

45TH SPACE WING

PATRICK AIR FORCE BASE

FY07 Secretary of Defense, Natural Resources Team Award



The 45th Space Wing (45SW) operates the Air Force's eastern launch range under the direction of Air Force Space Command (AFSPC). This vast complex of launch and support facilities encompasses more than 18,000 acres along the east coast of central Florida. The unique setting and ecology of the range is as diverse as the wing's mission of assuring access to the high frontier and supporting global operations. The wing is steeped in a rich history with over 3,360 successful launches spanning more than 50 years.

Home to 71 protected wildlife/plant species, PAFB and Cape Canaveral Air Force Station cover nearly 18,000 acres of sandy beaches, dunes, wetlands, coastal scrub and woodlands. 45th Space Wing environmental personnel are committed to environmental excellence in protecting, preserving and restoring natural resources.



PROGRAM HIGHLIGHTS

- Approximately 2,366 acres were restored during the last two years: 548 treated mechanically; 851 burned; and a \$379K program eliminated 967 acres of invading exotic vegetation, primarily Brazilian pepper and cogon grass.
- The threatened Scrub-Jay population is up 42% since the low in 2004; the increase in population closely tracks the increase in scrub habitat restoration that includes prescribed burns, mechanical treatment and invasive flora control.
- Southeastern Beach Mice also benefited from habitat restoration. Cape Canaveral Air Force Station is one of the last known areas where Southeastern Beach Mice thrive.
- Personnel reviewed more than 2,400 design packages, site plans and work requests to ensure safe conditions for the aerospace workforce and to protect sensitive ecological receptors.

Sea turtle and Scrub-Jay photo reprinted with permission of photographer, TJ Dunkerton



45th Space Wing, Patrick Air Force Base, Florida FY07 Secretary of Defense Natural Resources Conservation Team Award



BACKGROUND

Along Florida's east coast where the vast Atlantic stretches east, America's journey to space began decades ago and continues today. Headquartered at Patrick Air Force Base (PAFB), Florida, the 45th Space Wing (4SW) oversees space launch operations on the Eastern Range, including Cape Canaveral Air Force Station (CCAFS) 20 miles to the north.

The wing's global importance as a critical component of an effective national defense force is underscored by 3,346 space launches, with 28 occurring during the last two fiscal years. As the world's premier gateway to space, the Eastern Range supports launch operations for the Department of Defense, NASA, commercial entities and 16 foreign countries. All 11,000 personnel and 116 tenant units are committed to protecting natural resources while supporting assured access to space.

The environment of the 45SW is unlike any other in the Northern Hemisphere due to barrier island influences and the effect of two climate zones. Personnel face unique challenges in maintaining the fragile balance between operational considerations and a rare ecosystem that supports 71 protected wildlife and plant species.

The vast complex of launch and support facilities at PAFB and CCAFS encompasses 18,000 acres of sandy beaches, wetlands, coastal scrub and woodlands. Additionally, there are 4,087 acres at Antigua Air Station (Caribbean) and Ascension Auxiliary Airfield (South Atlantic) and 652 acres at two Florida tracking annexes.



TEAM DYNAMICS

The most outstanding feature of the 45SW natural resources program is the team's ability to protect, preserve and remain outstanding environmental stewards while executing the space launch mission. The 12-person natural resources team tackles these responsibilities by proactively managing a highly diverse and intricate natural resource program. Their combined 211 years of environmental experience enables them to expertly handle complex and sensitive issues. The team's success is the result of strategic alliances between AF program managers, regulators, the US Fish & Wildlife Service (USFWS), the Florida Fish and Wildlife Conservation Commission (FWCC), The Nature Conservancy and a variety of local organizations. A strong commitment to environmental excellence keeps the 45SW in compliance with the National Environmental Policy Act (NEPA) and all federal, state and local laws and regulations.

AWARDS AND SERVICES

The 45SW natural resources program was recognized for outstanding achievement by the AF and AF Space Command for the last ten years. Members were recognized for their innovative leadership and continuing efforts to protect and preserve natural resources while reducing costs and supporting the mission. The 45SW natural resource program goes beyond just meeting statutory and regulatory requirements by always "going the extra mile."

Personnel were also recognized for their outstanding contributions to the community and participation in the Florida Native Plant Society, Cape Canaveral Beautification Board, Gopher Tortoise Council, the Brevard Nature Alliance, American Butterfly Association, Marine Resource Council, Keep Brevard Beautiful and the Audubon Society.



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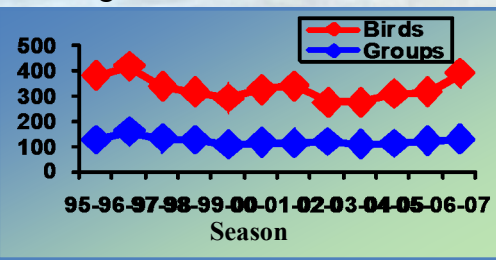
YEAR	AWARD
2007	Gen Thomas D. White Natural Resources Conservation Team Award (AF)
2007	Gen Thomas D. White Natural Resources Conservation Team Award (AFSPC)
2007	Environmental Flight (AFSPC)
2006	Gen Thomas D. White Natural Resources Conservation Award (AFSPC)
2006	Gen Thomas D. White Environmental Quality Award, Overseas (AFSPC)

ACCOMPLISHMENTS

Natural Resources Management

The 45SW's commitment to environmental stewardship, along with legal requirements, shapes its natural resources goals. A proactive, interdisciplinary management strategy focuses on an ecosystem-based approach. This strategy includes the AF objective of sustaining and restoring natural resources to uphold operational capabilities while complying with federal, state and local standards that protect and conserve wildlife, habitat and the surrounding watershed.

As the foundation for the program, the 45SW Integrated Natural Resource Management Plan



(INRMP) contains more than 50 objectives. Initiatives con-

tinually exceed requirements, with the team achieving 95% of the far-reaching and ambitious INRMP objectives set for FY 06-07. Revised in 2007, the guiding principles of the INRMP ensure compliance with the National Marine Fisheries Service, USFWS and FWCC.

A top INRMP goal is integrated ecosystem management. One of the largest ecosystems at CCAFS is the Florida Scrub Jay habitat. It encompasses 9,000 acres and is home to one of three remaining core populations. There are currently 391 individuals in 126 family groups. For nine years, the 45SW has partnered with The Nature Conservancy to study scrub jay demography and evaluate scrub habitat management practices. Aggressive habitat restoration activities, including mechanical clearing and controlled burning, resulted in an increase in the bird population by 42% since 2004.

Another 45SW INRMP initiative included migratory bird surveys that provided new insights into habitat function and biodiversity management strategies. The team conducts seasonal surveys that indicate some migrating and resident species are highly dependent on forested areas such as cabbage palm and maritime hammocks. Surveys also show that a diverse number of birds prefer transitional scrub/estuarine and scrub/marsh areas.

While scrub/coastal strand habitat support Florida Scrub Jays, these areas are also home to a variety of other animals, including gopher tortoise and beach mice. CCAFS is one of the last known areas where threatened Southeastern

Beach Mice thrive. Typically found in coastal dune habitat, they now reside miles inland.



To keep facilities rodent-free while protecting the species, the 45SW developed an agreement with the USFWS for a capture and release program.

The 45SW also initiated a beach mouse demographic study that indicates beach mice are not as dependent on dunes and sea oats as previous thought by the scientific community. They are more omnivorous than previously suspected and prefer scrub areas and open spaces. As a result of this study, two scientific papers are under preparation by Dynamac Corporation and the University of Central Florida. The wing's scrub habitat management plan and invasive species control programs enhance this habitat and increase the population. Since beach mice are thriving at CCAFS, the 45SW, USFWS and the FWCC established guidelines to use the Cape population as the donor for future reintroduction of the species to local wildlife refuges and the Canaveral National Seashore.

In an effort to protect endangered sea turtles, their nests, eggs and hatchlings, an intense





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Feral hogs

predator removal program was implemented. During the award period, 374 predatory raccoons and non-native feral hogs were removed from sea turtle nesting areas.

Mission Enhancement

Protecting natural resources while supporting the mission is top priority for the 45SW conservation team. Natural resources issues are incorporated into all wing planning efforts through a comprehensive siting and coordination process. More than 50 site plans and approximately 400 excavation permits were expertly evaluated. More than 2,600 work orders were reviewed and 200 project specific NEPA documents were processed. There were no adverse impacts to natural resources or space launch activities.

To ease the review process, the 45SW conservation team developed a comprehensive matrix of natural resource information for all facilities and launch complexes. This tool allows managers to consider all natural resource aspects and make sound use/reuse decisions on facilities for new space technology and programs such as Space-X.

Antennas, radar and other critical mission support equipment are prime nesting for some species of birds. Personnel erected 20 platforms under the migratory bird program to encourage nesting away from this equipment. Team

members continually collaborate with USFWS to incorporate engineering solutions and guidelines into new tower construction. Physical deterrents are installed on existing towers during maintenance activities to prevent future nesting.

In addition to the space mission, the 45SW natural resources team supports the wing's wide array of tenant units. Proactive monitoring of the 920th Rescue Squadron's pararescue training ensures negligible impacts to sea grass, birds and endangered manatees living in the Banana River. As a result of the team's effort, protective measures for natural resources are now incorporated into training procedures.

Land Use Management

Devastating hurricanes left 45SW beaches in desperate need of renourishment to save building infrastructure and threatened and endangered (T&E) sea turtle nesting habitat. A massive effort pumped 320,000 cubic yards of offshore sand on 45SW beaches in 2005 and more than 287,000 native coastal plants were planted. A supplemental installation of 50,000 plants along the dunes was completed in 2006/2007. Plant root systems help stabilize dunes, while leaves and branches trap sand blown from the beach thus raising dune heights. Higher dunes and plants create a visu-



*Osprey
nesting platform*

al barrier that reduces sea turtle hatchling disorientation from artificial lighting. Biologists aggressively monitor sand compaction, dune scarping and sea turtle nesting success. More hatchlings are surviving as there is less disorientation from lights from vehicle traffic on SR A1A. These efforts saved critical facilities and significantly cut disorientations by 90% over two years.

Another habitat for T&E species is created and enhanced by scalloping vegetation after invasive Brazilian pepper is removed near road shoulders. The natural resources team saves time and money by ingeniously writing specifications into utility related projects. By requiring specialized land clearing (scalloping), additional edge habitat is created for birds. The enhanced areas encourage foraging and include open, sandy areas where the birds cache food.

In an effort to enhance land use management base-wide, eco-friendly practices are now employed to manage weeds at the golf course. 45SW natural resources personnel advised the course to use salt tolerant plants, install maintenance-free zones and replace methyl bromide use with the more environmentally friendly basamid. Use of basamid saved approximately \$85K in 2007. The team partnered with the Brevard County Extension Service for a water quality assessment, free herbicide advice and weed identification. Additionally, the 45SW, in cooperation with the FWCC, introduced triploid grass carp as a biological control of aquatic vegetation to improve water quality in the canals.



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Forest Management

Central Florida is known as the “lightning capital of the world”. Lightning-induced wildfires are a constant threat to valuable space assets and endangered species. However, this natural fire regime serves two purposes: fuel load is reduced and optimal scrub habitat is maintained for native wildlife. Years of fire suppression interrupted the natural fire cycle, resulting in elevated wildfire threats. The 45SW partnered with the USFWS to establish an ongoing, ecologically balanced fuel load reduction plan. Surveys ensure the most vulnerable areas are integrated into the scrub habitat restoration program. Approximately 2,366 acres of overgrown scrub were treated to reduce vegetative fuel loads adjacent to critical facilities and enhance wildlife habitat. Over the last two years 548 acres were mechanically treated; 851 were burned and 967 acres of invasive Brazilian pepper/cogon grass were treated with approved herbicides.

A research project is underway at CCAFS to scientifically determine the most effective way to enhance scrub areas where burning isn't possible. The 5-year project investigates three methods: mechanical, herbicide and prescribed



burning combined in several different patterns at several different locations on the Cape. The study will be completed during FY10.

As new launch programs make their home at CCAFS, land must be cleared for new facilities. 45SW natural resources personnel, in conjunction with the USFWS, developed a scrub habitat compensation plan. This policy requires proponents, such as new commercial space launch developers, to fund future scrub habitat restoration. Four acres of land must be restored for every one acre lost to construction. Managed by the National Fish and Wildlife Foundation, funds are specifically used for future CCAFS restoration activities.

Fish and Wildlife

CCAFS is located on mostly undeveloped land and is home to a wide variety of fish and wildlife including nine T&E species. Sound management principles and a myriad of programs ensures their survival.

Protecting T&E sea turtles, their nests and hatchlings is a monumental task. The 45SW is located within the second largest Loggerhead sea turtle nesting region in the world! Diligent monitoring and management identified more than 5,000 nests, yielding approximately 350,000 hatchlings during the last two years. By minimizing exterior lighting, removing predators and conducting bi-annual beach cleanups, the wing's hatching success ratio of 65% now exceeds the USFWS recovery plan goal. Eight rare leatherback nests were also identified and monitored and information was provided to the FWCC.

Hatchlings use light reflecting off breaking waves to find their way toward the sea. Artifi-

cial lighting from beachfront or inland sources can disorient hatchlings away from the surf. An aggressive light management policy reduced disorientation rates from 50% in 1993 to less than 3% out of more than 5,000 nests in 2007! Personnel conduct daily monitoring of beaches and immediately take action to ensure unnecessary lights are removed or extinguished and that mission essential lights are shielded or changed to low pressure sodium fixtures.



A population of rarely observed endangered juvenile green sea turtles was discovered inhabiting the Navy Trident Submarine basin. The basin provides a unique ecosystem with its algae-covered rock revetment providing a perfect foraging area for this rare size class of juvenile green turtles. 45SW natural resources personnel immediately notified Navy personnel so that care could be taken if turtles are observed in the area. The team established fishing regulations and sea turtle awareness programs to minimize injuries to turtles and to protect the food source. Annual monitoring indicates there have been no adverse impacts from or to military operations.

In addition to protecting T&E species, biologists responded to 100 incidents involving sick/injured wildlife. Animals are transported to a licensed wildlife rehabilitator. Personnel relay critical data about the capture area to aid in injury identification for accurate treatment.



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Other Natural Resources

The 45SW leads by example as the first AFSPC base to achieve the National Arbor Day Foundation Tree City USA status and has maintained this distinction for 14 years!

Environmental personnel, collaborated with the outdoor recreation office to provide monofilament recycling stations for boating and fishing patrons. These recycling centers, coupled with environmental awareness briefings, eliminated 14,000 meters of fishing line and reduced potential injury to wildlife.

Another dual-benefit initiative occurred when natural resources personnel partnered with the grounds contractor to reduce grass mowing. This promotes natural growth of vegetation in sensitive riparian areas and on fragile dunes. A “no-mow” buffer area was created along the river and was regenerated with native wetland plants. Mowing was also eliminated on the back of dunes and native sea grapes were planted. In all, mowing was reduced by four acres, saving \$4,500 annually while coastal dune and riverine wetland habitats are expanding. In addition, the team noticed airfield grass was being cut too short and quickly worked with grounds crews to reset mower blades. This reduces bird/aircraft strikes as birds are hesitant to forage in tall grass for fear of unseen predators.

Invasive Species Control/Pest Management

PAFB and CCAFS are comprised of thousands of acres of wildlife paradise. Native ecosystems are more stable due to mechanical

removal and herbicide treatment of invasive vegetation. Control of invasives, and re-vegetation with native species is incorporated into projects by the natural resources team through the Environmental Impact Analysis Process (EIAP).

Integrating exotic vegetation control resulted in a large-scale project that removed 60 acres of invasives adjacent to estuarine shorelines. This effort improved biodiversity and wetland habitat and increased migratory bird populations. Monitoring and retreatment with approved aquatic herbicides allows stable, native re-colonization.

An integral part of invasive species control is preventing invasive plants from infesting newly restored areas. A \$379K program monitored and eliminated invading exotics and improved 1,800 acres. T&E habitat was restored and foraging was enhanced for native species such as white-tailed deer, gopher tortoises and birds.

Digitized Geographic Information Systems (GIS) maps were updated with invasive species treatments for 45SW properties to maximize natural resource management. GIS maps aide NEPA/EIAP analysis, scrub habitat restoration plans, identification of high fuel loads and overall master planning.

Conservation Education

The 45SW has an extensive education outreach program. Personnel conducted news media interviews, wrote ten news articles and

provided 30 briefings at on/off-base events including schools and professional organizations. Team members were also hand-picked to judge four science fairs at local schools. ‘Turtle walks’ promote the balance between wildlife protection and the wing mission.



Respected for outstanding knowledge and experience, 45SW natural resources personnel were chosen to provide briefings/site visits for:

- international sea turtle symposiums;
- birding festivals;
- the Strategic Environmental Research & Development Program’s Southeastern Threatened, Endangered and At-Risk Species Conference;
- the Florida Exotic Pest Plant Council; and
- the AFSPC natural resource/pest management conference.

Unique presentations combined the history of CCAFS and space with the distinctive habitats and T&E species that call it home. These initiatives resulted in opportunities for research funded by other organizations and also help reach 45SW goals. They include:

- a \$20K beach mouse study sponsored by the University of Miami;
- a \$10K alligator study funded by NASA;
- a \$15K project by The Florida Exotic Pest Plant Council to test different pesticides for effectiveness on Brazilian Pepper; and



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- a \$25K biocontrol research project sponsored by the US Department of Agriculture and the University of Florida on Brazilian pepper. If successful, this project will save the 45SW about \$300K annually in mechanical and herbicidal treatment to eradicate Brazilian pepper.

To further educate and protect the community and base populace, information pamphlets were developed on a myriad of 45SW natural resource issues. Informational photo placards are now posted at construction sites to indicate the presence of protected species and what to do in case one is encountered.

Community Relations

The wing enjoys a trusting relationship and outstanding partnership with the community. Personnel energetically created alliances with community organizations such as Keep Brevard Beautiful and the Ocean Conservancy in county-wide/international cleanups. These massive beach and shoreline cleanup efforts resulted in



more than 450 volunteers collecting more than 60 tons of trash from 21 miles of beach.

Crossing all environmental sectors, the conservation team also provided natural resources briefings to the wing's community-based Restoration Advisory Board.

Environmental Enhancement

Natural resources personnel were key players in the design of the Banana River shoreline restoration and repair project. This effort protected the riparian zone without adversely affecting shoreline wetlands, mangroves and estuarine waters. Rip-rap was engineered to stabilize the shoreline without permanent impact to the natural hardening effects of wetland vegetation. Leaving native vegetation provides more appealing views of the river and ensures wildlife habitat is maintained for a variety of birds and fish.

Natural Resources Compliance

Natural resource compliance at the 45SW is first and foremost about providing assured access to space. If federally mandated compliance is not met, other federal and state agencies may delay or otherwise adversely impact space launches. As part of the implementation and management of natural resources, periodic meetings and site visits are conducted between the 45SW and regulators to assess wing efforts. The USFWS, National Marine Fishery Service and the FWCC commended the 45SW for "working diligently to comply with the intent of the laws." They specifically cited the outstanding preparation, coordination and attention given to 20 consultations prepared per Section 7 of the Endangered Species Act as well as the Magnuson-Stevens Act.

The 45SW natural resources team developed a comprehensive relocation strategy to protect endangered gopher tortoises from mission-

related operations. Partnering with regulators, the team significantly reduced time to relocate tortoises in harms way during space launch activities, restoration or construction. This state-approved plan includes a blanket permit that reduces relocation time by 76%, from 21 days to 5. Approximately 100 gopher tortoises have been relocated using this plan.



Gopher Tortoise

Again partnering with the FWCC, 45SW personnel conducted an alligator habitat survey to protect federally threatened alligators that pose a safety threat to themselves or humans. Personnel secured permits so nuisance alligators can be removed to wetland areas by the wing's conservation law enforcement officer and a local trapper.

COMMITMENT

The men and women of the 45SW are committed to environmental excellence to restore, protect and preserve. Exceptional programs ensure natural resources are here for generations to come. Commitment extends beyond base boundaries, into the community and partnering with regulators. The 45SW natural resources team is dedicated to supporting the AF mission and the nation's space program while protecting the environment.