

Marine Corps Recruit Depot Parris Island

NATURAL RESOURCES CONSERVATION - SMALL INSTALLATION TEAM

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Mission - “WE MAKE MARINES.”

Marine Corps Recruit Depot Parris Island (MCRD Parris Island or the Depot) is a vital asset to our country’s national security. MCRD Parris Island’s mission is making United States Marines since 1915. The Depot accomplishes this mission by training 20,000 quality young men and women each year and transforming them through rigorous basic training, shared legacy, and a commitment to our core values in order to prepare them to win our nation’s battles in service to the country. Additionally, the Depot provides schools to train enlisted Marines as drill instructors and field staff, conducts rifle marksmanship training for Marine officers and enlisted personnel in the southeastern United States, maintains and operates facilities in support of the mission, provides services and housing for Depot personnel and conducts training for Marine Reserves.

Ecology

Parris Island is located within Beaufort County at the confluence of the Broad and Beaufort Rivers about six miles south of downtown Beaufort, South Carolina. Parris Island consists of a mixture of hummock islands, salt marsh, tidal creeks and rivers, upland habitat, tidal ponds and developed cantonment area totaling about 8,047 acres, with approximately 4,500 acres of wetland. Wetlands consist of mainly tidal salt marshes, creeks and rivers, and serve as nursery grounds for shrimp, crabs, and fish, which sustain most commercial and recreational marine fisheries in the area. The average elevation in this area is approximately five feet above sea level and most of the Depot is within the 100-year flood plain.

Program Highlights

The Natural Resources Staff

The Depot has a small, but dedicated staff that conducts extensive management of Parris Island’s diverse Lowcountry ecosystem. This team conducts unwavering daily management of resources to include coastal wetlands, essential fish habitat, migratory birds, timber/forested areas, and Conservation Law Enforcement. In addition to this overarching management of resources, the Natural Resources (NR) team has developed extensive monitoring and protection programs for species that include bald eagles, eastern diamondback rattlesnakes, fox squirrels, and sea turtles. Once initiated these focused efforts typically last decades providing not only benefits to the federal government’s protection of resources entrusted to it, but also contributing to the great scientific community’s research. Focusing not just on the current environment, the Depot NR team has taken a lead in the preparation for an uncertain future by developing studies and programs to inform the Depot’s leadership on proactive courses of action to ensure the continued resiliency of Parris Island’s resources in response to climate change impacts. Lastly, the Depot’s NR team has revived outreach efforts by developing passive parks that educate tenants on the ecosystem of the Lowcountry while simultaneously increasing quality of life

through its species diversity and beauty.

Resources Management Programs

The MCRD Parris Island Integrated Natural Resources Management Plan is robust and incorporates long-term monitoring and management of several resources. The result of these decades long effort of monitoring, the Depot has a robust baseline data set for wetland and coastal resources, essential fish habitat, migratory bird population assessments, and other ecological change indicators. The Forestry Management Plan is aggressively employed in order to preserve critical training operations, invasive species, and prevent wildfires. Management efforts also include review and approval of all potential impacts to NR through a Request for Environmental Impact Review, National Environmental Policy Act, and Depot Ground Disturbance Requests, these effort ensure protection of our nation's resources. Annual self-audits ensure our procedures are addressing requirements and adequately protecting assets.

Wetlands and coastal resources

Parris Island protects and enhances wetlands and coastal resources through best management practices for stormwater and erosion control, and analysis of projects to avoid and minimize environmental impacts. The Depot's wetland resources consist of saltwater tidal wetlands and few acres of freshwater wetlands consisting of wet flatwoods and ephemeral wetlands. The marsh and creeks support a wide diversity of finfish and nursery grounds for juvenile stages of many species. The adjacent estuaries also contain shellfish resources (whelks, oysters, clams, mussels), shrimp, and crab species. The threatened wood stork, egrets, herons, roseate spoonbills, and other migratory shorebirds such as red knots, plovers, sandpipers forage in the installation's marshes, tidal creeks, salt flats, brackish golf course ponds and Third Battalion Pond (saltwater impoundment).

Essential Fish Habitat Conservation

Federal agencies are required to identify and protect important marine and fish habitats. Fishery management councils, with assistance from the National Marine Fisheries Service have identified/delineated essential fish habitat (EFH) for managed species. Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. The Depot estuary and marine habitats are considered EFH's. The Depot's management actions are reviewed for their impacts to marine habitats during annual self-audits and project specific Requests for Environmental Impact Reviews. Management of firebreaks, forest management practice, sand stormwater control have positive effects on EFHs by reducing soil erosion and runoff of fertilizers and pesticides into coastal marshes.

Migratory birds

Migratory birds are abundant and diverse, with over 150 species detected during surveys. Several areas of the Depot have been identified as important to migratory birds, including the maritime forest, open tidal flats, Third Battalion Pond saltwater impoundment, hummock islands, and shrub/scrub edge communities. State, Federal and Non-Federal Entities have developed lists of priority species many of which live on Parris Island; these include the bald eagle, painted bunting, brown-headed nuthatch, colony nesting wading birds and shorebirds. Migratory bird data help understand the effects of climate change and effects of our management actions.

Bluebird nesting activity has been monitored for approximately 23 years by Natural

Resource personnel. Results indicate a healthy thriving population on the Depot with approximately 4,600 fledglings produced. Sixteen osprey nesting platforms were erected in the 1990's by Marine personnel and have been monitored and maintained by the Natural Resource personnel. Three nest sites are located on abandoned power poles and monitored along with the platform nests. For the reporting period of FY20/21, only two hatchlings out of 11 total fledged from the nests. The Depot believes eight nest sites that had hatchlings and eggs were heavily predated by crows and owls. In support of outreach efforts, the Depot reports nest activity, nests initiated and fledglings produced via a local/regional nest monitoring group.

Four bald eagle nest sites are monitored annually throughout the nesting season with nest activity and production reported to the South Carolina Department of Natural Resources (SCDNR). For the reporting period of FY20/21, a total of 9 eaglets were fledged. Since monitoring began in the mid-90's over 75 eaglets have been fledged. The Depot's NR staff collaborates with stakeholders on the Depot to provide education on nesting activity and best practices to ensure successful nesting. As a result of this coordination, Marines decided to temporarily re-locate proposed recruit training activity from an area adjacent to a bald eagle nest site after learning of the proximity of the site to the proposed recruit training and the extent of the nesting season.

Timber/Forested Areas

Parris Island consists largely of a mixture of salt marsh, upland habitat and developed cantonment area totaling about 8,000 acres. Of the upland habitat (~3,500 acres), a mixture of maritime forest (oaks, palmetto, pines), pine forest (slash/loblolly) and mixed hardwood-pine forest exists totaling ~1200 acres. The Depot is broken up into multiple areas by salt marsh, islands, roads, developed areas and recruit training area. The Depot's Natural Resources program aggressively manages the pine forests within the training areas with thinning and burning for income, wildlife habitat, and operational priorities. The Depot conducts timber thinning and prescribed burning for 600 acres of the pine forests to support training areas, provide wildlife habitat and generate revenue. Since 2003, the Depot has conducted seven major timber thinning operations to improve recruit training area, improve timber stands and improve wildlife habitat. Approximately 500 acres (Page Field, E-beach) are 50-60 year-old slash pines that have been thinned down to about 25-60 basal area. Another 125 acres of 50-60 year old slash pine/mixed hardwood have also been thinned down to 25 – 60 basal area. The Depot's goal is to burn between 150-300 acres annually (usually winter/early spring) to lower wildfire potential by burning short fuels such as leaves/pine needles, downed limbs and leftover timber debris, especially in the training areas. Since 2007, the Depot has conducted five major controlled burns in these areas, burning approximately 100-200 acres rotated among the areas. For the reporting period of FY20/21, the Depot was only able to burn ~100 acres of recruit training area. These continued actions by the NR staff have created a variety of habitats to support diverse populations of wildlife while at the same time providing quality recruit training areas.

Species of Interest

The Depot actively monitors eight threatened and endangered species. Our studies are collected by NR staff, reported to regional and national databases. These data are a trusted source of information within the scientific community and have been used recently when the eastern diamondback rattlesnake, a species of State concern, was a species under consideration for proposed listing under the Endangered Species Act (ESA).

Eastern diamondback rattlesnake (*Crotalus adamanteus*) - \$52K

NR personnel have monitored its resident eastern diamondback rattlesnake (EDB) population for 14 years, employed an adaptive research program, and fostered collaborations among universities, non-profits and the South Carolina Department of Natural Resources. Research conducted at the Depot has placed the USMC at the forefront of EDB management and conservation since 2008. The results of ongoing population monitoring and tracking on the Depot indicate that the maritime rattlesnake population on Parris Island behaves differently than the inland populations. Long-term monitoring of this poorly understood species has allowed Natural Resources personnel to balance public safety and the EDB conservation in a proactive manner. Intensive population monitoring has yielded important information, such as it takes 5-6 six years to reach reproductive maturity, however, adult EDB survival is high. This work is related to ongoing comprehensive surveys for other reptiles and amphibians aboard the Depot. Baseline surveys and understanding these sensitive and declining animals are the first steps to proactively managing the resources around the recruit training mission. The primary research goal is to guide conservation and decrease the probability that the species' candidacy for protection under the ESA, which could conflict with military training operations. Consequently, these findings and science-based recommendations were provided to the United States Fish and Wildlife Service when the species came under review for protection under the ESA.

Research conducted at the Depot are directly applicable to other DoD installations that are located within the EDB's range and use similar management practices (e.g., Camp Lejeune, Eglin Air Force Base, and Camp Shelby) used to minimize potential conflicts between military training operations and conservation. Furthermore, these research results will become increasingly important given the predicted effects of climate change and the projected impacts of sea level rise on coastal habitats (e.g., increased human-wildlife conflicts resulting from species redistributions in response to shifting climate conditions and habitat loss). The Depot continues to encourage collaborations and employ an adaptive research approach.

Southern Fox Squirrel Re-Introduction (*Sciurus niger niger*) - \$55K

In 2016, the Depot collaborated with Marshall University, Nemours Wildlife Foundation and other private properties in the South Carolina Lowcountry on a translocation study. Between January 2016 and June 2017, 63 Southern Fox Squirrels were trapped and moved to the Depot as part of a research project. The purpose of this study was to mitigate Southern Fox Squirrel population decline and establish a new breeding population. Southern Fox Squirrels are closely tied to longleaf pine ecosystems, characterized by an open canopy and sparse understory. They were relocated on Parris Island because it is within their historic range, and neighboring Sea Islands currently support stable populations. In FY20, another research project succeeded in capturing and placing transmitter collars on 32 individuals. Of those, 20 were determined to be native to the Depot, and of those, eight were juveniles. Additional funds were acquired in FY21/22 for Marshall University to continue live trapping, attaching collars, monitoring and tracking these individuals to determine if the population is sustainable, i.e. observed continued nesting, breeding and young squirrels.

Loggerhead Sea Turtle nesting – First Identification on MCRD Parris Island (*Caretta caretta*) - \$5K

Recent significant storm events, Hurricane Matthew, 2016, and Tropical Storm Irma, 2017, caused substantial erosion on the Depot's western and southwestern shorelines, washing away shell, salt marsh and mud. These events exposed approximately 4,000 linear feet of shallow sandy beach. Previously, the NR staff observed sea turtles transiting and foraging around Parris Island, but no active nests had been recorded. However, as a result of these weather events creating an ideal nesting habitat the Depot awarded a contract in FY2021 to a federally and state permitted non-governmental organization to identify and monitor the potential sea turtle nesting sites. Shortly after monitoring began the Depot identified two active nests and several false crawls in June of 2021. Following this initial finding, six more subsequent nests were located in July for a total of eight nesting sites. This marked the official recording of loggerhead sea turtles on Parris Island. Overall, out of the eight nests, six hatched, yielding 354 hatchlings. The extensive and daily monitoring of the Depot's habitat by the NR staff led the successful this successful identification and future protection of the Depot's newest protected species.

Bat surveys – First comprehensive surveys conducted at the Depot - \$25K

In 2021, the Depot awarded its first comprehensive bat survey to determine if federally threatened, endangered, or candidate species are present and to identify all bat species using a variety of habitat types on the Depot. In June 2021, a Depot contractor deployed acoustic detectors throughout Parris Island in order to determine presence of any potential federally threatened, endangered, or candidate bat species. In October 2021, initial results revealed that a total of 183,523 bat calls were identified and 139,119 were further analyzed to determine the species. Overall, eleven species were likely present, including Rafinesque's big-eared (*Corynorhinus rafinesquii*), big brown (*Eptesicus fuscus*), eastern red (*Lasiurus borealis*), hoary (*Lasiurus cinereus*), northern yellow (*Lasiurus intermedius*), southeastern (*Myotis austroriparius*), little brown (*Myotis lucifugus*), northern long-eared (*Myotis septentrionalis*), evening (*Nycticeius humeralis*), tricolored (*Perimyotis subflavus*), and Brazilian free-tailed bats (*Tadarida brasiliensis*). In FY22, the Depot will conduct mist nets surveys to verify species, in order to develop future bat management plans and inform future consultations with the U.S. Fish and Wildlife Service (USFWS). Similar to exceptional expertise and intuition utilized to find the Depot's first sea turtles, the bat surveys represent another instance of the continuous efforts by the Depot staff to protect all natural resources under its care.

Climate Change & Resiliency Investigations

The ongoing effects of climate change and extreme weather events represent a potential significant challenge to the Depot's military mission and the protection of its natural resources. In FY20, the Depot was the first to complete an iteration of the Navy Facilities and Engineering Command's Climate Change Adaptation and Resilience (CCAR) study. The results validated the ongoing efforts of the NR staff to gather a variety of diverse data to inform the development Depot's climate change and resiliency projects.

Herpetofaunal and Small Mammal Surveys – First comprehensive mammal survey and follow-up herpetofaunal surveys - \$107K

Coastal effects of climate change include sea level rise and increased tropical storm frequency and severity. Wind and flood damage caused by tropical storms are acute ecological disturbances that can radically change community composition. Species inhabiting sea islands are particularly vulnerable to these effects because their inherently small populations are

vulnerable to environmental and demographic effects on their population numbers and health. The cumulative effect of multiple storm surges will likely include a shift in community composition that reflects environmental tolerances, population growth potentials, and recolonization rates. Such shifts in species composition can manifest as trophic effects when prey populations crash because of environmental disturbance. Apex predators, such as the eastern diamondback rattlesnake (EDB), are particularly vulnerable to these bottom-up trophic effects.

Parris Island presents a unique opportunity to collect and build on baseline data for sea island habitats in light of increased tropical storm frequencies. Specifically, the Depot built upon the herpetofaunal inventory and rattlesnake monitoring data collected on the Depot between 2008 and 2021 to examine community-level changes as they relate to tropical storms and habitat alterations. As a component of the herpetofaunal community, amphibians have long been recognized as indicator species of environmental change. Thus, they serve as appropriate models for examining turnovers in community composition resulting from disturbances.

On the Depot, small mammals comprise the prey base for large-bodied snakes, particularly the EDB. Long-term EDB monitoring data collected from 2008 to the present has indicated that, in recent years (2018-2021), the EDB population has experienced an overall decline in body condition, suggesting that the EDB prey base has changed or has been diminished. In collaboration with Marshall University's eastern diamondback rattlesnake research the Depot has sought to understand acute and cumulative effects of tropical storms on sea island faunal communities, and to assist the Depot in meeting conservation goals.

In advance of the current work that began at the end of FY21, the researchers initiated trapping studies and system designs in FY20 that resulted in the current study design. A stratified random sampling protocol is based on locations previously (2009-2011) sampled and by incorporating storm surge exposure and habitat changes, the following goals are established: assess changes in the Depot's herpetofaunal community that occurred between 2012 and 2022, and assess changes in amphibian and reptile occurrence and abundance as they relate to tropical storm damage and habitat alterations; collect small mammal occurrence and abundance data, providing a baseline framework for future monitoring efforts; and examine small mammal data in relation to EDB body condition, distribution, and habitat to assess how tropical storms and habitat alterations potentially affect coastal EDB populations. Results and analysis will be used to determine amphibian and reptile occurrence and abundance as they relate to storm damage and habitat alterations that occurred since the initial herpetofaunal survey in 2009-2011. The research will also provide the Depot with a comprehensive small mammal and herpetofaunal inventory.

Vegetation Survey and Assessment to Vulnerability of Sea-level Rise - \$75K

A result of the 2020 Climate Change Adaptation and Resiliency study was the identification of several areas of vulnerability along our shorelines. The Marine Corps and Dr. Kyle A. Palmquist at Marshall University are collaborating to provide a baseline vegetation assessment and sea level rise vulnerability study. The project was awarded funds in 2021 and will begin work spring 2022 and to be completed in 2024. Coastal vegetation provides important ecosystem services, including storm protection, erosion control, and habitat for wildlife. These complex, highly zoned plant communities are structured by multiple environmental factors including salinity, elevation, soil texture, soil moisture, exposure, and light availability. Sea-level rise and intensification of the hydrologic cycle, including frequency and intensity of storms is expected to affect the distribution and composition of coastal vegetation in the future, with important implications. The proposed work has three primary goals: 1) conduct a vegetation

survey of the Depot to document the flora and plant communities in relation to environmental factors, 2) establish a network of vegetation monitoring plots to assess the potential future impacts of sea-level rise, and 3) understand how sea-level rise and associated factors have impacted coastal vegetation on the Depot up to present.

Santa Elena Shoreline Stabilization Study - \$225K

The Charlesfort-Santa Elena Site is an important early colonial archaeological site on Parris Island. It contains the archaeological remains of a French settlement called Charlesfort, settled in 1562 and abandoned the following year, and the later 16th-century Spanish settlement known as Santa Elena. The Spanish remains include a fort built directly on top of the abandoned Charlesfort remains. This fort and other nearby structures have been called at various times, Fort San Marcos, Fort San Felipe, and have the designated archaeological site identifiers 38BU51 and 38BU162. Because of their remarkable state of preservation, and their importance in understanding early French and Spanish colonial practices, the site was designated a National Historic Landmark (NHL) in 2001. The Depot's NHL is only one of four in the USMC. Currently, the site is experiencing significant erosion along the shoreline, putting cultural and natural resource assets at risk.

In FY21, the Depot awarded a contract to study the erosional forces occurring at this significant National Historic Landmark and expects to receive the results by FY23. In this contract, approximately 2,500 linear feet of shoreline along the Beaufort River and Port Royal Sound on the eastern boundary of the Charlesfort-Santa Elena historic site will be evaluated to determine the severity and source of erosion at the site. This study will develop the necessary actions to implement living shorelines or a hybrid living shoreline/hard structure alternative into an integrated and sustainable shoreline stabilization plan to reduce the loss of sediment thus protecting USMC property, natural and cultural assets to the maximum extent feasible.

Outreach: Public Involvement

In FY21, the Depot reestablished an Earth Day celebration by initiating the establishment of three native plant parks and trail systems. Earth Day had not been celebrated since 2015. These newly established parks and trails will increase visibility of Depot environmental stewardship efforts and create a natural resource engagement area over the next five years. Each Earth Day component will be added by volunteers and are integrated within the Depot's Master Plan to create a waterfront/marsh perimeter trail system. Benefits of developing the park and trails include increased storm water resiliency; active volunteer participation; wildlife habitat; and additional areas for employees, residents, and families to enjoy. Some native species diversity and features highlighted within the park include live oak, yaupon holly, wax myrtle, beautyberry, dogwood, butterfly/pollinator garden, park benches, paths, educational and interpretive signage. In FY21, the Depot designated a passive park site, planted three live oak trees, and constructed a new nature trail approximately 1,350 feet in length.

In addition to the Earth Day outreach effort, the Depot also has established, and maintains, several interpretive trails and boardwalks for both natural and cultural resources. Two are related to, and interpret, natural and cultural resources around the Charlesfort/Santa Elena National Historic Landmark. Two others are located along the salt marsh habitats and interpret the habitat, flora and fauna associated with that largest category of land that comprises the Depot. In addition to these passive use facilities, NR personnel conduct occasional outings/outreach for birding groups and butterfly walks.