New Jersey Marine Mammal and Sea Turtle Conservation Workshop Proceedings

Endangered and Nongame Species Program
Division of Fish and Wildlife
New Jersey Department of Environmental Protection
April 17-19, 2006

CONSERVATION IMPACT
focus | mission

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Executive Summary

The Endangered and Nongame Species Program, within the New Jersey Department of Environmental Protection's Division of Fish and Wildlife, convened the New Jersey Marine Mammal and Sea Turtle Conservation Workshop at the Richard Stockton College of New Jersey on April 17-19, 2006. The purpose of the workshop was to develop the knowledge base necessary to guide the state's marine endangered resource conservation and management programs by identifying which species the state should focus on and what actions it should take to conserve them. Marine experts from 13 agencies and organizations around the region participated in the workshop, which was facilitated by Conservation Impact.

Sixteen species of marine mammals and sea turtles were identified by participants as the focal species for the workshop – those species for which New Jersey could have an impact on their conservation. Species that were eliminated from further consideration were found to spend most or all of their time outside of New Jersey waters with limited or unknown impacts by New Jersey-based threats and many are currently managed by federal agencies.

Thirty-nine categories of threats, ranging from fishing gear of many types to sounds and epizootics were evaluated for their impact on the focal species in New Jersey waters. The highest ranking threats across all species were gillnets, epizootics, recreational boat strike, construction, fixed gear traps and pots, and persistent marine debris.

The principal immediate conservation actions, including research, recommended by the participants were to

- Develop a comprehensive fisheries characterization report for the state
- Gather the life history and ecology information that is lacking for most species
- Develop outreach programs to inform, educate, and encourage conservation-oriented behavior in various target audiences that currently have a negative impact
- Enforce existing laws and regulations to protect species and their habitats.

New Jersey has a great opportunity to turn these recommended actions into conservation. Through collaboration with neighboring states; with funding assistance from federal and state programs, and others; and by implementing a focused action plan, New Jersey could quickly establish an effective marine endangered resource conservation program.

Acknowledgements

The Endangered and Nongame Species Program, within the New Jersey Department of Environmental Protection's Division of Fish and Wildlife, would like to thank the many participants, organizers, and funders of the Marine Mammal and Sea Turtle Conservation Workshop. Dr. Carol Slocum was instrumental in bringing the workshop to Richard Stockton College of New Jersey and college staff helped keep the event running smoothly. Terry Terry provided much needed assistance with facility, hotel and food arrangements.

Bob Schoelkopf of the Marine Mammal Stranding Center contributed mammal and turtle stranding data for NJ species. The Northeast Region Stranding Network, through the National Marine Fisheries Service, contributed mammal stranding data for the region. More than 20 professionals from outside the Department of Environmental Protection contributed two to three days of their time, a well as their extensive expertise, to help the Department frame the work that needs to be done in New Jersey for the conservation of marine mammals and sea turtles. Funding was provided by the National Marine Fisheries Service through the National Fish and Wildlife Foundation, Richard Stockton College of New Jersey, and Cape May County Park and Zoo.

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Background

New Jersey's coastal marine and estuarine ecosystems provide habitat for a broad diversity of marine mammals and sea turtles during some period of their life cycles. Shoreline and near-shore recreational, development, and commercial activities, as well as water quality, can affect the health and habitat of those species. Several other species are found only in the deeper waters of the Atlantic where they can be affected by shipping traffic and fishing activities that originate or terminate in New Jersey.

The conservation status of many of these species is of concern, with one quarter of the cetaceans (whales, dolphins, and porpoises) and all of the sea turtles listed as endangered or threatened by the federal government and the State of New Jersey. The four pinnipeds (seals) that occur in the state, although not listed under the federal Endangered Species Act, are protected, along with other marine mammals, by the Marine Mammal Protection Act. Unfortunately, little is known about the ecology and conservation status of most of these species while they are in New Jersey waters and which threats are of greatest concern. Without this knowledge, managing for healthy populations is difficult and conservation and management efforts may not effectively protect them.

As a first step toward developing a conservation program for the state's marine mammals and sea turtles, the New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program signed a Section 6 agreement with the National Marine Fisheries Service (NMFS) of the National Oceanographic and Atmospheric Administration (NOAA) in 2004. Under Section 6 of the Endangered Species Act of 1973, this agreement establishes the cooperative efforts of NMFS and New Jersey for the conservation and management of resident endangered, threatened, candidate, and recently delisted species. In addition, New Jersey may apply for federal funding for implementation. Knowledge of current status, threats, and conservation needs is

necessary to develop and implement an effective conservation strategy that will guide research and management programs to address those threats and conservation needs.

Marine species are also included in the New Jersey Wildlife Action Plan that was submitted to the U.S. Fish and Wildlife Service in August, 2005. This statewide plan identifies the species of conservation concern in the state, important habitats for their conservation, and the threats to their populations. It also identifies the need for additional information on many marine species if they are to be adequately protected while in New Jersey waters. The results of this Workshop will help to fill those information gaps.

Workshop

The Marine Mammal and Sea Turtle Conservation Workshop was held on April 17-19, 2006, on the campus of the Richard Stockton College of New Jersey, Pomona, New Jersey. The workshop's purpose was to develop the knowledge base necessary to guide the state's marine endangered resource conservation and management programs by identifying which species the state should focus on and what actions it should take. Regional overviews of research, monitoring, and conservation actions for marine mammals and sea turtles were provided by the National Marine Fisheries Service (Appendix I). Participating experts identified the current state of knowledge on conservation status and needs, threats, and information gaps for 16 focal species. On the final day, a smaller group developed recommendations for priority conservation and research projects and proposed action steps for implementation. The 27 participants represented 13 agencies and organizations from the Mid-Atlantic and Northeast regions (Appendix V).

This report summarizes the findings and recommendations of the workshop. Detailed work products from the workshop are included in the appendices. Please refer to them for a more detailed treatment of the topics summarized here.

Results

Principal outcomes from the meeting were the identification of marine mammal and sea turtle species for which New Jersey could take effective conservation or management action, the most significant threats to those species while in New Jersey waters or where they may be affected by New Jersey-based influences, and the most important action

steps to improve their conservation status. Major information gaps that hamper effective action on their behalf were also identified.

Focal Species. Identifying the focal species for the workshop set the framework for the meeting. Focal species were selected from an initial list of potential species proposed by the Endangered and Nongame Species Program. Selection of the focal set was based upon whether a species could benefit from conservation and management by the State of New Jersey. Participants met in three taxonomic groups (cetaceans, pinnipeds, and turtles) to determine which species met those criteria and which did not (Appendix II). They also evaluated the current status of the focal species, identified the desired future condition for each species, and noted conservation or management information gaps (Appendix II).

Eight species of cetaceans, four pinnipeds, and four turtles were selected as the suite of focal species for the workshop (Table 1). Species that were eliminated from further consideration were found to spend most or all of their time outside of New Jersey waters with limited or unknown impacts by New Jersey-based threats, and were currently managed by federal agencies.

Threats. Thirty-nine threat categories were identified across all species, including various types of fishing gear, encounters with ships and boats, epizootics, chemical pollution and debris, noises, habitat loss and alteration, and direct killing (Appendix III). Each category was ranked from 0 (not a known threat) to 3 (high threat) for each species. The highest scoring threats when summed across all species were gillnets, epizootics, recreational boat strike, construction, fixed gear traps and pots, and persistent marine debris.

The dominant threats to individual species varied across taxonomic groups, as would be expected given their different life histories and occupied habitats. Gillnets, epizootics, recreational boat strikes, and contaminants were the most serious threats to cetaceans. For turtles, catastrophic oil spills, gillnets, and mobile fishing gear such as trawls and dredges ranked highest. The analysis for pinnipeds was coarser, with 13 threat categories receiving equally high rankings, including fishing gear (gillnets and seines), habitat loss and alteration, epizootics, boat and aircraft approaches, and direct killing.

Table 1. Marine mammal and sea turtle focal species. E = endangered, P= peripheral, S= Stable, T=threatened, U=undetermined. (Status ranks from New Jersey Fish and Wildlife Division, http://www.njfishandwildlife.com, accessed May 30, 2006.)

Common Name	Scientific Name	NJ Status
Fin Whale	*Balaenoptera physalus*	E
Humpback Whale	*Megaptera novaeangliae*	E
Right Whale	*Eubalaena glacialis*	E
Long-finned Pilot Whale	*Globicephala melaena*	U
Short-finned Pilot Whale	*Globicephala macrorhynchus*	U
Bottlenose Dolphin (coastal)	*Tursiops truncatus*	S
Common Dolphin	*Delphinus delphis*	U
Harbor Porpoise	*Phocoena phocoena*	U
Gray Seal	*Halichoerus grypus*	P
Harbor Seal	*Phoca vitulina*	S
Harp Seal	*Pagophilus groenlandicus*	P
Hooded Seal	*Cystophora cristata*	P
Kemp's Ridley Turtle	*Lepidochelys kempii*	E
Leatherback Turtle	*Dermochelys coriacea*	E
Loggerhead Turtle	*Caretta caretta*	E
Green Turtle	*Chelonia mydas*	T

There was disagreement among the participants about the impact of gillnets on pinnipeds. The pinnipeds group ranked gillnets as one of the highest threats. But the point was made that the available data do not support that high of a ranking for gillnet interactions with pinnipeds in New Jersey waters. The six years (2000-2005) of marine mammal stranding data from the New York, New Jersey, and Delaware representatives of the stranding network, which were provided in aggregate by the National Marine Fisheries Service, noted in the comments field only two pinnipeds stranded in netting, both in New York waters. The *2006 Draft U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Report* (www.nmfs.noaa.gov/pr/pdfs/sars/ao2006_draft.pdf, Waring, et. al, 2006) estimates the annual mortality of harbor seals from the Mid-Atlantic Gillnet fishery at 7 (CV 0.77) for 2000-2004, compared to an estimated 925/year from all human-caused mortalities.

Additional information is needed about the impacts of many threats on these species. Specific categories of threats that were most often scored as requiring further study but thought to be of consequence included wind turbines, chronic oil slicks, other contaminants, overharvesting of prey, personal watercraft strikes, and sounds created by military operations.

Recommended Conservation Actions. Workshop participants recommended priority conservation actions in four areas: threat abatement, life history/ecology research to inform actions, outreach, and protection/enforcement (Appendix IV). Many of these actions should be developed in collaboration with or informed by similar projects elsewhere in the region (refer to regional overviews in Appendix I). There was also an overarching recommendation to build the capacity and expertise needed to carry out the other recommendations by hiring a marine endangered species conservation and recovery staff person.

In response to the high level of threat posed by fishing gear interactions to most of the focal species, developing a comprehensive fisheries characterization report for New Jersey is an important first step to understanding the nature and extent of the threat. The report should cover gillnets, fixed gear (pots and traps), and mobile gear (trawls and dredges). Some of this characterization may already be completed for New Jersey by the ASMFC. With information on the types of gear, how it is used, size, quantity, location, effort, and how much bycatch is taken, a conservation plan can be developed and implemented to reduce bycatch. Conservation strategies will likely include gear modification, policy or regulatory changes, implementing a state-level observer program, and outreach to the fishing industry.

Life history and ecology information is needed for most species, including diet, contaminant loads, and epizootic events. Spatial/temporal habitat use information is needed for cetaceans in nearshore and pelagic waters and for pinnipeds at haul out sites and other locations. Ship-based surveys and partnering with whale watch groups for sighting information are needed to provide cetacean habitat use information. A sighting reporting system, with outreach to shoreline users, would help identify seal use areas. Very little is known about sea turtles in New Jersey waters. Observations and captures of them at sea and in nearshore waters should be recorded to build a better understanding of their habitat use.

Outreach to recreationists, homeowners, commercial sightseeing operations, and the sport and commercial fishing industries is an important part of conservation action for all three groups of species. In all cases, the message should educate the target audience about the focal species, encourage conservation-oriented behavior, and seek sighting information. A user-friendly system should be established to receive sightings.

Enforcing existing laws and regulations, as well as developing new regulations or policies, would improve protection for most focal species (e.g. protecting haul out sites). Ensuring that species are included in existing planning and permitting processes, as well as in the state's emergency response plan to oil spills or other environmental catastrophes is also essential.

Information Gaps. There are significant gaps in our knowledge of most marine species and this is especially true for the workshop's focal species. Without this knowledge, it will be difficult to effectively manage and conserve these species. Information on spatial/temporal habitat use patterns, prey use and competition with fishery harvests, population levels and stock affiliation of New Jersey's populations, and contaminant loads and their impacts is needed for most species. Other information needs have already been mentioned, particularly related to understanding threats so they can be effectively and efficiently abated.

Conclusion

The State of New Jersey has a significant role to play in the conservation and management of the marine mammals and sea turtles found in its waters or affected by its industries. Developing the capacity necessary to launch a marine species conservation program is the first step to successfully accomplishing the priority conservation actions recommended by workshop participants. Without leadership and follow through, little will be accomplished.

Other states in the region are conducting studies and taking conservation actions on behalf of many of the species New Jersey will focus on. Developing New Jersey's conservation action projects in collaboration with or informed by those of other states and federal agencies will help establish the marine conservation program quickly and effectively.

Developing a comprehensive fishery characterization report would broadly inform conservation strategies and actions for many species. At the same time, establishing surveys for key species would begin to fill the void of information on which species are where off the coast of New Jersey and when they are there. These two projects would substantially increase the ability of the state to take informed and effective action.

New Jersey has two new opportunities for funding its marine conservation program. With the signing of a Section 6 agreement with the National Marine Fisheries Service, the state has access to funds it previously could not receive. Implementation funds from the U.S. Fish and Wildlife Service for the state's Wildlife Action Plan can be used to fund marine conservation and research, as well. The results of this workshop provide a focus and a framework for effectively targeting those funds to the most urgent conservation actions for marine mammals and sea turtles.

Appendices

Monday, April 1

Today's meeting will run from 12:30 to 5:15.

12:30 Welcome
- Dr. Herman J. Saatkamp, Jr., President, Richard Stockton College of NJ
- Dr. Dennis Weiss, Dean, Natural Sciences and Mathematics, Richard Stockton College of NJ
- Dr. Lawrence J. Niles, Chief, Endangered & Nongame Species Program, NJ Division of Fish and Wildlife

12:45 Overview and purpose of the meeting

1:00 Introductions

1:30 Workshop framework
- Dave Jenkins, Principal Zoologist, Endangered and Nongame Species Program, NJ Division of Fish and Wildlife
- Amanda Johnson, National Marine Fisheries Service, Right Whale Research Coordinator
- Pasquale Scida, National Marine Fisheries Service, NE Regional Office, Endangered Species Coordinator

2:00 Work groups introduction

2:15 Break as we go into work groups

2:15 Work group session #1: Status of focal species -- cetaceans, pinnipeds, turtles
- Priority species requiring conservation action
- Current condition
- Principal causes of current conditions
- Desired future conditions

3:45 Work group reports

4:45 Mapping species locational information

5:15 Adjourn

Tuesday, April 18

Today's meeting will run from 8:30 to 4:00. Networking, coffee, and mapping from 8:00 to 8:30

8:00 Coffee, networking, and mapping
8:30 Overview and outcomes for today
8:45 Work group session #2: Threats assessment and recommended conservation actions
10:30 Break
10:45 Work group session #2, continued
12:30 Lunch (MAY run to 1:30 depending on # of groups to report)
1:15 Work group reports
- What are the major sources of threats to these species in New Jersey?
- What are their impacts on these species in New Jersey?
- What conservation issues are most important for New Jersey to address?
- Recommended actions
  - Timelines
  - Budgets
  - Responsibilities

2:45 Break
3:00 Discussion of reports: what's missing, commonalities, priorities
4:00 Adjourn

Wednesday, April 19

Today's meeting is an agency work session that will run from 8:30 to 12:00. Networking and coffee from 8:00 to 8:30

8:00 Networking and coffee
8:30 Priority conservation actions and desired outcomes (workshop results)
8:45 Develop project ideas to address priorities (group discussion)
9:15 Work groups develop project details
10:30 Work group reports
11:00 Discussion of projects
11:45 Next steps
12:00 Adjourn

Marine Mammal Regional Overview (focused on right whales) -- Amanda Johnson, National Marine Fisheries Service, Right Whale Research Coordinator, *revised 8.1.06*

Maine Dept. of Marine Resources

- Active in gear research and collaborations with the fixed gear fishing industry
  - Developing and testing new sinking groundlines
  - Using mini-loggers (small, almost neutrally buoyant archiving pressure tags) in the lobster trap/pot fishery to collect data on line behavior underwater under different environmental conditions (sea state, tidal current, depth) and gear configurations
- Maintain whale sightings and disentanglement networks
- Sponsored a Right Whale Foraging Workshop in April 2005
- Maine Marine Patrol - enforcement
  - Works through Joint Enforcement Agreement with NOAA Fisheries to enforce Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations (the state of Maine has adopted ALWTRP gear modification measures)

Massachusetts Division of Marine Fisheries

- Active in gear research and collaborations with the fixed gear fishing industry
  - Groundlines – developing and testing new sinking groundlines
  - Mini-logger work similar to that being done in Maine
  - Scale modeling of buoy line configurations – compare, quantify, and investigate buoy line profiles in a flume tank at Memorial University to assess entanglement risk
- Surveillance and Habitat Monitoring Program for North Atlantic Right Whales in Cape Cod Bay (aerial and vessel-based surveys, as well as habitat monitoring that includes plankton tows)
- Collaboration with Cornell University's Bioacoustics Research Program for monitoring right whales through passive acoustics (since 2003 and ongoing)
  - Assists in the deployment of pop-ups (in-situ devices that detect vocalizing right whales and store the data for retrieval and analysis after the pop-ups are retrieved) in Cape Cod Bay and southern Jeffreys Ledge
  - Assisted Cornell in deployment of two additional real-time acoustic monitoring buoys in Cape Cod Bay to monitor for right whales year-round, in near real-time
- Completed gear characterization study

- Detailed information collected about gear types and gear configurations used by Massachusetts fixed gear fishermen through dockside and/or phone interviews
- Rhode Island Dept. of Environmental Management - funded in 2005 to conduct a similar study of trap/pot and gillnet fisheries

New York State Dept. of Environmental Conservation

- Worked with the Riverhead Foundation for Marine Preservation and Research and NOAA Fisheries to conduct right whale aerial surveys in the NY area (Nov. 1, 2004 to Dec. 31, 2005). All cetacean sightings were recorded.
- Recently hired a Marine Endangered Species Coordinator to focus on conservation efforts for marine species in NY

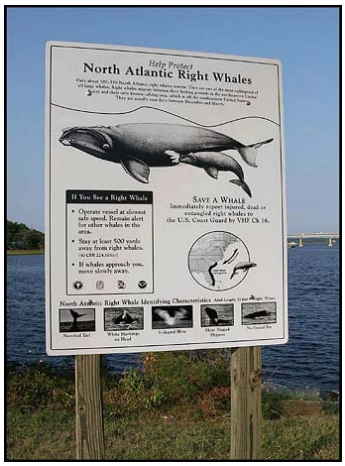
New Jersey Dept. of Environmental Protection, Endangered and Nongame Species Program

- Marine Mammal and Sea Turtle Workshop
  - Goal is to identify conservation needs and priorities for marine species in NJ and begin the development of a conservation program

South Carolina Dept. of Natural Resources

- Monitoring right whales off the coasts of SC and GA through aerial surveys (Nov. 15, 2004 to April 14, 2005); collaborative effort with Wildlife Trust

Florida Fish and Wildlife Conservation Commission



- Right Whale Informational Signs for Mariners
  - Increase awareness about right whale calving grounds
  - Inform boaters about right whale regulations and guidelines
  - Inform boaters and the public about reporting entangled right whales
  - 200 metal signs produced
    - Installed at 21 municipal boat ramp facilities and 28 targeted marinas from Amelia Island, GA to Miami, FL
    - Signs distributed to project cooperators (GA Dept. of Natural Resources, SC Dept. of Natural Resources, and University of North Carolina, Wilmington)

All final reports for completed projects are available at Right Whale Funding Opportunities, http://www.nero.noaa.gov/prot_res/prgrants/index.htm

Sea Turtle Regional Overview – Pasquale Scida, National Marine Fisheries Service, NE Regional Office, Endangered Species Coordinator

Sea Turtle Health Assessment Studies
- Collecting animals with assistance from fishermen
- NY and MD in NER. NC in SER.

Disentanglement Response
- Contracts set up in MA and RI
- Disentanglement kits
- Training workshops and response efforts

Stranding Response
- Coastwide stranding network, with network members in all East Coast states.
- NMFS provides extra support in states/times with high strandings (e.g., VA spring, MA cold stun)

Atlantic and Gulf Sea Turtle Strategy
- Gear-based approach to addressing turtle bycatch issues
- Fishery Characterization – State and Federal
- Rulemaking, Section 10 permits, etc.

Gear Research – bycatch reduction
- Scallop Dredges
- VA pound nets
- Trawls

NMFS Rulemaking – bycatch reduction
- See above

Section 7
- Evaluate Federal "actions" for their impacts on listed species
  - Fisheries
  - Dredging
  - Power Generation Facilities
  - Other

Recovery Planning
- Identifying and assessing threats
- Identifying and prioritizing actions
- Laying out the steps for recovery

Appendix II: Conservation Status and Information Gaps

The following tables are the products of participant work groups. They have been edited only for clarification.

Marine Species of Conservation Concern for New Jersey – Turtles

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Atlantic Loggerhead	▪ federally threatened ▪ state endangered ▪ stranding data: 1975 – present: 894 records ▪ common in NJ waters ▪ population trend: US nesting is decreasing ▪ in-water juveniles population in NJ unknown ▪ in-water population unknown in Atlantic and Gulf waters	▪ fisheries bycatch ▪ vessel strikes ▪ nesting habitat loss/degradation ▪ in-water habitat loss ▪ entanglement	▪ Recovered and delisted
Atlantic Leatherback	▪ federally endangered ▪ state endangered ▪ stranding data: 1975 – present: 352 records ▪ common in NJ (adults definite, juvenile probable) ▪ Florida nesting population increasing ▪ in-water status unknown in NJ, Atlantic and Gulf	▪ fisheries bycatch ▪ entanglement ▪ vessel strikes ▪ habitat loss/degradation – in-water only? ▪ Ingestion of marine debris	▪ Recovered and delisted or downlisted

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Kemp's Ridley Turtle	▪ federally endangered ▪ state endangered ▪ stranding data: 1975 – present: 89 records ▪ primarily juveniles in NJ waters ▪ Mexican nesting population increasing ▪ in-water population trend unknown in NJ and elsewhere ▪ common in NJ (high human interaction)	▪ fisheries bycatch ▪ vessel strikes ▪ in-water habitat loss/degradation ▪ increasing beach-nesting population ▪ shut down of harvest of nesting females and eggs ▪ requirement of TEDs in Mexico and US shrimp fisheries	▪ Recovered and delisted or downlisted
Atlantic Green Turtle	▪ federally endangered/threatened (treated as endangered) ▪ state threatened ▪ stranding data: 1975 – present: 15 records ▪ US nesting population increasing (Florida) ▪ records are few in number but not rare ▪ juvenile only present in NJ ▪ status in NJ is unknown ▪ in-water juvenile population status is unknown	▪ fisheries bycatch ▪ vessel strikes ▪ monofilament entanglement ▪ habitat loss/degradation ▪ disease – fibropapillomatosis ▪ prohibition of harvest and full protection of females and eggs on nesting beaches	▪ Recovered and delisted or downlisted

Marine Species Not of Conservation Concern for New Jersey – Turtles

Species: Atlantic Hawksbill Turtle

Justification: Occurrences in NJ rare because NJ is extreme northern extent of range. Potential for NJ actions to contribute to recovery are insignificant.

Species:

Justification:

Species:

Justification:

Information Gaps for Species of Concern

Species/Group: Sea Turtles

Information needed:

- population status and trends for NJ/Mid-Atlantic Region
- seasonal distribution and abundance
- NJ fisheries bycatch information
- habitat use/foraging areas (near shore vs. off shore vs. within estuary)
- detailed analysis of NJ stranding data
- food habitats, prey availability
- threats (locations)
- GIS products for above
- consolidation of species, habitat, and threats information from various sources

Species/Group:

Information needed:

Species/Group:

Information needed:

Marine Species of Conservation Concern for New Jersey – Seals

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Harp seals	▪ spend little time here ▪ in small numbers, more in recent years ▪ mostly offshore	▪ no habitat known so threats more	▪ continue surveillance to determine change
Gray seal Top priority	▪ increasing in numbers ▪ uses in shore habitat ▪ lower priority	▪ habitat known ▪ needs protection from both disturbance and habitat loss	▪ same as harbor seals
Hooded seal	▪ very few ▪ difficult to determine status or priority	▪ no habitat known ▪ threats are more global ▪ requires more regional approach	▪ continue surveillance to determine change in numbers
Harbor seals Top priority	▪ increasing in numbers ▪ most frequently occurring ▪ only species existing in NJ during breeding period ▪ may be increasing because of global climate change	▪ habitat known and needs protection, both disturbance and habitat destruction	▪ properly identify all haul outs ▪ protect haul outs from human disturbance and other forms of degradation with regulations and education

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Gray & Harbor Seals	▪ no survey data available for all species, so only strandings known ▪ no organized haul out site surveys ▪ all species doing OK ▪ gray and harbor are the two priorities	▪ Applies to both gray and harbor ▪ Two main categories: • human disturbance/interaction • lack of understanding of local life history, habitat use (especially haul outs ecology) and threats including Climate Change and influence of contaminates ▪ inadequate understanding of needs create a serous threat ▪ killing clubbing to death/ drowning ▪ repetitive disturbances in general, October to May, military flyovers, kayakers ▪ whole lighting on Atlantic Coast ▪ wind turbines and sound pollution ▪ ecotourism in general as a threat, but depends on regulations ▪ approach distances too short and not distinguished by types of use ▪ no protection for haul outs ▪ no outreach to help people understand they exist and need protection ▪ insufficient fines for people who are found to violate existing regulations	

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
		▪ the converging influence of increasing number of people and an increasing number of animals in the area ▪ global climate change in breeding areas ▪ contamination from coastal runoff, especially in haul outs area drainages ▪ inadequate funding for serious threat assessment such as contaminants	

Marine Species Not of Conservation Concern for New Jersey – Seals

Species:

Justification:

Species:

Justification:

Species:

Justification:

Information Gaps for Species of Concern – Seals

Species/Group: Seals

Information needed:

- identify locations of haul-out sites as well as details regarding each site (# of individuals, species present, timeframe of presence)
- identify documented and potential threats at haul-out sites
- estimate of population in NJ waters
- characterization of contaminant load
- GIS products of the above

Species/Group:

Information needed:

Species/Group:

Information needed:

Species/Group:

Information needed:

Marine Species of Conservation Concern for New Jersey – Cetaceans

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Fin Whale	▪ State and federal endangered. Migratory through NJ waters.	▪ Ship-strike mortality. ▪ Historical depletion of population and slow recovery rate.	▪ Greater understanding of spatial/temporal occurrence, numbers, & threats in NJ waters.
Humpback Whale	▪ State and federal endangered. ▪ Migratory through NJ waters.	▪ Entanglement in fisheries gear. ▪ Ship-strike mortality. ▪ Historical depletion of population and slow recovery rate.	▪ Greater understanding of spatial/temporal occurrence, numbers, & threats in NJ waters.
North Atlantic Right Whale	▪ State and federal endangered. Global population estimated at approx. 300 individuals. ▪ Migratory through NJ waters.	▪ Entanglement in fisheries gear. ▪ Ship-strike mortality. ▪ Historical depletion of population and slow recovery rate.	▪ Greater understanding of spatial/temporal occurrence, numbers, & threats in NJ waters.
"Coastal" Bottlenose Dolphin stock	▪ Listed as depleted by MMPA in 1993, largely as a result of die-off which occurred on US east coast during the 1980's. ▪ NJ waters provide a calving and nursery area.	▪ Epizootic die-off during the 1980's. ▪ Smaller population units than once thought (better understanding of stock structure). ▪ Bycatch.	▪ More accurate understanding of demography. ▪ Optimum sustainable population level. ▪ Greater understanding of spatial/temporal occurrence, numbers, & threats NJ waters.

SPECIES	CURRENT CONDITION	CAUSES	DESIRED CONDITION
Common Dolphin	▪ Not depleted under MMPA – stable.		▪ Maintain stable population. ▪ Greater understanding of spatial/temporal occurrence in NJ waters.
Harbor Porpoise	▪ Not depleted under MMPA – stable.	▪ Ship strike mortality. ▪ Bycatch motality.	▪ Maintain stable population. ▪ Greater understanding of spatial/temporal occurrence, numbers, & threats in NJ waters.
Pilot Whale (long-finned & short-finned)	▪ Not depleted under MMPA – stable.		▪ Maintain stable population. ▪ Greater understanding of spatial/temporal occurrence, numbers & threats in NJ waters.

Marine Species Not of Conservation Concern for New Jersey – Cetaceans

Species: Blue Whale
Justification: No sightings or strandings. Primarily an off-shore species.

Species: "Offshore" Bottlenose Dolphin
Justification: NJ waters not critical and population suitable.

Species: Sei Whale
Justification: Primarily an off-shore species.

Species: Sperm Whale
Justification: Primarily an off-shore, deep sea species.

Species: True's Beaked Whale
Justification: Primarily an off-shore, deep sea species.

Information Gaps for Species of Concern – Cetaceans

Species/Group: Cetaceans

Information needed:

- Greater understanding of spatial/temporal occurrence, numbers & threats in NJ waters.
  - what areas are preferred migratory corridors/calving grounds/nurseries/feeding grounds of cetaceans and during what seasons.
  - what ecogeographical variables (sea surface temperature, bathymetry, etc.) define critical habitats and what is the degree of importance of each.
  - what is the estimated proportion of the stock using NJ waters and what is the total number within the stocks found in NJ waters.
  - what are the primary causes of mortality/strandings in NJ waters.
- Prey preference in NJ waters.
- Analysis of genetically distinct stocks within species which occur in NJ waters.
- Assessment of health of individuals within NJ waters.
- Gear research (what gear is used and how may bycatch be reduced).
- GIS Products of the above

Appendix III: Threats Assessment Matrix

The following table is derived from the compiled products of participant work groups. It has been edited only for clarification.

Threats to focal species sorted from highest to lowest grand total across all species. 0=no known threat; 1=thought to be a threat, but more information is needed; 2=moderate threat; 3=high threat.

SPECIES	GILLNETS**	EPIZOOTIC	RECREATIONAL BOAT STRIKE	CONSTRUC-TION	FIXED GEAR: TRAPS, POTS	PERSIS-TENT MARINE DEBRIS	OVER-HARVEST OF PREY	CATASTRO-PHIC OIL SPILLS	CONTAM-INANTS	MILITARY EXPLO-SIONS
Fin Whale	2	2	2	1	2	0	1	0	1	1
Humpback Whale	3	2	2	1	3	0	1	0	1	1
Right Whale	3	1	2	1	3	0	0	0	1	1
Bottlenose Dolphin	3	3	3	1	1	3	2	1	2	2
Common Dolphin	1	2	0	0	0	2	1	0	2	2
Harbor Porpoise	3	3	3	1	0	3	2	1	3	2
Cetacean Total	**15**	**13**	**12**	**5**	**9**	**8**	**7**	**2**	**10**	**9**
Gray Seal	3	3	1	3	2	3	3	2	2	2
Harbor Seal	3	3	1	3	2	3	3	2	2	2
Harp Seal	3	3	1	3	2	3	3	2	2	2
Hooded Seal	3	3	1	3	2	3	3	2	2	2
Pinniped Total	**12**	**12**	**4**	**12**	**8**	**12**	**12**	**8**	**8**	**8**
Green Turtle	2	1	1	2	1	1	1	2	1	0
Hawksbill Turtle	1	1	1	2	1	1	1	2	1	0
Kemp's Ridley Turtle	3	1	3	2	2	1	1	3	1	2
Leatherback Turtle	3	1	3	2	3	1	1	3	1	2
Loggerhead Turtle	3	1	3	2	3	1	1	3	1	2
Turtle Total	**12**	**5**	**11**	**10**	**10**	**5**	**5**	**13**	**5**	**6**
GRAND TOTAL	**39**	**30**	**27**	**27**	**27**	**25**	**24**	**23**	**23**	**23**

**See text for discussion of gillnet impacts on pinnipeds.

SPECIES	MILITARY SOUND	POWER BOATS APPROACH	MOBILE GEAR: TRAWLS	SEINES	CHRONIC OIL SLICK (BILGE, RUNNOFF)	CARGO/ BIG SHIP STRIKE	LOSS OF SHALLOW WATER AND COASTAL WETLANDS	RECREA-TIONAL: HOOK & LINE	FIXED POUND NET	POINT SOURCE POLLUTION	PERSONAL WATER CRAFT STRIKES
Fin Whale	1	1	0	0	1	3	0	0	0	0	0
Humpback Whale	1	1	0	0	1	3	0	0	0	0	0
Right Whale	1	1	0	0	1	3	0	0	0	0	0
Bottlenose Dolphin	2	3	1	0	1	0	0	0	1	1	1
Common Dolphin	2	0	2	0	0	0	0	0	0	0	0
Harbor Porpoise	2	0	0	1	1	0	0	0	1	1	1
Cetacean Total	**9**	**6**	**3**	**1**	**5**	**9**	**0**	**0**	**2**	**2**	**2**
Gray Seal	2	3	1	3	2	0	3	2	2	2	1
Harbor Seal	2	3	1	3	2	0	3	2	2	2	1
Harp Seal	2	3	1	3	2	0	3	2	2	2	1
Hooded Seal	2	3	1	3	2	0	3	2	2	2	1
Pinniped Total	**8**	**12**	**4**	**12**	**8**	**0**	**12**	**8**	**8**	**8**	**4**
Green Turtle	1	0	2	1	1	1	1	2	2	1	1
Hawksbill Turtle	1	0	0	1	1	1	1	0	0	1	1
Kemp's Ridley Turtle	1	0	3	1	1	2	1	2	2	1	2
Leatherback Turtle	1	0	3	1	1	2	1	2	0	1	2
Loggerhead Turtle	1	0	3	1	1	2	1	2	2	1	2
Turtle Total	**5**	**0**	**11**	**5**	**5**	**8**	**5**	**8**	**6**	**5**	**8**
GRAND TOTAL	**22**	**18**	**18**	**18**	**18**	**17**	**17**	**16**	**16**	**15**	**14**

SPECIES	PASSING BOAT TRAFFIC	MILITARY AIRCRAFT	HELICOP-TERS	LAND APPROACH-HARRASSMENT	KILLING	FISHING SHIP STRIKE	WIND TURBINES	MOBILE GEAR: DREDGES	COASTAL DREDGING
Fin Whale	0	0	0	0	0	1	0	0	0
Humpback Whale	0	0	0	0	0	1	0	0	0
Right Whale	0	0	0	0	0	1	0	0	0
Bottlenose Dolphin	0	0	0	0	0	0	1	0	0
Common Dolphin	0	0	0	0	0	0	0	0	0
Harbor Porpoise	0	0	0	0	0	0	1	0	0
Cetacean Total	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**0**	**0**
Gray Seal	3	3	3	3	3	0	1	0	1
Harbor Seal	3	3	3	3	3	0	1	0	1
Harp Seal	3	3	3	3	3	0	1	0	1
Hooded Seal	3	3	3	3	3	0	1	0	1
Pinniped Total	**12**	**12**	**12**	**12**	**12**	**0**	**4**	**0**	**4**
Green Turtle	0	0	0	0	0	1	1	2	2
Hawksbill Turtle	0	0	0	0	0	1	1	0	0
Kemp's Ridley Turtle	0	0	0	0	0	2	1	3	2
Leatherback Turtle	0	0	0	0	0	2	1	2	0
Loggerhead Turtle	0	0	0	0	0	2	1	3	2
Turtle Total	**0**	**0**	**0**	**0**	**0**	**8**	**5**	**10**	**6**
GRAND TOTAL	**12**	**12**	**12**	**12**	**12**	**11**	**11**	**10**	**10**

SPECIES	COOLING WATER IMPINGE-MENT	UNPOWERED BOATS APPROACH	WHALE WATCH APPROACH	LIGHT	ABAN-DONED FISHING GEAR	FIXED WING	LONG-LINE	BENTHIC HABITAT DESTRUC-TION	PASSING SHIPS
Fin Whale	0	0	2	0		0	0	0	0
Humpback Whale	0	0	2	0		0	0	0	0
Right Whale	0	0	2	0		0	0	0	0
Bottlenose Dolphin	0	1	2	0		0	0	0	0
Common Dolphin	0	0	0	0		0	0	0	0
Harbor Porpoise	0	0	0	0		0	0	0	0
Cetacean Total	**0**	**1**	**8**	**0**	**0**	**0**	**0**	**0**	**0**
Gray Seal	1	2	0	2		3	0	0	0
Harbor Seal	1	2	0	2		3	0	0	0
Harp Seal	1	2	0	2			0	0	0
Hooded Seal	1	2	0	2			0	0	0
Pinniped Total	**4**	**8**	**0**	**8**	**0**	**6**	**0**	**0**	**0**
Green Turtle	2	0	0	0	1	0	0	1	0
Hawksbill Turtle	0	0	0	0	0	0	0	1	0
Kemp's Ridley Turtle	2	0	0	0	2	0	0	1	0
Leatherback Turtle	0	0	0	0	2	0	3	1	0
Loggerhead Turtle	2	0	0	0	2	0	3	1	0
Turtle Total	**6**	**0**	**0**	**0**	**7**	**0**	**6**	**5**	**0**
GRAND TOTAL	**10**	**9**	**8**	**8**	**7**	**6**	**6**	**5**	**0**

Appendix IV: Recommended Conservation Actions

The following tables are products of participant work groups. They have been edited only for clarification.

Recommended Conservation Actions—Cetaceans

ACTION	TIMELINE	LEAD	RESOURCES
Project: Conduct gear characterization for fixed gear fisheries in NJ waters **Action:** Work with NMFS to design questionnaire to characterize gear	1 year	NJ w/ NMFS	
Action: Go to fishermen meetings	1 year	NJ w/ NMFS	
Action: Conduct dockside interviews of fishermen	1 year	NJ w NMFS	
Action: Design survey and send it out	1 year	NJ w/ NMFS	
Project: Characterize mortality related to fixed gear fisheries in NJ waters **Action:** Acquire and review of existing observer database	weeks	ENSP	NMFS
Project: Characterize spatial/temporal habitat usage of cetaceans **Action**: Conduct outreach to whale watch operators to report sightings to ENSP	weeks	ENSP	
Action: Create a GIS product and use to identify potential spatial/temporal conflicts with fisheries/boaters/whale watch operators	? Depends on data acquisition	ENSP	SWG grants?
Action: Conduct ship-based surveys to collect data on abundance, behavior, and location	years		SWG grants?

Recommended Conservation Actions – Cetaceans continued

ACTION	TIMELINE	LEAD	RESOURCES
Project: Outreach/Education **Action:** Work with NMFS, Northeast Regional Office to provide information to fishermen/recreational boaters/whale watch operators regarding regulations and guidelines Action: Also contact merchant mariners about ship strikes	on-going	NJ w/ NMFS	SWG grants?
Project: Enforcement **Action:** Identify regulations not currently being enforced and enforce them	?		SWG grants?
Action: Talk to DAG about regulations which could be imposed to reduce human/cetacean conflict	weeks		SWG grants?

Recommended Conservation Actions: Pinnipeds

ACTION	TIMELINE	LEAD	RESOURCES
Systematic Census to locate haul out sites in time and place (multi-state)	Every year nov-june once/month every year	Marine mammal stranding /Stockton/FGW	Mosquito commission, Div. Fish and Wildlife,
Protection of haul out sites through outreach and law enforcement – this is a high priority	Same time frame Every Year	DFW/ MMSC//Stockton/ DFW/ Marine Law Enforcement	Boater safety, DFW, Regulation Adminstration
Surveillance of colonies for life history (especially diet) and habitat selection by seals in NJ.	Same time frame Every year on different coloni done every 5	Stockton/MMSC/ DFW	
Investigation of healthy seals and stranded seals to determine diet, contaminant loads, general health, parasite load	Same time frame 2 years	MMSC/DFW/DF W/ Stockton/	
Establish a sighting report system and a system for processing	Year 1 All year/ every year	MMSC/DFW/ Stockton	

Recommended Conservation Actions: Sea Turtles

These recommendations are not in priority order.

Overarching recommendation: Develop capacity for full-time staff position for marine endangered species conservation and recovery.

Recommendation 1

Catastrophic oil spills:

- Ensure sea turtles adequately/appropriately considered in the state's spill response plan ("oil spill contingency plans")

Recommendation 2

Gillnets:

- Compile comprehensive fisheries characterization report for NJ gillnet fisheries
- What size nets, when fished, how much effort, how much bycatch, (include information from NMFS observer programs). Use aerial surveys, fishing surveys, etc.
- Develop a plan based on fisheries characterization (may require regulatory/ legislative action, implementing state-level observer program)
- Implement measures to eliminate/reduce bycatch (consider gear modifications)
- Reduce/eliminate use of large mesh (> 7-8 in)

Recommendation 3

Fixed gear :

- Compile comprehensive fisheries characterization report for NJ fisheries
- How many pots, when fished, how much effort, how much bycatch, (include information from NMFS observer programs)? Use aerial surveys, fishing surveys, etc.
- Develop a plan based on fisheries characterization (may require regulatory/ legislative action, implementing state-level observer program)
- Implement measures to eliminate/reduce bycatch (consider gear modifications)

Recommendation 4
Trawls:

- Compile comprehensive characterization report for NJ (where, when, how much, etc.)
- Develop a plan based on fisheries characterization (may require regulatory/ legislative action, implementing state-level observer program)
- Implement measures to eliminate/reduce bycatch (consider gear modification)
- Work with NMFS to implement TED's in NJ

Recommendation 5
Dredging (fishing):

- Compile comprehensive characterization report for NJ (where, when, how much, etc.)
- Develop a plan based on fisheries characterization (may require regulatory/ legislative action, implementing state-level observer program)
- Implement measures to eliminate/reduce bycatch (consider gear modification).

Recommendation 6
Boat Strikes:

- Analyze stranding data to determine whether boat strikes are concentrated spatially/ temporally
- Outreach and education (post signs, include in boat licensing training)

Recommendation 7
Construction:

- Ensure sea turtle effects are evaluated during permitting for marine/estuarine/coastal projects (eg. piers, docks, jetties, groins)
- NMFS can provide information to inform staff on issues
- USACE in NC Doug Piatowski can also provide guidance
- NMFS comments on federal projects; NJ should review non-federal projects and their cumulative impacts

Critical Information Gaps:

Overharvest of Prey:

**potentially very serious for loggerheads and Kemp's Ridley

- How to get info: Develop and implement multi-state, collaborative diet study; determine harvest limits for species of importance to turtles (Determine if quotas exist)

Index studies

- Develop methodologies for assessing trends and abundance of turtles as part of a comprehensive Atlantic index study (in water abundance studies; 1-2 index sites in New Jersey waters)

Benthic Habitat Destruction:

- Look for existing data from other entities (state, academic, etc)

Seasonal Presence

- Determine seasonal presence and geographic distribution (may be elucidated by fisheries characterizations)

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Appendix VI: Species Summaries

These summaries cover the original set of 19 priority species identified by the Endangered and Nongame Species Program. Workshop participants identified 16 focal species for the workshop from this original group.

Note that the first three or four references in each summary provided most of the general information for the summary. Information from those sources is used without attribution to minimize repeated citations. These general references are identified in the References section of each summary.

- Bottlenose Dolphin (*Tursiops truncatus*)
- Common Dolphin (*Delphinus delphis*)
- Harbor Porpoise (*Phocoena phocoena*)
- Blue Whale (*Balaenopotera musculus*)
- Fin Whale (*Balaenopotera physalus*)
- Humpback Whale (*Megaptera novaeangliae*)
- Right Whale (*Eubalaena glacialis*)
- Sei Whale (*Balaenoptera borealis*)
- Sperm Whale (*Physeter macrocephalus*)
- True's Beaked Whale (*Mesoplodon mirus*)
- Harbor Seal (*Phoca vitulina*)
- Gray Seal (*Halichoerus grypus*)
- Harp Seal (*Pagophilus groenlandicus*)
- Hooded Seal (*Cystophora cristata*)
- Green Sea Turtle (*Chelonia mydas*)
- Hawksbill Sea Turtle (*Eretmochelys imbricata*)
- Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)
- Leatherback Sea Turtle (*Dermochelys coriacea*)
- Loggerhead Sea Turtle (*Caretta caretta*)

Bottlenose Dolphin (*Tursiops truncatus*)


National Marine Fisheries Service

Status

Federal: not listed
New Jersey: Stable
NatureServe: G5
IUCN Red List: Data Deficient
CITES: Appendix II

Description

The bottlenose dolphin is medium size, ranging to 6-12 feet in length averaging over 500 pounds. They are dark gray above and light colored below. The dorsal fin is moderately curved, the flippers are convex and pointed, and the flukes are curved along the rear margin and notched in the center. There is a sharp distinction between the forehead and the short nose.

Distribution and Populations

This species is found across the globe in temperate and tropical waters, where surface temperatures are about 50-90 degrees F. Two forms are known, one coastal and the other offshore, the latter in waters 650-6500 feet deep. Limits to the range and seasonal distribution appear to depend upon water temperature and available food. Of the estimated 10,000-13,000 bottlenose dolphins off the northeastern coast of North America, about 4% are coastal.

Biology

Female bottlenose dolphins reach maturity between 5 and 12 years of age; for males the range is 10 to 13 years. Lifespan can be over 40 years for males and 50 years for females. Calves can be produced at any time of year, but most are born in the spring and summer, after a gestation period of nearly a year. Females produce one young every 2-6 years.

Dolphins travel in groups of 10-25, but occasionally are seen in herds of several hundred to a thousand offshore. Coastal individuals can be found along shorelines, in bays, lagoons, river mouths, and may travel upstream in some rivers. Coastal individuals may maintain a home range and/or periodically move among areas, including offshore. Offshore individuals have been observed to travel over 2,500 miles. Animals may move out of high latitude waters for the winter. Bottlenose dolphins are often observed traveling with other species.

Coastal individuals feed on fish and invertebrates; offshore individuals feed on fish and squid. Offshore individuals may move with their migratory prey.

Vulnerable Life History Characteristics

Nearshore populations may be especially vulnerable to environmental degradation and pollution. Bottlenose dolphins are long-lived and can accumulate a significant load of toxins that females can pass on to their offspring and that may reduce fertility in males. Nearshore animals may also become habituated to humans. The cause of the die-off in the late 1980's may have been due to two morbilliviruses that spread southward from animals in New Jersey (Taubenberger et al. 1996).

Human Impacts

Incidental take in fishing gear occurs in various basins at relatively low levels. Efforts are underway to effectively exclude animals from nets. Dolphins in the Pacific are still hunted in low numbers for food

and bait. Of 124 bottlenose dolphins rescued by the Marine Mammal Stranding Center from 1995 through 2005, only 7 showed signs of human interaction. Four animals showed signs of interaction with fishing gear and 3 had other signs of interaction (Schoelkopf 2006). In New York and Delaware, from 2001 through 2005, 9 and 81 stranded bottlenose dolphins were rescued, respectively. Of those 90 individuals, 39 had fisheries impacts, 8 had been struck by boats, and 11 had been shot (Northeast Region Stranding Network 2006).

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Conservation and Management

Passage of the Marine Mammal Protection Act of 1972 has reduced the take of dolphins in U.S. Waters. Continuing development of methods to reduce incidental take by commercial fisheries is an important conservation measure. Improving conditions in the coastal environment would also help dolphins and their prey populations.

References

General information reported here without attribution was taken from the first three sources.

- Culik, B. 2003. *Tursiops truncatus*, bottlenose dolphin. Compiled for the Convention on Migratory Species (CMS). www.cms.int/reports/small_cetaceans/data/t_truncatus/t_truncatus.pdf
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Common Dolphin (*Delphinus delphis*)


National Marine Fisheries Service

Status

Federal: Not listed
New Jersey: Undetermined
NatureServe: G5
IUCN Red List: Lower Risk/Least Concern
CITES: Appendix II

Description

The common dolphin is one of several distinctively colored dolphins in the mid-Atlantic region. It has a dark back and light belly, buffy sides, and white flank, which create an hourglass pattern on the side. The dorsal fin is moderately curved. Body size ranges from 65 to 80 inches and weighs about 440 pounds.

The taxonomy of the common dolphin continues to be refined and there are several forms that may or may not be separate species. Previously it was split into two species, the short-beaked saddle-backed dolphin (*Delphinus delphis*) and the long-beaked saddle-backed dolphin (*Delphinus capensis*) (Heyning and Perrin 1994). The long-beaked saddle-back dolphin was thought to be more coastal in its distribution than the short-beaked.

Distribution and Populations

This common dolphin occurs in the Atlantic and Pacific oceans in subtropical and warm temperate waters, typically in waters more than 600 feet deep, in association with sea floor features such as escarpments. Distribution is not uniform in continental waters, but generally stays within surface waters from about 50 to 80 degrees F. Actual distribution of this species is hard to determine due to taxonomic confusion in the past. Along the northeastern coast of the U.S., it ranges to near Nova Scotia or Newfoundland in the summer and winters between the Gulf of Maine and Chesapeake Bay.

Biology

Life history characteristics vary among common dolphin populations. Typically it matures at approximately 5-7 years of age and calving occurs about every two years. Gestation period is 10-11 months and breeding peaks in spring, summer, or fall.

The common dolphin forages on pelagic schooling fish, such as sardines and anchovies, and squid, often feeding at night. It may use group feeding techniques to capture prey.

It is known to travel in groups of several dozen to 10,000 individuals that can be heard at a distance because of the splashing noises they make as they frequently jump out of the water. They may also travel with other species. They may migrate seasonally to stay with warmer waters and they have been observed to follow underwater escarpments.

Vulnerable Life History Characteristics

The common dolphin's pelagic lifestyle, large herds, and active diving behavior make it especially susceptible to being taken incidentally by commercial fishing operations.

Human Impacts

Common dolphins are still taken for food and bait in parts of its range and incidental take may be encouraged in parts of its range where there is a market for the meat. Black Sea and Mediterranean populations have declined, most likely due to over-harvesting and bycatch in legal and illegal fisheries, as well as other factors (Reeves et al. 2003). However, its principal interaction with humans is through commercial fishing operations, where it is one of the most common species in the bycatch of purse seine tuna fishery in the Pacific and swordfish driftnet fishery off of Italy. Fortunately, mortality rates have declined in the tuna fishery over the past 20 years due to changes in equipment and procedures.

Of the 47 common dolphins rescued by the Marine Mammal Stranding Center, New Jersey, from 1995 through 2005, only one showed signs of human interaction and that was with fishing gear (Schoelkopf 2006). In New York and Delaware from 2001 through 2005, 34 and 9 stranded saddlebacks, respectively, were rescued. Of those 43 individuals, 12 showed signs of fishery interaction, 7 had been struck by a boat, and 4 had been shot (Northeast Region Stranding Network 2006).

Conservation and Management

The principal form of conservation that would benefit the common dolphin is improving fishing gear of all types to exclude dolphins from the catch. In some areas, improving water quality would benefit the dolphin and undoubtedly other species, as well.

References

General information reported here without attribution was taken from the first three sources.

- Culik, B. 2003. *Delphinus delphis*, common dolphin. Compiled for the Convention on Migratory Species (CMS). www.cms.int/reports/small_cetaceans/data/d_delphis/d_delphis.pdf. Accessed March 3, 2006.
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- Schoelkopf, R. 2006b. Unpublished stranding data for 1995-2005. Marine Mammal Stranding Center, Brigantine, NJ.

Harbor Porpoise (*Phocoena phocoena*)


National Marine Fisheries Service

Status

Federal: not listed
New Jersey: Undetermined
NatureServe: G4G5
IUCN Red List: Vulnerable
CITES: Appendix II

Description

The harbor porpoise is relatively short and stocky, reaching a maximum length of 57-63 inches, with females attaining a larger size than males, and weighing 110-132 pounds. The back is dark gray and the belly is white. The sides are mottled gray where the top and bottom coloration meets broadly.

Distribution and Populations

The harbor porpoise occupies the north temperate and subarctic waters of the northern Atlantic and Pacific oceans. Based upon genetic and contaminant load analysis, there are thought to be four populations of the harbor porpoise in the northwestern Atlantic. The southern-most population, the Gulf of Maine/Bay of Fundy population, was estimated to have a minimum population size of about 75,000 individuals in 1999 (National Marine Fisheries Service 2003)

Biology

Sexual maturity is reached at 3-4 years of age and most individuals live to only 7 or 8 years of age. In the Atlantic, females appear to reproduce each year, giving birth to a single calf. The gestation period is 10-11 months and young are weaned at about 8 months. Calves are born from late May to mid-August.

Harbor porpoises are usually found in waters less than 650 feet deep and often in water less than half that deep. They utilize bays, estuaries, river channels (where they may swim a significant distance upstream), and off-shore areas over the continental shelf. They appear to limit their range to areas where the average annual water temperature doesn't exceed 63 degrees.

This porpoise is hard to detect in the wild. It is often found in small groups of fewer than 10 individuals, though occasionally it may be in groups of 50 to 100. It does not typically swim with other speices. It does not jump or bow ride ahead of boats and doesn't show much of itself as it swims. It can dive to depths of over 700 feet.

The principal food of the harbor porpoise is herring and similar fish, as well as squid.

This species appears to have limited migrations that are related to food distribution and the seasons, though relatively little is know of its movements. It has been observed moving into the Bay of Fundy as young herring arrive. It has also been observed to move inshore during the spring and summer and away from shore during the winter.

Vulnerable Life History Characteristics

The harbor porpoise's open water habit and preference for prey that are also harvested by the commercial fishing industry expose it potential interactions with fishering operations. This species is currently most vulnerable in the Baltic, Black, and Azov seas, where it has declined substantially and where environmental changes may be affecting its ability to rebound. Also, as a top carnivore, the harbor porpoise has accumulated major contamination loads, particularly in areas where rivers from industrialized areas drain into its feeding grounds. The solution to this problem requires improving water

quality in freshwater systems and reducing inputs, whether water or airborne. Some contaminants already in the system may simply require time to be removed through natural processes.

Human Impacts

Harbor porpoises can be taken as incidental bycatch of the fishing industry. With changes in fishing quotas and equipment beginning in 1999, the number of harbor porpoises killed in the mid-Atlantic coastal gillnet fishery declined from an estimated 358 to an estimated 33 per year (National Marine Fisheries Service 2003). Harbor porpoise are directly hunted in West Greenland, where about 1,000 individuals are hunted for meat each year. They carry a heavy contaminant load and individuals can be identified with a population based upon the mix and concentration of contaminants found in its tissues. Levels of contaminants in some cases are high enough to cause fertility problems in other species, but that effect has not been studied in the harbor porpoise (Reeves et al. 2003). This species is also sensitive to noise.

Of the 142 individuals rescued by the Marine Mammal Stranding Center in New Jersey from 1995 through 2005, 24 showed signs of human impact. Of those 24, 17 had interacted with fishing gear, 1 had been hit by a boat, and 4 had other interactions (Schoelkopf 2006). In neighboring states from 2001-2005, New York rescued 47 stranded harbor porpoises and Delaware rescued 12 (Northeast Region Stranding Network 2006).

Conservation and Management

Protecting and restoring diminished populations of this species will require multinational efforts. Continuing to improve and implement protections on fishing gear and working with federal agencies to enforce existing regulations are important protection actions. Also, acoustic disturbances in its feeding areas should be minimized.

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Blue Whale (*Balaenoptera musculus*)
Fin Whale (*Balaenoptera physalus*)
Humpback Whale (*Megaptera novaeangliae*)
Right Whale (*Eubalaena glacialis*)
Sei Whale (*Balaenoptera borealis*)
Sperm Whale (*Physeter macrocephalus*)
True's Beaked Whale (*Mesoplodon mirus*)

Fin Whale *National Marine Fisheries Service*

Status

All species except True's beaked whale are listed as endangered in the U.S. and New Jersey. All have a NatureServe rank of G3 or G3G4 (vulnerable) except the right whale, which is G1 (critically imperiled). All are listed by IUCN as endangered or vulnerable except for True's, which is listed as data deficient.

Description

All species are large and long-lived. The blue whale is not only the largest whale, but also the largest known animal on earth, past or present. The blue, fin, humpback, right, and sei whales are baleen whales that obtain their food by filtering it out of the water in the long plates of baleen that grow from the upper jaw and act as a strainer. The sperm and True's whales are toothed. True's has two teeth that erupt from the lower jaw of adult males (they are unerupted in females) and are thought to be used in combat with other males, based upon scars found on their skin. The sperm whale has teeth only on the lower jaw and sockets into which they fit in the upper jaw.

Distribution and Populations

All but True's are global in distribution and generally occupy subarctic to arctic waters in the summer and temperate to subtropical or tropical waters in the winter. True's range is less well known, but appears to be more restricted to temperate waters, both north and south of the equator.

Populations of all but True's have been decimated by hunting in the past and most have not recovered to anywhere near their estimated original population numbers. The right whale is at especially low numbers and does not appear to have recovered at all, despite protective measures. There are an estimated 300 right whales in the North Atlantic.

All but the humpback are pelagic, typically found off the continental shelf, though some, e.g. the right whale, may be found over the continental shelf. Humpbacks are often found over continental shelves, around oceanic islands, and sometimes closer to shore in embayments.

Biology

The actual life spans of these long-lived species aren't well known for some species, but most are thought to live at least 50 years and possibly as long as 90 or 100 years. Females mature at 5-10 years, depending upon the species. All give birth to a single calf, typically only every 2-4 years. Calves wean in less than a year, typically at 6-8 months of age.

All species migrate to some extent, occupying warmer waters in the winter and arctic or subarctic waters in the summer. Some travel great distances from calving to foraging grounds. The western North Atlantic humpbacks summer from New England to Greenland and winter near the West Indies. North

Atlantic right whales summer from New England to eastern Canada and from South Carolina to Florida. Many species return to the same locations seasonally, indicating historically good foraging areas. Most species travel alone or in small groups, but there may be larger congregations in good foraging habitat.

The baleen whales eat primarily invertebrates such as krill (euphausids) and copepods, though some also eat smaller schooling fish. The toothed species eat squid and occasionally fish.

Vulnerable Life History Characteristics

The pelagic habits of these long-lived species place them in areas where they can become entangled in fishing gear and be struck by large ships. It is also thought that they are sensitive to noises in their environment, such as from large ships. Why these species have not recovered from their early decimation is not known. For some, especially the right whale, it may be that even low numbers of population loss due to entanglement and ship strikes are enough to keep the population from recovering. Further research is needed to determine if commercial fishing activities may directly or indirectly affect their food sources, especially krill in the Pacific Ocean and smaller schooling fish.

Human Impacts

Ship strikes and entanglement in fishing gear are the most common sources of human impacts on these species today. Other impacts include pollution and plastics in the environment, noise, and whale-watching boat disturbances. Human interactions, especially ship strikes and fishing interactions, are monitored in the U.S. under provisions of the Marine Mammal Protection Act. Other effects, such as past reductions in population numbers and climate change, are not well understood.

Stranded sei (1), humpback (4), and fin (10) whales have been recovered from New Jersey over the past 11 years (1995-2005). Eleven of the 15 individuals showed signs of human impact, both ship strikes (9) and propeller hits (2) (Schoelkopf 2006). From 2001-2005, Delaware reported one stranded humpback that had been hit by a boat; New York reported 13 stranded whales (2 fin, 5 humpback, 2 right, 3 sei, and 1 sperm), of which one showed signs of fishery gear entanglement and 8 had been struck by ships (Northeast Regional Stranding Network 2006).

Conservation and Management

Despite conservation measures that have been in place for baleen whales through conventions to regulate whaling in 1931 and 1946, and more recently the U.S. Endangered Species Act, most species are not rebounding as scientists thought they would. Population size, structure, habitat use, communication, etc., are poorly known for all species and are essential to conducting informed management. Conservation measures to reduce and eliminate ship strikes and entanglement in fishing gear are important to continue to pursue. Also, identifying and protecting important habitat from shipping activity would reduce ship strikes and disturbances. Protection for all of these species will require multinational cooperation.

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Harbor Seal (*Phoca vitulina*)


National Marine Fisheries Service

Status
Federal: Not listed
New Jersey: Stable
NatureServe: G5
IUCN Red List:
CITES: Appendix

Description
Harbor seals range in color from white to dark brown, with contrasting spots or rings on the back. The pattern of the coat is unique to each individual. Males reach 1.4-1.9 meters and weigh 55-170 kg. Females are somewhat smaller at 1.2-1.7 meters and 45-105 kg.

Distribution and Populations
The harbor seal is widely distributed, occurring in temperate, subarctic, and arctic regions of the Northern Hemisphere. In the western North Atlantic, it breeds from Baffin Island to Massachusetts. It has been (rarely) found as far south as Florida. Along with several other species, the harbor seal is becoming more abundant in New York Harbor and adjacent waters and farther south during winter months. Slocum (2006) is studying a wintering, multi-species group of seals, primarily harbor seals, in Great Bay, New Jersey. Eastern and western North Atlantic populations are genetically differentiated. Global population is estimated at 400,000-500,000. The 2001 estimate for the coast of Maine is about 99,000 (National Marine Fisheries Service 2003).

Biology
Females mature at 3-6 years of age, around 50 kg., and males mature at 3-7 years of age at about 75 kg. Gestation of the single pup lasts 9-11 months. Pups in the western North Atlantic are typically born in a two-month period, depending upon the population and its latitude, between May and July. Pups can crawl and swim shortly after birth and wean quickly, in about 4 weeks. Lifespan is usually less than 25 years. Molting occurs in July to August in the western North Atlantic.

Harbor seals are generally solitary, except when they haul out onto land. They may move southward in the winter, when they can be observed as far south as the Chesapeake Bay. They typically occupy coastal waters in bays, harbors, coastal rivers, and up to about 10 miles offshore. In New Jersey, harbor seals are being studied at Great Bay where they are observed during non-breeding season (Slocum 2006).

Harbor seals eat fish and invertebrates, including squid, octopus, and crustaceans.

Vulnerable Life History Characteristics
Harbor seals are susceptible to impacts both on land and water. Habitat degradation, disturbances, and hunting may occur at haul out sites and nurseries on land. Water quality degradation and pollution, capture as bycatch in gillnet fisheries, and boat strikes are the principal risks in the water. Harbor seals are also subject to several diseases.

Human Impacts
Multi-species sink gillnet fishing is the principal cause of death related to commercial fishing in the North Atlantic and juveniles appear to be more susceptible than adults. Relatively few individuals are

taken in the mid-Atlantic coastal gillnet fishery where all bycatch for January to April was recorded over several years and observation was focused off of New Jersey (National Marine Fisheries Service 2003).

Strandings occur primarily during the winter months in the mid-Atlantic region. The Marine Mammal Stranding Center in New Jersey reported 224 stranded harbor seals from 1995 through 2005. Of those, 16 showed signs of human interaction, primarily with fisheries (Schoelkopf 2006). New York and Delaware reported 156 and 17 strandings, respectively, from 2001 through 2005, of which 74 (NY) and 3 (DE) showed signs of human interaction. Of the 74 New York animals, 58 indicated fishery interactions, 10 had been struck by a boat, and 6 had been shot (Northeast Region Stranding Network 2006).

Conservation and Management

The Marine Mammal Protection Act of 1972 has aided the recovery of the harbor seal and many other pinnipeds. However, entrapment in fishing gear remains a source of mortality for this species in the North Atlantic. Better understanding of entanglement events and improving protection mechanisms on the sink gillnet equipment could reduce these losses. Continuing to protect haul out sites will provide safe terrestrial habitat.

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Gray Seal (*Halichoerus grypus*)

Harp Seal (*Pagophilus groenlandicus*)

Hooded Seal (*Cystophora cristata*)

Gray Seal ©*National Zoological Park*

Status

These species are not federally listed and their global conservation status from NatureServe is G5 (secure) or G4G5 (apparently secure). IUCN lists them as lower or least risk, except the southern Baltic Sea population of the gray seal, which is listed as endangered.

Distribution and Populations

Theses seals generally occur in the North Atlantic in arctic, subarctic, and in some cases, temperate waters as adults. Breeding occurs primarily from the Gulf of St. Lawrence northward in the western North Atlantic populations. Young may be more widely distributed than adults and all have been reported in New Jersey, usually as juveniles, but occasionally as adults. Global populations estimates range from 5.5-9 million for harp seals to 650,000 for hooded seals, and 300,000 for grays; western North Atlantic population estimates are 4-6.4 million, 450,000, and 150,000 respectively. Hooded seals are highly migratory, wandering as far northwest as Alaska and as far south as the Caribbean. Harp seals may travel as far as 1,500 miles and young gray seals may wander more than 600 miles.

Biology

These are long-lived species, maturing typically between 3 and 7 years of age and living to 25-35 years of age, depending upon the species. Harp seals are about 5.5 feet long and weigh nearly 300 lbs. Gray seals are slightly larger at about 6 feet long and 400 lbs. Male hooded seals may reach nearly 10 feet long and weigh close to 900 lbs.; females are smaller at 7.5 feet and 500 lbs.

Breeding habitat is rocky beaches on isolated mainland coasts or islands (gray) or pack ice (hooded and harp). Breeding occurs in late winter to early spring, soon after the pups are born, and gestation takes about a year. All species produce one pup per year, which weans in 4 days (hooded), 12 (harp) or 18 days (gray). Each species congregates during molting, which occurs in late spring to summer. All 3 species have been observed in New Jersey's Great Bay during the non-breeding season (Slocum 2006).

All species feed on fish and invertebrates, including squid, octopus, and crustaceans. Hooded seals may dive almost 2,000 meters while feeding. Harp seals have been recorded dive 900 feet and gray seals may go as deep as 200 feet when feeding.

Vulnerable Life History Characteristics

All three species have similar vulnerabilities due to their pelagic life style and habit of congregating during breeding. Exposure to degraded environmental conditions is also a problem for some populations, especially in the Baltic Sea and in other areas where industrial wastes enter the Atlantic.

Human Impacts

All three species are protected by the Marine Mammal Protection Act of 1972 in the U.S. However, they continue to be hunted as adults and/or young elsewhere. Although hunting for their skins and oil has been reduced in some areas, such as in the European Union member states and Canada, relatively large numbers may be taken in some areas, including pups, which are taken for their fur.

All species are subject to entanglement in fishing gear. The commercial fishing industry in Canada and the United Kingdom is calling for culling of seal populations to protect economically valuable fish stocks, though others suggest that the decline in fish stocks due to overfishing has reduced food for the seals and is causing them to move farther south in search of food.

Oil spills and bioconcentrated organochlorines are two significant environmental contaminants that all three species face.

Strandings occur primarily during the winter months through early spring in the mid-Atlantic region. The Marine Mammal Stranding Center in New Jersey reported strandings of 75 gray, 240 harp, and 45 hooded seals from 1995 through 2005. Of those 360 individuals, 4 showed signs of human interaction (Schoelkopf 2006). New York and Delaware reported 493 and 34 strandings, respectively, from 2001 through 2005, with 322 (NY) and 4 (DE) showing signs of human interaction. 60% of the New York interactions were with fishery equipment, 33% with boat strikes, and 6.5% had been shot (Northeast Region Stranding Network 2006).

Conservation and Management

Hunting and entrapment in fishing gear are the two main causes of human-induced death in these species. While seals are taken by subsistence fishing communities in Canada, those deaths are low relative to the number trapped in fishing gear and killed for commercial sale in Canada, despite falling markets for seal products. Protecting haul-out sites for land-based species, improving fishing gear to limit entanglement, and reducing commercial hunting outside the U.S. are key conservation measures and will require multinational participation.

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Green Sea Turtle (*Chelonia mydas*)

National Marine Fisheries Service

Status

Federal: Endangered: breeding colony populations in FL and on Pacific coast of Mexico; Threatened everywhere else
New Jersey: Threatened
NatureServe: G3
IUCN Red List: Endangered
CITES: Appendix I

Description

Green sea turtle adults have a smooth, brown carapace, often with radiating or blotchy dark markings. Plastron is yellowish white. The carapace has four pairs of costal scutes, the first not touching the nuchal scute. Adults weigh 250-450 pounds and measure 36-48 inches carapace length.

Distribution and Populations

Primarily tropical in its distribution in the Atlantic, Pacific, and Indian oceans. Juveniles regularly occur as far north as New England; adults occasionally range that far north. There is limited nesting in the continental U.S., estimated at 200-1,100 nesting females, primarily on the Atlantic coast of Florida, with a few nests from North Carolina to Georgia. There is a phylogenetic distinction between all green turtles in the Atlantic and Mediterranean basin from those in the Indian and Pacific Oceans (Bowen et al. 1992). The geographic genetic substructure of green turtle nesting populations indicates that females return to their natal beaches to breed (Bowen et al. 1992). Juveniles forage far from their natal area, with local Florida foraging populations representing nesting colonies from the U.S., Mexico, and Venezuela (Bass and Witzell 2000).

Biology

Green sea turtles reach sexual maturity at 20 years of age or older, estimated at around 27 years of age for females in Florida, depending upon their growth rate. Females rarely nest in successive years. Nesting occurs at night on high energy beaches with deep sand, from approximately May through September in Florida, with most females returning to the area of their natal beach. They lay an average of 3-4 clutches per nesting season, but may lay as many as nine, at intervals of about two weeks. Each clutch contains on average about 140 eggs and takes 45-70 days to hatch, depending upon temperature. Hatchlings emerge from the nest typically at night and move to the sea.

Except when migrating, green turtles are typically found in near-shore, relatively shallow waters inside reefs, bays, lagoons, shoals, and inlets. They are attracted to these low energy environments by their principal foods, sea grasses and marine algae. Green turtles can migrate long distances between nesting and foraging areas. Animals that nest on Ascension Island are known to forage in Brazilian waters, over 600 miles away (Carr 1975). Hatchlings move to oceanic conversion zones where they have been observed in *Sargassum* rafts. They apparently remain there until they are 8-10 inches long, when the move into near-shore foraging habitats. Young green turtles eat a diversity of animals and plants.

Vulnerable Life History Characteristics

The green turtle's complex population structure and high rate of fidelity of nesting females to the beaches where they were born has multiple implications for conservation and management. Impacts at nesting beaches, such as egg collection, habitat destruction, and predation on adults and young, are significant causes of green turtle decline. Although individual females are known to occasionally move between beaches in a single nesting season or between nesting years, loss of habitat will have long-term effects on the colony. In addition, the multiple migratory stages of the life cycle expose each individual to diverse

conditions. Population changes in one area may be the result of environmental changes elsewhere, making effective conservation and management a multi-national responsibility. Fibropapillomatosis, a disease of unknown origin that causes multiple tumors on the skin and internal organs, interferes with activities and physiology, and can cause death.

Human Impacts

Commercial harvest for eggs and meat is a major cause of the green turtle's decline in parts of its range. Other threats include loss or degradation of nesting habitat from coastal development; modifications of nesting habitat, such as beach armoring, grooming, nourishment, and drift fencing; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; and vehicles and recreational equipment on nesting beaches (National Marine Fisheries Service 1991). In the marine environment, degradation of foraging habitat; marine pollution; entanglement and ingestion of debris; watercraft strikes; and destruction of habitat and incidental take from channel dredging; and incidental take from commercial fishing operations (long-lines and nets). Of the 8 green turtles rescued by the Marine Mammal Stranding Center in New Jersey between 1995 and 2005, 6 exhibited human interactions including with fishing activities, boat strike, and impingement on a power plant grate (Schoelkopf 2006).

Conservation and Management

Key conservation and management efforts include continuing to protect the most significant nesting beaches, reducing beach front lighting, and expanding the use of turtle excluding devices in fishing operations beyond U.S. waters. Also, continuing the research supported by U.S. Fish and Wildlife Service and National Marine Fisheries Service on fibropapilloma disease in search of a solution is important. Over the long-term, rising sea levels from global climate change will threaten many nesting beaches. The impact will be especially severe where development immediately adjacent to the shoreline has eliminated potential higher nesting habitat. Continuing international conservation efforts is the key to this species conservation.

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Hawksbill Sea Turtle (*Eretmochelys imbricata*)

National Marine Fisheries Service

Status

Federal: Endangered
New Jersey: Endangered
NatureServe: G3
IUCN Red List: Critically Endangered
CITES: Appendix I

Description

The hawksbill is a medium-sized turtle with a brown carapace distinguished by its large, overlapping scutes except in very young and very old individuals. Some have a radiating pattern of lighter markings, a "tortoiseshell" pattern. It has four pairs of costal scutes and the first does not touch the nuchal. There are two pairs of prefontals between the eyes and two claws on each flipper. Adults typically weigh 95-165 pounds and measure about 30 inches long, though they can reach 36 inches and 300 pounds.

Distribution and Populations

The hawksbill occurs in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. It is widely distributed in the Caribbean and in the western North Atlantic, especially in the Gulf of Mexico and waters off of southern Florida. It has been reported as far north as Massachusetts, but it is rarely observed north of Florida. Nesting occurs on the southeast coast of Florida and the Florida Keys in the continental U.S. The most important U.S. nesting sites are Mona Island, Puerto Rico, and Buck Island, U.S. Virgin Islands. After dramatic declines throughout the Caribbean since the 1950's and perhaps before, numbers appear to be slowly increasing at Mona Island and they are stable, but low, at Buck Island. Nesting is increasing in Mexico where conservation and protection measures are having an impact (Meylan 1999a).

Biology

Age at first reproduction for females is not well known and is thought to be as late as 30 years of age. Nesting occurs at night, from April to November, often on small, isolated, low energy beaches with deep sand and some woody vegetation. More densely occupied beaches in Mexico appear to be the exception, at least at current population levels. Females nest every 2 or 3 years. They lay on average 4.5 clutches of about 140 eggs each at 14 day intervals across the nesting season. Eggs require about 60 days to hatch, at which time the hatchlings move to the sea.

Adult hawksbills are often found in shallow (less than 65 feet deep), hard-bottom environments such as coral reefs and rocky areas, but may also be found in mangrove-bordered bays and estuaries. Adults feed on invertebrates and may be specializing on sponges. Hatchlings are found associated with floating vegetation in convergence zones. They return to a reef environment at about 13 inches in length, but it is not known what age that represents. Hawksbills may migrate several hundred miles between nesting and foraging areas (Meylan 1999b). Preliminary genetic analysis indicates that aggregations of turtles in foraging areas draw from distant and genetically different nesting colonies and that females return to natal beaches to nest (Bass 1999).

Vulnerable Life History Characteristics

As with other sea turtles, the hawksbill's long maturation period and high mobility cause it to be exposed to diverse environmental conditions controlled by many countries. At those beaches where numerous individuals nest (or did in the past), collection of females for meat, eggs, and the prized shell (tortoiseshell) is potentially quite easy. Turtle harvesting occurred prior to European settlement of the

Caribbean and as late as the early 1950's, harvesters reported collecting 35-50 females per night in a one mile stretch of beach (Meylan 1999a).

Human Impacts

Overexploitation by humans for tortoiseshell was the principal cause of this species' decline. The trade in tortoiseshell ended in 1993, but there is interest by Cuba to downlist the hawksbill to CITES Appendix 2, which would allow trade to resume. Other threats include habitat degradation and loss due to beach armoring, nourishment, and grooming; human activity and vehicle use on beaches; beachfront lighting; and development immediately adjacent to beaches. Entanglement in fishing gear, bycatch by the commercial fishing industry, marine pollution and debris which can be ingested, degradation of coral reefs from sedimentation, entrainment in cooling water intakes, and propeller strikes from recreational watercraft are among the threats in the marine environment.

Conservation and Management

Key conservation and management efforts include enforcing a global ban on tortoiseshell trade (some countries are not signatories of the CITES convention), protecting nesting beaches, reducing beachfront lighting, using turtle excluding devices in fishing operations, and implementing more habitat protection and patrolling. Assessing the current level of harvesting and implementing conservation and protection efforts where the threats are the highest is important for allowing breeding stocks to become re-establish. Over the long-term, rising sea levels from global climate change will threaten many nesting beaches. The impact will be especially severe where development immediately adjacent to the shoreline has eliminated potential higher nesting habitat. A multinational approach will be necessary to protect existing hawksbill populations and rebuild population numbers.

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Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

National Marine Fisheries Service

Status

Federal: Endangered
New Jersey: Endangered
NatureServe: G1
IUCN Red List: Critically Endangered
CITES: Appendix I

Description

Along with the olive ridley, Kemp's ridley is the smallest sea turtle, with an average adult weight of less than 45 kg and straight carapace length of about 65 cm. Adults are olive green-gray above and cream-colored below. The shell is nearly as wide as it is long. There are 5 costal scutes, the first one touching the nuchal. The 4 scutes on the bridge between carapace and plastron have a pore at the posterior edge.

Distribution and Populations

Nesting populations are restricted to the Gulf of Mexico, primarily at Rancho Nuevo, Tamaulipas, Mexico, with sporadic nesting on Mustang Island, Texas, and several recent nestings in Florida. Kemp's ridley is the most imperiled of the sea turtles, with dramatic declines occurring since the estimated breeding population of females was 42,000 in 1947. That number dropped to below 1,000 before beginning a slow increase in the last 15 years. Immatures range from the Gulf as far north as Nova Scotia.

Biology

Females reach maturity at 8-15 years of age. They reproduce annually, laying 1-4 clutches of 100 eggs during the day. Eggs require 50-55 days for incubation. Many females lay their eggs at the same time. Post-hatchlings spend many months as surface drifters in pelagic waters associated with weedlines in off-shore currents. Adults forage in the northern Gulf of Mexico. Juveniles range north to Chesapeake Bay and Long Island Sound in summer and sub-adults occupy coastal habitats and shallow off-shore banks. Young animals may wash ashore after being cold-stunned in late fall or early winter in northern latitudes. Kemp's ridley turtles feed on invertebrates, primarily benthic organisms, including crabs, mussels, scallops, snails, and plants.

Vulnerable Life History Characteristics

The limited nesting ground and tendency for many females to nest at once placed the population at risk of over-harvesting of eggs and adults by humans, as well as predation by other species. Entrapment in fishing gear added another significant threat to the species. Migration long distances for juvenile and subadult foraging increases exposure to a variety of environmental dangers, including near-shore habitat degradation, entanglement in fishing gear, and cold-stunning.

Human Impacts

Human impacts at the nesting grounds have been greatly reduced with habitat protection and patrolling for poachers. Requiring turtle excluding devices on Gulf shrimping operations has reduced deaths due to bycatch there. Dredging results in accidental takings and debris in the environment is often consumed by the turtles or entangles them. Of the 45 Kemp's ridleys rescued by the Marine Mammal Stranding Center in New Jersey since 1995, 53% showed signs of human impact. 11% indicated interaction with fishing gear, 18% became impinged on a power plant grate, 4% had been hit by a boat propeller, and 20% showed signs of other human impacts (Schoelkopf 2006).

Conservation and Management

Continuing protection of nesting beaches, including patrols to inhibit egg harvesting, is critical for nesting success. Enforcing use of turtle excluder devices by the shrimping industries of the U.S. and Mexico in the Gulf of Mexico should continue to encourage a population increase. Surveying for additional nesting locations and protecting any promising beaches would help expand the nesting population beyond Nuevo Rancho. Reducing oil spills in the Gulf and reducing the garbage load in Gulf waters would both help the turtles. Conservation of Kemp's Ridley will require on-going international cooperation.

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Leatherback Sea Turtle (*Dermochelys coriacea*)


National Marine Fisheries Service

Status

Federal: Endangered
New Jersey: Endangered
NatureServe: G2
IUCN Red List: Critically Endangered
CITES: Appendix I

Description

The leatherback is the largest living turtle. It has a unique, rubber-like carapace that consists primarily of tough, oil-saturated connective tissue. The carapace is dark and may have mottled pinkish blotches. The plastron is mottled black and whitish. Both the carapace and plastron are covered with skin, not scutes. Adults range in weight from 200-700 kg and the average curved carapace length is 155 cm.

Distribution and Populations

The leatherback occurs in the Atlantic, Pacific, and Indian Oceans, where it nests in tropical and subtropical waters and forages in temperate and subpolar areas. In the western North Atlantic, it ranges from Nova Scotia to Puerto Rico and the U.S. Virgin Islands. Summer concentrations in the vicinity of New Jersey occur south of Long Island, in the eastern and central Gulf of Maine, and in the Chesapeake Bay area. The largest Atlantic nesting colonies are in French Guiana/Suriname, Trinidad, and western Africa. In the southeastern U.S., most nesting occurs in Florida, though in much smaller numbers. A few nests have been reported from North Carolina to Georgia (Murphy and Murphy 2005). Numbers at many nesting beaches worldwide have declined over the past several decades (Spotila et al 1996).

Biology

Leatherbacks are thought to reach sexual maturity at 6 to 10 years of age. In the U.S. nesting occurs from March to July at night on high energy beaches near deep water. Females return to their nesting beaches every 2 to 3 years and lay 5 to 7 clutches per season at 9 to 10 day intervals. Clutches may be laid at different nesting beaches in the same season. Clutches contain 70-90 eggs that incubate for 55 to 75 days. Hatchlings emerge at night and move directly to the ocean. Nothing is known about their next several years.

Leatherbacks are the most pelagic of all sea turtles and the most migratory, approaching shore primarily to breed. They feed on invertebrates, especially jellyfish, and are able to dive deeply.

Vulnerable Life History Characteristics

The leatherback's migratory behavior subjects it to a variety of conditions under the control of many countries. Population changes in one area may be the result of environmental changes elsewhere, making effective conservation and management a multi-national responsibility. It's pelagic lifestyle exposes it to the longline fishery, which takes significant numbers each year as bycatch. The leatherback's propensity to eat plastic may be because the plastic resembles the turtle's preferred prey, jellyfish. As with all sea turtles, disturbances on the nesting beach that affect female behavior, changes to the physical condition of the nest site, or disturbances that disorient hatchlings are significant problems that increase predation rates and reduce nesting attempts or nesting success. Where they still occur, collecting eggs and adults affects survivorship.

Human Impacts

Habitat destruction and degradation, incidental catch in commercial fisheries, and plastics in the marine environment are the greatest threats to leatherbacks. Females are deterred by obstructions of nesting

habitats and hatchlings become disoriented by lights and incur a higher predation rate. Canadian pelagic long-line commercial fisheries in the North Atlantic take on average 170 leatherbacks per year, though no incidental takes were reported for 2001-2003 (DOR 2004). Leatherbacks have also been found tangled in fishing gear (DOR 2004). Global estimate for leatherbacks taken as bycatch of longline fishing for the year 2000 is 50,000 individuals, resulting in thousands of deaths (Lewison et al. 2004). Enlarged turtle excluder devices in the past few years have reduced the number of animals caught by shrimp trawling. Of the 177 leatherbacks rescued by the Marine Mammal Stranding Center in New Jersey from 1995 through 2005 (average = 16/year), 42 (24%) had signs of human interactions. 14% had evidence of being struck by a propeller, 8% had an interaction with fishery equipment, and 2% had been struck by a boat.

Conservation and Management

Leatherback migratory patterns make it essential that their conservation be a multi-national effort. Key conservation and management efforts include protecting nesting beaches, reducing beach front lighting, and using turtle excluding devices in fishing operations globally. Developing protective longline fishing gear that significantly reduces the number of leatherbacks taken as bycatch globally is critical to reduce unsustainable incidental harvests. Over the long-term, rising sea levels from global climate change will threaten many nesting beaches. The impact will be especially severe where development immediately adjacent to the shoreline has eliminated potential higher nesting habitat. Additional information is needed about the leatherback's life history, particularly for hatchlings and juveniles.

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Loggerhead Sea Turtle (*Caretta caretta*)

National Marine Fisheries Service

Status

Federal: Threatened
New Jersey: Endangered
NatureServe: G3
IUCN Red List: Endangered
CITES: Appendix I

Description

The loggerhead is a large sea turtle with reddish-brown carapace and flippers; the plastron is yellow. The carapace has five pairs of costal scutes with the first touching the nuchal scute. The bridge between the plastron and carapace has 3 large scutes. Adults average 200 pounds and 36 inches carapace length.

Distribution and Populations

The loggerhead is found in the Atlantic, Pacific, and Indian oceans in subtropical and tropical waters, ranging into temperate waters in the summer. Principal nesting habitat in the U.S. is on Atlantic beaches from North Carolina to south Florida, with the majority of nesting occurring in Florida. A few nests are regularly found in Virginia. Nests are found very rarely in New Jersey and have been unsuccessful (Schoelkopf, pers. comm. 2006). In non-nesting years, U.S.-nesting females are found off the eastern U.S. and south into the Gulf of Mexico.

There are five genetically distinct nesting subpopulations in the western North Atlantic, ranging from North Carolina to the Yucatan. Recent research (Bowen et al. 2005) has found that despite the strong genetic population structure at nesting beaches due to strong female fidelity, juvenile populations across the North Atlantic contain a broad mix of individuals from different nesting populations. As sub-adults move into shallower habitats, they begin to home in on their natal region, creating a population structure that is similar to, but not identical with the structure at their natal beach.

Biology

Loggerheads reach sexual maturity at 15-30 years of age and females may be reproductively active for about 30 years. Mating takes place in late March to early June in the southeastern U.S. Females usually nest every 2-3 years, returning to the beach where they hatched or within 1-2 miles of it. They typically lay 2-6 clutches of approximately 120 eggs each in open sandy beaches between the high tide line and dunes. Clutches are produced at intervals of 2 weeks, from late April to early September, with the peak of activity in June. The incubation period is 8-9 weeks and hatchlings emerge from the nest a few days after hatching, typically at night. The sex of the hatchlings is determined by the incubation temperature of the nest, not by a sex chromosome. Warmer nests produce more females and the sex ratio of loggerhead populations in the southeastern U.S. are skewed towards females.

Hatchlings move directly into the sea after leaving the nest. Most hatchlings from the southeastern U.S. are thought to spend up to 10-12 years associated with the North Atlantic gyre and have been found in the eastern North Atlantic and the Mediterranean Sea. Some have been found associated with *Sargassum* and they may spend several years there. Sub-adults move back to the general region of their natal beach, occupying near-shore and estuarine environments. Adults inhabit a variety of habitats, from the continental shelf to more coastal habitats of bays, lagoons, estuaries, and river mouths.

Loggerheads eat a range of invertebrates, such as crustaceans, mollusks, and echinoderms. They may also eat slow-moving or dead fish. Young feed on invertebrates concentrated at the surface.

Vulnerable Life History Characteristics

The loggerhead's complex population structure and high rate of fidelity of nesting females to their natal beaches has multiple implications for conservation and management (Bowen et al. 2005; Bowen et al. 1993). Impacts at nesting beaches, such as habitat destruction, increased predation and other mortality rates, as well as temperature changes that affect sex ratios, will have long-term effects. Individual females are known to occasionally move between beaches in a single nesting season or between nesting years, but genetic differences indicate that dispersal between subpopulations is rare. In addition, the multiple migratory stages of the life cycle expose each individual to diverse conditions, potentially on both sides of the North Atlantic. Population changes in one area may be the result of environmental changes elsewhere, making effective conservation and management a multi-national responsibility.

Human Impacts

Degradation and loss of nesting habitat are major threats to loggerheads. Coastal development, beach armoring, beach raking and augmentation, beach front lighting, vehicles, and increased predation from non-native predators are among the biggest problems. Degradation of coastal marine habitats occurs through structural changes, pollution, and boat traffic. Incidental take occurs as a result of commercial fishing (longline, gill net, and trawling) and channel dredging. Global estimate for loggerheads taken as bycatch of longline fishing for the year 2000 is 220,000 individuals, resulting in thousands of deaths (Lewison et al. 2004). Since 1995, an average of 47 stranded loggerheads were recovered each year in New Jersey, of which 25 % could be determined to have been affected by human activity. The most frequent human impact was propeller strikes (16%), followed by boat collisions (3.9%) and fisheries interactions (3.7%) (Schoelkopf, 2006).

Conservation and Management

Key conservation and management efforts include protecting nesting beaches, reducing beach front lighting, and using turtle excluding devices in fishing operations. Developing protective longline fishing gear that significantly reduces the number of leatherbacks taken as bycatch globally is critically needed. Over the long-term, rising sea levels from global climate change will threaten many nesting beaches. The impact will be especially severe where development immediately adjacent to the shoreline has eliminated potential higher nesting habitat.

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