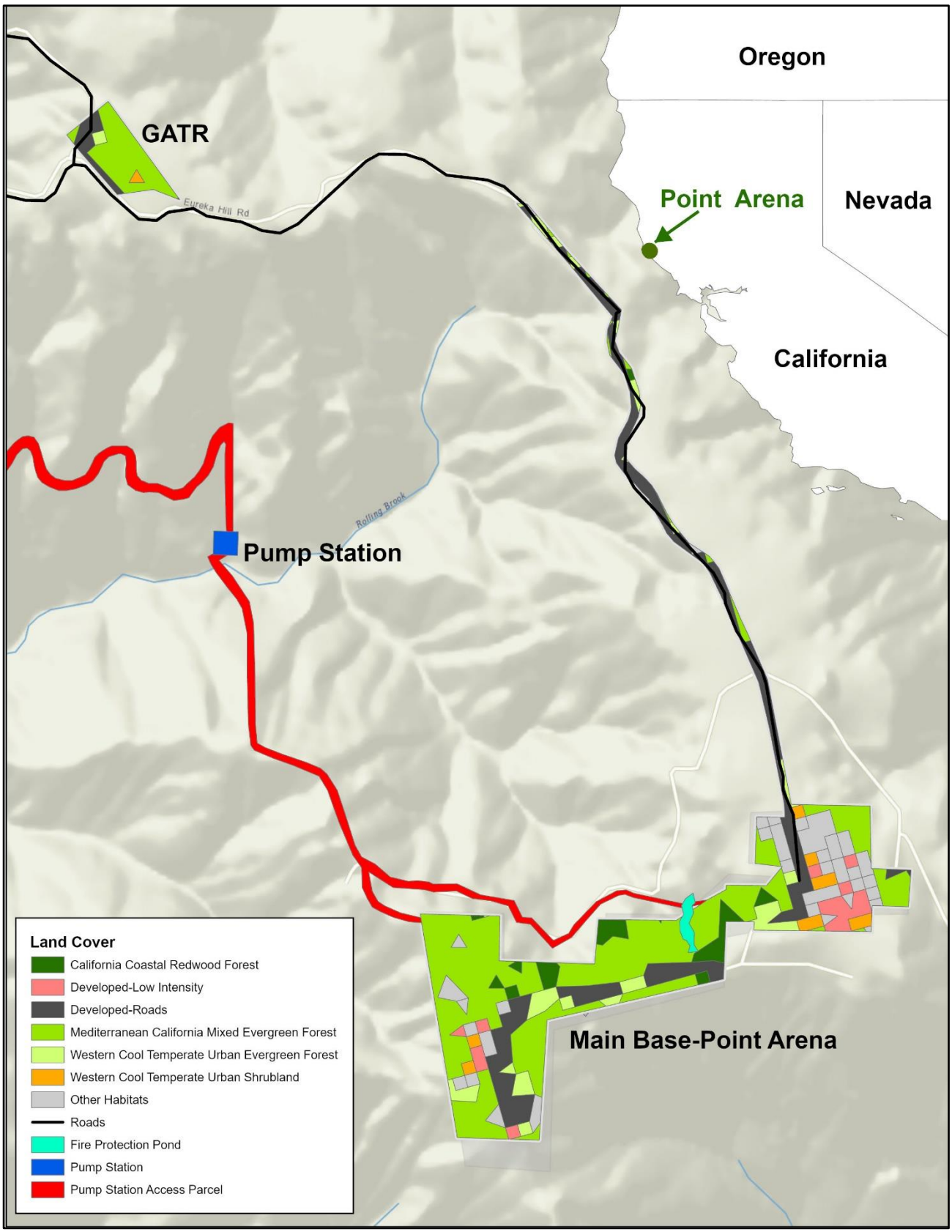

Figure 1. Land cover map of Point Arena for avian surveys

Figure 2. Developed area within Point Arena with abandoned buildings and mowed grassy area. Photo by Doug Raybuck.

Hurlburt

Hurlburt is an Air Force installation located in the Florida panhandle along the U.S. Gulf Coast in Okaloosa County. This relatively small installation is adjacent to the much larger Eglin Air Force Base, approximately 45 miles east of the city of Pensacola. Hurlburt consists of about 6,500 acres including the main cantonment area adjacent to the airfield and runway to the north of Highway 98, as well as a bayside cantonment area south of the highway (Figure. 3). The natural areas outside of cantonment vary widely in habitat composition (Table 2).

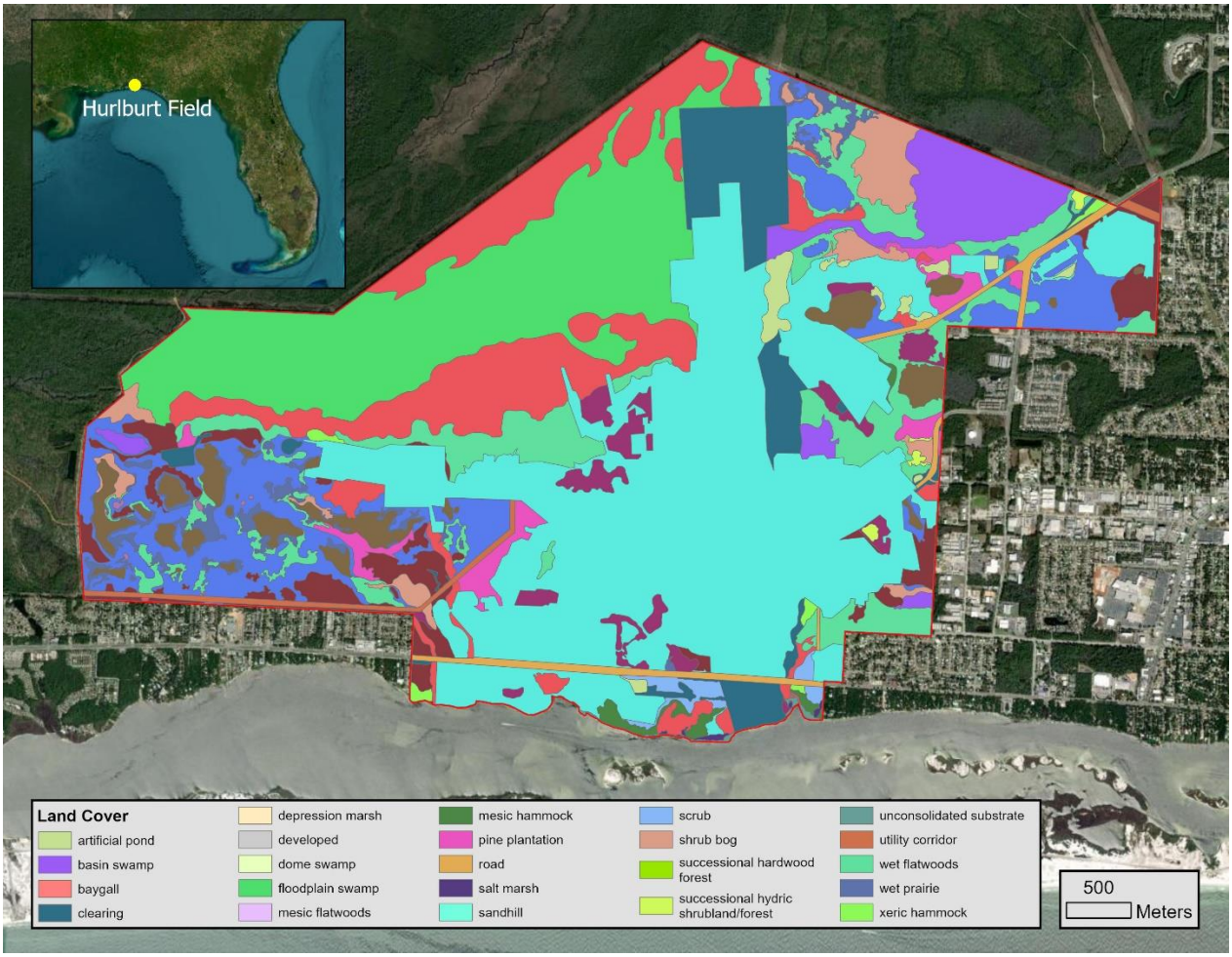

Figure 3. Imagery of Hurlburt along the panhandle of Florida with land cover within the installation boundary (red outline).

Restoration of ephemeral ponds on the Explosive Ordinance (EOD) range of Hurlburt by installation natural resource personnel has been ongoing for the last several years (Figure 4). Vegetation within the wetland sites is being mechanically removed and/or chemically treated. The purpose of this work is to make the wetlands more suitable for reticulated flatwoods salamanders (*Ambystoma bishop*), a federally endangered species that occurs on the base. Additionally, prescribed fire is implemented as a forest management tool at Hurlburt, mainly within the southwestern portion of the base (Figure 5), with many areas not being burned in recent years, if at all.

Table 2. Land cover types acquired from Landfire Existing Vegetation Type (2022) and associated acreage at Hurlburt.

Land Cover	Acres
artificial pond	48
basin swamp	242
baygall	687
clearing	312
depression marsh	3
developed	1985
dome swamp	183
floodplain swamp	953
mesic flatwoods	532
mesic hammock	28
pine plantation	98
road	81
salt marsh	4
sandhill	231
scrub	33
shrub bog	151
successional hardwood forest	133
successional hydric shrubland/forest	9
unconsolidated substrate	5
utility corridor	40
wet flatwoods	501
wet prairie	104
xeric hammock	17

Figure 4. Restored wetland site on Hurlburt. Photo by Chris Petersen March 2024.

Figure 5. Recently burned pine savannah at Hurlburt. This photo was taken by Doug Raybuck at Point Count Station 36 in June 2024.

METHODS

Herpetofaunal Surveys

Point Arena

Since no herpetological surveys have been conducted on Point Arena in several decades because of it being inactive, surveys in 2024 focused on establishing a baseline of amphibians and reptiles present on the site. In addition, there is the potential for the DOD MSS northwestern pond turtle (*Actinemys marmorata*) to be present on the site. Surveys were conducted in partnership with the California Academy of Sciences as part of a larger project to collect specimens and genetic material from herpetofauna on military lands across California. The primary method used to conduct the survey was Visual Encounter Surveys (VES), which involved searching selected wetland and upland habitats for wildlife when the probability of encounter is high (appropriate microhabitat, weather, and time of day for the target species). When surveying for herpetofauna, particular attention was taken to search under fallen logs, loose tree bark, plywood boards, and other discarded materials since these items are known to provide cover habitat for these species. VES occurred mostly during daylight hours but also were performed at night using flashlights and headlamps.

In total, three VES events were conducted at Point Arena. During the survey events, all observations of amphibian and reptile species encountered were recorded, and several species were collected as voucher specimens by the California Academy of Sciences. Species of herpetofauna that were captured by hand or could be photographed without capture were documented using the HerpMapper applet. For each HerpMapper entry, the species' common and scientific name, date, time, latitude/longitude, age class, and a photographic voucher were recorded.

Hurlburt

DOD PARC surveys at Hurlburt focused on determining the presence of two DOD MSS with potential occurrence (gopher frog [*Lithobates capito*] and Florida pinesnake [*Pituophis melanoleucus mugitus*]) in addition to a Florida state-threatened species (Florida bog frog [*Lithobates okaloosae*]). Two MSS (eastern diamond-backed rattlesnake [*Crotalus adamanteus*] and gopher tortoise [*Gopherus polyphemus*]) have both been confirmed present on the installation previously. Two active, three inactive, and two abandoned gopher tortoise burrows were documented during a 2008-2009 survey in sandhill and mesic flatwoods in the far western portion of the Hurlburt property (Florida Natural Areas Inventory, 2009). An eastern diamond-backed rattlesnake was confirmed present on Hurlburt in August 2017 in the base housing area (HerpMapper Record 200204) and more recently in August 2021 during a DOD PARC snake fungal disease survey.

Surveys for the gopher frog and Florida bog frog were conducted primarily via automated acoustic data recorders (Wildlife Acoustics Inc. SongMeter [model SM2+] acoustic recorders fitted with SMX-II acoustic microphones). Two acoustic loggers were deployed in 2023, and three units in 2024 (Figure 6). Each unit was programmed to record three minutes of audio every hour from 7:00 -12:00 pm daily. Thus, each night, one unit would record 18 minutes of audio. Wildlife Acoustics Kaleidoscope software was used to analyze the acoustic recordings from the data loggers. The software allows the user to view the recordings in both spectrograph and waveform format in addition to listening to the files.

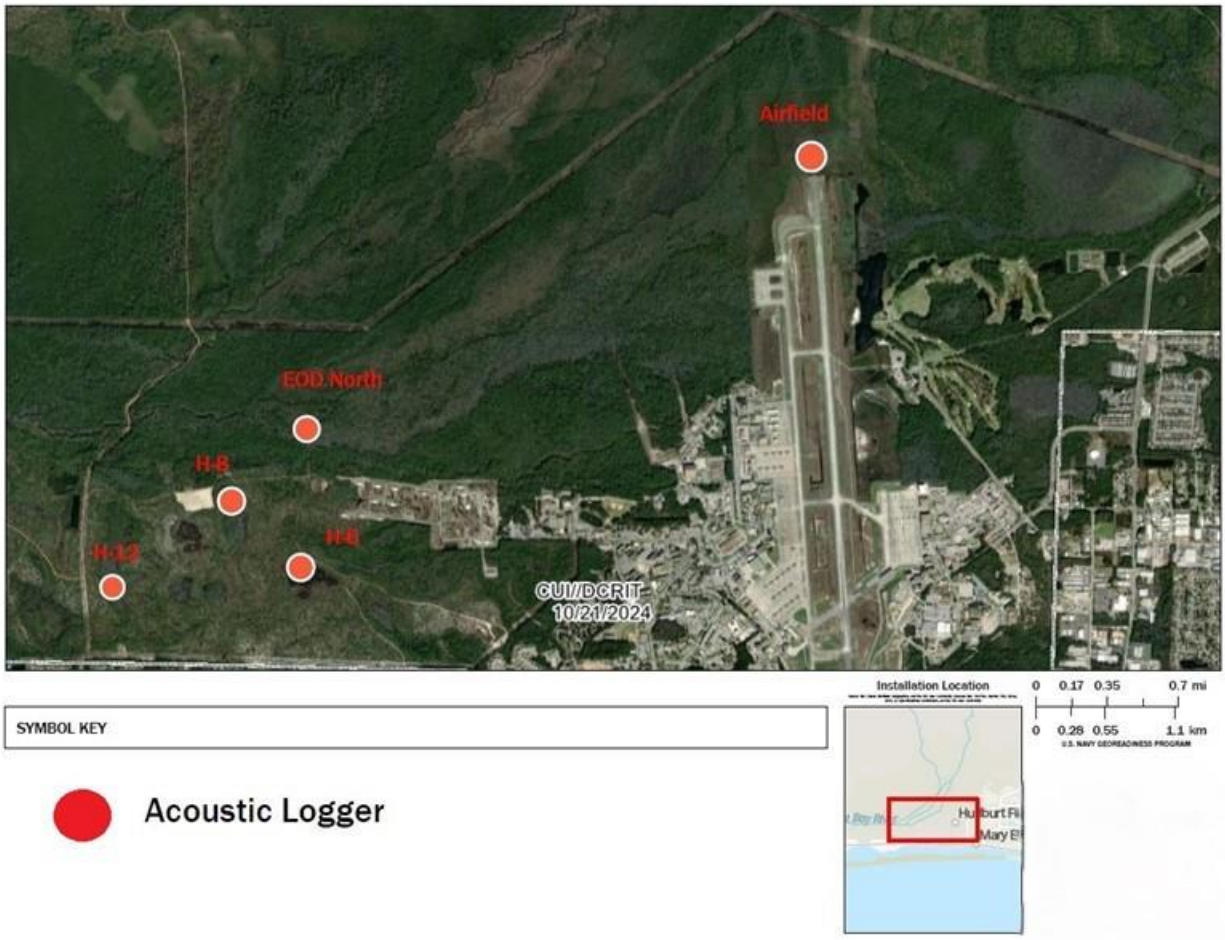

Figure 6. Location of acoustic loggers deployed on Hurlburt in 2023 and 2024.

Figure 7. Upland pine habitat on Hurlburt Field. Picture by Chris Petersen

In total, seven VES events were conducted in and around the restored wetland habitats in the EOD range of Hurlburt. The wetland habitat at the range appeared suitable for the gopher frog. VES for the Florida pinesnake occurred primarily in habitats with well-drained sandy soils, including upland pine forests and sandhills, in the western area of the installation including the EOD range (Figure 7).

During the March 2024 field survey, PARC participated in a survey being performed by the U.S. Fish and Wildlife Services (USFWS) and Amphibian and Reptile Conservation (ARC) biologists for the reticulated flatwoods salamander, a federally endangered species (Figure 8). Funnel traps were deployed in the restored wetland habitats in the EOD range to capture flatwoods salamanders. The traps also captured other amphibian and reptile species which are reported below.

In February 2025, gopher tortoise burrows initially found in the powerline right-of-way during the November 7, 2024 VES were scoped using a burrow camera. This camera system is comprised of a two-inch diameter camera head at one end of a 25-foot hydraulic hose / cable that is connected on the opposite end to a watertight pelican case with a seven-inch color monitor and a battery to power the system. Scoping a burrow consisted of inserting the camera into a burrow using the hydraulic hose, which is rigid and allows for manipulation of the camera angle permitting the camera head to be directed down the twists and turns often found in longer

tortoise burrows. As the camera was inserted into the burrow, it was stopped frequently to observe the screen and see if a gopher tortoise, or other wildlife, occupied a burrow. A burrow was considered “active” if a gopher tortoise was observed and “inactive” if no tortoise was observed and the camera reached the end of the burrow.

Figure 8. DOD PARC, ARC, and USFWS Field Survey Team During the March 2024 Survey. Photo by Chris Petersen

As with those species encountered at Point Arena, herpetofauna that were captured by hand or could be photographed without capture at Hurlburt were documented using the HerpMapper, applet, however no voucher specimens were collected for inclusion into a museum collection at Hurlburt.

Avian Surveys

Point Arena

The three-day in-person avian survey effort from 30 April through 2 May 2024 focused on visual and auditory surveys of all birds detected at Point Arena. Field surveys were conducted by Richard Fischer (ERDC-EL) and Douglas Raybuck (ERDC-EL), along with Kirsten Christopherson (USAF) and Eli Rose (USAF). Because of the small size of the installation, area searches, rather than point counts, were used to maximize the detections of birds. Area searches were conducted in all accessible habitats and spanned a total of 14.5 hours (between 0700 and 1500) over three days.

Additionally, seven autonomous recording units (ARUs; Wildlife Acoustics Minis) were deployed, with spacing >200 m apart (Figure 9), to increase the probability of detecting avian

Figure 9. Locations of Autonomous Recording Units (ARUs) at Point Arena for avian surveys.

DOD MSS over a longer sampling period, or potentially detecting federally threatened spotted owls (*Strix occidentalis*) or marbled murrelets (*Brachyramphus marmoratus*) that are largely nocturnal and were deemed possible breeders at the site based on range maps and presence of some large redwoods (Figure 10) and Douglas fir. In-person surveys were conducted during morning hours until approximately 1100 hrs. Although wind hampered survey conditions, both the main site and the GATR site were each covered twice by two–four surveyors, providing sufficient coverage and likely resulting in the detection of most species.

Figure 10. ERDC-EL biologist Rich Fischer (for scale) standing next to a mature, second-growth coastal redwood at Point Arena. Photo by Doug Raybuck.

The ARUs collected data for 24 hr/d between 30 April and 2 May (the in-person survey period) and beginning 3 May collected data for one-two hours before and one hour after sunrise, and one-two hours after sunset until battery power expired (23 Jun through 1 Jul). Further ARU analysis, using BirdNET (Cornell Lab of Ornithology) avian classification software, made it possible for a thorough breeding season inventory into the month of June. Each of the species detected and classified by BirdNET was confirmed (or rejected as a false positive) by listening to the segments of audio recordings in which the classifications occurred.

Hurlburt

Hurlburt surveys focused on detecting all avian species present at sampling points with a focus on Tier-1 DOD MSS Bachman's sparrow (BACS; *Peucaea aestivali*s), northern bobwhite (NOBO; *Colinus virginianus*), Atlantic least tern (LETE; *Sternula antillarum antillarum* and Southeastern American kestrel (AMKE; *Falco sparverius paulus*), and the Federally Endangered (proposed Threatened) red-cockaded woodpecker (RCWO; *Dryobates borealis)*. The primary method used at Hurlburt consisted of establishing point count stations using a systematic sampling scheme sufficient to sample suitable habitats for the targeted species. The natural areas outside of cantonment vary widely in habitat composition (Table 2). DOD PIF efforts focused on open pine woodlands with herbaceous understory that occurred within the southwestern and northeastern sections of Hurlburt. Targeted MSS and TES within this habitat were BACS, NOBO, and RCWO. Other dominant habitats that were surveyed with less intensity included flood swamps and baygall forests with many of these areas inaccessible. Other mixed hardwood and pine forests contained incredibly dense understories that made traversing through these areas nearly impossible; therefore, several points were relocated to more accessible locations for survey of these habitats (Figures 3, 11, and 12).

A total of 45 point-count stations were sampled using five-minute, fixed-radius point counts conducted by trained biologists Jacob Jung and Douglas Raybuck (ERDC-EL), from 21 May to 23 May (Figure 11). Point-count locations were at least 250 meters apart with only a few exceptions. Point-count surveys consisted of standing in a stationary location and recording all species seen or heard during the five-minute duration of the survey.

Surveys were initiated at sunrise and continued for up to four hours after sunrise, which captures the peak timing for breeding bird activity. Point-count survey locations at Hurlburt covered the accessible portions of the installation which included the majority of pine-savannah habitat that is known to host BACS, NOBO, and RCWO as well as unmanaged forest and swamp habitat that harbors Tier-2 MSS prothonotary warblers (PROW; *Protonotaria citrea*) among other species and bayfront habitats near the cantonment area.

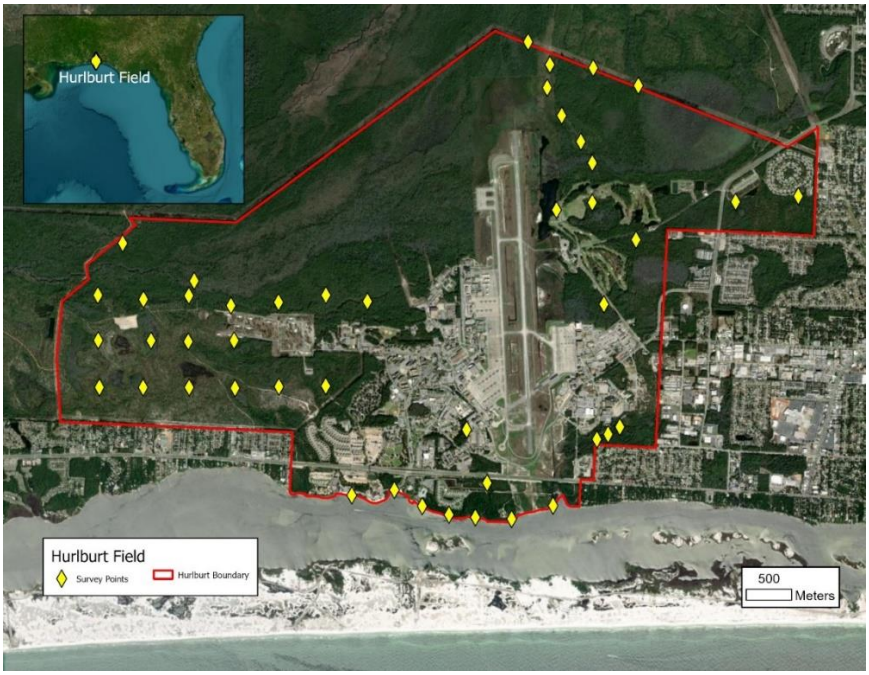

Figure 11. Locations of the 45 avian point counts (yellow diamonds) conducted at Hurlburt from 21-23 May 2024.

Figure 12. Dense understory of unmanaged pine forest at Hurlburt, photo taken during 2024 bird surveys. Photo by Doug Raybuck.

Mammal Surveys

Point Arena

DOD SMI steering committee members David McNaughton (November) and Kirsten Christopherson (April and August) surveyed concurrently with DOD PARC representatives in November 2023, April/May 2024, and August 2024. The methods used were primarily automated acoustic recorders (Titley Scientific Anabat Swifts and Wildlife Acoustics Song Meter 4 [SM4]) and visual encounter surveys in uninhabited buildings (Figure 13). Target MSS included little brown bat (MYLU, *Myotis lucifugus*) and hoary bat (LACI, *Lasiurus cinereus*), species that occur on the USFWS National Listing Workplan (USFWS 2024).

Two acoustic Swift detectors were hung for one night in November 2023. One was placed at the small fire pond near the power substation and petroleum storage tanks. The other was placed along the main road at the interface between housing and the forested area, using canopy cover to direct bats entering and exiting the open skies over the housing area while still capturing any forest foraging bats using the trail network.

Figure 13. Acoustic detectors recording bat calls at the Fire Pond (left) and the gate to the Family Housing area (right) in November 2023. Photos taken by David McNaughton

Four acoustic SM4 detectors were hung (Fire Pond East, Fire Pond North, GATR, and Housing) between two of the Point Arena properties on 30 April and 1 May 2024 for one night each. Three detectors were hung (Fire Pond East, GATR, Housing) for four consecutive nights from 19-22 August 2024. These datasets were more robust than the November 2023 results and were analyzed by the PacWest Bat Conservation International Datahub and National Data Processing

Lab (NA Bat 2024).

Hurlburt

DOD SMI did not survey at Hurlburt due to permanent staff dedicated to bat monitoring onsite. Local species of importance include tricolored bat (*Perimyotis subflavus*), hoary bat, and little brown bat. Habitats found on the installation are important for bat foraging, breeding, and overwintering. Hurlburt falls within the year-round activity zone for tricolored bats where nighttime temperatures remain high enough to potentially prevent long torpor. The base regularly uses acoustic data recorders and netting to derive its species list and monitor population trends.

RESULTS

Herpetofaunal Surveys

Point Arena

Field surveys were conducted at Point Arena during November 7, 2023 by Robert Lovich, California Academy of Sciences, and David McNaughton; August 20-21, 2024 by Rob Lovich and Kristen Christopherson.

DOD PARC network members conducted the surveys on foot and traversed the majority of the Air Force property each day of surveys. At the time of the surveys, there was limited standing water on the facility, and no anurans were detected visually or audibly by ear, so no acoustic loggers or dip netting was conducted. Eleven (11) herpetofaunal species (four amphibians and seven reptiles) were confirmed present during the three survey events (Table 3). No amphibian or reptile MSS were detected.

Table 3. Amphibians and Reptiles Confirmed Present at Point Arena During 2024.

Order	Species Type	Common Name	Scientific Name
Amphibian	Frog or Toad	Baja California Treefrog	*Pseudacris hypochondriaca*
Amphibian	Salamander	Black Salamander	*Aneides flavipunctatus*
Amphibian	Salamander	California Slender Salamander	*Batrachoseps attenatus*
Amphibian	Salamander	Rough-skinned Newt	*Taricha granulosa*
Reptile	Lizard	Northern Alligator Lizard	*Elgaria coerulea*
Reptile	Lizard	Southern Alligator Lizard	*Elgaria multicarinata*
Reptile	Lizard	Western Skink	*Plestiodon skiltonianus*
Reptile	Lizard	Western Fence Lizard	*Sceloporus occidentalis*
Reptile	Snake	Northern Rubber Boa	*Charina bottae*
Reptile	Snake	North American Racer	*Coluber constrictor*
Reptile	Snake	Terrestrial Gartersnake	*Thamnophis elegans*

There are eight species of reptiles and twelve species of amphibians that have the potential to occur

on the property but have not been detected (Table 4). The majority of the species with potential occurrence are snakes (seven species). Future survey efforts will be required to better understand the diversity of herpetofauna on the Air Force property.

Table 4. Amphibians and Reptiles with Potential Occurrence at Point Arena.

Order	Species Type	Common Name	Scientific Name
Amphibian	Frog or Toad	Western Toad	*Anaxyrus boreas*
Amphibian	Frog or Toad	Coastal Tailed Frog	*Ascaphus truei*
Amphibian	Frog or Toad	Sierran Treefrog	*Pseudacris sierra*
Amphibian	Frog or Toad	Northern Red-legged Frog	*Rana aurora*
Amphibian	Frog or Toad	Foothill Yellow-legged Frog	*Rana boylii*
Amphibian	Salamander	Northwestern Salamander	*Ambystoma gracile*
Amphibian	Salamander	Coastal Giant Salamander	*Dicamptodon tenebrosus*
Amphibian	Salamander	Arboreal Salamander	*Aneides lugubris*
Amphibian	Salamander	Wandering Salamander	*Aneides vagrans*
Amphibian	Salamander	Oregon Ensatina	*Ensatina eschscholtzii oregonensis*
Amphibian	Salamander	Southern Torrent Salamander	*Rhyacotriton variegatus*
Amphibian	Salamander	Red-bellied Newt	*Taricha rivularis*
Reptile	Snake	Forest Sharp-tailed Snake	*Contia longicauda*
Reptile	Snake	Ring-necked Snake	*Diadophis punctatus*
Reptile	Snake	California Kingsnake	*Lampropeltis californiae*
Reptile	Snake	California Mountain Kingsnake	*Lampropeltis zonata*
Reptile	Snake	Gophersnake	*Pituophis catenifer*
Reptile	Snake	Aquatic Gartersnake	*Thamnophis atratus*
Reptile	Snake	Common Red-sided Gartersnake	*Thamnophis sirtalis*
Reptile	Snake	Northern Pacific Rattlesnake	*Crotalus oreganus oreganus*

Hurlburt

VES were conducted at Hurlburt during December 13-14, 2024 by Robert Lovich; March 5-7, 2024 by Robert Lovich, Chris Petersen, Lorraine Ketzler (USFWS) and ARC biologists; November 7, 2024 by Robert Lovich and Bill Tate; and February 26-27, 2025 by Robert Lovich and Chris Petersen. A total of 33 herpetofaunal species (18 amphibians and 15 reptiles) were confirmed present collectively during the DOD PARC field surveys, USFWS and ARC reticulated flatwoods salamander surveys, and anuran species recorded on acoustic loggers (Table 5).

The ESA-listed American Alligator was encountered in several wetland habitats of the installation in 2024. This species is Federally protected by the ESA as a Threatened species, due to their similarity of appearance to the American crocodile. In addition, several ESA-endangered reticulated flatwoods salamanders were captured in funnel traps deployed by the USFWS and ARC during field surveys in February and March of 2024.

Table 5. Amphibians and Reptiles Confirmed at Hurlburt. Results include those from acoustic loggers deployed in 2023 and 2024 in addition to species confirmed present using other survey techniques by DOD PARC, USFWS, and ARC.

Order	Species Type	Common Name	Scientific Name
Amphibian	Frog or Toad	Southern Cricket Frog	*Acris gryllus*
Amphibian	Frog or Toad	Oak Toad	*Anaxyrus quercicus*
Amphibian	Frog or Toad	Southern Toad	*Anaxyrus terrestris*
Amphibian	Frog or Toad	Greenhouse Frog	*Eleutherodactylus planirostris*
Amphibian	Frog or Toad	Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*
Amphibian	Frog or Toad	Green Treefrog	*Hyla cinerea*
Amphibian	Frog or Toad	Pine Woods Treefrog	*Hyla femoralis*
Amphibian	Frog or Toad	Barking Treefrog	*Hyla gratiosa*
Amphibian	Frog or Toad	Squirrel Treefrog	*Hyla squirella*
Amphibian	Frog or Toad	Green Frog	*Lithobates clamitans*
Amphibian	Frog or Toad	Pig Frog	*Lithobates grylio*
Amphibian	Frog or Toad	Southern Leopard Frog	*Lithobates sphenocephalus*
Amphibian	Frog or Toad	Southern Chorus Frog	*Pseudacris nigrita*
Amphibian	Frog or Toad	Ornate Chorus Frog	*Pseudacris ornata*
Amphibian	Salamander	Reticulated Flatwoods Salamander	*Ambystoma bishopi*
Amphibian	Salamander	Dwarf Salamander	*Eurycea quadridigitata*
Amphibian	Salamander	Eastern Newt	*Notophthalmus viridescens*
Amphibian	Salamander	Lesser Siren	*Siren intermedia*
Reptile	Crocodilian	American Alligator	*Alligator mississippiensis*
Reptile	Lizard	Eastern Six-lined Racerunner	*Aspidoscelis sexlineata sexlineata*
Reptile	Lizard	Green Anole	*Anolis carolinensis*
Reptile	Lizard	Brown Anole	*Anolis sagrei*
Reptile	Lizard	Common Five-lined Skink	*Plestiodon fasciatus*
Reptile	Lizard	Eastern Fence Lizard	*Sceloporus undulatus*
Reptile	Lizard	Little Brown Skink	*Scincella lateralis*
Reptile	Snake	Southern Watersnake	*Nerodia fasciata*
Reptile	Snake	Glossy Crayfish Snake	*Regina rigida*
Reptile	Turtle	Snapping Turtle	*Chelydra serpentina*
Reptile	Turtle	Chicken Turtle	*Deirochelys reticularia*
Reptile	Turtle	Gopher Tortoise	*Gopherus polyphemus*
Reptile	Turtle	Eastern Mud Turtle	*Kinosternon subrubrum*
Reptile	Turtle	Eastern Box Turtle	*Terrapene carolina*
Reptile	Turtle	Yellow-bellied Slider	*Trachemys scripta scripta*

Two acoustic loggers were deployed on Hurlburt from May-August 2023. One logger was located north of the airfield and the second north of the EOD range. These loggers were placed in habitat that was thought to be suitable for Florida bog frogs. Three acoustic loggers were deployed in the EOD range from December 2023 to August 2024. These loggers were deployed in wetlands sites that contained habitat that appeared suitable for gopher frogs. Approximately 200 hours of audio were recorded collectively on the five acoustic loggers.

In total, 14 species of frogs and toads were confirmed present on the acoustic recorders. Site H-12 and the logger deployed north of the EOD range had the greatest anuran diversity (11 species each). The airfield logger site had the least number of recorded species; however, this was the result of the unit malfunctioning and only recording for a short duration. Neither the Florida bog frog nor gopher frog were confirmed present on the acoustic loggers. The non-native greenhouse frog (*Eleutherodactylus planirostris*) and the native squirrel treefrog (*Hyla squirella*) were both confirmed present in 2023 only at the airfield logger site but were not confirmed present on any loggers deployed in 2024.

All four salamander species confirmed present were found within depressional wetlands in the western section of the installation including the reticulated flatwoods salamander and dwarf salamander (*Eurycea quadridigitata*) (Figure 14). Two-toed amphiuma (*Amphiuma means*), which has been confirmed present during previous survey events on the installation, was not observed during this survey.

Figure 14. Two salamander species (reticulated flatwoods salamander and dwarf salamander) confirmed present in the wetland habitats of Hurlburt. Photos taken by Chris Petersen

Figure 15. Green anole. Photo taken bv Chris Petersen

Of the six lizard species confirmed present, the green anole (*Anolis carolinensis*) was most common throughout the installation (Figure 15). Eastern six-lined racerunners (*Aspidoscelis sexlineata sexlineata*) were observed on the north side of the EOD range only during the survey in November. The eastern glass lizard (*Ophisaurus ventralis*), coal skink (*Plestiodon anthracinus*), and broad-headed skink (*Plestiodon laticeps*) have been documented previously on the installation but were not observed during this survey.

Southern watersnake and glossy crayfish were both detected during this investigation. Both species were encountered in wetland habitats within the EOD range where funnel traps were deployed to capture reticulated flatwoods salamanders. In fact, a glossy crayfish snake was captured in one of the traps. At least nine other species of snakes have been confirmed present on Hurlburt during previous survey efforts, including the MSS eastern diamond-backed rattlesnake.

Figure 16. Gopher tortoise burrow. Photo taken by Robert Lovich

Six turtle species were detected during the 2024 surveys (Table 5). All of the turtle species were encountered within the wetland habitats of the installation except the eastern box turtle and the gopher tortoise, which were found in upland habitats. Several gopher tortoise burrows were documented during the November 2024 field survey within the powerline right of way located in the southwestern portion of the base (Figure 16). At the time of the survey, the vegetation within the right of way had been recently mowed, making the burrows more detectable. A burrow camera was used during the February 2025 survey to determine how many gopher tortoise burrows were active or inactive. Of the 20 burrows scoped using the camera, eight were determined to be active (contained a gopher tortoise) and twelve inactive (no gopher tortoise present).

Avian Surveys

Point Arena

During area searches, 69 individuals comprising 30 bird species were detected on 30 Apr 2024, 49 individuals and 20 species on 1 May, and 66 individuals (27 species) on 2 May (Table 6). The

avian community's species composition as detected by the human area searches (34 total species) was similar to that detected by ARUs (30 species) from 30 Apr to 2 May, with the exceptions of mountain quail (detected by ARUs but not by area searches) and California Quail, Vaux's swift, turkey vulture, bald eagle, red-tailed hawk, and American goldfinch detected during area searches but not with ARUs. No DOD MSS were detected during the 30 April through 2 May period.

Sixteen additional species were detected by the ARUs between 3 May and 25 June (Table 7). Thus, overall, the ARUs detected 46 species compared with 34 species detected during the three mornings of area searches. Of these, one DOD PIF Tier-2 species (olive-sided flycatcher; *Contopus cooperi*) was detected from 8 May through 23 June (no ARU data were recorded after 25 June at the locations where this species was detected). Only three species were detected during area searches but not by ARUs (bald eagle flyover, turkey vulture flyover, and American goldfinch), bringing the combined total species detected by both methods to 49 species.

Hurlburt

In the May 21-31 surveys, 523 individuals comprising 59 bird species were detected at Hurlburt (Table 8). These observations included "flyovers" which include aerial insectivores, and incidental observations of two species (red-headed woodpecker; *Melanerpes erythrocephalus,* and wild turkey (*Meleagris gallopavo*) between point-count surveys. Two MSS (BACS and LETE) as well as one federally endangered species (RCWO) were confirmed present (Figure 17). Additionally, red-headed woodpecker and prothonotary warbler, DOD PIF Tier-2 species, were detected.

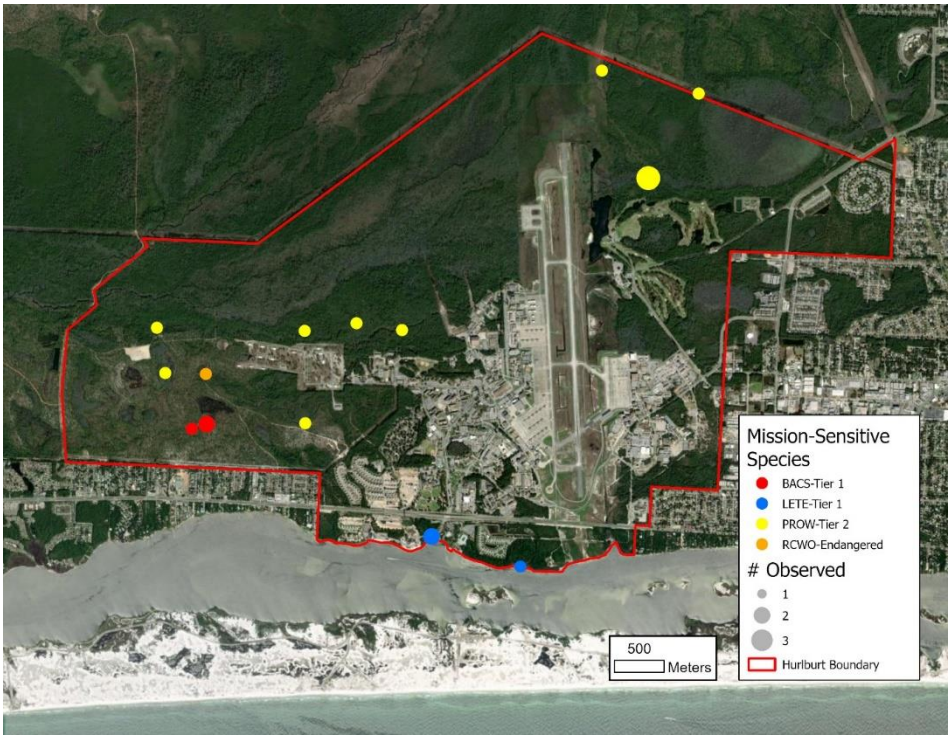

Figure 17. Locations and abundance of the three MSS and one endangered species detected during 21-23 May 2024 surveys at Hurlburt are indicated by colored circles on the map and are referenced in legend.

Table 6. Species detected during area searches and by Automated Recording Units (ARUs) at Point Arena Air Force Station, CA from 30-Apr through 2-May 2024**.**

	30-Apr	1-May	2-May	ARUs	Species	30-Apr	1-May	2-May	ARUs
Mountain quail*	0	0	0	x	Common raven	2	0	2	x
California quail**	2	0	0	0	Chestnut-backed chickadee	3	2	3	x
Band-tailed pigeon	0	1	0	x	Brown creeper	1	3	0	x
Vaux's swift**	6	0	2	x	Golden-crowned kinglet	1	0	3	x
Anna's hummingbird	2	2	3	x	Red-breasted nuthatch	5	0	2	x
Turkey vulture***	1	0	3	0	Bewick's wren	1	1	1	x
Bald eagle***	2	0	0	0	Western bluebird	3	2	2	x
Red-tailed hawk***	1	0	0	0	American robin	1	2	2	x
Acorn woodpecker	3	0	4	x	American goldfinch**	0	0	1	0
Hairy woodpecker	0	0	2	x	Purple finch	1	0	0	x
Northern flicker	0	0	1	x	Dark-eyed junco	4	2	6	x
Western flycatcher	2	4	4	x	Spotted towhee	3	3	2	x
Hutton's vireo	1	1	0	x	Orange-crowned warbler	1	1	1	x
Cassin's vireo	3	1	3	x	Yellow-rumped warbler	2	6	3	x
Warbling vireo	3	3	5	x	Black-throated gray warbler	4	6	4	x
Steller's jay	5	2	1	x	Hermit warbler	1	3	3	x
California scrub-jay	2	3	1	x	Western tanager	2	1	1	x
Black-headed grosbeak	1	0	1	x					

Area Search Effort

2-May	186 min	3.6 miles
1-May	159 min	3.41 miles
30-Apr	326 min	3.42 miles

* Detected by ARU but not during area searches
** Detected during area searches but not by ARU
*** Detected during area searches (bird recorded as a flyover) but not by ARU

Table 7. Species detected by each of seven ARUs deployed at Point Arena Air Force Station, CA from 30 April through 25 June, 2025**.**

Common Name	**Scientific Name**	**First Detected**	***n* ARU**
Acorn woodpecker	*Melanerpes formicivorus*	30-Apr	5
American crow	*Corvus brachyrhynchos*	3-May	1
American robin	*Turdus migratorius*	2-May	7
Anna's hummingbird	*Calypte anna*	30-Apr	3
Band-tailed pigeon	*Patagioenas fasciata*	1-May	7
Bewick's wren	*Thryomanes bewickii*	1-May	5
Black phoebe	*Sayornis nigricans*	31-May	1
Black-headed grosbeak	*Pheucticus melanocephalus*	30-Apr	7
Black-throated gray warbler	*Setophaga nigrescens*	30-Apr	7
Brewer's blackbird	*Euphagus cyanocephalus*	23-May	1
Brown creeper	*Certhia americana*	30-Apr	7
California quail	*Callipepla californica*	30-Apr	2
California scrub-jay	*Aphelocoma californica*	30-Apr	5
Cassin's vireo	*Vireo cassinii*	30-Apr	7
Cedar waxwing	*Bombycilla cedrorum*	14-May	1
Chestnut-backed chickadee	*Poecile rufescens*	30-Apr	7
Common raven	*Corvus corax*	2-May	6
Dark-eyed junco	*Junco hyemalis*	30-Apr	7
Downy woodpecker	*Dryobates pubescens*	1-May	4
Golden-crowned kinglet	*Regulus satrapa*	30-Apr	6
Hairy woodpecker	*Dryobates villosus*	1-May	5
Hermit thrush	*Catharus guttatus*	1-May	6
Hermit warbler	*Setophaga occidentalis*	30-Apr	7
Hutton's vireo	*Vireo huttoni*	30-Apr	7
Long-eared owl	*Asio otus*	23-Jun	1
Mountain quail	*Oreortyx pictus*	30-Apr	5
Northern flicker	*Colaptes auratus*	30-Apr	7
Northern saw-whet owl	*Aegolius acadicus*	16-May	1
Olive-sided flycatcher	*Contopus cooperi*	8-May	4
Orange-crowned warbler	*Leiothlypis celata*	1-May	5
Pileated woodpecker	*Dryocopus pileatus*	1-May	5
Pine siskin	*Spinus pinus*	9-May	2
Purple finch	*Haemorhous purpureus*	30-Apr	7
Red-breasted nuthatch	*Sitta canadensis*	30-Apr	7
Red-tailed hawk	*Buteo jamaicensis*	1-May	1
Spotted thowhee	*Pipilo maculatus*	30-Apr	6
Steller’s jay	*Cyanocitta stelleri*	30-Apr	7
Vaux's swift	*Chaetura vauxi*	30-Apr	5
Violet-green swallow	*Tachycineta thalassina*	2-May	4
Warbling vireo	*Vireo gilvus*	30-Apr	7
Western bluebird	*Sialia mexicana*	30-Apr	6
Western flycatcher	*Empidonax difficilis*	30-Apr	7
Western screech-owl	*Megascops kennicottii*	5-May	6
Western tanager	*Piranga ludoviciana*	30-Apr	7
Wilson's warbler	*Cardellina pusilla*	30-Apr	4
Yellow-rumped warbler	*Setophaga coronata*	30-Apr	7

Table 8. List of avian species detected at Hurlburt, including number of points detected and total number of individuals detected during May 21 – May 23 surveys. Endangered species are highlighted in blue, MSS Tier-1 species in green, and MSS Tier-2 species in orange. Detections refers to the number of point-counts (out of 45 total counts) where the species was detected, while Individuals refers to the total number of individuals that were detected. Red-headed woodpecker and wild turkey were detected between point counts and are considered incidental observations within the list.

Species	Detections (flyovers excluded)	Detections (flyovers included)	Individuals (flyovers excluded)	Individuals (flyovers included)
Carolina wren	30	30	37	37
Northern cardinal	30	30	36	36
Red-bellied woodpecker	24	24	26	26
Tufted titmouse	20	20	25	25
Pine warbler	18	18	22	22
Blue jay	17	17	15	15
Common yellowthroat	16	16	20	20
Great crested flycatcher	16	16	18	18
Eastern towhee	14	14	17	17
Brown-headed nuthatch	11	11	16	16
Prothonotary warbler	11	11	14	14
Mourning dove	10	11	13	19
Blue-gray gnatcatcher	9	9	10	10
Carolina chickadee	8	8	11	11
Fish crow	8	11	12	15
Blue grosbeak	7	7	6	6
Brown thrasher	7	7	8	8
Eastern bluebird	7	7	10	10
Brown-headed cowbird	6	6	6	6
Northern mockingbird	6	6	7	7
Red-winged blackbird	6	6	6	6
White-eyed vireo	6	6	7	7
Downy woodpecker	5	5	5	5
House finch	5	6	5	8
Northern flicker	5	5	5	5
Common nighthawk	4	6	4	6
Yellow-breasted chat	4	4	4	4
American robin	2	2	2	2
Brown pelican	2	2	2	2
Canada goose	2	3	9	10
Eastern kingbird	2	2	2	2
Great blue heron	2	2	2	2
Hooded warbler	2	2	2	2
Mississippi kite	2	3	2	3

Osprey	2	5	2	5
Pileated woodpecker	2	2	2	2
Red-eyed vireo	2	2	2	2
Red-shouldered hawk	2	2	2	2
American crow	1	1	1	2
Bachman's sparrow	1	1	2	2
Barred owl	1	1	1	1
Cattle egret	1	1	40	40
Cedar waxwing	1	1	1	1
Common grackle	1	2	2	9
Chuck-will's-widow	1	1	1	1
Great egret	1	2	1	2
Green heron	1	2	1	2
House sparrow	1	1	1	1
Indigo bunting	1	1	1	1
Least tern	1	2	2	3
Red-cockaded woodpecker	1	1	1	1
Summer tanager	1	1	1	1
Turkey vulture	1	1	1	1
Wood duck	1	3	1	4
Barn swallow	0	2	0	8
Chimney swift	0	8	0	23
Purple martin	0	3	0	7
Red-headed woodpecker	0	0	0	0
Wild turkey	0	0	0	0

Mammal Surveys

Point Arena

A total of 11 of the 16 potential bat species anticipated to occur at Point Arena have been documented (Table 9). Higher effort and better timing may yield additional species to the site, but the site's high perched position may miss species staying closer to insects, nocturnal warm air, and water in the lower elevations outside the stations' perimeters. Additional effort would be warranted for the pumping station if equipment could be kept safe overnight.

The automated acoustic recorders captured 10 of the 11 encountered species, though PAHE was not one of them. The fire pond recorded a few TABR and MYCA in November, but activity was low despite being the only high permanent water source available during that visit (other water sources are available far below in the canyons and lowlands, but these seem far enough away that local bats should be using the pond as a drinking water source). An additional eight species were detected over the fire pond and the GATR in May and August of the next year. TABR was only

Table 9. Species, locations, and timeframes of detected bat species at Point Arena AFS 2023-2024**.**

Species	Code	Fire Pond November	Fire Pond April/May	Fire Pond August	GATR May	GATR August	Housing November	Housing August	Other
Townsend's big-eared bat, *Corynorhinus townsendii*	COTO		x			x			
Big brown bat, *Eptesicus fuscus*	EPFU			x		x			
Hoary bat, *Lasiurus cinereus* *	LACI			x	x	x			
Western red bat, *Lasiurus frantzii*	LAFR			x	x	x			
Silver-haired bat, *Lasionycteris noctivagans*	LANO		x		x	x			
California myotis, *Myotis californicus*	MYCA	x	x	x	x	x			
Long-eared myotis, *Myotis evotis*	MYEV		x	x		x			
Fringed myotis, *Myotis thysanodes*	MYTH		x	x		x			
Yuma myotis, *Myotis yumanensis*	MYYU		x	x					
Mexican free-tailed bat, *Tadarida brasiliensis*	TABR	x				x			
Canyon bat, *Parastrellus hesperus***	PAHE								x**

*DOD Small Mammal Initiative Mission-Sensitive Species
**Canyon bat collected as specimen awaiting deposit to San Diego Natural History Museum.

recorded in migration periods (August and November) despite the abundant unoccupied buildings available for day roosts. Unfortunately, the housing area/forest interface had some form of high frequency interference in November that drowned out the acoustic range for bat species and filled up both storage cards quickly when the recorder turned on at dusk. Another unit posted in the housing area in August did not receive interference, but also failed to record any bat activity.

Signs of unidentified rodent and mesocarnivore (likely coyote, skunk, and raccoon) presence were also observed throughout the property, though formal trapping and survey efforts were not included in these surveys. One kangaroo rat carcass found in the Family Housing area could not be identified to species due to advanced decomposition.

The uninhabited buildings had some sign of limited use (guano), but no live bats were encountered in the former family housing area or most of the operations and support buildings. The most likely species using the former housing are the Mexican free-tailed bat (TABR, *Tadarida brasiliensis*) or big brown bat (EPFE, *Eptesicus fuscus*). USAF maintenance staff retrieved a desiccated carcass of a canyon bat (PAHE, *Parastrellus hesperus*) from the secondary transmitter tower in November 2023. This species likely occasionally roosts in the building during the breeding season (typically April to August), though day or night roosting is

undetermined. Cause of death was not determined, but the specimen is in the process of being donated to the San Diego Natural History Museum.

DISCUSSION

Herpetofaunal Species

Point Arena

During surveys at Point Arena, 11 amphibian and reptile species were detected. The only MSS potentially occurring at Point Arena, the western pond turtle, was not confirmed present at any properties at Point Arena, even though it is within the range of this species. Habitats lacked enough lentic or lotic habitats to support a population because it is high on top of a mountain, and only very small and steep streams drain the properties. It is concluded that western pond turtles are very unlikely to occur at Point Arena, and that multiple surveys for herpetofauna have not confirmed the presence this species.

Even though no amphibian or reptile MSS species were detected at Point Arena, the surveys conducted were of extremely high value for other reasons. U.S. Air Force staff are actively pursuing an Integrated Natural Resources Management Plan (INRMP) update on the properties, and since the installations has been closed for decades, no recent survey information was available. Both the bird and herpetofauna surveys provided an updated survey effort for all species of these two taxonomic groups at the installation. It was also beneficial by collecting specimens to be used by the California Conservation Genomics Project (CCGP). This statewide effort across properties therein will highlight the genetic diversity, and population status of numerous target species, and help to shape conservation efforts and policies for all of California's wildlife, both on and off military installations. Considering California has four million acres of lands that are military owned, it is a substantial benefit to understand the genetic diversity and population health and status on those lands and compared to non-military lands. The specimens collected also help to fill a gap in scientific knowledge to provide museum voucher material for further studies in perpetuity at the California Academy of Sciences, one of the largest museum collections of amphibians and reptiles in the world.

Hurlburt

At Hurlburt, surveys in 2023-2024 resulted in confirming the presence of 33 amphibian and reptile species, representing approximately 69% of all the species of herpetofauna that had been documented on the site during previous survey efforts. The DOD MSS gopher tortoise was documented during this survey and the eastern diamond-backed rattlesnake, also a DOD MSS, had been confirmed present on Hurlburt previously.

Gopher frogs were not observed, captured, or recorded on acoustic loggers during the surveys. Currently, there is no evidence to suggest that gopher frogs are present on Hurlburt. However,

there are several ponds within the EOD range that contain suitable habitat for their occurrence. The extensive vegetation clearing in the EOD range wetlands has greatly increased the habitat quality for both reticulated flatwoods salamanders and gopher frogs. Given that gopher frogs are confirmed present on Eglin Air Force Base located to the north of Hurlburt, and the long distances that this species will travel to breeding ponds, it is possible that gopher frogs may begin to utilize the EOD range wetlands in future years. Therefore, acoustic loggers should be deployed again at these sites within the next three to five years.

Florida bog frogs were not detected on Hurlburt during this survey. This species inhabits shallow, acidic spring seeps; boggy overflows of larger seepage streams; sluggish bends in streams; and pond edges, which there is not an abundance of on Hurlburt. This species has been confirmed present in Okaloosa County, Florida with the nearest population being approximately five miles from Hurlburt according to HerpMapper and iNaturalist records (iNaturalist, 2024; HerpMapper, 2024). Surveys performed by the Florida Natural Areas Inventory in 1996-1997, 2002-2003, and 2008-2009 also did not confirmed this species. As a result, it is concluded that Florida bog frogs are unlikely to occur on Hurlburt.

No Florida pinesnakes were detected during the survey and there is no data confirming its presence on Hurlburt. Additionally, this species was not confirmed present during the 2008-2009 Florida Natural Areas Inventory. This species is confirmed present in Okaloosa County, Florida, and there are many observations of it on Eglin Air Force Base (iNaturalist, 2024; HerpMapper, 2024). The western section of the Hurlburt property contains the primary habitat of this species (well-drained sandy soils, including upland pine forests and sandhills, scrubby flatwoods, oak scrub, dry oak forests). However, as Florida pinesnakes are known to occupy gopher tortoise burrows, the lack of a substantial gopher tortoise population on Hurlburt may limit their presence on the base.

Although no eastern diamond-backed rattlesnakes were detected at Hurlburt during the survey, this species has been documented on the base previously. An eastern diamond-backed rattlesnake was confirmed present on Hurlburt in August 2017 in the base housing area (HerpMapper Record 200204) and more recently in August 2021 during a DOD PARC snake fungal disease survey. Like the Florida pinesnake, the most suitable habitat for the eastern diamond-backed rattlesnake is located the western section of the Hurlburt property, particularly in the EOD range.

During the 1996-1997 Florida Natural Areas Inventory, gopher tortoises were found at two locations: the sandhill in the southeastern portion of the facility, and the sandhill northwest of housing. Neither area supported more than five tortoises during 1996-1997. In a follow-up inventory in 2002-2003, one abandoned burrow was observed in the scrub habitat at the southwest end of the air strip across from the Civil Engineering building. No other tortoise or burrows were located. The last Florida Natural Areas Inventory conducted in 2008-2009 reported the presence of a small population of gopher tortoises found at the far western boundary of Hurlburt (Florida Natural Areas Inventory, 2009). Two active, three inactive, and two abandoned

gopher tortoise burrows were found during that inventory. In addition, the burrows observed during the1996-1997 and 2002-2003 inventories were not relocated.

Of the 20 burrows scoped during February 2025 using the camera system, eight burrows were determined to be active (contained a gopher tortoise) and twelve determined inactive (no gopher tortoise present). This represents the greatest number of burrows and gopher tortoises that have been documented on the base since at least 1996. If the powerline right of way had not been mowed in November 2024, the burrows would have likely not been found because of thick vegetation obscuring them. The mowing that occurred will benefit the species, as they prefer upland habitats that are open and sunlit and contain herbaceous plants. It is recommended that this area be mowed approximately every three years.

Avian Species

Point Arena

A total of 34 bird species were detected during area searches conducted from 30 April through 2 May, and 46 species were identified using ARUs between 30 April and 1 July. While no Tier-1 MSS were confirmed present, the Tier-2 olive-sided flycatcher was confirmed present by ARUs from 8 May through 23 June. Besides olive-sided flycatcher, two other species listed by Partners in Flight on their Yellow Watch List, mountain quail and Vaux's swift, were detected. The fairly diverse breeding bird community at Point Arena suggests that the diverse mix of relatively undisturbed habitats within the installation fence line is providing habitat for these three Yellow Watch List species, as well as other regionally important species of elevated conservation importance (as defined by Partners in Flight within the Northern Pacific Rainforest Bird Conservation Region; see https://pif.birdconservancy.org/ACAD/Database.aspx). These include five Common Species in Steep Decline in the region (American crow, Bewick's wren, Brewer's blackbird, golden-crowned kinglet, and pine siskin), five species (chestnut-backed chickadee, black-throated gray warbler, hermit warbler, western flycatcher (pacific slope), and mountain quail) denoted with Regional Stewardship responsibility, and five species (band-tailed pigeon, orange-crowned warbler, chestnut-backed chickadee, olive-sided flycatcher, and Vaux's swift listed as species of Regional Concern.

The DOD PIF Tier-2 species, olive-sided flycatcher, was a late-arriving Nearctic-Neotropical migrant that potentially bred at Point Arena and spends the non-breeding season in the tropics of southern Mexico, Central America, or South America. It is unknown if the detections at multiple ARUs were for the same individual (or pair) or if there were multiple breeding territories. Regardless of how many individuals used the site in 2024, the presence of coniferous forest edge with tall trees and open canopy cover conditions (with moderate- to large-sized canopy gaps) at the site are conditions favored by this species. Best management practices recommend retaining standing dead trees that do not pose safety hazards, as exposed perches like snags and emergent trees—favored by this species—help maintain habitat conditions that are

likely to benefit it. The active logging (which seemed to be stand thinning and/or fire break creation) encountered while attempting to visit the Pump Station location is also likely to have opened the canopy, potentially providing additional olive-sided flycatcher habitat.

Although no federally listed Northern spotted owls or marbled murrelets were detected, maintaining the largest California redwood and Douglas firs that are currently present on the installation, and allowing the forest within the installation to continue to mature toward old-growth conditions, could also eventually provide potential for higher quality breeding habitat for these federally listed species. These species have been severely impacted by widespread historical clear-cutting of old growth redwood forests, as approximately 2 million acres were reduced (largely in the 20th century) by about 95% to just 100,000 acres that are still present in California in national, state, and local parks (https://www.nps.gov/redw/learn/historyculture/area-history.htm).

Hurlburt

Over the course of three mornings 59 different bird species were detected. Survey efforts were focused on DOD Tier-1 MSS, which included NOBO, BACS, Southeastern AMKE, and LETE. At Hurlburt, the primary habitats surveyed for these species were open southeastern pine woodlands. Three singing BACS were detected in the southwestern portion of the base where habitat (Figure 18) appeared most suitable for both BACS and NOBO; however, NOBO were not detected during surveys. More frequent prescribed fires in the northeastern section of Hurlburt where pine woodlands occur but a grassy understory is lacking or limited (Figure 19) would promote additional habitat for both BACS and NOBO. In addition to prescribed fire, thinnings may be necessary in some areas to reduce the basal area to create a pine savannah woodland. Further management of stands to achieve more heterogeneous tree densities and patchier understories would also likely further improve habitat quality. Hurlburt adjoins Eglin AFB which also has significant populations of BACS and NOBO which allows for increased colonization once habitat conditions become more suitable. Additional colonies of RCWO are likely to exist on the landscape with proper forest management conducive to this species as well.

Two DOD MSS Tier-2 species (red-headed woodpecker and prothonotary warbler were detected at Hurlburt with 14 PROW detected at 11 point-count locations. Due to access issues, only a limited portion of the flooded forest and baygall swamps on the western portion of the installation were surveyed, and these habitats are likely to support additional PROW breeding. Habitat at Hurlburt likely supports additional DOD MSS Tier-1 species such as Henslow's sparrow (*Centronyx henslowii*) and rusty blackbird (*Euphagus carolinus*) during winter and future surveys are warranted for these species. Furthermore, Hurlburt could potentially serve as important migratory stopover habitat for Tier-1 cerulean (Setophaga cerulea) and golden-winged (*Vermivora chryspotera*) warblers, prior to (in fall) or after (in spring) crossing the Gulf of America.

Figure 18. Managed pine savannah habitat that harbored Tier-1 MSS Bachman's sparrows and endangered red-cockaded woodpeckers at Hurlburt. Photo by Doug Raybuck.

Figure 19. Point Count in the northeast section of Hurlburt where habitat is marginal for northern bobwhite and Bachman's sparrow. Prescribed fire to remove woody shrubs and palmetto from understory would be beneficial to improving habitat for these MSS species. Photo by Jake Jung.

Mammal Species

Point Arena

The bat assemblage in the three Point Arena sites includes at least 11 species. One of these species is the MSS hoary bat, which USFWS added to the National Listing Workplan under their own discretion in 2021. This species is believed to be threatened by wind energy, which is not present on site. LACI roost singularly on the sides of trees and structures and transport their young between roost sites. They are an open flier that should be regularly found over the housing area and above the tree canopy.

MYLU, another MSS petitioned and awaiting listing determination was not detected on site. This species is often found on bridges and culverts, occasionally in building or tree roosts, and is suffering critical decline due to white-nose syndrome (WNS). Mendicino County does not have any positive WNS samples on record, though California now has five counties reporting positive samples within the acceptable range set by U.S. National Wildlife Health Center. Most likely these bats, if present, are lower in the topographic landscape.

The lack of TABR during the breeding season was unexpected. Ample available structures and insects provide potential habitat, though the site is close to the northern range boundary for the species. The use during migration (November, August) suggests that TABR may be found in lower elevations in the area instead of the high elevation sites sampled.

Despite the structures and forests, there was no noted colonial occupation or hibernation for any of the species encountered. Evidence left from active bats suggests bats mainly forage at the site and only briefly and rarely roost. Though building roosting appears to be rare, exclusion surveys are a best management practice prior to any building demolition. Many of the family homes have severe roof damage, and the buildings may not provide suitable climate or protection for day roosts. The PAHE found in the secondary tower is not a building-dwelling species. The carcass discovery was unexpected and may have come from an accidental collision or entrapment.

The site is remote, and any bat data gathered may be useful for filling gaps in ranges and natural history between coastal and inland populations. There are opportunities for netting, including trails with canopy cover, the stream, and the fire pond water source. Activity may be higher at lower elevations with greater insect density, but there is certainly native bat use of the site, and more species are likely to be discovered with greater effort.

Hurlburt

The onsite bat team at Hurlburt are experienced and knowledgeable with a high level of effort and a successful monitoring program. DOD SMI did not feel participation in the DOD PARC and DOD PIF survey efforts was appropriate to perform additional bat surveys given the amount of data the installation currently has and gathers. The staff regularly communicates with DOD

SMI, and the Initiative is ready to support the installation however possible in the future**.**

CONCLUSION

Hurlburt and Point Arena each support high biodiversity across birds, bat, reptile, and amphibian taxa. The surveys described in this report documented 49 bird species, 11 bat species, seven reptile species, and four amphibian species at Point Arena and 59 bird species, 15 reptile species, and 18 amphibian species at Hurlburt. This includes confirming the presence of two DOD MSS (one bird, one bat) at Point Arena and five DOD MSS (four bird – two Tier-1, two Tier-2; one reptile) at Hurlburt. Knowledge of the presence of these species and their locations of occurrences will be important to consider for future conservation and management efforts at these installations and will be available for incorporation into future INRMP revisions.

MILIARY MISSION BENEFITS

As outlined by the Sikes Act of 1960, the DOD bears responsibility to manage and maintain wildlife resources, and INRMPs have been developed at DOD installations as installation-specific management guidelines. This responsibility is reinforced by the Migratory Bird Treaty Act, Endangered Species Act, and Executive Order 13186. Periodic wildlife species inventories are essential to managing and maintaining these resources, and knowing which species occur and where they occur (especially MSS and threatened or endangered species) allow the DOD to most efficiently operate in a manner that minimizes conflicts between mission activities and wildlife species of concern. The data collected during these surveys provide updated information for inclusion into the respective installation INRMPs which contribute towards more effective management of the properties to support military readiness and unrestricted use of military lands.

ACKNOWLEDGEMENTS

This effort and report are dedicated to the memory of Ryan Orndorff, our friend, and the head of the DOD Legacy Resource Management Program. This project was funded by the DOD Legacy Resource Management Program. Lauren Scheinberg, and Erica Ely of the California Academy of Sciences provided help in conducting surveys, collecting specimens, and processing and accessioning them at the Academy. Lorraine Ketzler and Bill Tate of the Hurlburt Special Operations Civil Engineer Squadron/Environmental Management Element natural resources USFWS Liaison, and Kirsten Christopherson from Beale Air Force Base provided essential support in accessing the site and providing maps and data for the development of this report.