HABITAT CONSERVATION PLAN – A PLAN FOR THE PROTECTION OF SEA TURTLES ON THE BEACHES OF VOLUSIA COUNTY, FLORIDA

prepared for

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HABITAT CONSERVATION PLAN

A PLAN FOR THE PROTECTION OF SEA TURTLES ON THE BEACHES OF VOLUSIA COUNTY, FLORIDA

Prepared in Support of Incidental Take Permit No. TE811813 for Incidental Take Related to Beach Driving and Vehicular Beach Access-Related Activities Regulated and/or Managed by the County of Volusia, Florida

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PREFACE

The wide, flat, hard-packed sands of Volusia County's beaches are ideal for driving, and vehicles have had access to these beaches since the early days of the automobile. Although a lawful and traditional activity, beach driving has the potential to impact sea turtles and their nesting habitat, which is considered a "taking" under the Endangered Species Act (ESA) of 1973.

In February 1996, the County of Volusia, Florida (hereinafter referred to as the "County") applied to the U.S. Fish and Wildlife Service (USFWS or Service) for an Incidental Take Permit (ITP) to authorize the unintentional taking of federally protected species caused by beach driving and vehicular beach access-related activities regulated and/or managed by the County. A Habitat Conservation Plan (HCP), a statutory component of the ITP application, was prepared and submitted to the USFWS. The HCP described the various programs, policies, plans, and measures proposed by the County to minimize and mitigate the take of sea turtles causally related to ITP authorized activities.

Following extensive public review of the HCP, and considering public comment, the Service issued an ITP (PRT-811813/TE811813) to the County on November 22, 1996. Issuance of the ITP was conditioned upon the County's adherence to the minimization and mitigation measures contained in the HCP and other provisions set forth in the Permit. The Permit had a term of five years with an expiration date of December 31, 2001.

The ITP has been amended 11 times since it was issued (Table P-1). These amendments removed unnecessary restrictions on beach activities that provided little conservation value to covered species and addressed unintended omissions in the original HCP. The most recent amendment (No. 11), dated November 7, 2005, extended the term of the ITP until December 31, 2030.

In support of its application to the USFWS to extend the term of the ITP, the County prepared an Amended HCP that addressed prior deficiencies requiring regular ITP amendments, adjusted programs and policies to improve operational efficiency, and proposed additional take coverage for certain activities and species. Substantive changes in the Amended HCP included: (1) addition of the piping plover as a covered species, (2) expansion of the Plan Area to include inlet beaches at Ponce Inlet, (3) allowance of vehicle operations for lawful construction activities, emergency operations, and storm response, (4) expansion of the public driving area in HCP Region 3, 200 feet to the north, and (5) new mitigation measures.

Throughout the term of the ITP, the HCP has undergone minor updates to incorporate policies and procedures either formally authorized via ITP amendments or administratively agreed to by the USFWS. The HCP was last updated in June 2008. This update reflects those administrative changes that have been implemented by the County since then, with approval of the USFWS, as well as other program changes approved by the Service following the most recent 5-year review of Plan performance in 2011.

Table P-1.
History of Volusia County Incidental Take Permit for Beach Driving

Amendment	Date	Activities Authorized or Modified
ITP Issuance (PRT-811813)	11/22/96	Allowed for incidental take of sea turtles related to beach driving and vehicular beach access-related activities regulated and/or managed by Volusia County in accordance with the terms and conditions of the HCP and ITP.
Amendment 1	10/17/97	Changed the ending date for daily nesting surveys each year from October 31 to September 30.
		Changed the annual reporting date each year from December 31 to January 31.
Amendment 2	12/11/98	Changed the closing time for public vehicular access during the nesting season from 7 p.m. to 7 p.m. or sundown, whichever is earlier.
		Changed the time by which garbage pickup must be completed during the nesting season from 7 p.m. to 7 p.m. or sundown, whichever is earlier.
		Removed specific standard operating procedures (SOP) for the rut removal program from the ITP, and instead required USFWS approval of the SOP and any changes thereto.
		Allowed the placement of one portable restroom on the New Smyrna Beach side of Ponce Inlet and at other areas with prior USFWS approval.
		Provided for an annual adjustment to CZ markers each year prior to the start of the sea turtle nesting season.
		Explicitly acknowledged that municipal law enforcement, emergency, and other official vehicles are allowed to operate on the beach at night.
		Required the Protected Species Specialist (PSS) to review and approve special beach events in public driving areas during the nesting season, instead of having to be present during organization of those events.
		Expanded the Beach Safety vehicle easement adjacent to the North County Lifeguard Station from 30 feet to 100 feet.
Amendment 2 (Cont'd)	12/11/98	Removed specific protocol for the licensing of commercial fishermen from the ITP, and instead allowed the County to license anyone possessing a valid Florida commercial fishing license.
		Required the PSS to approve and monitor mechanical beach cleaning instead of having to be present during all beach cleaning operations.
		Removed specific protocol for managing beachfront lighting from the ITP and instead required USFWS approval of a Beach Lighting Management Plan.
		Removed the requirement that daily sea turtle nesting surveys had to begin at dawn.
		Changed the production schedule of maps and data summaries related to sea turtle monitoring from bi-weekly to "periodically at the request of the USFWS or as otherwise needed to manage human activities on the beach".
		Removed specific procedures for nest marking, nest relocation, and determination of reproductive success from the ITP and instead

		required that these activities be conducted in accordance with Florida Fish and Wildlife Conservation (FWC) Guidelines.
		Added a requirement for a USFWS-approved program to survey for washback hatchlings.
		Removed specific procedures for handling daytime sea turtle nesting events from the ITP and instead required USFWS approval of an SOP and any changes thereto.
		Changed the IPSCC meeting requirement from bi-monthly to bi-monthly during the nesting season and on an as-needed basis during the remainder of the year.
		Added specific issues to be addressed in a Volunteer Plan and required USFWS approval of the Plan and any changes thereto.
		Permitted County staff to conduct training using PSS-approved curricula instead of requiring the PSS to personally conduct all HCP training. Also removed specific training topics as a condition of the ITP and instead permitted curricula tailored to target audiences.
		Changed the requirement that full-time Beach Services staff receive HCP training from annually to biannually.

Amendment	Date	Activities Authorized or Modified
Amendment 2 (Cont'd)	12/11/98	Deleted the requirement that a turtle watch and other eco-tourism programs be developed by the PSS and instead allowed the County and/or private sector to develop those programs as demand arises.
		Clarified that the distribution of brochures showing driving areas and describing HCP regulations only had to be made available to motorists accessing the beach during periods when toll booths are in operation.
		Clarified that the requirements for reporting dead, injured or sick sea turtles only applied to those events that are causally related to ITP-regulated activities.
Amendment 3	6/11/99	Changed ITP number from PRT-811813 to TE811813.
Amendment 4	10/29/99	Allowed heavy construction equipment and related vehicle access to Natural Beach Management Areas (BMAs) and the CZ between 11/01/99 and 03/15/2000 for emergency repairs to public and/or private property damaged by Hurricanes Dennis, Floyd, or Irene as authorized by FEMA.
Amendment 5	01/12/01	Permitted commercial fishermen unlimited vehicular access to public driving areas outside the sea turtle nesting season.
		Permitted concessionaires to dispose of trash in beach receptacles provided the trash does not overflow the cans rather than having them remove all trash to off-beach receptacles.
		Changed the requirement that concessionaires and commercial fishermen receive HCP training from annually to biannually.
		Clarified that a log of high tide beach closures is only required during periods when the toll booths are in operation.
Amendment 6	11/27/01	Allowed heavy construction equipment and related vehicle access to Natural BMAs and the CZ between 12/01/01 and 03/31/02 for emergency repairs to public and/or private property damaged by severe erosion during the fall of 2001, as authorized by State and Federal agencies.
Amendment 7	01/23/03	Allowed heavy construction equipment and related vehicle access to Natural BMAs and the CZ between 01/23/04 and 03/31/03 for removal and replacement of two failing residential seawalls.
Amendment 9	12/05/03	Allowed heavy construction equipment and related vehicle access to Natural BMAs and the CZ between 12/05/03 and 01/31/04 for the removal of derelict pilings and a grounded commercial shrimp boat from the beach.

Amendment	Date	Activities Authorized or Modified
Amendment 10	10/22/04	Allowed heavy construction equipment and related vehicle access to Natural BMAs and the CZ between 09/23/04 and 04/30/05 for emergency repairs to public and/or private property damaged by Hurricanes Charlie, Frances, or Irene, as authorized by FEMA.
Amendment 11	11/07/05	Renewed ITP #TE811813 for a period of 25 years.
		Added the piping plover as an additional covered species.
		Expanded the Plan Area to include inlet beaches.
		Extended the public driving area 200 feet north of Granada Blvd. in Ormond Beach.
		Authorized construction vehicles to access Natural BMAs and the CZ year-round for emergency shoreline protection projects, storm cleanup and damage assessment, removal of hazardous materials, debris and/or obstacles from the beach that pose a public health or safety risk, and recovery of grounded boats and grounded planes. These activities must be properly permitted and approved and monitored by the County.
		Authorized construction vehicles to access Natural BMAs and the CZ outside the nesting season for non-emergency coastal construction projects permitted by local, State, and/or Federal agencies provided that they do not result in take of listed species or that such take has been authorized by appropriate State and/or Federal agencies.
		Authorized vehicles used for scientific research and monitoring to access Natural BMAs and the CZ year-round when approved and monitored by the County.
		Imposed new mitigation requirements, including a sea turtle rehabilitation facility at the Marine Science Center and restoration of 400 feet of dune habitat.

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LIST OF ABBREVIATIONS

ACOE	United States Army Corps of Engineers
ATV	All-Terrain Vehicle
BLMP	Beach Lighting Management Plan
BMA	Beach Management Area
BPO	Beach Safety Officer
CCCL	Coastal Construction Control Line
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species in Wild Fauna and Flora
CNS	Canaveral National Seashore
Comp Plan	Volusia County Comprehensive Plan
CZ	Conservation Zone
DBS	Division of Beach Safety (formerly Beach Services)
EA	Environmental Assessment
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FIND	Florida Inland Navigation District
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HOI	Hatchling Orientation Index
IMP	Inlet Management Plan
IPSCC	Interagency Protected Species Coordination Committee
ITP	Incidental Take Permit
IUCN	International Union for the Conservation of Nature (World Conservation Union)
MHW	Mean High Water
MSC	Marine Science Center
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NPSRA	North Peninsula State Recreation Area
PPH	Principal Permit Holder
PSS	Protected Species Specialist
SSC	Species of Special Concern
TFZ	Traffic-Free Zone
USC	United States Code
USFWS	United States Fish and Wildlife Service
UTV	Utility Terrain Vehicle
VCEM	Volusia County Division of Environmental Management

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EXECUTIVE SUMMARY

The wide, flat, hard-packed sands of Volusia County's beaches are ideal for driving, and vehicles have had access to these beaches since the early days of the automobile. During the early part of the last century, many land speed records were set on the County's beaches, the same that later gave rise to the sport of stock car racing. Obviously, beach driving has been a long-standing social tradition and a key element in the economic development of the County.

The Volusia County Home Rule Charter (hereinafter referred to as the "Charter") grants the County sole authority over beach management issues, including within the boundaries of constituent municipalities. The Charter also mandates that the public be provided adequate access to County Beaches. One of the requisite elements for ensuring public access is accommodation for parking. Historically, beach users traveling to County Beaches by car simply parked on the beach, thereby reducing the need for acquiring off-beach parking. Throughout the period that the ITP has been in effect, available and affordable land for off-beach parking has been at a premium. Because of off-beach parking shortages, as well as for economic and social reasons, the County has a compelling interest in wanting to provide its citizens and visitors with continued public vehicular access to its beaches.

Although a lawful and traditional activity, beach driving has the potential to impact sea turtles and their nesting habitat, as well as critical wintering habitat of the federally threatened piping plover. These impacts are prohibited "takings" under the Endangered Species Act of 1973. In February 1996, the County applied to the U.S. Fish and Wildlife Service (USFWS) for an Incidental Take Permit (ITP) to authorize the taking of federally protected species incidental to beach driving and vehicular beach access-related activities regulated and/or managed by the County. A Habitat Conservation Plan (HCP), a statutory component of the ITP application, was prepared and submitted to the USFWS. Following extensive public review of the HCP, and considering public comment, the Service issued an ITP (PRT-811813/TE811813) to the County on November 22, 1996. The ITP has been amended 11 times, the most recent of which extended its term to December 31, 2030.

Three species of sea turtles regularly nest on County Beaches, while two others are rare nesters. During the period that the ITP has been in effect, extensive data has been collected to assess the extent of "take" of these species causally related to beach driving. Analyses of this data conducted in support of ITP renewal indicated that the take has been minimal. Between 1997 and 2001, only six hatchlings were reported to have been directly impacted, and one unmarked nest was reportedly run over by a public safety vehicle. Indirect impacts to sea turtles have been limited primarily to hatchling encounters with vehicle ruts. There is no evidence to suggest that vehicular activity has affected either nesting success (the percentage of turtle crawls resulting in nests) or hatchling productivity. Nesting by loggerhead turtles increased significantly on County Beaches between 1988 and 2000.

The success of the County's HCP in minimizing take has resulted primarily from programs that spatially and temporally limit the potential for sea turtle-vehicle interactions. The general public is prohibited from accessing the beach at night when the vast majority of nesting and hatching occurs. Additionally, public no-driving zones and the establishment of marked Conservation Zones in public driving areas limit vehicle interactions with nests. Only about five percent of the nests deposited each year on County Beaches remain outside of these protected areas. These nests are conspicuously barricaded so vehicles can avoid them.

Federal designation of a 1.2 km (0.75 miles) section of the Plan Area as Critical Habitat for wintering piping plovers required adding this species to the list of species for which take was requested. Although no impacts to the piping plover have been documented during the period that the ITP has been in effect, vehicles may potentially harass resting birds and impact Critical Habitat, thereby causing a take. To fully encompass a potential incidental take resulting from vehicular activities within designated Critical Habitat for wintering piping plovers, the existing Plan Area was expanded to include both inlet shorelines west from the jetties to the intersection of the Ponce de Leon Inlet and Halifax River.

This HCP has been updated to describe the current programs, policies, and procedures implemented by the County, with approval from the USFWS, to minimize and mitigate the take of sea turtles and piping plovers within the Plan Area over the term of the ITP. The Plan Area encompasses the entire Volusia County coastline from the Flagler/Volusia Line to the Volusia/Brevard Line, including the sandy beaches bordering the Ponce de Leon Inlet. It is bounded on the east by the mean low water line and on the west by the bulkhead line or line of permanent vegetation. Within the Plan Area, the County exercises regulatory authority over those 35.6 miles of beaches (County Beaches) extending from the southern boundary of the North Peninsula State Recreation Area (NPSRA) to the northern boundary of the Canaveral National Seashore (CNS).

Under the HCP, vehicles used for emergency responses, public safety, or engaged in activities necessary to implement the terms and conditions of the ITP (e.g., sea turtle monitoring, code enforcement, HCP management, etc.) are allowed unlimited access to all County Beaches and may access other beaches within the Plan Area in support of public safety operations, if requested. Vehicles involved in sanitation, beach maintenance, and permitted coastal construction projects may also access all areas, but under specific constraints governing access times, access locations and operating procedures. With few exceptions, concessionaires, commercial fishermen and the general public may only access certain areas of the beach and only during daylight hours.

The HCP segregates turtles from vehicles through four basic mechanisms: (a) public access is limited to daylight hours, and public safety vehicles that operate at night must follow specific guidelines; (b) public driving is limited primarily to those areas where nest densities are lowest; (c) in those areas where public driving is permitted, all driving and parking must occur outside a marked Conservation Zone near the dune, where the

majority of nests are typically deposited; and (d) all nests are conspicuously marked so they can be avoided.

Natural Beach Management Areas (BMAs) are areas that are off limits to public driving. These areas, totaling 18.9 miles in length, or 53 percent of County Beaches, support relatively high nest densities and have historically had less intense coastal development than elsewhere in the County. There are three (3) Natural BMAs:

- The southern boundary of the NPSRA to a point 200 feet north of Granada Blvd. in Ormond Beach;
- Emilia Ave. to Beach Street in Ponce Inlet; and
- 27th Street in New Smyrna Beach to the northern boundary of the CNS.

Public driving is limited to Urban and Transitional BMAs, which collectively comprise 16.7 miles of County Beaches. These areas typically support lower nesting densities and more extensive coastal development than Natural BMAs. There is a single Urban BMA located between Zelda Blvd. and Florida Shores Blvd. in Daytona Beach. Within this 5.0-mile area, a 15-foot wide Conservation Zone is present. The remaining 11.7 miles of public driving area is segregated into four (4) Transitional BMAs, each containing a 30-foot wide Conservation Zone.

Conservation Zone (CZ) boundaries will be established prior to the beginning of each nesting season and then will remain in place throughout the remainder of the year, unless a storm event requires a major realignment. The marked boundary will be inspected daily, and all reported missing posts will be replaced within 48 hours, unless otherwise provided in the CZ Boundary Management Plan.

The County has developed beach policies to regulate vehicular access to, and traffic upon, County Beaches. Among other things, these policies describe: (a) beach opening and closing procedures; (b) methods for regulating traffic during unusually high tides to prevent encroachment into the Conservation Zone; and (c) procedures for controlling traffic and protecting sea turtles during occasional daytime nesting and hatching events.

The sea turtle nesting season in Volusia County extends from May 1 through October 31 each year, the inclusive period during which adult females come ashore to nest and hatchlings leave their nests to enter the ocean. Sea turtle nesting surveys will be performed each day between May 1 and September 30. Every nest documented by monitoring personnel will be conspicuously marked using established protocol. Barriers for nests outside of the Conservation Zone in public driving areas will be enlarged and traffic cones added to make them even more conspicuous.

Daily sea turtle monitoring activities will commence in driving areas first to allow public vehicles to access the beach at 8:00 AM. The public will not be allowed to access those areas until the daily survey is complete and all nests have been marked. Concessionaires, commercial fishermen, ramp graders, and sanitation vehicles may access the beach prior to 8:00 AM if the daily survey is completed before that time.

During the course of the daily surveys, monitoring personnel will promptly report missing barriers at viable nest sites to the County if the barrier cannot be quickly reestablished using redundant marking techniques. Missing nest barriers outside the Conservation Zone in public driving areas will be reestablished prior to allowing vehicles on that section of beach. Additionally, monitoring personnel will notify the County of all observed vehicle-related impacts to sea turtle nests, adults and/or hatchlings.

The County will obtain GPS locations for all marked nests. This data will be used to assist monitoring personnel in reestablishing lost nest barriers, as needed, and to generate geographically sequential lists of nests for use in rut removal operations. The County will be responsible for removing ruts and other large debris from in front of nests that have reached 46 days of incubation (60 days for leatherback nests). Personnel involved in this program will routinely inspect nest sites in public driving areas for the presence of ruts and will rely on sea turtle monitoring personnel and HCP Program staff to report ruts requiring attention in Natural BMAs. Routine rut removal operations will be performed in the late afternoon. Hand rakes and/or towed equipment will be used to flatten ruts within a 30-foot-wide path from the nest barrier to the wetted (intertidal) portion of the beach.

During the late summer and fall, the County will be responsible for conducting surveys for post-hatchlings during periods when large quantities of seaweed are washing ashore to ensure that the small turtles are not run over by vehicles on the beach. Post-hatchlings, or washback hatchlings, are turtles that have left nesting beaches further south, spent weeks or months at sea, and are then washed back onto the beach with seaweed during storm events. Washback hatchlings will be collected under a State permit issued to the County by the Florida Fish and Wildlife Conservation Commission (FWC) and will be transported to the County's Marine Science Center in Ponce Inlet for evaluation, treatment, and/or rehabilitation prior to release. A voluntary program consisting of volunteers under the supervision of the County's HCP Program staff has been developed to augment the recovery of washback hatchlings.

Special events on the beach are an integral part of the County's social fabric. All special events involving 51 or more people and the setup of equipment or facilities on the beach will require a special permit from the County. In the application, event organizers must describe the type of activities that will occur, the proposed location, the time of day the event will be held, and all equipment that will be placed on the beach in support of the event. In issuing a permit, the County will impose a variety of environmental conditions to minimize the potential for impacts to sea turtles and/or their nesting habitat. Events held in Natural BMAs will be limited principally to low impact activities, involving relatively few people, such as weddings, beach runs, socials, and church events. High impact events, such as those surrounding Spring Break, Speed Weeks, and Bike Week, as well as beach concerts, volleyball tournaments, and other competitive sporting events, will be held in Urban and Transitional BMAs.

The minimization measures established for the protection of sea turtles and their habitat also benefit piping plovers. The establishment of Natural BMAs and the CZ reduce the potential for disturbances to resting birds and protect their habitat. Additionally, the posting and enforcement of a 10 miles per hour speed limit for vehicles on the beach and the placement of signs warning drivers to look out for wildlife reduces the potential for collisions with resting plovers. A winter census of piping plovers within federally designated Critical Habitat will be conducted annually to better determine the extent of habitat utilization by this species on County Beaches.

The HCP describes a number of voluntary conservation measures to minimize impacts to migratory birds on County Beaches. These include annual spring surveys to identify and protect known shorebird nesting sites; a program for recovering live, incapacitated migratory birds from County Beaches and transporting them to licensed wildlife care facilities; establishment of a bird rehabilitation facility at the County's Marine Science Center in Ponce Inlet; development of public education and awareness programs/materials; monthly surveys of piping plovers and other shorebirds in the vicinity of Ponce de Leon Inlet and adjacent tidal flats; and participation in the Volusia Shorebird Partnership.

All personnel involved in implementation of the HCP will undergo initial and recurrent training. Training will be tailored to specific audiences and will be sufficient in scope to ensure that everyone understands his/her responsibilities under the HCP. Initial training will be provided to all existing HCP personnel during the first year that the ITP is renewed and then minimally every five years thereafter. New employees will undergo HCP training upon hiring. Any substantive changes to HCP programs or policies that may occur between recurrent training programs will be forwarded in writing to all affected groups.

As mitigation for unavoidable impacts to sea turtles and piping plovers, the County has developed a comprehensive public awareness and education program and sea turtle rehabilitation facility at the Marine Science Center (MSC) in Ponce Inlet. The rehabilitation facility is operated under a State permit issued by FWC and is staffed with knowledgeable and experienced personnel. It is equipped with numerous tanks of various dimensions that allow for the evaluation, care and rehabilitation of locally stranded juvenile and adult turtles as well as injured hatchlings and washbacks. The MSC contracts with a veterinarian at the University of Florida's College of Veterinary Medicine to provide specialized medical attention, as needed.

The MSC addresses a critical need in Florida's Sea Turtle Stranding and Salvage Network. Prior to its operation' there was a general lack of capacity at the State's rehabilitation facilities. The closest coastal facilities were in Orlando and Juno Beach (Palm Beach County), and it often took hours for sick or injured turtles to receive proper evaluation and treatment. Between 2008 and 2012, 513 stranded juvenile and adult sea turtles were received and treated at the MSC, with 40 percent of those originating in Volusia County. Approximately 35 percent of all live turtles received by the Center were successfully rehabilitated and returned to the wild.

In addition to its sea turtle rehabilitation function, the MSC provides a variety of educational programs aimed at increasing public awareness of the plight of sea turtles and their nesting habitat. These programs include school-age curricula, field trips, adult lecture series, exhibits and displays, and tours of the rehab facility. MSC public awareness programs also address various problems faced by resident and migratory shorebirds on County Beaches.

The County also provided mitigation to offset potential impacts to sea turtle nesting habitat associated with the extension of public driving 200 feet north of Granada Blvd. in Ormond Beach, which was authorized under Amendment 11 to the ITP. The County undertook a dune restoration project involving the planting of sea oats and other native dune vegetation along 400 feet of beach; the project was successfully completed in 2009.

The HCP will be managed through Volusia County's Division of Environmental Management (VCEM). Through assignment or contract, VCEM will appoint a Protected Species Specialist (PSS) who will provide professional guidance and oversight to all technical aspects of the HCP. The PSS will be responsible for developing and/or monitoring protected species programs to ensure that they are meeting their intended objectives.

An Interagency Protected Species Coordination Committee (IPSCC) has been established to facilitate inter-departmental communication and coordination among the various County divisions, departments, and offices that have responsibilities under the HCP. The IPSCC meet annually prior to the beginning of each nesting season. Thereafter, VCEM will convene meetings on an as-needed basis to discuss relevant issues involving sea turtles and piping plovers on County Beaches, address HCP program deficiencies, and review personnel and material resource allocations to ensure that the County is able to carry out its responsibilities under the ITP.

By March 31 of each year, the County will prepare and submit an Annual Report to the USFWS summarizing sea turtle nesting data and annual piping plover census data, assessing general compliance with ITP terms and conditions, and evaluating overall HCP performance in achieving its biological goal. Every five (5) years that the ITP is in effect, the USFWS and the County will meet formally to review HCP program performance and discuss adjustments to policies, procedures, and/or mitigation needed in response to changes in organizational structure, beach conditions, vehicular traffic patterns, sea turtle nesting trends, and/or the level of vehicle-related take occurring on County Beaches. More frequent meetings may be convened, if necessary, at any time by either the USFWS or the County to address HCP or ITP issues requiring immediate attention.

1

INTRODUCTION

Historical Perspective on Beach Driving

Volusia County's approximately 50 miles of Atlantic coast beaches have a long history as a major destination for tourists from around the world. One of the main attractions is the opportunity to drive on the beach. The wide, flat, hard-packed sands of local beaches are ideal for this activity, and they have been accessible to vehicles since the early days of the automobile.

The sport of automobile racing began in Volusia County with daredevil drivers taking speeds to new limits on the hard-packed sands of Daytona Beach, the "World's Most Famous Beach." Many land speed records were set on County beaches between the turn of the century and the mid-1930s, at which time speed runs gave way to stock car racing. The popularity of racing on the beach eventually gave rise to the Daytona International Speedway, one of the most famous racing facilities in the world. The Speedway now attracts hundreds of thousands of visitors to the beaches each year. Clearly, the long history of driving and racing on the beach has been central to the creation of a local identity for this beach community and has been a key element in the economic development of the region.

Beach Usage

The beaches are a major component of the local economy and are a valuable County, State, and National resource. Surveys report that the primary reason most people visit Volusia County is the beaches. In 2000, during the nine-month period from February through November, an estimated 1.24 million vehicles were counted entering the County beaches (EAI 2001a). At an estimated average occupancy of three persons per vehicle (Kimley-Horn and Associates 1987), the total vehicle-related population on the beaches during that period exceeded 3.7 million persons. In addition to visitors driving on the beaches, the original Environmental Assessment (EA) prepared in support of the County's Incidental Take Permit (ITP) application estimated that during the summer of 1994 an average of 21,115 persons arrived at the beaches daily from one of the 18,000 lodging rooms and condominium units along the beach. Collectively, this equates to nearly 35,000 people per day on the County's beaches during summer, the peak tourist season.

Need for Continued Vehicular Access to the Beach

The Volusia County Home Rule Charter (Section 205, Laws of Florida Special Acts, Chapter 70-966, as amended) grants the County sole authority over beach management issues, even within the municipal boundaries of constituent coastal cities. It also

mandates that the public be provided adequate public access to County Beaches. One of the requisite elements for ensuring public access is accommodation for parking. Historically, beach users traveling to County Beaches by car simply parked on the beach. Insofar as 25.7 miles of beach were accessible to vehicles, there was ample parking, even during the busiest holiday periods. Because of this traditional and lawful activity, few accommodations were made for off-beach parking. Although the County continues to pursue acquisition of new off-beach parking locations, development along the coastline and high costs for undeveloped property limit available options.

Authority for Managing Local Beaches

Volusia County is aware of its need to effectively manage its beaches for the safety, welfare, and enjoyment of visitors and residents alike. In 1983, Volusia County and its constituent municipalities entered into the Volusia Inter-Local Beach Agreement. This agreement permitted the development of uniform beach regulations for the purpose of establishing long-term plans, beachwide management, and long-range financial planning. In 1986, Volusia County became responsible for the beaches through a charter amendment. The Volusia County Charter specifically delineates the jurisdiction of the County within municipal boundaries on matters relating to the beaches. The County may exert regulatory authority only over the lands and waters lying seaward of the seawall or line of permanent vegetation and the approaches over which the public may ingress or egress the beach.

Conflict Between Traditional Beach Uses and Protected Species

Volusia County's beaches are utilized by a number of State and federally protected species, the most conspicuous of which are sea turtles. Each year between May and September, several species of threatened or endangered sea turtles come ashore on local beaches and collectively deposit several hundred nests. Additionally, piping plovers occasionally utilize certain areas of County Beaches as resting habitat during the winter. In 2001, the Federal government designated 1.2 km (0.75 miles) of beach south of Ponce de Leon Inlet as Critical Habitat for wintering piping plovers.

Both the State of Florida and the Federal government list all species of sea turtles that nest on Volusia County's beaches as threatened or endangered. All life history stages, including adults, eggs, and hatchlings are protected under the Endangered Species Act (ESA or Act) of 1973, as amended, and its implementing regulations (Title 50 Code of Federal Regulations Section 17; 50 CFR 17). Section 9 of the Act prohibits the "taking" of any endangered or threatened species. The Atlantic Coast population of the piping plover is listed federally as threatened.

The ESA defines *take* as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct." *Harass* and *harm* are further defined in the Code of Federal Regulations. *Harass* is defined as "an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to

such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, and sheltering." *Harm* is defined as an act "which actually kills or injures" listed wildlife. Therefore, any activity or omission, including the disruption or modification of habitat used by federally listed wildlife species, that significantly alters the behavior of these species or creates the likelihood of injury or death to these species may constitute a violation of section 9 of the ESA.

Vehicular activities on the beach have the potential to impact nesting turtles, eggs and hatchlings and interfere with the utilization of critical wintering habitat by the piping plover, both of which constitute takings prohibited under the Act. As long as vehicles continue to operate on County Beaches, there will be a potential for impacting adult sea turtles, their eggs and/or offspring during the nesting season. The nesting season, the inclusive period during which adult sea turtles are coming ashore to nest and hatchling sea turtles are emerging from their nests to enter the sea, is established by the Florida Fish and Wildlife Conservation Commission (FWC) and is based on long-term Statewide data. In Volusia County, nesting season is officially defined as May 1 through October 31.

Besides driving, there are a variety of other human impacts to sea turtles and piping plovers on Volusia County's beaches. These include: public and private beachfront lighting; seawalls (present along the vast majority of highly urbanized areas, such as Daytona Beach); special events; human presence on the beach at night; destruction of dunes through natural and human (non-vehicular) activities; trash and objects on the beach; and coastal construction, such as beach nourishment, dune restoration, seawall repair, and wind-blown sand removal. Consequently, Volusia County recognized the need for coordinating beach activities in a manner that minimized the potential for impacts to the natural beach/dune environment and the protected species that reside there.

Evolution of Habitat Conservation Plan

In 1992, the County Manager provided the County Council with a Beach Management Plan. This plan presented the past, current, and future projections of beach use and detailed the management plan that remains in effect. This management plan includes the enforcement of the following codes or regulations that pertain to sea turtles and other protected species that occur on the beaches:

- U.S. Endangered Species Act (ESA) of 1973, as amended;
- Florida Statute 379.2431, (Marine Turtle Protection Act);
- Florida Rule 68E-1, Florida Administrative Code, Prohibition against the take, possession, disturbance, mutilation, destruction, selling, transference, molestation, and harassment of sea turtles, nests, or eggs.
- Volusia County Ordinance, Minimum Lighting Standards (No. 89-60, as amended);
- Volusia County Lighting Ordinance (No. 2008-25);
- Volusia County Ordinance, Minimum Standards for Coastal Protection (91-42, as amended);

- Volusia County Ordinance, Minimum Standards for Beaches and Dunes (01-35, as amended)
- Volusia County Comprehensive Growth Management Plan; and
- Volusia County Beach Code.

In 1995, Shirley Reynolds and Rita Alexander, acting as plaintiffs on behalf of the loggerhead turtle (*Caretta caretta*) and the green turtle (*Chelonia mydas*), filed an action in court against the County Council under the citizen suit provision of the ESA, 16 U.S. Code (USC), 1540(g)(1)(A), for violations of 16 USC, 1538(a)(1)(B), which prohibits the take of a federally listed endangered species without an exemption granted by the U.S. Fish and Wildlife Service (USFWS or the Service). The plaintiffs requested that the court order Volusia County, as the Defendant, to prohibit all driving on Volusia County beaches from May 1 to October 31, the sea turtle nesting season, and adopt and implement Florida's Model Lighting Ordinance (USDC 1995).

The plaintiffs claimed that driving on the beach caused death and injury to loggerhead and green turtles during the nesting season. The plaintiffs also claimed the County's lighting ordinance was ineffective in preventing hatchling disorientation. On August 1, 1995, the court enjoined the County from permitting vehicles on it's beaches from one hour before sunset to one hour after sunrise until November 1, 1995. The court also enjoined the County from permitting any vehicles to enter the previously established thirty-foot (30-foot) Conservation Zone. Since the County already had ordinances prohibiting such activities, the court was, in this case, ordering strict enforcement of the it's ordinances.

The court found the evidence presented did not support the claim that daytime traffic was likely to result in the take of sea turtles. Although evidence indicated take resulting from artificial lighting, the court rejected the claim that the County Lighting Ordinance was likely to result in the take of sea turtles and denied the plaintiffs' request for action in matters related to lighting. The court also ruled that the County could move for dissolution of the court's order if it received a permit from the U.S. Secretary of the Interior pursuant to section 10(a)(1)(B) of the Endangered Species Act.

The County applied to the USFWS for an Incidental Take Permit (ITP). Because of the court's ruling, authorization for take was sought only for those impacts causally related to beach driving. A Habitat Conservation Plan (HCP), a statutory component of the ITP application, was prepared by Volusia County and submitted to the Service. The HCP described the various programs, policies, and measures proposed to minimize and mitigate the take of sea turtles causally related to beach driving on the County's Beaches.

Issuance of Incidental Take Permit

In accordance with implementing regulations of the ESA found in 50 CFR 17, the Service prepared an Environmental Assessment (EA) in support of its proposal to issue an ITP to Volusia County. The EA considered the biological requirements of sea turtles and other protected fauna and flora potentially affected by the County's beach driving

policies, assessed the extent to which take would likely result from vehicular traffic, and considered the effect of that take on the continued existence and recovery of affected species in the wild. Additionally, the EA assessed the social, economic, and environmental impacts potentially resulting from the proposed action, as well as those resulting from alternatives to the proposed action, such as removing cars from the beach.

Following both internal and public review of the EA and HCP, and considering public comment, the Service issued an ITP (PRT-811813/TE811813) to the County on November 22, 1996. Species covered under the ITP included loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles. Issuance of the ITP was conditioned upon the County's adherence to the minimization and mitigation measures contained in the HCP and other provisions set forth in the Permit. The term of the initial ITP was for a period of five years with an expiration date of December 31, 2001.

In October 2001, the County made application to the USFWS to renew the ITP, add an additional covered species, and amend certain covered activities. Amendment 11 to the ITP, issued November 7, 2005, extended incidental take coverage to December 31, 2030.

Substantive changes to the Amended HCP submitted in support of the ITP renewal application included: (1) addition of the piping plover as a covered species, (2) expansion of the Plan Area to include inlet beaches at Ponce Inlet, (3) allowance of vehicle operations for lawful construction activities, emergency operations, and storm response, (4) expansion of the public driving area in HCP Region 3 (moved 200 feet to the north of the Granada Blvd. vehicle access ramp), and (5) new mitigation measures (see TE811813).

Throughout the term of the ITP, the HCP has undergone minor updates to incorporate policies and procedures either formally authorized via ITP amendments or administratively agreed to by the USFWS. The HCP was last updated in June 2008. This update reflects those administrative changes that have been implemented by the County, with approval of the USFWS, as well as other program changes approved by the USFWS following the most recent 5-year review of Plan performance in 2011. Most of the background information included in this update, such as the Plan Area description and individual species accounts, is unchanged from the previous version (June 2008). The primary focus of this update is to ensure that descriptions of procedures, policies and programs remain current. Up-to-date information pertaining to sea turtle nesting trends, natural and human-related factors affecting hatchling production, shorebird and sea turtle rehabilitation statistics, voluntary conservation measures, and HCP performance can be found in the ITP-required reports submitted to the Service each year (for example see EAI 2013).

2

GOALS AND OBJECTIVES

In formulating section 10 of the ESA, Congress instituted a process for the amelioration of conflicts between traditional and lawful land-use practices and the conservation of protected species. This HCP describes the various programs, policies, and other measures that the County will implement to minimize and mitigate the take of sea turtles and piping plovers, while continuing to allow the long-standing, traditional and lawful practice of beach driving in Volusia County. The HCP has been in effect since November 1996. Based on the analysis of monitoring data collected to date, the protective measures described herein have been extremely effective in minimizing the take of federally listed species. A thorough review of HCP performance is provided to the USFWS each year via Annual Reports, as described in Chapter 11.

Biological Goal

The primary goal provided herein is to implement a long-term comprehensive plan that will minimize the potential for harm to listed species covered under the ITP within the defined Plan Area, while allowing for continued vehicular access to the County's beaches. Conservation of covered species and their habitat will be achieved through good faith implementation of the minimization and mitigation measures described herein along with active enforcement of those measures.

Objectives

To achieve this goal, the HCP is intended to meet the following objectives:

1. Embrace Federal, State, and County statutes, codes, ordinances, and regulations pertaining to the conservation of natural resources on County beaches.
2. Effectively and efficiently coordinate the protection of sea turtles and other federally listed species on County beaches among various departments/divisions, contractors, volunteers, private citizens, beach users, and other affected stakeholders.
3. Allow for the continued use of County beaches by residents and visitors in a manner that will sustain the social, recreational, cultural, economic and environmental values of the beach, while minimizing impacts to protected species.
4. Provide visitors to County beaches with an opportunity for diverse beach experiences.

5. Pursue development of off-beach parking alternatives and other facilities in those areas where vehicular access is prohibited while guaranteeing public access.
6. Establish monitoring programs to generate the requisite data needed to assess the effectiveness of the HCP in meeting its biological goal.

Habitat Conservation Plan

This HCP presents a comprehensive plan for the protection of sea turtles and piping plovers within the beach jurisdiction of Volusia County. Characterizations of the local human setting, beach activities, and protected species issues presented herein are largely unchanged from the June 2008 update to the HCP.

Within the framework of the ESA, the intent of an HCP is to further a conciliatory process for creative partnerships between private interests, public interest groups, municipal governments, and State and Federal regulatory agencies for the protection of endangered species and their habitat. In preparing the original HCP, the potential impacts of vehicular access and other human influences were examined, and user groups, scientists, governmental entities, and other interested and involved parties were consulted extensively. During the period that the HCP has been in effect, there has been on-going interaction among various HCP participants and affected stakeholders. Additionally, Volusia County has established an excellent working relationship with the USFWS. Annual reports furnished to the Service have provided objective assessments of HCP performance, and the County has been responsive to concerns raised by the Service in regard to perceived program deficiencies.

In the HCP, submitted to the USFWS in support of ITP renewal, each of the activities related to vehicular access on the beach was delineated, and every foreseeable, realistic, adverse, direct, indirect, and cumulative impact of such activities was reviewed. For those issues where the impacts were uncertain and could not be scientifically resolved, conclusions were drawn in favor of protected species conservation. This approach was based, in large part, on the acknowledged fact that sea turtle protection was an inexact science, that considerable information regarding sea turtle behavior and biology at that time was lacking, and that determining the exact extent of impacts to sea turtles from covered activities was not possible.

The original HCP examined several alternatives for resolving conflicts between beach driving and protected species management. Insofar as the majority of activities proposed by Volusia County are unchanged from those previously authorized by the USFWS, an exhaustive alternatives assessment is not presented in this HCP.

As evidenced by USFWS authorized changes made to date to improve HCP programs, policies, and procedures, this HCP is designed as a dynamic document. It is structured to permit adaptive changes in response to new information derived from monitoring programs. Mechanisms have been established to facilitate dialogue between the USFWS and Volusia County in response to changing conditions and to allow for the timely

revision of procedures to better achieve intended program objectives or respond to unforeseen circumstances. This HCP can be implemented and enforced, and its performance effectively monitored.

During preparation of the HCP, monitoring data was only available for the four-year period from 1997-2000. This period, hereafter referred to as the Assessment Period, provided an opportunity to evaluate the effectiveness of the various programs, policies, and procedures implemented by the County to protect sea turtles and other listed species on County Beaches. More extensive and current information related to the County's on-going sea turtle monitoring program, as well as current assessments of HCP performance, can be readily obtained from the Annual Reports submitted to the USFWS each year.

3

PLAN AREA

Geographical Setting

Volusia County is located on Florida's northeast coast (Figure 1). It is bounded on the north by Flagler County and on the south by Brevard County. The County's 50.6 miles of coastline are comprised of two adjacent barrier islands separated by the Ponce de Leon Inlet (Ponce Inlet) midway along its coast. The north barrier island extends for about 50 miles between Ponce Inlet and Matanzas Inlet in St. Johns County. The southern 27.9 miles of this barrier island lie in Volusia County. The south barrier island extends approximately 35 miles from Ponce Inlet to the Kennedy Space Center in Brevard County. The northern 22.1 miles of this island are in Volusia County.

With the exception of the 0.6 miles across the mouth of Ponce Inlet, Volusia County's entire coastline is comprised of sandy beaches. Thus, there are approximately 50.0 miles of Atlantic Ocean beaches in the County. From north to south, constituent municipalities fronting the County's beaches include Ormond Beach, Daytona Beach, Daytona Beach Shores, Ponce Inlet, and New Smyrna Beach (Figure 1). Unincorporated areas include the towns of Ormond-by-the-Sea, Wilbur-by-the-Sea, and Bethune Beach. At the northern tip of the Volusia County coastline is the North Peninsula State Recreation Area (NPSRA), and at the southern tip is the Canaveral National Seashore (CNS). These two parks are managed by the State and Federal government, respectively.

Plan Area

For the purposes of this HCP, the County's coastline is divided into two areas. The first is the Plan Area, for which take has been requested under the ITP, extending from the Flagler County Line on the north to the Brevard County line on the south. The Plan Area encompasses the entire 50.0 +/- miles of Atlantic Ocean beaches in the County, including those in the NPSRA and the CNS, as well as the beaches on the north and south shores of Ponce Inlet from the jetties west to the intersection of the Inlet and Halifax River. Even though the County does not exercise regulatory authority in the State and Federal parks, they are included because County public safety and/or emergency vehicles may have to enter those areas under emergency conditions. In so doing, they may impact protected species that occur there. The Plan Area encompasses approximately 1,244 acres.

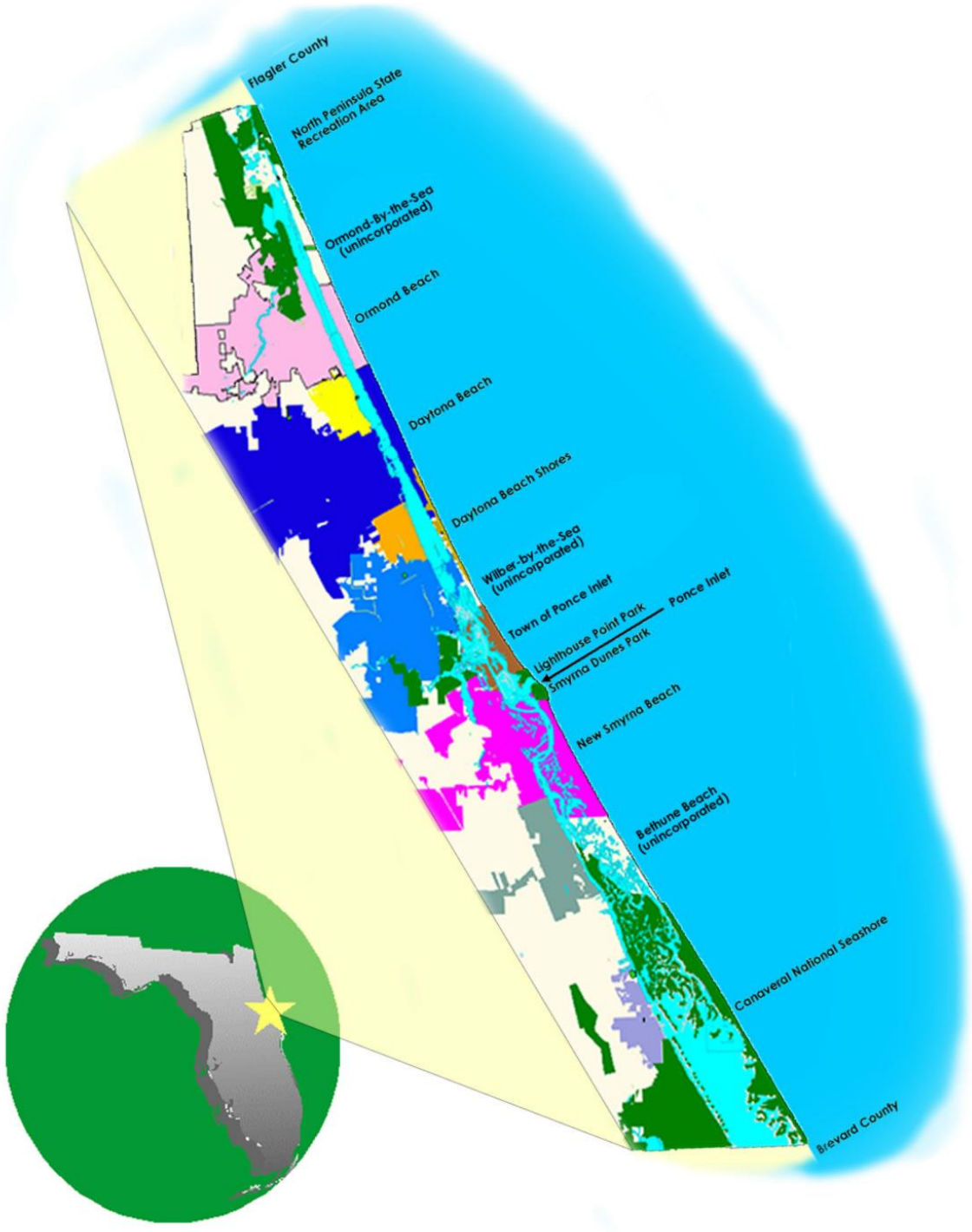

Figure 1. Volusia County coastline showing municipalities and large public parks.

The second area is a subset of the first and hereafter referred to as County Beaches, including those beaches over which Volusia County exercises sole beach management and regulatory authority. This area contains the Inlet beaches and 35.6 miles of sandy beach along the Atlantic Ocean (approximately 1,063 acres) from the southern boundary of the NPSRA to the northern boundary of the CNS.

The authority to regulate County Beaches arises from the Volusia County Home Rule Charter, which defines the beaches as follows:

> "Beach" refers to lands and waters lying seaward of the seawall or line of permanent vegetation and within three miles seaward of the mean low water mark, and "approach" refers to property over which there exists a public right of way by title, dedication, prescription, custom, or otherwise for beach ingress and egress between the beach and the easternmost north-south roadway. All beaches and approaches within and without municipalities are included. "Coastal area" includes all lands lying east of Interstate 95 as well as contiguous urbanized areas (Special Acts, Chapter 70-966, Article II, Section 205, as amended.

)

Substantial portions of the Beach within the Plan Area are fronted by seawalls and other types of armoring structures. Depending on the age and location of these structures and the extent of beach erosion at any given time, they may or may not be located landward of the foredune. In addition to the Coastal Construction Control Line, established in 1991 by the Florida Department of Natural Resources (now the Florida Department of Environmental Protection) to regulate coastal construction activities, the cities with beachfront properties within Volusia County have established a bulkhead line, seaward of which limitations are imposed on construction. In some areas where no seawall or bulkhead is present and where a bulkhead line has not been established, Volusia County has used the terminology *line of permanent vegetation* as a means of identifying the landward extent of the County's jurisdiction. Consistent with these concepts, the landward edge of the Plan Area is defined as the bulkhead line or line of permanent vegetation. Other coastal habitats, such as the dunes, may be mentioned in this HCP but are not included in the Plan Area for which the ITP is being requested.

The sandy beach extends eastward from the dunes to the sand-water interface, the location of which varies with the tides. The Plan Area, including County Beaches, must include all areas under the control of Volusia County where sea turtles are likely to nest and over which the USFWS has jurisdiction for listed species. To meet all of these criteria, the mean low water line has been established as the eastern boundary of the Plan Area.

Therefore, the Plan Area covered under this HCP is bounded on the:

- North by the Flagler County/Volusia County Line;
- South by the Volusia County/Brevard County line;
- East by the mean low water line; and
- West by the bulkhead line or line of permanent vegetation.

County Beaches are bounded on the:

- North by the southern boundary of the NPSRA;
- South by the northern boundary of CNS;
- East by the mean low water line; and
- West by the bulkhead line or line of permanent vegetation.

Public driving is confined to those areas of County Beaches where the beach sand is sufficiently compacted to allow for safe vehicle operation and where the dry portion of the beach is wide enough to support two-way vehicular traffic. At the north end of the County, sediment compaction characteristics typically do not permit safe vehicle operation. At the south end of the County in the Bethune Beach area, the beach is typically too narrow to provide sufficient driving lane widths during high tide. The Volusia County Beach Code prohibits public driving on Inlet beaches.

State and Federally Owned Lands

Volusia County has no management authority over 11.7 miles of beaches within the CNS and 2.7 miles within the NPSRA. Jurisdiction and conservation plans for these areas are the responsibility of the National Park Service and the Florida Department of Environmental Protection (FDEP), respectively.

Potential incidental take of protected species by County employees may occur in the CNS and the NPSRA when Volusia County Beach Safety personnel are requested to provide services within these areas. Although these areas are included in the ITP, it is recognized that the State and Federal government have their own beach use restrictions.

Natural Systems

The entire length of Volusia County's coastline consists of a barrier island–estuarine lagoon system. This system is interrupted only by Ponce Inlet, a tidal inlet connecting the estuarine lagoon system inshore of the barrier islands with the Atlantic Ocean. The undeveloped areas of the barrier island consist of a high, often well-vegetated dune ridge backed by a dense shrub-thicket zone. There is no evidence of overwash fans or storm-surge platforms, indicating that the Volusia County barrier island system has been relatively stable throughout a period of sediment accretion. This building phase appears to have ceased, and the islands now may be entering a new phase of erosion (Hine 1989).

The natural ecosystems of the east coast of peninsular Florida can be separated broadly into distinct communities that exist as bands of varying width running parallel to the shore. These natural systems include open ocean, nearshore, beach-dune, barrier island, estuarine/lagoon, and mainland areas, each of which may be separated further into its individual components. The Plan Area has been defined as the sandy beach which exists in a long, narrow corridor bounded on the north and south by the Volusia County line, on the east by the mean low water line, and on the west by the line of permanent vegetation on the dunes or seawall, whichever is more seaward.

Nearshore Area

The nearshore area can be defined as the transition zone between the open water areas to the east and the terrestrial habitats to the west. The ocean bottom in this area is primarily sandy, with some mud overlying sand. The slope is relatively gradual when compared to other east coast areas. The 30-foot depth contour is typically 2,000 to 2,500 feet from shore. The rough sea conditions and high waves, which result in a high-energy beach zone, prevent rooted vegetation from becoming established in the nearshore zone. In fact, the development of runout conditions (rip tides) caused by fast washback through breaks in nearshore sandbars are a common occurrence in Volusia County. No coral reefs or other significant natural underwater features support biologically productive communities in this area, although stony coral (*Oculina* spp.) banks may be found further offshore (Myers and Ewel 1990).

The nearshore area is inhabited by a variety of invertebrates and fishes. Various starfish, such as weak and netted sea stars (*Luida* spp.) and mollusks, such as netted olive (*Oliva reticularis*) and moon snail (*Polinices duplicatus*), are present in varying numbers throughout the year. The sand dollar (*Mellita quinquiesperforata*) also is found in the nearshore environment. Many of the fishes are migratory species. Fish present include bottom-feeding species, mid-depth feeders, and species found primarily near the surface. Typical species present include pompano (*Trachinotus carolinus*), mullet (*Mugil* spp.), and halfbeak ballyhoo (*Hemiramphus brazilieusis*). Many of these finfish have an annual migration pattern that brings them into Florida waters during the fall. During the winter they generally remain close to shore where prey items are available, and during the spring and summer they return to more northerly latitudes.

The loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*) and, to a lesser extent, Kemp's ridley (*Lepidochelys kempii*) sea turtles also inhabit the nearshore areas. Jellyfish and other open ocean species typically are transported into coastal areas either by the Gulf Stream current, which flows toward the north, by wind, or by a combination of these two factors.

A variety of bird species are found in this area, often because of the abundance of surface-feeding fish that are preferred prey. Birds typically present include various gulls and terns, brown pelicans, and double-crested cormorants.

Beach-Dune System

The beach-dune area begins at the sand-water interface and extends landward across the sandy beach up to the line of permanent vegetation. Fauna of the sand-water interface include an abundance of relatively small invertebrates, such as the mole crab (*Emerita talpoida*) and coquina (*Donax* sp.), which serve as food for larger predators, like the calico crab (*Hepatus epheliticus*) and various shorebirds. Resident and migratory shorebirds may use the beach-dune system for resting, feeding, and/or nesting.

Bird life along the sand-water interface is quite varied, with many of the species being migratory animals that spend only a portion of their annual life cycle in Florida. Birds that are observed feeding in this area generally during the fall, winter, and spring include plovers (*Charadrius* spp.), willets (*Catoptrophorus semipalmatus*), and ruddy turnstones (*Arenaria interpres*). Most individuals of these species return to breeding areas to the north for the summer nesting season. Others, such as the least tern (*Sterna antillarum*), are present during the spring/summer breeding season and then return to South America during the winter. Occasionally, wading birds that are year-round residents, such as the snowy egret (*Egretta thula*) and great blue heron (*Ardea herodias*) are observed on the beach, though they typically prefer estuarine habitats.

The sandy portion of the beach between the land-water interface and the beginning of vegetation varies in width both in a north-south direction and seasonally. The calmer sea conditions and lower tides associated with the summer months results in a wider, sandy beach, in comparison with the narrower beach experienced during the higher tides and rougher sea conditions of winter. The unstable, shifting sands, severe salt spray, and lack of fresh water make this area relatively inhospitable for most plants and animals. However, it is this area that is most desired by human visitors to the beach. The abundance of people who flock to the beach throughout the year also affects the fauna present. Many of the wildlife species previously identified are not particularly tolerant of human presence.

At an elevation above the high tide line, conditions become less severe and sand gradually gives way to sparse vegetation. Tendrils of various creeping plants extend down the beach, such as railroad vine (also known as beach morning glory, *Ipomoea pescapre*); these plants are established more firmly at slightly higher elevations where they are less apt to be impacted by tidal inundation and beach erosion. Other salt-tolerant plant species that inhabit this frontal dune include sea oats (*Uniola paniculata*), sea rocket (*Cakile* sp.), and beach elder (*Iva imbricata*).

It is in this vicinity, near the transition from barren sand above the high tide line into the sparsely vegetated area, that sea turtles prefer to build their nests. The loggerhead, green, leatherback, and to a lesser extent, the hawksbill and Kemp's ridley sea turtles, all have been documented to nest on the beaches of Volusia County. Piping plovers occasionally occur on the beaches and inshore tidal flats adjacent to Ponce Inlet, while the southeastern beach mouse has been documented inhabiting the dune system at Smyrna Dunes Park on the south side of Ponce Inlet. All of these species are protected

by State and Federal regulations as endangered or threatened species.

Landward of this zone, dune vegetation becomes both denser and more diverse. Other plant species present in this area may include marsh hay cordgrass (*Spartina patens*), beach croton (*Croton glandulosus*), saw palmetto (*Serenoa repens*), and prickly pear cactus (*Opuntia* sp.). Tremendous human-related impacts to the natural environment have occurred in this area of the dune community. While large sections of this natural habitat still exist (primarily toward the northern and southern extremes of Volusia County), a significant portion of this habitat has been destroyed and replaced with seawalls, hotels, condominiums, and other structures. Widespread destruction of this community type has resulted in a reduction in the numbers of many plant species that are useful in preventing beach erosion. Loss of plants in this community also has resulted in the designation of several floral species as threatened, endangered, or species of concern by the State and Federal governments.

The original EA characterized the physical appearance of the beach dune system within the Plan Area and provided representative cross-sectional beach profiles throughout the County. The northernmost 7.5 miles of the north barrier island (from the Volusia-Flagler County line to Ormond-by-the-Sea) was described as consisting primarily of vegetated frontal dunes with crest elevations of ±20 feet National Geodetic Vertical Datum (NGVD) and variable dry beach widths from the toe of the dune to the Mean High Water (MHW) Line ranging from ±35 to 100 feet. Between Ormond-by-the-Sea and Daytona Beach Shores lies a 15-mile segment of beach that is relatively wide (±160 feet), highly urbanized, and fronted primarily by vertical armoring structures (e.g., seawalls). However, within this section there is a 3,000-foot segment containing single-family homes and vegetated dunes with no shoreline armoring. The remaining 4 miles of shoreline north of Ponce Inlet consist of a combination of seawalls and vegetated dunes, again with a characteristically wide (±200 feet) dry beach. Within one mile of Ponce Inlet, the beach is backed by vegetated dunes.

Approximately 2.5 miles of beach immediately south of Ponce Inlet is characterized by vegetated dunes with crest elevations near 20 feet NGVD and a relatively wide beach of approximately ±120 feet. Throughout the remainder of New Smyrna Beach, the beaches range from 150 to 230 feet in width and contain primarily seawalled properties with only limited vegetated dunes. An approximately 1-mile segment of Bethune Beach is fronted by vertical seawalls and sloping rock revetments and typically is characterized by a relatively narrow high tide beach (0–50 feet wide). The southernmost ±5 miles of Volusia County's shoreline (CNS) is fronted by dunes with crest elevations as much as 20 feet NGVD, highly variable beach widths, and little to no development.

Beach Sediments

County Beaches consist of two main types of sediments. For most of Volusia County, the beach is comprised of clean, fine, well-sorted quartz sand that produces a hard-packed, low, flat, wide profile that is ideal for beach-related activities. The rest of the beaches consist of coarser, darker sands with a significant percentage of shell

fragments. Where these sands occur, the beach slopes are steeper and narrower and do not pack firmly after inundation. These beaches are not suitable for vehicular traffic and certain other recreational activities.

The horizontal surface area of County Beaches fluctuates considerably because of the influence of semidiurnal tides (two high tides and two low tides daily) and seasonal weather patterns (e.g., storm activity). The historical shoreline position indicates that most of the beach/dune system has not undergone significant erosion and has not demonstrated drastic changes in shoreline orientation. Exceptions to this are the beaches near Ponce Inlet and Bethune Beach.

Beach sand median grain size for the shoreline north of Ponce Inlet is cited by Hine (1989) to be approximately 0.20 mm. Stapor and May (1983) reported a zone of longshore sediment transport divergence characterized by coarse, shelly, poorly sorted beach sands in the vicinity of Bethune Beach. Sediment data obtained and analyzed by the Coastal and Oceanographic Engineering Laboratory (1973) of the University of Florida on a southern Volusia County beach indicated a coarse material, with median grain diameters ranging from 0.33 mm to 0.53 mm along the profile (medium to coarse sand).

During 1996, in preparation for implementation of the HCP, sediment samples were analyzed from various locations along the coast (EAI 1997). Samples were collected at a point 15 feet seaward of the toe of the dune or armoring structure at a depth of 45 cm (17.8 in). They were partitioned into size classes using the categories of Folk (1968) and then compared among sampling locations (Table 1).

Most samples collected from County Beaches in 1996 were similar to one another with the exception of those in the north end of the County (Ormond-by-the-Sea), where coarser grained sediments contributed proportionately more to total sample weight (EAI 1997). Sediments remained relatively coarse in the northern portion of Ormond Beach before giving way to the finer-grained sediments comprising the wide-flat beaches characteristic of most County Beaches. No samples were taken south of Bethune Beach, where sediment conditions more closely approximate those at the north end of the County.

Upland Land Uses

North Barrier Island

The 27.9 miles of oceanfront property on the north barrier island of Volusia County is largely developed, containing about 60 percent of the seasonal housing units, high-density housing acreage, and hotel acreage in the coastal area. In an ecological inventory conducted for the Coastal Management Element of the Volusia County Comprehensive Plan (Comp Plan), more than 90 percent of the island was classified as urbanized. The only exceptions are the northernmost 4 miles and the southernmost 3 miles of the island.

Ocean frontage land uses include hotels, single-family homes and high-density condominiums. Residential and hotel uses are usually intermixed on adjoining parcels, although on long stretches of beachfront one use is typically dominant.

Only approximately 13 percent of the coastline consists of vacant, potentially developable land, two-thirds of which is in the Town of Ponce Inlet. Most of this is zoned for single-and multi-family residential development. The balance of the vacant land consists of narrow infill parcels fronting U.S. Highway A1A.

Table 1

Percent Composition of Sediments from Various Volusia County Beach Locations, June 1996.

Location	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay
Ormond-by-the-Sea	0.0	2.5	28.3	50.3	18.8	0.2	0.0
Ormond Beach (Standish – Granada)	0.0	0.0	0.7	21.3	75.8	2.3	0.0
Ormond Beach (Granada-Zelda)	0.0	0.0	0.3	6.4	79.4	13.8	0.1
Daytona Beach	0.0	0.0	0.0	1.0	83.3	15.6	0.1
Daytona Beach Shores	0.0	0.0	0.0	4.4	86.0	9.6	0.1
Ponce Inlet	0.4	0.7	2.2	10.2	73.0	13.5	0.0
New Smyrna Beach (Jetty-Beachway)	0.2	1.3	4.0	6.5	73.7	14.2	0.0
New Smyrna Beach (Beachway-3rd)	0.0	0.0	0.0	0.4	76.8	22.7	0.1
New Smyrna Beach (3rd-27th)	0.0	0.1	0.1	1.3	79.5	18.8	0.2
Bethune Beach	0.0	0.0	0.0	1.1	88.9	10.0	0.0

South Barrier Island

The 22.1 miles of oceanfront property along the south barrier island is generally less urbanized than the oceanfront property of the north barrier island. The northern 10 miles of the south barrier island are urbanized, but the predominant land use is single-family residential. Consequently, upland densities south of Ponce Inlet are considerably lower than those north of the inlet. Many of the properties consist of seasonal residences.

The southern 12 miles of the south barrier island within the County are contained within the CNS and are completely undeveloped. Approximately 58 percent of the south island shoreline is in public ownership, compared to 13 percent on the north island. Vacant developable land in this area is at a premium, constituting only 2.5 percent of the shoreline.

Population and Beach Use Patterns

The beaches of Volusia County are open to the public 24 hours per day, 365 days per year. There are no restrictions on pedestrian or bicycle access. However, beach goers must abide by rules established in the Volusia County Beach Code and/or posted on the beach and at access points. Occasionally lifeguards or Beach Safety Officers may direct visitors off the beach because of thunderstorms or other hazardous conditions. Thus, in this HCP, references to restricted access, beach opening and closing times, and off-limit areas refer only to motorized vehicular traffic.

As described in the original EA, the beach user population is composed of a number of segments, including the local barrier island citizenry, Volusia County residents, the Central Florida "day-tripper" beachgoers, and overnight visitors. The actual beach user population can be characterized further as those arriving by foot and those arriving by car.

Volusia County's Beach Management Plan (Volusia County 1992) estimated that County Beaches attract four distinct demographic markets: Canadians and residents of northern states from November through January; Spring Break and race activity participants in February and March; primarily local residents in late April, May, and early June; and out-of-state families in June, July, and August.

The Beach Management Plan also addressed issues of access and capacity of the beaches. Capacity was based on the number of beach users and vehicles that could be permitted in a particular beach location without excessively diminishing the quality of the resources. Capacity includes all units of demand on the beach, including people arriving in vehicles, the number of vehicles, hotel and motel guests, pedestrians, bicycle users, and pedestrians accessing the beach from off-beach parking areas.

The Beach Management Plan highlighted an obvious, but often missed, dichotomy in the beach user population that relates the capacity of the beach to the experience level or

quality of the recreational activity experienced by the user. Experience levels were grouped into two major categories: the urban beach and the natural beach. The urban beach experience seeker considers a quality beach experience to be one with large numbers of people and the social experience of a crowd. The person seeking a natural beach experience looks for the opposite (i.e., a more isolated and less crowded beach). The Beach Management Plan concludes that a management regime for the beach must include opportunities for urban, natural, and intermediate experience levels.

The beach user population, as defined by the Beach Management Plan, is "the number of persons using County Beaches during a typical non-holiday weekend day during the summer." The summer is the sustained peak season for the beach, although the actual annual peak is reached during Spring Break.

The assumptions and data used to estimate and project the beach user population are based on the Volusia County Beach Study (Kimley-Horn and Associates 1987), which include the following:

- A non-holiday, weekend day in July was assumed to have 10,000 cars, including turnover;
- Average vehicle occupancy was 3 persons;
- The origin of the vehicles based on surveys conducted during four summer periods follows: Volusia County, 34 percent; Orange County–Seminole County, 22 percent; other Florida counties, 18 percent; and outside Florida, 26 percent; and
- Lodging rooms and condominium units totaled 18,000, with an average occupancy rate of 60 percent and an average of 2.3 persons per room. The total lodging population was estimated to be 24,840, and 15 percent of lodgers were expected to drive on the beach, leaving an on-foot population of 21,115.

Using these criteria, the beach management plan estimated the 1988 beach user population to be 62,000 for a typical non-holiday summer weekend day. The study projected that this population would increase at an average annual rate of 2.7 per year between 1990 and 1995. The projected non-holiday beach user population was projected to be 105,700 by 2010.

The beach user population was divided approximately evenly between those arriving on the beach by foot (52 percent) and those arriving by automobile (48 percent). The percentage arriving by automobile was expected to increase to 52 percent by 2010 because of the slower rate of growth projected for the cities surrounding the beach in comparison to the driving population. Since most of the walk-on population are from local residents, hotels, and motels along the beach and because this area is largely developed, growth in this area should be moderate in future years.

In 1987, the permanent and seasonal populations of the north and south barrier islands totaled 62,300 and 36,900 persons, respectively. By 2010, the permanent resident population is projected to increase to 66,200, and the seasonal population is expected to

increase to 62,500 persons.

Volusia County's permanent resident population in 1994 was estimated to be 396,631, or 2.9 percent of Florida's total population of 13,878,905. The median projections for Volusia County indicate a 2010 population of 531,100, or 3.0 percent of Florida's projected population of 17,958,400. Volusia County is the tenth most populous County in the State of Florida (Bureau of Economic and Business Research 1995).

The cities along the coast range in population from 62,453 in Daytona Beach to 1,994 in Ponce Inlet. Ormond Beach is the second most populous coastal city, with a 1993 population of 30,963. New Smyrna Beach and Daytona Beach Shores totaled 17,481 and 2,532, respectively. The central Florida population is projected to increase to 2.5 million by 2010, a 65 percent increase from 1987.

Vehicular Beach Traffic

Vehicular traffic as discussed in this HCP refers to the following types of approved motorized vehicles on the beach:

- Public safety and emergency vehicles;
- Vehicles operated by the general public;
- Vehicles operated by County staff or other authorized personnel engaged in implementation of the HCP;
- County personnel involved in code enforcement activities, such as assessing compliance with beachfront lighting regulations and removal of recreational furniture left on the beach overnight;
- Vehicles used for sea turtle monitoring, wildlife surveys, and other authorized scientific research;
- Beach maintenance and sanitation vehicles;
- Ramp maintenance vehicles;
- Vehicles operated by commercial fishermen;
- Concession-related vehicles, and
- Vehicles involved in coastal construction activities, emergency response, and other activities authorized under the ITP.

Under the Volusia County Beach Code, a number of zones were established on the beach to provide order to the vehicular traffic and allow for multiple beach uses: driving lanes, parking areas, overflow parking areas, Conservation Zones, traffic-free zones, and pedestrian areas. The Beach Code establishes a single lane of northbound traffic and a single lane of southbound traffic, each with an approximate width of 10 feet. The boundary of the western edge of the southbound lane is typically the mean daily high tide line. The designated parking area begins at that point and extends another 10 feet to the west yielding a total band 30 feet wide within which most public driving and parking are confined.

Aesthetics

The aesthetic environment of the beach includes tangible items such as signage, beach activity, beach maintenance facilities, and off-beach adjacent land uses. Intangible factors that affect the aesthetics of the beach relate to the experience levels discussed in the previous sections and to the perceptions of the beach landscape in the mind of the beachgoer.

The coastal environment in an undisturbed setting in northeast Florida typically consists of the beach, primary and secondary dune features, and a coastal maritime forest. The NPSRA and the CNS are examples of such pristine settings (with the possible exception of parking and roadway access to the parks). The more densely developed beaches (e.g., Ormond Beach, Daytona Beach, Daytona Beach Shores, and New Smyrna Beach), offer a stark contrast to the State and Federal beaches at the extreme north and south limits of the Volusia County boundary. Signage, concessionaire stands, and vehicles driving and parked on the beach create a visual distraction from the natural features found in undisturbed coastal environments.

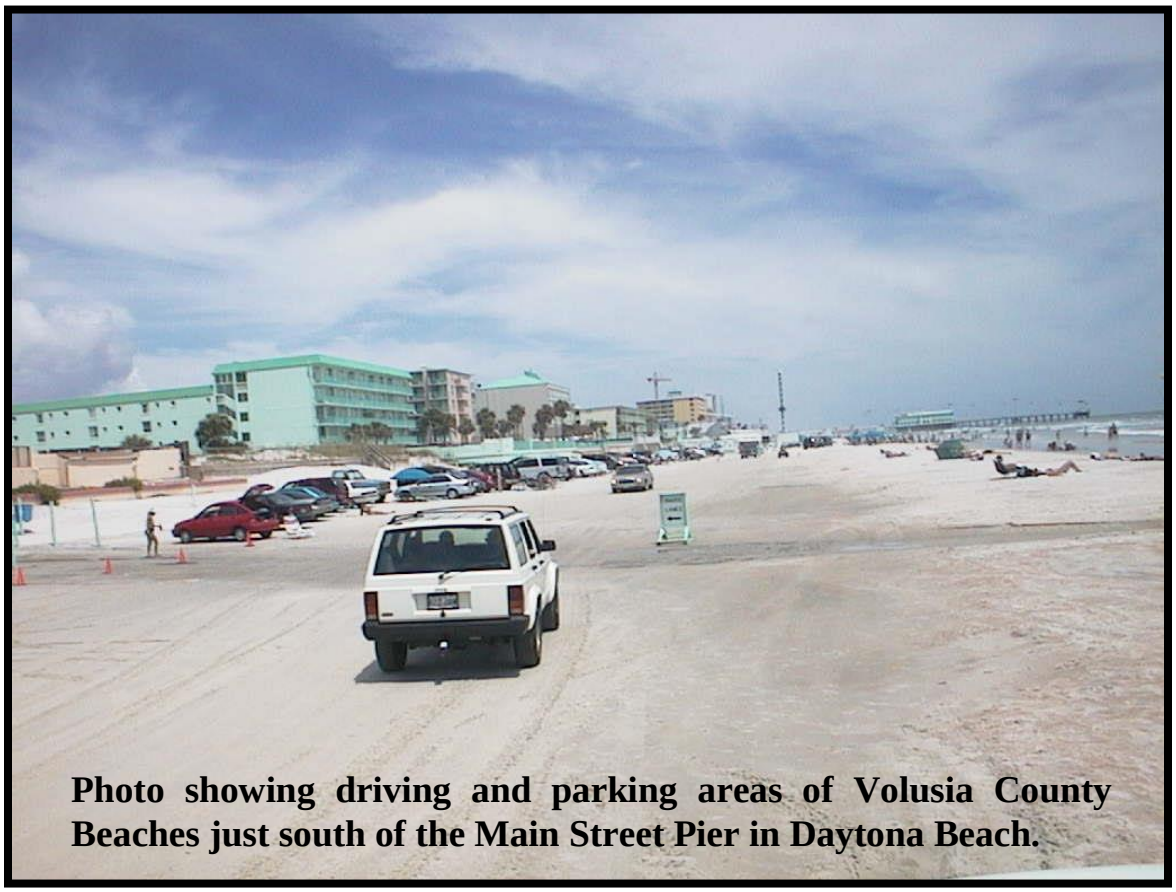

Photo showing driving and parking areas of Volusia County Beaches just south of the Main Street Pier in Daytona Beach.

The dynamic nature of the beach environment makes placing signs and trash cans and marking and managing driving lanes, parking areas, overflow parking areas, recreation areas, and no-entry zones a traffic and pedestrian management challenge. This management challenge in many ways resembles the type of traffic management

conducted in large metropolitan areas to adjust to the twice-daily rush-hour traffic flow. Variations in the tides only complicate the process.

Economic Activity/Tourism

The beach is central to the economy of Volusia County. In 1989, 10 million persons visited Volusia County. The Strategic Action Plan for Tourism in Volusia County (Price Waterhouse 1994) noted that the primary reason people come to Daytona Beach is the beach. Surveys of activities and attractions that draw visitors to the area cited "driving on the beach" as the primary reason for in-state visitors and the secondary reason for out-of-state visitors.

While growth in travel to the State of Florida increased from 27.3 million trips in 1984 to 40.5 million in 1992, Volusia County's share of the visitor market has decreased. In 1984, Volusia County ranked second in the State, with 14.6 percent of the visitors citing Volusia County as their primary or secondary destination. By 1992, Volusia County had fallen to third, and its share had dropped to 13.6 percent. Despite the drop in ranking, however, the tourist population in Volusia County increased from almost 4 million in 1984 to 5.5 million in 1992.

The Price Waterhouse report (1994) noted that the primary reason that U.S. travelers take vacations is to visit oceans and beaches. The report stated that "in Volusia County, beachgoers on foot encounter conflicts of use due to congestion problems resulting from automobiles on the beach. Traditional tourism may be compromised by these conflicts between pedestrian and vehicular users." In 1992, 15.8 percent of Volusia County's employment was related to tourism, compared to 11.7 percent for all of Florida.

Approximately 31 percent of visitors are from the State of Florida. Georgia, Ohio, and New York were the highest generators of out-of-state visitors. Foreign visitors totaled 12 percent, with Canada and the United Kingdom the most frequent place of residence for non-domestic visitors. Approximately 99 percent of Florida visitors to the area arrive by automobile, while 79 percent of non-Florida residents arrive by automobile and 20 percent arrive by air. Florida residents spend between $60 and $80 per day (excluding lodging) and stay an average of 2.71 to 3.83 days; non-Florida visitors spend between $70 and $85 per day (excluding lodging) and stay an average of 5.27 to 8.33 days.

The direct economic effects related to the beach primarily are related to vehicular access to the beach. These include beach access tolls, citations, franchise fees, concession licenses, fees for special events, and beach fines, all of which are revenue for Volusia County. Beach access fees are overwhelmingly the largest source of beach-generated revenues. Vehicle access tolls in 2001 generated approximately $3.3 million in revenues. Franchise fees, concession licenses, and interest income are the other major revenue sources.

4

PROTECTED SPECIES THAT MAY OCCUR IN THE PLAN AREA

The primary purpose of this HCP is to establish a management plan that will protect and enhance the habitat of protected species on Volusia County Beaches while still allowing for the legal and traditional uses of the beaches by local citizens and tourists. The original HCP took into account the best scientific information available at that time pertaining to federally listed species and their use of beach habitat within the Plan Area. Spatial and temporal distributions of those species have changed little during the period the ITP has been in effect.

Species Covered Under This Habitat Conservation Plan

This HCP is designed primarily to provide for the effective management and protection of federally listed species utilizing or potentially utilizing habitat within the Plan Area. These include the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles and the piping plover. However, at least one other federally listed species, the southeastern beach mouse, as well as numerous migratory birds and several State listed species (e.g., least tern) likely to occur in or adjacent to the Plan Area, may also benefit from the protective measures that will be instituted under the HCP. Table 2 provides a list of these species.

During the Intra-Service Section 7 Evaluation (October 31, 1996) of the County's ITP application, the USFWS concluded that, due to habitat requirements, distribution, and/or behavioral patterns, incidental take of federally listed species other than sea turtles was not anticipated. Although no harm to either the southeastern beach mouse or piping plover has been documented during the period that the ITP has been in effect, the 2001 Federal designation of Critical Habitat (50 CFR Part 17) on beaches adjacent to Ponce de Leon Inlet warranted inclusion of the wintering piping plover as an additional covered species under the HCP. Biological information pertaining to State listed species, such as the least tern, can be found in the original EA and HCP.

Table 2

State and Federally Protected Wildlife Species Known to Occur or Potentially Occur Within the Plan Area.

Scientific Name	Common Name	Designated Status			Occurrence	Abundance
		USFWS	FWC	CITES		
Reptiles						
Caretta caretta	Loggerhead sea turtle	T	T	I	N	C
Chelonia mydas	Green sea turtle	E	E	I	N	O
Dermochelys coriacea	Leatherback sea turtle	E	E	I	RN	O
Eretmochelys imbricata	Hawksbill sea turtle	E	E	I	RN	R
Gopherus polyphemus	Gopher tortoise		SSC		RV	O
Lepidochelys kempii	Kemp's ridley sea turtle	E	E	I	RN	R
Mammals						
Peromyscus polionotus niveiventris	Southeastern beach mouse	T	T		RV	O
Birds						
Actitis macularia	Spotted sandpiper	M	M		R	U
Ardea herodias	Great blue heron	M	M		R	U
Arenaria interpres	Ruddy turnstone	M	M		M	C
Butorides striatus	Green heron	M	M		R	R
Calidris alpina	Dunlin	M	M		M	U
Calidris bairdii	Baird's sandpiper	M	M		M	O
Calidris ferruginea	Curlew sandpiper	M	M		M	O

Table 2

State and Federally Protected Wildlife Species Known to Occur or Potentially Occur Within the Plan Area.

		Designated Status				
Scientific Name	Common Name	USFWS	FWC	CITES	Occurrence	Abundance
Calidris fusciollis	White-rumped sandpiper	M	M		M	O
Calidris hemantopus	Stilt sandpiper	M	M		M	O
Calidris minutilla	Least sandpiper	M	M		M	U
Calidris maritima	Purple sandpiper	M	M		M	O
Calidris pusilla	Sanderling	M	M		R	C
Casmerodius albus	Great egret	M	M		M	O
Cathartes aura	Turkey vulture	M	M		R	C
Catoptrophorus semipalmatus	Willet	M	M		R	C
Charadrius melodus	Piping plover	T	T		M	R
Charadrius semipalmatus	Semi-palmated plover	M	M		M	C
Charadrius vociferus	Killdeer	M	M		R	C
Charadrius alexandrinus	Snowy plover	M	M		M	R
Coragyps atratus	Black vulture	M	M		R	U
Corvus brachyrhynchos	Common crow	M	M		R	C
Corvus ossifragus	Fish crow	M	M		R	C
Egretta caerulea	Little blue heron	M	SSC		R	U
Egretta rufescens	Reddish egret	M	SSC		R	R

Table 2

State and Federally Protected Wildlife Species Known to Occur or Potentially Occur Within the Plan Area.

		Designated Status				
Scientific Name	Common Name	USFWS	FWC	CITES	Occurrence	Abundance
Egretta thula	Snowy egret	M	SSC		R	U
Falco peregrinus (anatum)	American Peregrine falcon	M	M		M	R
Falco peregrinus (tundrius)	Arctic peregrine falcon	M	E	I	M	R
Geotrygon chrysia	Common ground dove	M	M		R	U
Haematopus palliatus	American oystercatcher	M	M		R	U
Larus argentatus	Herring gull	M	M		R	C
Larus atricilla	Laughing gull	M	M		R	C
Larus delawarensis	Ring-billed gull	M	M		R	C
Larus fuscus	Lesser black-backed gull	M	M		M	O
Larus philadelphia	Bonaparte's gull	M	M		M	R
Limnodromus griseus	Short-billed dowitcher	M	M		M	R
Mycteria americana	Wood stork	E	E		R	R
Nyctanassa violacea	Yellow-crowned night heron	M	M		R	R
Nycticorax nycticorax	Black-crowned night heron	M	M		R	R
Pandion haliaetus	Osprey	M	SSC	II	RV	U
Pelecanus occidentalis	Brown pelican	M	SSC		R	C
Philomachus pugnax	Ruff	M	M		M	O
Pluvialis dominica	Lesser golden plover	M	M		M	C

Table 2

State and Federally Protected Wildlife Species Known to Occur or Potentially Occur Within the Plan Area.

		Designated Status				
Scientific Name	Common Name	USFWS	FWC	CITES	Occurrence	Abundance
Pluvialis squatarola	Black-bellied plover	M	M		M	C
Quiscalus major	Boat-tailed grackle	M	M		R	C
Quiscalus quiscula	Common grackle	M	M		R	C
Rynchops niger	Black skimmer	M	SSC		R	U
Sterna antillarum	Least tern	M	T		RN	C
Sterna caspia	Caspian tern	M	M		R	C
Sterna fosteri	Forester's tern	M	M		R	C
Sterna hirundo	Common tern	M	M		M	U
Sterna maxima	Royal tern	M	M		R	C
Sterna nilotica	Gull-billed tern	M	M		R	U
Sterna paradisaea	Arctic tern	M	M		M	O
Sterna sandvicensis	Sandwich tern	M	M		M	U
Tringa solitaria	Solitary sandpiper	M	M		M	U
Xema sabini	Sabine's gull	M	M		M	O
Zenaida macroura	Mourning dove	M	M		R	C

STATUS:

R = rare; T = threatened; E = endangered; SSC = species of special concern; I = included in Appendix I of CITES; II = included in Appendix II of CITES; M = Protected as a Migratory Bird

Table 2

State and Federally Protected Wildlife Species Known to Occur or Potentially Occur Within the Plan Area.

Scientific Name	Common Name	Designated Status			Occurrence	Abundance
		USFWS	FWC	CITES		

OCCURRENCE:
N = nests in area; RN= rare nester in area; R = resident; M = migrant; RV = rare visitor

ABUNDANCE:
C = common; U = uncommon; R = rare; O = occasional
Refers to abundance in Plan Area of Volusia County

SOURCES: CITES 1973.
Coile 1993.
FCREPA 1992a, b.
FWC 1997.
FNAI 1994.
USFWS 1999.
Unpublished data collected by Ecological Associates, Inc. during HCP monitoring, 1997-2000.

Species Accounts

Loggerhead Turtle

BIOLOGICAL INFORMATION

The loggerhead turtle (*Caretta caretta*) was federally listed on July 28, 1978, as a threatened species under the ESA (43 FR 32800). Internationally, it is considered "vulnerable" by the International Union for Conservation of Nature (IUCN; Casale and Tucker 2015) and is listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The loggerhead turtle is circum-global in distribution and inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans (Dodd 1988). Loggerhead turtles spend virtually their entire life cycle in marine and estuarine waters, with the exception of brief periods when adult female turtles come ashore to lay their eggs.

According to the Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*), Second Revision (2008) approximately 47,000 to 90,000 loggerhead turtle nests are deposited on southeastern U.S. beaches annually. The vast majority of this nesting occurs in Florida. The South Florida rookery, along with one other in Masirah, Oman, are the only known nesting aggregations to have more than 10,000 females nesting per year. The beaches of east central and southeast Florida from Brevard to Broward Counties are especially prolific nesting areas, accounting for about 90 percent of the total nests deposited each year in Florida (Meylan *et al.* 1995). Approximately 2.8 percent of loggerhead turtle nesting in Florida occurs in Volusia County (Meylan *et al*. 1995).

The adult loggerhead foraging grounds for the south Florida nesting population are thought to be around the Caribbean Islands of the Bahamas, Cuba, and Dominican Republic, as well as around the eastern seaboard of the United States, Florida Keys, and Gulf of Mexico (Meylan 1982, Meylan *et al.* 1983, Henwood 1987, Rankin-Baransky 1997). The average female makes reproductive migrations between her foraging grounds and nesting beach every two or three years (Richardson and Richardson 1982, Murphy and Hopkins 1984). Best available scientific information suggests that loggerheads, like other species of sea turtles, return to their natal beaches to lay their eggs (Bowen *et al.* 1993).

Mating season in southeastern Florida begins in early March, prior to commencement of nesting. The first loggerhead nests begin to appear in late April, and the last nests are deposited in early to mid-September (NMFS and USFWS 1991a, Meylan *et al.* 1995). Nesting peaks during the months of June and July. Aerial surveys have shown the numbers of adult turtles off the east coast of Florida to be about 15 times higher in the spring and summer than in the fall and winter, indicating that adults migrate from elsewhere to mate and nest (Thompson 1984, National Research Council 1990).

The general nesting process for all species of sea turtles is stereotypical, with subtle variations (Miller 1997). Hailman and Elowson (1992) documented the sequential behaviors associated with loggerhead turtle nesting (ascending the beach, making the body pit, digging the egg chamber, laying eggs, filling the egg chamber, covering the body pit, and returning to the surf). Unless otherwise noted, the phases described below for loggerheads apply to the other sea turtle species as well.

Nesting occurs almost exclusively at night. Female sea turtles emerge from the surf zone and ascend the beach in search of an appropriate place to construct their nests. If a suitable nesting site cannot be found, the turtle will return to the ocean and will typically select another site either later that night or the next night (Miller *et al.* 2003). If the turtle receives favorable visual cues, and if undisturbed, she will emerge from the water and ascend the beach.

Sea turtle eggs require a low-salinity, high-humidity, well-ventilated substrate that is not inundated by tidal overwash for development (Miller 1997). It has been suggested that abrupt changes in temperature, moisture, salinity and/or beach slope along an ocean to dune gradient may aid in nest site selection (Stoneburner and Richardson 1981, Wood and Bjorndal 2000). Nest placement may also be influenced by local lighting conditions and/or the presence of structures on the beach. On urban beaches, where a bright sky glow is often present landward of the beach, Salmon *et al.* (1995a) found that females tended to concentrate their nests on the beach within the darker silhouettes of large condominiums, and nested with lower frequency in the more illuminated areas between the structures. Mosier (1998) and Bouchard *et al.* (1998) observed that nest densities in front of armoring structures were reduced relative to areas of natural dune vegetation.

Once a suitable site is found, the turtle will begin excavating a shallow body pit. At the rear of this depression, she will then excavate an egg chamber, which is about 60 cm deep (Ernest and Martin 1999). Into the egg chamber, the loggerhead female will usually deposit between 100 and 120 eggs (Ehrhart 1979, Raymond 1984, Ehrhart and Witherington 1987, Steinitz 1990, Broadwell 1991, Ernest and Martin 1993, Ehrhart 1995). Once egg-laying is complete, the female packs the top of the egg chamber with moist sand with her rear flippers then covers the entire body pit by throwing sand backwards with her front flippers. The turtle then crawls back to the ocean. The average time that a loggerhead turtle spends on dry land during the entire nesting process is 63.0 minutes (Hailman and Elowson 1992). The young receive no subsequent parental care.

Female sea turtles typically lay several clutches of eggs during each season that they nest (Ehrhart 1982). In a review of literature on loggerhead turtles, Ehrhart (1989) concluded that the estimate of 4.1 nests per female made by Murphy and Hopkins (1984) was the current best estimate of mean intraseasonal clutch frequency in this species. Renesting intervals vary among species but are generally approximately two weeks (Hirth 1980, Ehrhart 1982). Individuals usually return to the same general area to lay successive clutches (Carr 1967, Dodd 1988). Genetic evidence supports long-held beliefs that turtles exhibit a natal homing instinct (i.e., upon reaching reproductive age, sea turtles return to their natal beaches to nest; Meylan *et al*. 1990, Bowen *et al*. 1993, Allard *et al*. 1994).

Genetic research involving mitochondrial DNA (mtDNA) has identified five distinct loggerhead nesting sub-populations/nesting aggregations in the western North Atlantic (Bowen 1994 and 1995, Bowen *et al.* 1993, Encalada *et al.* 1998, Pearce 2001):

- Northern (North Carolina, South Carolina, Georgia, and northeast Florida);
- South Florida (from 29°N latitude on Florida's east coast to Sarasota on Florida's west coast);
- Dry Tortugas, Florida
- Northwest Florida (Eglin Air Force Base and the beaches near Panama City); and
- Yucatan (eastern Yucatan Peninsula).

Data indicate that gene flow between these five regions is very low. If nesting females are extirpated from one region, dispersal from adjacent sub-populations will not be sufficient to replenish the depleted stock. The Northern Sub-population has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (TEWG 1998 and 2000). Adult loggerheads of the South Florida Sub-population have shown significant increases over the last 25 years, indicating that the sub-population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 1998. Nesting surveys in the Northwest Florida and Yucatan Sub-populations have been too irregular to date to allow for a meaningful trend analysis (TEWG 1998 and 2000). The Dry Tortugas Sub-population has only recently been identified as a distinct management unit (Pearce 2001).

To date, it has not been possible to identify precise boundaries between the Northern and South Florida Sub-populations. Encalada *et al.* (1998) hypothesized that the break should occur somewhere between Amelia Island and Cape Canaveral. Recent analyses of samples from both Amelia Island and Volusia County do not resolve the issue (Pearce 2001). This area may represent yet another distinct nesting sub-population or an overlap of the two adjacent sub-populations. Pending additional testing, and erring on the side of conservation, Francisco *et al.* (1999) advocated treating the nesting loggerhead turtles of Volusia County as a distinct management unit.

From the time a female turtle crawls onto the beach until the time that egg laying begins, she may be disturbed by noises, lights, or movement on the beach (Hendrickson 1958, Dodd 1988). This may cause her to abort her nesting attempt and return to the ocean (Hailman and Elowson 1992). Disruption to the nesting process may place an energy burden, and hence a reproductive cost, on a female turtle, but this impact has not been quantified. The further into the nesting process she becomes, particularly with respect to digging activity, the greater the potential energy cost associated with the disruption. Repeated disruptions may cause a turtle to venture to a "safer" area or deposit her eggs in a sub-optimum habitat (Murphy 1985). Excessive energy expenditures theoretically could reduce an individual's total reproductive output for the season. Salmon *et al.* (1995a) studied nesting preference in loggerheads on the urbanized beaches of Boca Raton, Florida. They report that nesting turtles showed a propensity for nesting in front of dark

buildings and trees that block bright lights and urban glow. This indicated that light barriers might be effective in mitigating lighting problems. However, shading from light barriers may affect the incubation temperature of nests and result in skewed sex ratios of hatchlings produced.

During incubation, sea turtle nests can be impacted by a variety of natural and anthropogenic factors. Natural factors include tidal inundation, erosion, sediment accretion, root invasion, excavation by other turtles, and predation (Bustard and Greenham 1968, Stancyk 1982, Whitmore and Dutton 1985, Ehrhart and Witherington 1987, Ernest and Martin 1999, EAI 2001b). Human-related impacts include construction activities, stormwater and pool runoff, deliberate or incidental excavation of eggs, nest penetration by recreational equipment (e.g., beach umbrellas, volleyball posts), and excessive pressure above the nest caused by foot or vehicular traffic (Mann 1977, Witham 1982, Coston-Clements and Hoss 1983).

Sea turtle nests incubate for variable periods of time. The loggerhead turtle incubation period ranges from approximately 49 to 80 days for nests left *in situ* (in place; Dodd 1988). The warmer the temperature of the sand surrounding the egg chamber, the faster the embryos develop (Mrosovsky and Yntema 1980). Sediment temperatures prevailing during the middle-third of the incubation period also determine the phenotypic sex of sea turtles (Mrosovsky and Yntema 1980). Moisture conditions in the nest similarly influence incubation period, hatching success, and hatchling size (McGehee 1990). Sea turtle hatchlings do not typically emerge from the nest immediately after hatching from their eggs. Instead, they remain in the egg chamber for several days before ascending to the beach surface (Christens 1990). The inclusive time between the date a clutch of eggs is laid and the date the first hatchling emerges from the nest is termed the incubation period. The average incubation period for loggerhead nests along the central and south Florida east coast is typically between 49 and 54 days (Ehrhart and Witherington 1987, EAI 2000a and 2001b).

Hatchlings emerge from their nests almost exclusively at night, presumably using decreasing sand temperature as a cue (Hendrickson 1958, Mrosovsky 1968, Witherington *et al*. 1990). Nighttime emergences are beneficial, because the risks of predation and hyperthermia are reduced. An abrupt lowering of sand temperatures after nightfall apparently increases hatchling activity and elicits an emergence response. Even after the initial emergence of hatchlings from the nest, there may be secondary emergences on subsequent nights (Carr and Ogren 1960, Ernest and Martin 1993). The number of hatchlings leaving each nest is extremely variable. Ehrhart and Witherington (1987) reported that average emerging success (percentage of eggs that produce hatchlings which escape from the nest) of 85 nests in southern Brevard County was 63.7 percent. Thus, the average loggerhead nest (116 eggs) would produce about 74 hatchlings.

Emergence marks the beginning of the period of high activity during which hatchlings enter the sea and swim away from land in a "frenzy" (Wyneken and Salmon 1992). Hatchlings may use a variety of cues to guide them to the offshore, pelagic environments where they spend their early years (Carr 1987, Bolten *et al*. 1993, Witherington 1994,

Bolten and Balazs 1995). Hatchlings first use light cues to find the ocean. On natural, undeveloped beaches, ambient light reflected off the ocean creates a relatively bright horizon compared to the dark dune and vegetation landward of the nest. This contrast guides the hatchlings to the ocean (Witherington 1992, Salmon *et al*. 1992), where they then begin orienting to waves (Wyneken *et al*. 1990). Salmon *et al*. (1995b) demonstrated scientifically the effects of artificial lighting and disorientation and also tested the success of shielding lights and how silhouettes of dark buildings and trees deflect lighting impacts.

Prevailing waves along Florida's east coast during the nesting season are typically from the east and southeast. By swimming into the waves, hatchlings are guided to offshore habitats. Upon entering the surf, hatchlings swim incessantly in an offshore direction for about 20 hours (Wyneken and Salmon 1992). During this period, they also may set an internal magnetic compass, which may account for their ability to accurately navigate over long distances in the world's oceans (Lohmann and Lohmann 1994). Cues hatchlings receive in the nest or between the time they leave the nest and arrive at offshore habitats may be critical to their ability to return to their natal beaches for nesting as adults.

Western Atlantic loggerheads are estimated to spend about ten years in the pelagic environment (Bolten and Balazs 1995). When loggerhead turtles reach the size of 40-60 cm straight carapace length, they move into various inshore estuaries or reef-system habitats in the shallow coastal waters of the western Atlantic (Carr 1986 and 1987). The nearshore regions where juvenile and subadult loggerheads live and forage have been termed developmental habitats. Loggerheads may reside in these developmental habitats either seasonally or year-round until they reach sexual maturity, which is estimated to occur between 20 to 30 years or more of age (Frazer and Ehrhart 1985, Klinger and Musick 1995, Parham and Zug 1997).

Hatchlings may be impacted by a variety of natural processes and human activities, both while in the nest and during their nest-to-sea migration. Prior to emerging from the nest, hatchlings are vulnerable to predation (by raccoons, ghost crabs, and other predators) and tidal inundation (Stancyk 1982, Ehrhart and Witherington 1987, Milton *et al*. 1994, Martin 1996). If water fills the nest and does not drain rapidly, the hatchlings may drown. Vehicles, beach cleaning equipment, foot traffic, and recreational equipment can cause physical disturbances above the nest, which may crush hatchlings, prematurely remove them from the nest, or cause their premature emergence. Obstacles over the top of the nest may impede or prevent their emergence.

After hatchlings emerge from the nest, they may be attacked by a variety of nocturnal predators, including raccoons, ghost crabs, night herons, dogs, foxes, and cats (Stancyk 1982, Dodd 1988). In addition to mortality from predators, hatchlings also may be impacted by human activities.

Probably the single largest anthropogenic threat to hatchlings along Florida's nesting beaches is the impact of coastal lighting. Because hatchlings instinctively orient to the

brightest horizon, they are frequently drawn toward buildings and roadways in urban areas (McFarlane 1963, Philibosian 1976, Mann 1977, Witherington 1992). False lighting cues can cause misorientation (hatchlings travel along a consistent course towards a light source) or disorientation (hatchlings are not able to set a particular course and wander aimlessly; Witherington 1990). Both situations have potential for serious impacts.

Hatchlings attracted to lights near roadways may be run over by vehicles. Additionally, prolonged crawling on the beach depletes valuable energy stores that are intended to take the hatchlings on their offshore odyssey. Excessive crawling leads to exhaustion and extends a hatchling's period of vulnerability to terrestrial predators. Weakened hatchlings that eventually reach the ocean may be more vulnerable to marine predators, which are abundant in nearshore waters (Wyneken *et al*. 1994).

In addition to problems created by beachfront lights, hatchlings often must navigate through a variety of obstacles before reaching the ocean. These include natural and human-made debris, natural and human-made physical structures, recreational equipment, pedestrian footprints, parked vehicles, and vehicle ruts. As with impacts associated with beachfront lighting, obstacles on the beach interfere with a hatchling's timely progress toward the ocean. Travel times of hatchlings from the nest to the water may be extended when traversing areas of heavy foot traffic or vehicular ruts (Hosier *et al*. 1981). Hatchlings may be upended and spend both time and energy in righting themselves. Although hatchlings may be capable of scaling the walls of some vehicular ruts, the walls often cast a shadow causing the hatchlings to move north or south within the rut in the direction of the brightest light (Cox *et al*. 1994, Hughes and Caine 1994, LeBuff 1990, Arianoutsou 1988, Mann 1977).

SITE-SPECIFIC INFORMATION

Between 1988 and 2000, loggerhead turtles accounted for 96 percent of all nesting in Volusia County (Table 3). Within County Beaches this species accounted for 98.5 percent of all nesting (Table 4). Consequently, loggerhead turtles, a threatened species, are at highest risk of being impacted by vehicular activity on the beach. A detailed discussion of potential vehicular impacts to all species of turtles to be covered under the ITP is presented in Section 5 of this HCP.

The nesting season in Volusia County, as defined by the FWC, is May 1 through October 31. This period encompasses the majority, but not all, of nesting and hatchling emergence. In Florida, loggerhead turtles generally begin nesting in mid-April. The earliest recorded nest in Volusia County was April 18, 1994 (Table 5). Because routine nesting surveys typically are not initiated until late April or early May, earlier nesting

Table 3

Annual Number of Sea Turtle Nests, by Species, for All of Volusia County, 1988-2000.

Year	Loggerhead	Green	Leatherback	Hawksbill[1]	Kemp's Ridley	Unknown	TOTAL
1988	1,338	5	5	0	0	0	1,348
1989	1,433	18	0	0	0	0	1,451
1990	1,766	47	1	0	0	0	1,814
1991	1,719	14	2	0	0	0	1,735
1992	1,457	91	1	0	0	0	1,549
1993	1,757	14	1	0	0	0	1,772
1994	2,131	115	1	0	0	0	2,247
1995	2,044	20	2	0	0	0	2,066
1996	1,889	98	0	0	2	0	1,989
1997	1,273	12	7	0	0	0	1,292
1998	2,078	173	7	0	1[2]	0	2,259
1999	2,263	3	6	0	0	0	2,272
2000	2,208	290	6	0	0	2	2,506
TOTAL	**23,356**	**900**	**39**	**0**	**3**	**2**	**24,300**
Average	**1,796.6**	**69.2**	**3.0**	**0.0**	**0.2**	**0.2**	**1,869.2**

[1] Only one hawksbill has been documented nesting in Volusia County. It nested in CNS in 1982.

[2] The 1998 record is unconfirmed.

Table 4

Annual Number of Sea Turtle Nests, by Species, for Beaches Managed by Volusia County (County Beaches), 1988-2000.

Year	Loggerhead	Green	Leatherback	Kemp's Ridley	Unknown	TOTAL
1988	245	0	1	0	0	246
1989	283	0	0	0	0	283
1990	403	1	1	0	0	405
1991	384	3	2	0	0	389
1992	198	5	1	0	0	204
1993	338	0	0	0	0	338
1994	490	5	0	0	0	495
1995	443	0	0	0	0	443
1996	491	7	0	2	0	500
1997	337	4	5	0	0	346
1998	517	16	4	1	0	538
1999	626	0	2	0	0	628
2000	596	20	2	0	2	620
TOTAL	**5,351**	**61**	**18**	**3**	**2**	**5,435**
Mean	**411.6**	**4.7**	**1.4**	**0.2**	**0.2**	**418.1**

events may have been overlooked. In Volusia County, loggerhead turtles generally cease nesting by mid-September.

Volusia County is the site of only 2.8 percent of all loggerhead nesting in Florida (Meylan *et al*. 1995). A summary of annual nesting data from 1988 through 2000 in the Plan Area is presented in Table 6. During this period, annual nest production varied from approximately 1,300 to 2,300 nests. Although there have been a few inconsistencies in data collection techniques and survey boundaries (primarily within NPSRA) over the 13-year period of record, these data indicate a significant increasing trend of loggerhead nesting in the County (Figure 2; $r^2 = 0.43$, $p < 0.05$).

Over the period of record, 73.9 and 3.2 percent, respectively, of all loggerhead nesting within the Plan Area has occurred within the CNS and NPSRA (Table 6). Thus, on average, only 22.9 percent of nesting in Volusia County occurs within County Beaches, even though County Beaches account for 71.2 percent of the County's entire coastline. Annual nesting totals have ranged from 198 (in 1992) to 626 (in 1999). As for the entire County, loggerhead nesting on County Beaches has shown a significant increasing trend, and the trend is even more robust than for the County as a whole (Figure 3; $r^2 = 0.62$, $p < 0.01$).

During daily surveys of County Beaches during the sea turtle nesting season, monitoring personnel interpret the distinctive tracks (crawls) left by turtles on the beach at night to determine which species came ashore and whether or not it laid eggs. In Florida, loggerhead sea turtles typically deposit nests on about 50 percent of their emergences onto the dry beach (Trindell *et al*. 1998). Non-nesting emergences are referred to as false crawls. Nesting success is calculated by dividing the number of nests by the total number of crawls (nests plus false crawls). Between 1996 and 2000, nesting success for loggerhead turtles on County Beaches, ranged from 48.9 to 55.0 percent and averaged 52.4 percent (Table 7). This number is based on a total of 4,895 individual crawls.

Table 5

Temporal Nesting Patterns of Florida Sea Turtles for All of Volusia County, 1979-2000.

Species	Earliest Date	Latest Date
Loggerhead	April 18	September 16[1]
Green	May 18	September 28
Leatherback	April 18	July 17
Hawksbill[2]	August 16	August 16
Kemp's ridley[3]	May 8	June 1

[1] One loggerhead reportedly nested in Volusia County on October 16, 1985; however, based on extensive data from southeast Florida, where the latest date of reported nesting is October 2, this record appears to be an anomaly.

[2] This species has been recorded as nesting in Volusia County during 1982 only.

[3] This species has been confirmed nesting in Volusia County during 1996 only; another nesting was reported in 1998, but no photographs, genetic analysis of nest contents or other reliable means of positive identification were presented.

Sources: Meylan *et al*. 1995 (1988-1992).
FWC unpublished data (1993-2000).

Between 1996 and 2000, a total of 1,619 *in situ* loggerhead nests undisturbed by predators were excavated to determine nest fate. The average clutch size of those nests ranged from 40 to 187 eggs and averaged 109.6 eggs (Table 8).

As for adult turtles, when hatchlings emerge from a nest, they leave distinctive tracks in the sand. Based on these signs of emergence, monitoring personnel can determine incubation periods for individual nests. Incubation period is the inclusive number of days between the date a nest was laid and the date the first hatchling emerges from the nest. The length of time required for eggs to complete incubation is determined by prevailing sand temperature; the warmer the sand, the shorter the incubation period. Sand temperature, in turn, is influenced by prevailing weather conditions and the amount of tidal overwash experienced by a nest during its incubation period. Between 1996 and

2000, incubation periods for 1,445 *in situ* loggerhead nests on County Beaches ranged from 44 to 84 days and averaged 57.4 days (Table 9). Annual average incubation periods ranged from 56.0 to 59.8 days.

Table 6

Annual Number of Loggerhead Sea Turtle Nests for All of Volusia County, 1988-2000.

Year	NPSRA[1]		County Beaches[2]		CNS[3]		Total Number of Nests
	No. of Nests[4]	Percent	No. of Nests	Percent	No. of Nests	Percent	
1988	41	3.06	245	18.31	1,052	78.62	1,338
1989	55	3.84	283	19.75	1,095	76.41	1,433
1990	118	6.68	403	22.82	1,245	70.50	1,766
1991	66	3.84	384	22.34	1,269	73.82	1,719
1992	61	4.19	198	13.59	1,198	82.22	1,457
1993	89	5.07	338	19.24	1,330	75.70	1,757
1994	86	4.04	490	22.99	1,555	72.97	2,131
1995	57	2.79	443	21.67	1,544	75.54	2,044
1996	46	2.44	491	25.99	1,352	71.57	1,889
1997	30	2.36	337	26.47	906	71.17	1,273
1998	28	1.35	517	24.88	1,533	73.77	2,078
1999	36	1.59	626	27.66	1,601	70.75	2,263
2000	33	1.49	596	26.99	1,579	71.51	2,208
TOTAL	**746**	**3.19**	**5,351**	**22.91**	**17,259**	**73.90**	**23,356**
Average	**57.4**		**411.6**		**1,327.6**		**1,796.6**

[1] NPSRA = North Peninsula State Recreation Area

[2] County Beaches = Beaches from NPSRA to CNS under jurisdiction of Volusia County.

[3] CNS = Canaveral National Seashore

[4] Nesting data for NPSRA should be used with caution as the length of beach surveyed each year has varied dramatically over the period of record. Furthermore, only 2.7 miles (72 percent) of NPSRA lie within Volusia County; the remaining 1.1 miles lie within Flagler County.

Sources: Meylan *et al*. 1995 (1988-1992).
FWC unpublished data (1993-2000).

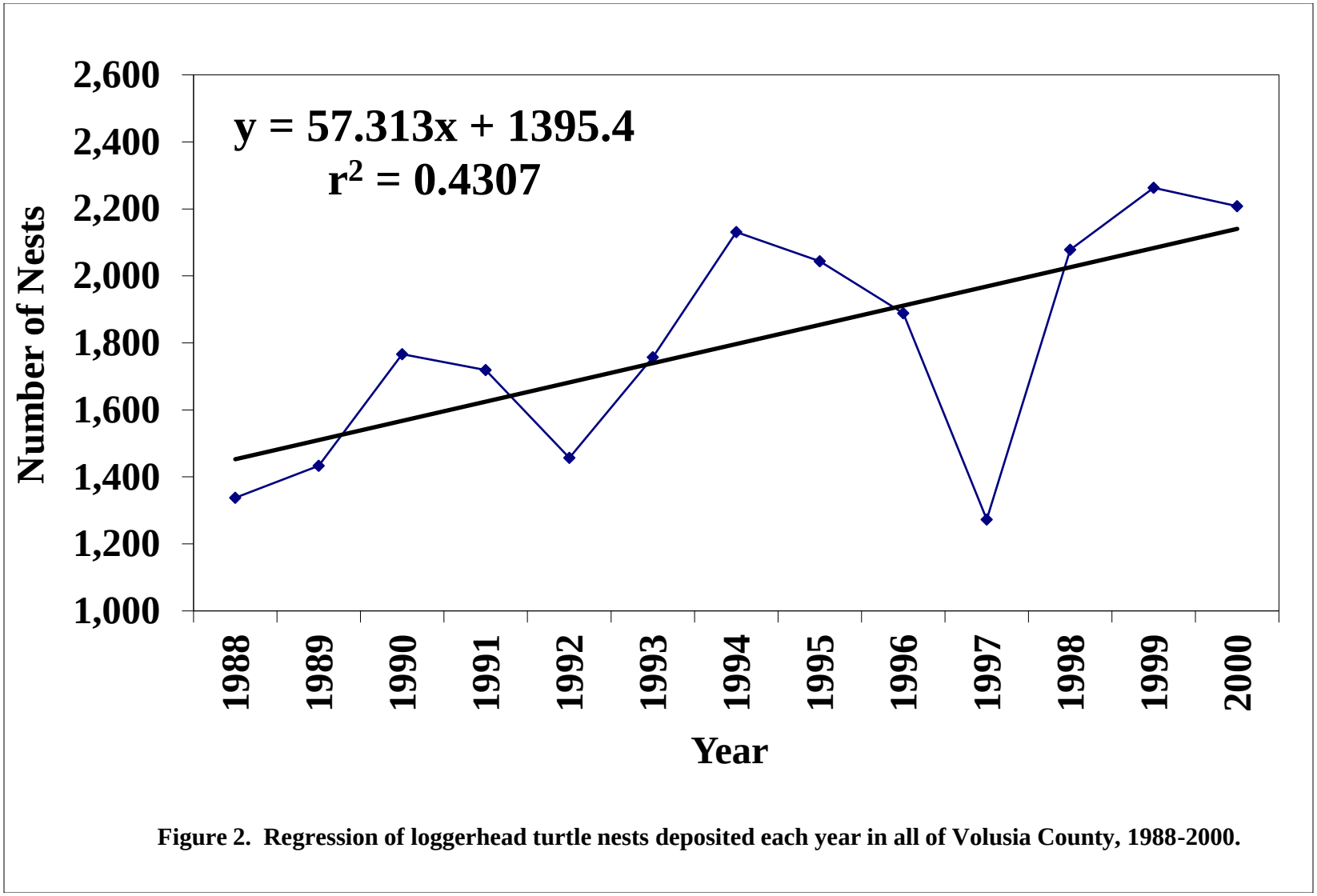

Figure 2. Regression of loggerhead turtle nests deposited each year in all of Volusia County, 1988-2000.

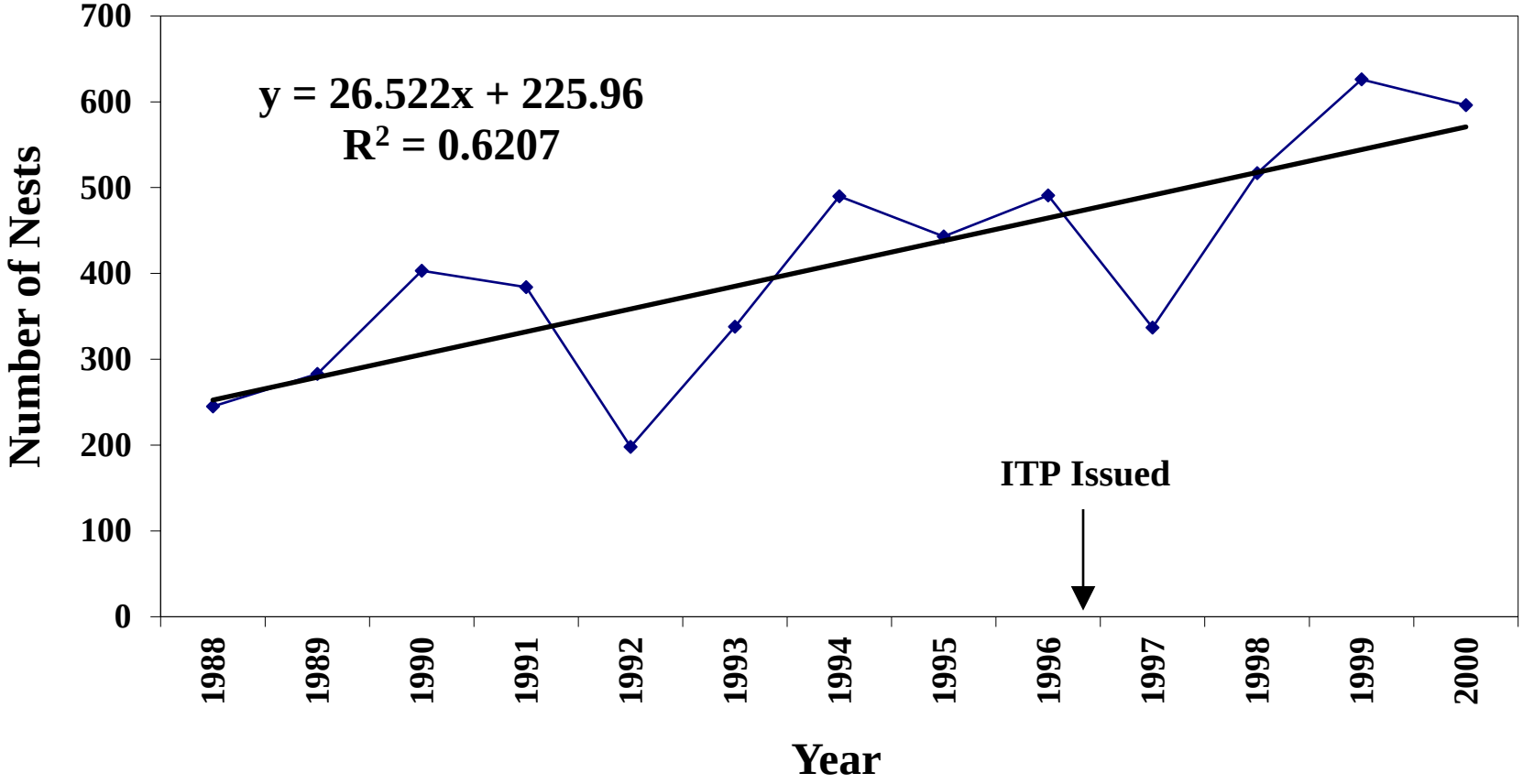

Figure 3. Regression of loggerhead turtle nests deposited each year on County Beaches, 1988-2000.

Table 7

Nesting Success of Loggerhead Sea Turtles on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Number of Nests	Number of False Crawls[1]	Total Crawls	Nesting Success[2] (Percent)
1996	491	457	948	51.8
1997	337	352	689	48.9
1998	517	426	943	54.8
1999	626	560	1,186	52.8
2000	596	533	1,129	52.8
TOTAL	**2,567**	**2,328**	**4,895**	**52.4**
Average	**513.4**	**465.6**	**979.0**	**52.4**

[1] False crawl = Non-nesting emergence onto the beach by adult turtle.
[2] Nesting success = Percentage of total crawls that result in a nest.

Table 8

Clutch Size of Loggerhead Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Clutch Size				
	N[1]	Mean	Standard Deviation	Minimum	Maximum
1996	361	108.9	20.3	52	165
1997	238	112.0	19.8	47	164
1998	334	106.7	21.8	46	157
1999	303	111.8	20.0	59	187
2000	383	109.6	21.1	40	176
TOTAL	**1,619**	**109.6**	**NA**	**40**	**187**

[1] N = Number of *in situ* nests undisturbed by predators used to calculate clutch size.

Table 9

Incubation Period for *in situ* Loggerhead Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Incubation Period				
	N[1]	Mean	Standard Deviation	Minimum	Maximum
1996	242	59.2	5.7	46	84
1997	192	59.8	5.8	48	76
1998	291	56.0	4.1	46	69
1999	327	56.0	4.7	44	70
2000	393	57.5	4.6	47	73
TOTAL	**1,445**	**57.4**	**NA**	**44**	**84**

[1] N = Number of *in situ* nests undisturbed by predators used to calculate incubation period.

Reproductive success could be determined for 1,361 *in situ* loggerhead nests deposited on County Beaches between 1996 and 2000 (Table 10). Two commonly used measures of reproductive success, hatching success and emerging success, were calculated. Hatching success is the percentage of eggs in the clutch that produced hatchlings that successfully extricated themselves from their egg shells (HS = Hatched Eggs ÷ Clutch Size). Emerging success is the percentage of eggs in the clutch that produced hatchlings that successfully emerged from the nest prior to nest excavation (ES = [Hatched Eggs – Live Hatchlings – Dead Hatchlings] ÷ Clutch Size). Between 1996 and 2000, hatching success ranged from 70.3 to 84.2 percent and averaged 79.6 percent. Emerging success over that same period ranged from 65.6 to 79.7 percent and averaged 74.3 percent. By comparing the two sets of numbers, it is apparent that the vast majority of hatchlings that extricated themselves from their egg shells successfully emerged from their nests.

Based on the high standard deviation values for both measures of reproductive success, it is obvious that there is considerable variability among individual nests (Table 10). During every year both measures ranged from 0 to 100 percent, indicating that in some nests no eggs hatched, while in other nests every egg that hatched produced a hatchling that successfully emerged from the nest.

Insofar as the average loggerhead clutch size on County Beaches is 109.6 eggs (Table 8), an average loggerhead nest produces 81.4 hatchlings (emerging success multiplied by clutch size). This would equate to nearly 209,000 hatchlings being produced from the 2,567 nests on County Beaches between 1996 and 2000 (Table 4). However, if nests

washed out by tides or destroyed by predators were factored into the equation this number would decline.

Table 10

Reproductive Success for *in situ* Loggerhead Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	N[1]	Hatching Success[2]		Emerging Success[3]	
		Mean	Std. Dev	Mean	Std. Dev
1996	178	84.2	19.5	76.5	24.9
1997	163	80.8	28.7	74.7	28.4
1998	334	70.3	35.4	65.6	36.4
1999	303	82.2	25.6	75.7	30.1
2000	383	83.1	24.8	79.7	26.2
TOTAL	**1,361**	**79.6**	**NA**	**74.3**	**NA**

1 N = Number of *in situ* nests undisturbed by predators used to calculate hatching and emerging success.

2 Percentage of eggs in the clutch that produced hatchlings that successfully extricated themselves from their egg shells.

3 Percentage of eggs in the clutch that produced hatchlings that successfully emerged from the nest.

Green Turtle

BIOLOGICAL INFORMATION

In 1978, the breeding populations of the green turtle (*Chelonia mydas*) in Florida and on the Pacific Coast of Mexico were federally listed as endangered; all other populations were listed as threatened (43 FR 32800). The North Atlantic Distinct Population Segment was reclassified as threatened in 2016 (NOAA Fisheries 2016).

The green turtle is a circum-global species in tropical and subtropical waters. The major green turtle nesting colonies in the Atlantic Ocean occur on Ascension Island, Aves Island, Costa Rica, and Surinam (NMFS and USFWS 1991b). Nesting in the United States occurs in small numbers in the U.S. Virgin Islands and on Puerto Rico and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties.

Allard *et al*. (1994) concluded that the Florida nesting population of green turtles is genetically distinct, and Meylan *et al*. (1995) stated that the Florida green turtle nesting

aggregation deserves recognition as a regionally significant colony. Brevard County accounts for nearly 39.5 percent of nesting green turtles in Florida, and Volusia County accounts for 3.1 percent (Meylan *et al*. 1995).

The nesting behavior and life history stages of green turtles are similar to those of loggerheads. However, green turtles typically do not begin nesting until late May. Estimates of the number of green turtle nests deposited each year in Florida range from several hundred to over 8,400 (FWC, unpublished data).

Like the loggerhead, green turtles lay multiple clutches of eggs during the nesting season. Based on research conducted in south Brevard County during 1991 and 1992, Johnson (1994) estimated that green turtles deposited one to seven clutches during the nesting season with an average of about three nests per female. However, he cautioned that, because of inherent biasing factors, the true mean probably lies between 3 and 4.

The mean clutch size of green turtle nests is usually 110 to 115 eggs, but this mean varies among populations (NMFS and USFWS 1991b). Witherington and Ehrhart (1989) reported an average clutch size of 136 eggs for 130 clutches on the east coast of Florida. In south Brevard County, Johnson (1994) reported a mean clutch size of 131 eggs. When data from 1985 through 1992 were combined, Johnson (1994) estimated overall hatchling emerging success to be 56.7 percent; thus, the average nest yielded approximately 74.8 hatchlings. Incubation periods for green turtle nests range from approximately 48 to 70 days (Marquez 1990).

In the State of Florida, green turtle nesting appears to be increasing, at least in the last half of the twentieth century (Dodd 1982; Meylan *et al*. 1995). During the period from 1989 to 2000, green turtle nesting in Florida exhibited a clear biannual periodicity, with relatively low nest numbers being recorded in odd-numbered years and high nest numbers being documented in even-numbered years (Witherington and Koeppel 1999; FWC unpublished data).

SITE-SPECIFIC INFORMATION

In Volusia County, green turtles typically nest from late May or early June to early or mid-September. The earliest and latest recorded nests in Volusia County were laid May 18 and September 28, respectively (Table 5). The Plan Area for Volusia County is the site of approximately 3 percent of all green turtle nesting in Florida (Meylan *et al*. 1995). From 1988 through 2000, annual green turtle nest production in the Plan Area varied from 3 nests in 1999 to 290 nests in 2000 (Table 11).

A regression analysis applied to green turtle nesting data over the past 13 years suggests a weak but increasing trend ($r^2 = 0.28$), although the regression is not statistically significant at $p<0.05$ (Figure 4). The biannual nesting pattern in Volusia County is very distinct, and despite the lack of a significant regression, nesting during peak years (even-numbered years) has increased steadily. Over the past decade, every successive peak year except one, 1996, has seen a record number of green turtle nests.

Table 11

Green Turtle Nesting in Volusia County, 1988-2000.

Year	NPSRA[1]		County Beaches[2]		CNS[3]		Total Number of Nests
	No. of Nests[4]	Percent	No. of Nests	Percent	No. of Nests	Percent	
1988	3	15.00	0	0.00	17	85.00	20
1989	0	0.00	0	0.00	18	100.00	18
1990	4	8.51	1	2.13	42	89.36	47
1991	3	21.43	3	21.43	8	57.14	14
1992	3	3.30	5	5.49	83	91.21	91
1993	1	7.14	0	0.00	13	92.86	14
1994	7	6.09	5	4.35	103	89.57	115
1995	1	5.00	0	0.00	19	95.00	20
1996	2	2.04	7	7.14	89	90.82	98
1997	0	0.00	4	33.33	8	66.67	12
1998	6	3.47	16	9.25	151	87.28	173
1999	1	33.33	0	0.00	2	66.67	3
2000	6	2.07	20	6.90	264	91.03	290
TOTAL	**37**	**4.04**	**61**	**6.67**	**817**	**89.29**	**915**
Average	**2.85**		**4.69**		**62.85**		**70.39**

[1] NPSRA = North Peninsula State Recreation Area

[2] County Beaches = Beaches from NPSRA to CNS under jurisdiction of Volusia County.

[3] CNS = Canaveral National Seashore

[4] Nesting data for NPSRA should be used with caution as the length of beach surveyed each year has varied dramatically over the period of record. Furthermore, only 2.7 miles (72 percent) of NPSRA lie within Volusia County; the remaining 1.1 miles lie within Flagler County.

Sources: Meylan *et al*. 1995 (1988-1992).
FWC unpublished data (1993-2000).

Nearly 90 percent of all green turtle nesting between 1988 and 2000 occurred in the CNS, with an additional 4 percent taking place in the NPSRA (Table 11). No more than 20 nests per year were recorded on County Beaches outside the CNS and the NPSRA.

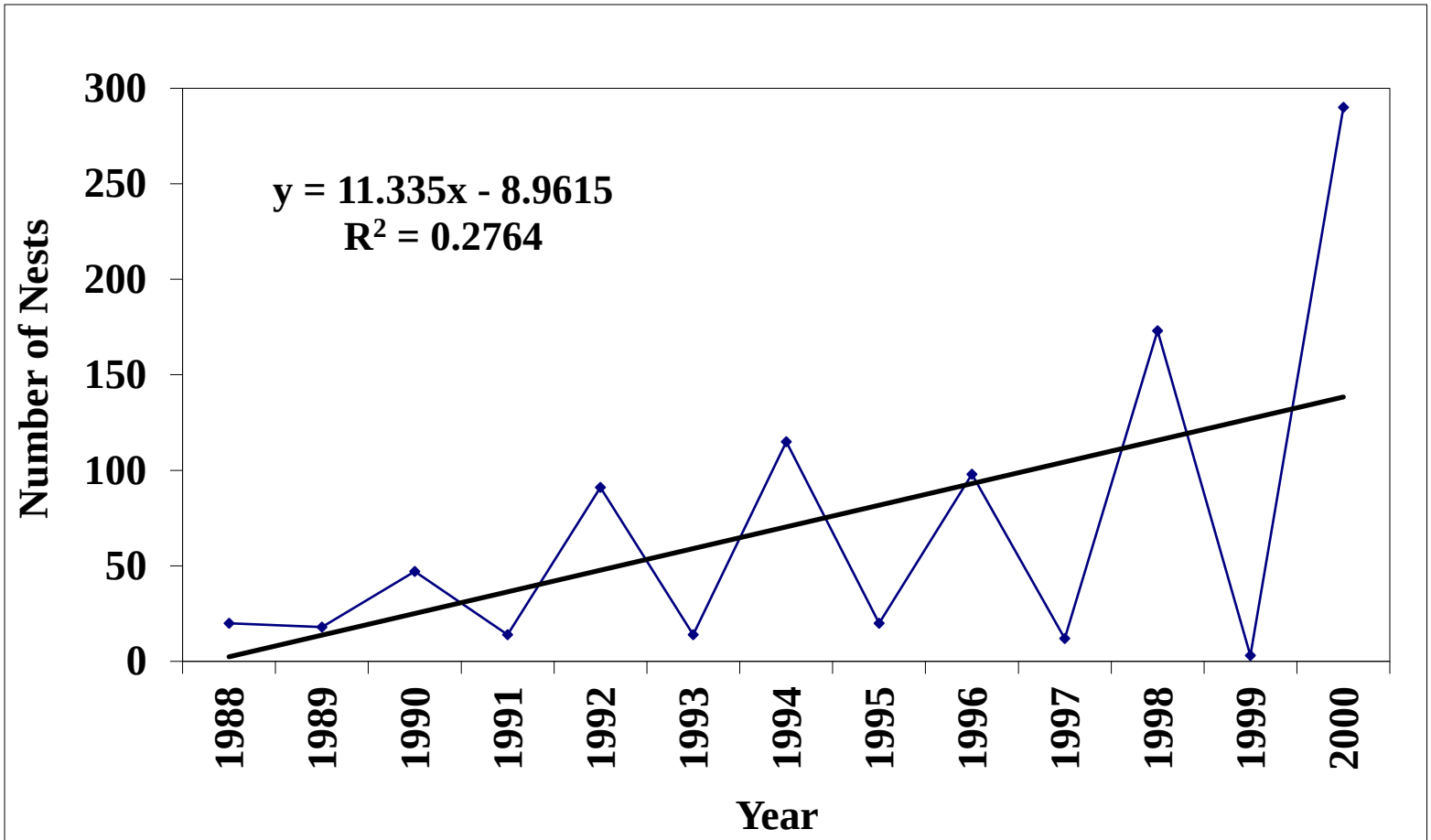

Figure 4. Regression of green turtle nests deposited each year in all of Volusia County, 1988-2000.

However, as elsewhere in the County, nesting by green turtles appears to be increasing on County Beaches, with a record number of nests (20) being recorded in 2000. Between 1996 and 2000, nesting success for green turtles on County Beaches ranged from 47.1 to 80.0 percent and averaged 54.0 percent (Table 12). However, this number is based on a total of only 87 crawls.

Table 12

Nesting Success of Green Sea Turtles on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Number of Nests	Number of False Crawls[1]	Total Crawls	Nesting Success[2] (Percent)
1996	7	6	13	53.8
1997	4	1	5	80.0
1998	16	18	34	47.1
1999	0	4	4	0.00
2000	20	15	35	57.1
TOTAL	**47**	**4**	**91**	**51.6**
Average	**9.4**	**8.8**	**18.2**	**47.6**

[1] False crawl = Non-nesting emergence onto the beach by adult turtle.

[2] Nesting success = Percentage of total crawls that result in a nest.

Between 1996 and 2000, a total of 36 *in situ* green turtle nests undisturbed by predators were excavated to determine nest fate. The average clutch size of those nests ranged from 81 to 200 eggs and averaged about 134 eggs (Table 13). Incubation periods for green turtle nests on County Beaches ranged from 47 to 68 days and averaged 56.2 days (Table 14).

Reproductive success could be determined for 36 *in situ* green turtle nests deposited on County Beaches between 1996 and 2000. Hatching success ranged from 73.1 to 83.4 percent and averaged 78.5 percent (Table 15). Emerging success over that same period ranged from 50.9 to 76.0 percent and averaged 68.8 percent.

Insofar as the average clutch size of green turtle nests on County Beaches is 133.9 eggs (Table 13), an average nest produces 92.1 hatchlings. This would equate to slightly more than 4,300 hatchlings being produced from the 47 nests on County Beaches between 1996 and 2000 (Table 12), provided none of the nests were washed out by tides or destroyed by predators.

Table 13

Clutch Size of Green Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Clutch Size				
	N	Mean	Standard Deviation	Minimum	Maximum
1996	5	159.3	31.5	125	200
1997	4	119.5	12.0	106	131
1998	15	141.3	21.4	97	170
1999[2]	0	NA	NA	NA	NA
2000	12	118.9	24.2	81	164
TOTAL	**36**	**133.9**	**NA**	**81**	**200**

[1] N = Number of *in situ* nests undisturbed by predators used to calculate clutch size.
[2] No green turtle nests were deposited on County Beaches in 1999.

Table 14

Incubation Period for *in situ* Green Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Incubation Period				
	N[1]	Mean	Standard Deviation	Minimum	Maximum
1996	5	53.7	5.9	47	58
1997	4	55.3	4.0	52	61
1998	13	57.7	4.9	49	68
1999	0	NA	NA	NA	NA
2000	9	55.7	4.4	49	62
TOTAL	**31**	**56.2**	**NA**	**47**	**68**

[1] N = Number of *in situ* nests undisturbed by predators used to calculate incubation period.

Table 15

Reproductive Success for *in situ* Green Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	N[1]	Hatching Success[2]		Emerging Success[3]	
		Mean	Std. Dev	Mean	Std. Dev
1996	5	82.7	19.0	63.7	36.9
1997	4	83.4	22.4	50.9	98.5
1998	15	80.0	25.9	76.0[4]	34.1
1999[5]	0	NA	NA	NA	NA
2000	12	73.1	32.9	68.0	33.5
TOTAL	**36**	**78.5**	**NA**	**68.8**	**NA**

1 N = Number of *in situ* nests undisturbed by predators used to calculate hatching and emerging success.

2 Percentage of eggs in the clutch that produced hatchlings that successfully extricated themselves from their egg shells.

3 Percentage of eggs in the clutch that produced hatchlings that successfully emerged from the nest.

4 Based on data from 11 nests only.

5 No green turtle nests were deposited on County Beaches in 1999.

Leatherback Turtle

BIOLOGICAL INFORMATION

The leatherback turtle (*Dermochelys coriacea*), the largest of the extant species of sea turtle, was federally listed as an endangered species in 1970 (35 FR 8491). Unlike other sea turtles, the carapace, or top shell, of the leatherback is not covered with bony plates. Rather, its carapace is composed of a black, oil-saturated, rubber-like tissue which is strengthened by a mosaic of thousands of small bones just below the outer skin of the carapace. The morphology of the leatherback is so distinct that it is placed in a separate family (Dermochelyidae) from other extant species of sea turtles (Cheloniidae) (NMFS and USFWS 1992).

Other unique characteristics include the leatherback's presence in cold waters, an internal temperature that exceeds ambient water temperature, and its ability, unique among reptiles, to be active at temperatures that have been reported to be as low as 0 degrees Celsius (Frair *et al*. 1972, Goff and Lien 1988). Whereas the other species of sea turtles tend to inhabit relatively shallow coastal waters where they feed on bottom dwelling

plants and animals, leatherbacks tend to be pelagic (Pritchard and Trebbau 1984). They feed primarily on soft-bodied animals, such as jellyfish, that are abundant in the open ocean (Lazell 1980, Hendrickson 1980, Shoop and Kenney 1992).

Leatherback turtles travel great distances between their winter foraging and summer nesting grounds (Goff *et al*. 1994, Girondot and Fretey 1996). The leatherback turtle is found in the Atlantic, Pacific, and Indian Oceans and has been spotted as far north as the Barents Sea, Canadian Maritime Provinces and Alaska, and as far south as Chile, the Cape of Good Hope, and New Zealand (Pritchard and Trebbau 1984).

Nesting grounds are distributed circum-globally (40º North to 35º South Latitude), with the largest known nesting ground occurring on the Pacific Coast of southern Mexico. The total population of mature females worldwide has been estimated to be 34,500 (Spotilla *et al*. 1996). Two of the largest populations of leatherbacks occur in the Western Atlantic in French Guiana and Suriname (Spotilla *et al.* 1996). In French Guiana, over 50,000 nests were recorded in 1988 and 1992 (Girondot and Fretey 1996). Nesting occurs frequently, but in lesser numbers, from Costa Rica to Columbia and in Guyana and Trinidad (National Research Council 1990). Nesting in the United States occurs primarily in Puerto Rico, the U.S. Virgin Islands, and southeastern Florida.

Only about 16 to 31 leatherback turtles were thought to nest annually in Florida (Meylan *et al.* 1995, NMFS and USFWS 1992). However, that figure appears to have increased significantly over the last decade (Witherington and Koeppel 1999). The majority (more than 90 percent) of the leatherback turtle nests recorded in Florida between 1988 and 1992 occurred in St. Lucie, Martin, and Palm Beach Counties, and less than one percent occurred in Volusia County (Meylan *et al*. 1995).

Leatherbacks are thought to migrate to their nesting beach about once every two to three years (NMFS and USFWS 1992, Miller 1997). Nesting by this species in Florida typically begins and ends earlier in the season than for the other species, with the first nests being recorded in late February or early March and the last nests in July (Meylan *et al.* 1995). Tucker (1989) and Tucker and Frazer (1991) reported that leatherback turtles nested an average of five to seven times per year, with a mean internesting interval of nine days to ten days. The mean annual clutch size of leatherback turtles varies from 65 to 80 yolked eggs (Tucker and Frazer 1991, NMFS and USFWS 1992), and incubation periods vary from 55 to 75 days (NMFS and USFWS 1992).

On Hutchinson Island, Florida, in Martin and St. Lucie Counties, the average leatherback nest contains 76.8 yolked eggs and the average emerging success is 50.1 percent (Ecological Associates, Inc., unpublished data, 1998-2000). Thus, a typical leatherback nest unaffected by predation or storms produces about 38 hatchlings. Incubation periods for leatherback nests in Florida are generally longer than for loggerhead and green turtle nests, because leatherbacks have a tendency to deposit nests earlier in the season when cooler temperatures prevail.

SITE-SPECIFIC INFORMATION

Historically, nesting by leatherback turtles in Volusia County has been rare, with no more than two nests being reported per year between 1988 and 1996 (Table 16). However, it appears that nesting by leatherbacks has been increasing during recent years. The earliest recorded nest in Volusia County was laid April 18; the latest was laid on July 17 (Table 5). However, because routine nesting surveys historically were not initiated until late April or early May, earlier nesting events may have been overlooked (Meylan *et al*. 1995). Of the 35 nests recorded in Volusia County between 1988 and 2000, slightly more than half occurred within County Beaches (Table 16).

Between 1996 and 2000, nesting success for leatherback turtles on County Beaches ranged from 0.0 to 100.0 percent and averaged 76.5 percent for the five years combined (Table 17). However, this number is based on a total of only 17 crawls.

Between 1996 and 2000, a total of seven (7) *in situ* leatherback turtle nests undisturbed by predators were excavated to determine nest fate. The clutch size of those nests ranged from 55 to 104 eggs and averaged about 85 eggs (Table 18). Incubation periods for leatherback nests on County Beaches ranged from 63 to 79 days and averaged 73 days (Table 19).

Reproductive success could be determined for only five (5) *in situ* leatherback nests deposited on County Beaches between 1996 and 2000. Mean hatching success ranged from 71.9 to 89.1 percent and averaged 78.5 percent (Table 20). Emerging success over that same period ranged from 69.2 to 87.3 percent and averaged 75.4 percent.

Insofar as the average clutch size of leatherback turtle nests on County Beaches is about 84.7 eggs (Table 18), an average nest produces 63.9 hatchlings. This would equate to slightly more than 830 hatchlings being produced from the 13 nests on County Beaches between 1996 and 2000, provided none of the nests were washed out by tides or destroyed by predators.

Table 16

Leatherback Turtle Nesting in Volusia County, 1988-2000.

Year	NPSRA[1]		County Beaches[2]		CNS[3]		Total Number of Nests
	No. of Nests[4]	Percent	No. of Nests	Percent	No. of Nests	Percent	
1988	0	0.00	1	100.00	0	0.00	1
1989	0	NA	0	NA	0	NA	0
1990	0	0.00	1	100.00	0	0.00	1
1991	0	0.00	2	100.00	0	0.00	2
1992	0	0.00	1	100.00	0	0.00	1
1993	1	100.00	0	0.00	0	0.00	1
1994	0	0.00	0	0.00	1	100.0	1
1995	2	100.00	0	0.00	0	0.00	2
1996	0	NA	0	NA	0	NA	0
1997	1	14.29	5	71.43	1	14.29	7
1998	0	0.00	4	57.14	3	42.86	7
1999	1	16.67	2	33.33	3	50.00	6
2000	0	0.00	2	33.33	4	66.67	6
TOTAL	**5**	**14.29**	**18**	**51.43**	**12**	**34.29**	**35**
Average	**0.4**		**1.4**		**0.9**		**2.7**

[1] NPSRA = North Peninsula State Recreation Area

[2] County Beaches = Beaches from NPSRA to CNS under jurisdiction of Volusia County.

[3] CNS = Canaveral National Seashore

[4] Nesting data for NPSRA should be used with caution as the length of beach surveyed each year has varied dramatically over the period of record. Furthermore, only 2.7 miles (72 percent) of NPSRA lie within Volusia County; the remaining 1.1 miles lie within Flagler County.

Sources: Meylan *et al*. 1995 (1988-1992).
FWC unpublished data (1993-2000).

Table 17

Nesting Success of Leatherback Sea Turtles on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Number of Nests	Number of False Crawls[1]	Total Crawls	Nesting Success[2] (Percent)
1996	0	1	1	0.0
1997	5	0	5	100.0
1998	4	1	5	80.0
1999	2	1	3	66.7
2000	2	2	4	50.0
TOTAL	**13**	**5**	**18**	**72.2**

[1] False crawl = Non-nesting emergence onto the beach by adult turtle.
[2] Nesting success = Percentage of total crawls that result in a nest.

Table 18

Clutch Size of Leatherback Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Clutch Size				
	N	Mean	Standard Deviation	Minimum	Maximum
1996	0	NA	NA	NA	NA
1997	3	87.3	15.4	65	98
1998	3	86.0	27.0	55	104
1999	0	NA	NA	NA	NA
2000	1	73.0	NA	73	73
TOTAL	**7**	**84.7**	**NA**	**55**	**104**

N = Number of *in situ* nests undisturbed by predators used to calculate clutch size.

Table 19

Incubation Period for *in situ* Leatherback Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Incubation Period				
	N	Mean	Standard Deviation	Minimum	Maximum
1996	0	NA	NA	NA	NA
1997	3	74	2.7	71	76
1998	1	63	NA	63	63
1999	0	NA	NA	NA	NA
2000	2	76.5	3.5	74	79
TOTAL	**5**	**73.0**	**NA**	**63**	**79**

Table 20

Reproductive Success for *in situ* Leatherback Sea Turtle Nests on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	N	Hatching Success[1]		Emerging Success[2]	
		Mean	Std. Dev	Mean	Std. Dev
1996	0	NA	NA	NA	NA
1997	3	71.9	11.0	69.2	11.9
1998	1	89.1	NA	87.3	NA
1999	0	NA	NA	NA	NA
2000	1	87.7	NA	82.2	NA
TOTAL	**5**	**78.5**	**NA**	**75.4**	**NA**

[1] Percentage of eggs in the clutch that produced hatchlings that successfully extricated themselves from their egg shells.

[2] Percentage of eggs in the clutch that produced hatchlings that successfully emerged from the nest.

Hawksbill Turtle

BIOLOGICAL INFORMATION

The hawksbill turtle (*Eretmochelys imbricata*) occurs in all of the tropical and subtropical oceans. It was federally listed as endangered in 1970 (35 FR 8491). Throughout their range, hawksbills typically nest at lower densities compared to green and loggerhead turtles (National Research Council 1990). The low numbers may be the direct result of long-term over fishing. Although they are regularly spotted in coastal waters and reefs off South Florida, few hawksbills nest on Florida beaches (Meylan *et al*. 1995). Most of the Western Atlantic nesting takes place on the Yucatan Peninsula, Belize, Nicaragua, Panama, Venezuela, Antiqua, and other Caribbean islands (NMFS and USFWS 1993). Hawksbills have an apparent preference for remote beaches with dense shrubbery on the landward side of the intertidal zone where offshore reefs or rock outcrops are in the vicinity (National Research Council 1990).

Hawksbills share many of the same life-history traits as loggerhead and green turtles. They are thought to migrate to their nesting beach about every three years, and nest about two to three times during the nesting season (Miller 1997). The average renesting interval is about 14.5 days. Hawksbills lay an average of 140 eggs per clutch, and the average incubation period is 59.2 days (NMFS and USFWS 1993).

SITE-SPECIFIC INFORMATION

During the period of 1979 through 2000, only one hawksbill turtle nest was recorded in Volusia County (Meylan *et al*. 1995; FWC unpublished data). This nest was laid within the CNS in 1982.

Kemp's Ridley Turtle

BIOLOGICAL INFORMATION

The Kemp's ridley sea turtle (*Lepidochelys kempii*) has received protection in Mexico since the 1960's and was listed as endangered under United States law in 1970 (35 FR 18320). Together with the olive ridley, they are the smallest of the extant species of sea turtles. The Kemp's ridley is also the rarest and most endangered of the sea turtles, with nesting primarily occurring in the Mexican states of Tamaulipas and Veracruz (USFWS and NMFS 1992, USFWS 2001).

Kemp's ridley distribution is mainly limited to the Gulf of Mexico and Western Atlantic with occasional sightings in the Eastern Atlantic. Adult turtles are thought to spend most of their time in the Gulf of Mexico, while juveniles and subadults also regularly occur along the eastern seaboard of the United States (USFWS and NMFS 1992). The Kemp's ridley is carnivorous, feeding on swimming crabs, mollusks, jellyfish, and fish, with blue crabs apparently a preferred food.

Breeding and nesting occur from April through August on sandy beaches during broad daylight. They may nest singly or in large groupings called *arribadas*. Once they have

mated, the females wait for heavy surf and high northeast winds before emerging from the water to nest. Kemp's ridleys are thought to nest every one or two years, depositing an average of 2.5 clutches per nesting season (TEWG 2000). The renesting interval is between 20 and 28 days, and the mean clutch size is about 110 eggs (Miller 1997).

SITE-SPECIFIC INFORMATION

Kemp's ridley turtles are known to wash up on the beaches of Volusia County, usually dead, and no nesting is known to have occurred in the County prior to 1996. However, in 1996, two Kemp's ridley nests were documented on County Beaches. Both nests were deposited during the daytime by the same individual, as determined from photographs, and both emergences occurred during periods of strong onshore winds and rough surf (Johnson *et al*. 1999). Only seven Kemp's ridley nests were documented in the State of Florida from 1979 through 1999, and those observed in Volusia County were the first on the east coast (Johnson *et al*. 1999; FWC unpublished nesting data). A few non-nesting emergences by Kemp's ridleys were reported in Palm Beach County.

One of the two Kemp's ridley nests deposited on Volusia County Beaches was moved due to imminent threat of tidal inundation. It contained 108 eggs (Johnson *et al*. 1999). After an incubation period of 64 days, hatchlings began to emerge. Based on interpretation of nest contents, hatching and emerging success were estimated to be 79 and 74 percent, respectively. The second Kemp's ridley nest incubated *in situ.* The 94 eggs contained in this clutch fared much worse, with few hatchlings escaping the nest (hatching and emerging success was nine and four percent, respectively). Based on genetic analysis of material removed from the two clutches, it was determined that the parent was a pure Kemp's ridley sea turtle.

Another Kemp's ridley nest was reported by volunteer monitoring personnel in 1998. Although the conditions surrounding the nesting event are typical for the species (e.g., daytime, windy conditions, rough surf, etc.), no positive evidence of its true identity was obtained.

Piping Plover

BIOLOGICAL INFORMATION

The piping plover (*Charadrius melodus*) is a small, highly mobile, beach-dwelling bird of the plover family, Charadriidae. Three populations of this species have been recognized: the Northern Great Plains population, whose breeding range includes Nebraska, North Dakota, South Dakota, Montana, and several territories in Canada; the Great Lakes population, whose breeding range includes lake shorelines in both the United States and Canada; and the Atlantic Coast population, whose breeding range extends from near the North Carolina/South Carolina border north through Maine and Nova Scotia. The Atlantic Coast population was listed as threatened by the USFWS in 1986 (50 FR 50726-50734); the other two populations are listed as endangered. All three populations are migratory, and thus, the piping plover is also protected under Federal regulations through the Migratory Bird Treaty Act (MTBA) of 1918.

Piping plovers nest above the high tide line in coastal areas. Nesting habitat includes, ocean beaches, sandflats at the ends of barrier islands, gently sloping foredunes, blowout areas behind primary dunes, sparsely vegetated dunes, and washover areas cut into or between dunes. Eggs are laid in a depression in the sand close to the dunes; the nest is sometimes lined with shell fragments. Eggs hatch in about 25 days and the young soon begin foraging with their parents. The chicks fledge and begin flying in about 30 days. At the end of their breeding season, young and adults congregate on undisturbed beaches prior to their southward migration.

The piping plover eats mostly crustaceans and insects that it finds along the water's edge or among seaweed and flotsam that washes ashore. Feeding areas also include the intertidal portions of mudflats, and sandflats, as well as the shorelines of coastal lagoons and salt marshes. Foraging occurs primarily during daylight hours.

Piping plovers occur in Florida during the non-nesting (winter) season. They are generally found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets. Although piping plovers have been observed on beaches adjacent to the open waters of the Atlantic Ocean, they appear to prefer the calmer shore conditions typically found along the Gulf Coast and in the sheltered portions of coastal inlets. These areas typically afford more productive feeding habitat and are less subject to human disturbance.

SITE-SPECIFIC INFORMATION

The International Piping Plover Census is designed to determine and document the abundance, habitat, and locations of wintering piping plovers along the Atlantic seaboard. These surveys, which are coordinated by the USFWS, typically involve volunteers, many of whom are associated with local Audubon Societies. The surveys are performed over a one-week period between January and February every five years.

During the 1991 census, in which 32 miles of Volusia County beachfront were surveyed, four piping plovers were observed, all in the immediate vicinity of Ponce Inlet. In 1996, the entire beachfront was censused by local Audubon volunteers. Three plovers were observed on the inlet beaches at Smyrna Dunes Park (south side of Ponce Inlet). A week after the official survey, monitoring personnel sighted six birds at the same location. No piping plovers were observed on County Beaches during the 2001 census, but 11 were spotted on an intertidal sand bar inside the inlet a few days after the official survey ended. Additionally, in early May of 2000, County personnel reported five plovers resting on the south shore of Ponce Inlet in Smyrna Dunes Park. Later that same year (September) volunteer sea turtle monitoring personnel reported 14 birds in the same area. From these data it is apparent that the beaches, sand flats, and intertidal sand bars in and around Ponce Inlet are occasionally, if not regularly, used by wintering piping plovers.

In 2001, the USFWS designated 168 acres in the Ponce Inlet area as Critical Habitat for wintering piping plovers (50 CFR 17). The majority of this habitat is adjacent to Lighthouse Point Park and Smyrna Dunes Park, which bound the north and south shores of the inlet, respectively. This habitat includes the shoreline extending from the jetties at Ponce Inlet west to the Halifax River and Inlet junction. However, it also includes ocean

shoreline extending 1.2 km (0.75 miles) south of Ponce Inlet. Critical Habitat is bounded on the east by the mean low, low water line (MLLW) and on the west by the point where densely vegetated habitat or developed structures begin and where "the constituent elements" no longer occur. All Critical Habitat within Volusia County, as described above, is located within the HCP Plan Area.

Southeastern Beach Mouse

BIOLOGICAL INFORMATION

The southeastern beach mouse (*Peromyscus polionotus niveiventris)* is one of six existing coastal subspecies of the oldfield mouse (P*eromyscus* polionotus). Members of this complex are known collectively as "beach mice." The southeastern beach mouse was afforded Federal protection as a threatened species in 1989 (53 FR 20598-20602) and has similar protection at the State level. Although the oldfield mouse is a wide-ranging species in the southeastern United States, the southeastern beach mouse has historically been limited in distribution to the barrier islands on the east coast of Florida from Palm Beach County north to Ponce Inlet in Volusia County.

The southeastern beach mouse is the largest member of the beach mouse complex. It averages about 5.5 inches (139 mm) in total length, having a tail that is about 2.0 inches (52 mm) long. It has a buff-colored back, pure white underparts, and indistinct, white markings on its nose and face.

All subspecies of beach mice are specialists of habitats in the early stages of vegetative succession. They are found in the greatest numbers in areas characterized by open, bare patches of sparsely vegetated sandy sediments. Thus, they preferentially inhabit the dynamic foredunes and transitional backdunes of coastal barrier islands. Barrier islands are extremely dynamic environments, subject to dramatic episodes of erosion and accretion in response to storms and other coastal processes. Beach mice are well adapted to these rapidly changing environments.

The preferred habitat of the southeastern beach mouse appears to be the sea oat (*Uniola paniculata*) zone along the beach dune and the somewhat sparsely vegetated areas just landward of the foredune. However, this species also has been documented to be present in areas dominated by oaks (*Quercus* spp.), rosemary (*Ceratiola ericoides*), and saw palmetto (*Serenoa repens*; FCREPA 1992a, USFWS 1993).

All oldfield mice construct and maintain burrows in the dune system. Burrows are usually located on the well-drained sloping side of a dune and typically consist of an entrance tunnel up to 3.3 ft. (1 m) deep, a nest chamber at a depth of 2 to 3 ft. (0.6 to 0.9 m), and an escape tunnel (USFWS 1993). The escape tunnels generally rise from the nest chamber to just below the exterior of the dune, and are thus extremely vulnerable to crushing via trampling by humans.

Beach mice are nocturnal, remaining in their burrows during the day and then emerging at night in search of food. They are generally omnivorous rodents, their diet consisting

primarily of the seasonal seeds of dune plants, such as sea oats and dune panic grass (USFWS 1993). However, they may also consume small invertebrates.

Both natural and human-related impacts have contributed to a decrease in the population of the southeastern beach mouse. The primary natural cause is the loss of suitable habitat caused by beach erosion. Human-related impacts are primarily related to coastal development, predation by free-ranging housecats, and increased pedestrian use of the beach/dune system.

SITE-SPECIFIC INFORMATION

Historical records indicate that Ponce Inlet was the likely geographical boundary separating the southeastern beach mouse from the pallid beach mouse (*Peromyscus polionotus decoloratus*), a recently extinct subspecies that ranged north to Matanzas Inlet in St. Johns County (FCREPA 1992a). However, until recently it appeared that the southeastern beach mouse had been extirpated from all suitable habitat north of Canaveral National Seashore (USFWS 1993). That situation changed in the spring of 2002, when trapping conducted by the USFWS captured two beach mice within Smyrna Dunes Park immediately south of Ponce Inlet. Additionally, the abundance of tracks within the primary and secondary dune system suggested that a relatively healthy population of this subspecies might exist within the park. Beach mice might also occur on private property up to one-half mile south of the park where houses and condos are set well behind the primary dune and swale system (B. Brooks, USFWS, *pers. comm*.). The USFWS intends to undertake more systematic surveys in the near future to better document the size and distribution of this population. Insofar as the preferred habitat and behavior of the beach mouse are unlikely to put it in jeopardy of vehicle interactions on County Beaches, and HCP restrictions described later in this HCP largely preclude vehicular degradation of its habitat, Volusia County is not requesting Federal take authorization for this species.

5

POTENTIAL IMPACTS OF BEACH ACTIVITIES ON PROTECTED SPECIES

Sea Turtles

Sea turtles nesting on County Beaches, as elsewhere in Florida, face a variety of natural and human-related threats (NMFS and USFWS 1991a and b). Natural threats to nesting habitat include nest predation, beach erosion, and invasion of exotic dune vegetation (e.g., Australian pine, *Causarina equisetifolia*). Various anthropogenic threats to nesting habitat include beach armoring, beach nourishment, coastal construction, artificial lighting, increased human presence on the beach at night, beach cleaning, recreational beach equipment, beach vehicular driving, and poaching. Threats to turtles in the water include oil and gas exploration, dredging, marina and dock development, commercial fisheries, boats, power plant entrapment, and ingestion of marine debris. Most pertinent to this HCP are impacts associated with vehicles on the beach, beachfront development, and a variety of coastal construction activities.

This section describes natural and human-related activities that have been documented to, or may potentially, impact sea turtles on County Beaches. The information presented is derived from the scientific literature and records compiled from Annual Reports submitted to the USFWS between 1997 and 2000 (EAI 1998a and b, 1999, 2000b and 2001a).

Natural Events

PREDATION

Depredation of sea turtle eggs and hatchlings by native and introduced species occurs on almost all nesting beaches. Foxes (e.g., *Urocyon cinereoargenteus*), raccoons (*Procyon lotor*), and dogs have been documented raiding sea turtle nests on County Beaches. Up until 1999, mammalian predators affected fewer than 10 nests per year on County Beaches. However, that number increased to 19 in 1999 and then rose again to 31 in 2000. The area of highest nest depredation occurred in the vicinity of Lighthouse Point Park, a County park just north of Ponce Inlet. Both foxes and raccoons are primarily responsible for destruction of nests in that area. Another area of relatively heavy nest predation is located at the south end of the County just north of the CNS. Only raccoons appear to be a problem in that area. Sometimes nests are depredated prior to egg hatching, and other times predators only invade a nest after hatchlings have already emerged (scavenging).

Nest screening appears to be an effective deterrent to mammalian predation if done early in the incubation period. Due to the historically low depredation rates, screens were not

routinely applied to nests on the date they were first encountered. For example, in 2000, only five (5) of the 46 nests screened north of the inlet were screened prior to the first sign of predator tampering. Consequently, considerable damage had already occurred at many of the nests before the screens were applied. Although early screening in subsequent years reduced the extent of nest depredation, foxes and raccoons can readily move into new areas resulting in periodic increases in nest losses.

Ghost crabs (*Ocypode quadrata*) are prevalent along the entire length of County Beaches. Monitoring personnel record observations of ghost crab holes near nest barriers. Between 1997 and 2000, crab burrows were associated with approximately 10 to 30 percent of all nests. However, the extent to which these crabs were invading nests, depredating eggs and hatchlings, and/or affecting reproductive success is not known. Ghost crabs appear to depredate emergent hatchlings, as indicated by hatchling tracks terminating at crab burrows and crab tracks adjacent to dead hatchlings on the beach.

Fire ants (*Solenopsis invicta*) have been documented as a problem for sea turtle eggs and hatchlings (Wilmers *et al*. 1996, Moulis 1997). Between 1997 and 2000, the presence of fire ants was reported at between four and eight percent of all nest sites. Often times, they were observed inside the nest during nest excavation or on hatchlings at the surface of the nest. However, as for ghost crabs, the extent of damage to eggs and hatchlings directly attributable to ants cannot be reliably quantified.

Although not considered a typical form of predation, roots of sea oats (*Uniola paniculata*), railroad vine (*Ipomoea pescapre*), and other dune plants sometimes invade the nest cavity and penetrate incubating eggs. This occurs primarily in nests laid high on the beach at or landward of the toe of the dune. During 2000, monitoring personnel reported that 51 of the 516 nests excavated (10 percent) had roots above or inside the egg chamber.

TIDAL INUNDATION

Erosion, inundation, and accretion appear to be the major abiotic factors negatively affecting incubating egg clutches (NMFS and USFWS 1991a). Short-term erosion events (e.g., storms) are a natural phenomenon throughout the tropics and sub-tropics where both the number of turtle nests and the amount of storm activity vary considerably from year to year. Turtles have evolved a strategy to offset episodic impacts to hatchling productivity by laying large numbers of eggs and by broadly distributing their nests both spatially and temporally. Thus, rarely is the total annual reproductive output affected by a storm that impacts a nesting beach. However, chronic erosion exacerbated by human activities along the coastline can result in a permanent reduction in both the quantity and quality of available nesting habitat leading to long-term impacts to productivity.

During erosion events, nests deposited closest to the water's edge may be completely washed out. Nests incubating higher on the beach can be uncovered or inundated with seawater during unusually high tides, both of which can reduce reproductive success.

In Volusia County, 5.6 percent of all nests deposited between 1996 and 2000 were washed out by tides (Table 21). However, the vast majority of that damage occurred during a single year. In 1999, a year of record nesting, Hurricanes Dennis, Floyd and Irene all skirted the coast of Volusia County, causing considerable erosion and beachfront damage. About 20 percent of all nests were washed away. During other years, nest loss due to erosion was less than three percent, and in three of the five years evaluated, it was less than one percent.

Table 21

Number of Sea Turtle Nests Affected by Tides on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Total Nests[1]	Overwashed		Number Washed Out	
		N	Percent	N	Percent
1996	500	92	18.4	14	2.8
1997	346	146	42.2	0	0.0
1998	538	172	32.0	1	0.2
1999[2]	628	NA[3]	NA	129	20.5
2000	620	231	37.3	4	0.6
TOTAL	**2,632**	**641[4]**	**32.0[4]**	**148**	**5.6**

[1] All species combined.
[2] Beaches affected by Hurricanes Dennis, Floyd & Irene.
[3] The number of nests overwashed was not enumerated, but anecdotal evidence suggests that the majority of nests on County Beaches were overwashed at least once during their incubation period.
[4] Excludes 1999.

Nests that are not washed out of the beach may suffer reduced reproductive success as the result of tidal inundation. Eggs saturated with seawater are particularly susceptible to embryonic mortality (Bustard and Greenham 1968, Milton *et al*. 1994, Martin 1996). Accretion of sand above incubating nests may also result in egg and hatchling mortality. Although occasional overwash of nests on Hutchinson Island, Florida, appeared to have minimal effect on reproductive success, prolonged or repeated exposure resulted in fewer emergent hatchlings (Ernest and Martin 1993). Ehrhart and Witherington (1987) reported that 17.5 percent of the loggerhead nests deposited in their Brevard County study area did not emerge due to erosion, accretion, and storm surge.

In Volusia County the effects of wave overwash on incubation periods is apparent (Table 22). Nests overwashed at least once incubated on average about 1.5 days longer than those on dry sections of beach. The effect was even more pronounced for those nests experiencing multiple days of overwash. Longer incubation periods may increase susceptibility of eggs and hatchlings to depredation.

Table 22

Effect of Tidal Overwash on Incubation Periods for Loggerhead Nests
Deposited on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Dry		Overwashed	
	N	Mean Incubation Period	N	Mean Incubation Period
1996	49	55.6	90	57.8
1997	115	58.4	77	61.8
1998	214	55.9	77	56.4
1999	302	56.1	55	54.2
2000	248	57.1	145	58.3
TOTAL	**928**	**56.6**	**444**	**58.0**

[1] N = Number of *in situ* nests undisturbed by predators used to calculate incubation period.

In addition to those direct impacts associated with tidal overwash, storm events during the nesting season may cause hatchlings that have already entered the water to wash back up on the beach with algae and flotsam. In some instances these hatchlings may have been at sea for weeks or months. Stranded washback post-hatchlings, as they are referred to, are vulnerable to being accidentally run over by vehicles on the beach.

Human-Related Activities

VEHICULAR IMPACTS

Vehicular activity on the beach can be partitioned into the following categories

- Public safety operations, such as those involving lifeguards, emergency vehicles, and law enforcement vehicles;
- Public vehicular access, including shuttle service to non-driving areas;
- Routine beach maintenance and sanitation;
- Access ramp maintenance;
- Concession operations, including rental vehicles, such as all-terrain vehicles (ATVs) and golf carts;
- Activities necessary to implement the terms and conditions of the ITP (e.g., sea turtle monitoring, GPS data collection, HCP management, etc.);
- Code enforcement activities, such as assessing compliance with beachfront lighting regulations and removal of recreational furniture left on the beach overnight;

- Planned coastal construction projects approved by local, State, and/or Federal regulatory agencies, such as seawall repairs, beach nourishment, dune restoration, and removal of wind-blown sand, that will not result in the unauthorized take of federally listed species, as determined by the USFWS, when no reasonable upland alternative exists;
- Scientific monitoring and studies other than those related to sea turtles;
- Emergency shoreline protection projects approved by local, State, and/or Federal regulatory agencies; and
- Non-routine beach maintenance and sanitation, such as storm cleanup and removal of hazardous materials, debris and/or obstacles from the beach that pose a public health or safety risk following storms and other unforeseen circumstances (e.g., boat groundings, plane crashes, etc.).

Each of the activities listed above will be managed differently under this HCP, and thus, the potential for impacts will vary among activities. Later sections of this HCP describe the programs that will be implemented to minimize and mitigate the take of sea turtles associated with vehicular activity on the beaches within the Plan Area.

Direct Impacts

Direct impacts potentially resulting from vehicles on the beach are summarized in Table 23. Most of the impacts listed are obvious, and thus, there is no need to discuss them in detail. Adult, hatchling, live stranded, and live washback hatchling sea turtles, as well as sea turtle nests may be run over by vehicles. At night vehicle lights may disturb nesting turtles and disorient hatchlings. To minimize these impacts, the County has implemented measures, as described elsewhere in this HCP, to separate to the greatest extent practicable, turtles and vehicles in both time and space.

Sea turtles typically emerge from the ocean at night to lay their eggs. Similarly, hatchlings typically emerge from their nests at night to enter the sea. The HCP significantly reduces the potential for direct impacts to both nesting females and emergent hatchlings by limiting public vehicular access to daylight hours.

The HCP has further reduced the potential for impacts to nests by restricting public driving and parking to those areas of County Beaches where nest densities are relatively low. In areas where driving is permitted, a no-driving and no-parking zone (referred to as a Conservation Zone) near the dune has been established to keep vehicles away from those areas where the vast majority of nests are placed. Furthermore, all known nest sites are conspicuously marked so vehicle operators can easily avoid them. When compared with beach driving policies and practices prior to issuance of the original ITP, the comprehensive protected species management programs outlined in this HCP dramatically reduce the potential for vehicular-related incidental take on County Beaches.

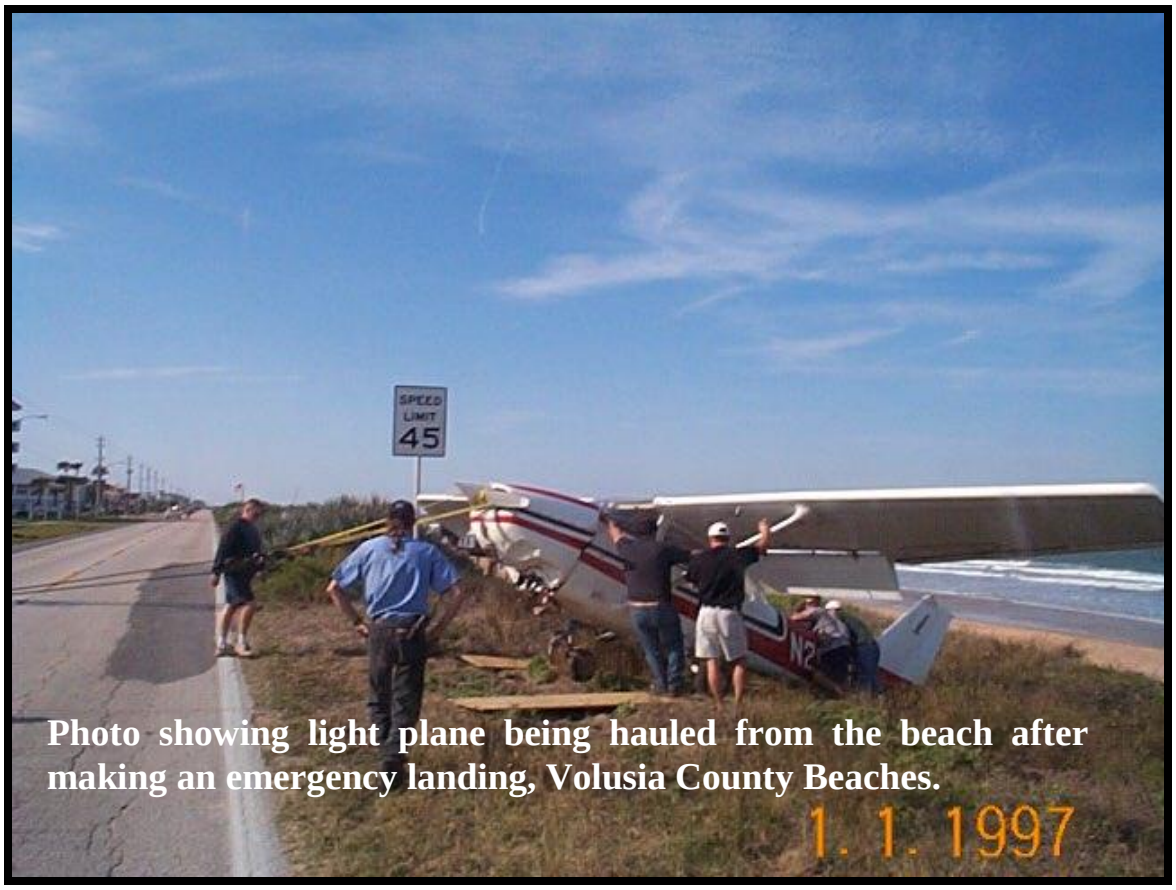

Photo showing light plane being hauled from the beach after making an emergency landing, Volusia County Beaches.

Perhaps the greatest impact associated with vehicles on the beach is the potential to run over an unmarked nest. When evaluating direct physical impacts of pedestrian and vehicular traffic on nests, the presence of unmarked nests must be considered. Unmarked nests can occur when a nest goes undetected by monitoring personnel or the barriers used to mark a nest are washed out by tides or vandalized.

Sea turtle monitoring personnel conduct daily surveys of all County Beaches. The surveys are initiated shortly after sunrise from May 1 through September 30 each year and take two to four hours to complete. Nests deposited before May 1st may not be reported and therefore may remain unprotected from vehicle traffic throughout their incubation periods. However, this is probably a rare event, as the leatherback turtle is typically the first species to begin nesting, and the large size of their tracks and nest would unlikely go undetected by the County's public safety personnel who patrol the beaches daily. These officers are trained to identify a sea turtle crawl and are instructed to report those occurring outside of the nesting season to appropriate HCP personnel. The likelihood for a nest to be deposited after September 30 is even more remote (see Table 5).

A more likely scenario leading to an unmarked nest is the failure of monitoring personnel to detect a nest on the beach. The distinctive tracks left on the beach at night by turtles is interpreted the following morning to determine which species came ashore and whether

or not it nested. However, sometimes these tracks can be misinterpreted. In an assessment of data generated by permitted and trained turtle surveyors, FWC determined that 7 percent of the crawls marked for study were incorrectly recorded as false crawls when they were actually nests (Schroeder 1994). In other cases, natural elements or human activity on the beach may cause a nest to be missed. The greater the disturbance, the greater the likelihood that the crawl will be overlooked.

Rain and wind obscure tracks, while wavewash can completely erase a track, particularly during storms or abnormally high tides. In some cases, wavewash may obliterate all signs that a turtle has been on the beach. Humans on the beach can also obscure signs of nesting. Sometimes tracks are intentionally obliterated, either maliciously or in misguided efforts to protect the nest from human tampering. Typically, however, heavy foot traffic is responsible, particularly at locations where crowds gather to watch a turtle nest. As a result of the various situations, some nests are likely to be missed, even by the most experienced personnel.

Nests missed during the morning surveys may later be identified by signs of hatchling emergences in areas where no nest was previously documented. Monitoring personnel typically report one to five missed nests on County Beaches each year based on hatchling tracks. However, signs of hatchling emergence are very easily obliterated by the same elements that interfere with detection of nests. Furthermore, some nests produce no hatchlings. Thus, it is likely that some nests missed or misidentified during the morning surveys go undetected. These nests are at greatest risk of impact from vehicles on the beach.

The loss of nest markers due to tides or vandalism is another means for a nest to be placed at risk of vehicular impacts. However, as described elsewhere in this HCP, the County has developed minimization measures to reduce this risk. During the Assessment Period (1997-2000), there was only one instance of a previously marked nest being left unprotected from vehicular traffic for an extended period.

Indirect Impacts

Sediment Compaction

A secondary effect of vehicular traffic on the beach is the potential for compacting sediments under the weight of cars, trucks, and heavy equipment. Compaction is an important consideration for sea turtle conservation, because if sediments are too compact, a female turtle may have difficulty excavating an egg chamber of adequate depth or dimensions (Raymond 1984, Ryder 1990, Carthy 1994). She may also have to dig more often before finally constructing a suitable egg chamber, or she may abandon the nesting attempt altogether. Increased energy expenditures during the course of nesting may place a higher reproductive cost on that individual. Additionally, if the chamber is poorly constructed, the fate of the eggs may be affected. For example, if the chamber is too shallow, eggs are more susceptible to erosion, predation, and disturbance from activities on the beach.

Table 23

Potential Vehicular Impacts to Sea Turtles on Beaches Managed by Volusia County (County Beaches).

Life History Stage	Type of Impact	Impact Description	Minimization Measure
Adult Sea Turtles	Direct	Vehicles may run into or over nesting females	• Do not allow general public to operate vehicles on beach at night • Limit nighttime vehicle operations to public safety, sea turtle monitoring, and other official activities required to implement the HCP • Limit routine nighttime operation of authorized vehicles to the extent practicable • Require authorized vehicles to operate at slow speed • Require training of new HCP personnel to review nighttime operation procedures • Implement procedures to protect turtles from vehicular impacts during rare daytime nesting events
		Vehicle headlights may frighten turtles from the beach or deter others from emerging from the ocean	• Do not allow general public to operate vehicles on beach at night • For vehicles authorized to conduct nighttime operations, turn off headlights when vehicles are at rest • Require training of new personnel to review nighttime operation procedures

Table 23
(Continued)

Life History Stage	Type of Impact	Impact Description	Minimization Measure
Adults	Indirect	Vehicles may degrade nesting habitat	• Confine public traffic to marked driving lanes on or near the wetted portion of the beach • Prevent driving and parking near the dune • Close off known locations where vehicles illegally access the beach through dune habitat from upland properties • Limit operation of authorized vehicles in soft-sand areas of the beach to the extent practicable • Require restoration of dune and beach habitat following coastal construction activities
		Vehicles may compact sediments	• Confine public traffic to marked driving lanes on or near the wetted portion of the beach • Require beach maintenance and sanitation vehicles to operate on wetted portion of beach or use light-weight vehicles with wide, low-pressure tires • Do not allow heavy construction equipment on the beach during the sea turtle nesting season, except for emergency or unusual situations as authorized by the ITP
Eggs	Direct	Vehicles may run over nests and crush eggs	• Prevent public access to those areas of the beach where nest densities are relatively high • Survey for new nests before public traffic is allowed on the beach each day • Conspicuously mark sea turtle nests so they can be avoided • Do not allow heavy construction equipment on the beach during the sea turtle nesting season, except for emergency or unusual situations as authorized by the ITP

Table 23
(Continued)

Life History Stage	Type of Impact	Impact Description	Minimization Measure
Eggs	Indirect	Vehicles may compact sediments over a nest and thereby affect gas exchange within the egg chamber	• Prevent public access to those areas of the beach where nest densities are relatively high • Survey for new nests before public traffic is allowed on the beach • Conspicuously mark sea turtle nests so they can be avoided
		Vehicles may deposit contaminants (e.g., oil, coolants, etc.) on the sand that may affect the incubation environment	• Prevent public access to those areas of the beach where nest densities are relatively high • Confine public traffic to marked driving lanes on or near the wetted portion of the beach where tidal flooding will scrub the sediments
Hatchlings	Direct	Vehicles may compact sediments over a nest and impede hatchling emergence	• Prevent public access to those areas of the beach where nest densities are relatively high • Survey for new nests before public traffic is allowed on the beach • Conspicuously mark sea turtle nests so they can be avoided
		Vehicles may run over hatchlings as they migrate from the nest to sea	• Do not allow general public to operate vehicles on beach at night • Limit nighttime vehicle operations to public safety, sea turtle monitoring, and other official activities required to implement the HCP • Limit routine nighttime operation of authorized vehicles to the extent practicable • Require authorized vehicles to be operated at slow speed • Require headlights to be turned on at night when authorized vehicles are moving so hatchlings can more easily be seen • Require training of new HCP personnel to review nighttime operation procedures • Implement procedures to protect hatchlings from vehicular impacts during rare daytime hatching events

Table 23
(Continued)

Life History Stage	Type of Impact	Impact Description	Minimization Measure
Hatchlings	Direct	Vehicle headlights may disorient hatchlings as they travel from the nest to sea	• Do not allow general public to operate vehicles on beach at night • For vehicles authorized for nighttime operations, turn off headlights when vehicles are at rest • Require training of new personnel to review nighttime operation procedures
	Indirect	Vehicles may leave ruts that impede a timely migration from the nest to sea	• Confine public traffic to marked driving lanes on or near the wetted portion of the beach • Limit operation of authorized vehicles in soft-sand areas of the beach to the extent practicable • Require beach maintenance and sanitation vehicles to operate on wetted portion of beach or use light-weight vehicles with wide, low-pressure tires • Implement a program to remove ruts from in front of nests nearing hatching • Do not allow heavy construction equipment on the beach during the sea turtle nesting season, except for emergency or unusual situations as authorized by the ITP
Stranded Sea Turtles	Direct	Vehicles may run over a live stranded turtle	• Implement procedures to report sea turtle strandings and protect live stranded turtles from vehicular impacts
Washback Hatchlings	Direct	Vehicles may run over a live washback post-hatchling sea turtle	• Implement procedures for surveying driving areas for washback hatchlings during periods when large quantities of seaweed are being washed ashore by strong winds and high seas • During periods when washback hatchlings are likely to be present, do not allow public vehicular access to the beach until after the daily washback hatchling survey has been completed

In a cursory assessment of the impact of beach driving, Fletemeyer (1995) found that sediment compaction levels in Volusia County were higher in two areas routinely driven on than in nearby non-driving areas. However, it is unclear what steps were taken in that study to isolate driving effects from other physical beach variables (e.g., sediment type, tidal influence, etc.) that influence compaction. In a related assessment, Fletemeyer (1995) repeatedly drove an SUV over a section of beach where public driving was prohibited. Although he found that compaction values were greater after the vehicle made its passes than before, the highest values obtained were well below those typically regarded as detrimental to sea turtle nesting.

There have been no controlled studies to isolate the effects of long-term vehicle use from natural factors potentially affecting compaction levels on the beach. Hine (1989) reported that "for most of the Volusia County beach, the sand consists of clean, fine, well-sorted quartz sand that produces a hard-packed, low, flat, wide profile, ideal for driving vehicles." Historical records show that early automobile pioneers were attracted to the area's hard, flat beaches to test their combustion engines. Thus, it is likely that historical sediment conditions coupled with natural coastal processes may be more important than beach driving in producing the characteristic hard-packed sands evident today.

Vehicle Ruts

It is widely reported that vehicular ruts left in the sand create obstacles for hatchlings attempting to reach the ocean after leaving the nest. Upon encountering a vehicle rut, hatchlings may be misoriented along the vehicle track, rather than cross over it to reach the water. Apparently hatchlings become diverted, not because they cannot physically climb out of the rut (Hughes and Caine 1994, Arianoutsou 1988), but because the sides of the track cast a shadow that disrupts their sea-finding ability (Mann 1977). If hatchlings are detoured along vehicle ruts, they are at greater risk to predators, fatigue, and desiccation.

At least two studies have confirmed hatchling disorientation by vehicular ruts (Cox *et al*. 1994, Hosier *et al*. 1981). In one study, tire ruts were found to cause nearly 21 percent of hatchling turtles to invert (flip over). Live and desiccated turtles have also been observed in deep vehicle ruts (LeBuff 1990, M. Sole, FDEP, pers. comm. 1995).

A majority of Volusia County beach vehicular traffic occurs on hard packed sands where ruts are less easily formed. There are occasions, however, when vehicles traverse soft sand areas where ruts are left behind. Soft sand sometimes develops in localized areas along the driving lanes due to natural sand transport. Localized soft sand conditions have occurred primarily in the vicinity of Granada Boulevard in Ormond Beach and north of Beachway in New Smyrna Beach. High tides may occasionally force motorists to leave marked traffic lanes and drive higher on the beach and into soft sand areas to avoid incoming salt water. Measures to control traffic on the beach during unusually high tides are described elsewhere within this HCP.

During the Assessment Period (1997-2000), there were reports of hatchlings encountering ruts each year. However, this affected hatchlings from fewer than 10 nests per year or only 1.2 percent of all nests on County Beaches (Table 24).

Because of the difficulty in counting individual hatchling tracks, and variation in the method of reporting these incidents, reliable estimates of the total number of hatchlings involved are not available. Similarly the fate of affected hatchlings is often unknown. Sometimes hatchlings cross directly over the ruts, and other times they become misoriented and crawl parallel to the beach within the ruts. The severity of impacts is most likely related to the depth and length of the ruts. Although most hatchling tracks eventually reach the water, some become trapped and others are depredated.

Table 24

Number of Hatchling/Vehicle Rut Interactions on Beaches Managed by Volusia County (County Beaches), 1997-2000.

Year	North of Ponce Inlet	South of Ponce Inlet	All County Beaches	Percent of Nests Affected
1997	4	5	9	2.6
1998	0	3	3	0.6
1999	2	2	4	0.6
2000	0	9	9	1.5
TOTAL	**6**	**19**	**25**	**1.2**

The County's program to eliminate ruts in front of nests nearing hatching has undergone several improvements during the period the ITP has been in effect and is now very effective. A path is cleared from the nest to ocean. However, in some instances hatchlings are first disoriented by nearby or distant light sources (see Artificial Beachfront Lighting elsewhere in this section) and then encounter ruts only after they have traveled a substantial distance away from the nest. Minimization of impacts associated with vehicle ruts are addressed primarily through a rut removal program, as described elsewhere in this HCP.

Contaminants

Another potential indirect effect of vehicles is the emission of oil, antifreeze, grease, and other substances from automobiles parking and driving on the beach. However, there have been no studies to quantify this source of pollution. Vehicle-related pollutants likely are quite mobile in beach sands, so they should be diluted and flushed from the beach area by rainfall, waves, and tides without reaching concentrations that could be harmful to incubating sea turtle nests. Furthermore, the vast majority of nests are located

in areas where the general public is not permitted to drive. To date, no evidence of harm to sea turtles from vehicle emissions has been observed or reported.

BEACH MANAGEMENT ACTIVITIES

Public Safety & Law Enforcement

Public safety, law enforcement and other emergency vehicles are provided unlimited access to all beaches within the Plan Area. Both routine and emergency operation of vehicles on the beach have the potential to impact adult, hatchling, live stranded, and live washback hatchling sea turtles, as well as sea turtle nests, as summarized in Table 23.

Public safety functions on Volusia County Beaches are the responsibility of the Division of Beach Safety (DBS). In 2012, the DBS was composed of 55 full-time Beach Safety Officers (BPOs) who are cross-trained to perform both law enforcement and ocean rescue activities. Additionally, the DBS employs approximately 160-180 seasonal and part-time lifeguards whose sole function is to man the lifeguard towers.

BPOs perform numerous tasks ranging from law enforcement, maintenance assistance, special events management, traffic management, and environmental management. The DBS has between 20 and 30 vehicles on the beach each day at any given time. These include 4X4 pickup trucks, SUVs, UTV's, ATVs and trailered jet skis. Normally, two vehicles, one north and one south of Ponce Inlet, patrol County Beaches (35.6 miles) at night as a necessary law enforcement presence.

Past studies have indicated that nearly 60 percent of Beach Safety Officer activity is associated with traffic management and vehicle use on the beach. Investigations and follow-up activities are limited to resolution of minor crimes, while major criminal investigations are performed with the assistance of the Florida Department of Law Enforcement, the Volusia County Sheriff's Office and upland jurisdictions. However, maintaining security and order on the beach is a major undertaking, especially during special events and peak periods, such as Spring Break. Spring Break takes place in March and carries into April. The Beach Safety personnel deal with a broad spectrum of criminal activity, including rapes, drunkenness, rowdiness, assaults, and theft.

Other public safety vehicles that have access to the beach are fire rescue, ambulances, and local municipal law enforcement. These vehicles generally drive on the hard-sand portions of the beach. Their presence and their access to the beach are essential to life saving and considered absolutely necessary.

The potential for impacts related to emergency and/or law enforcement vehicles on the beach may be slightly higher, in some respects, than for those associated with operation of vehicles by the general public. That is because these vehicles are required to respond to calls relating to public safety and law enforcement both day and night and at all locations on County Beaches. This may require these vehicles to enter areas closed to public traffic, where nest densities are relatively high. Life-threatening emergencies sometimes require access by EVAC ambulances and fire trucks. The size and weight of

these vehicles demand that they only be driven on hard packed sand. Due to the infrequent need for these large vehicles, the potential for impacts to sea turtles is very low.

Since ITP Amendment No. 11 was issued in 2005, there have been no reports of a sea turtle nest being run over at night by a public safety or emergency vehicle. Minimization of future impacts will be achieved primarily through HCP training of public safety personnel, as described elsewhere in this HCP.

Traffic Control

The County utilizes a variety of structures to regulate traffic on the beach. Public vehicular access is controlled through designated access points or beach ramps. Locked gates and do not enter signs at these control points prevent the public from accessing the beach at night when sea turtles are present and prior to completion of the daily sea turtle nesting survey. Once on the beach, orderly public vehicular traffic is maintained through appropriately placed signage. Driving and parking areas are segregated from non-driving areas through placement of various markers. These posts have the potential to pose obstacles to nesting females, although this has only rarely occurred since the original ITP has been in effect.

Between 2006 and 2012 there were 15 reported incidents of vehicular impacts to sea turtles; 11 post-hatchling washbacks and 4 hatchlings were run over. Measures to minimize impacts to sea turtles during occasional daytime nesting and hatching events are presented elsewhere in this HCP. Additionally, protocols have been developed to maximize the recovery of post-hatchlings and minimize take during fall washback events.

Photo showing vehicular access ramp at Flagler Ave. in New Smyrna Beach.

Conservation Zone

Within areas designated for public driving, a Conservation Zone (CZ) has been established to prevent driving and parking near the dune where the majority of sea turtle nests are deposited. The CZ also allows the dune system to develop naturally, without disturbance from vehicular activity.

The CZ is currently marked by 4x4 posts placed at approximately 50-foot intervals. As for other traffic control structures, the presence of these posts on the beach can present obstacles to nesting turtles. The distance between posts was developed to strike a balance between establishing a clear demarcation of the CZ and limiting impacts to nesting turtles.

During the Assessment Period (1997-2000), a total of 54 turtles contacted CZ posts, representing about six percent of all crawls in those areas where a CZ is present (Table 25). However, in many of these cases, the turtle contacted the post before, during or after nesting successfully. Although other encounters occurred on non-nesting emergences, there were only two incidents where a turtle clearly abandoned her nesting attempt as a result of contacting the post.

Other potential impacts associated with the CZ are related to CZ boundary maintenance. As posts are lost to tides or vandalized, they must be replaced to maintain the integrity of the CZ. A mechanical auger is used to dig a hole on the beach. Thus, during post replacement, unmarked sea turtle nests may be impacted. Minimization of these impacts will be achieved primarily through a CZ Boundary Management Plan, as described elsewhere in this HCP.

Photo showing vehicles aligned in typical parking position seaward of the marked Conservation Zone in a Transitional Beach Management Area, Volusia County Beaches.

Table 25

Number of Sea Turtles Contacting CZ Posts on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Total Crawls in Areas Where CZ Present	Number of Encounters With CZ Posts	Percentage of Crawls Encountering CZ Posts	Number of Abandoned Nesting Attempts Due to CZ Posts
1997	152	12	7.9	0
1998	221	13	5.9	0
1999	270	15	5.6	1
2000	242	14	5.8	1
TOTAL	**885**	**54**	**6.1**	**2**

HCP Programs

A variety of programs and protective measures are necessary to implement this HCP. Many require operation of vehicles on the beach, including but not limited to the following:

- Daily sea turtle monitoring and related activities;
- Enforcement of lighting regulations;
- Collection of GPS data;
- Monitoring of concessionaire activities; and
- Monitoring of special events.

Each of these activities has the potential to impact sea turtles, as summarized in Table 23. However, during the period that the original ITP has been in effect, there have been no reported incidents of vehicular impacts to sea turtles as the result of vehicles involved in HCP implementation. Minimization of future impacts will be achieved primarily through training of County staff and other HCP participants, as described elsewhere in this document.

Photo showing post and signage currently used to mark eastern boundary of the Conservation Zone, Volusia County Beaches.

Lifeguard Stations

Both permanent lifeguard stations and portable lifeguard towers are present along County Beaches for the safety of the thousands of people that visit the beach each day. Lifeguards and other public safety personnel access the permanent stations by vehicles. In some instances this involves driving in soft-sand areas of the beach, where the vehicles may leave ruts.

The portable lifeguard towers are moved from the dune area to near the high tide line each day. These structures have, on occasion, been toppled by tides or vandalism. When this occurs, the structures may create an obstruction to nesting turtles. However, there were only a few instances of turtles contacting the portable lifeguard towers during the Assessment Period (1997-2000).

The full-time and seasonal lifeguards operate out of lifeguard stations that are used for off-beach parking and storage of equipment such as jet skis, boats, and immediate-response equipment used for life saving. However, these stations house more than materials for lifeguard activities: they are used by all Beach Safety personnel for telephone communications, report writing, and field office space. Toll supervisors also use the stations to count money and for record keeping.

Volusia County lifeguards perform several thousand surf rescues annually; a much higher number than most all other Florida beaches. The lifeguards operate a fleet of ATV's, UTV's, and four-wheel-drive vehicles for transporting equipment around the beach. Among some of the potential environmental impact of these vehicles to sea turtles are: 1) vehicles are driven through soft sand where ruts are left, 2) vehicles are driven over undetected (and therefore unmarked) nests, or 3) vehicles run over daytime nesting adults or emerging hatchlings.

Lifeguards conduct routine patrols throughout County Beaches. However, the majority of operations are concentrated in public driving areas where beach usage is heaviest. The routine patrols are limited to the wet sand areas whenever possible. The presence of these vehicles is essential to the saving of human life. Lifeguards are vigilant for potential safety problems, and each vehicle carries a variety of lifesaving equipment.

In public driving areas, lifeguards may drive their personal vehicles to access assigned posts. However, in non-driving areas, personal vehicles are parked off the beach.

Trash Collection & Beach Maintenance

The County deploys trash receptacles along its beaches to collect refuse discarded by beachgoers. In non-driving areas, the receptacles are placed near dune crossovers, while in driving areas they are attached at regular intervals in stands attached to CZ posts. Approximately 1,600 trash receptacles at 800 separate stands are present along County Beaches. Three-fourths of these are north of Ponce Inlet, and the remainder are located south of the inlet.

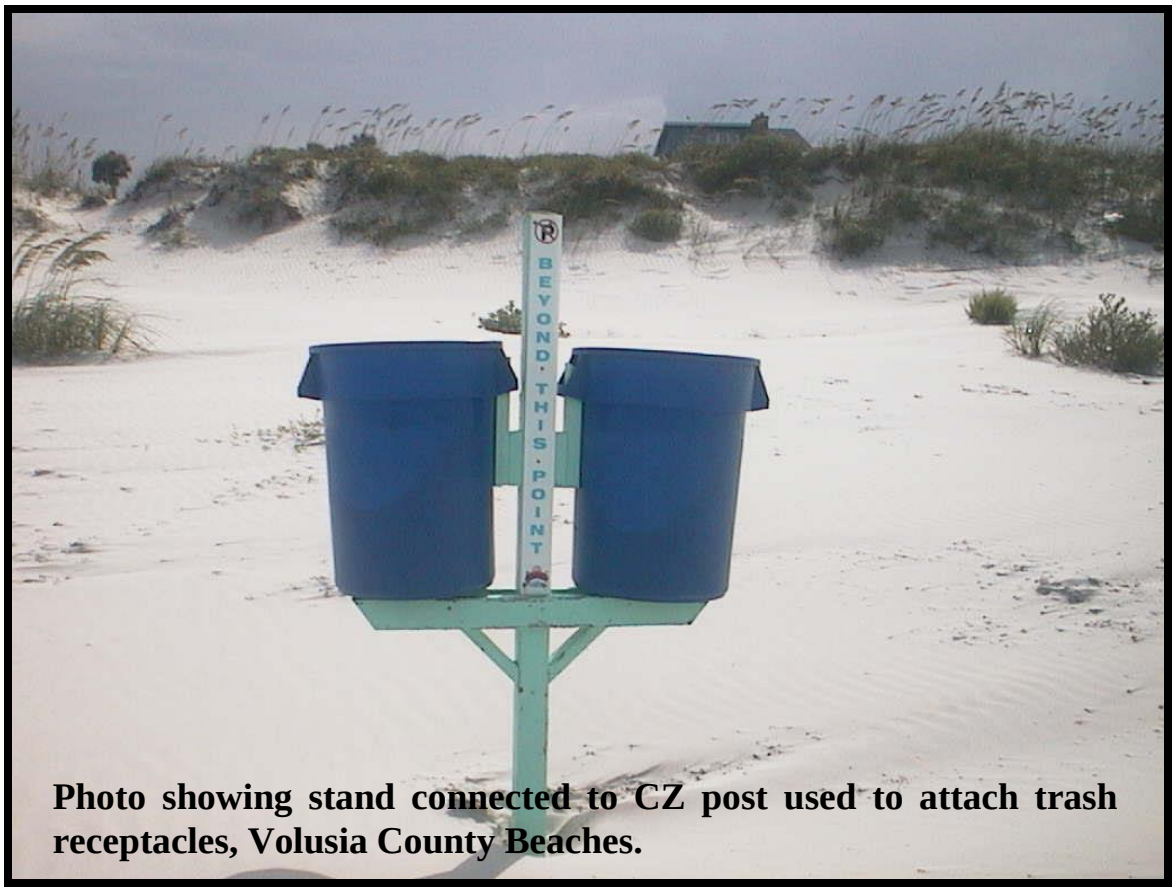

Photo showing stand connected to CZ post used to attach trash receptacles, Volusia County Beaches.

Management of trash is important from a sea turtle conservation perspective because trash left on the beach overnight may attract predators such as raccoons, foxes, crows, and ants. This is particularly important along those stretches of beach where natural plant communities are largely intact (e.g., in and around park lands) and foxes and raccoons are most abundant.

Volusia County uses a contractor to collect trash from the beach each day. Although some trash is collected by hand, the majority of trash pickup is accomplished from a variety of vehicles. The standard trucks that are used have the potential for impacting sea turtle nests, as summarized in Table 23. However, during the period that the original ITP has been in effect there have been no documented turtle-vehicle interactions resulting from trash collection activities on the beach. Minimization of future impacts associated with trash collection will be achieved through HCP training and other protective measures, as described elsewhere in this document.

Mechanical beach raking used to collect debris and trash from the beach may cause damage to nests, particularly if the tongs on the raking machine are set below 4 inches (Witham 1982). Although in the past the County occasionally conducted mechanical beach raking of its beaches outside of the sea turtle nesting season, it is no longer being done. Therefore, no impacts associated with this activity are anticipated.

Portable toilets are located adjacent to vehicular access ramps and in a limited number of other high use areas. In most cases, pumping trucks service these toilets without having to drive into soft sand areas. Sometimes tidal or other conditions necessitate the relocation or removal of the portable facilities from the beach. Service vehicles involved in these activities have the potential to impact sea turtle nests, as summarized in Table 23. Additionally, the portable facilities are sometimes knocked over by tides, particularly during storms, or vandals. The overturned restrooms can pose an obstacle to nesting turtles and may cause sanitation problems for beachgoers. Fortunately, these events are rare and are dealt with expeditiously.

Ramp Grading

Volusia County Beaches have 41 vehicular access points. Volusia County uses a contractor to remove sand from the ramps deposited by the wind and tides. All 41 ramps are maintained for safe and unfettered access to the beach by public safety/emergency vehicles. Some are graded daily and others are attended to as needed. A minimal amount of sand is scraped from the ramps and pushed down onto the wetted portion of the beach where it is distributed by tidal action. This activity is performed under a FDEP permit.

Ramp grading equipment has the potential to impact sea turtle nests, as summarized in Table 23. Measures to minimize the potential for these impacts are addressed through HCP training of contracted personnel and other measures as described elsewhere in this HCP. There have been no reported incidents of take associated with ramp grading activities since the original HCP has been in effect.

Photo showing equipment used to remove excess sand from ramps at vehicular access points, Volusia County Beaches.

ARTIFICIAL BEACHFRONT LIGHTING

Both nesting and hatchling sea turtles are adversely affected by the presence of artificial lights near the beach (Witherington and Martin 2000). Experimental studies have clearly demonstrated that bright lights can deter adult female turtles from emerging from the ocean to nest (Witherington 1992). Thus, not surprisingly, many researchers have noted a relationship between the amount of lighted beach development and sea turtle nest densities. For example, Mattison *et al.* (1993) noted that emergences of nesting turtles in Broward County, Florida, were reduced in areas where lighted piers and roadways were near the beach. In areas where a glow of artificial light is present behind the dune, loggerhead turtles prefer to nest in the darker areas silhouetted by tall buildings and dune vegetation (Salmon *et al.* 1995a).

Although there is a tendency for turtles to prefer dark beaches, many do nest on lighted shores. As noted by Witherington and Martin (2000), in doing so, they place the lives of their offspring at risk. That is because artificial lighting can impair the ability of hatchlings to properly orient to the ocean once they leave their nests.

Hatchling sea turtles exhibit a robust sea-finding behavior. A direct and timely migration from the nest to sea may be vital to their survivorship. Although the cues involved in sea finding are complex, hatchlings rely primarily on vision for proper orientation

(Witherington and Martin 2000, Salmon *et al.* 1992, Lohmann *et al.* 1997). A combination of light and shapes is thought to be responsible. The extent to which one or the other drives the process may be a function of the relative strength of each stimulus.

Hatchlings have a tendency to orient toward the brightest direction. On natural undeveloped beaches the brightest direction is almost always away from elevated shapes (e.g., dune, vegetation, etc.) and their silhouettes and toward the broad open horizon of the sea. On developed beaches, the brightest direction is often away from the ocean and toward lighted structures. Hatchlings unable to find the ocean, or delayed in reaching it, are likely to incur high mortality from dehydration, exhaustion, or predation (Carr and Ogren 1960, Witherington and Ehrhart 1987, Witherington and Martin 2000). Hatchlings lured into lighted parking lots or toward street lights are often crushed by passing vehicles (McFarlane 1963, Philibosian 1976, Peters and Verhoeven 1994, Witherington and Martin 2000).

Artificial lighting cues can cause either misorientation or disorientation (Witherington 1990). Hatchlings that are misoriented travel along a consistent course away from the ocean and toward a light source. Those that are disoriented are unable to establish a particular course and wander aimlessly. However, typically, the two behaviors are lumped under the term disorientation.

Hatchlings are frequently attracted to point source lights on buildings and roadways in urban areas (McFarlane 1963, Philibosian 1976, Mann 1978, Witherington 1992). Urban areas may also have a non-point source nighttime glow (sky glow), which may affect hatchling orientation on otherwise dark sections of beach (Witherington 1993).

Once disoriented, turtles often enter conflicting light environments as they head landward. As hatchlings approach buildings and roads, they encounter obstacles that may screen the source of artificial light (Salmon *et al*. 1995b). They may then re-orient themselves correctly toward the ocean or continue along the obstruction (e.g., seawall, deep ruts, buildings) until they can see the original or perhaps another source of artificial light. If the stimulus affecting disorientation is strong enough and continuous enough, hatchlings may remain on the beach overnight until the brightening sky at sunrise becomes a dominant influence and attracts them to the surf. Mann (1977) found that most turtles in artificial light-dominated areas oriented correctly on brightly moonlit nights. However, on moonless nights, hatchlings were easily disoriented by artificial lights.

Deviations from normal seafinding behavior may result in expenditure of energy stores, dehydration, and increased likelihood of predation (Witherington and Martin 2000). However, the relationship between level of light-caused disruption and survivorship has not yet been quantified. Relative degrees of sub-lethal and lethal effects have been reported, ranging from a mild misorientation of a few hatchlings to a strong disorientation of a whole clutch resulting in mortality for many (Salmon *et al*. 1995a, Witherington and Martin 2000).

Both Mann (1977) and Ehrhart and Witherington (1987) found high mortality in the emergences where the majority of the hatchlings were strongly disoriented. If the hatchlings are drawn landward from the beach, they may enter roadways where they may be run over or become irretrievably lost from finding their way to the surf. The protracted wanderings of disoriented hatchlings also lengthens the time they are susceptible to predation from raccoons, ghost crabs, seabirds, fish crows, and possibly dogs and cats. The prolonged exposure can exhaust and/or dehydrate the turtles to the point of death or limit their chance of survival once in the water. Weakened hatchlings that eventually reach the water may be more vulnerable to marine predators, which are abundant in nearshore waters (Wyneken *et al*. 1994).

Artificial lighting does not appear to be as problematic for nesting adult female sea turtles. They seem to use a "straight ahead" method to select a nest site. They do not appear to be affected as much by lights up and down the beach as they are by bright lights right in front of them upon emerging (Salmon *et al*. 1995b, Witherington 1992). Distant point sources and urban glow are more likely to affect hatchlings than adult females (Salmon *et al*. 1995b).

It is difficult to determine the exact number of turtles involved in artificial light disorientation events. Discerning hatchling disorientation evidence is difficult and relies primarily on following and counting hatchling tracks. Disorientation evidence is easily obliterated by natural and anthropogenic factors, including tidal inundation and pedestrian traffic. Even if the evidence is clear, it is not always possible to attribute any given disorientation event to a particular artificial light source. Sometimes the offending light source is obvious, but usually it could be one or more lights.

To reduce the harmful effects of artificial beachfront lighting, Volusia County has adopted lighting regulations that mimic those contained in the State of Florida's Model Lighting Ordinance for Sea Turtle Protection (Chapter 16B-55). The intent of these regulations is not to prohibit lighting of beachfront properties, but rather to manage light so it is confined to the property and does not shine out onto the beach. A variety of measures are available for effectively managing lights (Witherington and Martin 2000). The County's light management program is described elsewhere in this HCP.

HUMAN ACTIVITY ON THE BEACH

Up until the time a nesting sea turtle begins laying eggs, she may be frightened back into the ocean by human activity and lighting on the beach (McFarlane 1963). It is not known if the fright response has a long-term negative effect on nesting success. Once a turtle leaves the beach she may return to the same location or select a new site later that night or the following night. However, repeated interruption of nesting may cause a turtle to place her nest in a sub-optimum incubation environment (Murphy 1985). The extent to which heavy nighttime beach use by humans may cause a turtle to abandon its historical nesting range is not known.

Little information is available on the potential impacts of typical beach visitors on adult and hatchling sea turtles on County Beaches. Visitors using flashlights or lanterns on the

beach at night during the nesting season can cause nesting turtles to leave the beach and hatchlings to become temporarily disoriented. As Volusia County has endeavored to educate its residents and visitors about sea turtles and their presence on County Beaches, many well-intended individuals have set out in search of nesting sea turtles. Monitoring personnel have reported increased use of flashlights on the beach at night over the last several years, but no quantifiable data relating to the associated impacts are available.

Direct harassment may also cause adult turtles to abandon nesting efforts (Johnson *et al*. 1996). There have been occasional reports of beachgoers touching and even sitting on adult turtles on the beach. Although illegal, handling, playing with, or collecting hatchlings sea turtles, also occurs on County Beaches. This may cause desiccation and fatigue and reduce the survivorship of hatchlings once they are released into the surf.

On other Florida beaches, human poaching of turtle nests has been a problem (Ehrhart and Witherington 1987). However, on County Beaches there have been few confirmed cases of poaching.

It is unlawful for beach visitors to be in the dune vegetation or to disturb sea turtle nests, hatchlings, or adults. Nevertheless, uninformed beachgoers, particularly children, have been reported digging into nests in search of eggs and/or hatchlings, presumably out of curiosity. Most often, though, impacts are indirect. For example, hatchlings may become trapped in holes dug on the beach. Additionally, research has shown that human footprints on the beach can interfere with the ability of hatchlings to reach the ocean (Hosier *et al*. 1981), and heavy pedestrian traffic may possibly compact sand over unmarked nests. Visitors are generally sympathetic to hatchlings and may pick them up and release them into the surf. The negative impacts of this activity may include some loss of imprinting to the beach (LeBuff 1990). Minimization of each of these potential impacts will be addressed primarily through the County's educational and public awareness programs, as addressed elsewhere in this HCP.

RECREATIONAL BEACH EQUIPMENT

The use and storage of lounge chairs, cabanas, umbrellas, catamarans, sailboats, and other types of recreational equipment on nesting beaches can hamper or deter nesting by adult females and trap and/or impede hatchlings during their nest to sea migrations. The recovery plan for Atlantic loggerhead turtles (NMFS and USFWS 1991a) indicates "the documentation of false crawls at these obstacles is becoming increasingly common as more recreational beach equipment is left in place nightly on nesting beaches." The recovery plan cites documented reports of adult turtles being trapped under heavy wooden lounge chairs, eggs being destroyed by equipment (e.g., beach umbrellas) penetrating the egg chamber, and hatchlings being hampered during emergence by equipment inadvertently placed on top of the nest.

In Volusia County, private landowners sometimes store recreational beach equipment in the dunes. There are a few reports of this equipment causing problems for adult nesting turtles each year. However, documented impacts to hatchlings are less frequent. In 2012, Volusia County formally revised its Beach Code to prohibit the

overnight storage of furniture and recreational equipment on the beach. The new ordinance declares that unattended portable recreational equipment left on the beach from 9:00 p.m. to 6:00 a.m. is a public nuisance and subject to removal and disposal by the County. Such equipment permitted by Federal, State, or local law is not subject to the new regulation. The ordinance is enforced through the Division of Beach Safety.

Damage to dune vegetation caused by the improper storage of recreational equipment is a violation of Section 161.053, Florida Statutes. County staff involved in HCP implementation will notify FDEP whenever they receive reports of repeated or flagrant violations. Beach Safety employees also attempt to notify property owners whenever recreational equipment on the beach is reported to have impacted nesting sea turtles or is in close proximity to a nest so the boat can be moved and properly secured.

SPECIAL BEACH EVENTS

Volusia County Beaches are known for a wide variety of special events that take place on the beach each year. These events considerably increase the number of people and vehicles in a given area. Most of the major events are scheduled outside of the sea turtle nesting season. The few high impact events that occur during the nesting season are largely confined to the urbanized areas where nest densities are lowest.

Volusia County's Unified Beach Code defines special events as temporary uses of the beach for purposes that otherwise would be prohibited. Application must be made for a permit to hold special events. In some cases a FDEP special beach use permit is also required. Special events include, but are not limited to the following:

- Volleyball tournaments;
- Company picnics;
- Family reunions;
- Organized runs and walks;
- Surfing contests;
- Lifeguard competitions;
- Weddings/receptions;
- Physical fitness competitions;
- Sand soccer games;
- Concerts; and
- Church events.

Spring Break, Speed Weeks, and Bike Week are the three busiest periods for tourist activity. The majority of activity associated with these events occurs along a three-mile stretch of the shore in Daytona Beach along the Pier and Main Street areas. These events involve numerous special events on the beach, such as outdoor music concerts and sporting contests, and generate large quantities of trash. However, all three occur outside of the sea turtle nesting season.

No known take has been documented on County Beaches as a result of a special beach event. Measures to be implemented to minimize future impacts are addressed elsewhere in this HCP.

BEACH CONCESSIONS

Volusia County has the exclusive local authority to regulate the provision of goods and services by concessionaires on the beach. Concessions operate under a franchise contract with the County (example provided in Appendix A). The contracts can be revoked if concessionaires fail to comply with the conditions of the agreement, as it pertains to business operations on the beach.

In 2012, three basic types of concessions were allowed on County Beaches: 1) equipment rental; 2) food and beverage services; and 3) equipment rental and food and beverage services combined. Fifty-six (56) concession locations were present along the 16.7 miles of beach of County Beaches where public driving is permitted.

All activities associated with the business operations of each concession are required to take place within the designated beach area specified in the concessionaire agreement. Under current County regulations, concession vehicles must travel to and from their designated locations in the traffic lanes, but unlike other private vehicles may park parallel to the beach. As for the general public, concessionaires are not permitted vehicular access to those areas of County Beaches where nest densities are highest. Although there have been no reported impacts to turtle nests associated with the operation of concession vehicles, their presence on the beach has the potential to impact sea turtles, as summarized in Table 23.

In addition to the concession vehicles themselves, some concessionaires were previously allowed to rent motorized vehicles, including ATVs, golf carts, and mopeds, to the general public. These rental vehicles had to be equipped with governing devices so that the maximum operational speed did not exceed 10 miles per hour. Due to their relatively small size, and wide, low-pressure tires, ATVs were able to travel in soft sand areas where most standard cars and trucks would become stuck. Although renters received on-site instructions as to where they were allowed to operate, they occasionally entered areas of the beach that were off-limits to driving and parking. Although the County does not currently permit motorized vehicle concessions on its beaches, it may allow such rentals in the future.

Other potential impacts of concessionaires are associated with increased trash on the beach. The presence of concessionaires reportedly results in the congregation of people in the area surrounding the concession, which can exacerbate the refuse problem. Concessionaires are required, by their agreement with the County, to pick up and appropriately dispose of litter within 100 feet of their location. When left on the beach overnight, this litter can attract fire ants and other predators or can create obstacles for nesting and hatchling turtles.

One final potential impact associated with concession operations is the rental of beach umbrellas. These umbrellas are placed in holes dug in the sand with a hand auger. Drilling on the beach could impact unmarked sea turtle nests.

COMMERCIAL FISHERMEN

Volusia County issues permits for commercial fishing. Individuals applying for this permit must have a State commercial fishing license and must agree to follow the restrictions established by Volusia County for purposes of implementation of the ITP and this HCP. During 2012, there were 59 licensed fishermen that had special vehicular access permits to County Beaches.

Individuals engaged in commercial fishing drive on the hard-packed sand of the beach primarily to follow various species of bait fish, which are netted from the shore. A small number of commercial fishermen fish with pole and line for pompano and other commercial species. Most travel to and from their fishing spots in trucks. Thus, they have the potential to impact sea turtles, as summarized in Table 23. However, no known take of turtles related to commercial fishing activities on County Beaches has been reported during the five years that the original ITP has been in effect. Nevertheless, the County has implemented measures to minimize the potential for future impacts, as described elsewhere in this HCP.

SHORELINE PROTECTION

Coastal Armoring

In an effort to protect coastal properties from storm-related erosion, property owners may petition the State of Florida to construct concrete and metal seawalls, rock revetments, and other types of shoreline protection devices. Collectively, these hard structures are referred to as armoring. Coastal armoring is known to have both direct and indirect effects on nesting and hatchling sea turtles (National Research Council 1990). In general, the quality of nesting habitat is degraded by the presence of these structures on the beach.

Over 21 percent (145 miles) of Florida's beaches are armored (NMFS and USFWS 1991a and b). In Volusia County, it was estimated that as of 2001, there were 132 armoring structures collectively encompassing slightly more than 14 miles of shoreline (Table 26). This represents slightly less than 30 percent of the County's coastal beaches. However, there are no armoring structures in either the NPSRA or CNS. Therefore, the entire 14 miles of armoring are contained within County Beaches; approximately 40 percent of County Beaches are armored.

Within County Beaches, seawalls are most extensive north of Ponce Inlet in the highly urbanized region of Daytona Beach and Daytona Beach Shores. In addition to approximately 3 miles of seawalls south of Ponce Inlet, there is also an approximately 1-mile stretch along Bethune Beach where revetments have been constructed of coquina-rock boulders. Revetments are considered to be an unacceptable form of beach

armoring since they take up more space on the beach, are an impediment to pedestrian beach access, and are more vulnerable to storm damage.

Table 26

Number and Length of Armoring Structures in Volusia County Plan Area.

Location	Number of Structures	Length of Structures (Miles)	Length of Beach (Miles)	Percentage Armored
NPSRA	0	0	2.73	0.0
County Beaches	132	14.39	35.60	40.42
CNS	0	0	11.69	0.0
TOTAL	**132**	**14.39**	**50.02**	**28.77**

In Volusia County, where detailed information is maintained regarding obstacles encountered by turtles during their nesting activities, loggerhead turtles contacted seawalls, rock revetments, or other types of armoring structures on 16.7 and 22.8 percent, of all crawls during 1999 and 2000, respectively (EAI 2000b and 2001a). Ninety-one (91) and 83 percent, respectively, of those encounters resulted in the turtle returning to the ocean without nesting. Overall, armoring was responsible for nearly one-third of all non-nesting emergences (false crawls) on Volusia County's beaches.

There have been no major studies designed specifically to assess the effects of armoring structures on reproductive success. However, studies by Mosier (1998) and Mosier and Witherington (2000) demonstrate that seawalls create sub-optimal nesting habitat and incubation environments for sea turtles. Seawalls can effectively eliminate a turtle's access to upper regions of the beach/dune system. Consequently, nests on armored beaches in Brevard and Indian River Counties were generally found at lower elevations than those on non-walled beaches. Lower elevations subject nests to a greater risk of tidal inundation and can potentially alter thermal regimes, an important factor in determining the sex ratio of hatchlings (Mrosovsky and Provancha 1989, Mrosovsky 1994, Ackerman 1997, Delpech and Foote 1998). For these reasons, the U.S. Fish and Wildlife Service considers armoring structures to cause take of sea turtles.

High tides frequently reach the base of armoring structures, particularly during spring tides and storm events. Thus, nests deposited in front of these structures are often subject to tidal inundation. For this reason, many nests near seawalls and rock revetments in Volusia County have to be relocated each year to a more suitable incubation environment. The negative effects of seawalls become more pronounced the closer the seawalls are to the surf zone. Thus, the quality of beach habitat seaward of armoring structures on eroding sections of coastline can be expected to diminish as the shoreline recedes.

During the past several decades, armoring structures built in Volusia County have been fairly successful in protecting upland properties. However, the seawalls and the construction behind them have prevented dune growth and precluded the beach system from storing the sand necessary for natural replenishment during and after storms. Data suggest that the erosion in the 1970s along most of the Volusia County coastline may have resulted from the 14 miles of armored coast that is unable to build dunes. Where seawalls end abruptly, the corners can develop localized edge effects that also adversely impact downdrift natural beaches. The original EA described measures undertaken by the County to limit the construction of new armoring structures on County Beaches.

Sand Fences

Sand fences have been known to trap hatchling turtles and act as barriers to nesting turtles (National Research Council 1990). All sand fences are permitted by FDEP and must adhere to their guidelines to avoid negative impacts to turtles.

Photo showing loggerhead turtle interacting with sand fence, Volusia County Beaches.

During the Assessment Period (1997-2000), there were between 30 and 50 crawls a year where adult turtles contacted sand fences during nesting attempts. However, as with the CZ posts, not all contacts resulted in false crawls; many of the turtles successfully nested before or after contacting the fence. Impacts of sand fences on hatchlings have been rare.

Beach Nourishment

Although beach nourishment is generally viewed as a more environmentally benign solution to shoreline protection than armoring, it too has potential for impacting sea turtles. It can affect the sea turtle reproductive process in a variety of ways. Although nourished beaches may provide a greater quantity of nesting habitat, the quality of that habitat may be less suitable than pre-existing natural beaches. Sub-optimal nesting habitat may decrease nesting, place an increased energy burden on nesting females, result in abnormal nest construction, and reduce the survivorship of eggs and hatchlings. A thorough review of the processes associated with each of these potential effects was presented by Crain *et al.* (1995).

Most nourishment projects on heavily nested beaches are planned to proceed outside of the main portion of the nesting season to minimize take of turtles. Nevertheless construction impacts can occur. Unmarked nests may be crushed by construction equipment or buried during deposition of dredged materials on the beach. Nests relocated out of harm's way may experience reduced reproductive success (Moody 1998).

Nourished beaches tend to differ in several important ways from natural beaches. They are typically wider, flatter, more compact, and the sediments are moister than those on natural beaches (Nelson *et al.* 1987, Ackerman *et al.* 1991, Ernest and Martin 1999). On severely eroded sections of beach, where little or no suitable nesting habitat previously existed, nourishment can result in increased nesting (Ernest and Martin 1999). However, on most beaches nesting success typically declines for the first one or two years following construction, even though more habitat is available for turtles (Trindell *et al.* 1998). Reduced nesting success on nourished beaches has been attributed to increased compaction of sediments, scarping, and changes in beach profile (Nelson *et al.* 1987, Crain *et al.* 1995, Davis *et al.* 1994, Lutcavage *et al.* 1997, Steinitz *et al.* 1998, Ernest and Martin 1999). Compaction presumably inhibits nest construction, while scarps often cause female turtles to return to the ocean without nesting or deposit their nests seaward of the scarp where they are more susceptible to tidal inundation.

Beach nourishment can affect the incubation environment of nests by altering the moisture content, gas exchange, and temperature of sediments (Ackerman *et al.* 1991, Ackerman 1997, Parkinson and Magron 1998). The extent to which the incubation environment is altered is largely dependent on the similarity of the nourished sands and the natural sediments they replace. Consequently, results of studies assessing the effects of nourishment on reproductive success have varied among study sites.

A regional-scale beach management study for County Beaches south of Ponce Inlet indicated that only the two-mile section of beach immediately south of the Inlet exhibits net accretion. The remaining nine miles are all classified as critically eroded by the State of Florida and would benefit from various large and small-scale restoration projects, including sand transfer, beach nourishment, and dune restoration. As of 2012, the County had not embarked on a long-range shore protection program. However, it may conduct future emergency beach restoration activities in the event of severe erosion following storm events.

The Florida Inland Navigation District (FIND) periodically conducts maintenance dredging of the Intracoastal Waterway. Dredged spoil is placed in upland containment sites. Once the sites are full, beach compatible sediments may be transferred to the beach. Much of the dredged material will be placed in the nearshore area south of the Inlet at a depth of 18-35 feet where it will be incorporated into the littoral sand budget through long-shore transport and other natural coastal processes.

As elsewhere in Florida, all beach nourishment and sand transfer projects are regulated through State and Federal permitting programs. The U.S. Army Corps of Engineers (ACOE), the Federal agency responsible for issuing permits, will undergo section 7 consultations with other Federal agencies to address listed species issues. The ACOE permit issued for these projects will specify measures to be implemented to minimize and mitigate impacts to turtles based on those consultations. Consequently, activities associated with beach nourishment and other federally permitted beach projects, including those involving the use of vehicles on the beach, are outside the scope of this HCP and, as such, are not covered under the ITP.

COASTAL CONSTRUCTION

In addition to shoreline protection activities, there are a variety of other types of coastal construction activities, each of which may affect sea turtles. These include, but are not limited to, the following:

- Construction of new and repair/maintenance of existing upland structures and dune crossovers;
- Construction of jetties and groins;
- Installation of utility cables;
- Installation and/or repair of public infrastructure;
- Dune restoration; and
- Removal of wind-blown sand from upland properties.

Many of these activities may alter nesting habitat and impact sea turtles, as summarized in Table 27. If vehicles are used on the beach in support of coastal construction, impacts to sea turtles may occur, as summarized in Table 23. These projects will be evaluated on a case-by-case basis in consultation with the U.S. Fish and Wildlife Service to determine if they are likely to cause take. In many cases impacts may be avoided altogether by requiring that non-emergency construction activities be performed outside of the nesting season and implementing other protective measures, as described elsewhere in this HCP.

STORMWATER OUTFALLS

Rainfall incidents on the dunes and beaches percolate rapidly into the permeable sands and produce little, if any, runoff. Runoff from most developed areas on the barrier islands, typically collected by storm sewers, discharges into the estuarine lagoons landward of the islands. However, runoff from beachfront parking lots, roads, and swimming pool decks discharges directly to the beaches and dunes either by sheet flow or through stormwater collection system outfalls. Collectively, these outfalls sometimes create localized erosion channels, prevent natural dune establishment, and wash out sea turtle nests.

In the past, the water from hotel swimming pools was frequently pumped onto the beach when beachside pools were cleaned. This can leave chemical residue on the beach and cause localized erosion. The Volusia County Health Department now prohibits pool pump backwash from being discharged onto the beach, and VCEM proactively educates

property owners about the environmental problems associated with this activity. As a result, pool discharges onto the beach are now much less frequent. The Health Department continues to investigate newly reported cases.

Between 1996 and 2000, 8 to 12 nests per year, or approximately two percent of all nests, were relocated because of the threat of stormwater runoff (Table 28). Prior to the current relocation effort, several nests were washed out each year during periods of heavy upland runoff. Others suffered reduced reproductive success.

Most of the beach-directed stormwater outfall occurs on beaches fronted by seawalls. Most of these properties were developed in the 1960s and 1970s, which pre-dates current stormwater management regulations. The St. Johns River Water Management District typically requires all new developments to provide treatment of stormwater by retention or detention before it is discharged off site.

In addition to the direct physical effects of upland runoff, contaminants contained in the discharges, such as oils, grease, metals, pesticides, and nutrients, may alter the incubation

Table 27

Potential Impacts Associated With Coastal Construction Activities, Including Installation of Armoring Structures.

LIFE HISTORY STAGE	POTENTIAL IMPACT
Eggs	Eggs may be crushed, unearthed or otherwise destroyed during construction activities (e.g., heavy equipment, excavation, pile driving, water jetting, etc.).
	Eggs may be buried beneath sand placed on the beach, resulting in mortality of developing embryos.
	Developing embryos may suffer movement-induced mortality during relocation.
Hatchlings	Hatchlings may be trapped beneath equipment or supplies on the beach.
	If large quantities of sand are placed over incubating nests, hatchlings may not be able to escape from the nest.
	The migration of hatchlings to the ocean may be impeded by equipment/supplies on the beach. Ruts left on the beach by construction vehicles may trap or misdirect hatchlings, increasing energy expenditures and susceptibility to predation.
	Construction lighting may disorient hatchlings.
Nesting Females	Construction lighting and/or construction activities may deter nesting females from emerging onto the beach and reduce nesting success.
	Females may become entangled or trapped in building equipment and materials while searching for a nest site.
	Disturbed soil and holes left overnight in the construction areas may trap or topple nesting females.

environment of nearby nests and have as yet undetermined consequences on embryonic development and reproductive success. The effect of chemicals contained in pool discharges is similarly unknown. There is no current means of comparing the quantity and effects of pollutants generated on upland property, roads, and parking lots that wash onto the beach via stormwater runoff.

Table 28

Number of Nests Relocated Due to Stormwater Outfalls on Beaches Managed by Volusia County (County Beaches), 1996-2000.

Year	Number of Nests Relocated	Total Number of Nests on County Beaches	Percent of Nests Relocated Due to Stormwater Outfalls
1996	12	500	2.4
1997	8	346	2.3
1998	11	538	2.0
1999	8	628	1.3
2000	11	620	1.8
TOTAL	**50**	**2,632**	1.9

Piping Plovers

Because piping plovers only utilize Florida's beaches as wintering habitat, the loss and degradation of nesting habitat due to development, shoreline stabilization, natural predators, and free-ranging pets, as has been documented in more northern Atlantic Coast states, is not an issue in Volusia County (USFWS, 1988). However disturbance of plovers in their resting and feeding habitats may occur.

While in Florida, typically from September through March, the piping plover is only mildly receptive to interaction with humans and is less tolerant of close interaction than many other shorebirds, such as sanderlings and ruddy turnstones. Upon approach, the piping plover will evade perceived threats by retreating on the ground to more distant locations (often seeking camouflage protection in sparsely vegetated dune areas) or may take to the air in search of sandy beach areas that appear free from disturbance. Unleashed pets may also cause birds to take flight.

Prior to submittal of the Amended HCP, all reported observations of piping plovers within the Plan Area had been on inlet beaches where driving by the general public is prohibited. There had been no reported observations of piping plovers on ocean-facing beaches. Since then, there have been routine sightings of piping plovers on ocean-facing beaches throughout the County. These sightings are summarized in the Annual Reports submitted to the USFWS each year. Although the general public is authorized to drive

through 1.2 km (0.75 miles) of designated Critical Habitat for wintering piping plovers, traffic lanes are considerably seaward of preferred resting habitat near the dunes. No direct impacts to piping plovers related to vehicular activities on ocean-facing County Beaches are known to have occurred in the past, and none are expected in the future. Official vehicles, such as those operated by Beach Safety Officers, sea turtle monitoring personnel, beach maintenance contractors, park staff, etc., have the potential to disturb resting or foraging birds and/or impact Critical Habitat of wintering piping plovers on inlet beaches. However, routine operations by official vehicles along these beaches are limited.

Migratory Birds

The beach environment within the Plan Area provides potential nesting and foraging habitat for various species of resident shorebirds, as well as resting and stopover points for migratory species (Table 2). Factors, such as erosion of nesting habitats and anthropogenic disturbances such as pedestrian and vehicular traffic, free-roaming domestic cats and dogs, and habitat loss due to beachfront development can negatively affect these birds.

Colonial nesting shorebirds are sensitive to disturbance. Although nesting shorebirds can habituate themselves to limited human activities (Brubeck *et al*. 1981), chronic disturbances, particularly those caused by free-roaming domestic cats and dogs can have more serious consequences. Some evidence suggests that these types of persistent disturbances can result in decreased reproductive success and even abandonment of a nesting colony (Fisk 1978, Gaddy 1982, Gochfeld 1983). Nesting terns, for example, will often mob perceived threats to their nest sites (e.g., nearby pedestrian or vehicular traffic), thereby increasing energy expenditures and leaving their eggs vulnerable to overheating or predation (Gaddy 1982). Actual intrusion into a nesting colony by pedestrian or vehicular traffic could unintentionally cause direct harm to eggs (e.g., crushing) and young. Free-roaming pets can kill young chicks.

Documented shorebird nesting within the Plan Area has been minimal during the period that the ITP has been in effect, and most of that activity has occurred on the inlet beaches. Consequently, any direct impacts associated with vehicular traffic on the beach will be limited primarily to resting and foraging birds. Aggregations of birds near the water's edge are typically separated a sufficient distance from traffic lanes to minimize the potential for direct contact in those areas where the general public is afforded vehicular access to the beach. Additionally, the posting and enforcement of a 10 MPH speed limit for vehicles on the beach reduces the potential for collisions with resting shorebirds. Furthermore, birds typically take flight when vehicles approach. Thus, the potential for vehicle-bird collisions within the Plan Area is very low when vehicles operate at lawful speeds and is limited principally to those individual migrants that may be weak, ill, or injured and unable to fly when a vehicle approaches. However, vehicles in the vicinity of congregating birds may cause harassment, as described below.

Harassment of migratory birds resulting from both pedestrian and vehicular traffic on the beach may include disruption of foraging activities and increased energy expenditures. For example, some studies indicate that human disturbance reduces the amount of time that piping plovers spend feeding (Johnson and Baldassare 1988, Haig 1992), which could limit an individual's ability to survive its lengthy migration. Upon approach, shorebirds will evade perceived threats by taking to the air in search of areas that appear free from disturbance. Certain species are more sensitive to disturbance than others, and thus may take flight more often or otherwise change their behavior in response to pedestrian or vehicular traffic. However, studies to quantify these effects are largely lacking.

Another consequence of anthropogenic activities on the beach is improperly discarded refuse. Trash may increase the severity of predation on nesting birds by attracting predators such as raccoons, foxes, or crows to the beach. Birds can also become entangled in improperly discarded fishing line and other trash on the beach. Leaving trash on the beach or littering is a violation of the Volusia County Beach Code (Section 20-120). The HCP contains programs for cleaning the beach and collecting trash in a manner that will largely avoid negative impacts to wildlife.

Southeastern Beach Mouse

Populations of the southeastern beach mouse routinely encounter both natural and anthropogenic threats. The most serious natural threats to the subspecies' long-term persistence include habitat loss due to storm events and predation. The most serious human threat is coastal development, which destroys and/or fragments essential habitat of beach mice. Humans may also impact this subspecies through beach driving, improper disposal of trash on the beach, and trampling through the dunes.

Generally, scientists believe that populations of beach mice are capable of substantial rebounds following storm events. Typically the mice retreat into the back dunes when the primary dunes are overwashed (Frank and Humphrey 1996). Thus, a functional primary and secondary dune system is critical to their survival. Encroaching coastal development can eliminate this important safety valve. Additionally, hurricanes typically strike during the autumn months, and beach mouse losses are typically evidenced by recessed population levels during the following spring. But, during the summers following hurricanes, seed production by sea oats is unusually high due to fertilization from the previous storm's overwash (Holler *et al.* 1989). This extraordinary abundance of food resources prompts a restorative population boom, as the remnant populations in the secondary dunes again recolonize the foredunes.

The Recovery Plan for the southeastern beach mouse states that its natural predators include snakes, bobcats, foxes, raccoons, skunks, and owls (USFWS 1993). Frank and Humphrey (1996) determined that predation by feral and free-roaming cats is also a significant factor affecting the long-term persistence of certain beach mice populations. For example, in a single experiment, the population of the Anastasia Island beach mouse (*Peromyscus polionotus phasma*) increased approximately 20 percent after a sweeping

cat control program was initiated at a State park in St. Johns County, Florida (Frank 1996). Consequently, there is a general consensus among experts that control of domestic and feral cats in beach mouse habitat is an essential management strategy in reducing the subspecies' vulnerability to extinction.

Frank and Humphry (1996) found that beach mice were regularly attracted to refuse containers placed directly on the beach in St. Johns County. The mice would often enter the drainage holes in the bottoms of the containers. The researchers found that by mounting the containers on posts and elevating them above the ground, the attraction of the cans was reduced. However, beach mice will forage on refuse in the vicinity of the trash containers, even if the cans are elevated. Garbage on the beach draws beach mice away from the dune and onto portions of the beach where vehicles are present, thus placing the mice at risk. Trash may also attract predators of beach mice. These potential impacts demonstrate the importance of effective trash management.

Frank and Humphrey (1996) indicated that the most apparent problem caused by human activities on undeveloped publicly held lands was physical damage to dune structure and vegetation caused by people walking through the dunes. The beaches in the vicinity of Ponce Inlet are visited by large numbers of surfers, fishermen and sunbathers. In the past, the lack of sanitation facilities near the jetty prompted some beachgoers to enter the dunes to relieve themselves. The escape tunnels of beach mice are very close to the surface of the sand, and thus the burrows are extremely vulnerable to crushing via human trampling (USFWS 1993). Additionally, some experts consider the deposition of urine, feces, and soiled diapers in the dunes to be a serious threat (Frank and Humphrey 1996). Beach driving may exacerbate this problem, because vehicular access often allows people to reach remote beaches that may be a considerable distance from a portable toilet or public facility.

Little information is documented about the direct and indirect impacts that beach driving might have on beach mice. In St. Johns County, Florida, traffic near the dune has been documented to prune back pioneering vegetation and prohibit seaward dune growth on the upper beach (Frank and Humphrey 1996). This has a direct impact on the extent and quality of beach mouse habitat. Additionally, traffic in St. Johns County was historically allowed beach access to designated areas 24 hours a day outside of the sea turtle nesting season. Because beach mice are nocturnal, they could be impacted by this nighttime activity. For example, during nightly surveys conducted along the Gulf coast, beach mice were observed to run out into the path of an oncoming vehicle (Patrick, USFWS, *pers. comm.* 2002). Headlights associated with night driving may also frighten or disrupt the nocturnal activities of beach mice.

Insofar as the preferred habitat and behavior of the beach mouse are unlikely to put it in jeopardy of vehicle interactions on Volusia County Beaches, and HCP restrictions described later in this HCP (e.g., prohibition of nighttime driving by the general public and prohibition of driving and parking near the dune) largely preclude vehicular degradation of its habitat, Volusia County is not requesting Federal take authorization for this species.

6

PLAN MANAGEMENT

The HCP is designed as a supplement to the Volusia County Beach Management Plan to be implemented through existing regulations, the Beach Code (Volusia County Code of Ordinances Chapter 20), the Volusia County Lighting Ordinance (Volusia County Code of Ordinances Chapter 50-71), and Article XII of the Land Development Code. The HCP will be used by Volusia County to manage the beaches in a way that will permit traditional and lawful beach uses while providing conservation measures for federally protected species. The HCP takes into account the growing population of beach visitors and the increasing number of vehicles on the beach. In preparing the original HCP, input was solicited from stakeholder groups and officials that were interviewed during the EA process. The main issues that were addressed included communication, consistency of policy enforcement, education, and overall coordination. Other concerns were the rights of citizens to the customary use of the beach in accordance with State and local laws, economic development needs, and tradition. The details of programs implemented to balance sea turtle protection and the needs and interests of the community have been refined over the period that the original HCP has been in effect. These programs have proven very effective in managing County Beaches in a manner and extent compatible with the protection of sea turtles and other listed species.

Administration of the Habitat Conservation Plan

The organization outlined below is designed to enhance communication and coordination among the various County divisions and departments, County contractors, sea turtle monitoring personnel, concessionaires, commercial fishermen, and other stakeholders involved in implementation of the HCP.

Protected Species Specialist

Volusia County will continue to fill (either directly or through contract) a position, which will be titled Protected Species Specialist (PSS). The PSS will be able to use the resources of Volusia County government to monitor and manage protected species on County Beaches. This person will coordinate with the County's HCP Coordinator and appropriate regulatory agencies to accomplish the goals of this HCP. The purpose of this position is to provide professional leadership to all aspects of protected species management on County Beaches. If this position is vacated at any time that the ITP is in effect, Volusia County will assign a responsible staff person to temporarily fulfill the duties of the PSS until a permanent replacement is selected. The County will act expeditiously in filling the position upon its vacancy.

RESPONSIBILITIES

The PSS will be responsible for the following activities under the HCP:

- Evaluating the activities of sea turtle monitoring personnel to ensure that HCP objectives are achieved;
- Managing and analyzing protected species data;
- Assessing the effectiveness of HCP programs in protecting sea turtles and other listed species;
- Periodically reviewing HCP programs to ensure that they are performed in accordance with the most current Federal, State, and/or County laws, rules, and regulations pertaining to protected species;
- Assisting the County in developing public education and awareness materials and programs;
- Preparing data reports and HCP program evaluations for submission to the USFWS in accordance with ITP conditions; and
- Providing guidance and oversight of all technical aspects of the HCP.

MINIMUM QUALIFICATIONS

The person or persons assigned to the role of the PSS will at a minimum have the following qualifications:

- A minimum of a Bachelor's Degree in the biological sciences or closely related fields and three (3) years of practical experience managing coastal zone species, including sea turtles;
- A thorough knowledge and understanding of sea turtle biology and conservation and sufficient practical experience to obtain a FWC marine turtle permit to conduct nesting surveys and other activities required under the HCP;
- Thorough knowledge and understanding of the Volusia County Beach Management Plan, the HCP, the Volusia Beach Code, the Volusia County Lighting Ordinance, and other State and Federal regulations pertaining to the protection of sea turtles on County Beaches;
- Knowledge of scientific data collection and analysis techniques and practical experience preparing technical reports (must be able to read, comprehend, and/or compose advanced technical material);
- Ability to work out of doors, near salt air and salt water, and in beach sand;
- Ability to develop and manage multi-faceted programs;
- Ability to communicate effectively both orally and in writing (must be able to speak, hear, and possess visual acuity, particularly at night); and
- A good professional demeanor and the ability to effectively interface with diverse stakeholder groups.

HCP Coordinator

Volusia County will continue to assign a staff person to administer the ITP. This person, if qualified, may also serve in the capacity of PSS. The HCP Coordinator will perform the following responsibilities under the HCP:

- Assign sufficient personnel to ensure that all required protected species monitoring and related activities, including data collection and management, are performed in accordance with the ITP and this HCP;
- Develop budgets to ensure that adequate funding is available to implement the HCP;
- Ensure that equipment provided by the County to protected species monitoring activities is adequate to achieve HCP objectives;
- Develop and negotiate contracts with outside parties involved in the sea turtle monitoring program, as applicable;
- Receive input from the PSS regarding the effectiveness of HCP programs and adjust procedures, personnel and material outlays, as needed, to improve program performance;
- Serve as the County's Point-of-Contact with State and Federal regulatory agencies regarding all issues related to the HCP and ITP; and
- Coordinate all intra-departmental activities of Volusia County government associated with implementation of this HCP.

HCP Field Manager

Volusia County may assign a staff person to serve as Field Manager. This person, if qualified, may also serve in the capacity of PSS and/or HCP Coordinator. The Field Manager will perform the following tasks, as required, by the PSS and/or HCP Coordinator:

- Manage and/or coordinate the day-to-day activities of sea turtle monitoring personnel;
- Conduct and/or coordinate surveys for other protected species, as required by the HCP;
- Receive, review, and summarize monitoring data and related information provided by sea turtle monitoring personnel;
- Manage ancillary data collection activities, such as GPS;
- Oversee entry of sea turtle and related data into the County's database;
- Perform quality assurance measures, as directed by the PSS, to ensure reliability of the County's sea turtle database; and
- Relay problems identified by HCP program personnel to the PSS and/or appropriate County division/department for remedial action and monitor the resulting response to ensure that the problem is adequately resolved.

As applicable, the HCP Coordinator and Field Manager will maintain close communication and will consult with the PSS whenever a situation arises that could affect the County's ability to comply with the ITP or otherwise fulfill its obligations under the HCP.

Principal Permit Holders

All sea turtle monitoring programs in Florida are conducted under the authority of FWC's Bureau of Imperiled Species Management, which issues permits to qualified individuals to perform specific activities in support of the State's sea turtle protection programs. These individuals are referred to as Principal Permit Holders (PPHs). One or more PPHs will be responsible for monitoring County Beaches in support of the HCP. These individuals may include County staff, members of non-profit organizations, unaffiliated volunteers, and/or professional consultants.

All additional monitoring personnel involved in activities described in this HCP must be listed on a Marine Turtle Permit issued by FWC. They will be directly responsible to the PPH on whose permit they are listed. The PPH will ensure that all listed personnel have sufficient training and practical experience to conduct their monitoring activities in accordance with the most current FWC guidelines (Appendix B) and the procedures described in this HCP. Any discrepancies between FWC guidelines and the HCP will be brought to the immediate attention of the PSS and the USFWS will be notified. Until such time as those discrepancies are resolved, the FWC guidelines will prevail. The PSS and/or HCP Coordinator will communicate with FWC, as necessary, to resolve conflicts between the State's sea turtle guidelines and HCP requirements. The County will petition FWC to mandate that PPHs involved in implementation of the Volusia County HCP comply with all HCP and ITP requirements as a condition of their Florida Marine Turtle Permit.

Data Management

Methods of collecting sea turtle data will be developed by the PSS and managed through the Field Manager. Volusia County will use its capabilities to develop maps and analyses of the data collected, as needed by the PSS and/or regulatory agencies, to assess trends or HCP program performance. The PSS will analyze data, at least annually, to evaluate the effectiveness of HCP programs and to determine if changes in procedures are required. The PSS will be responsible for preparing Annual Reports furnished to the USFWS and other data summaries as may be requested by State and Federal regulatory agencies.

Enforcement of Laws and Regulations

The HCP Coordinator will be responsible for coordinating the activities of appropriate departments and divisions within Volusia County government who are responsible for the enforcement of Federal, State, and County regulations pertaining to protected species on

County Beaches. The development and standardization of procedures to effectively monitor and enforce pertinent protected species regulations will be coordinated with the PSS. The HCP Coordinator will ensure that County enforcement staff is properly educated and organized to effectively carry out their responsibilities under the HCP and that there are effective inter- and intra-departmental lines of communications. The PSS will periodically review County regulations, codes, and directives to determine if they require change or stricter enforcement to achieve HCP objectives. Volusia County will coordinate enforcement of State and Federal protected species laws with the FWC and USFWS, as necessary.

Methods used by the Division of Beach Safety to enforce HCP and ITP regulations on the beach may include verbal warnings, written warnings, citations, and tickets, as appropriate, in conformance with County code and/or State law. As with enforcement of traffic laws on upland highways, it is recognized that HCP violations may occur outside the presence of law enforcement personnel. Such infractions, which occur without apparent consequence, will not be deemed a violation of the ITP. However, it will be the responsibility of County personnel charged with enforcing the HCP and ITP to act with due diligence in monitoring for infractions and for taking appropriate enforcement action when infractions are observed.

Public Education

A major element that must be established for the protection of sea turtles and other protected species on the County Beaches is a well-planned public education program. This program will be coordinated by the County in coordination with the PSS and may be carried out by various County, municipal, non-profit, and private agencies. Copies of all draft ITP/HCP-related educational materials will be provided to the USFWS for review and comment prior to distribution.

Interagency Protected Species Coordination Committee

The Interagency Protected Species Coordination Committee (IPSCC) will be comprised of the PSS and representatives from various facets of Volusia County government, including the County Manager's office, Division of Beach Safety, Legal Department, Environmental Management (VCEM) and Coastal Division; the HCP Coordinator will serve as chair of the IPSCC. The primary function of the IPSCC is to facilitate inter-departmental communication and coordination among the various County divisions, departments, and offices that have responsibilities under the HCP. This committee will meet prior to the beginning of each sea turtle nesting season. Thereafter, the HCP Coordinator or PSS will convene meetings on an as-needed basis to discuss relevant issues involving protection of listed species on County Beaches, address HCP program deficiencies, and/or review personnel and material resource allocations to ensure that the County is able to carry out its responsibilities under the HCP and ITP.

Volusia County Environmental Management

The Director of VCEM, or his/her designee, will serve on the IPSCC. VCEM will be responsible for providing staff, material resources, and logistical support to implement the terms and conditions of the HCP. It will also be responsible for managing the collection, storage, and analysis of data collected under the HCP and for overseeing the transfer of this information into the County's GIS system. Educational programs and materials germane to implementation of the HCP will be developed and/or distributed under the oversight of this department. The Director of VCEM will assign an HCP Coordinator.

Volusia County Division of Beach Safety

Beach Safety (formerly Beach Services) will play a major role in carrying out many of the programs contained in the HCP and will be the primary agency responsible for enforcing County, State and Federal laws relevant to implementation of the HCP. Effective management of vehicles and people on the beach will largely determine the extent to which the HCP will achieve its intended goals, and that management is the responsibility of Beach Safety personnel.

Director of Beach Safety

The HCP Coordinator will communicate with the Division of Beach Safety on a regular basis regarding HCP programs. The Director of Beach Safety, or his/her designee, will serve on the IPSCC, and will coordinate management of County Beaches under the HCP. The Beach Safety Director will ensure that policies, programs, and other initiatives developed by the Division for management of vehicles and beach activities are implemented in compliance with the HCP and ITP.

Beach Safety Employees

The Director of Beach Safety will ensure that all employees in the Division receive training, as outlined in this HCP, prior to operating vehicles on the beach and periodically thereafter. Additionally, he/she will be responsible for ensuring that all Beach Safety employees strictly enforce all County, State, and Federal regulations pertaining to protected species and habitat protection, as required under the HCP. Beach Safety employees will collect data and maintain records, as may be required, to assess HCP program performance. Beach Safety will ensure that all enforcement data (e.g., number of HCP-related citations issued) are properly maintained and transmitted to the PSS and/or HCP Coordinator for development of reports, as may be required by the ITP and other permits held by the County pursuant to the HCP. Beach Safety employees will be responsible for participating in training programs and will be required to certify that they understand their responsibilities under the HCP. They will provide input to the PSS and/or HCP Coordinator through the Director of Beach Safety, or his/her designee, on

problems pertaining to enforcement of HCP-related regulations and management activities on County Beaches.

Lifeguards have the primary responsibility of public safety. Since they are watching the beach and are present during peak use periods, they may also observe activities that are illegal or improper under the HCP. Lifeguards will notify their supervisors of such activities, and an available Beach Safety Officer will respond to the situation. Lifeguards will receive HCP training prior to operating vehicles on the beach.

Vehicle Management

The Division of Beach Safety is responsible for regulating vehicles operated by the general public on County Beaches. This will require that information be provided to the public regarding hours that the beach is routinely open for vehicular access and notifications of temporary beach closures due to high tides, unsafe conditions (e.g., thunderstorms), or other unusual conditions.

Volusia County will continue to provide a clear system of communications with the general public and other beach users. This includes material distributed at vehicular access points, printed material distributed to beachfront lodging facilities, public service announcements via the media, and roving announcements on the beach. Printed material will include information regarding rules for beach driving and parking and guidelines for protecting sea turtles and other wildlife utilizing the beach/dune system. Areas off limits to public driving will be clearly identified.

All vehicular access points will have signs that can be read easily by people who are entering the beach. These signs will state clearly the basic rules for appropriate beach use and will be maintained year-round. Volusia County will be responsible for maintaining signs and delimiting driving and non-driving areas on the beach and will ensure that these areas are maintained and managed in accordance with the HCP.

Beach Concession Management

Volusia County awards contracts for corporations to provide beach concession services and is responsible for enforcing the rules and conditions of those contracts (example provided in Appendix A). Volusia County will ensure that its contracts with concessionaires reflect relevant measures for sea turtle and habitat protection contained in this HCP. Concession owners and all of their employees that work on the beach must undergo training as prescribed in this HCP. Volusia County will revoke the contracts of concessionaires who flagrantly or repeatedly violate the terms and conditions of their agreements.

In the past, when the County allowed motorized vehicle rental concessions on the beach, concessionaires were responsible for educating their patrons about HCP rules for the protection of sea turtles and their nesting habitat. An ATV Concession Management

Team developed and implemented a system whereby relevant HCP information was verbally conveyed to patrons, and related signs were affixed to the rental vehicles; compliance was self-policed. This program resulted in a substantial decline in the number of HCP infractions involving rental vehicles over the period when they were allowed on the beach. Although the County does not currently issue contracts for motorized vehicle rental concessions, it may allow this activity in the future. Specific conditions for the operation of rental vehicles will be included in the concession contracts, and the HCP Coordinator will monitor concession operations for compliance.

Commercial Fishermen

The Division of Beach Safety issues permits to individuals engaged in commercial fishing activities on County Beaches (example provided in Appendix C). To be permitted, the applicant must have a valid Florida commercial fishing license. Permittees must receive training, as established by this HCP, and abide by all relevant driving rules and restrictions. Volusia County will permanently revoke the permit of any commercial fisherman who drives in protected beach zones, as defined in this HCP.

Special Events

Volusia County issues permits to individuals that apply for permission to use County Beaches for special events. The permits contain provisions for the protection of sea turtles and the beach dune habitat (example provided in Appendix D). Additionally, each permit issued for events in non-driving areas and for events in driving areas during the sea turtle nesting season is submitted to the HCP Field Manager for review and approval. After discussing any unusual events or circumstances with the PSS, the HCP Field Manager may attach additional conditions to ensure compliance with the HCP and ITP. Applicants may also be required to obtain FDEP approval for certain events. Beach Safety will ensure that all applications for special events are processed, and the events monitored, in accordance with this HCP.

Volusia County Legal Department

The Volusia County Attorney, or his/her designee, will serve on the IPSCC. The County Attorney's office will work with the IPSCC to ensure that the County complies with the terms and conditions of its ITP, in accordance with prevailing law, and satisfactorily fulfills the objectives of the HCP. As necessary, the County Attorney will help develop new and/or revise existing regulations to improve protection for federally listed species and their habitat on County Beaches. Any changes to County regulations affecting covered species in the Plan Area will be complimentary to the programs and policies contained in the HCP and will not affect implementation of the HCP or adherence to ITP terms and conditions. Proposed changes in County code or policy affecting HCP implementation or contrary to the terms and conditions of the ITP will be submitted to the Service for approval prior to adoption, as described in Chapter 11 of this HCP.

In fulfillment of this task, the County Attorney will advise the Volusia County Council of its responsibilities and obligations under the HCP and ITP. The County Attorney will also provide legal advice to all County departments relative to HCP/ITP issues, as prescribed under County charter. As necessary, the County Attorney's office will work with local beachfront municipalities to develop inter-local agreements or other instruments as may be required to implement the HCP and/or adhere to the terms and conditions of the ITP.

Volusia County Code Enforcement

In 2008, the Director of Code Enforcement delegated enforcement of protected species regulations on County Beaches, such as those pertaining to beachfront lighting regulations, to VCEM. Code Enforcement will continue to advise VCEM on appropriate enforcement procedures and will assist in shepherding cases through the County's Code Enforcement Board.

Volusia County Manager's Office

The Volusia County Manager, or his/her designee, will serve on the IPSCC. The County Manager will work with the IPSCC to ensure that the County has dedicated sufficient fiscal and material resources to implement the terms and conditions of the HCP and ITP. The County Manager's Office will ensure that effective lines of communication and cooperation are maintained among County divisions, departments and offices involved in HCP implementation and will resolve any disputes that may arise concerning responsibilities under the HCP. The County Manager may periodically reassign responsibilities and/or personnel among County government units to ensure that HCP program management is properly integrated into the County's overall organizational structure and that available fiscal and personnel resources are most effectively utilized.

7

BEACH MANAGEMENT AREAS AND THE CONSERVATION ZONE

The intent of current beach management policies under the Volusia County Beach Code is to provide order to multiple beach uses and opportunities for residents and visitors alike to enjoy a variety of beach experiences. Within County Beaches, a variety of zones have been established for managing beach activities. These include driving lanes, parking areas, overflow parking areas, conservation zones, traffic-free zones, and pedestrian areas. Under the HCP, various beach areas have been established within which no public vehicular access is permitted. All vehicular access outside of these zones will be monitored and managed by the Division of Beach Safety as a matter of public safety and to minimize impacts on protected species.

Protected Species Beach Management Areas

The purpose of designating Protected Species Beach Management Areas (BMAs) is to provide beachgoers with a variety of recreational opportunities while maintaining a high level of protection for sea turtles and the piping plover and their respective habitats. Under this approach, the most intense beach uses are restricted to the highly developed and commercialized coastal areas where sea turtle nest densities are lowest. In the largely undeveloped natural coastal areas, where nesting is highest, only passive beach uses are allowed. Within each BMA, the HCP sets the conditions for the following activities:

- Operation of "public safety vehicles", such as those used by Beach Safety Officers, lifeguards, and County and municipal law enforcement and fire/rescue personnel;
- Activities necessary to implement the terms and conditions of the ITP, such as protected species monitoring, ancillary data collection, and HCP management;
- Code enforcement activities, such as assessing compliance with beachfront lighting regulations and removal of recreational furniture left on the beach overnight;;
- Operation of vehicles by the general public, including shuttle service to non-driving areas;
- Routine beach maintenance and sanitation;
- Access ramp maintenance;
- Concession operations, including those involving the rental of ATVs and other off-road vehicles;
- Commercial fishing activities;
- Special events;
- Coastal construction projects approved by local, State, and/or Federal regulatory agencies, such as those involving seawall repairs, construction of

dune crossovers, dune restoration, and removal of wind-blown sand, that will not result in the unauthorized take of federally listed species, as determined by the USFWS;
- Scientific monitoring and studies other than those related to the HCP;
- Emergency shoreline protection projects approved by local, State, and/or Federal regulatory agencies; and
- Non-routine beach maintenance and sanitation, such as removal of hazardous materials, debris and/or obstacles from the beach that pose a public health or safety risk following storms, accidents, and other unforeseen circumstances.

To minimize the take of protected species under the HCP, three different BMAs have been established to regulate beach uses on County Beaches (Figure 5):

- Urban (5.0 miles);
- Transitional (11.7 miles); and
- Natural (18.9 miles).

The locations of the BMAs were established with stakeholder input by examining the distribution of sea turtle nest densities and considering human beach uses, historic beach traffic volume and patterns, beach driving conditions, access ramp locations, off-beach parking capacity, and other economic and social factors.

Natural Beach Management Areas

Natural BMAs were established in those areas where sea turtle nesting densities on County Beaches were historically the highest and where off-beach development was less intense than elsewhere in the County. Three separate regions encompassing 18.9 miles of beach are designated as Natural BMAs (Figure 5):

- HCP Region 2 - Southern boundary of North Peninsula State Recreation Area (NPSRA) to 200 feet north of Granada Blvd. in Ormond Beach;
- HCP Region 6 - Emilia Ave. to Beach Street in Ponce Inlet; and
- HCP Region 9 - 27th Street in New Smyrna Beach to the north boundary of Canaveral National Seashore (CNS)

Beachfront development in Natural BMAs includes primarily single- and multi-family residences. Less than 30 percent of the shoreline is armored, and during the Assessment Period (1997-2000), annual nest densities averaged 22.0 nests per mile (Table 29).

Vehicular restrictions for Natural BMAs are summarized in Table 30. Access will be restricted primarily to pedestrian and bicycling beach visitors. No driving, except for public safety, sanitation, protected species monitoring, HCP management activities, scientific research approved by the PSS, and emergency repairs/cleanup will be allowed in these areas. Vehicles used for local, State and/or federally approved coastal

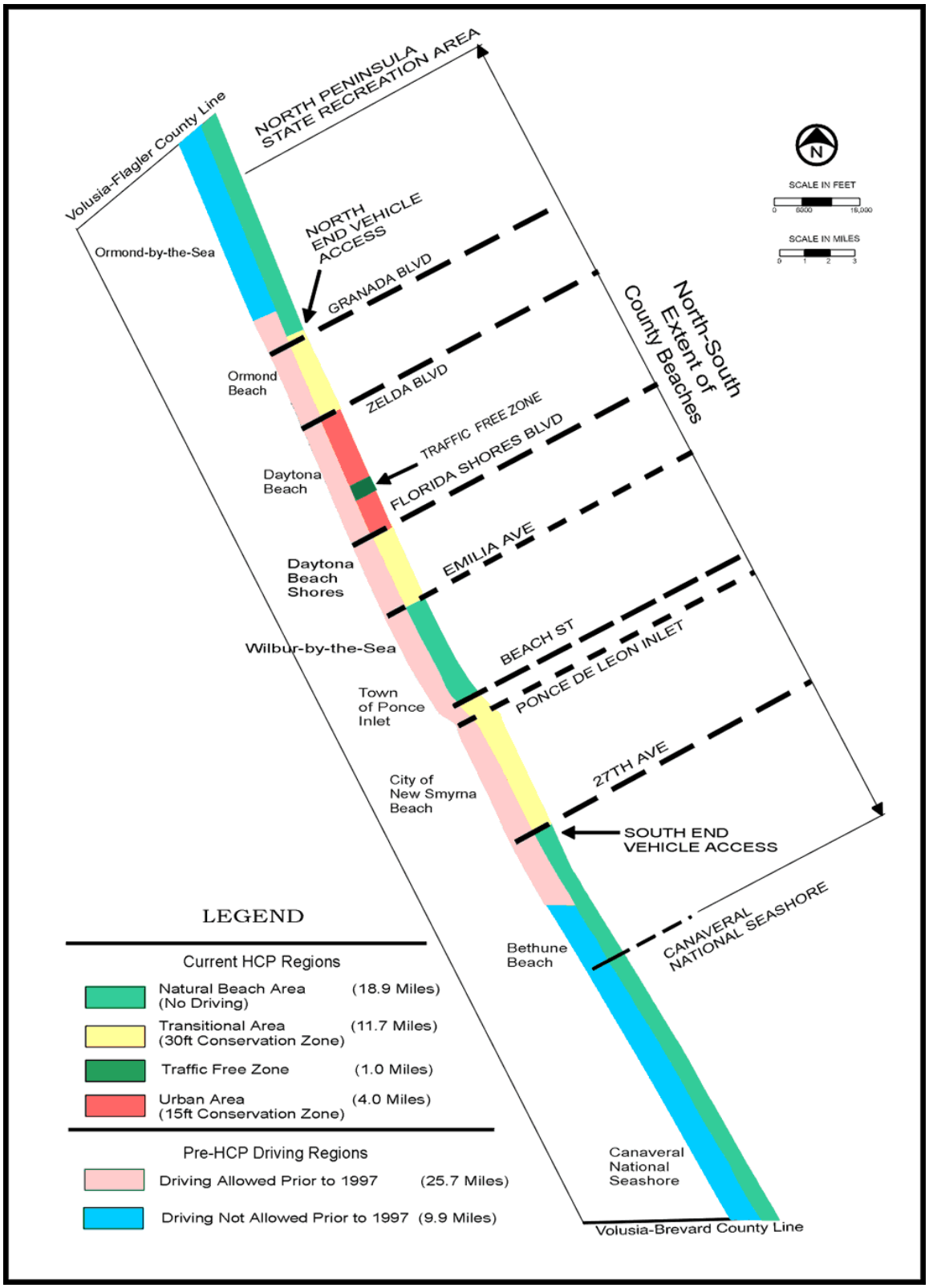

Figure 5. Public driving and non-driving areas before and after the Volusia County HCP went into effect in 1997.

construction projects may be allowed entry to Natural BMAs outside of the sea turtle nesting season, if no reasonable upland alternative is available. Upon completion of construction, the HCP Field Manager will assess the condition of the beach/dune system at the construction site and will review his/her findings with the PSS, as needed. Any damage to the beach dune system resulting from construction activities must be repaired to its pre-construction condition prior to the beginning of the next nesting season.

In the future, the County may offer limited tram service to shuttle people from off-beach parking and community pickup points to drop-off locations along Natural Beach Areas. If this occurs, tram operation will be restricted to the wetted beach only, and the number of trips per day will be limited. A detailed plan, including travel routes, trip frequency, and operating procedures, will be prepared by the County and submitted to the USFWS for approval prior to implementation of tram service in Natural BMAs. The PSS will evaluate the impacts of this service and will consult with the USFWS if impacts occur.

Table 29

Variations in Nesting and Shoreline Armoring Among Beach Management Areas, Volusia County Beaches, 1997-2000.

HCP Region	Type	Length of Beach (Miles)	Nests [1]	Nest Density [2]	Miles of Armoring	Percentage Armored	Average Nesting Success [3]
2	Natural	8.85	145.0	16.4	0.833	9.4	72.66
3	Transitional	3.17	22.2	7.0	0.463	14.6	49.24
4	Urban	5.04	12.3	2.4	4.861	96.4	46.22
5	Transitional	3.06	17.3	5.6	2.347	76.4	48.04
6	Natural	4.50	69.0	15.3	1.507	33.5	71.52
7	Transitional	0.51	6.5	12.7	0.000	0.0	61.11
8	Transitional	4.90	59.2	12.1	1.310	26.7	58.30
9	Natural	5.57	201.5	36.2	3.073	55.2	40.32
Natural BMAs		18.92	415.5	21.96	5.413	28.6	72.30
Transitional BMAs		11.64	105.2	9.04	4.120	35.4	54.53
Urban BMA		5.04	12.3	2.44	4.861	96.4	43.36
All County Beaches		**35.60[1]**	**533.0**	**15.0**	**14.394**	**40.4**	**52.72**

[1] Average number of nests per year for all species combined, 1997-2000.
[2] Nest Density = Average annual number of nests per mile, all species combined.
[3] Nesting Success = Percentage of all crawls that result in nests (nests/total crawls).

Table 30

Summary of Vehicle Access Restrictions for Natural Beach Management Areas, Volusia County Beaches.

Vehicle Type	Time of Year	Hours of Entry	Prior Approval for Access Required
General Public	Year Round	No Entry Permitted	NA
Public Safety	Year Round	Unlimited	No
Sea Turtle Monitoring Program	Year Round	Unlimited	No
Other HCP Management Activities	Year Round	Unlimited	No
Code Enforcement	Year Round	Unlimited	Yes
Scientific Studies	May 1-October 31	In Accordance with County Authorizations	Yes
	Nov 1-Apr 30	Unlimited	Yes
Commercial Fishermen	Year Round	No Entry Permitted	NA
Concessionaires	Year Round	No Entry Permitted	NA
Ramp Grading	May 1-October 31	Upon Completion of Daily Nesting Survey	No
	Nov 1-Apr 30	Sunrise to Sunset	No
Sanitation Collection	May 1-October 31	Upon Completion of Daily Nesting Survey. Off the beach by sunset	No
	Nov 1-Apr 30	Sunrise to Sunset	No

Table 30
(Continued)

Vehicle Type	Time of Year	Hours of Entry	Prior Approval for Access Required
Special Events	Year Round	No Entry Permitted Without Event-Specific PSS Approval and Concurrence from USFWS	NA
Coastal Construction	May 1-October 31	No Entry Permitted	NA
	Nov 1-Apr 30	In Accordance with County Authorizations and FDEP Permits	Yes
Emergency Repairs & Cleanup	May 1-October 31	In Accordance with County Authorizations (and FDEP Permits, if applicable)	Yes
	Nov 1-Apr 30	In Accordance with County Authorizations (and FDEP Permits, if applicable)	Yes

The following performance standards apply in Natural BMA's:

a. Public driving is prohibited year-round.
b. Public safety vehicles are allowed 24-hour access, as necessary to ensure public safety. They will operate on the wetted portion of the beach (areas affected by tidal wave wash) to the extent possible and will only access soft-sand areas when it is necessary to perform assigned duties.
c. Persons involved in implementation of the terms and conditions of the HCP and ITP, including but not limited to, sea turtle monitoring, ancillary data collection, and HCP management, are allowed 24-hour vehicular access to Natural BMAs year round. They will operate on the wetted portion of the beach to the extent possible and will only access soft-sand areas when it is essential to the performance of their responsibilities under the HCP.
d. Personnel involved in code enforcement activities are allowed 24-hour vehicular access year round, but activities must be coordinated with the HCP Coordinator, and all vehicle operators must receive HCP training.
e. Personnel involved in wildlife monitoring (other than sea turtles), government research, or other *bonafide* scientific data collection activity are allowed 24-hour vehicular access year round with the written approval of the HCP

Coordinator in consultation with the PSS. Vehicle operators must abide by all conditions attached to the authorization. The HCP Coordinator will impose the most restrictive access times and locations possible to allow the authorized activity's objective to be achieved.

f. No motorized vehicle rentals are allowed.
g. Vehicle access by commercial fishermen is prohibited.
h. Concessionaire operations are prohibited.
i. Between May 1 and October 31 each year, trash collection minimally must be performed in the late afternoon until 7:00 PM or sundown, whichever is earlier, so that trash is not left on the beach overnight. Outside of the nesting season trash pickup can occur between sunrise and sunset. Trucks and other heavy vehicles involved in this activity may only operate on wetted portions of the beach. ATVs or similar light-weight vehicles used for trash pickup can move from the wetted portion of the beach into soft-sand areas to empty trash receptacles if outfitted with wide, low-pressure tires. However, these light-weight vehicles must travel on the wetted portion of the beach when moving from one receptacle to the next.
j. Low impact special events not involving vehicles may be allowed in Natural BMAs year round upon review and approval of the HCP Field Manager. However, no vehicle usage on the beach can be associated these events.
k. Vehicles involved in local, State, and/or federally approved coastal construction activities may access the Natural BMAs each year between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier, with prior written approval of the HCP Coordinator. Approval will only be granted if there is no reasonable alternative upland access to the construction site and the approved activity will not result in the unauthorized take of federally listed species, as determined by the USFWS. Vehicle operators must abide by all conditions attached to the authorization, including those describing access locations, times, and operating procedures. Upon completion of construction, the HCP Field Manager will assess the condition of the beach/dune system at the construction site and report any damage to the PSS. Any damage to the beach dune system resulting from construction activities must be repaired to its pre-construction condition prior to the beginning of the next nesting season.
l. Vehicles involved in the following activities may access Natural BMAs under special circumstances: storm cleanup; emergency shoreline protection projects approved by local, State, and/or Federal agencies; non-routine beach maintenance and sanitation, such as removal of hazardous materials, debris and/or obstacles from the beach that pose a public health and/or safety risk; and others as may be authorized by the USFWS. All such activities must be approved, coordinated, and monitored by the HCP Coordinator in consultation with the PSS. Approval for entry to Natural BMAs will only be granted if such entry is necessary for the performance of the authorized activity. Upon completion of beach activities, the HCP Field Manager will assess the condition of the beach/dune system at the activity site(s) and will convey

his/her findings to the PSS. Any damage to the beach dune system resulting from authorized activities must be repaired to its pre-construction condition prior to the beginning of the next nesting season.

m. A tram is permitted to transport beach users into Natural BMAs provided it operates in accordance with a management plan approved by the USFWS.

Urban Areas

Urban BMAs were established in those areas where sea turtle nesting densities were historically the lowest and off-beach development was highly urbanized. One region, 5.0 miles in length, was designated as an Urban BMA (Figure 5).

- HCP Region 4 - Zelda Blvd. to Florida Shores Blvd. in Daytona Beach.

Beachfront development in the Urban BMA includes hotels, high-rise condominiums and a few single-family residences. Ninety-six (96) percent of the shoreline is armored, and during the Assessment Period (1997-2000), annual nest densities averaged only 2.4 nests per mile (Table 29). Vehicular restrictions for Urban BMAs are summarized in Table 31.

The following performance standards apply in Urban BMAs:

a. Public driving is allowed in two-way traffic flow unless tides and/or other naturally occurring events preclude sufficient hard sand areas to accommodate traffic. Vehicles operated by the general public must drive and park seaward of a marked 15-ft (4.6 m) Conservation Zone (CZ).
b. Between May 1 and October 31 each year, public vehicular traffic is permitted seaward of the CZ from 8:00 AM to 7:00 PM, or sundown, whichever is earlier. At other times of the year, driving is limited to between sunrise and sunset.
c. Public safety vehicles are allowed 24-hour access year round. Access to the CZ is permitted, as a reasonable means to ensure public safety and conduct patrols.
d. Persons involved in implementation of the terms and conditions of the HCP and ITP, including but not limited to, sea turtle monitoring, ancillary data collection, and HCP management, are allowed 24-hour vehicular access year round. All driving and parking must be seaward of the marked CZ with the exception of sea turtle monitoring personnel participating in nesting surveys. During periods when high tides encroach on the CZ, sea turtle monitoring personnel may enter the CZ if that provides the only reasonable means of completing the daily survey.
e. Personnel involved in code enforcement activities are allowed 24-hour vehicular access year round, but activities conducted outside of normal public access times must be coordinated with the HCP Coordinator, and all vehicle operators must receive HCP training.
f. Personnel involved in wildlife monitoring (other than sea turtles), government research, or other *bonafide* scientific data collection activities are allowed 24-

hour vehicular access year round with the approval of the PSS. Vehicle operators must abide by all conditions attached to their County authorizations (and FDEP permits, if applicable), including beach access locations, times and operating procedures.

g. Motorized vehicle rentals will be allowed year round. These rental vehicles must abide by all conditions applicable to public vehicles, including beach access times and driving and parking regulations.
h. Each year between May 1 or the date on which the first nest is deposited, whichever is earlier, and October 31, or the date on which the last nest has hatched, whichever is later, vehicle access by commercial fishermen is permitted from 8:00 AM to 7:00 PM, or sundown, whichever is earlier. At other times of the year, vehicular access is authorized between 6:00 AM and 10:00 PM, consistent with the Volusia County Beach Code. However, commercial fishermen cannot drive or park within the CZ at any time of the year.
i. Licensed concessionaires must abide by all rules applicable to other public vehicles, including beach access times and driving and parking regulations. The only exception is that concessionaires may gain earlier access if the daily turtle monitoring survey is completed before 8:00 AM. The County is responsible for ensuring that concessionaires clean up trash within 100 feet of their locations and properly dispose of this trash each day as required by their contract with the County.
j. Between May 1 and October 31, sanitation collection is permitted between 8:00 AM and sundown. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Light-weight vehicles used for trash collection may remain on the beach until sunset if performing concurrent rut removal operations. Between November 1 and April 30 each year, trash collection can occur between sunrise and sunset. Trucks and other heavy sanitation vehicles must operate on wetted portions of the beach, to the greatest extent practicable. ATVs or similar light-weight vehicles used for trash pickup can operate in soft-sand areas if outfitted with wide, low-pressure tires. These vehicles must be approved by the PSS. No sanitation vehicles may enter the CZ.
k. The HCP Field Manager must review and approve all special events held between May 1 and October 31. Any vehicle associated with a special event must abide by all rules applicable to other public vehicles.
l. Vehicles involved in coastal construction activities authorized by local, State, and/or Federal regulatory agencies may access the beach each year between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier. Vehicle operators must abide by all rules applicable to other public vehicles, with the exception that they may enter the CZ to access seawalls and other upland structures, if no reasonable alternative upland access to the construction site is available and the permitted activity will not result in the

Table 31

Summary of Vehicle Access Restrictions for Urban And Transitional Beach Management Areas, Volusia County Beaches.

Vehicle Type	Time of Year	Hours of Entry[1]	Prior Approval for Access Required	Early Access if Turtle Survey is Complete	CZ Entry Permitted	Prior Approval for CZ Entry Required
General Public	May 1-October 31	8:00AM-7:00PM	No	No	No	Not Allowed
	Nov 1-Apr 30	Sunrise to Sunset	No	No Surveys Conducted	No	Not Allowed
Public Safety	Year Round	Unlimited	No	NA	Yes	No
Sea Turtle Monitoring Program	May 1-October 31	Unlimited	No	NA	Yes	No
	Nov 1-Apr 30	Unlimited	No	No Surveys Conducted	Yes	No
Other HCP Management Activities	Year Round	Unlimited	No	NA	Yes	No

Table 31
(Continued)

Vehicle Type	Time of Year	Hours of Entry[1]	Prior Approval for Access Required	Early Access if Turtle Survey is Complete	CZ Entry Permitted	Prior Approval for CZ Entry Required
Code Enforcement	Year Round	Unlimited	No	NA	No	Not Allowed
Scientific Studies	May 1-October 31	Unlimited	Yes For Any Activity Outside of Hours Specified for General Public	Yes	Yes	Yes
	Nov 1-Apr 30	Unlimited	No	No Surveys Conducted	Yes	Yes
Commercial Fishermen	May 1-October 31	8:00AM-7:00PM	No	Yes	No	Not Allowed
	Nov 1-Apr 30[2]	6:00AM-10:00PM	No	No Surveys Conducted	No	Not Allowed
Concessionaires	May 1-October 31	8:00AM-7:00PM	No	Yes	No	Not Allowed
	Nov 1-Apr 30	Sunrise to sunset	No	No Surveys Conducted	No	Not Allowed

Table 31
(Continued)

Vehicle Type	Time of Year	Hours of Entry[1]	Prior Approval for Access Required	Early Access if Turtle Survey is Complete	CZ Entry Permitted	Prior Approval for CZ Entry Required
Ramp Grading	May 1-October 31	8:00AM-7:00PM	No	Yes	No	Not Allowed
	Nov 1-Apr 30	Sunrise to Sunset	No	No Surveys Conducted	No	Not Allowed
Sanitation Collection	May 1-October 31	8:00AM-Sunset	No	Yes	No	Not Allowed
	Nov 1-Apr 30	Sunrise to Sunset	No	No Surveys Conducted	No	Not Allowed
Rut Removal[4]	May 1-October 31	8:00AM-Sunset	No	No	No	Not Allowed
Special Events	May 1-October 31	8:00AM-7:00PM	Yes[5]	No	No	Not Allowed
	Nov 1-Apr 30	Sunrise to Sunset	No	No Surveys Conducted	No	Not Allowed

Table 31
(Continued)

Vehicle Type	Time of Year	Hours of Entry[1]	Prior Approval for Access Required	Early Access if Turtle Survey is Complete	CZ Entry Permitted	Prior Approval for CZ Entry Required
Coastal Construction	May 1-October 31	8:00AM-7:00PM	Yes	No	No	NA
	Nov 1 – Apr 30	Sunrise to Sunset	Yes	No Surveys Conducted	Yes	Yes
Emergency Repairs & Cleanup	May 1- October 31	In Accordance with County Authorizations (and FDEP Permits, if applicable)	Yes	Yes	Yes	Yes
	Nov 1- Apr 30	In Accordance with County Authorizations (and FDEP Permits, if applicable)	Yes	No Surveys Conducted	Yes	Yes

[1] For vehicles permitted access between 8:00AM and 7:00PM from May 1 through October 31, vehicles will not be let on the beach after sundown if sundown occurs earlier than 7:00 PM
[2] Access during this period will not be permitted on any days that turtle nests are known to be present on the beach.
[3] Light-weight vehicles engaged in concurrent rut removal operations may remain on the beach until sunset.
[4] Only light-weight vehicles may remain on the beach after 7:00PM;
[5] Vehicle usage is the same as for the general public but the special event must be permitted by Volusia County.

unauthorized take of federally listed species, as determined by the USFWS. Access to the CZ must have prior written approval of the HCP Field Manager and vehicle operators must abide by all conditions attached to the authorization, including those describing access locations, times, and operating procedures. Upon completion of construction, the HCP Field Manager will assess the condition of the beach/dune system at the construction site and report any damage to the PSS. Any damage to the beach dune system resulting from construction activities must be repaired to its pre-construction condition prior to the beginning of the next nesting season.

m. Vehicles involved in the following activities may access the CZ under special circumstances: storm cleanup; emergency shoreline protection projects approved by local, State, and/or Federal agencies; non-routine beach maintenance and sanitation, such as removal of hazardous materials, debris, and/or obstacles from the beach that pose a public health and/or safety risk; and others as may be authorized by the USFWS. All such activities must be approved, coordinated, and monitored by the HCP Coordinator in consultation with the PSS. Approval will only be granted if entry to the CZ is necessary for the performance of the authorized activity. Upon completion of beach activities, the HCP Field Manager will assess the condition of the beach/dune system at the activity site(s) and will convey his/her findings to the PSS. Any damage to the beach dune system resulting from authorized activities must be repaired to its pre-construction condition prior to the beginning of the next nesting season.

Transitional Areas

Transitional BMAs were established in those areas where historical sea turtle nesting densities and off-beach development were intermediate to those of Natural and Urban BMAs. Four regions, encompassing 11.7 miles of beach are designated as Transitional BMAs (Figure 5):

- HCP Region 3 – 200 feet north of Granada Blvd. to Zelda Blvd. in Ormond Beach and Daytona Beach, respectively;
- HCP Region 5 - Florida Shores Blvd. to Emilia Ave. in Daytona Beach Shores;
- HCP Region 7 - Beach Street to the north jetty at Ponce Inlet; and
- HCP Region 8 - South jetty at Ponce Inlet to 27th Ave. in New Smyrna Beach.

Beachfront development in Transitional BMAs includes a mixture of natural dunes and some armoring and a combination of commercial and residential development. Approximately 35 percent of the shoreline is armored, and during the Assessment Period (1997-2000), annual nest densities have averaged 9.0 nests per mile (Table 29).

Vehicular restrictions for Transitional BMAs are summarized in Table 31. Performance standards are the same as those for Urban BMAs, with the exception that public vehicles must drive and park seaward of a marked 30-ft (9.1 m) CZ. Additionally, under the

Volusia County Beach Code, the general public is prohibited from driving within 100 feet of the north jetty at Ponce Inlet or north of the rock jetty on the south side of the inlet (HCP Regions 7 and 8). This provision prevents public driving along inlet beaches where wintering piping plovers are occasionally present. However, vehicles used for public safety, sanitation, protected species monitoring, HCP management, code enforcement, scientific research approved by the PSS, emergency repairs/cleanup, and other official activities will be allowed in these areas.

Photo showing relationship of Conservation Zone boundary markers in relation to a natural dune in a Transitional Beach Management Area, Volusia County Beaches.

Traffic-Free Zones

Although not part of the Protected Species Beach Management Area system, traffic-free zones (TFZs) will be used by the County to create special use areas within Urban and Transitional BMAs. These areas will restrict public vehicular access, but otherwise activities will be managed as for the general BMA in which they occur.

In 2012, there was one large TFZ on County Beaches, encompassing a one-mile section of beach between Seabreeze and International Speedway Boulevards in the core commercial area of Daytona Beach (HCP Region 4, Urban BMA). This zone was created to support Daytona Beach's Community Redevelopment Area (CRA or E Zone). The Daytona TFZ was opened in March 2000 upon completion of a $2 million, 1,500-space parking garage next to the Ocean Center, one block removed from the beach. A

tram service was envisioned but never instituted to shuttle beachgoers from the parking garage to the beach. However, this option still exists for the future. The County will consider designating additional areas as TFZs as the need arises, provided adequate off-beach parking can be developed to support them.

Within Traffic-Free Zones, driving and parking rules applicable elsewhere in Urban and Transitional BMAs apply with the following exceptions:

a. No driving or parking by the general public is allowed;
b. Motorized vehicle rentals may be disallowed, and
c. Methods for marking the CZ are different, as described below.

The north and south boundaries of Traffic-free Zones will be marked similar to Natural BMA boundaries. Appropriately worded signs will be affixed to the poles to indicate that public driving is prohibited beyond this point. Additionally, within the TFZs, the standard method used to mark the CZ elsewhere in public driving areas may be replaced by other types of markers. Because there is no public vehicular traffic, these may be spaced much further apart than the standard CZ posts. All CZ regulations, as summarized in Table 31, will apply in the TFZs. Concessionaires will be assigned to specific marked locations outside the CZ in the TFZ, and they must park east of these designated locations.

Conservation Zone

The intent of the Conservation Zone is to separate turtle nests, sensitive dune habitat (motor vehicles are prohibited from driving in the dunes by State law, Chapter 161, Florida Statutes), and other natural resources from vehicles in those areas where the public is allowed to drive and park on the beach. Vehicles operated by the general public may not park or drive landward of the eastern marked boundary of the CZ. CZ widths for each of the three different types of BMAs are as follows:

- Natural – No marked CZ present;
- Urban – 15 feet; and
- Transitional – 30 feet.

The seaward boundary of the Conservation Zone will be marked and posted at intervals necessary to ensure that even people unfamiliar with beach regulations will clearly understand that vehicles are not allowed to enter the Conservation Zone at any time. This restriction will be in effect throughout the year and applies to both driving and parking.

The integrity of the CZ will be maintained through year-round enforcement. For the purpose of enforcing the CZ, Beach Safety Officers will use the tires of a vehicle as a reference point. The tires cannot extend landward of an imaginary line drawn between the centerline of two adjacent CZ boundary posts. The edge of the vehicle may extend

beyond the eastern boundary of the CZ, as long as it does not encroach on a marked sea turtle nest.

8

BEACH MANAGEMENT AND CONSERVATION ZONE REGULATIONS

The Protected Species Beach Management Areas (BMAs) have been designed to meet the primary goals of wildlife protection, visitor use, and tourism development. This includes protection of the beach/dune system, sea turtles, piping plovers, and other wildlife, as well as provisions for the year-round use of the beaches by both residents and visitors seeking diverse beach experiences. Tourism development can be enhanced by protecting wildlife such as sea turtles, which can serve as a primary attraction for tourists, and by providing attractive facilities and beach access.

BMA designations will remain in effect year-round. However, management techniques may be changed from time to time as a result of changing beach conditions, nesting patterns, and other factors, as indicated by monitoring data. Any changes to BMA boundaries will require written approval from the USFWS. All rules and restrictions outlined in this HCP will take effect immediately upon renewal of the ITP except where otherwise stipulated in the HCP or ITP.

Marking Public No-Driving Zones

Marking Beach Management Area Boundaries

All designated BMAs must be clearly delineated with markers and signs that can be easily seen and read so that visitors are effectively informed of the boundaries and restrictions of these areas. The marker system will be designed so that enforcement officials can easily determine if a vehicle has illegally entered a non-driving area.

At present, markers separating Natural BMAs (non-driving areas) from Transitional BMAs (driving areas) consist of a series of telephone posts extending from the dune to below the normal low tide line. In the future, alternative materials of equal effectiveness may be substituted for the posts. The spacing between posts will be sufficiently narrow to preclude cars and trucks from entering the Natural BMAs. However, some of the posts must necessarily be placed farther apart to allow access by public safety, sea turtle monitoring, sanitation, and other authorized vehicles as authorized by the ITP. The County will install/deploy conspicuous signage to notify the public that the area beyond the posts is a conservation area and vehicular access is prohibited. Natural BMA zone markers and related signage will be maintained throughout the year to ensure the integrity of the boundary. Repairs and adjustments will be made, as needed, in response to storm damage, vandalism, and changes in beach width caused by erosion and accretion. The HCP Coordinator will ensure that all requisite State and Federal authorizations and/or permits for boundary zone management are obtained before maintenance activities are initiated.

Natural BMA boundaries will be established at the following locations as depicted in Figure 5:

- South boundary of HCP Region 2 - 200 feet north of the north right-of-way at Granada Blvd. in Ormond Beach;
- North boundary of HCP Region 6 - The south edge of the right-of-way at Emilia Ave. in Daytona Beach Shores;
- South boundary of HCP Region 6 – The north edge of the right-of-way at Beach Street in Ponce Inlet; and
- North boundary of HCP Region 9 – The south edge of the right-of-way at 27th Ave. in New Smyrna Beach.

The County's legal right-of-way varies among ramps in proportion to the width of the access road. The County is responsible for ramp grading and other activities within these rights-of-way. If the legal right-of-way at a ramp separating a Natural BMA from an adjacent driving area is 50 feet wide, the poles marking the boundary of the Natural BMA will be positioned 25 feet north or south of the centerline of the ramp, as applicable.

Maps showing the locations of driving and non-driving areas, with narratives clearly outlining permitted access, driving and parking restrictions, and sea turtle conservation issues, will be made available to beach visitors accessing the beach by vehicles. A representative sample of these materials is presented in Appendix E. Throughout the year the brochures will be made available at all open vehicle access points and will be, upon request, distributed to hotel and motel proprietors, local Chambers of Commerce, and municipalities along the beach. Additionally, Volusia County will place daily notices of driving conditions on its website (http://www.volusia.org/services/public-protection/beach-safety/beachcams-and-daily-safety-report.stml). Beachside establishments, as well as other interested parties, can access the site via the internet and provide relevant information to their patrons. Social media managed by Beach Services may also be used to advise motorists and other beachgoers of beach conditions. Equally or more effective methods for disseminating information pertaining to HCP driving regulations (at a lower cost) may be identified for future use. Any changes to the type or content of these public awareness materials or related methods of distribution will be submitted to the USFWS for review and approval prior to final development.

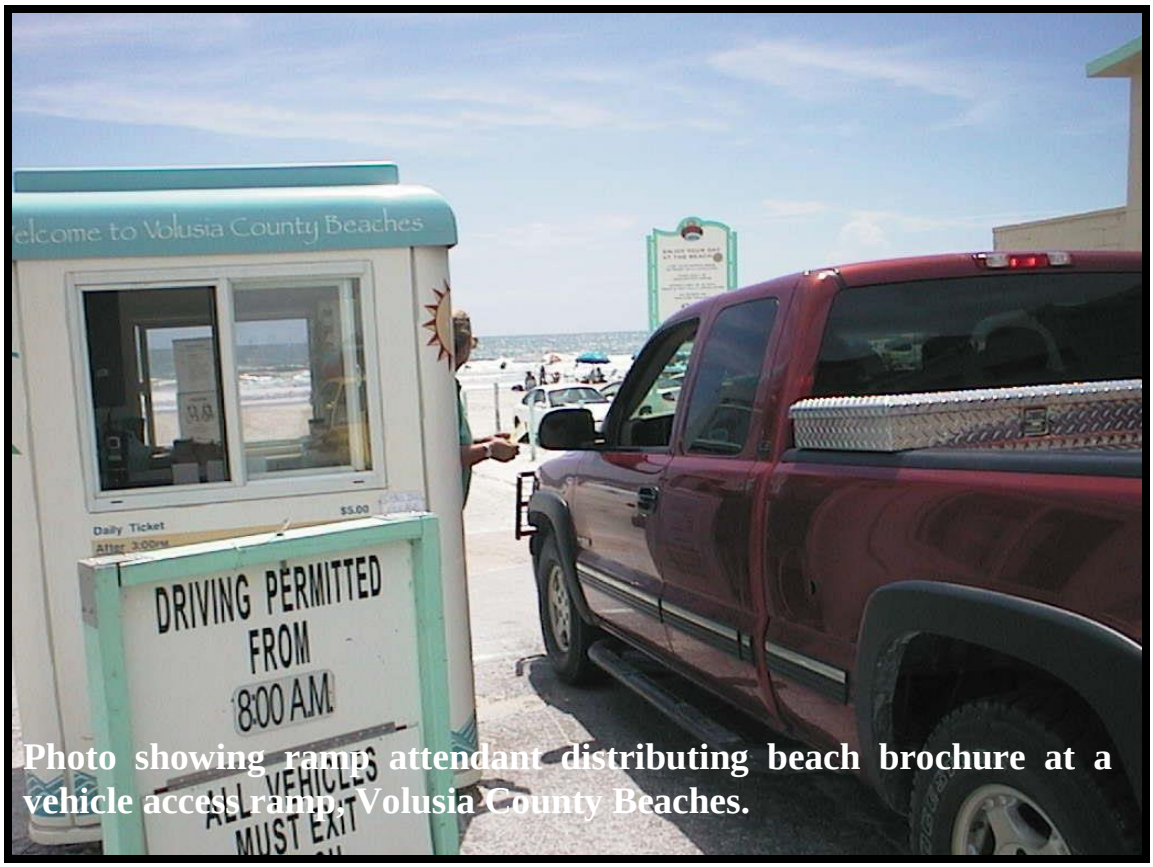

Photo showing ramp attendant distributing beach brochure at a vehicle access ramp, Volusia County Beaches.

Marking Conservation Zone Boundaries

All designated Conservation Zones must be clearly delimited with posts and signs that can be easily seen and read so that visitors are effectively informed of the driving and parking restrictions associated with these areas. As described in Section 7 of the HCP, the marker system will be designed so that enforcement officials can easily determine if a vehicle has illegally entered the CZ.

The eastern boundary of the CZ will be determined by measuring an appropriate distance seaward from the toe of the dune or beachfront armoring structure (seawall, rock revetment, etc.), whichever is most seaward. In an effort to improve traffic control, and to assist in enforcing parking regulations, the CZ will be placed in a relatively straight line. Due to the undulating nature of the dune system, this may place some posts slightly further from the dune than required. Similarly, in cases where the dune juts seaward, some posts may be slightly closer to the dune than required. However, the average distance of CZ posts from the dune/seawall of any five consecutive posts must be equal to or greater than 15 or 30 feet, respectively, in Urban and Transitional BMAs.

In the Traffic-Free Zones, the standard posts used to mark the CZ elsewhere in public driving areas may be replaced with other types of markers. Because public vehicles are

not permitted in these areas, the markers may be spaced much further apart than the standard CZ posts.

During the spring of each year, the CZ boundary will be inspected by the HCP Coordinator and/or HCP Field Manager and any needed modifications will be made prior to May 1, the beginning of the sea turtle nesting season. Thereafter, the boundary will remain static, with the exception of any large-scale re-alignments that may be necessary following major storm events or to encompass a major expansion of dunes and vegetation outside the nesting season.

Photo showing steep dune escarpment as the result of storm erosion, Volusia County Beaches.

Specific procedures for establishing the width of the CZ and marking and monitoring its eastern boundary are contained in the Conservation Zone Boundary Management Plan (Appendix F). Any changes to this plan must be approved by the USFWS. The County agrees to abide by the Conservation Zone Boundary Management Plan for the duration of the ITP. Information depicting the CZ and describing driving and parking restrictions will be made available to persons accessing the beach by vehicle year round, as described above for the Beach Management Areas.

Regulating Human Uses of the Beach

All regulations concerning activities within each of the three BMAs and the Conservation Zone will be enforced year-round. Regulations specified in this HCP become effective immediately upon renewal of the ITP and approval of the HCP unless otherwise stipulated.

Vehicles in Natural Beach Management Areas and the Conservation Zone

No driving or parking of vehicles will be permitted in designated Natural BMAs or Conservation Zones year-round, except as provided below:

NATURAL BEACH MANAGEMENT AREAS

a. Public safety vehicles are allowed 24-hour access to Natural BMAs, as necessary to ensure public safety. They will operate on the wetted portion of the beach to the extent possible and will only access soft-sand areas when it is necessary to perform assigned duties.
b. Persons involved in implementation of the terms and conditions of the HCP and ITP, including but not limited to, sea turtle monitoring, ancillary data collection, and HCP management, are allowed 24-hour vehicular access to Natural BMAs year round. They will operate on the wetted portion of the beach to the extent possible and will only access soft-sand areas when it is essential to the performance of their responsibilities under the HCP.
c. Personnel involved in code enforcement activities are allowed 24-hour vehicular access to Natural BMAs year round, but activities must be coordinated with the HCP Coordinator, and all vehicle operators must receive HCP training.
d. Personnel involved in wildlife monitoring (other than sea turtles), government research, or other *bonafide* scientific data collection activity are allowed year-round, 24-hour vehicular access to Natural BMAs with the written approval of the HCP Coordinator in consultation with the PSS. Vehicle operators must abide by all conditions attached to the authorization. The HCP Coordinator will impose the most restrictive access times and locations possible to allow the authorized activity's objective to be achieved.
e. Sanitation vehicles may access the Natural BMAs for routine trash collection. Between May 1 and October 31 each year, trash collection minimally must be performed in the late afternoon before sundown, tidal conditions permitting, so that trash is not left on the beach overnight. Outside of the nesting season trash pickup can occur throughout daylight hours. Trucks and other heavy sanitation vehicles must operate on wetted portions of the beach. ATVs or similar light-weight vehicles used for trash pickup can operate in soft-sand areas if outfitted with wide, low-pressure tires. However, in the Natural BMAs, these light-weight vehicles must travel between trash receptacles on the wetted portion of the beach.
f. Vehicles involved in local, State, and/or federally approved coastal

construction activities may access the Natural BMAs each year between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier, with prior written approval of the HCP Coordinator. Approval will only be granted if there is no reasonable alternative upland access to the construction site and the approved activity will not result in the unauthorized take of federally listed species, as determined by the USFWS. Vehicle operators must abide by all conditions attached to the authorization, including those describing access locations, times, and operating procedures.

g. Vehicles involved in the following activities may access Natural BMAs under special circumstances: storm cleanup; emergency shoreline protection projects approved by local, State, and/or Federal agencies; non-routine beach maintenance and sanitation, such as removal of hazardous materials, debris and/or obstacles from the beach that pose a public health and/or safety risk; and others as may be authorized by the USFWS. All such activities must be approved, coordinated, and monitored by the HCP Coordinator in consultation with the PSS. Approval will only be granted if entry into the Natural BMAs is necessary for the performance of the authorized activity.

h. A tram is permitted to transport beach users into Natural BMAs provided it operates in accordance with a management plan approved by the USFWS.

Photo showing equipment used for federal emergency shoreline protection project following three major storm events in 1999, Volusia County Beaches.

CONSERVATION ZONE

a. Public safety vehicles are allowed access to the CZ to ensure public safety or when the tide precludes their operation outside the CZ.
b. Sea turtle monitoring personnel participating in nesting surveys may encroach into the CZ during high tides if that provides the only reasonable means of completing the daily survey.
c. Vehicles involved in local, State, and/or federally approved coastal construction activities may access the CZ between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier, with prior written approval of the HCP Coordinator in consultation with the PSS. Access approval will only be granted if there is no reasonable alternative upland access to the construction site and the approved activity will not result in the unauthorized take of federally listed species, as determined by the USFWS. Vehicle operators must abide by all conditions attached to the authorization, including those describing access locations, times, and operating procedures.
d. Vehicles involved in the following activities may access the CZ under special circumstances: storm cleanup; emergency shoreline protection projects approved by local, State, and/or Federal agencies; non-routine beach maintenance and sanitation, such as removal of hazardous materials, debris and/or obstacles from the beach that pose a public health and/or safety risk; and others as may be authorized by the USFWS. All such activities must be approved, coordinated, and monitored by the HCP Coordinator in consultation with the PSS. Approval will only be granted if entry into the CZ is essential to the performance of the authorized activity.

All persons authorized to routinely operate vehicles in Natural BMAs or the CZ will receive HCP training, as described elsewhere in this HCP. Drivers must sign a statement indicating that they have received HCP training, understand the rules, and agree to abide by all HCP conditions. When entering otherwise restricted areas, vehicle operators will be instructed to be particularly vigilant for marked sea turtle nests. No vehicles will be authorized to operate on or in the dunes except in emergency situations.

Vehicle operators allowed to access Natural BMAs or the CZ solely for authorized construction activities will be required to follow special vehicle operating guidelines developed by the HCP Coordinator in consultation with the PSS. For those FDEP-permitted projects also requiring a permit from the County's Building and Zoning Department, the driving conditions will be included in the County permit. If a County permit is not required, driving guidelines will be included in a Memorandum of Understanding (MOU). Those needing vehicular beach access will be required to sign the MOU acknowledging that they understand and agree to comply with the driving conditions.

The HCP Coordinator will provide Vehicle Access Passes to vehicle operators allowed to access the beach for authorized construction activities, and copies will be provided to Beach Safety. The Passes will list driving restrictions and operating conditions specific

to each project. HCP Program staff will verbally review these conditions with each contractor before they are allowed to drive on the beach. Drivers will be required to place the Passes on the vehicle's dashboard, so Beach Safety Officers can easily determine which vehicles are authorized to be in areas off limits to the general public.

Standard Beach Opening and Closing Times

Official vehicle beach access hours for the general public will be from 8:00 AM to 7:00 PM or sundown, whichever is earlier, during the period from May 1 through October 31 each year (sea turtle nesting season) and from sunrise to sunset outside of the sea turtle nesting season. Standard operating procedures for opening and closing County Beaches to public vehicular traffic are presented in Appendix G.

Ramp attendants will arrive at their posts prior to the posted public opening times. The County will establish a system for notifying ramp attendants when the morning sea turtle nesting surveys have been completed. The general public will not be allowed to access the beach by vehicle until 8:00 AM, or the morning survey is completed, whichever is later. Sanitation vehicles, concessionaires and commercial fishermen will be permitted early access (prior to 8:00 AM) provided the morning survey has been completed.

Vehicle operators will be notified of nighttime beach closures by roving announcements made by Beach Safety Officers. The announcements will begin about an hour prior to the posted closing time to encourage voluntary departure. During the sea turtle nesting season, gates will typically be closed to on-coming traffic at about 6:30 PM, or one-half hour before sunset, as applicable, to facilitate removal of vehicular traffic from the beach by the established "closing" times. Vehicles still on the beach will be escorted to the closest open ramp by Beach Safety Officers. Vehicles still on the beach after 7:00 PM (or sunset, as applicable) will be cited and/or towed.

Driving Zone Delineation

Under the Volusia County Beach Code, public vehicular traffic is limited to two opposing lanes of traffic. There must be at least 30 feet of beach seaward of the CZ to support driving and parking (10 feet for parking and 10 feet for each driving lane). Mobile signs marking the driving lanes and posting speed limits will be put in place daily prior to opening County Beaches for vehicular access. These signs will be maintained at all times when public traffic is on the beach and will be appropriately stored at night so they do not pose obstacles to nesting turtles and emerging hatchlings.

Vehicular access to all or a portion of County Beaches may be prohibited at any time that Beach Safety feels that it cannot properly manage beach traffic in compliance with the ITP and this HCP. Examples include, but are not limited to, periods of hazardous weather conditions, soft-sand conditions, and unusually high tides. The County will distribute brochures, erect signs, and/or initiate other public awareness programs to ensure that vehicle operators are aware of the rules and conditions for beach access,

driving, and parking, as outlined in this HCP, and that access may be prohibited at any time.

The County will continue to implement its Beach Access and Closure Policy (Appendix G) to close/limit public vehicular access to County Beaches during unusual high tide and/or rough weather conditions. Volusia County will adhere to the Beach Closure Plan for the life of the ITP. Any changes to this plan must be approved by the USFWS prior to their implementation.

Nighttime Operation of Public Safety Vehicles

Lighting used in the interest of public safety officials carrying out their official responsibilities on the beach at night is exempt from the County's lighting regulations. However, to the extent practicable, public safety vehicles, including those used by Beach Safety Officers, lifeguards, and County and municipal law enforcement and fire/rescue personnel will adhere to the following guidelines when conducting routine operations on the beach at night:

- While driving on the beach during the sea turtle nesting season, headlights will be turned on so nesting and hatchling sea turtles may be more easily spotted and avoided;
- When a vehicle is at rest for more than one minute, headlights must be turned off. However, amber parking lights may be turned on; and
- Vehicle operators will abide by all other rules contained in the "Nighttime Vehicle Operation Guidelines" developed by the PSS (Appendix H).

All Beach Safety personnel involved in public safety operations must receive HCP training, as described elsewhere in this HCP. Copies of the Nighttime Vehicle Operation Guidelines will be distributed to the Volusia County Sheriff's Office, municipal police departments, Code Enforcement departments, and other individuals or agencies authorized to operate vehicles on the beach at night. These groups will be invited to participate in HCP training provided by the County.

Beach Maintenance

Beach maintenance refers to activities needed to maintain the beach in a clean, safe, and aesthetically pleasing condition. These activities are necessary for public health and safety and include trash collection, beach raking, access ramp grading, and management of restroom facilities.

BEACH RAKING

Beach hand raking is occasionally performed to remove trash and accumulated flotsam and other debris from around dune walkovers. No mechanical beach cleaning, with the exception of tire rut removal, as described in Section 9 of this HCP, will be permitted

during the sea turtle nesting season (May 1 through October 31). All raking of trash and debris will be done by hand during this period. Raking cannot be conducted inside turtle nest barriers or in the general vicinity of bird nesting sites.

Mechanical raking may be conducted each year between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier. The HCP Field Manager, in consultation with the PSS, must approve this activity and must periodically monitor operations to ensure that they are conducted in a manner that does not degrade nesting habitat or the beach dune system. All raking must occur seaward of the CZ.

All beach raking will be conducted under a valid permit issued by FDEP, unless otherwise provided by law. Volusia County and/or its contractor will maintain an active permit and will abide by all conditions contained in the permit and this HCP.

TRASH COLLECTION

All trash receptacles along the beach within the Plan Area, with the exception of the few immediately adjacent to authorized pedestrian access points (i.e., dune crossovers), are mounted on posts at the edge of the CZ. Along that section of beach adjacent to Smyrna Dunes Park (HCP Region 8) the seaward edge of the CZ is 30 feet from the toe of the dune.

Between May 1 and October 31, sanitation collection is permitted in Urban and Transitional BMAs between 8:00 AM and sundown. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Light-weight vehicles used for trash collection may remain on the beach until sunset if the vehicle is performing concurrent rut removal operations (see Appendix K). In Natural BMAs, trash collection minimally must be performed in the late afternoon, tidal conditions permitting, so that trash is not left on the beach overnight. Between November 1 and April 30 each year, trash collection can occur between sunrise and sunset in all Beach Management Areas.

Trucks and other heavy vehicles used for trash collection must operate on wetted portions of the beach. ATVs or similar light-weight vehicles used for trash pickup, if outfitted with wide, low-pressure tires and approved by the PSS, can operate in soft-sand areas. However, in the Natural BMAs, these light-weight vehicles must travel between trash receptacles on the wetted portion of the beach.

RAMP GRADING

Volusia County currently uses a contractor to remove sand deposited by the wind and tides from vehicle access ramps. Some ramps are graded daily and others are attended to on an as-needed basis.

All ramp grading will be conducted under a valid permit issued by FDEP, unless otherwise provided by law. Volusia County and/or its contractor will maintain an active permit and will abide by all conditions contained in the permit and this HCP.

Sand scraped from the ramps will be scooped, pushed, or swept from the ramp and deposited on the wetted portion of the beach where it can be dispersed by tides. Ramp grading and the corridor used to move sand from the ramp to the tide line will not exceed the width of the paved access ramp, except where necessary for public safety. At no time will grading exceed the width of the County's legal right-of-way at a particular ramp.

Although the primary objective of ramp grading is to provide for safe passage of vehicles from landside roads to the beach, the effects of this activity on sea turtles must be considered. Routine ramp grading sometimes creates shallow depressions at the base of the ramps. During high tides, wavewash reaching the ramps collects in these "pools." If ramp grading results in a continuous corridor between the ramp and the ocean that is lower than the natural beach elevation, this tidal flooding phenomenon is exacerbated. Tidal inundation may threaten nearby turtle nests. Consequently, ramps not routinely used for public access will only be graded on an as-needed basis to keep them operable for public safety vehicles.

Between May 1 and October 31 each year, ramp grading is permitted between 8:00 AM and 7:00 PM or sundown, whichever is earlier. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Between November 1 and April 30, ramp grading is permitted between sunrise and sunset.

Ramp grading vehicles must travel on the wetted portion of the beach between ramps. In the Natural BMAs, if tides preclude beach travel between ramps on wetted sand, the grading equipment must use upland roads or curtail grading operations in those areas until the tides recede.

If a turtle nest is laid within a ramp grading corridor, it will be relocated by State permitted sea turtle monitoring personnel in accordance with the most current FWC guidelines. If nests cannot be relocated in conformance with FWC guidelines, they will be marked and left in place. Ramp grading activities will avoid marked sea turtle nests to the greatest extent practicable.

RESTROOM FACILITIES

Portable restrooms are serviced by trucks that deposit wastes at dumping stations located off the beach. Portable restroom facilities will be located on the beach adjacent to the CZ within the County's legal right-of-way at vehicle ramps. This right-of-way will not be considered part of the Conservation Zone or Natural Beach Management Area. Maintenance of these areas is permitted by FDEP. Additional restrooms may be placed near the south jetty at Ponce Inlet in New Smyrna Beach. The jetty is used extensively by surfers and fishermen, and there are no nearby facilities. Portable restrooms adjacent to Smyrna Dunes Park will reduce the likelihood of human trampling of the dunes and associated impacts to beach mouse habitat. Additional facilities may be deployed away from vehicle ramps if necessary to alleviate human health/sanitation problems and/or improve protected species conservation. The deployment of these facilities will be in conformance with the County's Policy for the Placement of Portable Restroom Facilities

(Appendix I). Any changes to this policy must be approved by the USFWS. The County agrees to abide by the Portable Restroom Placement Policy for the duration of the ITP.

Between May 1 and October 31, vehicles servicing the portable restrooms are permitted access to Urban and Transitional BMAs between 8:00 AM and 7:00 PM or sundown, whichever is earlier. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Between November 1 and April 30 each year, sanitation operations can occur between sunrise and sunset.

In driving areas, sanitation vehicles used to service restroom facilities will travel between ramps on the wetted portion of the beach. A 30-foot corridor perpendicular to the shoreline will be designated as the drive path from the wetted beach to the portable restrooms. In Natural BMAs, sanitation vehicles must access portable restrooms from the landward side of the adjacent beach ramp.

Photo showing location of portable restroom adjacent to vehicle access ramp, Volusia County Beaches.

TRAINING

All personnel involved in beach maintenance activities will receive HCP training as described elsewhere in this HCP and must sign a statement certifying that he/she understands and will abide by operational procedures established for the protection of sea turtles and other covered species. Anyone involved in beach maintenance activities who

has not received training, as evidenced by a signed training certificate will be considered in violation of driving regulations and appropriate remedial action will be taken. This may include verbal and written warnings, fines, and/or termination for repeated violations. Contractors whose employees repeatedly fail to receive training and/or comply with HCP vehicle operating restrictions may be subject to penalties and/or contract revocation.

Concessionaires

No concessionaires will be permitted to drive or park vehicles or place signage or store merchandise, equipment, or other paraphernalia in any protected area, including Natural BMAs and the Conservation Zone. Concessionaires are not permitted vehicular access to Natural BMAs during any time of the year. Concessionaires are permitted in Urban and Transitional BMAs, but must abide by all rules applicable to other public vehicles. Between May 1 and October 31 each year, access is permitted between 8:00 AM and 7:00 PM or sundown, whichever is earlier. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Between November 1 and April 30, access is permitted between sunrise and sunset.

Concessionaires must be contracted by Volusia County and must abide by all conditions of their agreements with the County (Appendix A). If a sea turtle nest occurs within 30 feet of a concession location, the HCP Coordinator will notify the County's contract manager, and the concession will be directed to move an appropriate distance away or will be reassigned to a new location.

Concessionaires must clean up and properly dispose of trash within 100 feet of their location each day. Small amounts of trash can be placed in beach receptacles, as long it does not cause them to overflow. No trash may be stacked on the beach at the base of the receptacles.

In the event that motorized vehicle rental concessions are allowed on the beach in the future, ATVs or other types of rental vehicles shall be prohibited in Natural BMAs. All concessionaires who rent ATVs in the Urban and Transitional Areas will undergo HCP training, as described elsewhere in this HCP. Operators of rental vehicles observed violating HCP driving and parking regulations will be fined as for other types of motorized vehicles operated by the general public.

The County's contracts with concessionaires will include specific language addressing rental vehicles. Concessionaires will be required to work cooperatively with the County in developing and implementing measures to minimize HCP and ITP violations. The County will revoke the contracts of those concessionaires who flagrantly or repeatedly fail to abide by the conditions of his/her contract.

Commercial Fishermen

Between May 1 and October 31, commercial fishermen may access Urban and Transitional BMAs by vehicle from 8:00 AM to 7:00 PM, or sundown, whichever is earlier. Earlier access may be allowed if the daily turtle monitoring survey is completed before 8:00 AM. Between November 1 or the date on which the last nest has hatched, whichever is later, and April 30 or the date on which the first nest is deposited, whichever is earlier, access to these areas is authorized between 6:00 AM and 10:00 PM, consistent with the Volusia County Beach Code. Commercial fishermen cannot drive or park in Natural BMAs or within the CZ at any time of the year.

All driving provisions established in the HCP for the general public apply to commercial fishermen, with the exception that they may park seaward of the established traffic lanes. When operating vehicles on the beach and engaged in fishing activities, a sign must be displayed on the vehicle indicating that the operator of the vehicle is a permitted commercial fisherman.

Commercial fishermen must be permitted by the County, and must receive HCP training and certification, as described elsewhere in this HCP. The permit must be carried whenever these individuals are engaged in fishing activities and must be presented to Beach Safety Officers upon request. Repeated or flagrant violations of HCP or ITP rules will result in revocation of the permit.

Pets and Animals on the Beach

Pet regulations are stipulated in the Volusia County Beach Code. Individuals who allow animals to roam free on County Beaches will be cited according to Volusia County regulations. Any free-ranging or feral dogs or cats will be reported to Volusia County Animal Control Services.

Storage of Boats and Recreational Equipment

Private landowners whose property extends into the Conservation Zone or Natural Beach Management Areas occasionally store boats and other recreational equipment in these areas. If the storage and/or transport of this equipment impacts a sea turtle nest, traps adults or hatchlings, or impedes adult turtles from accessing nesting habitat, it is a violation of the Federal ESA. If improper storage of recreational equipment causes direct harm to nesting migratory birds, owners of such equipment may also be subject to Federal penalties pursuant to the Migratory Bird Treaty Act. Additionally, damage to dunes or dune vegetation caused by the improper storage of equipment is a violation of Section 161.053, Florida Statutes. The County will attempt to notify landowners whenever observed problems arise and will advise them about alternative storage options or request them to remove the materials from the beach/dune system. Whenever sea

turtles are impacted by improperly stored equipment, sea turtle monitoring personnel will collect relevant information and notify HCP Program staff. If the problem persists and the property owner is uncooperative in resolving it, the HCP Coordinator will turn the matter over to the USFWS. Additionally, FDEP will be notified of flagrant and/or repeated violations of State law.

The Volusia County Beach Code now prohibits the overnight beach storage of furniture and recreational equipment. Unattended portable recreational equipment left on the beach from 9:00 p.m. to 6:00 a.m. is declared a public nuisance and is subject to removal and disposal by the County. The ordinance will be enforced by the Division of Beach Safety.

Special Events

Vehicles that are involved in special events including the transport, setup, or cleanup of equipment, supplies, and/or personnel will abide by all beach driving and parking rules applicable to the general public. No vehicles are allowed within Natural Beach Management Areas or the Conservation Zone. Within Urban and Transitional BMAs, vehicle access is limited during the nesting season from 8:00 AM to 7:00 PM or sunset, whichever is earlier, and from sunrise to sunset at other times of the year.

All special events involving 51 or more people and/or the setup of equipment or facilities on the beach shall require a special event permit from Volusia County. The application for a special event permit must describe: the nature of the event, including all planned activities; identify its proposed location; indicate the time of day it will be held, including setup and cleanup; and list all equipment that will be placed on the beach in support of the event (example provided in Appendix D). Equipment that must be listed includes, but is not limited to:

- Scaffolding;
- Stages;
- Tents;
- Tables;
- Sound equipment;
- Monopole structures;
- Banners/billboards;
- Volleyball nets;
- Barbecue grills; and
- Temporary lighting.

Applications for special events scheduled to occur in Urban and Transitional BMAs during the sea turtle nesting season (May 1 – October 31) or in Natural BMAs year round will be forwarded to HCP Program staff for approval. Standard environmental conditions will be attached to all permits issued for special events (example provided in Appendix D). The HCP Field Manager may, in consultation with the PSS if necessary, add additional conditions to ensure that the event will have minimal potential for impacting

sea turtles and complies with HCP and ITP rules. The event organizer named as applicant on the permit will be responsible for ensuring that all permit conditions are abided by.

Events held in Natural BMAs will be limited to low impact activities that do not require vehicle usage on the beach and involve relatively few people, such as weddings, beach runs, socials, and church events. High impact events, such as those surrounding Spring Break and Bike Week, as well as beach concerts, volleyball tournaments, and other competitive sporting events, will be held in Urban and Transitional BMAs.

The HCP Field Manager will ensure that all approved special events comply with County and State rules and regulations. Events involving nighttime lighting, excavation of dry beach, and/or overnight storage of equipment on the beach must receive a FDEP permit. This permit must be submitted to the HCP Field Manager prior to approval of the event. If a County permit is issued, the applicant must agree to abide by all conditions of both the County and FDEP permits.

Beach Safety, and HCP Program staff, with support from sea turtle monitoring personnel, will monitor special events to ensure that permit conditions are abided by. Substantive problems will be brought to the attention of the PSS. Whenever possible, any violation of permit conditions will be addressed during the event. Applicants will be warned in writing of serious infractions. Flagrant and/or repeated violations will preclude event organizers from obtaining permits for similar events in the future.

Lifeguard Stations

Lifeguards must have vehicular access to the permanent lifeguard stations and mobile towers on all areas of the County Beaches. Driving to and from stations will take place on the wetted portion of the beach, except in emergency situations or when beach conditions make it necessary for routine public safety patrols to be conducted higher on the beach. With the exception of the North County Lifeguard Station, routine access to permanent lifeguard stations will be limited to a 30-foot-wide driving corridor perpendicular to the shoreline between the station and the wetted beach. Driving and parking is permitted within a 20-foot radius surrounding each permanent station. Additional 30 foot wide emergency access points to the beach may be designated at County right of ways if required for public safety. All access points shall be barricaded to prevent public vehicular access when not in use. To allow for vehicular access through the soft sand at the North County Lifeguard Station in Ormond-by-the-Sea, the driving corridor may be expanded to encompass a cone-shaped area that widens in a seaward direction from the station. This corridor cannot exceed 100 feet at the high tide line.

Mobile lifeguard towers will be stored west of the driving lanes at night and moved closer to the surf during the day when they are in use. Lifeguards manning these stations in Urban and Transitional BMAs will park seaward of the CZ in normal public parking areas.

All Beach Safety Officers and lifeguards must participate in HCP training before operating vehicles on the beach, as described elsewhere in this HCP. They must sign statements certifying their participation in training and acknowledging their understanding of HCP rules and regulations regarding operation of motor vehicles on the beach.

9

MONITORING AND MANAGEMENTOF FEDERALLY LISTED SPECIES

This section of the HCP describes the measures that will be implemented by Volusia County to monitor federally listed species on County Beaches for which take authorization has been requested. Sea turtles may potentially utilize all beaches within the Plan Area, including inlet beaches. Wintering piping plovers have been observed almost exclusively on inlet beaches where they are largely unaffected by vehicular traffic. However, the1.2 km (0.75 miles) of beach immediately south of the jetty in New Smyrna Beach, where public vehicular access is allowed, are within designated critical wintering habitat of this species. Consequently, five species of sea turtles and the piping plover will be protected under this HCP.

Piping Plovers

Throughout the term of the ITP, Volusia County will conduct and/or coordinate annual winter censuses of piping plovers. The surveys will be conducted along inlet beaches and the 1.2-km (0.75-mile) section of HCP Region 8 immediately south of Ponce Inlet (federally-designated Critical Habitat). Monitoring personnel may include County staff, contracted biologists, or local volunteer birding enthusiasts, such as members of the Audubon Society.

Winter piping plover surveys will be conducted on at least one day each month during the period from December through February each year. The date and time of monitoring, name of monitoring personnel, location and number of birds sighted, and notes of observed activity (e.g., feeding, resting, etc.) will be recorded on standard data sheets developed or provided by the PSS. Every fifth year, the census will be conducted in conformance with Federal guidelines for the International Piping Plover Census coordinated by the USFWS. All data generated by the annual census will be furnished to the HCP Coordinator.

Sea Turtle Monitoring Program

A scientifically based sea turtle monitoring program is essential to the success of the HCP. The monitoring program will be developed and managed by the PSS and will be conducted by personnel that either have prior experience or are trained specifically to carry out the field responsibilities described in the HCP. The PSS will monitor and evaluate the sea turtle program to ensure that data collected in support of the HCP are consistent, reliable, and permit an accurate assessment of the effectiveness of protective measures implemented under the ITP.

All persons involved in sea turtle monitoring activities on County Beaches, as described below, must be listed on a valid Marine Turtle Permit from FWC. These individuals may include County staff, members of non-profit organizations, unaffiliated volunteers, and/or professional consultants. Principal Permit Holders will be responsible for directing and managing the activities of individuals listed on their permits in accordance with the most current FWC guidelines and requirements of this HCP (refer to Section 6). One or more Principal Permit Holders may be involved in implementation of the sea turtle monitoring program. A copy of all Marine Turtle Permits issued by FWC for activities associated with implementation of this HCP will be maintained by Volusia County and provided to the USFWS upon request.

The primary objectives of the sea turtle monitoring program are to:

- Document the number of nesting and non-nesting emergences by species and the location of all observed nests on County Beaches;
- Conspicuously mark nests so they can be avoided by vehicles;
- Map and monitor nest sites so lost barriers can be quickly reestablished; and
- Document vehicle-related impacts to nests.

These objectives will be achieved through the following programs:

Monitoring Nesting Activity

The purpose of the daily surveys is to document the temporal and spatial distribution of sea turtle nests on County Beaches and to ensure that those nests are adequately protected from vehicles on the beach. County Beaches extend from the southern boundary of the NPSRA to the northern boundary of the CNS, including inlet beaches where suitable nesting habitat is available.

Daily sea turtle nesting surveys will be performed annually from May 1 to September 30. Periodic monitoring will be conducted after September 30 until all marked nests have hatched or nest barriers have been removed from the beach. In accordance with the most current FWC guidelines, monitoring personnel will begin the surveys at or near dawn. The County will take all practicable measures (e.g., contractual agreements with PPHs) to ensure that a sufficient number of personnel are dedicated to the monitoring program to complete the morning survey in a timely manner and that all required monitoring and nest marking in public driving areas is completed before vehicles are allowed on the beach. Monitoring personnel will utilize a system established by Volusia County to notify Beach Safety when the survey of public driving areas is complete to allow early access by commercial fishermen, concessionaires, ramp graders, and sanitation workers. All or portions of County Beaches will remain closed to public vehicular access until 8:00 AM or the nesting survey, including nest marking, is complete, whichever is later.

Monitoring personnel may use light trucks, ATVs, and/or other motorized vehicles to conduct the surveys. These vehicles will be operated in accordance with guidelines established in this HCP. Generally vehicles will be operated along the line where wet

and dry beach converge. Occasionally, primarily during extreme high tides, the vehicles used for these surveys may enter the Conservation Zone. Sea turtle recovery plans, such as the Recovery Plan for the U.S. Population of Loggerhead Turtle, *Caretta caretta*, recognize the need for vehicular access to nesting areas during performance of permitted research activities (NMFS and USFWS 1991a).

Monitoring personnel will interpret each sea turtle emergence (crawl) evident from the previous night and will determine if the crawl resulted in a nest. Nesting and non-nesting emergences (false crawls) will be recorded by species and survey area on standardized field data sheets developed by the PPH.

Marking and Mapping Nest Sites

MARKING NEST SITES

The purpose of nest marking is to make all nest sites conspicuous to vehicle operators and other beachgoers. Nests will be marked in accordance with the most current FWC guidelines (Appendix B). Because of high vehicular traffic volume on the beach, all nests in public driving areas will be considered as being in a hazardous area, as defined by FWC.

Each marked nest will be inscribed with a unique identification number that will permit determination of the species and nest date. The barriers of nests left *in situ* outside of the Conservation Zone in Urban and Transitional BMAs regions will be made even more conspicuous by adding additional stakes, sea turtle signs, and/or traffic cones.

Frequently, a turtle will begin to excavate a nest but will then abandon her attempt. These abandoned digs are indicated by disturbed areas along the path of the crawl. If monitoring personnel are not certain as to whether or not a disturbed area is a nest, they will mark it as a nest.

MAPPING NEST SITES

GPS data will be collected at all marked nest sites. The GPS used will be of sufficient precision to allow for the reestablishment of nest barriers should they be washed out by tides or vandalized. GPS data will be collected in a timely manner and entered into the County's sea turtle and GIS databases. All data will be referenced to the nest identification number inscribed on the nest barrier. Nest mapping will be done in conjunction with ArcView and/or other GIS software programs. Maps and data will be provided to the PSS, USFWS, FWC, and other agencies, upon request and will be used as needed to manage human use activities on the beach.

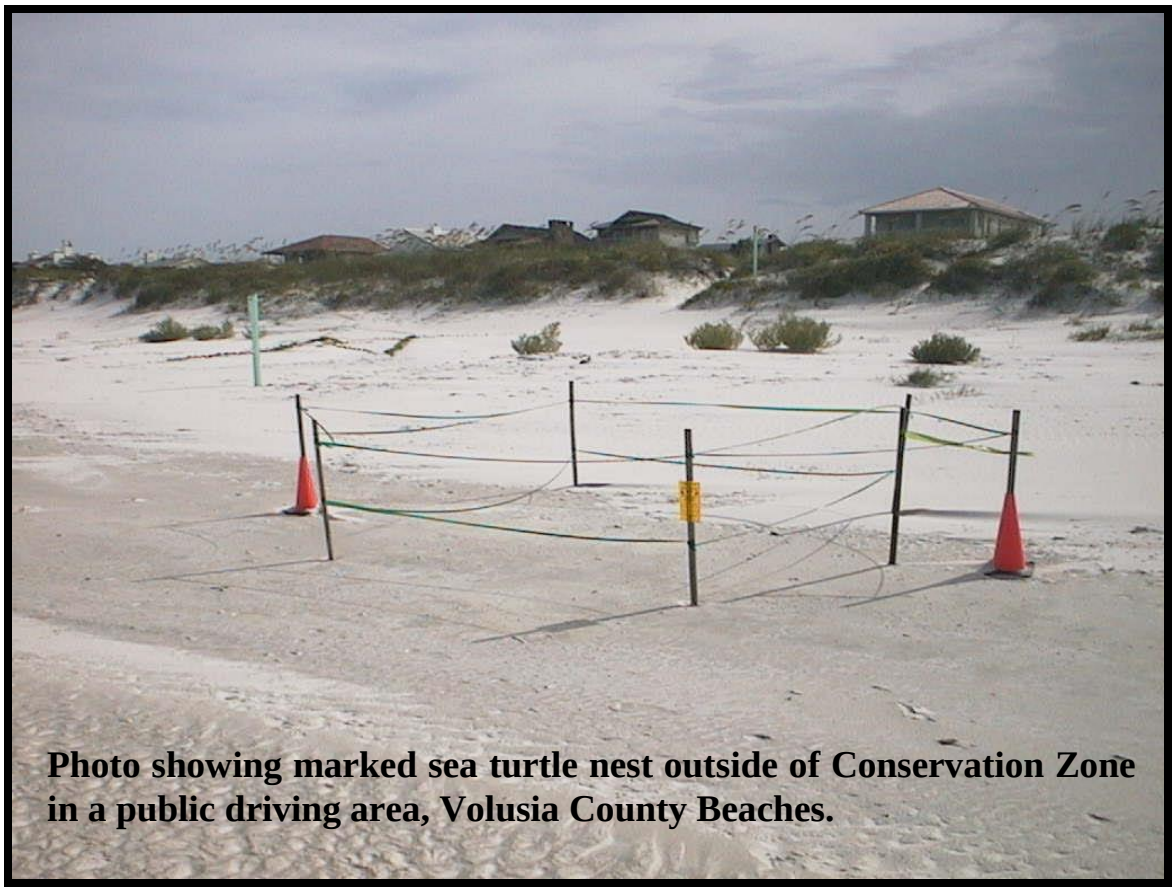

Photo showing marked sea turtle nest outside of Conservation Zone in a public driving area, Volusia County Beaches.

Protecting Nests From Natural and Other Threats

NEST CAGING AND SCREENING

Nest caging and screening may be used at the discretion of the PPH to protect incubating eggs and hatchlings from predators and other potentially detrimental factors on the beach. All caging and screening will be performed in accordance with the most current FWC guidelines (Appendix B).

NEST RELOCATION

Nest relocation will be used as a management tool to minimize nest loss. Nest relocation will be performed at the discretion of the Principal Permit Holders in accordance with the most current FWC guidelines (Appendix B). If a nest outside the CZ in an Urban or Transitional BMA is relocated, it will be moved higher on the beach into the CZ or into an adjacent Natural BMA. Relocated nests will be marked and monitored in a manner consistent with procedures described for *in situ* nests.

Photo showing hand-held GPS unit used to obtain precise locations of marked nests, Volusia County Beaches.

Nest Monitoring

NEST INVENTORY

It is imperative that marked nests be monitored daily so that if nest barriers are washed out or vandalized, the barrier can be reestablished before traffic is allowed on the beach. The HCP Field Manager will maintain an inventory of all marked nests. The inventory will be updated regularly as new nests are added and hatched nests are removed from the beach. In public driving areas (Urban and Transitional BMAs), the inventory will be annotated to indicate if a nest is located inside or outside of the marked CZ.

Every morning, all nests listed on the inventory will be checked to ensure that nest barriers are present. Damaged barriers will be repaired as necessary to ensure their visibility to the public. Missing barriers will be reported immediately to the HCP Field Manager and the approximate nest location determined using GPS data or alternative methods established by the PPH. The PPH will assess the nest site to determine if viable eggs are likely to be present (e.g., nest barriers may be lost due to high tides and/or storm activity). If it is determined that viable eggs may be present, the nest barrier will be reestablished. For viable nests in driving/parking areas of Urban and Transitional BMAs, no public traffic may access that section of beach until missing nest barriers have been reestablished.

MISSED NESTS

Missed nests are evidenced by signs of hatchling emergences in areas where no nest barriers are present. Once discovered, missed nests will be marked and monitored in a manner consistent with procedures described for *in situ* nests.

VEHICULAR IMPACTS

During daily nest monitoring, monitoring personnel will record any evidence of vehicular impacts to sea turtle nests, adults, and/or hatchlings. This information will be furnished to the HCP Field Manager on the day the event is observed. The HCP Coordinator will report the incident to the USFWS in accordance with ITP conditions.

HATCHLING EMERGENCES

Signs of first hatchling emergence will be noted whenever observed and used to determine incubation period. Evidence of hatchling emergence will be closely examined to determine if hatchlings properly oriented to the ocean. If monitoring personnel observe evidence of hatchling disorientations, a standard disorientation report form will be completed in accordance with the most current FWC guidelines and a copy provided to the HCP Field Manager.

Nests may be excavated to determine reproductive success at the discretion of the Principal Permit Holder in accordance with the most current FWC guidelines (Appendix B). However, reproductive success must be determined for any marked nests impacted by vehicles on the beach to document the extent of take, if any, which may have occurred.

Stranding and Salvage Operations

STRANDINGS

Throughout the year, Volusia County staff and other HCP personnel will report all sea turtle strandings to the appropriate Principal Permit Holder. The PPH will dispatch a permitted individual to the site and complete a standard Sea Turtle Stranding and Salvage Report in accordance with the most current FWC guidelines. If there is any evidence that a stranded turtle has been impacted by vehicular traffic, the HCP Coordinator will be notified immediately. The HCP Coordinator or PSS will prepare a report and notify the USFWS in accordance with conditions of the ITP.

In the event that a live stranded turtle occurs in an Urban or Transitional BMA during times of the day that public access is allowed, Beach Safety Officers will be dispatched to the site. Traffic will either be routed away from the turtle or the turtle moved to a safe location by the Beach Safety Officer under the direction of the appropriate PPH so that it is out of harm's way. Live strandings will be handled by permitted monitoring personnel in accordance with the most current FWC guidelines and transferred to the County's Marine Science Center, unless otherwise directed by FWC. Personnel involved in the

evaluation, care, rehabilitation, and/or release of stranded turtles must be properly permitted by FWC and must conduct all hands-on activities in accordance with the most current FWC guidelines.

WASHBACK HATCHLINGS

Hatchling sea turtles that have left nesting beaches and been at sea for several weeks or months are occasionally brought back onto shore by heavy winds and surf. When they wash back onto County Beaches, they are at risk of being impacted by vehicles on the beach. Consequently, the County will conduct surveys of the beach during times when large amounts of seaweed are washing ashore. These surveys will be performed under FWC authorization and in accordance with the Policies and Guidelines for Washback Hatchling Surveys (Appendix J). The guidelines contain procedures for controlling beach traffic at times and places that washback surveys are being performed and establish appropriate protocol for collecting and handling post-hatchlings. Substantive revisions to these policies and guidelines must be approved by USFWS prior to their implementation.

The County's Marine Science Center (MSC) will serve as the central care facility for washback hatchlings collected on County Beaches. Personnel involved in the evaluation, care, rehabilitation, and/or release of these turtles must be properly permitted by FWC and must conduct all hands-on activities in accordance with the most current FWC guidelines.

Ancillary Protective Measures

RUT REMOVAL

The goal of this HCP is to eliminate or minimize impacts to sea turtles from vehicular activities on County Beaches. Although all traffic is generally directed to wetted portions of the beach, vehicles will sometimes enter soft sand areas to traverse the beach and to park. Ruts left on the beach have the potential to impede or trap hatchlings during their nest to sea migration. Consequently it is necessary to implement a rut removal program.

All marked sea turtle nests on County Beaches must be evaluated for rut removal as they near hatching. However, rut removal personnel will concentrate on nests in Urban and Transitional BMAs where public vehicular access is permitted. Sea turtle monitoring personnel and/or other HCP authorized personnel will inspect nests in non-driving areas (Natural BMAs) each day for the presence of ruts and, to the extent practical, will remove or obliterate these obstacles. If the ruts are too extensive to remove in a timely manner without interfering with their other responsibilities, the Rut Removal Coordinator will be contacted as soon as possible, so rut removal personnel can be dispatched the same day. The HCP Field Manager will provide HCP personnel with multiple contact numbers and a schedule of on-call County staff to be contacted on weekends and holidays to report rut problems in Natural BMAs.

Raking will be conducted mechanically with equipment and/or vehicles approved by the PSS. Equipment may include, but is not limited to, towed chains, rakes, and/or sections

of chain link fence. The equipment used cannot penetrate the sand by more than three inches. If the use of equipment, shown to be effective in rut raking operations, conflicts with other provisions of this HCP, the USFWS will be notified and a determination made as to its acceptability.

Rut removal operations will commence at each loggerhead and green turtle nest when it has reached 46 days of incubation. During the Assessment Period (1997-2000), average incubation periods for *in situ* nests of these species was 57.4 (Table 9) and 56.2 (Table 14) days, respectively. Hatchlings emerged from only two nests, both in 1999, prior to 46 days of incubation. The average incubation period for leatherback turtles between 1997 and 2000 was 73.0 days (Table 19), and the shortest incubation period documented during that period was 63 days. Consequently, rut removal operations at leatherback nests will commence at 60 days of incubation.

Specific procedures associated with rut removal are detailed in the Standard Operating Procedures for Rut Removal (Appendix K). Volusia County will adhere to the Standard Operating Procedures for Rut Removal for the life of the ITP. Changes to these procedures must be approved by the USFWS prior to their implementation.

Rut removal personnel will be trained by the PSS and/or HCP Field Manager to evaluate nests to determine if rut removal is needed. They will also be trained on the proper techniques for removing ruts in the various beach zones. The HCP Field Manager will closely monitor the rut removal program to ensure that established procedures are being adhered to and the program is achieving its intended results. The HCP Field Manager will consult with the PSS and/or HCP Coordinator on an as-needed basis to address any program deficiencies.

Photo showing towed bar and chain apparatus used to smooth ruts seaward of nests approaching hatching, Volusia County Beaches.

DAYTIME NESTING AND HATCHING EVENTS

If adult or hatchling sea turtles are observed or reported on the beach in Urban or Transitional BMAs during periods that the beach is open to vehicular traffic, the Division of Beach Safety will immediately dispatch an officer to the incident location and will notify the appropriate sea turtle monitoring personnel and/or HCP Field Manager. All pedestrian and vehicular traffic will be kept a safe distance away. As necessary, traffic will be stopped or rerouted until the event is over.

Specific procedures associated with daytime nesting and hatching events are described in the Beach Safety Environmental Policy (Appendix L). Volusia County will adhere to the procedures established for responding to these unusual daytime events over the life of the ITP. Any changes to these procedures must be approved by the USFWS prior to their implementation.

Any notes, records, and/or observations of daytime nesting or hatching events, including documentation of vehicular impacts, made by Beach Safety Officers and/or sea turtle monitoring personnel will be furnished to the HCP Field Manager on the day of the event. The HCP Field Manager will be responsible for forwarding this information to the USFWS in accordance with conditions of the ITP.

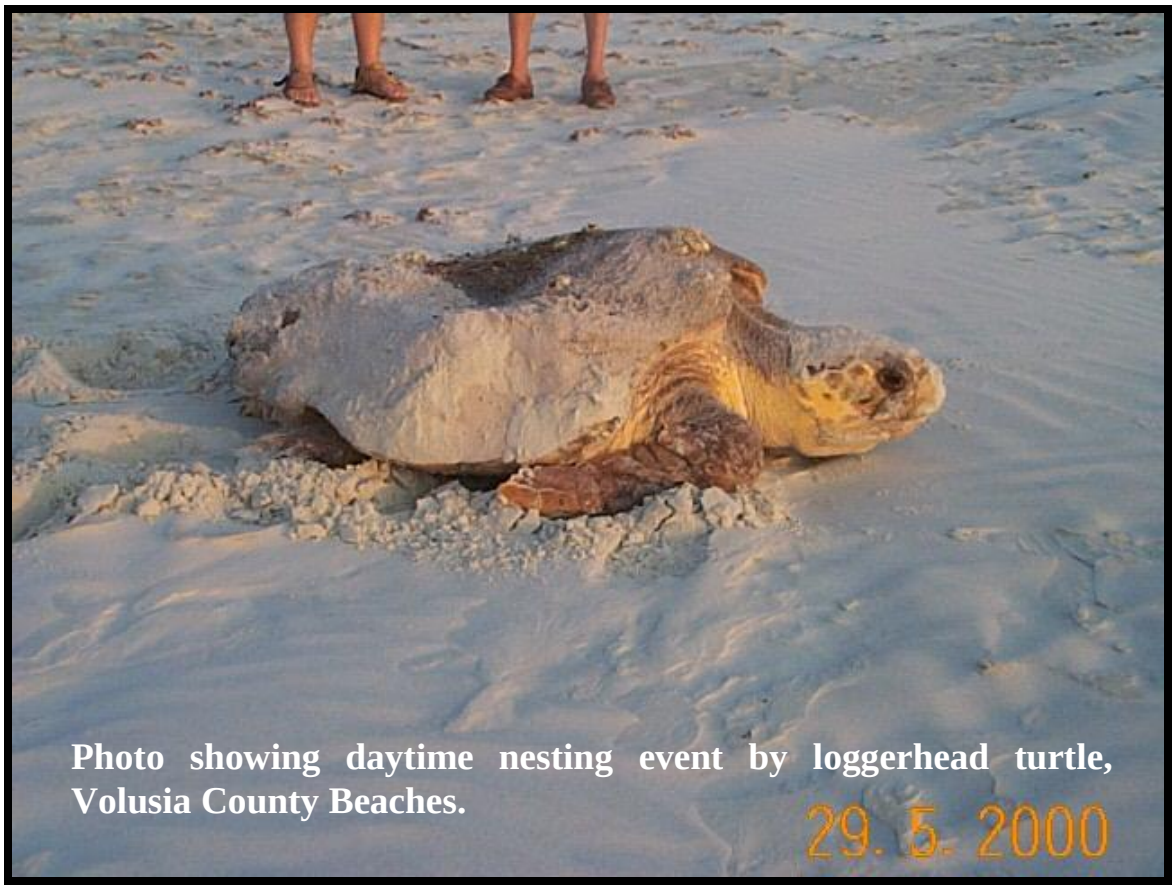

Photo showing daytime nesting event by loggerhead turtle, Volusia County Beaches.

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MANAGEMENT OF OTHER POTENTIAL IMPACTS

A variety of human activities potentially impacting protected species on County Beaches are either outside of the control of Volusia County or are regulated in part by other agencies. The County's approach to managing these activities is described below.

Shoreline Protection

Structural Protection

Structural shoreline protection systems, including seawalls, revetments, and riprap, require permits from FDEP under the State's Coastal Construction Control Line (CCCL) regulations. Other structural systems that extend below the mean high water, such as groins and jetties, also require authorization from the ACOE. The repair of existing and installation of new structures will not be permitted inside the Conservation Zone or Natural BMAs without a FDEP and/or an ACOE permit, as applicable, and written authorization from Volusia County. Under this HCP, non-emergency construction that will not result in the unauthorized take of federally listed species, as determined by the USFWS, will not occur during the sea turtle nesting season (May 1 – October 31) without explicit Federal authorization. Construction activities must be conducted in compliance with all applicable permit conditions, and vehicles on the beach must abide by all established HCP rules regarding access times and operating procedures. Emergency repairs can occur during the sea turtle nesting season in accordance with procedures established elsewhere in this HCP. Shoreline protection projects requiring County authorization shall be conditioned to require restoration of the beach/dune system to its pre-existing condition should any damage result from construction activities. The County will work with FDEP and the ACOE to ensure that the spirit and intent of the HCP are considered during the review of permit applications for shoreline protection projects.

Sand Fences

Sand fences installed for dune protection require permits from FDEP under the State's CCCL regulations. The repair of existing and installation of new fences will not be permitted inside the Conservation Zone or Natural Beach Management Areas without a FDEP permit. Sand fences cannot be installed or repaired during the sea turtle nesting season. All activities, including vehicle access locations, times, and operating procedures, must be conducted in accordance with this HCP and conditions imposed by County and/or State authorizations for the work. The County will work with FDEP to ensure that the spirit and intent of the HCP are considered during the review of permit applications for the installation of new and removal of relict sand fences.

Dune Modification and Restoration

Any project involving modifications to the dune system, including dune restoration, require permits from FDEP under the State's CCCL regulations. Construction of new and restoration of existing dunes will not be permitted inside the Conservation Zone or Natural BMAs without a FDEP permit. Written authorization from Volusia County will be required for vehicular beach access, if necessary to construct the project. Under this HCP, non-emergency dune alterations cannot occur during the sea turtle nesting season. All activities, including vehicle access locations, times, and operating procedures, must be conducted in accordance with this HCP and conditions imposed by County and/or State authorizations for the work. Emergency repairs to the dune can occur during the sea turtle nesting season in accordance with procedures established elsewhere in this HCP.

Windblown Sand Removal

Removal of wind-blown sand from in front of seawalls and on upland properties require permits from FDEP under the State's CCCL regulations. This work will not be permitted inside the Conservation Zone or Natural BMAs without a FDEP permit. Written authorization from Volusia County will be required for vehicular beach access, if necessary to conduct the work. Under this HCP, wind-blown sand removal cannot occur during the sea turtle nesting season. All activities, including vehicle access locations, times, and operating procedures, must be conducted in accordance with this HCP and conditions imposed by County and/or State authorizations for the work. The County will work with FDEP to ensure that the spirit and intent of the HCP are considered during the review of permit applications for wind-blown sand removal.

Beach Nourishment

Beach nourishment projects require permits from FDEP and the ACOE. USFWS biological opinions and incidental take statements will authorize take of listed species on County Beaches and will specify required minimization measures that will be incorporated into the ACOE permits issued for these projects. Therefore, construction activities and the use of vehicles associated with beach nourishment and other Federal beach projects will not be regulated under the HCP or ITP. However, the County will work with FDEP and the ACOE to ensure that the spirit and intent of the HCP are considered during the review of permit applications for beach nourishment projects.

Volusia County will work to ensure that implementation of the Ponce deLeon Inlet Management Plan, if and when this takes place, is consistent with the spirit and intent of the HCP. Construction schedules and methodologies will be reviewed to ensure that potential impacts to sea turtles and their habitat are considered and minimized. To the greatest extent possible, project locations will be selected to enhance nesting habitat for sea turtles and other protected species on County Beaches.

Hurricanes and Other Severe Weather Events

Debris from storms may be strewn on the beach both inside and outside of the Conservation Zone and in Natural BMAs. Vehicles, including heavy equipment, may be necessary to repair damaged structures and/or remove materials from the beach. All such activities must be approved, coordinated, and monitored by the HCP Coordinator in consultation with the PSS. Approval will only be granted if such entry into the Natural BMA or CZ is essential to the performance of the authorized activity. In addition to re-marking viable turtle nests (see below), additional protective measures, such as repositioning and/or re-marking the Conservation Zone, establishing special travel corridors, and/or temporarily placing some driving areas off-limits to public vehicular traffic may be imposed by the work authorization.

In the event that a hurricane causes damage to County Beaches between May 1 and November 1, the following activities will take place as soon as reasonably possible after the crisis of the storm has passed:

- The HCP Field Manager and/or sea turtle monitoring personnel will perform an inspection of previously marked nest sites on County Beaches using the most recent nest inventories;
- At each nest site, the PPH will make a determination as to whether or not viable eggs are likely to be present;
- At those sites likely to contain viable eggs, nest markers will be repaired or replaced in accordance with guidelines contained in this HCP;
- Documentation of post-storm inspection results, including the numbers of nests washed out, will be included in the corresponding Annual Report;
- Based on the results of the inspection, the HCP Field Manager will, in consultation with the HCP Coordinator, PSS, and Beach Safety Director, coordinate reopening of the beach to public vehicular traffic; and
- As soon as nest barriers have been reestablished at viable nest sites, normal protective measures, including daily nesting surveys, monitoring of marked nests, and rut removal, will resume.

Emergency Conditions

Authorization of vehicle access to beaches within the Plan Area at times and/or places not otherwise permitted under this HCP as it relates to emergency conditions may be granted by the HCP Coordinator, in consultation with the PSS. An emergency condition will be an event, action, or circumstance that poses an imminent threat to human life, health, or property, or to the environment, including protected species. This includes, but is not limited to, passage of hurricanes and other severe storms, downing of aircraft along the coastline, grounding of boats on the beach, oil spills, and washing ashore of dangerous or hazardous materials. If an immediate response is required, the HCP Coordinator may act

unilaterally in directing appropriate County resources to the site. If sufficient planning time is available or if the emergency situation is anticipated to affect the beach over a protracted period, the IPSCC will be convened.

The USFWS will be advised no later than the following business day of all emergency conditions resulting in authorization of vehicles on the beach at times and/or places not routinely allowed under the ITP. The County will document the event, including any related impacts that may have occurred to covered species in the Plan Area, for inclusion in the corresponding Annual Report.

Changed Circumstances

Changed circumstances include the following:

- Significant increases in the amount of take of covered species occurring within the Plan Area during the life of the ITP as a result of permitted activities;
- Changes in the protected status of covered species; and
- Other actions or conditions that may alter the basis of the Service's "no jeopardy" opinion leading to the renewal of the ITP.

Changed circumstances will be addressed through regular consultation with the Service as described in Chapter 11.

Unforeseen Circumstances

Unforeseen circumstances are those events, conditions, or situations that are completely unanticipated at the time of preparation of this HCP. If, during the implementation of this HCP, an unforeseen circumstance occurs that could have a substantial and adverse effect on the status of covered species in the Plan Area or could affect the ability of Volusia County to effectively manage activities under this HCP, the following procedures will be followed:

1. Within five business days of the date the Unforeseen Circumstance is brought to the County's attention, the HCP Coordinator will advise the USFWS Jacksonville Field Office by certified letter of the following:

    - The nature of the situation;
    - The geographic and temporal extent to which the beach will be affected by the situation; and
    - The potential impact of the situation on sea turtles and/or piping plovers in the Plan Area.

    Copies of the letter will be delivered to all members of the IPSCC.

2. Within three days of USFWS receipt of the written notification described above, the County will discuss the Unforeseen Circumstance with USFWS personnel and other affected parties, as applicable. An appropriate response to the situation, such as modifying the HCP and/or ITP, will be developed and implemented upon approval of the USFWS. The County and USFWS will determine the extent to which additional information is needed to document the merit and/or significance of the Unforeseen Circumstance or assess its relative impact on protected species in the Plan Area. As mutually agreed to, a monitoring plan may be implemented. The plan will contain the following:

    - A description of the data and/or information to be collected;
    - Procedures for collecting the data/information;
    - Data/information collection responsibilities;
    - A schedule for collecting the needed information; and
    - Reporting requirements.

3. Upon obtaining all necessary information under the monitoring plan, the USFWS, Volusia County, and other third party individuals or agencies, as applicable, will meet to analyze and review the data and develop an action plan to successfully resolve issues associated with the Unforeseen Circumstance.

Reorganization and/or Reassignment of Responsibilities

The County Manager may periodically reassign responsibilities and/or personnel among County government units to ensure that HCP program management is properly integrated into the County's overall organizational structure and that available fiscal and personnel resources are most effectively utilized. The title of the position or government unit assigned responsibilities under this HCP will automatically transfer with such changes. Any changes to the names and/or titles of offices, divisions, staff positions, groups, agencies, and other entities with HCP implementation responsibilities identified in this HCP will be documented in the corresponding Annual Report.

Change of Authority

If Volusia County delegates regulatory authority over all or a portion of County Beaches to another governmental entity, or if regulatory authority over the beaches is by any other means transferred or usurped by law or agreement the Service will be notified immediately. The ITP may be amended, suspended, or revoked by the USFWS depending on the specific circumstances, and a new Section 10 ITP application may be required.

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DATA EVALUATION, RECORD KEEPING, REPORTING, AND HCP MODIFICATIONS

Sea Turtle Data Analysis

Upon completion of each nesting season, sea turtle data will be analyzed by the PSS to characterize temporal and spatial nesting patterns. This data will be summarized in a manner that allows an assessment of human and natural impacts to sea turtles on County Beaches. Direct, indirect, and cumulative impacts to sea turtles related to vehicular activity on the beach will be identified. Any known deficiencies to HCP-required programs to minimize or mitigate impacts will be described and remedial actions recommended.

Piping Plover Information

Data gathered during the annual census of wintering piping plovers will be tabulated by the PSS. Dates and times of surveys, names of monitoring personnel, locations of bird sightings, observations of piping plover activity will be summarized.

HCP Performance Information

Data will be collected and maintained by the County to demonstrate that minimization and mitigation measures required under this HCP are being implemented. This information may include, but is not limited to, the following:

- Records of beach openings and closings;
- Vehicle counts;
- Dates, group, content, and number of attendees at HCP training classes;
- Logs of public education and awareness programs provided by the County;
- Records of rut removal operations;
- Records of washback surveys;
- Documentation of IPSCC meetings, including minutes;
- Records of monies and resources expended on HCP programs; and
- Documentation of efforts and/or achievements in acquiring off-beach parking adjacent to Natural BMAs.

Enforcement Data

Data will be collected and maintained to document the County's good faith efforts to enforce provisions of the HCP and ITP. This data, to be included in each year's Annual Report, will include, but is not limited to the following:

- Number of reported infractions of Natural BMA and CZ driving/parking rules and regulations;
- Number of warnings, tickets, and/or citations for observed Natural BMA and CZ infractions;
- Number of warnings, tickets, and/or citations for vehicles accessing the beach outside of established access hours;
- Number of vehicles towed from the beach at night; and
- Number of citations or arrests for disturbance or harassment of protected species or other infractions of State wildlife laws and the ESA.

Reporting

Sea turtle and piping plover data, as well as information relating to HCP performance and enforcement will be incorporated into an Annual Report that will be submitted to the USFWS and FWC by March 31 of each year. To the extent practicable, this information will be provided in tabular format along with brief interpretative text, as necessary, to clarify presented data. Identified program deficiencies and documented impacts to covered species, will be summarized. The intent of the Annual Report is to provide the Service with a broad assessment of the adequacy of HCP programs, procedures, and policies in achieving their intended biological goal. As applicable, recommendations will be made for improving HCP performance. Following review of the report, the County and the USFWS will discuss any issues requiring immediate attention.

Assessing HCP Performance

As noted above, the Annual Report will include an overall assessment of HCP performance, identification of program deficiencies, and recommendations for improvements, as applicable. There will be no formal annual meetings between the USFWS and County unless necessary to address critical issues or changed circumstances. However, the USFWS and County will communicate regularly to review and assess the extent to which the HCP is achieving its biological goal. Additionally, the USFWS may make unannounced inspections of County Beaches to ensure compliance with the ITP.

Every five years, the USFWS and County will meet formally to assess HCP performance and discuss any needed adjustments to policies, procedures, and/or mitigation in response to changes in Volusia County's organizational structure, beach conditions, vehicular traffic patterns, sea turtle nesting trends, and/or the level of vehicle-related take occurring on County Beaches. However, at any time during the five-year interval, the USFWS or the County may request a joint meeting to discuss HCP/ITP issues, if needed.

Changes to the HCP and ITP

The HCP Coordinator may from time to time request changes to the HCP and/or ITP to improve HCP performance, streamline permit administration, and eliminate unnecessary

restrictions on beach-related activities that are demonstrated to provide no conservation benefit. These changes may include minor alterations that do not affect the amount or extent of take of covered species and do not result in substantial modifications in the overall implementation of the HCP. Such changes may only require approval of a procedural modification in HCP implementation by the USFWS. Other more substantial changes to the HCP and/or ITP that may result in an increase in the amount or extent of take of covered species or substantial changes in procedure or process in implementing the HCP would require a formal permit amendment. Requests for changes likely to require a formal permit amendment will be reviewed and approved by the IPSCC prior to submittal to the USFWS. All requests must be submitted to the USFWS in writing with appropriate supporting data. No changes in standard operating procedures described in the HCP or in ancillary plans already approved by the Service may occur without the expressed written consent of the USFWS.

Over the 25-year life of the ITP, administrative changes to the ITP may be requested at any time. However, formal revisions to the HCP will occur only once every five years after a joint formal review by the County and USFWS. Consequently, there may be occasions when the letter and/or intent of the ITP and HCP are in conflict. In those cases, the ITP will prevail. Additionally, any changes to the ITP will be construed as to affect a corresponding change to the HCP.

Interpretation of the HCP and ITP

Interpretation of the intent of the HCP and ITP is the responsibility of the Volusia County Attorney's Office in consultation with the USFWS. As necessary, the HCP Coordinator may request clarification from the USFWS. It is understood that the USFWS is the legal guardian of the ITP and, therefore, has the final word in resolving differences of interpretation.

Coordination With Regulatory Agencies

Volusia County will work with the USFWS, ACOE, FDEP, and FWC to identify appropriate methods for allowing County input into permitting decisions for projects on County Beaches. The HCP Coordinator will take the lead role in this interagency coordination effort.

Non-Compliance

The USFWS may revoke Volusia County's ITP at its discretion if actions, or the lack thereof, on the part of Volusia County are deemed in substantial non-compliance with the HCP or ITP and appropriate remedial actions directed by the Service are not satisfactorily implemented.

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MINIMIZATION AND MITIGATION MEASURES

The conservation and management efforts described in this HCP are designed to minimize the potential for incidental take of sea turtles and piping plovers related to vehicles within the Plan Area while accommodating, to the greatest extent practicable, traditional and lawful human beach uses. Despite this balancing effort, some incidental take is likely to occur. Thus, the County has also developed, and agrees to implement, measures to mitigate take.

Minimization Measures

Sea Turtles

Efforts to minimize take and allow for potential growth in the nesting population of sea turtles within the Plan Area include implementation of:

- Methods for separating sea turtles and vehicular traffic;
- A professionally managed sea turtle monitoring and nest protection program;
- Regulation of activities potentially impacting sea turtles; and
- An active enforcement program.

SEPARATION OF SEA TURTLES AND VEHICLES

Minimization of take has, in part, been accomplished by:

1. Restricting public vehicular access to daylight hours when the risk of encountering sea turtles is lowest.
2. Restricting public vehicular access to Urban and Transitional BMAs where nest densities are lowest.
3. Establishing a Conservation Zone to enhance development of nesting habitat and prohibiting public driving and parking near the dunes where the majority of nests are deposited.

SEA TURTLE MONITORING AND NEST PROTECTION

Minimization of take has, in part, been accomplished by:

1. Establishing the position of PSS to provide strong professional guidance and leadership on issues involving sea turtles, piping plovers, and other protected species.
2. Standardizing data collection methodologies to allow for assessment of impacts.
3. Conspicuously marking nest sites.

4. Monitoring marked nest sites to ensure that the barriers remain in place.
5. Reestablishing nest barriers that are washed out or vandalized.
6. Removing ruts and other obstacles in front of nests that are nearing hatching.
7. Surveying for live stranded sea turtles and washback hatchlings.
8. Implementing procedures to protect nesting and hatching sea turtles from traffic during rare daylight events.

REGULATION OF ACTIVITIES POTENTIALLY IMPACTING SEA TURTLES

Minimization of take has, in part, been accomplished by:

1. Establishing rules for the operation of all vehicles on the beach.
2. Developing guidelines for managing public vehicular access to, and traffic on, County Beaches.
3. Restricting non-emergency construction projects in Natural BMAs and the Conservation Zone to periods outside the nesting season and requiring that any impacts to nesting habitat resulting from such activities be repaired.
4. Attaching environmental conditions for the protection of sea turtles to permits issued for special events.
5. Controlling the activities of concessionaires and commercial fishermen through permits and licensing agreements.
6. Establishing guidelines for trash collection, sanitation, ramp grading and other beach maintenance activities.

ACTIVE ENFORCEMENT

Minimization of take has, in part, been accomplished by Volusia County's commitment to active enforcement of all HCP and ITP rules and regulations. The County has established an excellent record of enforcing HCP driving/parking regulations during the period that the original HCP has been in effect. These efforts have been summarized in the Annual Reports provided to the USFWS each year.

Piping Plovers

Minimization of impacts to piping plovers has been achieved through many of the same measures implemented to protect sea turtles, including:

1. Not allowing the general public to operate vehicles on the beach at night, thereby preventing impacts to resting birds;
2. Imposing a 10 MPH speed limit to reduce the potential for bird/vehicle collisions; and
3. Establishing a Conservation Zone in public driving areas, particularly in designated Critical Habitat, thereby separating traffic from resting habitat.

Signage will be added to the beach at appropriate intervals along driving lanes warning motorists to drive slowly and look out for wildlife. This signage will be deployed throughout County Beaches, particularly along the 1.2 km section of beach near Ponce Inlet designated as Critical Habitat for wintering piping plovers. Additionally, the County will add signage at constructed public access points leading from Smyrna Dunes Park to inlet beaches on the south side of Ponce Inlet. The signs will advise beach users to avoid disturbance to resting and foraging shorebirds.

HCP/ITP Training

As described throughout this document, numerous County departments, contractors, and outside groups and agencies are involved in implementation of the HCP. It is essential that everyone understand the intent of protected species regulations and his/her responsibilities under this plan and the ITP.

The PSS has developed training materials, previously approved by the USFWS, to ensure consistency in HCP/ITP training across a broad range of personnel with varying HCP implementation responsibilities. Training classes will be tailored to target audiences to focus on their specific operations. Information presented in the classes may include information on the general biology of covered species, conservation issues, and specific measures that must be taken to minimize take. Training will include a thorough review of relevant HCP programs and ITP terms and conditions, as well as the following:

- A review of procedures for each of the activities to be performed under the HCP;
- Coordination and communication guidelines; and
- Reporting responsibilities.

The PSS, HCP Coordinator, and/or HCP Field Manager may conduct training classes. Training for all groups will be conducted as set forth in Table 32. Videotaped training sessions may be used for initial and/or recurrent training, as appropriate.

All persons receiving HCP training will be required to sign a form indicating that they (1) have received the training class, (2) understand their responsibilities under the plan, and (3) agree to abide by all rules and regulations regarding driving and parking on the beach. Any substantive changes in HCP rules and regulations occurring between

Table 32

HCP/ITP Training Schedules.

Group	Initial Training	Recurrent Training
Full-time Beach Safety Officers and staff	First year of ITP or upon hiring and prior to operating vehicles on the beach, whichever comes first	Every 5 years, coincident with formal HCP evaluation
Seasonal and part-time lifeguards and other Beach Safety Staff	First year of ITP or upon hiring and prior to operating vehicles on the beach, whichever comes first	Annually
Other County staff with HCP Responsibilities	First year of ITP or upon hiring and prior to operating vehicles on the beach, whichever comes first	Every 5 years, coincident with formal HCP evaluation
Sea Turtle Monitoring Personnel	Prior to sea turtle nesting season during first year of ITP	Annually, prior to sea turtle nesting season
Concessionaires	First year of ITP or upon licensing and prior to operating vehicles on the beach, whichever comes first	Every 5 years, coincident with formal HCP evaluation
Commercial fishermen	First year of ITP or upon issuance of County permit and prior to operating vehicles on the beach, whichever comes first	Every 5 years, coincident with formal HCP evaluation
Ramp Attendants	Prior to the start of each nesting season	Annually
Sanitation workers, ramp graders, and other beach maintenance personnel	First year of ITP or upon hiring and prior to operating vehicles on the beach, whichever comes first	Annually for three consecutive years then once every five years

training classes will be forwarded, in writing, to all affected parties by the HCP Coordinator. Alternatively, special training classes will be convened to review and discuss the changes, if deemed necessary.

Prior to the beginning of each sea turtle nesting season HCP Program staff and/or the PSS will meet with the principal permit holders to review monitoring procedures, discuss any changes in HCP rules and regulations and/or ITP terms and conditions, and establish effective lines of communication. The Principal Permit Holders will be responsible for reviewing FWC guidelines (Appendix B) with all persons listed on their permits and ensuring that those individuals abide by vehicle operating guidelines and adhere to HCP rules and regulations. Upon request, the PSS and/or HCP Field Manager will meet with sea turtle monitoring personnel to review or clarify protocol contained in this HCP.

Public Education and Awareness

Minimization of impacts to sea turtles and piping plovers has, in part, been accomplished by:

1. Posting conspicuous signage on the beach delimiting restricted areas (i.e., Natural BMAs, the Conservation Zone, and Traffic-Free Zones).
2. Providing vehicle operators, as they access the beach, with brochures describing driving and parking regulations and delineating non-driving areas.
3. Placing signage on the beach advising vehicle operators to drive slowly and watch out for wildlife.
4. Providing daily announcements to local hotels, tourist centers, and media about driving conditions.
5. Developing public services announcements, advisories, and/or other notices to local media regarding important HCP and protected species issues on County Beaches.
6. Placing information about sea turtles, piping plovers, and HCP regulations on the County's official website and public park kiosks.
7. Publishing and distributing sea turtle educational handouts.

In addition to the above activities, the PSS, HCP Coordinator, HCP Field Manager and/or other County staff will work with public education entities such as local science centers, museums, public and private schools, community organizations, chambers-of-commerce, and others to disseminate information regarding the HCP and the conservation of protected species on County Beaches. A presentation discussing these topics has been developed and can be presented to community groups upon request.

Mitigation

Marine Science Center

As mitigation for the limited amount of take of federally listed species documented on County Beaches since the ITP has been in effect, or is likely to occur from future vehicular activities described in this HCP, the County has built and funded a first-class sea turtle rehabilitation and public education center. The Marine Science Center (MSC) is located in the Town of Ponce Inlet, centrally located to County Beaches, for this purpose.

The MSC began its sea turtle rehabilitation efforts in April of 2002. At that time, the entire northeast region of the State of Florida was in desperate need of this type of facility. There was no local facility to care for sick and injured sea turtles. Stranded turtles and washback hatchlings had to be transported considerable distances to either Sea World in Orlando or Marineland in St. Augustine. Marineland no longer provides sea turtle rehabilitation services, and the State has indicated that there was a shortage of capacity at other existing facilities. The next closest coastal facility on Florida's east coast is the MarineLife Center of Juno Beach in Palm Beach County. With sea turtle strandings in Florida reaching an all-time high in 2003, the MSC couldn't have opened its doors at a more critical time.

Under the HCP, the MSC will provide the following functions:

- Rehabilitative care and subsequent release for sick and injured sea turtles found on County Beaches;
- As capacity permits, receive and care for sick and injured turtles transported from other areas;
- As applicable, provide residency to permanently impaired sea turtles;
- Evaluate the condition of washback hatchlings prior to their release; and
- Disseminate information on sea turtle conservation issues through on-site and outreach public awareness and education programs.

SEA TURTLE CARE AND REHABILITATION

All species of sea turtles will be accepted at the MSC and will be housed as capacity permits. At least one of the holding tanks at the facility will be designated for hatchlings, one for quarantine animals, and one for permanent and pre-release animals. Initially, the number of juvenile and adult turtles that could be accepted was limited to 15. However, additional turtles, depending upon size and space availability can now be accommodated. All hatchlings will be accepted under any circumstances.

State-of-the-art Life Support Systems include heaters and chillers to maintain proper water temperatures in the tanks. These systems were designed with the facility's specific needs in mind and based upon statewide evaluation of, and consultation with, existing sea

turtle rehabilitation facilities. The following institutions were consulted during conceptual design of MSC facilities:

- Sea World of Orlando;
- Mote Marine Laboratory (Sarasota);
- Hidden Harbor Turtle Hospital (Marathon);
- The Marinelife Center of Juno Beach;
- The Florida Aquarium (Tampa);
- Whitney Lab (University of Florida);
- Hubbs-Sea World Research Institute; and
- Clearwater Marine Aquarium.

During planning for the MSC, FWC was consulted extensively and all requisite permits were in hand prior to initiation of operations. The MSC has experienced staff consisting of at least one full-time sea turtle rehabilitation specialist, a full-time assistant, and additional part-time assistants to provide medical attention to turtles under its care. Veterinary services are currently provided under contract to the College of Veterinary Medicine at the University of Florida, although a veterinarian may be added to the Center's staff in the future.

Between 2008 and 2012, the MSC received and treated a total of 513 juvenile and adult stranded sea turtles (Table 33). The capacity of the MSC depends on the sizes of the sea turtles it is rehabilitating at any particular time. In the event of emergencies, the Center is capable of handling larger numbers of sea turtles. For example, during the cold stunning event of 2010, the MSC housed and treated 77 sea turtles at one time. During the fall of 2007, the Center treated 6,000 hatchlings and post-hatchling washbacks over a 3-week period.

Sea turtles arrive at the rehabilitation facility year-round with a variety of injuries and illnesses, including hypothermia and pneumonia (typically related to natural cold-stunning events), monofilament fishing line entanglement, boat prop damage, and ingestion of foreign debris. Each sea turtle arriving at the facility receives initial trauma treatment, blood-work and radiographs. A medical protocol is then established based on the sea turtle's injuries/illness and diagnostic findings. The protocols often include antibiotics, wound management, fluid therapy and nutritional supplements. A large majority of the medical tests are performed on premises, but an outside laboratory is used if necessary. The MSC's contract veterinarian is available for consultation and surgeries, as needed. The Center is capable of performing anesthetic surgery on site as well as endoscopic procedures.

Table 33

Number of Stranded Juvenile and Adult Sea Turtles
Received and Treated by the Marine Science Center, 2008-2012.

Year	Loggerheads	Green Turtles	Kemp's Ridley	Hawksbill	Hybrid[1]	Total
2008	13	50	0	4	0	67
2009	29	71	2	2	0	104
2010[2]	25	145	1	0	0	171
2011	36	79	6	0	0	121
2012	25	22	2	0	1	50
TOTAL	**128**	**367**	**11**	**6**	**1**	**513**

[1] Cross between a loggerhead and green sea turtle.
[2] Over half of the green turtles received were victims of a cold-stunning event.

Once stable, sea turtles received at the MSC are housed in tanks of various dimensions. The man-made saltwater used at the facility is filtered and recirculated to prevent contamination and to help maintain sterility. The tanks are equipped with filtration, heating and cooling, and ozone treatment systems. Turtles are typically isolated from one another to allow MSC staff to monitor diet and overall health and to prevent injuries due to crowding. Depending on the sizes of the turtles in treatment and the nature of their illness/injuries, each tank can be partitioned in accordance with FWC permit requirements to accommodate a larger number of individuals. Prior to release, large sea turtles are tagged with metal flipper tags and/or PIT tags. Morphometric data are taken and the turtle is returned to the general area where it stranded per FWC directives.

One of the major factors affecting the successful rehabilitation of sea turtles is the length of time between the time a turtle strands and the time it receives treatment. A sea turtle stranding in Volusia County can now receive medical attention within less than an hour of stranding, as opposed to the hours it previously took to coordinate and transport the animal to a facility in Orlando (Seaworld) or further south (Loggerhead Marinelife Center). Approximately 42 percent of all stranded juvenile and adult sea turtles received at the MSC from 2008 through 2012 originated in Volusia County (Table 34), and approximately 35 percent of those that were alive when they reached the facility were successfully treated, rehabilitated and returned to the wild (Table 35).

In addition to the juvenile and adult sea turtles treated by the MSC, many more hatchlings and post-hatchlings (washbacks) are handled at the facility. Sea turtle monitoring personnel, Beach Safety Officers, and HCP Program staff, now have a designated area to take all washbacks and hatchlings recovered 24-hours a day during the nesting season. These small turtles receive a medical exam and professional treatment, if needed, before being returned to the ocean. In the absence of the MSC, many of these animals would die. From 2002 to 2012, the MSC handled over 15,000 hatchlings and post-hatchling washbacks.

Table 34

Original Stranding Location of Juvenile and Adult Sea Turtles

Received and Treated by the Marine Science Center, 2008-2012.

Location	2008	2009	2010	2011	2012	Total
Indian River County	1	1	7	0	0	9
Brevard County	18	24	95	15	2	154
Volusia County	27	41	43	82	20	213
Flagler County	7	10	8	5	9	39
St. Johns County	14	24	12	15	10	75
Other Florida Counties	0	2	0	4	0	6
Out of State	0	0	0	0	9	9
Unknown	0	2	6	0	0	8
TOTAL	**67**	**104**	**171**	**121**	**50**	**513**

The MSC began rehabilitation operations in April 2002

Table 35

Patient Outcome of Juvenile and Adult Sea Turtles
Received and Treated by the Marine Science Center, 2008-2012.

Outcome	2008	2009	2010	2011	2012	Total
Euthanized Due to Severity of Illness/Injury	2	3	0	1	1	7
Died During Treatment/Rehabilitation	25	25	59	61	25	195
Transferred to Another Facility	1	25	21	16	0	63
Successfully Rehabilitated and Released	20	39	70	21	13	163
Remained Under Rehabilitation	12	6	9	10	1	38
Dead Upon Arrival	**7**	**6**	**12**	**12**	**10**	**47**
TOTAL	**67**	**104**	**171**	**121**	**50**	**513**

PUBLIC EDUCATION

The MSC provides educational programs that address the plight of sea turtles and other federally protected species, including migratory birds, found along the County's coastline. As indicated below, a mix of programs and public awareness materials have been used to disseminate this information.

- School-age educational programs, curricula and exhibits addressing sea turtle biology and conservation issues;
- Field trips;
- Adult lecture series;
- Pamphlets, brochures, books, and other distributional materials;
- Exhibits and displays (e.g., exterior light fixtures demonstrating proper light management for sea turtle conservation); and
- Guided tours and controlled viewing of the sea turtle rehabilitation facility (educational signage is displayed throughout the rehab area).

In addition to the MSC's full and part-time staff, volunteers provide vital support for all of the Center's educational programs. In 2012, 141 volunteers dedicated approximately 8,300 hours of service to the Center.

COSTS

Construction of the facility is estimated to have cost more than $2 million, much of which was derived from grants. Annual operating costs for Fiscal Year 2015/2016 were $1,695,808, including salaries of staff.

Dune Restoration

In its Amended HCP submitted in support of ITP renewal, Volusia County proposed relocating the southern boundary of the northernmost Natural BMA (HCP Region 2) 200 feet to the north to permit public vehicular access to Oceanfront Park in Ormond Beach (Figure 6). This amendment was first requested in 1998 by the Ormond Beach City Commission to address the lack of off-beach parking near the Granada Blvd. beach approach. They indicated that the on-beach parking restrictions resulting from implementation of the original HCP had dramatically restricted the ability of the public to access the beach within the City of Ormond Beach and to use the amenities at Oceanfront Park. The park, located along the north side of the Granada Blvd. beach access ramp, contains public restrooms, showers, and covered picnic facilities overlooking the beach and is in high demand. This facility was constructed at a time when on-beach parking in the area was permissible. Consequently, no provisions were made by the City to provide for off-beach parking. Persons using the park often parked illegally in nearby shopping centers.

Since the original HCP went into in effect, Volusia County has worked diligently to explore and pursue opportunities to acquire additional off-beach parking spaces adjacent to the Natural BMA north of Granada Blvd. However, there is limited space east of S.R. A1A that can be used to accommodate parking. In some cases acquisition costs have been prohibitive, and in others, owners have been unwilling to sell. The likelihood of acquiring land west of S.R. A1A is somewhat greater, but additional costs and safety concerns come into play when pedestrians are required to cross S.R. A1A to reach the beach. Marked walkways, signage and/or traffic signals would be required to ensure that pedestrians are able to safely reach the beach.

In the absence of reasonable off-beach parking alternatives, the County agreed to assist Ormond Beach in addressing the issue of access to Oceanfront Park. Amendment 11 to the ITP authorized the relocation of the HCP Region 2 southern boundary 200 feet to the north to provide 20 new on-beach parking spaces adjacent to the park.

During the Assessment Period (1997-2000), there were only three nests deposited in the 200-foot section of beach affected by the proposed change (Table 36). This represented only 0.14 percent of the 2,132 nests deposited on County Beaches over the same period. Thus, the potential for additional take of sea turtles resulting from the boundary adjustment is extremely small. All measures included in this HCP to minimize impacts to sea turtles and other listed species in Transitional BMAs will apply to the 200-foot driving area extension.

Table 36

Sea turtle nesting in the 200-foot area north of Granada Blvd.

YEAR	NUMBER OF NESTS DEPOSITED BY SPECIES		
	Loggerhead	Green Turtle	Leatherback
1997	2	1	0
1998	0	0	0
1999	0	0	0
2000	0	0	0
TOTAL	**2**	**1**	**0**

Notwithstanding the minimal impacts to sea turtles likely to be caused by the 200-foot expansion of public driving, Volusia County proposed planting native dune vegetation along a 400-foot section of beach outside of the affected area as mitigation for any future take should it occur. The project, which was approved by the USFWS concurrent with ITP renewal (November 7, 2005), was successfully completed and the associated mitigation requirements fully satisfied on August 25, 2009.

Figure 6. Aerial photo showing the location of the northern boundary of HCP Region 3 (Transitional BMA) under the original Incidental Take Permit and following USFWS authorized changes.

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VOLUNTARY CONSERVATION MEASURES

In addition to the required minimization and mitigation measures proposed elsewhere in this HCP, Volusia County has already implemented or plans to implement the following voluntary measures for the benefit of covered species as well as other protected species inhabiting County Beaches.

Sea Turtles

Artificial Light Management

Under its original ITP, Volusia County developed a Beach Lighting Management Plan (BLMP). The document characterized upland development, beachfront lighting, sea turtle nesting patterns, and disorientation trends. It identified the strategies, tools, policies, procedures, and resources needed to effectively manage artificial lighting along County Beaches. As discussed below, the County has successfully completed implementation of its BLMP. Although lighting problems persist, particularly in the highly urbanized areas of Daytona Beach and Daytona Beach Shores, the program currently in place is steadily improving the quality of sea turtle nesting habitat on County Beaches. The County is committed to continuation of its light management efforts on a policy basis by adequately staffing and funding this program into the future. This policy is independent of HCP and ITP requirements and represents a voluntary program.

In June 1999, the County adopted a new Minimum Standards Ordinance for beachfront lighting that mimics, in large part, the State of Florida's Model Lighting Ordinance for Sea Turtle Protection. It is now one of the most restrictive lighting ordinances in the State, and applies to all County Beaches, including those beaches adjacent to the coastal municipalities, with enforcement responsibilities assigned to the County. Thus, there is now a uniform light management program throughout the County.

Following adoption of the new Minimum Standards Ordinance, the County hired two new code enforcement officers to enforce the lighting regulations. One full-time position was dedicated to the County's light management program year-round, while the other assisted in lighting evaluations and code enforcement activities during the nesting season. In 2008, the light management program was transferred from Code Enforcement to HCP Program staff in VCEM in an effort to improve public awareness and provide additional technical resources to property owners trying to achieve compliance with lighting regulations. During 2012, one person was assigned to the program full-time during the nesting season. They were assisted by other HCP Program staff. Code Enforcement helps guide cases through the County's Code Enforcement Board, as needed.

During the period that the light management program has been in effect, lighting of all

beachfront facilities along County Beaches has been evaluated. The County has aggressively targeted facilities that have failed to initiate good-faith efforts to resolve identified problems. Hundreds of Notices of Violations have been sent out and flagrant or repeat offenders are taken before the County's Code Enforcement Board; fines have been levied in some cases. Pursuant to both Florida Statutes and the County Code, first-time violations of the County's lighting regulations can result in penalties of up to $1,000 per day. Repeat offenders can face fines of up to $5,000 per day.

Since 1997, the County has worked with Florida Power & Light Company (FPL) and the USFWS to ensure that coastal roadway lights leased and/or operated by the County are properly managed. Each year the County provides FPL with a list of lights to be turned off during the nesting season. Additionally, all streetlights along State Road (SR) A1A in the northern part of the County, where SR A1A is very close to the beach and the lights are visible from the beach, have been retrofitted with shielded cut-off fixtures equipped with amber lenses.

Coupled with the enforcement side of the program, the County has continued and strengthened its public awareness program. Lighting workshops have been convened, pre-season notices are sent out each year to approximately 3,500 beachfront properties, and an informative newsletter has been developed and distributed to condominium associations, property management companies, local merchants, and schools. Additionally, the County offers technical guidance to those involved in lighting modifications to ensure that retrofitting projects are successfully implemented. Lists of lighting contractors and suppliers have been assembled and are distributed to those requiring outside assistance.

The County's previous Minimum Standards Ordinance required that new construction in Daytona Beach and Daytona Beach Shores comply with lighting regulations applicable elsewhere. However, there was no formal mechanism in place to ensure that buildings constructed after 1990 met the lighting standards. The BLMP recommended development of a countywide program for reviewing building permits issued by the municipalities for new construction to ensure that applicable lighting regulations were being adhered to. The County will continue to work cooperatively with its coastal municipalities and review lighting plans for new construction whenever requested.

The County continues to work with the city of Daytona Beach to bring their beachfront lighting into compliance. However, due to the highly commercialized nature of the community and the complex lighting and safety issues that exist there, achievement of light management goals may take some time. Even if all point sources of light are brought into compliance, pervasive sky glow is likely to cause problems for hatchlings on adjacent beaches for the foreseeable future. Volusia County will keep abreast of State and Federal initiatives to address the problem of sky glow and will implement practical measures as they become available.

The County will continue with its lighting maintenance program even in those areas where a high level of compliance has been achieved. Lighting inspections will be

performed at the beginning of each nesting season to ensure that existing facilities remain in compliance. Additionally, sea turtle monitoring personnel furnish the HCP Field Manager with copies of all hatchling disorientation forms. If nearby lights appear responsible for the disorientation, code enforcement personnel will be dispatched to the scene, and owners of non-compliant lights will be cited.

Washback Watchers Program

In addition to the systematic surveys for washback hatchlings conducted by Beach Safety as a requirement of the ITP, the County developed a proactive program called Washback Watchers to help locate and remove even more washback hatchlings from County Beaches. The County coordinated the effort with the FWC, VTP, and VSTS. Individuals participating in the program are listed on a FWC Marine Turtle Permit that allows them to collect, hold, and transport the washbacks. A brochure was developed to recruit volunteers, and special training classes developed in consultation with the VTP and VSTS are provided before the volunteers begin active participation on the beach. Following the training, the volunteers walk the beaches during the late summer and fall collecting hatchlings and placing them in specially marked buckets for transport to the Marine Science Center.

Migratory Birds

Reduction of Impacts

Reduction of impacts to migratory birds, has been achieved through many of the same measures implemented to protect sea turtles and piping plovers, including:

1. Confining vehicular access by the general public to Transitional and Urban BMAs, thereby leaving 53 percent of bird nesting, foraging, and resting habitat on County Beaches (Natural BMAs) largely undisturbed by traffic.
2. Not allowing the general public to operate vehicles on the beach at night, thereby preventing disturbance to resting birds.
3. Imposing a 10 MPH speed limit to reduce the potential for bird/vehicle collisions.
4. Establishing a Conservation Zone in public driving areas, thereby separating traffic from resting and nesting bird habitat.

Marking Shorebird Nesting Sites

Each spring throughout the term of the ITP, Volusia County will continue to conduct and/or coordinate a survey of all County Beaches to identify beach nesting sites of migratory shore birds (e.g., least terns, black skimmers, plovers, etc.). Monitoring personnel may include County staff, contracted biologists, or local volunteer birding enthusiasts, such as members of the Audubon Society. The surveys will be conducted once each year during the nesting season (April – August).

During each survey, the date and time of monitoring, name of monitoring personnel, and location and approximate number of nesting birds will be recorded on standard data sheets developed or provided by the PSS. If a nesting site is identified during the survey or otherwise reported to the County, the site will be cordoned off with stakes and ribbon, construction netting, or other appropriate materials, as directed by the PSS in consultation with FWC. Pedestrian and vehicular access to barricaded nesting sites will be prohibited through the posting of appropriate signage. The HCP Field Manager or designee will periodically inspect the site, and the barricade will remain in place until all nesting activity has ceased. Field personnel will take appropriate precautions to minimize disturbances to the nesting birds during identification, marking, and monitoring of nesting sites. Any observed or reported impacts to barricaded nesting sites, particularly those related to vehicular traffic, will be documented and provided to the HCP Coordinator.

In addition to the dedicated spring surveys, Beach Safety and sea turtle monitoring personnel will be advised during HCP training to report all observed nesting sites to the HCP Field Manager. These sites will be protected as described above.

Recovering Weak, Ill, and Injured Birds

During spring and fall migrations, several species of birds, such as loons and gannets, frequently strand on County Beaches. These birds, weakened by their long flights, will sometimes light on the ocean and subsequently may be washed ashore by wind and waves. They are not adapted for movement on dry land (their feet are positioned for swimming, not walking) and have to be physically transported to sheltered water or to a rehabilitation facility for rest and recuperation. Other birds, such as gulls and pelicans, entangled in fishing line improperly discarded on the beach, in the ocean, or in inland waterways may also set down on the beach. Unable to forage, they eventually become weak and are unable to fly. Similarly, injured shorebirds are occasionally found on the beach. All of these birds are susceptible to vehicular impacts, particularly on those sections of beach where the general public is afforded vehicular access. Even in Natural BMAs, weak, ill, and injured birds may perish without human intervention. Although the cause of the incapacitation is often a natural phenomenon, human care can serve to mitigate anthropogenic impacts to the species.

Volusia County has implemented a program to recover weak, ill, and injured birds from County Beaches and coordinate their transport to State and/or federally licensed wildlife rehabilitation facilities. Birds recovered by beachgoers or Beach Safety Officers will be transported to one of the County's permanent lifeguard stations. Each of these stations will be equipped with clean cages (pet carriers) of appropriate dimensions to accommodate both large (e.g., pelicans) and small birds. Upon retrieval of an incapacitated bird, the lifeguard station will notify Volusia County Animal Control or an authorized agent of one of the licensed wildlife rehabilitators in the area. Animal Control, Beach Safety, or the authorized agent will then transport the bird to an approved wildlife care facility or will release the bird in accordance with instructions given by the licensed wildlife rehabilitator.

Every evening before the last day shift leaves each lifeguard station, the cages will be checked to ensure that all birds recovered from the beach have been retrieved and transported off site. The cages will be kept clean and dry and otherwise prepared for any new birds that may be recovered.

Specific procedures related to the transport, handling, and temporary storage of weak, ill, and injured birds by Beach Safety staff may be revised periodically in response to logistical demands. However, the primary objectives of current and future procedures will remain that: (1) the birds are recovered from the beach as quickly as practical; (2) the birds are handled and stored in a humane manner; and (3) agencies/individuals responsible for transporting the birds offsite are notified in a timely manner.

Each permanent lifeguard station will maintain a log of all ill or injured birds received, the type of birds received (if known), the time and name of the agency/individual called to retrieve the bird from the lifeguard station, and the time the bird was picked up for transport off site.

During HCP training, Beach Safety staff will be provided with information on the proper handling and temporary confinement of ill and injured birds. County HCP Program staff will provide this training and will be responsible for: (1) coordinating bird recovery from County Beaches; (2) ensuring that all lifeguard stations have current contact numbers of agencies/individuals involved in transporting birds off site; and (3) periodically revising bird recovery procedures, as may be necessary to improve program effectiveness and/or respond to changing logistics.

Mary Keller Bird Rehabilitation Sanctuary

Volusia County has established the Mary Keller Bird Rehabilitation Sanctuary seabird rehabilitation and education facility at the Marine Science Center in Ponce Inlet to care for injured seabirds and shorebirds recovered from County Beaches. The Sanctuary focuses on the rescue, rehabilitation, and release of indigenous and migratory species. Its lab is fully equipped with x-ray machine, centrifuge, refractometer, glucometer, and microscopes. Staff have the capability to analyze blood chemistries, determine packed cell volume, and administer anesthesia. This aids in the initial diagnoses of illnesses and injuries. The MSC has a veterinarian contracted through the College of Veterinary Medicine at the University of Florida to provide technical guidance and medical support, as needed.

The facility consists of a treatment room/ICU that can hold up to 50 birds, a conditioning room, an exterior flight cage, and educational exhibit enclosures. Birds are first admitted to the treatment/ICU room for observation, diagnosis, and treatment. Following treatment, birds that can be successfully rehabilitated are transferred to a conditioning room consisting of 4 cages, each with its own pool. This step of the rehabilitation process is designed to allow patients time to recover and waterproof their feathers before being introduced to the exterior flight cage. The flight cage, a 300 square foot enclosure

containing an 80 square foot pool, was specifically designed for seabirds and shorebirds. This area provides adequate space for the birds to build up their muscle strength and recover flight skills prior to their release back to the wild.

Some birds received by the Sanctuary that cannot be successfully treated and returned to the wild will be utilized in educational programs presented at the MSC. These programs focus on human impacts to wildlife, particularly seabirds and shorebirds. Any species received at the Sanctuary that is permanently impaired and cannot be transferred to another facility or used locally for educational purposes because of unsuitability or lack of facility capacity will be humanely euthanized in conformance with State and/or Federal guidelines.

Migratory Bird Restoration Area

In the original HCP, Volusia County committed to the establishment of a large least tern nesting area just north of Ponce Inlet. However, subsequent annual monitoring indicated that terns were not attracted to this posted area. High pedestrian traffic near the jetty and/or an abundance of feral/free-roaming cats at the adjacent Lighthouse Point Park may have contributed to this phenomenon. Consequently, in the Amended HCP, Volusia County shifted this voluntary conservation action to a potentially more favorable nesting area south of Ponce Inlet in Smyrna Dunes Park. Logistical constraints and potential conflicts with other protected species on the property once again rendered the project infeasible. After exploring other options and extensive consultation with the Service, the County ultimately settled on a more practical voluntary conservation initiative. Proposed measures were formally submitted to the USFWS for review and comment on November 22, 2011. They included continued shorebird monitoring within federally designated Critical Wintering Habitat for Piping Plovers (Unit FL-34) and on adjacent tidal flats interior of Ponce Inlet (Rockhouse Creek Shoals). Volusia County also committed to its continued participation in the Volusia Shorebird Partnership (VSP). The Service approved the proposed measures with slight modifications, as described below.

Systematic Shorebird Surveys

Amendment No. 11 to the County's ITP contains no requirement for shorebirds other than protecting known nesting sites within the Plan Area. Nevertheless, the County has worked in good faith to fulfill its voluntary commitment to creating, restoring, and/or managing shorebird nesting habitat. In October 2004, VCEM began conducting annual shorebird surveys in support of permitting for the anticipated south jetty extension project at Ponce Inlet. Although this project was never constructed, Volusia County has continued to collect data on shorebird utilization of Unit FL-34 and Rockhouse Creek Shoals. Monitoring results have been reported to the Service each year.

Voluntary monitoring of Unit FL-34 and Rockhouse Creek Shoals will continue once per month from July 15 each year through May 15 of the following year, and the resultant data will be reported to the Service in the corresponding Annual Report. The only

potential change or interruption to this effort would be if the jetty extension project or another Federal project is constructed in or around Unit FL-34. At that time, HCP Program staff will conduct the shorebird surveys in accordance with applicable State and/or Federal permit conditions and provide the results separately to the Service. Standard monitoring, as described above, will resume once permit-required monitoring has been completed. All shorebird monitoring specifically required by the ITP will continue in accordance with previously established HCP protocol and results presented in the Annual Reports.

The voluntary shorebird surveys will be organized and directed by HCP Program staff with support of the Marine Science Center, the VSP (see below), and other interested parties. The survey area will be partitioned into discrete segments, and monitoring personnel will identify and enumerate all birds observed on the ground within each segment. Additionally, the following information will be collected for all piping plovers observed:

- Number of individuals within each segment, and a GPS location for each individual or group of birds sighted.
- Documentation of each plover's activity or behavior on the beach (e.g., foraging, loafing, etc.).
- A description of the habitat occupied by each plover (e.g., intertidal, at water's edge, near dune, etc.).
- Notation of any bands observed, with the resulting information reported to the national banding coordinators.
- Photographs of tagged birds or unusual behavior, whenever possible.

Volusia Shorebird Partnership

In late 2009, with the support of FWC, VCEM was encouraged to form a shorebird partnership to facilitate protection of nesting, resting, and foraging habitat. The first VSP meeting was held on March 5, 2010. Shorebird partners include VCEM staff, local Audubon chapters, FWC wildlife and law enforcement officials, State and Federal park staff from North Peninsula State Recreation Area and Canaveral National Seashore, respectively, other interested County departments, and local non-profit organizations, such as the Marine Discovery Center in New Smyrna Beach. Subsequently, the VSP crafted the following mission statement:

> *The Volusia Shorebird Partnership is a county-wide alliance of interested groups, organizations, and individuals committed to advancing shorebird and seabird stewardship in Volusia County. The Partnership accomplishes this through coordinated and collaborative work that helps to identify and address important needs with regard to research, management, education, outreach, and public policy.*

The VSP has discussed the need for a Critical Wildlife Area (CWA) designation at the Port Orange, "Rookery Island" just south of the Dunlawton Bridge. The group is committed to working towards this goal through monitoring and reporting activities. This is an example of the type of effort the partnership will put forth in the future. As both a participant and initial coordinator, VCEM is in an ideal position to provide consistency and focus to this effort and ensure that adequate protections are in place for shorebirds and their habitats. The County will utilize its coordinator role in the VSP to identify opportunities for shorebird nesting habitat creation, restoration, enhancement, and/or management consistent with the VSP mission statement.

Volusia County's committed participation in the VSP should result in greater protection of shorebird habitat outside of the Plan Area, and it could also lead to new habitat protection initiatives within the Plan Area. Over time the partnership will result in expanded data collection efforts, and the resultant information will be made available to State and Federal agencies for regulatory decision making.

The FWC has developed a monthly nesting survey observation program for shorebird partnership programs, like the VSP. Under this program, systematic monitoring for nesting shorebirds will be conducted each nesting season within pre-established survey routes throughout Volusia County. This effort should result in better documentation of nesting activity and therefore, increased protection of shorebird nest sites within the Plan Area.

Establishment of Restricted Access Bird Nesting Sites

Volusia County, with assistance from FWC and the VSP, will continue to explore opportunities to establish restricted access bird nesting sites within the Plan Area. Likely nesting sites will be identified and, where practical, the areas will be posted prior to the start of each nesting season to restrict pedestrian access. The VSP will provide a pool of volunteers to monitor the posted sites for potential disturbances and educate the public about shorebird conservation efforts.

Additional Measures

The County has already developed and distributed public awareness materials (e.g., Beach Eco News) dealing with bird-related issues and has developed and implemented a monofilament fishing line recycling program. These, as well as proposed future measures, will have substantial conservation benefits for migratory birds on County Beaches. Additionally, the County intends to implement the following conservation measures:

- Add language to beach brochures regarding migratory shorebirds;
- Add information on the County's website regarding County-sponsored measures to protect and conserve migratory shorebirds;

- Place appropriate signage adjacent to beach driving lanes advising motorists to drive slowly and watch out for birds and other wildlife; and
- Incorporate bird issues into educational programs provided through the Marine Science Center.

14

HCP FUNDING

Volusia County is committed to the success of the HCP and will commit the funds necessary to implement the plan. Insofar as the original ITP has been in effect since November 1996, the County has a solid understanding of the resources needed to achieve HCP objectives.

Volusia County government operates on an October 1 through September 30 fiscal year (FY), and appropriates funds on an annual basis. Insofar as the governing board cannot bind a subsequent board, provision for longer-term plan funding is not possible.

Each year the HCP budget is developed by VCEM and presented to the County Council for approval. Monies are allocated from the General Fund, as there are no dedicated funding sources for HCP implementation. (Beach revenues, such as those generated by tolls and concession agreements, are used to fund, in part, Beach Safety operations.) Each year's annual budget will be provided to the Service for approval via the Annual Reports. It is understood that failure of the County Council to fund ITP-required programs during any fiscal year that the Permit is in effect may result in Service revocation of the Permit.

Volusia County's HCP budget for FY 2015/2016 totaled $455,685, the majority of which was allocated for County staff (HCP Coordinator and Field Manager) and contracted services. The remainder was for vehicles, equipment, supplies, and printing and distribution of public awareness materials. An additional $1,695,808 was allocated for the operation of the Marine Science Center and Mary Keller Bird Rehabilitation Sanctuary.

GLOSSARY

Armoring—The placement of man-made structures or devices in or near the coastal system for the purpose of preventing erosion of the beach or the upland dune system or to protect upland structures from the effects of coastal wave and current activity.

Artificial Lighting—Any source of temporary, fixed, or movable light emanating from a man-made device, including, but not limited to, incandescent mercury vapor, metal halide, or sodium lamps, spotlights, streetlights, construction security lights, or lights that illuminate signs. This definition shall not include hand-held or vehicular lighting (Ordinance Number 2008-25).

Assessment Period—The first four complete years (1997-2000) that the original HCP was in effect and for which monitoring data were available to assess HCP performance.

Beach—Lands and waters lying seaward of the seawall or line of permanent vegetation and within three miles seaward of the mean low-water mark.

Beach Safety Officer—A certified law enforcement officer of the Division of Beach Safety.

Beach Renourishment—The process of adding sand to a beach area to compensate for the effects of erosion.

Bulkhead—A rigid armoring structure or partition to prevent upland property from being lost to erosion.

Clutch—The collective number of eggs laid in a nest by a sea turtle.

Coastal Construction Control Line (CCCL)—The Coastal Construction Control Line established by the State of Florida Department of Environmental Protection, Division of Beaches and Coastal Systems, as defined in Chapter 161, Fla. Statutes.

Comprehensive Plan—The "Volusia County Comprehensive Plan" adopted by the County Council pursuant to Ordinance 90-10, as amended, in compliance with requirements of the Local Government Comprehensive Planning and Land Development Regulations, F.S. 163.3161 et seq., as amended (Ordinance Number 90-33, LXI, 9-27-90).

Commercial Fisherman—A commercial fisherman licensed under the laws of the State engaged on a *bonafide* basis in fishing as a major portion of his/her livelihood.

Concessionaire—A business operation licensed by Volusia County to provide recreation,

food and beverage or merchandise services on the beach.

Conservation Zone—A marked zone either 15 or 30 feet seaward from the toe of the most seaward dune, dune escarpment, or manmade structure, whichever is most seaward.

County Beaches—Beaches under the full control and operational authority of Volusia County government extending from the southern boundary of the NPSRA to the northern boundary of CNS.

County Manager—Manager appointed by the County Council to be the head of the administrative branch of County government and responsible to the County Council for the proper administration of all affairs of the County.

Crawl—The distinctive tracks left by a turtle on the beach at night.

Disorientation—The alteration of the natural behavior of hatchling sea turtles when they are not able to set a particular course and wander aimlessly, typically as the result of artificial light.

Driving Area—Hard sandy portion of the beach designated by signs or other traffic control devices 20 feet east of the mean daily high tide line wherein driving on the beach shall be permitted in a single lane of northbound traffic and a single lane of southbound traffic, together with that portion of the soft sand in front of open vehicular approaches wherein driving shall be permitted in an east or west direction for the purpose of entry to or exit from the beach. The driving area shall not include traffic-free zones established by this chapter or regulations adopted pursuant to this chapter. The Director of Beach Safety shall have the discretion of moving the driving area west of the daily mean high tide land as long as the driving area and the parking area do not encroach into the Conservation Zone.

Dune—A mound or ridge of loose sediment, usually sand-sized, lying upland of the beach or shore, deposited by any natural or artificial mechanism. The term may also include a beach ridge, dune ridge, chenier, or similar topographic feature.

Emergency—An event, action, or circumstance that poses an imminent threat to human, life, health, or property or to the environment.

Emergency Shoreline Protection—Projects permitted by the Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, which are undertaken to combat acute erosion events caused by storms or unusual weather events that threaten qualified upland structures.

Emergency Vehicle—Vehicles used in responding to emergencies, such as police, fire rescue and ambulances, used by County and/or municipal public safety agencies.

Emerging Success—The percentage of eggs in the clutch that produce hatchlings which successfully emerge from the nest.

False Crawl—An emergence by an adult female sea turtle onto the beach and back to the ocean that does not include digging a complete nest cavity and depositing eggs.

Harass—An intentional or negligent act or omission which creates the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering (CFR 17.3).

Harm—An act which actually kills or injures listed wildlife and may include significant habitat modification or significant impairing of essential behavioral patterns, including breeding, feeding, or sheltering.

Hatching Season—The time period when the majority of sea turtle nests are due to hatch. In Volusia County, this typically extends from July 1 to October 31.

Hatching Success—The percentage of all eggs in a clutch that successfully extricated themselves from their egg shells.

Hatchling—A newly hatched sea turtle.

In situ—In the natural or original position.

Incidental Take—Take of any federally listed wildlife species that is incidental to, but not the purpose of, otherwise lawful activities (see Take).

Incubation Period—The period during which the embryo in an sea turtle egg develops before hatching.

Line of Permanent Vegetation—The extreme seaward boundary of natural vegetation, which extends continuously inland.

Mean High Water—The average height of the high waters over a nineteen-year period. For shorter periods of observation, "mean high water" means the average height of the high waters after corrections are applied to eliminate known variations and to reduce the result to the equivalent of a mean nineteen-year value.

Mean High-Water Line—The intersection of the tidal plane of the high water with the shore.

Misorientation—The alteration of natural sea turtle behavior by traveling along a consistent course usually towards an artificial light source.

Mitigation—Actions required to be taken to offset environmental impacts of permitted

activities.

Motorized Vehicle—Any vehicle which is self-propelled by either gasoline or battery power, including but not limited to golf carts, Segways, and any rented concession vehicle, but not including human-powered bicycles.

National Geodetic Vertical Datum (NGVD)—As corrected in 1929, is a vertical control used as a reference for establishing varying elevations within the floodplain.

Nest—An area where sea turtle eggs have been naturally deposited or subsequently relocated.

Nesting Season—The period from May 1 through October 31 of each year.

Nesting Success—Calculated by dividing the number of nests by the total number of crawls (including both crawls that resulted in nests and false crawls).

Plan Area—The area for which take has been requested under the Incidental Take Permit extending from the Flagler/Volusia County Line to the Volusia/Brevard County Line.

Primary Dune—The first natural or manmade mound or bluff of sand which is located landward of the beach which has substantial vegetation, height, continuity and configuration.

Public Vehicles—Privately owned vehicles, operated by the general public, granted access to Volusia County beaches by the Unified Beach Code.

Public Safety Vehicles—Trucks, cars, all-terrain vehicles (ATVs), Utility Terrain Vehicles (UTV's), and other motorized vehicles involved in routine or emergency public safety operations, such as those used by Beach Safety Officers, lifeguards, and County and municipal law enforcement and fire/rescue personnel.

Reproductive Cost—The decrease in annual egg production suffered by an individual as a result of increasing energy expenditures during nesting.

Revetment—A sloped facing structure of an armoring material such as, but not limited to, quarry stone, concrete, or geotextile fabrics, built to protect an escarpment, embankment, or shore structure against erosion by wave action or currents (see "Toe Scour Protection"). A form of rigid armoring.

Semidiurnal Tide—Tides that occur in a cycle of two high tides and two low tides each tidal (lunar) day.

Seawall—A structure separating land from water areas, primarily designed to prevent upland erosion and other damage as a result of wave action. A form of rigid armoring.

Special Events—(1) Any use, activity or event conducted or promoted on the beach that would, if not permitted under this chapter, constitute a violation of any provision of this chapter or any rule or regulation issued under the authority of this chapter, (2) Any activity or event that is organized and promoted to attract, and is likely to attract, a crowd of more than 50 persons to a certain place on the beach at a certain time under circumstances that are likely to interfere with the public's right of access and use of the beach or create a need for additional police, lifesaving or other services, or (3) Any activity or event on the beach that is promoted or sponsored by commercial interests and will advertise or promote private commercial interests.

Species of Special Concern (SSC)—A species which is protected by the FWC, pursuant to the Florida Administrative Code, because the population is declining at a rate that will soon warrant designation as a threatened species.

Stranding—A marine mammal or sea turtle which has been washed up on the beach either dead, injured, ill or weak.

Take—To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct with regard to federally listed endangered and threatened wildlife species (See harass, harm).

Unauthorized Take—Take of federally listed species not covered under a Federal Incidental Take Permit or incidental take statement from a Biological Opinion issued by the USFWS pursuant to the ESA section 7 consultation process.

Vehicle—Every device in, upon, or by which any person or property is or may be transported or drawn upon a highway (See motorized vehicle).

Vehicular Access—Public access to Volusia County Beaches by passenger cars and trucks, concessionaires, commercial fishermen, public safety vehicles and beach maintenance equipment.

Washback hatchling—A post-hatchling sea turtle that left its nesting beach and may have been at sea for several weeks or months before being brought back onto shore by heavy winds and surf.

14

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APPENDIX A - EXAMPLE OF BEACH CONCESSION AGREEMENT

Volusia County
FLORIDA

Beach Concession Agreement

FOR

Volusia County Beach Rentals, LLC

COUNTY OF VOLUSIA
Purchasing and Contracts
123 West Indiana Avenue, Room 304
Deland, Florida 32720

A copy of this document can be provided upon request.

APPENDIX B - FWC MARINE TURTLE CONSERVATION GUIDELINES

A copy of this document can be provided upon request.

APPENDIX C - COMMERCIAL FISHERMAN PERMIT

Volusia County
FLORIDA

COMMERCIAL FISHING PERMIT APPLICATION

PERMIT #: _____

APPLICANT'S NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____ DOB _____

SALTWATER PRODUCTS LICENSE#: _____ EXP: _____

- **Volusia County permits commercial fisherman to fish on County Beaches. Permit regulations will require applicants to show that they have a valid Florida Saltwater Products license. Permittees must follow the restrictions established by Volusia County and the Habitat Conservation Plan (HCP). During the turtle season, May 1-Oct. 31, Permittees can access the beach by vehicle from 8 AM or after the volunteer turtle patrol has cleared the area (whichever is earlier) until 7PM or sundown (whichever is earlier). From Nov. 1 (or after the last nest has hatched) through Apr. 30 (or whenever the first nest is laid) vehicular access is from 6:00 a.m. – 10:00 p.m. Driving in Natural Beach areas are prohibited at all times of the year. All vehicular access provisions established by the HCP for the general public apply to commercial fishermen during the turtle-nesting season. Commercial fisherman must use red or amber light shields on all lights or lanterns when fishing from the beach after dark during the sea turtle nesting season. Permittees must show that they have received educational instruction and that they agree that any infractions of regulations pertaining to protected species and habitat will result in the immediate revocation of their commercial fishing permit. The Volusia County permit of any fisherman who drives in the vehicle protected beach zones will be revoked permanently. Sec. 20-116. Fishing., Unified Beach Code: It shall be unlawful for any person: (1) To fish in the ocean after having been warned by a member of the Beach Safety or any law enforcement officer that the health and safety of swimmers is being endangered; or (2) While on the beach or within 600 feet from shore to intentionally fish for sharks or to fish by those methods commonly known as "chumming" or "bloodbaiting." Nothing in this section shall be construed to create a duty of any sort on the part of any county or municipal employee to prevent fishing or to warn of the presence of sharks in the ocean.**

_____ _____

Applicant's signature **Date**

THE ABOVE APPLICANT UNDERSTANDS AND AGREES TO ALL RESTRICTIONS AND REQUIREMENTS WRITTEN IN THIS CONTRACT. _____

INITIALS

****THIS PERMIT IS GRANTED TO THE ABOVE NAMED INDIVIDUAL**

APPENDIX D - EXAMPLE OF SPECIAL EVENT APPLICATION

County of Volusia
Department of Public Protection
Beach Safety Division
515 South Atlantic Ave., Daytona Beach, FL.32118
(386) 239-6414 • Fax (386) 239-6420
www.volusia.org

2014 SPECIAL EVENT APPLICATION

***DATE:*_____** ***PERMIT NUMBER:*_____**

DESCRIBE EACH ACTIVITY THAT WILL TAKE PLACE ON THE BEACH:
_____

LIST ALL EQUIPMENT THAT WILL BE USED FOR THE EVENT:
_____

EVENT LOCATION ADDRESS:
_____

LINEAR FEET REQUIRED FOR EVENT: _____

SET UP DATE(S): _____

EVENT DATE(S): _____ **NUMBER OF DAYS:_____**

BREAK DOWN DATE(S): _____

EVENT TIME(S): **FROM _____ TO _____-SET UP**
FROM _____ TO_____ -EVENT
FROM _____ TO_____ -BREAK DOWN

TITLE OF THE EVENT: _____

EVENT SPONSOR: _____

ADDRESS: _____CITY: _____

STATE:_____ZIP:_____ PHONE:_____ FAX:
_____

CONTACT PERSON: _____ E-Mail: _____

WEB URL: _____

ESTIMATED DAILY ATTENDANCE: _____ **WILL FEES BE CHARGED: Y N**

IF YES, EXPLAIN: _____

PERMITTEE SHALL KEEP A COPY OF THIS PERMIT ON SITE, WHILE OPERATING ON VOLUSIA COUNTY BEACHES

PERMIT NUMBER: _____

SITE PLAN: (use attached) - Please include:

- **Area to be closed**
- **Any structures, booths, bleachers, tents to be erected**
- **If placement of structure requires digging or placement of posts, please indicate where and how many.**
- **Sanitary facilities (trash, comfort stations)**
- **Special parking arrangements**
- **Any special features (TV, radio coverage, etc.)**

GENERAL CONDITIONS

- **This application must be completed and returned to *Beach Services*, 515 South Atlantic Avenue, Daytona Beach, Fl. 32118 at least 45 days prior to the event.**
- **There shall be no sale or distribution of products or other material without the prior approval of *Beach Services*.**
- **An approved Special Event Application is required for all groups and must be in the possession of the applicant at the event.**

The applicant must provide at his/her expense the following services as determined necessary by *Volusia County Beach Services. Any contractor used for the following service(s) must have HCP training prior to operating on Volusia County beaches. You may coordinate training through Environmental Mgmt. at 386.238.4716.*

1. *Additional Lifeguard, Law Enforcement and /or traffic control personnel*
2. *First Aid*
3. *Sanitation facilities to accommodate crowd*
4. *Other items such as trash cans, barricades etc.*

- **Groups shall leave areas in clean and orderly condition, satisfactory to Beach Safety, including, but not limited to, trash removal and returning the beach to grade.**
- **The applicant, in exercising the privileges granted by this permit, shall comply with ordinance Chapter 20, Beach Code,Volusia County Code of Ordinances.**
- **This permit is a revocable permit and may be revoked at the discretion of the *County Council, Volusia County or Beach Safety* upon 24 hours notice or without notice, if the safety and health of the public is threatened, notwithstanding any other terms or conditions of the permit to the contrary.**
- **The permittee hereby agrees to save and hold harmless the County of Volusia, its agents and employees, from any and all claims, damages, suits at law or equity of whatever kind of nature for damages to or loss of property or injury or death to persons, resulting directly or indirectly from, or attributable to, the applicant or its employees in connection with the special event authorized by this permit.**

PERMIT NUMBER:_____

ENVIRONMENTAL CONDITIONS

The protection of the beach ecosystem is a priority of *Volusia County Beach Safety*. All special events must be managed in a manner that preserves the natural resources of Volusia County Beaches and must comply with all state, federal and County environmental regulations.

- ***All event activities and temporary equipment set-up must take place fully seaward (east) of the Conservation Zone (CZ; conspicuously marked with posts and signs). No driving or parking of vehicles or trailers in the CZ is permitted.***
- *All general public driving and parking rules apply. The speed limit is 10 mph on the beach at all times.*
- ***NO** activity is permitted within 30 feet of a marked sea turtle nest.*
- *In public driving areas, vehicles must obey all standard driving rules including opening and closing times (November 1 – April 30: sunrise to sunset; May 1 – October 31, 8:00 AM to 7:00 PM). No driving or parking of vehicles or trailers is permiited in the Natural Beach (non-driving) areas without explicit authorization from Volusia County.*
- *Fully protect all beach vegetation. Keep all event participants off the dune and dune vegetation.*
- *Protect the dune. The dune must not be altered either by direct means such as digging, excavation, or by heavy pedestrian traffic. All pedestrian access to the beach must be via vehicle access ramps or elevated dune crossovers. Removal of beach sand from the beach is prohibited.*
- *All equipment associated with the event and all trash generated by the event must be removed from the beach upon conclusion of each day's activities.*
- *Use of disposable Styrofoam items is prohibited.*
- *Use of toxic chemicals or materials is prohibited.*

Additional Environmental Conditions specific to your event may be applicable. These conditions will be attached to your permit and must be followed.

INSURANCE

The permit holder shall carry, at a minimum, a $1,000,000 comprehensive general liability insurance policy (or special events policy) and the County of Volusia shall be an additional insured under the policy. The permit holder shall provide a Certificate of Insurance naming the County as the certificate holder and additional insured under the comprehensive general liability policy in the format below:

County of Volusia
123 W. Indiana Avenue
Deland, FL 32720

Prior to obtaining insurance, we recommend you contact Scott Poertner, Volusia County Risk Management to verify insurance requirements. Additional policies may be required upon application review. Mr. Poertner can be contacted at 386-736-5963.

Please provide a copy of your W-9 along with this application for our Accounting Dept's financial records; or you can provide your EIN or SSN here: _____

_____ _____

Applicant Signature *Date*

Office Use Only

_____

Beach Director *Date*

_____

Director, Special Events *Date*

APPENDIX E - BEACH BROCHURES

North Beach Brochure

Protect wildlife.
Respect the beach.

Volusia County's coastal habitats include beaches and sand dunes that support a variety of plants and animals. Among these are threatened and endangered species such as sea turtles, gopher tortoises, southeastern beach mice and piping plovers.

Sea turtle nesting season
(May 1 through October 31)

Sea turtles generally crawl onto the beach at night to lay their eggs in the dry sand. After covering their nests, they return to the sea. Hatchlings emerge from nests in about two months and crawl to the ocean.

Nests are marked daily and may not be disturbed. Lighting visible from the beach can confuse sea turtles and is restricted during sea turtle nesting season.

During sea turtle nesting season, the beach is open to driving from 8 a.m. - 7 p.m. unless there are unsafe tide or weather conditions.

volusiaseaturtles.org

Conservation zone

To protect sea turtles and sand dunes, Volusia County has established a conservation zone that is off limits to vehicles.

The conservation zone extends from the posts to the dunes or sea wall. The conservation zone is 15 - 30 feet wide.

Park your vehicle east (seaward) of the conservation zone.

Sand dunes

Please stay off the dunes and do not remove sea oats or other plants. Dune vegetation is protected by law.

Keep Volusia beautiful

Place trash in blue trash receptacles. Place plastic bottles and aluminum cans in yellow recycling containers.

Leave no trace

For the safety of others and wildlife, do not leave chairs, umbrellas or other items behind when you leave the beach. County staff may remove any items left on the beach between 9 p.m. and 6 a.m. It's great fun to dig holes in the sand, but please fill them in when you leave.

Pet-friendly areas

Pets on leashes are permitted on the inlet side of the shores at Lighthouse Point Park and Smyrna Dunes Park. They are not permitted on ocean-fronting beaches.

Service animals are welcome.

Coastal wildlife

To help us protect coastal wildlife and habitat, please:

- Do not disturb marked turtle nests. These areas are being studied and protected.
- Do not touch turtles. Watch from 30 feet away.
- Do not feed wildlife.
- Do not litter. Cigarette butts, fishing line and other trash can harm wildlife.
- Do not walk, run, cycle or drive through resting or feeding shorebirds.
- Do not shine lights on the beach at night. This may frighten nesting turtles and interfere with hatchlings' ability to find the sea.
- Report injured or dead sea turtles and distressed wildlife to a beach employee or call 386-239-SURF.

Beach safety

- **Monitor children closely at all times. Hold their hands when crossing traffic.**
- Sunbathe west of parking areas and east of traffic lanes only.
- Do not sit, lie or place personal property in driving and parking areas.
- Alcohol, fireworks, pets and glass containers are not permitted on the beach.
- Music and noise audible beyond 50 feet is prohibited.

Ocean safety

- Swim in front of a staffed lifeguard tower at all times.
- Check the lifeguard tower sign and flag color for current surf conditions.
- Leave the beach during storms. Lightning can strike 10 miles from where it is raining. Adhere to lifeguard storm warnings.
- Jellyfish stings are rarely serious, but may require first aid. Do not wash stings in fresh water or showers as this aggravates the sting. Use saltwater only. Contact the closest lifeguard.
- Rip currents are dangerous. Do not swim against the current. Stay calm, tread water and wave arms for help. The current will eventually slow. Swim parallel to the shoreline.

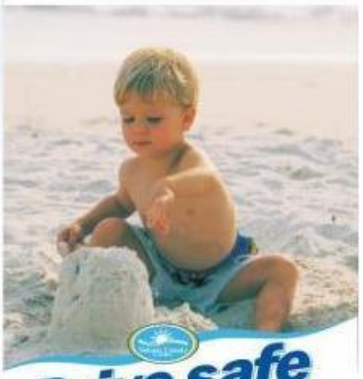
Volusia County

volusia.org

Beach conditions and safety: **386-239-SURF**

Lifeguard Headquarters and Administration Center
515 S. Atlantic Ave., Daytona Beach, FL 32118

(north beach version) *(Updated June 2016)*



Drive safe Play safe

Welcome to Volusia County's beautiful beaches!

For your safety and comfort, we ask that you follow our beach regulations and safety tips.

SLOW!
Beach driving speed limit is 10 mph

Driving and parking

- Drive carefully and watch for pedestrians, especially children. **Observe the 10 mph speed limit.**
- Limit cruising on the beach. Find a parking spot and enjoy your day.
- Drive with your headlights on and a front window down.
- Please refrain from using your cell phone while driving.
- Texting while driving is prohibited.
- Park perpendicular to the coastline.
- Double parking is not permitted.

Driving hours

Weather and/or tides permitting, driving is allowed on the beach from:

- 8 a.m. - 7 p.m. May 1 through Oct. 31
- Sunrise to sunset Nov. 1 through April 30

Traffic-free zones

If you are visiting with children, you may want to choose a traffic-free zone.

- North of Granada Boulevard in Ormond Beach
- Beach in front of Ormond Beach's Andy Romano Beachfront Park
- Seabreeze Boulevard south to International Speedway Boulevard in Daytona Beach
- Emilia Avenue in Daytona Beach Shores south to Beach Street in Ponce Inlet

No beach parking

Parking is not allowed in front of:

- Sun Splash Park, Daytona Beach
- Frank Rendon Park, Daytona Beach Shores
- Andy Romano Beachfront Park, Ormond Beach

One-way traffic zone

- International Speedway Boulevard south to Silver Beach Avenue, Daytona Beach

RES-Q bracelets

Parents can pick up waterproof bracelets at toll booths and lifeguard towers. They're asked to write their child's name and their cell phone number on the bracelet for quick identification and notification if the child becomes lost.

Off-beach parking areas near traffic-free zones

Ormond-by-the-Sea: Michael Crotty Bicentennial Park, Al Weeks Sr. North Shore Park, Tom Renick Park, Standish Avenue, Amsden Road and Neptune Avenue

Ormond Beach: Andy Romano Beachfront Park

Daytona Beach: Ocean Center parking garage and Breakers Oceanfront Park

Wilbur-by-the-Sea: Heron Street, Toronita Avenue and Major Street

Ponce Inlet: North Turn Restaurant, Winterhaven Park, Oceanview Avenue, Inlet Harbor Road and Lighthouse Point Park

South Beach Brochure

Protect wildlife.
Respect the beach.

Volusia County's coastal habitats include beaches and sand dunes that support a variety of plants and animals. Among these are threatened and endangered species such as sea turtles, gopher tortoises, southeastern beach mice and piping plovers.

Sea turtle nesting season
(May 1 through October 31)

Sea turtles generally crawl onto the beach at night to lay their eggs in the dry sand. After covering their nests, they return to the sea. Hatchlings emerge from nests in about two months and crawl to the ocean.

Nests are marked daily and may not be disturbed. Lighting visible from the beach can confuse sea turtles and is restricted during sea turtle nesting season.

During sea turtle nesting season, the beach is open to driving from 8 a.m. - 7 p.m. unless there are unsafe tide or weather conditions.

volusiaseaturtles.org

Conservation zone

To protect sea turtles and sand dunes, Volusia County has established a conservation zone that is off limits to vehicles.

The conservation zone extends from the posts to the dunes or sea wall. The conservation zone is 15 - 30 feet wide.

Park your vehicle east (seaward) of the conservation zone.

Sand dunes

Please stay off the dunes and do not remove sea oats or other plants. Dune vegetation is protected by law.

Keep Volusia beautiful

Place trash in blue trash receptacles. Place plastic bottles and aluminum cans in yellow recycling containers.

Leave no trace

For the safety of others and wildlife, do not leave chairs, umbrellas or other items behind when you leave the beach. County staff may remove any items left on the beach between 9 p.m. and 6 a.m. It's great fun to dig holes in the sand, but please fill them in when you leave.

Pet-friendly areas

Pets on leashes are permitted on the inlet side of the shores at Lighthouse Point Park and Smyrna Dunes Park. They are not permitted on ocean-fronting beaches.

Service animals are welcome.

Coastal wildlife

To help us protect coastal wildlife and habitat, please:

- Do not disturb marked turtle nests. These areas are being studied and protected.
- Do not touch turtles. Watch from 30 feet away.
- Do not feed wildlife.
- Do not litter. Cigarette butts, fishing line and other trash can harm wildlife.
- Do not walk, run, cycle or drive through resting or feeding shorebirds.
- Do not shine lights on the beach at night. This may frighten nesting turtles and interfere with hatchlings' ability to find the sea.
- Report injured or dead sea turtles and distressed wildlife to a beach employee or call 386-239-SURF.

Beach safety

- **Monitor children closely at all times. Hold their hands when crossing traffic.**
- Sunbathe west of parking areas and east of traffic lanes only.
- Do not sit, lie or place personal property in driving and parking areas.
- Alcohol, fireworks, pets and glass containers are not permitted on the beach.
- Music and noise audible beyond 50 feet is prohibited.

Ocean safety

- Swim in front of a *staffed* lifeguard tower at all times.
- Check the lifeguard tower sign and flag color for current surf conditions.
- Leave the beach during storms. Lightning can strike 10 miles from where it is raining. Adhere to lifeguard storm warnings.
- Jellyfish stings are rarely serious, but may require first aid. Do not wash stings in fresh water or showers as this aggravates the sting. Use saltwater only. Contact the closest lifeguard.
- Rip currents are dangerous. Do not swim against the current. Stay calm, tread water and wave arms for help. The current will eventually slow. Swim parallel to the shoreline.

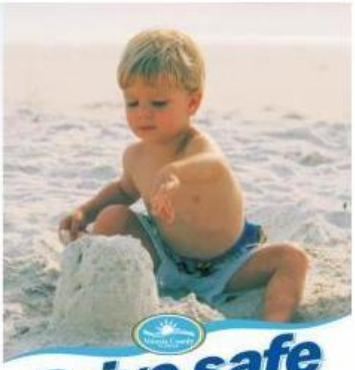
Volusia County FLORIDA

volusia.org

Beach conditions and safety: **386-239-SURF**

Lifeguard Headquarters and Administration Center
515 S. Atlantic Ave., Daytona Beach, FL 32118

(south beach version) *Updated June 2016*



Drive safe Play safe

SLOW
CHILDREN PLAYING

Welcome to Volusia County's beautiful beaches!

For your safety and comfort, we ask that you follow our beach regulations and safety tips.

SPEED LIMIT 10

SLOW!
Beach driving speed limit is 10 mph

Driving and parking

SLOW
CHILDREN PLAYING

SPEED LIMIT 10

- Drive carefully and watch for pedestrians, especially children. **Observe the 10 mph speed limit.**
- Limit cruising on the beach. Find a parking spot and enjoy your day.
- Drive with your headlights on and a front window down.
- Please refrain from using your cell phone while driving.
- Texting while driving is prohibited.
- Park perpendicular to the coastline.
- Double parking is not permitted.

Driving hours

Weather and/or tides permitting, driving is allowed on the beach from:

- 8 a.m. - 7 p.m. May 1 through Oct. 31
- Sunrise to sunset Nov. 1 through April 30

Traffic-free zones

If you are visiting with children, you may want to choose a traffic-free zone.

- North of the jetty at Smyrna Dunes Park
- 27th Avenue south to the Volusia County line

Off-beach parking areas near traffic-free zones

New Smyrna Beach

- Smyrna Dunes Park, 2995 N. Peninsula Drive
- 27th Avenue Park, 3701 S. Atlantic Ave.
- Matthews Avenue
- Hiles Boulevard

Bethune Beach

- Mary McLeod Bethune Park, 6656 S. Atlantic Ave.

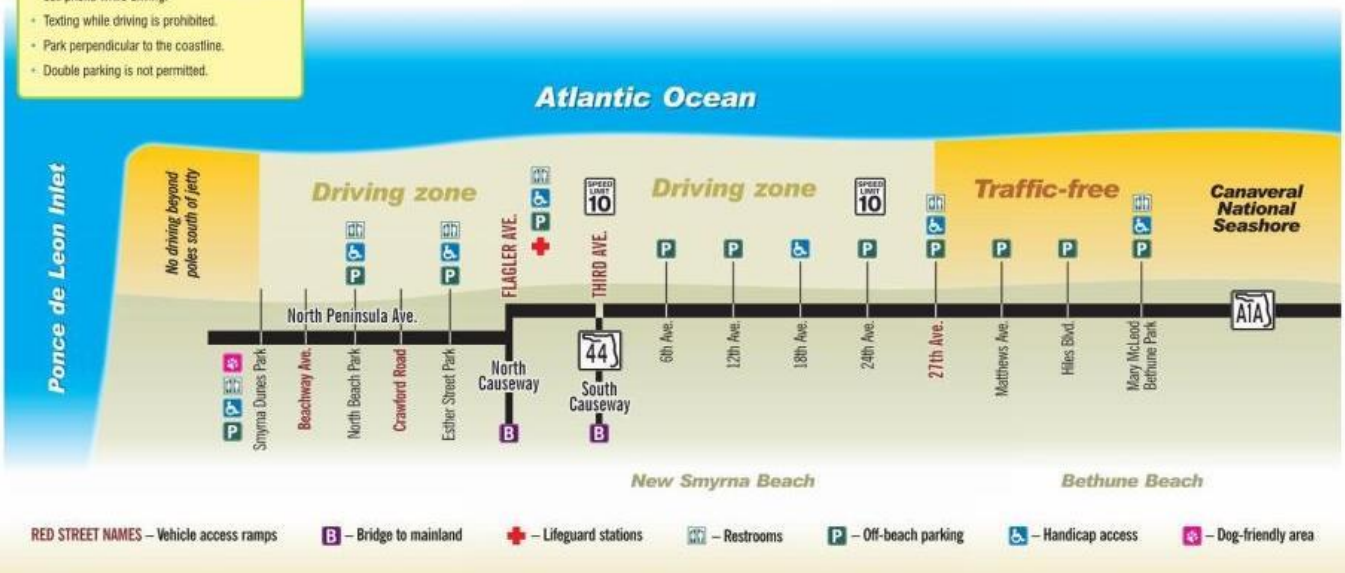
No beach parking

Parking is not allowed in front of:

- Flagler Avenue Park, New Smyrna Beach
- Ester Park, New Smyrna Beach

RES-Q bracelets

Parents can pick up waterproof bracelets at toll booths and lifeguard towers. They're asked to write their child's name and their cell phone number on the bracelet for quick identification and notification if the child becomes lost.



RED STREET NAMES – Vehicle access ramps | B – Bridge to mainland | – Lifeguard stations | – Restrooms | P – Off-beach parking | – Handicap access | – Dog-friendly area

APPENDIX F - CZ BOUNDARY MANAGEMENT PLAN

VOLUSIA COUNTY BEACHES
CONSERVATION ZONE BOUNDARY MANAGEMENT PLAN

Revised: November, 2013

PURPOSE:

This document describes the process by which the Conservation Zones (CZ) defined in the Habitat Conservation Plan (HCP) under the U.S. Fish & Wildlife Service (USFWS) Incidental Take Permit (ITP) No. TE811813 will be permanently marked, monitored and maintained.

POLICY:

Volusia County shall be responsible for permanently marking, monitoring, and maintaining the integrity of the CZ in conformance with its HCP and conditions contained in the ITP. During the spring of each year, the CZ boundary will be inspected by the PSS and/or HCP Field Manager and any needed modifications will be made prior to May 1, the beginning of the sea turtle nesting season. Thereafter, the boundary will remain static, with the exception of any realignment that may be necessary following major storm events, as described in the HCP. The CZ will be inspected daily, and any missing or damaged markers will be replaced within 48 hours of the time they are reported missing, unless otherwise stipulated herein.

METHODS AND MATERIALS:

The width of the Conservation Zone (CZ) in each Protected Species Beach Management Area is established in the HCP, as follows:

- Natural Areas – No marked CZ present;
- Urban Area (including traffic-free zones) – 15 feet; and
- Transitional Areas (including traffic-free zones) – 30 feet.

The proper distance is determined by measuring from the toe of the dune or armoring structure (e.g., seawall, bulkhead, revetment, etc.), whichever is more seaward. Due to the undulating nature of the dune system, the landward points used to determine placement of CZ posts often do not form a straight line. However, in order to effectively enforce CZ regulations and maintain orderly parking and traffic flow, the CZ posts will be installed in a relatively straight line. This may place some posts slightly further from the dune than required. Conversely, in cases where the dune juts seaward, some posts may be slightly closer to the dune than required. However, the average distance from the dune/seawall of any 5 consecutive posts must be equal to or greater than 15 or 30 feet, respectively, in Urban and Transitional BMAs.

The CZ will be marked using four (4) inch square, wooden posts, spaced at intervals of approximately 50 feet. This spacing is adequate to establish a clearly visible line of demarcation

along the beach, yet permits pedestrians to freely pass through the CZ between the beach and upland properties. This spacing also has been shown not to pose an obstacle to nesting sea turtles. Alternative materials of equivalent effectiveness may be used to mark the CZ upon prior approval of the USFWS.

The CZ marker posts will be buried in the sand a sufficient depth (e.g., 4 feet) to prevent them from easily being dislodged or washed out. Similarly, they will extend a sufficient height above the surface of the sand (e.g., 4 feet) so the CZ boundary is clearly visible to vehicle operators. Visual clutter and potential hazards to pedestrians will be considered when determining the type of material, dimensions, and height of posts used to mark the CZ. The CZ marker posts may be painted a distinctive color to enhance visibility and to provide an aesthetically pleasing image for the Conservation Zone.

A sign will be mounted vertically on the east (seaward) side of each CZ marker post. The sign will include the international symbol for "No Parking", with the words "Beyond This Point" extending downward. Alternative signage clearly indicating that vehicles are not permitted to park or drive west of the CZ posts may be substituted for the above signs upon prior approval of the USFWS.

In the Traffic-Free Zones, the standard 4X4 posts used to mark the CZ elsewhere in public driving areas may be replaced with other types of markers. Because public vehicles are not permitted in these areas, the markers may be spaced much further apart than the standard CZ posts. With the exception of the type and number of posts used, the CZ in Traffic-Free Zones shall be monitored and maintained as in other areas where a CZ is present.

INSTALLATION:

The CZ marker posts may be installed mechanically using a tractor equipped with an auger or manually using a hand-held auger, posthole digger, or similar device. If a tractor is used, it must traverse the beach using the established vehicle traffic lanes, and it cannot encroach into the Conservation Zone during the sea turtle nesting season.

On an annual basis, prior to the start of the sea turtle nesting season (May 1), the Protected Species Specialist (PSS), or designee, will supervise the measurement of the CZ and the realignment of posts, if necessary. Once the CZ boundary has been established, it will remain in place throughout the nesting season, regardless of changes in the dune contour. The only exception is in the event that a major storm event substantially impacts the beach/dune system thereby necessitating large-scale realignments of the CZ boundary (see Maintenance below).

A tractor and auger may be used for CZ marker post placement anytime outside of the sea turtle nesting season or during the nesting season when large numbers of posts need to be replaced. Individual posts lost during the nesting season will be replaced under the supervision of the HCP Field Manager, or designee. The first 18 inches of the posthole must be dug by hand and then the remaining portion can be excavated using a hand-held auger, posthole digger, or similar

device. The only exception is in the event that a major storm event necessitates the movement/installation of large numbers of CZ posts (see Maintenance below).

MAINTENANCE:

County staff and/or other HCP personnel will check the CZ marker posts daily. Missing posts will be reported to a person or office designated by the County and replaced within 48 hours of the time they are reported missing. In the event that numerous posts are found to be missing on a given segment of beach, such that a reasonable person would not know where it is permissible to park, that section of beach will be closed immediately to public vehicular access to prevent inadvertent encroachment into the CZ. The missing posts will then be replaced as quickly as possible using established installation methods and the beach reopened to public vehicular traffic.

In the event that a major storm causes extensive damage to the beach/dune system, or parts thereof, and destroys the majority of the CZ posts along large sections of beach, the affected CZ will be remarked using the new dune contour as a reference point. The poles will be replaced with a tractor and auger under the supervision of the HCP Field Manager or his/her designee. The 48-hour replacement criteria in the ITP will be waived following a major storm, but the beach will remain closed to public vehicles until the CZ is re-established.

CZ boundary realignment may be performed outside the sea turtle nesting season, if needed, to accommodate a major seaward expansion of dunes and vegetation along portions of the County's coastline. These adjustments will be at the discretion of the HCP Coordinator and will be conducted as for realignments following storm events.

MANAGEMENT:

Beach Safety Officers will routinely monitor the CZ to ensure that vehicles do not drive or park landward (west) of the marked CZ boundary. As part of HCP training, all County personnel working on the beach, including lifeguards, toll collectors and maintenance workers, will be instructed to immediately report any observed violations of CZ regulations to the Division of Beach Safety. Beach Safety Officers will strictly enforce the prohibition of vehicles in the CZ and will issue verbal or written warnings, parking tickets, and/or traffic citations, as needed, to achieve a high level of compliance.

APPENDIX G – BEACH ACCESS AND CLOSURES POLICY

VOLUSIA COUNTY DEPARTMENT OF PUBLIC PROTECTION BEACH SAFETY DIVISION
Director Mark Swanson

Departmental Standards Directive

TITLE:	**BEACH ACCESS AND CLOSURES**
CODIFIED:	**24.02**
EFFECTIVE:	**11/01/2013**
RESCINDS/AMENDS:	**04/01/2013**
ATTACHMENTS:	**1**

PURPOSE/ DISCUSSION

The Purpose of this directive is to establish guidelines that are consistent with the Volusia County Beach Code, the Federal Incidental Take Permit (ITP) for beach driving and the County's Habitat Conservation Plan (HCP). This directive deals primarily with vehicular ingress and egress on areas of the beach commonly associated with motor vehicle traffic.

The ITP allows for motor vehicle traffic on specific areas of the beach during specific hours of the day. This permit is conditioned upon implementation of the HCP which establishes procedures for the protection of endangered species and receives the enforcement power to regulate vehicular traffic through the County Beach Code.

POLICY

It shall be the policy of the Volusia County Department of Public Protection, Beach Safety Division to regulate motor vehicle traffic and enforce State and County laws governing the movement and parking on Volusia County Beaches. Furthermore, the department is tasked with the opening and closing for beach driving to include but is not limited to hours of the day, turtle nesting season and high tides.

PROCEDURE

BEACH OPENING AND CLOSURES

24.02.01 November 1st through April 30th of each calendar year, the beach driving areas shall be opened at sunrise for motor vehicle traffic. This process may be delayed due to high tides which impede the designated traffic lane. As described in the Unified Beach Code (UBC), Sec. 20-172(b).

- "Traffic is restricted to a single lane of northbound traffic and a single lane of southbound traffic. A single driving lane will be approximately 10 feet wide. The western edge of the southbound lane will be set at the mean daily high tide line and extend eastward ten feet. The northbound lane will extend an additional ten feet east. The parking area will begin at the daily high tide line and continue 30 feet west."

24.02.02 November 1st through April 30th of each calendar year, the beach shall be closed to motor vehicle traffic at sunset.

- One hour prior to the mandatory time, without jeopardizing public safety, Beach Safety units will conduct public address announcements in their assigned areas to alert beach patrons that all vehicles must be off the beach by the mandatory beach closing time.
- One half hour before the mandatory time, without jeopardizing public safety, Beach Safety units will initiate beach to uniformly direct vehicles to specific approaches that are open for exiting vehicles.
- During the closing process, access gates in areas free of vehicles shall be closed and locked. All other vehicles shall be directed to the nearest open approach or approaches until all vehicles are completely off of the beach.
- All vehicles that have not exited the beach by the designated time will be cited and/or towed at the owner's expense.

24.02.03 May 1st through October 31st of each calendar year (sea turtle nesting season) the beach driving areas shall be opened at 8:00am, or after the daily sea turtle nesting survey has been completed, whichever is later, and closed at 7:00pm or sunset (whichever is earlier).

- The Shift Supervisor shall coordinate with the appropriate monitoring group to ensure that clear lines of communication have been established for reporting when the nesting survey in their district has been completed each morning.
- Monitoring groups may use a marking system to designate when specific approaches can be opened for vehicular ingress to the beach. In the event that there is a delay in completing the nesting survey by 8:00am, monitoring personnel will make contact with the appropriate Beach Safety Station informing them of the delay.
- Sanitation, maintenance, and concessionaire vehicles may access the beach prior to 8:00am if the morning turtle survey has been completed in their area.

CONSERVATION ZONE

24.02.04 The Conservation Zone (CZ) is the area west of the 4 X 4 marker posts along those sections of beach open to public driving. It extends from the posts to the dune or seawall, as applicable. Public driving and parking within the CZ is prohibited year round.

NATURAL BEACH MANAGEMENT AREAS

24.02.05 Natural Beach Management Areas (NBMA) are areas that are closed to public beach driving year round. There are three NBMA's managed by Volusia County: the area beginning 200' north of Granada Blvd. to the southern boundary of the North Peninsula State Recreation Area in Ormond beach; the area between

Emilia Ave. and Beach St. in Wilbur by the Sea and Ponce Inlet; and the area from 27th Ave. to the northern boundary of the Canaveral National Seashore in New Smyrna Beach.

CZ AND NMBA GUIDELINES

24.02.06 The CZ and NBMA were established under the HCP to protect beach habitat for sea turtles and other wildlife. The ITP prohibits public vehicular access to these areas at all times. Emergency and law enforcement vehicles, routine public safety patrols, protected species monitoring, HCP management activities, scientific research approved by Volusia County Environmental Management (VCEM), and certain sanitation and beach maintenance operations are allowed in these areas when necessary, as specified in the HCP.

24.02.07 The County may authorize vehicle access to the CZ and NMBA throughout the year to undertake activities necessary to protect the health and safety of the public, including, but not limited to, storm cleanup, removal of hazardous or dangerous materials, removal of downed aircraft and grounded boats and any other public safety or health threat reviewed, approved, and deemed appropriate by the U.S. Fish and Wildlife Service. VCEM HCP staff should be contacted for coordination during these events. VCEM involvement will ensure HCP compliance and minimize habitat damage.

BEACH CLOSURE DUE TO HIGH TIDES

24.02.08 During high tide conditions where both traffic lanes are flooded and there is less than 30 feet between the tide line and the Conservation Zone markers, the beach in these areas shall be closed to all vehicular traffic.

- Vehicles that remain parked will be allowed to stay on the beach as long as no driving is attempted.
- Under no circumstances may vehicles operated by the general public be allowed to drive or park west of the Conservation Zone markers.

24.02.09 Beach Safety personnel shall notify the on duty toll supervisor by phone or radio to have all toll booth operators within the affected areas to close their east bound gates to prevent vehicular traffic from entering the beach.

- All west bound gates shall remain open for vehicles exiting the beach.

24.02.10 Areas that maintain traffic lanes (30 feet or more between the tide line and the Conservation Zone markers) shall remain accessible for vehicular traffic during designated hours.

24.02.11 Areas which close for high tide conditions shall barricade or cordon of their northern and southern boundaries, whichever is applicable to prevent traffic from encroaching into the closed area.

24.02.12 Closed areas of the beach shall reopen only when the Shift Supervisor or senior officer on duty determines that there is a minimum of thirty (30) feet from the Conservation Zone markers and the tide line.

24.02.13 Vehicles which remain parked in an area, where the traffic lanes are temporarily closed due to high tides, shall not be allowed to drive except for leaving the beach at the nearest exit. Vehicles that enter the Conservation Zone during this time will be cited.

24.02.14 Patrols will conduct public address announcements alerting beach patrons that vehicles must remain parked outside of the Conservation Zone during high tide conditions.

24.02.15 Operators of vehicles which attempt to move a vehicle, other than to leave the beach at the nearest exit, will be cited or charged as appropriate. Cited vehicles will be forced to exit the beach through the water if necessary, to the exit.

COASTAL CONSTRUCTION

24.02.16 Between May 1- Oct. 31 (sea turtle nesting season) each year, no coastal construction activities can occur within either the CZ or NBMA. Between Nov. 1- April 30 each year, vehicular access for coastal construction is permitted, but must be coordinated with VCEM, as described below.

24.02.17 Vehicular access permission will be granted through VCEM HCP staff, and approved activities will be specified through a Memorandum of Understanding (MOU) between the County and the respective property owner/contractor. The MOU will identify access times, locations, authorized activities, and conditions for conducting the work. A vehicle placard will be issued to the responsible party and must be displayed on all construction vehicles accessing the CZ and NBMA. See attachment "A", Vehicle Placard.

24.02.18 A copy of the MOU will be provided to the appropriate Lifeguard Station(s) for reference. Persons issued a MOU may contact the station to coordinate gate openings. Beach Safety will notify VCEM of possible violations of the MOU, enforce the regulations in the MOU and deny vehicular access until the violations are resolved.

TRAFFIC FREE ZONE OPERATION

24.02.19 The Traffic Free Zone (TFZ) is a one-mile stretch of beach located between International Speedway Blvd. (ISB) and Seabreeze Blvd. in Daytona Beach. It was established by Volusia County to create a traffic-free beach environment for visitors utilizing adjacent upland properties. Public vehicular access to the TFZ is discretionary and is not prohibited under the HCP, with the exception that driving and parking cannot occur within 15' of the dune or seawall, as applicable. Thus, Beach Safety may allow public vehicular access to the TFZ under certain circumstances, such as for special events. This permission may be granted through a Beach Services Special event permit. When the general public is allowed vehicular access to the TFZ, all HCP regulations (access times, driving and parking policies, etc.) apply.

24.02.20 The Beach Safety Division shall have the responsibility of monitoring and coordinating all vehicles that enter Traffic Free Zones on Volusia County Beaches

24.02.21 All public safety vehicles are permitted at all times in order to provide public service and protection to visitors within the traffic free zone.

24.02.22 The Volusia Turtle Patrol and Environmental Management vehicles may traverse the traffic free zone for morning turtle surveys and for HCP-related environmental events that may occur throughout the day.

24.02.23 Service vehicles are permitted for trash pick-up and maintenance in the morning between 8:00am and before 10:00am. In the afternoon pick-up and maintenance are permitted between 4:00pm. and 7:00pm, unless a maintenance problem exists that is safety related. During the sea turtle nesting season these vehicles may access the beach before 8:00am. *if* the morning turtle survey has been completed.

24.02.24 Delivery vehicles used to service concessionaires located within the traffic free zone shall drive and park seaward (east) of the line that designates the Conservation Zone and will be permitted throughout the day from 8:00am. To 7:00pm.

24.02.25 Delivery and maintenance vehicles are permitted to service the Main St. Pier, upon notification of the Volusia County Beach Safety Division.

24.02.26 Concessionaires assigned to a fixed location within the traffic free zone shall not be permitted to use Oakridge, Main St, or Harvey ramps unless they receive the expressed permission granted by the Director.

24.02.27 Ice Cream venders that have converted to John Deere (Dune Dinner) style 4X4 vehicles will be permitted to operate in traffic free zones, but not natural beach areas.

24.02.28 Special event vehicles permitted by the Volusia County Beach Safety Division will be permitted to unload equipment between 8:00 am. and 10:00 am. During the turtle nesting season, vehicular access may be delayed until the daily sea turtle nesting survey has been completed, All vehicles must exit before sunset from November 1st through April 30th, and before 7 pm. during turtle nesting season. Vehicles that remain on the beach for special events must remain stationary throughout the day.

COMMERCIAL FISHING

24.02.29 Commercial fishermen can access the public driving areas of the beach between 6:00am and 10:00pm from November 1, through April 30 of each calendar year.

- During the hours that the beach is closed to vehicular driving, commercial fishermen must call the Volusia County Sheriff's Office Communication Center to arrange for a Beach Safety Officer to meet them at a specific ramp gate to let them on or off of the beach.

24.02.30 During turtle nesting season, (May 1 through October 31 of each calendar year), commercial fishermen, can access the beach in the morning at 8:00 am. or after the daily sea turtle nesting survey has been completed, whichever is later.

- Commercial Fisherman may not access the beach after beach closing during the turtle nesting season.

24.02.31 Commercial fishermen may park their vehicles east of the traffic lane, displaying a commercial fishermen permitted.

- Commercial fishermen may at no time park or operate a motor vehicle in the natural areas and Conservation Zones.

CONCESSION STANDS

24.02.33 Concession stands may operate on the beach from sunrise to sunset, November1 through April 30 of each calendar year.

24.02.34 Concession stands may operate on the beach from 8:00am. To 7:00pm, May 1 through October 31 of each calendar year.

- Concessionaire vehicles cannot access the beach until after the daily morning sea turtle nesting survey has been completed.

24.02.35 All concession vehicles must adhere to all beach vehicle traffic laws.

TRASH COLLECTION VEHICLES

24.02.36 Trash collection vehicles may operate on the beach from sunrise to sunset, November1 through April 30 of each calendar year.

24.02.37 Trash collection vehicles may operate on the beach from 8:00 am. To 7:00 pm. May 1 through October 31 of each calendar year.

- Trash collection vehicles may not operate on the beach until after the daily morning sea turtle nesting survey has been completed.

WASHBACK SURVEYS

24.02.38 Between August 1 and November 30 of each calendar year, vehicular beach access may be delayed during periods when large quantities of seaweed are washing ashore. This applies to beach sanitation and maintenance vehicles, commercial fishermen, and concessionaires, as well as the general public,

- During these periods, the beach may be closed to oncoming traffic while the wrack line is searched for washback hatchlings.
- If the wrack line is above the eastern edge of the established traffic lanes prior to the official daily opening of the beach, vehicles will not be allowed access to the beach until after the washback survey is complete,
- If the wrack line from the previous night is east of the established driving area prior to the official daily opening of the beach, vehicles will be allowed access to the beach. As the tide comes in and the wrack line begins to encroach into the traffic lanes, the beach will be closed to oncoming vehicles, and the wrack line will be surveyed at high tide, Existing cars on the beach will be managed, as specified above under Beach Closure Due to High Tides.
- Washback surveys will be coordinated through Volusia County Environmental Management

(VCEM). VCEM will notify the appropriate Beach Safety personnel when the survey has been completed and the area can be opened for vehicular access.

ATTACHMENTS

Attachment A: Coastal Construction Access Card

Revised: JW 03/21/2007

CSD – 4/1/2013

Approved by: Director Mark Swanson

APPENDIX H - NIGHTTIME VEHICLE OPERATION GUIDELINES

VOLUSIA COUNTY BEACHES HCP
NIGHTTIME VEHICLE OPERATION GUIDELINES
FOR COUNTY AND MUNICIPAL PUBLIC SAFETY VEHICLES

Volusia County's Habitat Conservation Plan (HCP) allows for continued public vehicular access to County Beaches while providing protection to sea turtles that use the beaches as nesting habitat. The HCP recognizes the need for the operation of public safety and other official (e.g., Code Enforcement) vehicles on the beach at night. However, nighttime operations increase the risk of impacts to sea turtles. Although the County's Incidental Take Permit (ITP) allows for this kind of impact, measures must be implemented to minimize the risk.

Accordingly, all personnel who conduct nighttime operations of vehicles on the beach in an official capacity are required to adhere to the procedures listed below. Additionally, law enforcement officers and other officials who anticipate routine or regular nighttime operation on the beach are encouraged to participate in an HCP training class provided periodically to Beach Safety Officers and other County personnel. The County will notify all affected agencies of scheduled classes.

OPERATING PROCEDURES

1. Ensure that all gates used for ingress to and egress from the beach are closed and locked when not in use. This will prevent unauthorized vehicles from accessing the beach at night, a violation of the County's ITP.

2. Use low-beam headlights when traveling on the beach. This will allow you to sight and avoid running over nesting females and hatchlings on the beach. However, headlights must be turned off and amber parking lights turned on when the vehicle is at rest for more than one minute. This will prevent hatchlings from being attracted toward the vehicle.

3. Drive below the previous high tide line (wetted portion of the beach) whenever possible. This reduces the chance of creating ruts which may trap hatchlings trying to reach the ocean.

4. Do not drive inside (landward) the marked Conservation Zone boundary (posts spaced about 50 feet apart in public driving areas) or near the dunes except when it is necessary for performing public safety operations and no alternative is available. Areas near the dune have the highest concentrations of nests.

5. Avoid running over sea turtle nests. All known nest sites are conspicuously marked.

6. Watch for tracks of nesting females on the beach to avoid impacts. If a turtle is on the beach do not shine lights in her direction, and attempt to leave the area without disturbing the nesting process.

7. Although it may be necessary to use your spotlight in the performance of public safety operations, avoid the indiscriminate shining of spotlights along the dune area where turtles may be nesting. The lights could cause the turtle to abort her nesting attempt.

8. Contact the Beach Safety Officer on duty if you observe, or are alerted to, any of the following situations involving sea turtles:

    a. Crowds interacting with nesting females or hatchlings in a disruptive manner (touching, flashlights, loud noises); and

    b. Disoriented hatchlings crawling in any direction other than towards the ocean.

9. Complete an incident report describing any event involving sea turtles, including witness accounts. Forward incident reports to Volusia County's Environmental Management.

CONTACTS

Appropriate points of contact for questions and/or reports involving nighttime beach operations are provided below.

Contact	Purpose	Number
Volusia County Beach Safety (Nighttime Operations)	To request assistance or report incidents involving sea turtles during nighttime operations	Volusia County Sheriff's Office 386-239-6484
Volusia County Beach Safety (Daytime Operations)	To report problems encountered on the beach at night or to request clarification on nighttime operations	386-239-6414
Volusia County Environmental Management	To receive information related to the County's HCP or Incidental Take Permit	386-238-6414 or 386-238-4716

THANK YOU FOR ASSISTING VOLUSIA COUNTY
IN COMPLYING WITH ITS INCIDENTAL TAKE PERMIT

APPENDIX I – POLICY FOR THE PLACEMENT OF PORTABLE RESTROOM FACILITIES

POLICY FOR THE PLACEMENT OF PORTABLE RESTROOM FACILITIES UNDER VOLUSIA COUNTY'S HABITAT CONSERVATION PLAN

Volusia County's HCP describes the authorized locations for placement of portable restroom facilities on County Beaches.

> *Portable restroom facilities will be located on the beach adjacent to the CZ within the County's legal right-of-way at vehicle ramps. This right-of-way will not be considered part of the Conservation Zone or Natural Beach Management Area. Maintenance of these areas is permitted by FDEP. Additional restrooms may be placed near the south jetty at Ponce Inlet in New Smyrna Beach. The jetty is used extensively by surfers and fishermen, and there are no nearby facilities. Portable restroom(s) adjacent to Smyrna Dunes Park will reduce the likelihood of human trampling of the dunes and associated impacts to beach mouse habitat. Additional facilities may be deployed away from vehicle ramps if necessary to alleviate human health/sanitation problems and/or improve protected species conservation. The deployment of these facilities will be in conformance with the County's Policy for the Placement of Portable Restroom Facilities. Any changes to this policy must be approved by the USFWS.*

The need for limitations on the placement of portable restroom facilities is based on the potential impacts that these facilities pose to adult and hatchling sea turtles during the nesting season (May 1 – October 31):

- The structures constitute an obstacle to nesting turtles;
- The facilities may trap hatchlings in unmarked nests;
- Service vehicles may run over unmarked nests;
- Service vehicles may leave ruts on the beach that could trap hatchlings; and
- Facilities that are vandalized or turned over by high tides may contaminate nesting habitat.

Conversely, the absence of adequate facilities in high-use beach areas may impact sea turtle nesting as well as other sensitive natural resources. For example, at popular locations distant to vehicle ramps or other restroom facilities, beachgoers frequently trespass into the dunes to go to the bathroom (a particular problem with surfers at Smyrna Dunes Park). This behavior potentially tramples dune vegetation, impacts known beach mouse habitat, poses a public health risk, and/or elicits complaints from adjacent property owners. The lack of nearby facilities may also increase the amount of vehicular traffic moving to and from restroom facilities from remote locations (with attendant impacts to nesting habitat).

To balance these conflicting impacts, Volusia County shall adhere to the following policy regarding the placement of portable restroom facilities:

PORTABLE RESTROOM PLACEMENT POLICY

1. Placement of portable restroom facilities at vehicle access ramps.

   Portable restroom facilities will be located on the beach adjacent to the CZ within the County's legal right-of-way at vehicle ramps.

2. Placement of portable restroom facilities at Smyrna Dunes Park.

   Three portable restroom facilities may be placed near the south jetty at Smyrna Dunes Park.

3. Short-term placement of portable restroom facilities for special events.

   Portable restroom facilities may be utilized during permitted special events, as authorized under the ITP, with the following conditions:

   a. No temporary facilities may be placed in Natural BMAs.
   b. The number of temporary facilities placed on the beach at any special event shall be limited to the minimum number required for adequate sanitation. The environmental conditions attached to the special event permit shall indicate the maximum number of temporary facilities authorized.
   c. All temporary facilities shall be placed outside the Conservation Zone.
   d. Temporary facilities shall not be placed within 50 feet of a marked sea turtle nest. Should a nest be deposited within 50 feet of a temporary facility, the facility shall be moved an appropriate distance away under the supervision of the PSS or his/her designee.
   e. No temporary facilities may remain on the beach for more than five days.
   f. The placement of temporary facilities on the beach shall be in conformance with all applicable local and state rules and regulations.

4. HCP Training

   All drivers of vehicles placing and/or servicing portable restroom facilities must be HCP trained.

APPENDIX J – WASHBACK HATCHLING SURVEY GUIDELINES

VOLUSIA COUNTY BEACHES
POLICIES AND GUIDELINES FOR
WASHBACK HATCHLING SURVEYS

Revised: November 2013

PURPOSE:

Hatchling sea turtles that have left nesting beaches and been at sea for several weeks or months are occasionally transported back to shore and onto beaches by heavy winds and surf. When these post-hatchling "washbacks" show up on beach-driving areas they are at risk of being impacted by vehicles. The purpose of this document is to establish the standards and methods needed to minimize the potential for such impacts on County Beaches.

POLICY:

From August 1st through November 30th each year, Volusia County shall:

1) Conduct systematic surveys of wrack lines (the zone at the high tide line where sargassum seaweed and floating debris [flotsam] accumulate) for live and dead sea turtle post-hatchling washbacks following heavy wind and surf events;
2) Collect, hold and deliver live and dead washbacks to a sea turtle care facility for evaluation, rehabilitation, and/or release or disposition; and
3) Regulate vehicular beach access and/or use to accommodate the surveys.

GUIDELINES:

These guidelines are designed to:

- Establish systematic methods for conducting surveys of wrack lines for live and dead washback sea turtles; and
- Establish procedures for the proper handling and care of live washbacks, and disposition of dead washbacks, collected on County Beaches.

Preparation - If the wind has been predominantly onshore and one or more wrack lines are expected to develop on the beach, staff, equipment, and vehicles will be mobilized in anticipation of conducting surveys of those wrack line(s) in Urban and Transitional Beach Management Areas (BMAs). Appropriate containers (as defined below) will also be provided to all lifeguard stations to receive and temporarily hold sea turtles delivered by County surveyors and the general public.

Authorization – Prior to August 1 each year, the County will obtain a FWC letter of authorization to allow County staff to collect, receive and/or temporarily hold washback hatchlings. All personnel potentially involved in the surveys will be listed on the letters of authorization. An application to renew the authorization will be submitted to the FWC Bureau of Protected Species Management prior to May 1 each year.

Survey Procedures – Upon confirmation of the presence of a new or fresh wrack line, Beach Safety vehicles will commence systematic surveys of the wrack line to collect post-hatchling washbacks, as described in the Beach Safety Environmental Policy (Appendix L). The vehicles will travel slowly on the wetted portion of the beach just above or below the wrack line, as conditions allow a vehicle to pass while avoiding traversing over fresh seaweed. Although the surveys will focus on the Urban and Transitional Areas, they may also be conducted in Natural Areas, time and resources permitting. In Natural Areas, surveys will be conducted prior to the afternoon trash collection, tides and staffing permitting.

Surveys will be conducted at least once each day throughout the period when weather conditions continue to wash fresh wrack ashore. If tidal conditions require more than one survey per day, a second survey will be conducted if sufficient FWC-authorized personnel are available.

Beach Clearance Procedures - Surveyors will be equipped with either two-way radios or cellular phones to relay when areas are cleared for public vehicular access. Clearance for vehicular traffic will be handled under two scenarios:

1. If new or fresh wrack lines are present seaward (east) of the Conservation Zone, an initial survey will be conducted at first light prior to opening the beach to motor vehicles.

2. If new or fresh wrack not present during the initial survey begins to encroach on traffic lanes during normal beach driving hours, the beach will be closed to oncoming vehicles. Cars already on the beach will be managed as required by the County's policy for beach closing during high tide conditions (Appendix G). A roving announcement prior to high tide will advise vehicle owners that they will not be allowed to move their vehicles until the tide recedes, the wrack line is surveyed, and clearance is given for vehicle traffic to continue. Failure to abide by these policies will be enforced by verbal warnings and issuance of citations, if warranted. If the tide is not expected to recede before the beach officially closes for the night, then the beach will be cleared of all vehicles, as is done under normal beach closing procedures at least one (1) hour prior to the anticipated high tide.

Under either of the above scenarios, after an entire Urban or Transitional BMA has been surveyed and as many post-hatchlings recovered as possible, the surveyor will notify either the Beach Safety Headquarters (north) or New Smyrna Beach (south) lifeguard station dispatchers, as directed by Beach Services, and let them know that the area has

been cleared. The dispatchers will then notify the toll booth attendants that the ramp gates can be opened for vehicular access, tidal conditions permitting.

Collection And Handling Procedures – Surveyor's will complete a form (see Attachment A, Appendix L) each day that surveys are conducted to document the date and time of surveys, the number of hatchlings collected, and the location and time that the hatchlings are dropped off at a designated collection site. Only small sea turtles, with a carapace length of less than approximately 12.5 cm (5 inches), will be collected. Larger sea turtles washed back onto the beach will be treated as a normal stranding, left on the beach, and the Marine Turtle Principal Permit Holder notified immediately.

All live and dead sea turtles fitting the above description will be collected and held for pickup and evaluation by sea turtle permit holders in accordance with FWC guidelines or transported directly to the MSC (see Attachment B, Appendix L). Live hatchlings will be placed in a bucket or container labeled "For Marine Turtle Hatchlings Only" with a damp towel (no standing water). The bucket will have a perforated lid that will allow for adequate air exchange, and will be placed in a shaded, well-ventilated location (not air-conditioned) until the turtles can be transferred to sea turtle permit holders. Live sea turtles can be kept together in one container, depending on their size, condition and level of activity. However, when large numbers of washback hatchlings are recovered, several containers may be required. Washback hatchlings should be transferred to sea turtle permit holders within three (3) hours of collection, whenever possible.

If there is any evidence that a washback hatchling has been impacted by vehicular traffic (e.g., body laterally/ventrally compressed, eyes protruding from sockets, internal organs protruding from mouth, etc.), the following steps shall be taken:

1. Prior to removing the specimen from the beach, photographs will be taken, when possible, to show its position relative to driving lanes, the CZ, wrackline, and other beach features;

2. The specimen will be placed in a plastic bag, if available, or other suitable container labeled with the date, collection location, and collector's name, and an incident report will be completed. The report will include the date, time and location of the take, any pertinent information regarding beach conditions (e.g., no traffic on beach at time, seaweed scattered across driving lanes, etc.), and the name of the person completing the report;

3. Environmental Management will be notified immediately (Environmental Management must notify U.S. Fish & Wildlife Service within 24 hours); and

4. The specimen will be kept on ice or in a cool location until it can be transferred to either Environment Management or the Marine Science Center along with a copy of the incident report, as directed by Environmental Management.

General Public Contribution – During washback events, a roving announcement may be utilized by the County to inform pedestrians not to place any sea turtles back into the ocean or carry them home. The public will be instructed to deliver the turtles to the closest lifeguard stand or Beach Safety Officer. All sea turtles brought to Beach Safety officials by the general public will be containerized as described above. The container must not be opened, moved or otherwise disturbed or displayed to the general public. The Beach Services employee receiving these animals will notify the dispatcher at either the Beach Safety Headquarters or New Smyrna Beach stations, as directed, and the dispatcher will then contact the appropriate sea turtle permit holder or designee for transport to the Marine Science Center.

Evaluation, Release And Rehabilitation – Post hatchling sea turtles will be retrieved by permitted personnel of the County's Marine Science Center (MSC). Principal Permit Holders involved in the sea turtle monitoring program and Beach Safety may assist in the transfer of washbacks to the rehab facility. Additionally, FWC-authorized personnel may be directed to deliver washbacks directly to the MSC.

Staff of MSC will evaluate the condition of live post-hatchlings, provide care and rehabilitation as necessary, and coordinate their release in accordance with FWC guidelines. MSC will maintain a log indicating the date, stranding ID, number of hatchlings received, and their county of origin, if known. The following information will be recorded for each post-hatchling received at the facility: species, size (carapace length), and condition (live or dead).

Any evidence of vehicle interaction not previously documented will be reported to the HCP Program Manager immediately upon discovery, and an incident report will be completed. The report will include the following, if known: name and contact number of the person providing the specimen, date and time when found, location where found (address, facility name, etc.), location of the turtle on the beach when found (e.g., near the waterline, inside CZ, etc.), and any other pertinent information (e.g., was turtle mingled in seaweed or exposed on sandy beach when found). The incident report, along with photographs of the specimen, will be provided to Environmental Management and the specimen placed in a labeled plastic bag and frozen. The specimen will be maintained by the MSC, transferred, or disposed of as directed by the FWC letter of authorization and/or other FWC guidance. The HCP Program Manager shall be responsible for notifying the USFWS of any take of washback hatchlings causally related to vehicular activity in accordance with conditions of the ITP. Upon notification, the USFWS will inform the HCP Program Manager whether or not it is interested in acquiring the specimen(s).

The MSC will also maintain records indicating the number of washback hatchlings successfully released or transferred to other facilities. Copies of these records, as well as any information pertaining to sea turtle rehabilitation activities submitted to FWC, will be provided to the HCP Field Manager no later than December 31 of each year for incorporation into reports furnished to the USFWS.

Large-scale Washback Events – Five hundred (500) or more washbacks recovered during a single washback season, shall serve as the threshold for triggering an enhanced washback recovery response. Whenever this threshold is triggered, the HCP Program Manager will promulgate and immediately implement changes to these policies and guidelines consistent with the purpose of this document, for the remainder of that washback season. Such changes and their details may include, but are not limited to, the following:

1. Dedication of additional County staff, sea turtle monitoring personnel and/or volunteers to augment Beach Safety surveys in both public driving and Natural BMAs;

2. Establishment of drop-off boxes at permanent lifeguard stations to hold washbacks overnight;

3. Lengthening of the Washback Season beyond November 30;

4. Processing recovered washbacks at the MSC in batches rather than individually; and

5. More frequent reporting of washback recovery efforts by the MSC to ensure timely reporting to the USFWS.

The HCP Program Manager shall inform the USFWS in writing of having exceeded the washback threshold, and include the changes promulgated and implemented, or expected to be implemented, within five days of exceeding the threshold.

APPENDIX K - RUT REMOVAL PROCEDURES

VOLUSIA COUNTY BEACHES
STANDARD OPERATING PROCEDURES FOR
RUT REMOVAL

Revised: November 2013

PURPOSE:

Sea turtle hatchlings emerge from their nests at night and crawl to the ocean in a frenzied state. Hatchlings trapped by obstacles on the beach or impeded in their nest to sea migration may have reduced survivorship. The purpose of these procedures is to minimize the potential for such impacts related to vehicular activity on County Beaches.

POLICY:

Volusia County shall be responsible for removing vehicular ruts seaward (east) of sea turtle nests nearing hatching to minimize the potential for take of hatchlings during their nest to sea migration. Rut removal will be performed in conformance with the Habitat Conservation Plan (HCP) and conditions contained in the County's Incidental Take Permit (ITP).

COMMENCEMENT AND DURATION OF RUT REMOVAL OPERATIONS:

Rut removal operations will commence at every loggerhead and green turtle nest 46 days after the nest is laid (60 days for leatherback nests), or the first hatchling emerges, whichever comes first. Each marked nest will be evaluated daily in accordance with the procedures contained herein until the nest barrier is removed from the beach.

COORDINATION AND TRAINING:

Rut removal operations will be managed and coordinated by the HCP Field Manager, or other entity designated by the County. Logistical support will be provided by the HCP Program Coordinator.

Sufficient personnel, equipment, and vehicles, including 4-wheel drive trucks, SUVs, and/or ATVs, will be dedicated to the program to ensure that all required tasks can be performed efficiently and effectively on a daily basis. Equipment will be made ready and available at least one week prior to commencement of rut removal operations each year. Rut removal may be performed by County staff or by contracted firms/individuals. All personnel involved in the program will be trained by HCP Program staff and/or the PSS prior to initiation of rut removal operations each year.

The Field Manager will closely monitor the rut removal program to ensure that established procedures are being adhered to and the program is achieving its intended results. The Field Manager will consult with the PSS and/or HCP Program Coordinator on an as-needed basis to address any program deficiencies.

AREAS TO BE MONITORED:

Areas of County Beaches accessible to the driving public will be routinely monitored for ruts by rut removal personnel. These sections of beach have the greatest potential for ruts. In non-public driving areas (Natural Beach Management Areas), nests will be inspected daily for ruts by Beach Services Officers, County staff, and/or sea turtle monitoring personnel authorized to operate vehicles in these restricted areas. If ruts are observed, they will be reported to the Field Manager the same day and rut removal personnel dispatched to the nest site(s).

Rut removal will be routinely performed in the following areas:

- North boundary of Oceanfront Park (north side of Granada Blvd.) in Ormond Beach south to Emelia Ave. in Daytona Beach Shores (HCP Regions 3, 4 and 5).
- Beach St. to the north jetty in Ponce Inlet (HCP Region 7).
- The south jetty at Ponce Inlet south to 27th Avenue in New Smyrna Beach (HCP Region 8).

Rut removal will not be routinely performed in the following areas:

- North Peninsula State Recreation Area south to the north boundary of Ocean Front Park (HCP Region 2).
- Emelia Ave. south to Beach St. (HCP Region 6).
- 27th Ave. in New Smyrna Beach south to the Canaveral National Seashore (HCP Region 9).

MARKING NESTS FOR RUT REMOVAL:

The Field Manager (or designated Rut Removal Coordinator) will provide rut removal personnel with a geographically sequenced list of nests within routinely monitored areas. This list will indicate the date that rut removal is to begin at each nest site. Known street addresses, prominent landmarks and nearby gated beach access points may be appended to the list to assist in nest location.

Sea turtle monitoring personnel will attach a long piece of surveyor's tape (unique color agreed to by the County) to the nest barrier when the nest has reached 46 days of incubation (60 days for leatherback nests). Alternative methods of marking nests nearing

hatching may be used if approved by the Field Manager. This will provide field personnel with an easy method for identifying nests in the field that require monitoring.

If sea turtle monitoring personnel observe a hatchling emergence at a nest prior to 46 days of incubation (60 days for leatherback nests), the uniquely colored surveyor's tape will be attached to the nest barrier and the event reported to the Field Manager the same day. If the nest is located in an area routinely monitored, the Field Manager will advise the appropriate rut removal personnel to inspect the nest site that afternoon and will add the nest to the rut removal nest inventory list.

Caged nests in routinely monitored areas will not be monitored for ruts, as hatchlings from these nests are collected and transported to other areas for release. Therefore, if a cage is needed, it must be applied prior to 46 days of incubation. Sea turtle monitoring personnel will notify the Field Manager whenever a cage is applied to a nest so the inventory list can be amended accordingly.

RUT REMOVAL PROCEDURES:

Time of Day – Marked nests in routinely monitored areas will be examined daily. Rut removal will commence no earlier than 5:30 PM to minimize the potential for new ruts being created after raking has been completed.

The Field Manager will develop guidelines for determining which sections of beach to monitor first. Heavily used areas, such as that section of beach in New Smyrna Beach between Beachway Drive and the south jetty should be monitored last to allow the majority of vehicles to exit the beach before rut raking begins.

Mechanical rut removal activities will be completed prior to sunset. If ruts meeting the criteria listed below have not been removed prior to sunset, they will be hand raked. All rut removal vehicles must be off the beach by nightfall.

Criteria for Determining if Ruts are Present – Rut removal will be performed at a nest site if the following criteria are met:

- One or more ruts occur within a 30 foot wide path (15 feet to the north and 15 feet to the south) extending from the nest site to the ocean; and
- At least one of these ruts is deeper than 1 inch; and
- Any rut deeper than 1 inch is at least 3 feet in length; and
- Ruts deeper than 1 inch are oriented in a direction other than east-west.

All rut removal personnel will be trained by HCP Program staff and/or the PSS on how to evaluate nests to determine if rut removal is needed. In the event that personnel assigned to rut removal duties are uncertain whether the criteria set forth above are met, they should perform rut removal.

Site Inspection Before Raking – Prior to performing any rut removal activities, the area to be raked will be visually inspected to ensure that no hatchlings are present on the beach. If hatchlings are present, they should be allowed to crawl to the ocean. If hatchlings appear weak or injured, the appropriate Principal Permit Holder (PPH) will be notified immediately at the contact numbers provided by the Field Manager. Rut removal personnel will then handle the hatchlings in accordance with directions provided by the PPH and will continue on with rut removal operations.

Raking Outside the Conservation Zone (CZ) – Ruts located seaward (east) of a marked CZ will be removed (smoothed-out) by towing an apparatus that effectively obliterates ruts. This gear may be subject to approval by the U.S. Fish and Wildlife Service. The area raked will encompass a path that is at least 30 feet wide, centered in front of the nest, from the nest site to the previous high tide line wherever ruts are present. During rut removal operations, personnel will take care to ensure that the vehicle used to smooth the ruts does not leave ruts in the process. Additional, hand-raking may be required to fill in very deep ruts.

Raking Inside the Conservation Zone (CZ) – **Ruts located landward (west) of a marked CZ will be removed by hand raking only.** Only rakes or comparable tools that penetrate no greater than 3 inches deep into the sand are to be used for hand raking.

Raking Near Marked Nests – **At no time should either hand or mechanical raking be conducted inside a nest barrier even if the nest is outside the CZ.** A two-foot buffer zone should be preserved around the outside of the nest barrier. This will make it easier for sea turtle monitoring personnel to identify hatchling tracks the following morning. If ruts are present within this buffer zone hand rake up to the edge of the barrier.

Removing Other Obstacles – Other potential impediments to hatchlings as they travel from their nests to the ocean should also be removed by rut removal personnel. These include, but are not limited to the following:

- Holes dug in the beach (excluding footprints) that are greater than 6 inches wide and 3 inches deep. Footprints do not have to be raked. Holes too large to be obliterated using the standard rut removal equipment will be filled using hand tools (rakes or shovels). Only sand piled adjacent to the hole or obtained from the wetted portion of the beach will be used as fill material. At no time are personnel to dig below the ambient grade of the dry beach.

- Large objects, including but not limited to; beach chairs, wooden poles and logs, fishing line and miscellaneous garbage that could block or trap hatchlings will be removed by hand.

SUSPENSION OF RUT REMOVAL DUE TO HAZARDOUS CONDITIONS:

Rut removal will not be performed if the beach is closed to the general public due to

adverse weather conditions (e.g., lightning storms). Personnel will arrive at their assigned beach locations and wait for the weather to clear. If the weather clears in sufficient time to permit rut removal operations before dark, personnel will perform their duties.

High tides may occasionally preclude safe vehicle operation. If high tides prevent access to certain sections of the beach, transfer rut removal operations to those sections that are accessible and wait for the tide to recede. If the tide does not recede in time for all rut removal activities to be completed before dark, rut removal will be suspended for the day.

REPORTING RUTS AND OTHER IMPEDIMENTS IN AREAS NOT ROUTINELY MONITORED:

In the Natural BMAs, the activities of Beach Services Officers, sea turtle monitoring personnel, and other authorized personnel, will largely be confined to the wetted portion of the beach. However, if they have to traverse soft sand areas, they will make a good faith effort to remove any ruts created by their vehicles waterward of nests due to hatch. In the event that they are unable to perform this function in a timely manner because of other pressing responsibilities, they will notify the Field Manager the same day so a special rut removal detail can be dispatched to the nest site that afternoon.

HCP personnel operating vehicles in Natural BMAs will also monitor for the presence of any substantial impediments to hatchlings seaward of nests due to hatch. If possible, these obstacles will be removed when they are first observed. However, if the obstacles cannot be easily moved, the Field Manager will be notified the same day so a special detail can be dispatched to the nest site that afternoon.

Beach Services Officers, County staff, sea turtle monitoring personnel and others having HCP responsibilities and operating vehicles on County Beaches will make a concerted effort to minimize the creation of ruts. Additionally, they will assist to the greatest extent practical with the removal of ruts and other obstacles in front of nests in Natural Beach Management Areas. This will minimize the disruption of routine rut removal operations and will minimize the need for rut removal vehicles having to enter Natural BMAs.

REMOVAL OF NEST BARRIERS:

Rut removal operations at a nest site will be terminated when the nest barrier is removed from the beach. Nest barriers will be removed by sea turtle monitoring personnel when one of the following occurs:

- The nest is washed out;
- It is determined that the nest has been destroyed by tidal inundation;
- The nest is vandalized or poached by humans and no viable eggs remain;
- The nest is depredated and no viable eggs remain;

- At least three days have passed since the date of first hatchling emergence and no new hatchling tracks are present (for nests where nest excavation is not performed);
- At least 70 days (80 days for leatherbacks) have passed without any sign of hatchling emergence (for nests where nest excavation is not performed);
- The nest is excavated but the clutch could not be located; or
- The nest is excavated and reproductive success data has been collected.

ASSESSING RUT REMOVAL OPERATIONS:

The Field Manager will develop a system that will allow rut removal personnel to document which nests were inspected and which required rut removal. If nests on the inventory were not inspected (e.g., inclement weather, high tides, etc.) or if rut removal operations could not be performed (e.g., equipment breakdown), explanatory information will be provided. This information will be given to, and maintained by, the Field Manager. The Field Manager and/or PSS will periodically evaluate this data and other aspects of the rut removal program to ensure that the program is achieving its objectives.

APPENDIX L - BEACH SAFETY ENVIRONMENTAL POLICY

ATTACHMENT A

VOLUSIA COUNTY DEPARTMENT OF PUBLIC PROTECTION BEACH SAFETY DIVISION
Director Mark Swanson

Departmental Standards Directive

TITLE:	**ENVIRONMENTAL**
CODIFIED:	**45.01**
EFFECTIVE:	**11/01/2013**
RESCINDS/AMENDS:	**10/12/2012**
ATTACHMENTS:	**4**

PURPOSE

The purpose of this policy is to establish guidelines and procedures for the handling of various environmental issues encountered by Beach Safety Officers and to establish guidelines in reporting hazardous material incidents to the proper authorities.

DISCUSSION

Volusia County beaches provide a coastal environment consisting of sand dunes, vegetation, various sea birds and marine species. Protecting this environment and its inhabitants is paramount for the survival of the Volusia County coastal region. Many of the animals that inhabit the beach and coastal marine waters are protected by state and federal law, and in some cases, they are endangered species. The Volusia County beaches also provide a natural aquatic playground for millions of people who visit the beach each year. To maintain the integrity of the environment for the enjoyment of beachgoers and the protection of wildlife, a variety of federal, state and local laws and regulations have been enacted. In addition to legislative enforcement, various permits and plans have been generated to establish guidelines and procedures for the protection and preservation of the beach environment. These permits and plans include, but are not limited to, the County's Habitat Conservation Plan (HCP) and the Federal Incidental Take Permit (ITP) issued for beach driving. The ITP, prohibits motor vehicles operated by the general public from traveling on certain portions of the beach, but allows beach driving in other areas. The ITP stipulates that a condition of this permit is the implementation of minimization and mitigation measures contained in the HCP. The HCP provides policies and procedures for the protection of endangered species and their habitat on Volusia County Beaches.

POLICY

It shall be the policy of the Volusia County Department of Public Protection, Beach Safety Division, to have a good understanding of the beach environment and to enforce all federal, state, and local laws relevant to the protected species that inhabit it. Furthermore, it shall be the policy to annually train, understand and abide by all permits, plans, procedures and DOT Guidelines for the protection of this environment and the recovery of hazardous materials.

PROCEDURE

NIGHTTIME SEA TURTLE EVENTS

45.01.01 Sea turtles conduct most of their activity at night. The adults typically emerge from the ocean at night to nest. The hatchlings (baby turtles measuring less than 2 in.) also generally emerge from their nests and crawl to the ocean during the hours of darkness.

45.01.02 Events that may occur or be encountered at night include:

- Female turtles crawling in the sand to make a nest;
- Hatchlings crawling to the ocean after leaving their nest.

45.01.03 Crowd control is almost always necessary when turtle activity is occurring.

45.01.04 Flashlights and fireworks can scare and disorient turtles, especially hatchlings emerging from a nest. Corrective measures must be taken by Beach Safety Officers, either through legal action or a cease and desist order.

- Legal fireworks should be displayed far enough away from turtle activity where they are not visible or audible in relation to the turtle's location.

45.01.05 The minimum safe distance for the public to view nighttime turtle activity is at least 30 feet.

45.01.06 Flashlights by themselves are permissible on the beach. However, the use of flashlights near turtle activity, whether unintentional or intentional, may harass turtles and can disrupt their normal behavior.

NIGHTTIME DISORIENTATION EVENTS

Disorientation: Turtle hatchlings heading in any direction other than toward the ocean. This event is usually due to the attraction of a nearby light source.

45.01.07 In the event that a disorientation is reported or observed, the Beach Safety Officer shall contact the closest Principal Permit Holder (PPH) or his/her designee as soon as possible.

45.01.08 In the event that the hatchlings are disorientated by a light source, the Beach Safety Officer should attempt to have the light source extinguished.

45.01.09 In the event that hatchlings are in imminent danger, e.g.:

- Nearing or crossing a roadway;
- The hatchlings are spread out over a wide area and there is a possibility of losing track of them.

Collect the hatchlings and hold them in a designated bucket lined with a damp towel until the PPH or his/her designee arrives to take custody. The use of flashlights

should be minimized to prevent other hatchlings from being disoriented. Do not place the hatchlings in the ocean unless directed by the PPH.

45.01.10 In situations where the general public has good intentions to assist the Beach Safety Officer, the officer should diplomatically inform them not to assist and vacate the immediate area. Always contact the closest PPH for advice.

NIGHTTIME BEACH SAFETY SURVEYS

45.01.11 The sea turtle nesting season is from May 1 through October 31 of each calendar year. When conducting nighttime Beach Safety surveys during this period, adhere to the following guidelines;

45.01.12 To avoid creating vehicle fire ruts, Beach Safety vehicles should be operated in the wetted sand portion of the beach below the most recent high tide line.

45.01.13 Beach Safety vehicles that stop in an area for more than 1 minute should extinguish the headlights and leave only the amber parking light illuminated.

45.01.14 In the event that an adult sea turtle is encountered during nighttime patrols, Beach Safety vehicles should not cross the turtle's path unless the vehicle is 50 feet away from the turtle.

45.01.15 Beach Safety Officers should not use flashlights or spotlights to illuminate the turtle's activity.

45.01.16 If an injured or trapped turtle is observed, contact the closest PPH for instructions, (see sea turtle strandings).

45.01.17 In the event that a Beach Safety vehicle encounters hatchlings emerging from a turtle nest, the officer should immediately extinguish all lights. The vehicle should not cross the path between the hatchlings and the ocean. The turtle hatchlings may emerge from the nest for an extended period of time.

- In the event that a Beach Safety observes a nest emergence and the hatchlings are crawling to the ocean, the officer does not have to report the event. Reports are made only in the event of a disorientation or if any turtles are impacted by a motor vehicle.

MARINE TURTLE HATCHLING HANDLING

45.01.18 In the event that young turtles are brought to the Beach Safety by the public, place the turtle in a bucket with a damp towel on the bottom. DO NOT USE STANDING WATER. Cover the bucket with a ventilated lid or cloth material. The bucket should be kept in a shaded location *away* from loud noises, air conditioning, and direct sun. The Beach Safety Officer should attempt to obtain information from the public, including location and time the turtle was found and what actions they took.

- Call the PPH closest to your location for directions as to what to do next.

SEA TURTLE STRANDINGS

45.01.19 A stranded sea turtle is any sick, injured or Dead Sea turtle larger than the palm of your hand that has washed onto shore.

- NOTE: Turtles smaller than the palm of your hand are considered washbacks, approximately 2 – 5 inch carapace (shell) length. (See washback section).

45.01.20 Any turtle found stranded alive shall immediately be reported to the closest PPH or his/her designee.

- Stay with the turtle to handle crowd control until the PPH arrives.
- In the event that the turtle is in the surf line, move it higher on the beach to prevent it from being taken back out by the tide and drowning;
- Do not move the turtle unless it is absolutely necessary;
- Shade the location if possible;
- If the turtle is on dry beach, do not place it in the ocean.

45.01.21 Any turtle found stranded dead shall be reported to the closest PPH.

- Leave the turtle on the beach until a PPH or his/her designee arrives to complete a stranding report;
- After the report is completed, the PPH responder will spray paint the shell with an X;
- After the spray painted X is observed, fill out the Contractor Notification Form to order a trash pick up. (See Contractor Notification Policy 103.01).
- The stranding PPH responder usually will notify the Zone station that the stranding report is completed and the carcass is ready for removal.

WASHBACKS

45.01.22 Washbacks are post hatchling sea turtles with a carapace (shell) 2 – 5 inches in length, that are deposited on the beach with Sargassum seaweed between August and November. Strong onshore winds break up vast rafts of the floating seaweed and it is eventually washed onshore. The washed up seaweed is referred to as a wrack line. The small turtles use the Sargassum seaweed as their habitat.

45.01.23 Small post hatchlings are at risk of being run over by motor vehicle traffic, dehydrated by the sun and subject to predation by birds and crabs.

45.01.24 As a condition of the (HCP) and the (ITP) searches will be conducted for these high risk turtles. All full-time staff will receive annual training and a letter of consent from the Florida Fish and Wildlife Conservation Commission to collect and transport washbacks.

45.01.25 Survey requirements:

- Washback season extends from August 1 through November 30;
- Wrack lines occurring in the driving areas of the beach must be surveyed by the Beach Safety if

they occur east of the Conservation Zone and west of the traffic lanes, in a vehicle use area;

- Wrack line surveys will be conducted by all terrain vehicles (ATV) operated by Beach Safety employees, unless inclement weather or mechanical problems prevent their use.
- Wrack line surveys must be conducted at first light immediately following the latest high tide and prior to beach opening to motor vehicle traffic.
- In the event that a wrack line occurs during normal beach driving hours, Beach Safety employees will make roving announcements prior to high tide advising motorists that they should remain parked on the beach in the affected wrack line areas until the tide recedes. The wrack line will be surveyed and clearance given for motor vehicle traffic to continue.
- In the event that 500 washbacks are recovered prior to November 30th, the HCP Coordinator may request that Beach Safety assist with surveys in natural (non-driving) areas.
- Suveys may also be required after November 30th if unusual numbers of washbacks are still coming ashore.

45.01.26 Currently the Division is responsible to complete two forms, one for wrack line surveys (Survey Log) and the other is for washback turtle recoveries (Chain of Custody Log). (See attachments "A' and "B').

- In the event that a wrack line occurs east of the Conservation Zone during the period between August 1 and November 30, Beach Safety Employees will conduct a wrack line survey. Upon completion of the survey, a survey report form will be filled out. A copy of the form will be faxed to Beach Safety Lifeguard Headquarters at (386) 238-4772. A hard copy will be maintained in a file at each Zone conducting the survey. (See attachment "A").
- In the event during the course of the wrack line survey, Beach Safety Employees or the general public recover a turtle from the wrack line, a chain of custody log form will be completed and will remain with the turtle until it is delivered to the Marine Science Center (See attachment "B", Chain of Custody Log).
- All washback turtle recoveries will be handled according to Directive 45.01.18. Washback turtles may also be transported to the Marine Science Center by permitted personnel listed at each Zone Station. NOTE: Washback turtles should be transported to the (MSC) with in 3 hours of their initial recovery unless overnight stations are activated at Dunlawton and New Smyrna Stations. Holding of washbacks overnight is only permitted during periods when exceptionally large numbers of washbacks are being recovered and only with the approval of the HCP Coordinator.

45.01.27 At the conclusion of each season, Environmental Department personnel will request all pertinent forms maintained at each Zone Station.

VEHICLE IMPACTS

45.01.28 Anytime that a marine turtle is impacted by a motor vehicle on the Volusia County Beaches, an incident report will be completed and HCP staff notified immediately. The report should include the date and location of the incident, the collector's name, and any pertinent information regarding beach conditions at the location where the turtle was found. Prior to removing the specimen from the beach, photo's should be taken to show the turtle in relation to the beach scene where it was discovered. A copy of the final report with photos, if available, will be forwarded to the HCP Coordinator.

45.01.29 In the event that the turtle is alive, it will require emergency care. The turtle should be transported to the Marine Science Center as soon as possible. If recovered after hours, call MSC staff in route so they can arrange a timely response.

UNUSUAL DAYTIME EVENTS

45.01.30 Occasionally adult sea turtles will emerge from the ocean to nest and hatchlings will emerge from the nest during the day. These turtles are in danger of motor vehicle impacts.

45.01.31 Whenever a daytime turtle event is observed or reported with in a public beach diving area, a Beach Safety Officer should immediately respond.

- If the beach is open to motor vehicle traffic, stop all traffic in the vicinity of the turtle activity until the activity is completed;
- Implement appropriate crowd control measures;
- Notify the closest PPH;
- Complete an incident report and forward a copy of the report to the HCP Coordinator. If possible, the Beach Safety Officer should stay with the turtle/s until the PPH or his/her designee arrives and the activity has ceased.

45.01.32 Whenever a daytime turtle event is observed or reported in a non driving area, (natural area), report the event to the nearest PPH and complete an incident report.

OTHER TURTLES

45.01.33 Occasionally land turtles will make their way onto the beach. The best way to determine the difference from a sea turtle is to examine the limbs. A sea turtle will have flippers, the land turtle will have feet with claws.

45.01.34 Upon discovering a land turtle on the beach, place the land turtle back into the sand dunes or move it to another upland location.

45.01.35 In the event that the land turtle has injures, contact the Marine Science Center and inquire if they have space to treat the turtle. The MSC will advise you of the best way to handle the turtle.

MARINE MAMMAL STRANDINGS

Marine mammals on the beach may include dolphins, whales and manatees. Please use the contact

information in attachment D to notify appropriate staff response.

45.01.36 The Hubbs-Sea World Research Institute will call a local stranding specialist to come to your location. Response teams are sometimes located a good distance away and arrival times may be delayed.

45.01.37 If the mammal is still alive, maintain motor vehicle and crowd control and assist with the mammal until a biologist arrives. (See attachment "C" & "D").

- Stabilize the mammal so that it does not roll around in the surf where it can further injure itself; watch out for the tail because even a very sick animal has a lot of strength.
- The skin of marine mammal is very sensitive to the sun. If possible, keep the mammal shaded. If not, place wet towels over the mammals skin (BE CAREFUL NOT TO COVER THE BLOW HOLE OR THE MAMMAL WILL SUFFOCATE);
- Keep the mammal wet by pouring water over its skin, paying special attention to cover the dorsal fin and tail. Keep water clear of the blowhole.

45.01.38 If the mammal is alive, Beach Safety Officers will not be required after the specialist arrives unless continued crowd control is necessary.

45.01.39 In the event that the mammal is dead, do not have it removed from the beach until biologists have concluded their examination and collected necessary information. If the biologists are unable to transport the mammal off of the beach when they are finished complete a Contractor Notification Form. (See Directive 103.01)

45.01.40 In the event the mammal is stranded in a natural area, the stranding responder may require bringing a vehicle onto that section of the beach to pick up the mammal.

- The driver should be instructed to drive on the wetted section of the beach below the most recent high tide line;
- The Beach Safety Officer or a person who has received HCP training from Environmental Management should escort stranding responders to the stranding location;
- The Beach Safety Officer will complete an incident report. A copy of the report should be forwarded to the HCP Coordinator.

FISH KILLS

45.01.41 Fish kills can be anything from one fish washed in without anything visibly wrong with it, e.g. no hook in its throat or an apparent fisherman's throw back, to thousands of fish

45.01.42 Fish kills do not include marine mammals or sea turtles, (see Mammal or Marine Turtles section) for further guidance on responding to those types of strandings.

45.01.43 Fish kills will be reported to the Florida Marine Research Institute (FMRI). See attachment D for contact numbers.

45.01.44 Upon reporting fish kills to FMRI, the following information may be asked:

- Location;
- Time and date observed;
- Type of fish if known;
- Approximate number of fish involved;
- Any abnormal behavior;
- Fresh kill or decomposing;
- Presence of tumors, lesions or other deformities on the fish;
- Discoloration or odor (other than fishy smell) in the surrounding water;
- Any other thing that is out of the ordinary.

45.01.45 In the event that there are numerous fish that require special equipment to remove, contact the HCP Coordinator for further instruction.

45.01.46 In the event that the fish kill covers an extensive area of the driving zone, the beach should not be opened for motor vehicle traffic in the affected area until the fish have been removed or until a Zone Supervisor orders the area open. This process makes clean up efforts easier.

FDEP VIOLATIONS

45.01.47 FDEP violations include any type of beach or dune work, involving removal or planting of vegetation, building structures, e.g. crossovers, seawalls, installation of sand fences, placement of sand from upland properties, or excavation (digging) without a current FDEP permit and approval from the HCP Coordinator.

45.01.48 Any of the activities listed above should be reported to Environmental Management HCP staff. The HCP Staff will determine if a specific project is authorized and if the activity is in compliance with the FDEP permit and the HCP.

45.01.49 Special events on occasion require a FDEP permit. In the event that an event organizer is in question, request the special event organizer to produce a copy of the County Environmental Conditions which should be attached to the Special Event permit. The environmental conditions should state if a FDEP permit is required. If a FDEP permit is required and the special event organizer can not show proof thereof, contact the HCP Staff or have that portion of the event removed until approval is received.

POOL AND STORM WATER RUNOFF

45.01.50 Large amounts of water from upland properties may on occasion be seen pouring onto the beach. New construction is required to re-direct storm water from spilling onto the beach. Beach Safety Officers should note this at all new construction and report it to the HCP Staff if large amounts of water are still witnessed.

45.01.51 Many older hotels and motels were designed to drain water onto the beach, However, this usually occurs only during heavy rains. These facilities are "Grandfathered in" the system and they are not subject to enforcement for allowing this to occur.

45.01.52 In the event that the source of water appears to be coming from a pool discharge, the activity is

considered illegal. Actions to be taken by Beach Safety Officers if this is observed are:

- The activity is to be reported to the Volusia County Health Department, see attachment D for contact numbers;
- The property owner or manager will be notified to cease and desist the activity immediately until they have received the proper authorization from the Health Department;
- If this activity occurs on weekends or holidays, the Beach Safety is authorized to issue a cease and desist order until contact is made with the Health Department;
- Beach Safety Officers will complete an incident report in the event that this activity occurs on weekends and holidays and forward a copy to the HCP Staff.

WATER QUALITY, REDTIDES, BAD WATER QUALITY AND ALGEA BLOOMS

45.01.53 In the event water quality problems are observed or reported, notify the Volusia County Health Department and report all details available.

Contact: Same as Pool and Run off Section

45.01.54 In the event that the public is complaining of health problems or exhibit symptoms attributed to the water quality, The Beach Safety will close off the section of the affected beach to water activity.

- Health warning signs will be placed in the affected areas;
- Upon notification, the Health Department will collect water samples. The results should be made available with in 48 hours;
- The Health Warnings will be left in place until the Health Department issues a notice that the water is suitable for public use.

LIGHTER THAN AIR PARTY BALLOONS

45.01.55 The Florida Legislature found that the release of large numbers of balloons inflated with lighter than air gases poses a danger and nuisance to the environment, particularly to sea turtles and other marine animals.

45.01.56 It is unlawful to intentionally release 10 or more lighter than air balloons within a 24 hour period except for meteorologist or scientific purposes.

- Fine for this violation of a non-criminal infraction is $250.00.

45.01.57 Persons may petition the Circuit Court to enjoin the release of 10 or more balloons within the County, Ord. 372.995.

45.01.58 Hot air balloons recovered after launching, balloons released indoors or balloons which are biodegradable or photodegradable, as determined by rule of the Maritime Fisheries Commission, and which are closed by hand tied knot with out string, ribbon or other attachments, are permissible.

HAZARDOUS MATERIAL & MARKINGS

45.01.59 Officers shall review the DOT Emergency Response Guidebook, which includes the hazardous material Markings, Labeling, and Placard guide.

45.01.60 The guidebook lists the various labels for hazardous materials. Officers that come upon the scene where hazardous materials are located shall immediately notify communications.

45.01.61 Whenever possible, the officer shall attempt to identify the material through the Emergency Guidebook and relay the information to communications the type of label or placard on the container.

45.01.62 Prior to the arrival of the hazardous material unit, the Operations Deputy Chief shall remain in charge of the incident. Upon the arrival of the HAZ-MAT team, the Deputy Chief will communicate with the HAZ-MAT commander to assist with the security of the scene until containment is reached.

45.01.63 Military Signal Flares shall be handled in accordance with Procedure 21.05.37.

HAZARDOUS MATERIALS

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45.01.68 Hazardous materials-e.g. Military flare's, LP gas tanks, barrels and similar items-Photograph (see directions for photographs) and contact the HAZMAT team or upland fire department for identification and "made safe" analysis. If "made safe" contact the division fiscal affairs personnel for the contact information of the appropriate vendor or the U.S. Military and make arrangements for removal.

45.01.69 Hazardous materials containers, spills and potential spill situations can be reported to the Environmental Emergency Response Team (EERT) by calling a pager system at (386) 831-5266. The call responder will provide directions as to how each situation should be handled and will dispatch appropriate response staff.

45.01.70 All incidents involving vehicular responses to hazardous materials on the beach must be reported to VCEM for required HCP documentation and reporting.

VOLUSIA COUNTY BEACH SAFETY

SICK AND INJURED BIRDS

45.01.71 There will be a variety of sick or injured birds that end up on the beach, especially during spring and fall migrations. Birds often end up on the beach because of exposure to pesticides and other toxins, disease, injury, lack of adequate food, or sheer exhaustion. The decision to release these birds should not be made by Beach Safety personnel but by experienced rehabbers after examination. All injured or sick birds should be transported ultimately to a rehabber for treatment and release.

45.01.72 When interacting with a sick or injured bird adhere to the following procedures:

- Approach the bird slowly (from behind if possible).
- Throw a towel over the birds head or use a net if the bird is able to move away from you.
- Hold the beak first on long beaked birds (pelican, herons, gannets).
- Pick up the bird by holding the wings folded towards the body.
- Place the bird in a clean and dry cage.
- Remove the towel from the birds head.
- Cover the cage if possible, and keep the bird in a quiet, sheltered location until it can be transported or picked up by rehabber agents.
- Notify transport personnel of the bird in possession, including its type (if known), disposition, and location found.
- Log in the bird rescue in the injured bird log found at each station.

PERTINENT STAUTUES AND LAWS GOVERNING WILDLIFE, ANIMALS, AND PLANTS

45.01.73 The following may be used as a reference to enforce possible environmental violations.

- Dune Protection, FSS Ch. 161. 053(8).
- Sea Oat / Sea Grape Protection, FSS Ch. 161.242
- Cruelty to animals, FSS 828.12
- Fish and Protected Marine Wildlife including manatees and dolphin. FAC, Ch. 68 & 39
- Marine Animals, FSS Sec 370.12
- Florida Litter Law (to include monofilament line), FSS 403.413

ATTACHMENTS

Attachment A: Wrack line survey form

Attachment B: Washback report form

Attachment C: Response to Marine Mammal Stranding

Attachment D: Wildlife Response Contacts

Revised: NN 10/12/2012
JW 03/21/2007
CSD - 05/01/2009

Approved by: Director Mark Swanson

ATTACHMENT A

POST-HATCHLING WASHBACK SURVEY LOG

(***Please complete for every fresh seaweed survey conducted***)

District (Check One): □2 (OB) □3 (DB) □4 (NSB)
Name of Surveyor(s):_____ Date: _____
Starting Time: _____Tidal Stage: _____
Starting Location: _____
Survey Turnaround Point: _____
Ending Location:_____
Ending Time: _____
Survey Conveyance (Check One): □ ATV □ UTV □ on Foot □ Truck*
***(Truck used due to: □ bad weather/ □ mech. issues/ □ other: _____)**

DO NOT COLLECT SEA TURTLES LARGER THAN YOUR HAND
For hatchlings or standings, contact the Marine Turtle Permit Holder

Number and Condition of Washbacks Collected		Location Found	Time found
Live	Dead		

COMMENTS: _____

_____

_____

_____

Please fax completed form to HCP Staff (238-4772) or e-mail to HCP staff, Shift Supervisor and Deputy Chief. File originals at station.

ATTACHMENT B

VOLUSIA COUNTY BEACH SAFETY
POST-HATCHLING WASHBACK SEA TURTLE CHAIN OF CUSTODY LOG
(***Complete for all washback sea turtles found OR transported – deliver with turtles to the MSC***)

District (Check One): □2 (OB) □3 (DB) □4 (NSB)
Name: _____ Date: _____

Received From:	Number and Condition of Washbacks		Location(s) Found	Time Received
	Live	Dead		
Beach Safety Survey				
General Public				
Ramp Grader				
Ramp Attendant				
Washback Watcher				
Other (Note in Comments)				
TOTAL				

□ **Transported Directly by Beach Safety to MSC Time Arrived at MSC:**

_____ OR

Group Notified* (Check One): □VTP □EAI □MSC □HCP Staff □WW Volunteer

Time Notified: _____ Time Retrieved: _____

CONTACT MARINE TURTLE PERMIT HOLDERS IMMEDIATELY

South of Ponce Inlet	Marine Science Center (MSC)	North of Ponce Inlet
Ecological Associates, Inc. (EAI)	Turtle Rehab Staff	Volusia Turtle Patrol (VTP)
Marine Turtle Permit Holder	386-304-5544 (Direct Line)	Marine Turtle Permit Holder
386-290-0737 (Cell)	386-804-5587 (Cell)	386-366-4443 (Cell)
386-238-4716 (Office)	386-304-5545 (Main Line)	386-767-5257 (Home)

COMMENTS:_____
_____

* **If vehicular take is suspected for any turtles collected or received, call HCP Staff IMMEDIATELY:**
Jennifer Winters 386-717-0602 (Cell) or 238-4668 (Office)
Becki O'Keefe 386-316-5898 (Cell) or 386-238-4716 (Office)

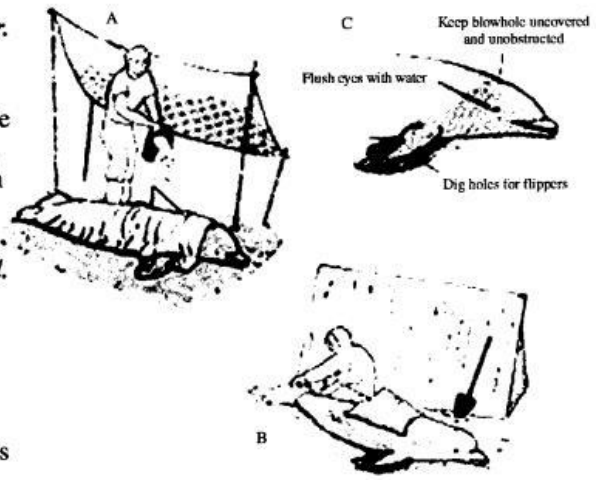
MSC USE ONLY
Number of Washbacks Received: _____ Time Received: _____
Number of Live _____ Number of Dead _____

SUGGESTED RESPONSE FOR MARINE MAMMAL STRANDING EMERGENCIES

If you find a live dolphin or whale:

- ***Please do not push the animal back into the water.*** Stranded marine mammals are typically very sick or orphaned and will beach themselves again.
- ***Try to keep the animal upright*** and relieve pressure from the flipper by digging pits under them in the sand.
- ***Keep the animal cool and wet*** by pouring water on the skin or applying wet towels and shading the animal (avoid getting water in or blocking the blowhole).
- ***Try to keep people and pets away from the animal.*** Limit the number of people to the minimal needed to hold the animal upright. Petting stranded marine mammals should be avoided because it may cause stress to the animal

Avoid the tail area and let go of the animal if it thrashes. Stranded whales and dolphins are wild animals and can be dangerous.



Mass Strandings:

- A mass stranding is defined as ***two or more cetaceans coming ashore*** (excluding parent-calf pairs).
- ***The causes are still unknown.***
- ***Such an even requires the assistance of several people and can be very dangerous.*** Use extreme caution and follow the protocols for live dolphin or whale strandings.

Data collected from dead marine mammals can provide a great deal of information about the animal's biology and life history.

If you find a dead dolphin or whale:

Try to remove the animal from the surf if it is possible to do so safely.

Secure the animal so that it does not was away. This can be done by tying a rope around the tail flukes and then tying the remainder of the rope to a bucket and then burying the bucket deep into the sand.

Call Florida Wildlife Conservation Commission at: 1-888-404-3922. They will contact a biologist who will respond to the scene to gather information on the animal(s).

Marine mammals are protected by federal law. It is illegal for unauthorized persons to disturb, handle, or feed them. It is also illegal to collect or possess parts of marine mammals from dead strandings.

WILDLIFE RESPONSE CONTACT NUMBERS

HABITAT CONSERVATION PLAN (HCP) STAFF (Volusia County Environmental Management)

HCP Program Manager:

Office (386) 238-4668

Cell: (386) 717-0602

Field Manager:

Office: (386) 238-4716

Cell: (386) 316-5898

SEA TURTLE MONITORING – PRINCIPAL MARINE TURTLE PERMIT HOLDERS

South of the Inlet

Ecological Associates, Inc. (EAI) Primary Contact: Field Biologist

Cell: (386) 290-0737

North of the Inlet

Volusia Turtle Patrol Primary Contact: Volunteer Coordinator

Cell: (386) 366-4443

Home: (386) 767-5257

MARINE SCIENCE CENTER (MSC)

Sea Turtle Rehabilitation

Primary Contact: Principal Marine Turtle Permit Holder

Office Number: (386) 304-5544

Cell: (386) 804-5587

Staff Hours: Monday–Sunday 8:00 am. To 4:00 pm. (A person is always available at the MSC during this period).

After hours turtle drop off – Storage unit for washback drop off will be located at lab driveway entrance (contact MSC staff by phone before dropping off of any turtle).

Bird Rehabilitation

Primary Contact:

Office: (386) 304-5530

Cell: (386) 561-0624

Staff Hours: Monday–Sunday 8:00 am. To 4:00 pm. (A person is always available at the MSC during this period).

After hours bird drop off – cages are located at the bird rehab entrance adjacent to the Ponce Inlet boat ramp parking lot. Staff will come as needed if available (contact MSC staff by phone after drop-off).