Wallops Island Protected Species Monitoring Plan

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Prepared for:
National Aeronautics and Space Administration
Wallops Flight Facility
Wallops Island, Virginia

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CHANGE RECORD SHEET

ISSUE	DATE OF RELEASE	REASONS FOR REVISION	APPROVAL
1	5/06/10	**Baseline Document**	
2	2/02/11	**Document amended to indicate intention to survey for additional species of interest.**	
3	3/21/11	**Addition of the Launch Range Biological Opinion Terms that were related to monitoring.** **Addition of Sea Turtle Hatchling and Live Hatchling Procedures.**	**Sw**
4	5/2/11	**Stranding Center's new phone number**	

TABLE OF CONTENTS

APPENDICES

1.0 ACRONYMS

ATV	All Terrain Vehicle
DGIF	Virginia Department of Game and Inland Fisheries
cm	centimeter
CNWR	Chincoteague National Wildlife Refuge
ESA	Endangered Species Act
GPS	Global Positioning System
km	kilometer
NASA	National Aeronautics and Space Administration
ORV	Off-Road Vehicle
UAS	Uninhabited Aerial System
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VAQ	Virginia Aquarium
WFF	Wallops Flight Facility

2.0 INTRODUCTION

Section 7 of the Endangered Species Act (ESA) directs all federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat. Section 7 applies to management of federal lands as well as other federal actions that may affect listed species.

The National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) owns and manages Wallops Island in Accomack County, Virginia. Wallops Island provides habitat to a variety of protected species. This protected species monitoring plan describes the collection of information consistent with Section 7 of the ESA and will facilitate consultations between NASA WFF and the USFWS Virginia Field Office.

This monitoring plan details a methodology to monitor protected species within the property boundaries of Wallops Island. Protected species covered by this plan include, the federal endangered green sea turtle (*Chelonia mydas*) and leatherback sea turtle (*Dermochelys coriacea*); the federal threatened piping plover (*Charadrius melodus*), loggerhead sea turtle (*Caretta caretta*), and seabeach amaranth (*Amaranthus pumilus*); and the federal candidate species red knot (*Calidris canutus*). Included in the monitoring plan is the marine mammal and sea turtle stranding program managed at WFF in cooperation with the Virginia Aquarium (VAQ). Monitoring on the WFF Main Base and Mainland are not included as part of this plan as no habitat exists on either of these land masses to support the protected species listed above.

3.0 PROTECTED SPECIES MONITORING AREAS

Protected species monitoring will be conducted on four areas of the Wallops Island Shoreline: the North End, Recreational Beach, Sea Wall, and the South End. These four monitoring areas are illustrated in Figure 3-1.

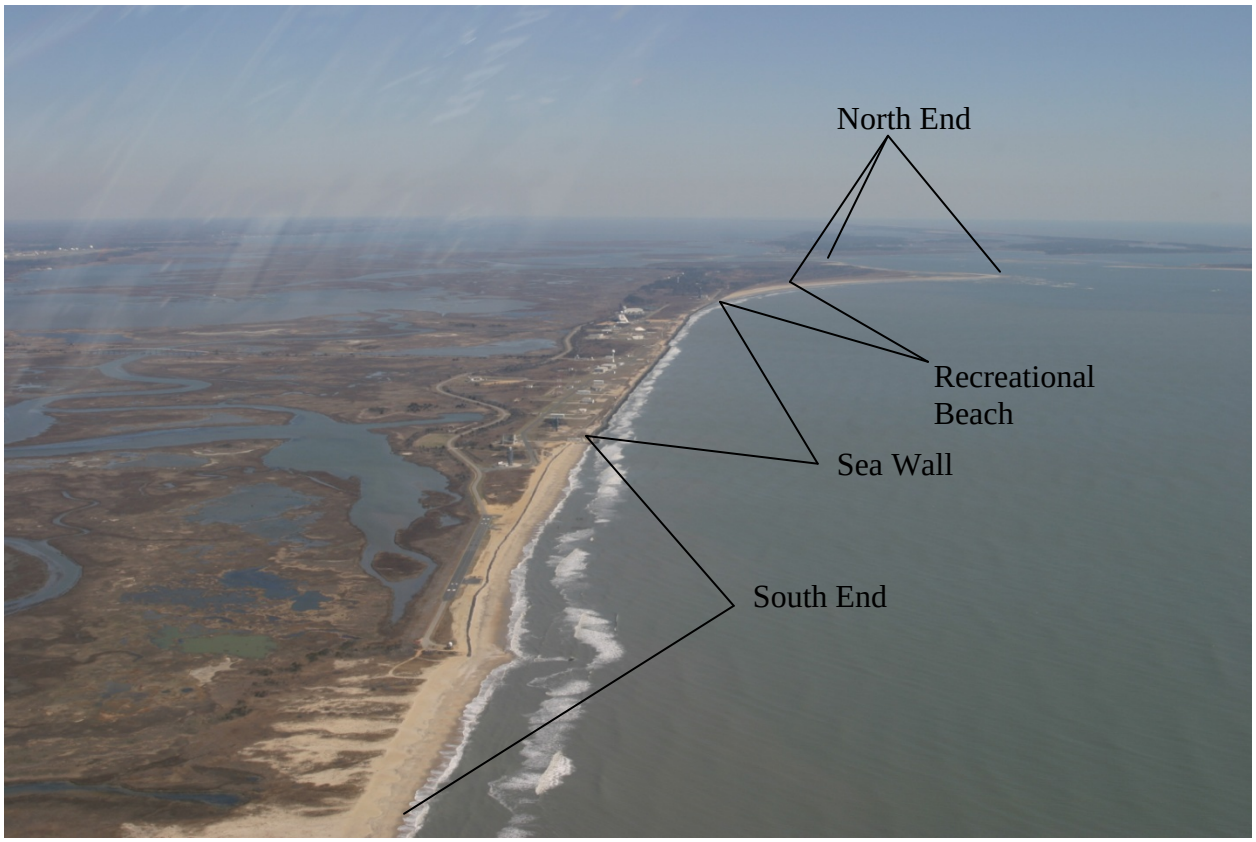

Figure 3-1 Four Protected Species Monitoring Areas on Wallops Island

3.1 North End

The North End refers to the beach on the northern tip of Wallops Island facing the Atlantic Ocean. The monitoring area begins at the northernmost point of Wallops Island and extends south to the pedestrian barrier for the Piping Plover Nesting Area, making up 3.9 kilometers (km) (2.4 miles) of coastline. It is comprised of tidal flats and pools, a large tidal pool, small-vegetated dunes, wide beach areas, and shrub-scrub habitat. This area is favored by piping plovers and red knots. It is closed to all recreational use and designated as the Piping Plover Nesting Area from March 16 through August 31, or until the last plover chicks fledge. During this time, “Area Closed” signs are posted perpendicular to the ocean to restrict pedestrian access.

Vehicle use extends as far north as the large tidal pool and then an all terrain vehicle (ATV) may be used to monitor areas north of that point. Monitoring staff will not proceed past the explosion hazard signs that are placed on the northern end of the beach where the primary dune begins. The North End monitoring area is illustrated in Figure 3-2.

Figure 3-2 North End and Recreational Beach Monitoring Areas

3.2 Recreational Beach

From the pedestrian barrier (seaward of the helipad), south to the sea wall (seaward of the Navy Aegis Building V-24), the Recreational Beach consists of approximately 1.6 km (1 mile) of primary and secondary dunes with a flat sandy beach along the ocean. This area has been historically used by sea turtles for nesting. The recreational beach area may be used only during non-operational hours between sunrise and sunset. Nonoperational hours are normally weekends and holidays and before 7:30 a.m. and after 4:30 p.m. on weekdays. Launch activities may require additional closure of the recreational beach area outside of normal working hours. Recreational beach users are required to notify the Island Gate security if anyone is observed violating WFF's use policy by littering; having open fires, pets, or weapons; or accessing other areas that are off limits due to operations or explosion hazards. Failure to comply with beach use restrictions will result in closure of the Island for recreational use. The Recreational Beach monitoring area is illustrated in Figure 3-2.

3.3 Rock Wall

The Rock Wall extends from the Recreational Beach south to Building Z-40. No standing beach is located in this area of Wallops Island. This area consists of approximately 4.3 km (2.7 miles) of rock seawall approximate 4.3 meters (14 feet) high that protects the island from the constant wave action of the Atlantic Ocean. The Rock Wall monitoring area is illustrated in Figure 3-3.

3.4 South End

The South End extends from the end of the rock seawall at Pad 0B, an orbital rocket launch complex, past the UAS Runway and the Z-100 Camera Stand, south to the Wallops Island property boundary. The South End consists of approximately 1.6 km (1 mile) of steep and narrow sandy beach shadowed by eroded buildings, a small asphalt runway, and a low dune line to the west. The property boundary is marked by a row of short, white stakes placed perpendicular to the ocean approximately 0.4 km (0.25 miles) south of Z-100. The South End is highly vulnerable to adverse weather conditions; erosion and flooding are common occurrences. The South End is closed to recreational use year-round; however, USFWS officials are permitted through the area to gain access to Assawoman Island. The South End monitoring area is illustrated in Figure 3-3.

Figure 3-3 Sea Wall and South End Monitoring Areas

4.0 PROTECTED SPECIES MONITORING

Care must be taken in handling any dead specimens of proposed or listed species that are found to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death is not disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure that the term are appropriate and effective. Upon locating a dead protected species (i.e. deceased loggerhead turtle), notify Tylan Dean at the Virginia Field Office at 804-693-6694 ext. 166. Upon locating a dead protected species that is thought to have been harmed from a NASA operation, notify Tylan Dean above and the Virginia Law Enforcement Office at 804-771-2883.

4.1 Piping Plover

4.1.1 Description of Piping Plover

The Atlantic Coast piping plover population became federally listed as threatened on January 10, 1986. Piping plovers are small, beige and white shorebirds with a black band across their breast and forehead. The piping plover breeds on coastal beaches from Newfoundland and southeastern Quebec to North Carolina and winters primarily on the Atlantic Coast from North Carolina to Florida, although some migrate to the Bahamas and West Indies. Plovers typically feed on invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks. Feeding areas include intertidal portions of ocean beaches; wash over areas, mudflats, sand flats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes.

After they establish nesting territories and conduct courtship rituals beginning in late March or early April, piping plover pairs form shallow depressions (nests) in the sand to lay eggs. Nests are situated above the high tide line on coastal beaches, sand flats at the ends of sand spits and barrier islands, gently sloping dunes, blowout areas behind primary dunes, and wash over areas cut into or between dunes. Nest sites are shallow scraped depressions in substrates ranging from fine grained sand to mixtures of sand and pebbles, shell or cobble. They may also nest on areas where suitable dredge material has been deposited. Nests are usually found in areas with little or no vegetation, although on occasion, plovers will nest under stands of American beachgrass (*Ammophila breviligulata*) or other vegetation, typically laying four eggs that hatch in about 28 days. Figure 4-1 is a photo of a piping plover.

Figure 4-1 Piping Plover

4.1.2 Piping Plover Monitoring

Monitoring activities within piping plover nesting habitat will include conducting pre-nesting surveys, nest searches, erecting predator proof nest exclosures, brood monitoring, and removal of predators. Use of Wallops Island Beach by field personnel, security and employees will also be monitored.

4.1.1.1 Pre-nesting Season

During the pre-nesting season, field personnel will conduct surveys to document the arrival of piping plovers. Beginning in late February, all four beach monitoring areas will be surveyed three times per week, as practicable, for piping plover arrival, establishment of territories, courtship display, and preliminary nest scrapes. According to CNWR, plovers nest usually the last week of April. Each beach monitoring area of Wallops Island will be surveyed for feasible habitat in the event habitat may increase or decrease in a particular area (i.e. Rock Wall monitoring area may have beach habitat in the future). Monitoring results will be recorded in the Monitoring Field Form (see Appendix A).

4.1.1.2 Nest Searching and Monitoring

Three times per week, as practicable, nest searching and monitoring will begin when territorial pairs are firmly documented and will continue to August 31st, or until the last chick fledges. Monitoring results will be recorded in the Monitoring Field Form. Field personnel will use binoculars and spotting scopes to observe plovers from a vehicle or dune. As mating pairs are identified, field personnel will walk through nesting areas at a slow pace looking for scrapes and plover tracks. Scrapes and plover tracks concentrated in an area indicate that eggs may be laid soon. To find eggs, field personnel will rely on piping plover behavior such as mating, territorial

displays, feigning a broken wing, piping or calling, false brooding, and slinking away quietly. Weather conditions, time, and potential stress on the bird will be taken into consideration while nest searching. Nest searching and monitoring will not occur in high wind, extreme heat, rain, or foggy conditions. Monitoring staff may install an infrared game camera to monitor the nest.

Once located, a nest will be marked, approximately 9 meters (10 yards) away towards vehicle traffic, with a wooden paint stick bearing a nest number. The number of eggs and a descriptive location of the nest will be documented on a Monitoring Field Form. The paint sticks will allow nests to be uniquely identified from a distance causing minimal disturbance to the incubating adults. From a distance, monitoring staff will check nests three times per week, as practicable, for incubating adults until chicks hatch. If nests or eggs are missing or destroyed, personnel will briefly search the area to determine the cause of nest loss.

Predator-proof exclosures will be placed around nests. Exclosures will consist of welded wire encircling piping plover nests, providing a barrier between incubating adults and predators. The 5.1 centimeters (cm) (2 inches) by 10.2 cm (4 inches) openings in the welded wire allow plovers to access nests but prevent raccoons and foxes from reaching the nests (USFWS, 2008). Monitoring staff will place nylon fish netting with a 3.8 cm (1.5 inch) mesh over the top of the welded wire to deter avian predators from diving into the exclosures. Exclosures will be constructed around nests after the third egg is laid, or for smaller clutches, if no additional eggs are laid after 3 days. If monitoring staff observe predator tracks or nest predation in a breeding area, nests with only two eggs will be exclosed. Time constructing the exclosures and the time the incubating adult spends off the nest will be recorded on a Monitoring Field Form to determine if nest abandonment is related to excessive exclosure set up time (USFWS, 2008). If a nest is located on the Recreational Beach, signage will be place around the nest in addition to an exclosure. A photo of a predator exclosure is shown in Figure 4-2.

Figure 4-2 Predator Exclosure

4.1.1.3 Brood Monitoring

After the eggs hatch, field personnel will record the number of eggs remaining in the nest cup for an accurate count of eggs hatched and to determine how many chicks are in a brood. Broods will be located three times per week, as practicable, until the chicks either fly or reach 25 days in age (USFWS, 2008). When feasible, observations of chicks will be made from a vehicle using spotting scopes and binoculars. If this method proves ineffective because of visual obstructions such as vegetation and dunes, searches will be conducted on foot. To reduce potential stress to broods, chick observations will be attempted during morning hours and last only as long as necessary to count the number of chicks. Brood monitoring will not be conducted in extreme weather conditions, such as excessive heat, rain, fog, or high winds.

4.2 Red Knot

4.2.1 Red Knot Description

The red knot is a medium sized, bulky sandpiper. It is a relatively short bird with short legs. The head and breast are reddish in breeding plumage and grey the rest of the year. Outside of breeding season, it is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays. The red knot breeds in drier tundra areas, such as sparsely vegetated hillsides. The red knot typically feeds on invertebrates, especially bivalves, small snails, and crustaceans. During breeding season, it also eats terrestrial invertebrates. The Delaware Bay stopover is the final and most crucial spring stopover during the northern migration. This is because the birds feed on the eggs of spawning horseshoe crabs in preparation for their nonstop leg to the Arctic. The birds rest and feed in the Delaware Bay between late April and early June, with the population peaking May 15th through May 30th.

Over the past 20 years, the highly migratory population of red knot within North America has declined by approximately 90%. Concern for this species led to an application to the USFWS for fast track consideration for federal listing under the ESA and a large-scale investigation of conflicts between migrants and the horseshoe crab industry. Most of the conservation efforts to date have focused on the Delaware Bay. In the mid-1990s, 3 years of aerial surveys showed that numbers of red knots moving through the barrier islands of Virginia, between mid-May and the second week of June reached a peak of 8,000-10,000 birds. Surveys in 2005 and 2006 recorded comparable numbers (USFWS, 2007). These findings suggest that the Virginia barrier islands may have more significance to the species than previously believed. However, unlike the birds staging in Delaware Bay, birds using the barrier islands do not depend on horseshoe crabs. USFWS in cooperation with other federal and state agencies have been banding and tracking these shorebirds to obtain more information. Figure 4-3 is a photo of a red knot.

Figure 4-3 Red Knot in Breeding Plumage

4.2.2 Red Knot Monitoring

Monitoring for red knots will take place simultaneously with the piping plover monitoring. Monitoring will be recorded in the monitoring data form in Appendix A with the following information:

1. Date, Time, Observer, Place of Encounter – The date, time, observer name, and place of encounter will be recorded. Place of encounter will include a general location (e.g., north end, recreational beach) and when possible a global position system (GPS) position.
2. Flock size – Flock size will be estimated and recorded.
3. Number of banded birds – The number of banded red knots will be estimated and recorded.

4.2 Sea Turtles

4.2.1 Sea Turtle Descriptions

Green sea turtles are the largest of all the hard-shelled sea turtles, but have a comparatively small head. While hatchlings are just 50 millimeters (2 inches) long, adults can grow to more than 0.91 meters (3 feet) long and weigh 136 to 159 kilograms (300 to 350 pounds). Adult greens are unique among sea turtles in that they are herbivorous, feeding primarily on sea grasses, sea lettuce, and algae. Other organisms living on sea grass blades and algae add to the diet. This diet is thought to give the turtles greenish colored fat, from which they take their name. A greens' carapace (top shell) is smooth and can be shades of black, gray, green, brown, and yellow. Their plastron (bottom shell) is yellowish white. Figure 4-4 is a photo of a green sea turtle.

Greens are considered threatened throughout the U.S., but the breeding colonies on the Pacific coast of Mexico and along the Florida coast are considered endangered. The Atlantic green was

listed as a threatened species in 1978, with the exception of the above-mentioned breeding populations. The National Marine Fisheries Service Northeast Region considers all of the greens in the Chesapeake Bay as endangered because it is impossible to distinguish between those individuals which overwinter in Florida waters and those which overwinter outside those waters. Atlantic greens are rare in the mid-Atlantic portion of their range and are extremely rare in Virginia.

Figure 4-4 Green Sea Turtle

The leatherback sea turtle was federally listed as endangered in 1970. It is the largest, deepest diving, most migratory, and widest ranging of all sea turtles. The adult leatherback can reach 1.3 to 2.4 meters (4 to 8 feet) in length and weigh between 226 to 907 kilograms (500 to 2000 pounds), with an average weight of 300 kilograms (660 pounds). Its shell is composed of a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges or keels. This blue-black shell may also have variable white spotting; the plastron is white. A tooth-like cusp is located on each side of the gray upper jaw; the lower jaw is hooked anteriorly. The paddle-like clawless limbs are black with white margins and pale spotting. Hatchlings are predominantly black with white flipper margins and keels on the carapace. Figure 4-5 shows a photo of a leatherback sea turtle.

Figure 4-5 Leatherback Sea Turtle

The loggerhead was federally listed as threatened in July 1978. This species is perhaps the most common of the sea turtles and the only one that still regularly nests on the U.S. Atlantic Coast, on beaches from New Jersey to Texas. This reddish-brown turtle averages 0.9 meters (3 feet) in length and 136 kg (300 pounds) in weight. The loggerhead's powerful jaws are well suited to eating hard-shelled prey. It feeds on crabs and other crustaceans, mollusks, jellyfish, and sometimes fish and eelgrass.

The distinctly heart-shaped carapace of the adult loggerhead averages 80 centimeters (31 inches) in length. Exclusive of hatchlings, loggerheads in Virginia's waters are mostly juveniles with carapace lengths from 20 centimeters (7.8 inches) to more than 120 centimeters (47 inches) and weighing between 20 to 40 kilograms (44 to 88 pounds). The carapace and top of the appendages are reddish brown to mahogany, and the plastron and bottom of the appendages are cream to yellow. It is common to find barnacles and other organisms encrusted on the carapace. Four scutes (plates) occur between the eyes (prefrontals), and there are five lateral carpacial scutes on each side. Loggerheads usually have three bridge scutes. Figure 4-6 is a photo of a loggerhead sea turtle.

Figure 4-6 Loggerhead Sea Turtle

4.2.2 Sea Turtle Monitoring

Sea turtle nesting activity does not occur yearly on the Virginia barrier islands. Virginia is considered the northernmost extent of the loggerhead nesting range. One green nested at Virginia Beach, Virginia in 2005 and no leatherback nests have been recorded in the state. However, all three species of sea turtles are found off the continental Atlantic Coast from Florida to Nova Scotia (USFWS, 2008). Report any evidence of potential nesting activity of green sea turtles or leatherbacks to the Virginia Field Office with 1 business day of observation.

Monitoring activities within sea turtle nesting habitat on Wallops Island Beach include crawl track observations, nest searches and nest protection. Sea turtles to be monitored are the federal endangered green and leatherback sea turtles and the federally threatened loggerhead sea turtle.

4.2.2.1 Crawl & Nest Searches

Sea turtle crawl track and nest searches will be conducted simultaneously with piping plover monitoring. Sea turtle crawl and nesting activity typically occurs in Virginia from May through August (USFWS, 2008). Monitoring for sea turtles will be completed three times per week, as practicable, from May through August. When a sea turtle crawl track is found on the beach, monitoring staff will determine whether the crawl resulted in a nest. Staff will gently dig by hand into the body pit to locate the egg chamber, to determine if eggs were laid. Once the first layer of eggs is seen or felt, digging will cease. Staff will cover the eggs with moist sand and replace the layer of dry sand over the nest. The GPS location and date of the crawl will be recorded in a Monitoring Field Form regardless if a nest is found. The presence of a body pit in a sea turtle crawl indicates the turtle attempted to lay eggs. Monitoring staff will notify CNWR at 757-336-6122 (either extension 318 Eva Savage or 320 Amanda Daisey) of the nest. Nest searches will not occur during inclement weather such as rain or high winds. A photo of a crawl track and nest are shown in Figure 4-7.

Figure 4-7 Loggerhead Crawl & Nest

4.2.2.2 Nest Protection

A variety of predators such as raccoon and fox prey on incubating turtle eggs. A predator screen will be positioned over all nests. The screen consists of a piece of welded wire with 5.1 cm (2 inch) by 10.2 cm (4 inch) openings held in place with small metal tent stakes (USFWS, 2008). The 10.2 cm (4 inch) openings will be placed parallel to the water's edge. The predator screen will allow hatchlings to leave the nest cavity, yet prevent raccoon and fox from reaching the eggs. Monitoring staff will sweep a dusting of sand over the screen to hide it from predators and trespassers. Excess sand can make hatchling emergence difficult or impossible. Sand accumulation of 30.5 cm (12 inches) or more over the predator screen will be removed as the hatching window approaches (USFWS, 2008). Nests will be marked, thus establishing a buffer zone, to protect the nest from human activity. Staff will place a minimum of four informative "Area Closed" signs forming a radius around the nest. Rope will be strung between the signs to discourage vehicles and pedestrians from trespassing into the nest site. The nest will be monitored three times per week, as practicable. A photo of a protected nest is shown in Figure 4-8.

Figure 4-8 Sea Turtle Nest Protection

4.2.2.3 Hatching Procedures

The incubation rate for the northern range of the loggerhead sea turtle is estimated at 60 to 90 days from egg deposition, 45 to 95 days for leatherbacks, and 45 to 75 days for greens. One week prior to the predicted hatch window, staff will rake and sweep away tire tracks and debris east of a turtle nest to insure hatchlings will have a clear path to the ocean. NASA will coordinate turning off appropriate building lights and install turtle friendly amber LED lights on nearby buildings. Staff will excavate nests a minimum of 90 days after egg deposition to determine hatching and emergence success. A staff member will dig the nest area by hand. When sand gives way to the nest chamber, the staff member will tally the nest contents such as dead hatchlings, pipped eggs, unhatched eggs, and eggshells. Once recorded, the nest contents will be placed back in the nest and recovered. If live hatchlings are encountered during a nest excavation, follow the Live Hatchling Procedures.

4.2.2.4 Live Hatching Procedures

If a mix of live hatchlings and unhatched eggs are encountered during nest excavation, staff will immediately recover the egg chamber with moist sand and return the nest site to its original condition. Staff will wait a minimum of 72 hours before attempting excavation again.

However, if hatchlings are found at the bottom of an excavated nest under eggshells during daylight, staff will release the hatchlings later the same night. Staff will line a sturdy plastic container with moist sand and place the live hatchlings inside. A moist cloth will be attached over the top opening of the container. The container will be placed in a quiet, dark room with the door closed. A staff member will release live hatchlings at their original nest location after dark.

4.3 Seabeach Amaranth

4.3.1 Seabeach Amaranth Description

Seabeach amaranth is an annual plant that grows on sandy beaches along the mid-Atlantic coast of the United States. It is an herbaceous reddish-colored ground cover with highly branched stems that can form clumps reaching up to 30 cm (12 inches) in diameter. The leaves are spinach-green and clustered towards the tips of the stems, with inconspicuous flowers and fruits. Plants germinate from April to July, initially forming a small sprig but soon branch and form a clump which binds sand that accumulates at its base. Larger plants may contain over one hundred stems which branch from the center and attain a diameter of over 1 meter (3.3 feet), although plants are typically 20 to 40 cm (8 to 16 inches) in diameter. Flowering begins in June with seed production in July until senescence in early winter. Plants are monoecious (having male and female flowers on the same plant) (USFWS, 2008). A photo of seabeach amaranth is shown in Figure 4-9.

Figure 4-9 Seabeach Amaranth (scale in inches)

4.3.2 Seabeach Amaranth Monitoring

Monitoring activities within seabeach amaranth habitat on Wallops Island will include plant searches, protection, and surveys. These activities will be completed in conjunction with monitoring the other protected species listed in this plan. One complete seabeach amaranth search will take place annually in August. Monitoring staff will walk a grid search pattern from the primary dune to the intertidal zone. The number of plants found and their locations will be recorded with a GPS unit. If any plants are found, they will be marked with informative “Area Closed” signs around plants. Rope will be strung between the signs to discourage trespassing.

The Wallops Island piping plover area on the North End will be closed from March 16 through August 31st, or until the last plover chicks fledge each year. This closure will incorporate potential areas of seabeach amaranth habitat, offering additional protection to any plants found in that area.

4.5 Other Species of Interest

WFF realizes that there are other species of interest that either nest on or occupy Wallops Island for at least some portion of the year. Accordingly, the 2011 monitoring surveys will include monitoring for other species besides those on the Federal Endangered Species List. The protected species monitoring team will confer with the USFWS and the VDGIF to determine what other species will be surveyed and to confirm survey methods . At a minimum, the surveys will include

- Wilson's Plover (*Charadrius wilsonia*)
- American Oystercatcher (*Haemotopus palliates*)
- Black Skimmer (*Rynchops niger*)
- Colonial nesting birds such as tern spp.

5.0 MARINE MAMMAL STRANDING MONITORING

In conjunction with monitoring of the other protected species listed in this plan, marine mammal stranding monitoring will occur three times per week, as practicable, from May through September. The marine mammal stranding monitoring is coordinated with the VAQ. Procedures for marine mammal stranding monitoring include surveying for and reporting deceased or living sea turtles, seals, dolphins, porpoises, whales and manatees stranded on Wallops Island.

5.1 Deceased Stranded Marine Mammals

Upon locating a deceased mammal or sea turtle, monitoring staff will take a digital photograph of the animal and record the length and width of its body as well as its GPS coordinates. This information will be emailed to the VAQ at vaqstranding@verizon.net the same work day. Staff will move the deceased animal above the high tide line before the following high tide. The VAQ will schedule an appointment to obtain the stranded mammal. During the scheduled appointment, all VAQ personnel will obtain a temporary escort badge from security and will be escorted at all times while on NASA property. Should the VAQ be unable to schedule an appointment, they may request more information concerning the stranded mammal. After delivering the requested information to VAQ, the stranded mammal will be spray painted to identify the stranding is case closed. A photo of a deceased stranded mammal is shown in Figure 5-1.

Figure 5-1 Deceased Stranded Leatherback

5.2 Live Stranded Marine Mammals

Should a live stranded marine mammal be encountered, VAQ will be notified at 757-385-7575 (office) or 757-437-6364 (pager-24hr). VAQ will ask for behavior and physical condition information about the stranded mammal. VAQ may or may not schedule an appointment to obtain the live stranded marine mammal depending on the circumstances of the particular stranded mammal. Monitoring staff will monitor the live stranded mammal on a daily basis until the marine mammal has voluntarily left Wallops Island, VAQ has obtained it, or it has expired. A live stranded mammal should not be approached to ensure personnel safety. The WFF Security Office will be notified of the location of the live stranded mammal. Digital photographs will be taken and emailed to VAQ at vaqstranding@verizon.net.

6.0 MISSION SPECIFIC MONITORING

The purpose of mission specific monitoring is to survey on Wallops Island the area adjacent to a planned rocket launch for a protected species listed in this plan. Monitoring staff will survey approximately 46 m (50 yards) north and south of the beach adjacent to a rocket launch at a maximum of 24 hours before launch. Another survey will be conducted as soon as official clearance is granted after launch.

Video monitoring will be implemented of plover nests most likely to be affected by launch activities (those closest to the launch pad) during launches to measure and record bird responses. This monitoring shall be conducted for at least each of the first 10 large rocket launches (expected to exceed 100 dB within plover nesting habitat). If no plover nests are active within areas expected to be subjected to sound >100 dB, other similar shorebird species nesting in similar habitat should be monitored as surrogates to provide information on species responses. Monitoring shall include measurement of actual sound at monitoring site during launch, weather

conditions, and other factors which may contribute to responses. Monitoring shall take place 2 hours prior to, during, and at least 2 hours after the launch. With five business days of each launch, a DVD of the monitoring and a report in digital format containing the additions measurements will be provided to the Virginia Field Office. NASA may request to discontinue the monitoring following documentation of avian responses from the first launches.

Should a protected species be located during the survey, Joel Mitchell, the NASA Natural Resources Lead, will be immediately notified at (757) 824-1127 or his alternate, Josh Bundick, at (757) 824-2318. The Environmental Office will then coordinate with the Range & Mission Management Office and USFWS regarding the located protected species.

7.0 VEHICLE USE DURING MONITORING

Vehicle monitoring routes will be in areas where protected species will not nest, such as the intertidal zone. If a nest occurs near a survey route, a new route will be established to avoid disturbance. In the event that a piping plover or sea turtle nest is discovered on the Recreational Beach or South End, monitoring staff will inform the Security Office and send notices to all WFF employees, contractors, and tenants warning recreational users not to approach these nests. In addition, beach vehicle users may be handed protected species related fact sheets as they enter the Wallops Island security gate.

7.1 Vehicle Use During Sea Turtle Hatch Window

During a sea turtle nest hatch window on the North End or the Recreational Beach, fencing around the nest will be extended to the ocean high tide line to allow safe passage of turtle hatchlings to the sea. Pedestrians and vehicles accessing the area must avoid the nest and buffer zone established within the “Area Closed” signs. One week prior to a predicted sea turtle hatch window, monitoring staff will rake and sweep away tire tracks seaward of a turtle nest. The hatchlings will have a path clear of obstacles to the ocean. In the event that the above listed actions adversely affect sea turtle nests, proper adjustments in the program will be made or the actions reduced or discontinued.

8.0 SECURITY AND EMPLOYEE REPORTING

Should staff/employees observe anyone violating the protected areas, protected species, littering; having open fires, pets, or weapons; or accessing other areas that are off limits due to operations or explosion hazards, they will report the violation by calling security at 757-824-2222 or 757-824-1111.

If security observes any protected species or nests, or anyone violating a protected species or nest, they shall call the environmental hotline at (757) 824-1718 or Shane Whealton at (757) 824-1090 or Joel Mitchell at (757) 824-1127. Security should be encouraged to report anything that may be a negative impact on the habitat or any animal.

9.0 TRAINING AND CERTIFICATION

Monitoring staff will attend the annual marine mammal stranding training offered by the VAQ. Each season, monitoring staff will shadow USFWS personnel as an apprentice, learning each monitoring activity for all protected species listed in this plan. For example, staff will accompany USFWS personnel during each pre-nesting, nesting, nest protection and brood monitoring activity for piping plovers.

All WFF employees are offered a natural resources training module that is available at http://sites.wff.nasa.gov/code250/documents.html#flora_&_fauna. Signs at the ORV access on Wallops Island will be installed providing protected species information. An annual special announcement will be provided to inform employees of the uses and guidelines of the recreational beach. Additionally, protected species fact sheets will be available at the Wallops Island security gate.

10.0 PLAN REVIEW AND RECORD RETENTION

This monitoring plan will be reviewed annually in cooperation with USFWS and revised if applicable. Monitoring activities will be assessed to determine if there are additional management actions to be taken for the listed species in this plan (i.e. alter the extent of the piping plover protection area).

This plan and its records will be retained in accordance with NASA Procedural Requirement 1441.1 NASA Records Retention

11.0 REPORTING AND ANALYSIS

Monitoring staff will compile an annual summary report of the monitoring results and events. The summary report should also include information on changes in habitat and mission impacts. This information is beneficial in aiding the USFWS and NASA in reassessing impacts on the take of protected species. This annual summary report will be sent in digital format by December 31 of each year to:

- Ruth Boettcher, Non-Game Wildlife Diversity Biologist
  3801 John Tyler Memorial Highway
  Charles City, VA 23030
  Ruth.boettcher@dgif.virginia.gov

- USFWS Virginia Field Office
  6669 Short Lane
  Gloucester, VA 23061
  Tylan_dean@fws.com

- USFWS Chincoteague National Wildlife Refuge (CNWR)
  P.O. Box 62
  Chincoteague Island, VA 23336
  Amanda_Daisey@fws.gov

12.0 POINTS OF CONTACT

- CNWR (757) 336-6122
- Ruth Boettcher (804) 829-6580
- NASA Security (757) 824-2222
- WFF USDA (757) 824-1254
- USFWS VA Office (804) 693-6694
- VAQ (757) 385-7575

13.0 REFERENCES

USFWS, 2008, Sea Turtle Biological Opinion-Draft, Assateague, VA., August

USFWS, 2008, 2008 Piping Plover Biological Opinion, Assateague, VA., April

USFWS, 2008, 2008 Seabeach Amaranth Biological Opinion, Assateague, VA., April

USFWS, 2007, Virginia Red Knot Resighting Protocol, Assateague, VA., April

WFF USDA, 2003, Wallops Island Piping Plover Plan, Wallops Island, VA.

Appendix A

Monitoring Field Forms