


Beach Driving and Sea Turtles

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Sandra L. MacPherson

- BS & MS in Wildlife & Fisheries Science
 - 23 years working on Endangered Species issues
 - 15 years as the Service's Sea Turtle Coordinator
 - Oversight of sea turtle recovery efforts on U.S. nesting beaches
 - Loggerhead Recovery Team member
 - Loggerhead Turtle Expert Working Group member
 - Loggerhead Biological Review Team member
 - Marine Turtle Conservation Act Grants Committee member
 - Key liaison with the National Marine Fisheries Service
 - Key participant in the development of two beach driving Habitat Conservation Plans
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Loggerhead



Green



Leatherback



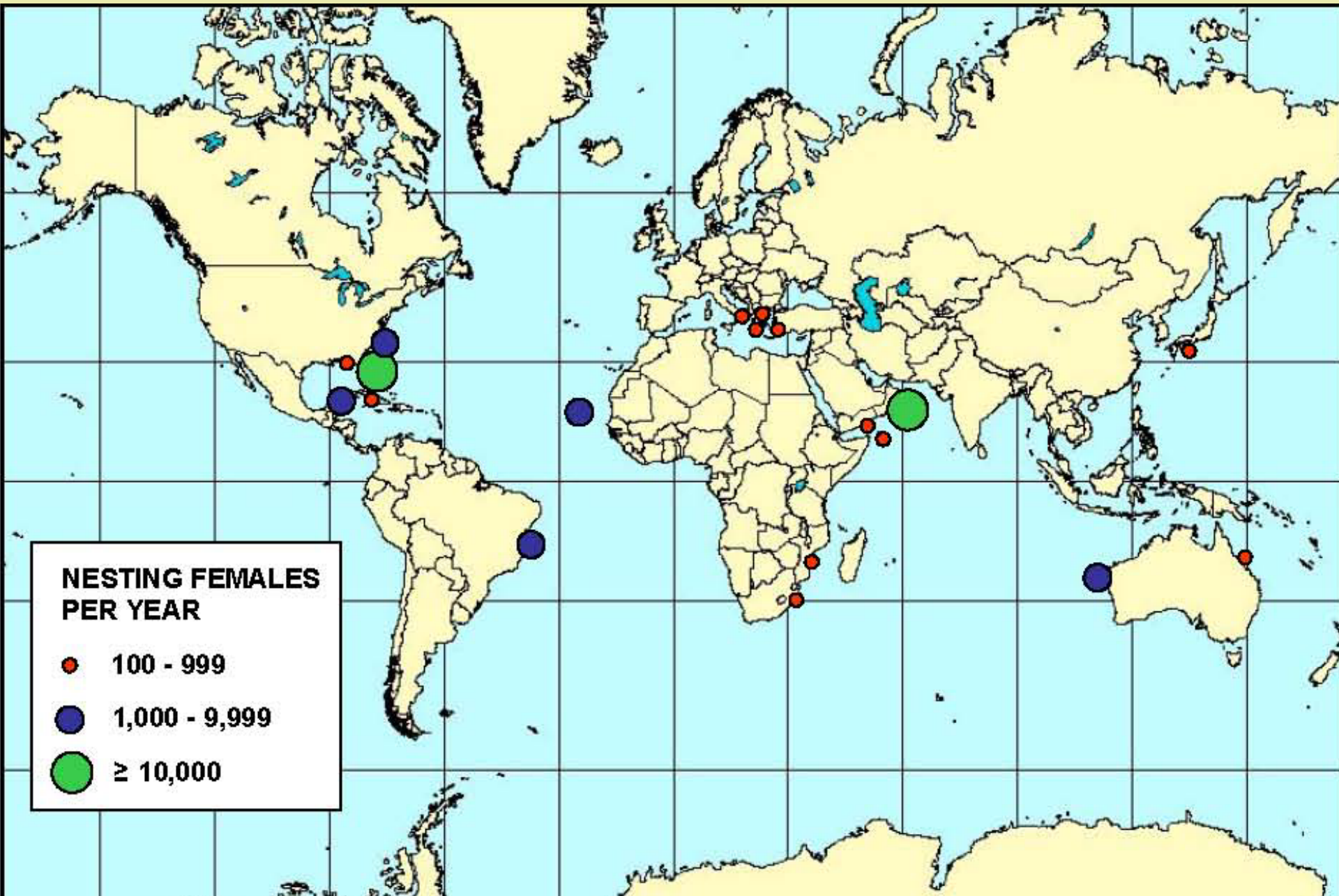
Hawksbill



Kemp's Ridley



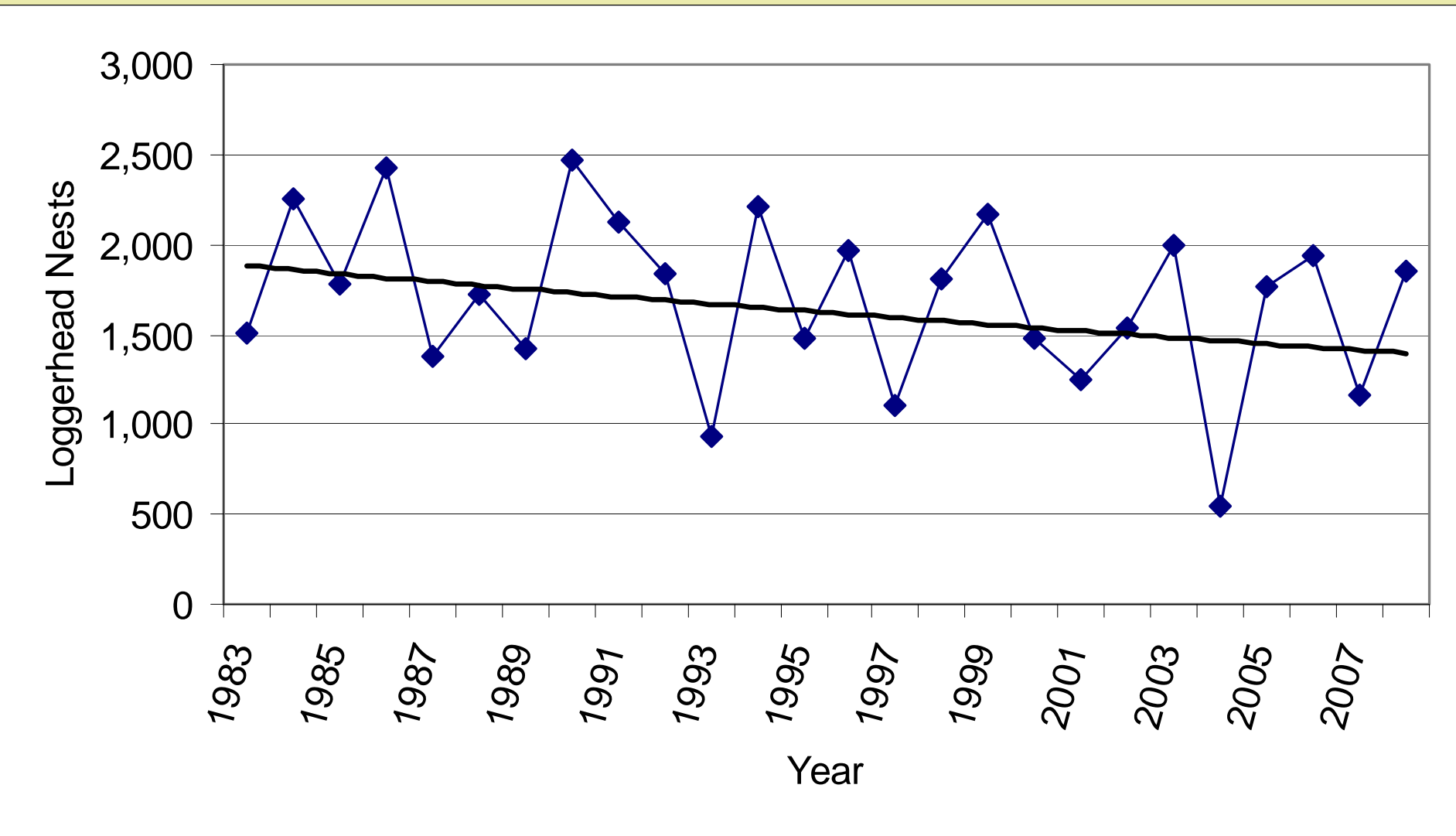
Global distribution of loggerhead nesting assemblages



Georgia - South Carolina - North Carolina



Loggerhead Northern Recovery Unit Population Trend






Beach Driving and Sea Turtles





Potential Impacts

DIRECT

- Deterrence to Nesting
 - Decreased Nesting Success
 - Collisions with Turtles
 - Crushing of Nests
 - Entrapment in Tire Ruts
 - Disorientation by Vehicle Lights
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Deterrence to Nesting



Aborted Nesting Attempts



Collisions



Misorientation in Ruts




Disorientation by vehicle lights





Potential Impacts

INDIRECT

- Compaction
 - Contaminants
 - Dune vegetation
- 

Compaction



Contaminants



Impacts to Dune Vegetation




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Solutions

A single, thin, wavy line in the same muted blue-purple color runs horizontally across the bottom of the slide.




Why Don't We Relocate All the Sea Turtle Nests?





Exceptions:


- The nest is laid below the average high tide line where regular inundation will result in embryonic mortality.
 - The nest is laid in an area known to be susceptible to erosion during the nest incubation period.
 - The nest is laid under a sloughing escarpment and is subject to being buried deeply.
- 



Nest Relocation: Handling Mortality



Nest Relocation: Changes to the Incubation Environment

- Incubation Temperature
 - Gas Exchange
 - Moisture Content
 - Hatching Success
 - Hatchling Emergence
- 



Changes to Incubation Environment

- Temperature
 - Gas Exchange
 - Moisture Content
- 



Changes to Incubation Environment

- Temperature
 - Gas Exchange
 - Moisture Content
- 




Changes to Incubation Environment

- Temperature
 - Gas Exchange
 - Moisture Content
- 



Moisture Content Influences:

- Nitrogen excretion
 - Mobilization of calcium
 - Mobilization of yolk nutrients
 - Hatchling size
 - Energy reserves in the yolk at hatching
 - Locomotory ability of hatchlings
- 




Why Don't We Breed Turtles in Captivity and Release Them in the Wild?






Reduced Reproductive Success

- Farm-reared turtles have had significantly lower hatching success than turtles that originated from the wild
 - Farm-reared turtles, thus, may be less reproductively successful than wild stock
- 




Disease

- Common in captive-reared turtles
 - Release of captive-reared turtles might introduce or spread diseases among wild populations
- 



Behavioral Modification

- Captive-reared turtles don't behave like wild turtles making them more susceptible to mortality in the wild
 - May interfere with homing mechanisms and other biological mechanisms
- 

Genetics

- Alteration of the genetics of wild populations

*In 1990, the National Research Council's Committee on Sea Turtle Conservation determined that captive breeding of sea turtles "would be a method of last resort, and a risky one at best, because captive animals in an aquarium or zoo retain only a portion of the genetic material of their species in the wild."



What's Been Done to Address Beach Driving and Sea Turtle Interactions Elsewhere?



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The Volusia County Experience



Volusia County


THE ATTRACTION CONTINUES





HCP PHILOSOPHY


Separate Turtles from Vehicles

- **Vehicle Access Times**
 - **Beach Management Areas**
 - **Natural (30.4 km)**
 - **Transitional (18.8 km)**
 - **Urban (8.0 km)**
 - **Conservation Zones**
- 



HCP PHILOSOPHY

Separate Turtles from Vehicles

- Vehicle Access Times
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Public Access Hours

May 1-Oct 31: 8:00AM (or after nest survey) – 7:00PM


Nov 1-Apr 30: Sunrise – Sunset





HCP PHILOSOPHY


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CONSERVATION ZONE BUILDING DUNES



Conservation Zone Width

15 Feet in Urban Area

30 Feet in Other Public Driving Areas



Conservation Zone

Driving and Parking Inside CZ is Prohibited



Additional HCP Provisions

MINIMIZATION

- Mark and Protect All Nests
- Conduct Rut Removal Program
- Train Beach Personnel Annually
- Conduct a Public Education Program

MITIGATION

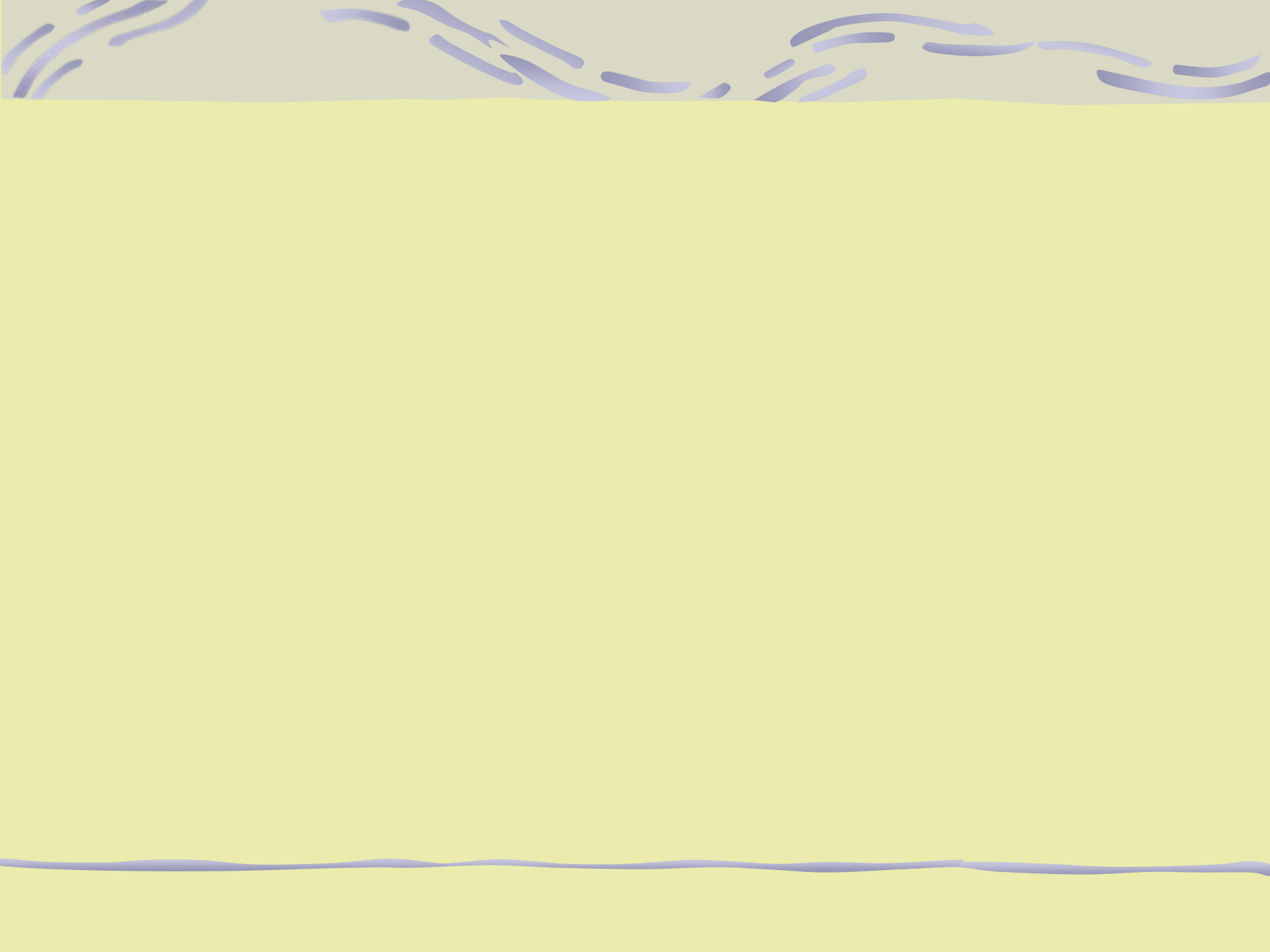
- Lighting Management
 - Operation of a Turtle Rehab Facility
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Documented Direct Impacts

1997 - 2007

- Adults (Nighttime or Daytime) – 0
- Unmarked Nests – 1 (Beach Safety, 1999)
- Marked Nests – 0
- Hatchlings (Daytime Emergence) – 3 (1998)
- Hatchlings (Nighttime Emergence) – 3 (Beach Safety, 2 in 1999 and 1 in 2001)
- Hatchling/Rut Encounters – avg. 2.4/yr (only 2 since 2002)
- Washbacks – 7 (1 in 2006 and 6 in 2007)






Recovery Plan Comparison

Demographic Recovery Criteria

- 1991 Plan - The adult female population in Florida is increasing and in North Carolina, South Carolina, and Georgia, it has returned to pre-listing nesting levels (NC=800 nests/season; SC=10,000 nests/season; GA=2,000 nests/season). The above conditions must be met with data from standardized surveys which continue for at least 5 years after delisting.
- 2008 Draft Plan - For the Northern Recovery Unit: There is statistical confidence (95%) that the annual rate of increase over a generation time of 50 years is 2% or greater resulting in a total annual number of nests of 14,000 or greater for this recovery unit (approximate distribution of nests is NC=14% [2,000], SC=66% [9,200], and GA=20% [2,800]). This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).



Recovery Plan Actions

- 611. Eliminate nest management techniques that are not scientifically based.
 - 6111. Evaluate the effects of nest management activities on nest productivity, hatchling fitness, and sex ratios and develop scientifically based standardized protocols for nest management.
 - 6112. Implement scientifically based standardized protocols for nest management.
 - 6113. Use the least manipulative method to protect nests.
 - 6114. Discontinue the use of hatcheries as a nest management technique.
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Recovery Plan Actions

612. Minimize and control vehicular traffic on nesting beaches.

6121. Prohibit nighttime driving on beaches during the loggerhead nesting season.


6122. Ensure that the linear kilometers of nesting beach where vehicular traffic is permitted does not increase above 2006 levels.

6123. Manage daytime driving to minimize impacts to loggerheads.






Recovery Plan Actions

- 614. Minimize harassment of nesting females and hatchlings.
 - 6141. Evaluate the extent and effects of harassment of nesting females and hatchlings and develop management recommendations.
 - 6142. Conduct public education campaigns to minimize harassment of nesting females and hatchlings.
 - 6143. Increase the number of interpretive turtle walks to meet demand and minimize overall disturbance to nesting females and hatchlings.
 - 6144. Enforce laws to minimize harassment of nesting females and hatchlings.
- 



Recovery Plan Actions

41. Reduce nest predation.

- 411. Reduce the annual rate of mammalian predation to at or below 10% of nests within each recovery unit using ecologically sound predator control programs.
 - 412. Control fire ants on and adjacent to loggerhead nesting beaches.
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Recovery Plan Actions

- 25. Minimize effects of light pollution on hatchlings and nesting females.
 - 251. Develop, fully implement, and effectively enforce light management plans to address direct and indirect (e.g., sky glow, uplighting) artificial lighting on nesting beaches.
 - 2511. Implement and enforce lighting ordinances on lands under local government jurisdiction.
 - 2512. Implement and enforce lighting management plans on all lands under state and Federal jurisdiction.
 - 252. Evaluate the extent of hatchling disorientation on nesting beaches based on standardized surveys.
 - 253. Prosecute individuals or entities responsible for nesting female or hatchling disorientation under the Endangered Species Act or appropriate state laws.



Areas where Beach Driving Occurs

- NE FL - Nassau, Duval, St. Johns, & Volusia Cos.
 - NW FL - Gulf Co.
 - GA - Cumberland, Little Cumberland, and Sapelo Islands
 - NC - Fort Fisher State Recreation Area, Carolina Beach, Freeman Park, Onslow Beach, Emerald Isle, Indian Beach/Salter Path, Pine Knoll Shores, Atlantic Beach, Cape Lookout National Seashore, Cape Hatteras National Seashore, Nag's Head, Kill Devil Hills, Town of Duck, and Currituck Banks
 - VA - Chincoteague NWR and Wallops Island
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