In the Office of Endangered Species
National Marine Fisheries Service
United States Department of Commerce
And
U.S. Fish & Wildlife Service
United States Department of Interior

Turtle Island Restoration Network
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Petitioners

Date: January 10, 2002

Petition for an emergency rule to list the Northern and Florida Panhandle subpopulations of the Loggerhead Sea Turtle *(Caretta caretta)* as Endangered Species throughout their range in the Western North Atlantic Ocean and designate critical habitat.

Petition to list the Northern and Florida Panhandle subpopulations of the Loggerhead Sea Turtle *(Caretta caretta)* as Endangered Species throughout their range in the Western North Atlantic Ocean and designate critical habitat.

The Sea Turtle Restoration Project of Turtle Island Restoration Network and the Center For Biological Diversity formally petition the National Marine Fisheries Service ("NMFS") and U.S. Fish & Wildlife Service ("FWS") to list the Northern and Florida Panhandle loggerhead sea turtles as Endangered Species throughout their range in the western north Atlantic Ocean and associated beaches pursuant to the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531 *et seq*. This petition is submitted under 5 U.S.C. § 553(e) and 50 C.F.R. § 424.14, which grant interested parties the right to petition for issue of a rule from the Secretary of Commerce.

Petitioners also submit this petition under 50 C.F.R. § 424.20, formally requesting that the Secretary issue an emergency rule listing the Northern and Florida Panhandle loggerhead sea

turtles, and any other distinct subpopulation that merits it, as Endangered Species throughout their range in the western north Atlantic and associated beaches.

Petitioners also request that critical habitat be designated for the Northern and Florida Panhandle subpopulations concurrently with their listing as endangered throughout their range, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

I. Petitioners

Petitioner TURTLE ISLAND RESTORATION NETWORK ("TIRN") is a non-profit corporation organized under the laws of the State of California with its principal place of business in Marin County, California. TIRN has approximately 3,500 members in the United States and throughout the world, each of whom shares a commitment to the study, protection, enhancement, conservation, and preservation of the world's marine ecosystems and the wildlife that inhabit the oceans. Many of TIRN's members spend time in a number of wildlife-viewing activities including swimming, snorkeling, kayaking, scuba diving, whale watching, and sport-fishing.

The Sea Turtle Restoration Project, established in 1989, operates under the fiscal sponsorship of TIRN and is dedicated to the protection and restoration of endangered and threatened species of sea turtles. The staff and members of TIRN and the Sea Turtle Restoration Project include wildlife biologists who are engaged in the study, protection, enhancement, conservation and preservation of endangered and threatened marine species, as well as professional wildlife photographers whose livelihood depends in part on their continued ability to photograph sea turtles, whales, dolphins and other marine species. TIRN brings this action on behalf of itself and its adversely affected members.

Petitioner CENTER FOR BIOLOGICAL DIVERSITY (the “Center") is a non-profit corporation dedicated to the preservation, protection and restoration of biodiversity, native species, ecosystems, and public lands. The Center has over 6,000 members and maintains offices in Berkeley, Idyllwild and San Diego, California, Phoenix and Tucson, Arizona, and Silver City, New Mexico. The Center has worked for the protection of marine species and marine ecosystems through administration action, education, and litigation. The Center has a particular interest in the preservation and recovery of endangered marine species such as loggerhead sea turtles. The Center submits this petition on behalf of its members and staff with an interest in the loggerhead sea turtle.

II. Introduction and Summary

The loggerhead sea turtle *(Caretta caretta)* can be found along the Atlantic coast of the United States, from the Florida panhandle north to Cape Cod. Loggerhead sea turtle populations have declined dramatically along the southeastern U.S. as development and fishing efforts have increased. While the species has begun to recover along southeastern Florida, the continued decline in the Northern and Florida Panhandle population segments threatens to extirpate the turtle from its historic range. NMFS has recognized the critical necessity of protecting these subpopulations and has thus made admirable efforts to protect them on a case-by-case basis when studying fisheries and other impacts. An official designation as a Distinct Population Segment (“DPS”) nation and listing as an Endangered Species for these subpopulations, however, are crucial to ensure a comprehensive protection strategy.

Loggerhead sea turtles exhibit unusual behavior that distinguishes these different subpopulations: the behavior of the loggerhead is sex-dependent, such that the females return to their natal beaches to reproduce every 2.5 years while the males remain in the ocean. After

hatching, this reptile spends most of its life in the ocean, returning to land only to reproduce. While little was known about the loggerhead only thirty years ago, many scientists have since focused their studies on this species and have indicated that it must be managed carefully to avoid extirpation in substantial portions of its current range.

In the 1980's NMFS discovered that the shrimp and groundfish fisheries were adversely impacting loggerheads by capturing them in their netting and drowning them, by discarding old netting so that it would entangle turtles, and by catching them on lures. In response, NMFS implemented a Turtle Excluder Device ("TED") program, wherein fishers would attach a device to their boats that would return most of the turtles to the ocean before they were killed. While the TED program has generally proven successful in reducing loggerhead mortality, TEDs do not protect all turtles equally, retaining and drowning larger turtles even when smaller turtles pass through the opening.

Without heightened protection, the Northern and Florida Panhandle population segments of the loggerhead sea turtle will disappear. The Southern Florida population will also be adversely impacted by the loss of gene flow between itself and the Northern subpopulation. Thus, the health of the entire loggerhead species depends upon an endangered designation for the Northern and Florida Panhandle population segments.

III. Legal Status

On June 2, 1970, the EPA federally listed the loggerhead sea turtle as threatened worldwide. It followed this with a July 28, 1978 listing as threatened under the Endangered Species Act of 1973. The species is considered "Endangered" by the IUCN (the World Conservation Union) and is listed in Appendix 1 of CITES (Convention on International Trade in Endangered Species Flora and Fauna). While the loggerhead's overall status, based on the

size of the total U.S. and global populations, has not been upgraded to endangered in the ensuing years, two of the three recognized U.S. subpopulations have continued to decline. NMFS recently began to address this problem on a case-by-case basis, without an effective overarching scheme for recovery that includes a retroactive analysis of harmful fisheries effects.

A. Life History

1. Stock Definition and Geographic Range

Loggerhead sea turtles exhibit a complex gender-specific dispersal behavior that should form the basis of appropriate management techniques. NMFS, on the basis of Turtle Expert Working Group recommendations[1], has informally recognized five distinct loggerhead nesting subpopulations in the western North Atlantic, with three of these along the southeastern U.S coast.[2] The U.S. nesting populations are divided geographically into: (1) a northern nesting subpopulation, from North Carolina south to northeast Florida at about 29°, (2) a south Florida nesting subpopulation, from 29° on the east coast to Sarasota on the west coast, and (3) a Florida panhandle nesting subpopulation at Eglin Air Force Base and beaches near Panama City, Florida.[3]

These subpopulations are identified on the basis of geographically structured nesting assemblages.[4] Nesting female loggerheads show a strong site fidelity to their natal beaches,

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[1] Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) and Loggerhead (*Caretta caretta*) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp.; Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.

[2] NAT'L MARINE FISHERIES SERVICE, REINITIATION OF CONSULTATION ON THE ATLANTIC HIGHLY MIGRATORY SPECIES FISHERY MANAGEMENT PLAN AND ITS ASSOCIATED FISHERIES 31 (June 8, 2001).

[3] *Id*.

[4] *See, e.g.*, B.W. Bowen et al., *Global Phylogeography of the Loggerhead Turtle (Caretta caretta) as Indicated by Mitochondrial DNA Haplotypes*, 48 EVOLUTION 1820 (1994); S.E. Encalada et al., *Population Structure of Loggerhead Turtle (Caretta caretta) Nesting Colonies in the Atlantic and Mediterranean as Inferred from Mitochondrial DNA Control Region Sequences*, 130 MARINE BIOLOGY 567 (1998).

returning to the same area in successive reproductive migrations.[5] Since the females are responsible for the species' reproduction, this high site fidelity leads to low maternal gene flow between nesting assemblages, and the existence of genetic subdivisions among regions and ocean basins.[6] In short, genetic lineage is directly linked to natal beaches. Due to this high site fidelity for nesting, if extirpation of an assemblage occurs, repopulation of the beach through regional dispersal would require thousands of years.[7] This theory has been confirmed in several cases where lost assemblages have not been re-established (*e.g.*, Bermuda, Cayman Island, Alto Velo).[8]

The loggerhead sea turtle inhabits open ocean waters, continental shelves, bays, lagoons, and estuaries of temperate and tropical regions of the Atlantic, Pacific and Indian Oceans.[9] In the Western North Atlantic, these loggerheads generally nest in temperate zones, on sandy beaches. In the United States specifically, loggerheads nest primarily along the Atlantic coastline from North Carolina to the Gulf Coast of Florida. Loggerheads spend most of their adult lives in the ocean as benthic foragers. Generally, loggerhead life-stages can be broken down as follows: 1) egg, 2) beach hatchling, 3) pelagic juvenile, 4) benthic juvenile, 5) benthic adult, and 6) nesting (female) adult.

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[5] K.A. Bjorndal et al., *Sea Turtle Nesting at Melbourne Beach, Florida. I. Size, Growth, and Reproductive Biology*, 26 BIOLOGICAL CONSERVATION 65 (1983); R. Bell & J.I. Richardson, *An Analysis of Tag Recoveries from Loggerhead Sea Turtles (Caretta caretta) Nesting on Little Cumberland Island, Georgia*, 33 FLORIDA MARINE RESEARCH PUBLICATIONS 20 (1978).

[6] S.A. Karl et al., *Global Population Genetic Structure and Male-Mediated Gene Flow in the Green Turtle (Chelonia mydas): RFLP Analyses of Anonymous Nuclear Loci*, 131 GENETICS 163 (1992).

[7] Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.

[8] *Id*.

[9] C.J. Dodd, Jr., *Synopsis of the Biological Data on the Loggerhead Sea Turtle Caretta caretta (Linnaeus 1758)*, 88 U.S. DEP'T. INT. FISH WILDL. SERV. BIOL. REP. 14 (1988).

Once adult females reach reproductive maturity, they migrate from their foraging areas about every 2.5 years to nest at their natal beaches.[10] Once females reach this natal beach, they deposit clutches of about 115 eggs each in an average of 4.1 nests.[11] While the eggs incubate, the ambient temperature of the nest determines their sex. Eggs incubated at lower temperatures produce more males, so that the Northern population produces about 65% males while the South Florida population produces only 20% males.[12] Once loggerheads hatch, they imprint on an as yet unidentified characteristic of their natal beach, compelling them to return to their vicinity of origin to nest upon reproductive maturity. These hatchlings spend a frenzied one to three days crawling and swimming from the beach to offshore currents.

Once hatchlings reach the water they are considered pelagic immatures and float along ocean gyres. Loggerheads spend 10 to 12 years as pelagic juveniles while currents carry them across ocean basins, thousands of miles from their natal beaches.[13] During this stage the different population segments begin to mix,[14] such that a survey of pelagic juveniles would find samples from each population segment.

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[10] J.I. Richardson & T.H. Richardson, *An Experimental Population Model for the Loggerhead Sea Turtle (Caretta caretta), in* BIOLOGY AND CONSERVATION OF SEA TURTLES 165 (K.A. Bjorndal ed., 1982).

[11] C.J. Dodd, Jr., *Synopsis of the Biological Data on the Loggerhead Sea Turtle Caretta caretta (Linnaeus 1758)*, 88 U.S. DEP'T. INT. FISH WILDL. SERV. BIOL. REP. 14 (1988); T.M. MURPHY & S.R. HOPKINS, AERIAL AND GROUND SURVEYS OF MARINE TURTLE NESTING BEACHES IN THE SOUTHEAST REGION, U.S. FINAL REPORT TO NAT'L. MARINE FISHERIES SERVICE SOUTHEAST FISHERIES CENTER (1984).

[12] Nat'l Marine Fisheries Service Southeast Fisheries Science Center. 2001. Stock Assessments of Loggerhead and Leatherback Sea Turtles of the Western North Atlantic. U.S. Dep't of Commerce NOAA Technical Memorandum NMFS-SEFSC-455, 343 pp.

[13] J. Maigret, *Repartition des Tortues de Mer sur les Cotes Ouest Africaines*, 22 BULL. SOC. HERP. 34 (1983); A. Carr, *Rips, FADS and Little Loggerheads*, 36 BIOSCIENCE 92 (1986); A. Carr, *New Perspectives on the Pelagic Stage of Sea Turtle Development*, 1 CONSERVATION BIOLOGY 103 (1987); K.A. Bjorndal et al., *Caretta caretta (Loggerhead) Growth and Pelagic Movement*, 25 HERP. REV. 23 (1994); A.B. Bolten et al., *Biology of Pelagic-State Loggerheads in the Atlantic*, U.S. DEP'T. COMMERCE NOAA TECH. MEMO. NMFS-SEFSC-351, at 19 (1994).

[14] A.B. Bolten et al., *Trans-Atlantic Developmental Migrations of Loggerhead Sea Turtles Demonstrated by mtDNA Sequence Analyses*, 8 ECOLOGICAL APPLICATIONS 1 (1998).

Once pelagic immatures reach a straight carapace length of about 40 to 60 cm, they begin a benthic feeding stage along coastal areas.[15] These areas include lagoons, estuaries, bays, river-mouths and coastal waters with a depth of less than 100 m. Benthic juveniles mature over a period of about 10 years before leaving the coastal feeding grounds for their first reproductive migration.[16]

Genetic evidence indicates that benthic population assemblages are composed of turtles from a mixture of subpopulations. From Chesapeake Bay to Georgia, the loggerheads are nearly evenly split between the South Florida and Northern subpopulations. The percentage of loggerheads from the South Florida and Northern subpopulations, respectively, is as follows: Georgia, 41% and 59%; South Carolina, 50% and 50%; Chesapeake Bay, 46% and 54%.[17] The genetic origins of Gulf of Mexico foraging populations have yet to be determined. Loggerhead sea turtles reach reproductive maturity only after 20 to 30 years, and may make lengthy journeys between their foraging grounds and nesting beaches.[18] For example, tagging studies indicate that the South Florida subpopulation's non-nesting females are dispersed throughout the Bahamas, Greater Antilles, Yucatán, eastern Gulf of Mexico and southern

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[15] A. Carr, *New Perspectives on the Pelagic Stage of Sea Turtle Development*, 1 CONSERVATION BIOLOGY 103 (1987).
[16] *Id*.
[17] C.J. Sears, *Preliminary Genetic Analysis of the Population Structure of Georgia Loggerhead Sea Turtles*, U.S. DEP'T. COMMERCE NOAA TECH. MEMO. NMFS-SEFSC-351 135 (1994); C.J. Sears et al., *Demographic Compositon of the Juvenile Loggerhead Sea Turtle (Caretta caretta) Feeding Population off Charleston, South Carolina: Evidence from Mitochondrial DNA Markers*, 123 MARINE BIOLOGY 869 (1995); J. Norrgard, Determination of Stock Composition and Natal Origin of Juvenile Loggerhead Turtle Population (Caretta caretta) in Chesapeake Bay Using Mitochondrial DNA Analysis (1995) (unpublished M.S. Thesis, College of William and Mary, on file with the College of William and Mary).
[18] C.J. Dodd, Jr., *Synopsis of the Biological Data on the Loggerhead Sea Turtle Caretta caretta (Linnaeus 1758)*, 88 U.S. DEP'T. INT. FISH WILDL. SERV. BIOL. REP. 14 (1988); NMFS Office of Protected Resources, *Loggerhead Sea Turtles*, www.nmfs.noaa.gov/prot_res/species/turtles/loggerhead.html (last accessed Nov. 16, 2001); P.T. Plotkin & J.R. Spotila, *Post-Nesting Migrations of Loggerhead Turtles Caretta caretta from Georgia, U.S.A.: Conservation Implications for a Genetically Distinct Subpopulation*, ORYX (in press).

Florida.[19] Non-nesting females from the Northern subpopulation are found along the entire east coast of the U.S. and even along the northeastern Gulf of Mexico.[20] Incomplete studies indicate that the Florida panhandle subpopulation remains in the Gulf of Mexico.[21]

2. Population Distribution and Trends

While most western north Atlantic surveys (tagging, aerial and ground nesting) of loggerhead population size began in the 1970s, commercial landings data suggest that the turtles were historically much more abundant than they are at present.[22] Accurate assessment of loggerhead populations, however, is made difficult by their lengthy sexual maturation and the consequent 20- to 30-year lag between nesting success and entry into the breeding population. Since sea turtles are most often surveyed at their nesting sites due to the impracticability of surveying them on their benthic feeding grounds, evidence of severe or unsustainable mortality in juvenile stages is not apparent until the adult (nesting) population begins to decline, so that there is a delay of 20 to 30 years between the beginning of the problem and its documentation. Due to the pelagic and benthic mixing of subpopulations which are identical in physical appearance, it is nearly impossible to determine the percentages of turtles from individual subpopulations foraging at sea without DNA analysis.

In the face of such difficulties, NMFS has relied on nesting data collected from certain beaches from 1989 to 1995. In 1983 the first recovery plan estimated U.S. Atlantic and Gulf

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[19] R. Bell and J.I. Richardson, *An Analysis of Tag Recoveries from Loggerhead Sea Turtles (Caretta caretta) Nesting on Little Cumberland Island, Georgia*, 33 FLA. MAR. RES. PUBL. 20 (1978); A.B. Meylan, *Sea Turtle Migration - Evidence from Tag Returns, in* BIOLOGY AND CONSERVATION OF SEA TURTLES 91 (K.A. Bjorndal ed., 1982); A.B. Meylan et al., *Sea Turtle Nesting at Melbourne Beach, Florida. II. Postnesting Movements of Caretta caretta*, 26 BIOL. CONSERV. 79 (1983).

[20] A.B. Meylan, *Sea Turtle Migration - Evidence from Tag Returns, in* BIOLOGY AND CONSERVATION OF SEA TURTLES 91 (K.A. Bjorndal ed., 1982).

[21] *Id*.

[22] W.N. Witzell, *The U.S. Commercial Sea Turtle Landings*, U.S. DEP'T. COMMERCE NOAA TECH. MEMO. NMFS-SEFSC-350 (1994).

abundance of nesting females at 14,150 (based on 4.1 nests per female). Assuming an average of 2.5 years for remigration, the total number of females would be 35,375. Recently, however, female turtle population size was revised to an estimated 43,061. This increase is assumed to be largely a result of increased effort to survey nests.

a. Northern Subpopulation

The Northern subpopulation has declined dramatically over just the past twenty years.[23] Both ground surveys and aerial surveys have been performed to determine nesting effort in this subpopulation, particularly in South Carolina and Georgia. There, two nesting sites, Cape Island and Little Cumberland Island, have been surveyed completely since 1973 and so may give reliable data that can be extrapolated to the entire subpopulation.[24] From 1973 to 1995, Cape Island, South Carolina reported a significant decline averaging 3.2% per year.[25]

Additionally, aerial surveys for the Final Report to FWS showed that nesting in South Carolina declined by 26.4% (1,400 nests) over a five-year period.[26] This result was consistent for developed, undeveloped, and partially developed beaches.[27] Also, beach strandings declined during this period at a similar rate, indicating an overall drop in population size.[28]

While the numbers from Little Cumberland Island did not reflect the total nesting numbers well, they may be used to show a more long-term trend. From 1964 to 1995, nesting

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[23] S.R. Hopkins-Murphy et al., POPULATION TRENDS AND NESTING DISTRIBUTION OF THE LOGGERHEAD TURTLE (CARETTA CARETTA) IN SOUTH CAROLINA 1980-1997, FINAL REPORT TO THE U.S. FISH AND WILDLIFE SERVICE 7 (Apr. 2001).
[24] Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41, 43.
[25] *Id*.
[26] S.R. Hopkins-Murphy et al., POPULATION TRENDS AND NESTING DISTRIBUTION OF THE LOGGERHEAD TURTLE (CARETTA CARETTA) IN SOUTH CAROLINA 1980-1997, FINAL REPORT TO THE U.S. FISH AND WILDLIFE SERVICE 7 (Apr. 2001).
[27] *Id*.
[28] L.B. Crowder et al., *The Effects of Turtle Excluder Devices (TEDs) on Loggerhead Sea Turtle Strandings with Implications for Conservation*, 1995 COPEIA 773 (1995).

declined significantly at the rate of 2.6% per year.[29] Thus, there is a clear trend marking a drop in the Northern subpopulation.

b. South Florida Subpopulation

The South Florida subpopulation is increasing in size. Eight beaches have been surveyed since 1983, but extensive surveying began only in 1989.[30] One of the beaches, Hutchinson Island, and the composite of all eight both reflect accurately the nesting trend seen across the entire range after 1989, so earlier numbers from these two areas can be extrapolated to the entire subpopulation. Thus, Hutchinson Island showed a significant increase of 4.0% per year from 1971 to 1994.[31] The eight beaches, considered together, increased significantly at 5.7% per year from 1983 to 1994.[32] The extensive surveying from 1989 to 1995 shows no trend.[33]

c. Florida Panhandle Subpopulation

Rare and erratic nesting surveys for the Florida Panhandle subpopulation have not provided data reliable enough for detailed analysis. However, from 1989 to 1995, the nesting population ranged from 113 to 928.[34] With less than 1,000 annual nesters, this population is clearly endangered, with the possibility that a single anthropogenic or natural event could potentially extirpate the entire population. Thus, this tiny population requires cautious management.

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[29] Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) and Loggerhead (*Caretta caretta*) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp. at 63.
[30] A.B. Meylan et al., Fla. Dep't. Envtl. Protection Unpublished Data (1995).
[31] *Id*.: r^2=0.62, b=0.79, SE of b=0.15, P<0.0001, n=19.
[32] *Id*.: r^2=0.63, b=0.80, SE of b=0.19, P=0.002, n=12.
[33] *Id*.: r^2=0.33, b=0.58, SE of b=0.37, P=0.18, n=7.
[34] *Id*.

IV. Discussion

When Congress enacted the ESA in 1973, it intended the statute to "provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species . . . ."[35] Thus, the ESA ensures protection for any species listed as endangered or threatened by the Secretary of Commerce or the Secretary of the Interior.[36] According to the 1978 Amendments to the Act, a "species" is ". . . any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature."[37] While Congress has not defined "distinct population segment," or DPS, NMFS and U.S. Fish and Wildlife Service (FWS) have jointly declared that a population segment must be both discrete and significant in relation to the remainder of the species to which it belongs and must satisfy ESA conservation status.[38]

The three factors, discreteness, significance and conservation status are analyzed successively, requiring that each be met before examining the next. Thus, a population segment must first be classified as discrete in relation to the rest of the species with which it is associated.[39] A petitioner must then show the segment is biologically or ecologically significant to the larger species.[40] Finally, a segment will be listed only where it satisfies the ESA's requirements for conservation status.[41] Thus, the different factors are analyzed successively,

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[35] 16 U.S.C. § 1531(b).
[36] Endangered Species Act, 16 U.S.C. § 1531 *et seq*. (1973).
[37] 16 U.S.C. § 1532(16).
[38] 61 Fed. Reg. 4722, 4725 (Feb. 7, 1996) (FWS and NMFS Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Endangered Species Act).
[39] *Id*.
[40] *Id*.; *see Southwest Ctr. for Biodiversity v. Babbitt*, 980 F. Supp. 1080, 1085 (D. Ariz. 1997).
[41] *Id*.

requiring that each be met before examining the next.[42] As discussed below, each of these tests is satisfied for the subpopulations at issue in this petition.

A. Discreteness

A population segment is discrete if it is either 1) "markedly separated from other populations of the taxon as a consequence of physical, physiological, ecological, or behavioral factors," or 2) "delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act."[43] Evidence of marked separations can be shown through quantitative measures of genetic or morphological discontinuity.[44] While a boundary-separated population segment might not be physically or behaviorally distinct, the existence of differing standards could require greater protection.[45] The Northern and Florida Panhandle subpopulations of loggerhead sea turtle are discrete populations because they differ markedly from other populations of the same taxon in terms of physical, physiological, ecological and behavioral factors. NMFS essentially concurs with this conclusion: "NMFS treats these genetically distinct loggerhead turtle nesting aggregations as distinct subpopulations whose survival and recovery is critical to the survival and recovery of the species."[46]

Physiologically, genetic evidence indicates that nesting colonies of the loggerhead sea turtle are demographically independent if separated from each other by 100 km of inappropriate

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[42] *Id*.
[43] *Id*. at 4725.
[44] *Id*.
[45] *Id*. at 4723-24.
[46] Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries 33 (June 8, 2001) ("Biological Opinion").

nesting habitat.[47] Therefore, the Northern and Florida Panhandle subpopulations show distinctions in their mitochondrial DNA that have been created by a highly structured nesting site fidelity, such that females home to their natal nests, creating nesting assemblages that remain static.[48] In 1993, Bowen *et al*. discovered that maternally mediated gene flow between nesting populations was very low, as a consequence of high fidelity to natal beaches.[49] They based this genetic distinction on the mitochondrial DNA, that which is passed along matrilineal paths.[50] Thus, the nesting assemblages are genetically distinct because the females exhibit high nesting site fidelity.[51]

As indicated in the 1998 and 2000 Assessments of the loggerhead populations, the Turtle Expert Working Group ("TEWG") has used Bowen's studies to distinguish between these three subpopulations on the basis of their genetic differences.[52] The TEWG was so confident of this distinction that it recommended that "they be considered independent demographically, consistent with the definition of a distinct vertebrate population segment and of a management unit."[53] As a result, NMFS has recently managed the genetically distinct nesting populations as DPS "whose survival and recovery is critical to the survival and recovery of the species."[54]

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[47] B.W. Bowen, *Tracking Marine Turtles with Genetic Markers*, 45 BIOSCIENCE 528 (1995); B.W. Bowen et al., *Population Structure of Loggerhead Turtles (Caretta caretta) in the Northwestern Atlantic Ocean and Mediterranean Sea* 7 CONSERVATION BIOLOGY 834 (1993).
[48] *Id*.
[49] *Id*.
[50] *Id*.
[51] *Id*.
[52] Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries 33 (June 8, 2001).
[53] Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries 33 (June 8, 2001) (citing 59 Fed. Reg. 65884-65885 (Dec. 21, 1994), 61 Fed. Reg. 4722-4725 (Feb. 7, 1996), and Nat'l Marine Fisheries Service Southeast Fisheries Science Center, *Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic*, NOAA, NMFS-SEFSC CONTRIBUTION PRD-00/01-08 Parts I-III and Appendices I-VI (2001)).
[54] *Id*.

A recent report has indicated that nuclear DNA does not show the same genetic distinction as the mitochondrial DNA.[55] Hence, while females return to particular beaches every year, the males provide an avenue of gene flow across the subpopulations.[56] However, since the females are responsible for nesting, management and conservation efforts should be focused on the origin of the female.[57] Regardless of the nuclear DNA findings, natal homing by females means that each nesting colony will have an independent trajectory in terms of age structure, fecundity, nest survivorship, etc. Thus, nesting colonies will either succeed or fail based solely on the mortality of nesting females. In the words of the TEWG, "[g]iven the high site fidelity of nesting females to their natal beach and low gene flow between nesting assemblages, most Western North Atlantic loggerhead nesting assemblages are vulnerable to extirpation."[58] In affirming the necessity of considering the nesting assemblages to be demographically independent for conservation and management, TEWG has stated that "[t]his conclusion holds even if males should prove not to be philopatric to their natal site, because the production of progeny depends on female nesting success."[59]

Physically and ecologically, the loggerheads are separated by a behavioral barrier that compels them to return to their natal beaches. This physical separation is accentuated by the fact that a 100-km separation between suitable nesting habitats will virtually guarantee the absence of any mixing. While various population share habitat during the juvenile pelagic and benthic

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[55] A.M. Francisco et al., *Stock Structure and Nesting Site Fidelity in Florida Loggerhead Turtles (Caretta caretta) Resolved with mtDNA Sequences*, MARINE BIOLOGY (submitted).
[56] *Id*.
[57] *See Id*.
[58] Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) and Loggerhead (*Caretta caretta*) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp. at 63, 47 n.1.
[59] Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.

feeding stages, the physical separation upon nesting is the crucial factor in sea turtle reproductive and population success.

The three subpopulations differ markedly in their nesting chronology. Sea turtle nesting is mediated by temperature, such that females return to the beach only when the temperature is "correct." Thus, southern turtles reproduce earlier than northern turtles. This behavioral difference should be reflected in conservation policy, in that research visits to both northern and southern beaches should correspond with the varying times during which the turtles are nesting there. In-shore fishing efforts also should be responsive to this timing.

The post-nesting migration behavior of the northern subpopulation of loggerheads is also distinct from that of the southern subpopulation, in that most northern loggerheads migrate north to feed along the U.S. Atlantic coast[60], while most southern loggerheads migrate south to feed in the Gulf of Mexico and the Caribbean Sea.[61]

B. Significance

Once a population segment is deemed discrete, its biological and ecological significance must be considered with respect to the species.[62] NMFS has stated that a species should not be listed solely on the basis of its significance to the overall ecosystem.[63] However, the agency

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[60] P.T. Plotkin & J.R. Spotila, *Post-Nesting Migrations of Loggerhead Turtles Caretta caretta from Georgia, U.S.A.: Conservation Implications for a Genetically Distinct Subpopulation*, ORYX (in press); R. Bell & J.I. Richardson, *An Analysis of Tag Recoveries from Loggerhead Sea Turtles (Caretta caretta) Nesting on Little Cumberland Island, Georgia*, 33 FLORIDA MARINE RESEARCH PUBLICATIONS 20 (1978).

[61] P.T. Plotkin & J.R. Spotila, *Post-Nesting Migrations of Loggerhead Turtles Caretta caretta from Georgia, U.S.A.: Conservation Implications for a Genetically Distinct Subpopulation*, ORYX (in press); D.K. Caldwell et al., *The Atlantic Loggerhead Sea Turtle, Caretta caretta (L.), in America. I. Nesting and Migration of the Atlantic Loggerhead Turtle*, 4 BULLETIN OF THE FLORIDA STATE MUSEUM 295 (1959); A.B. Meylan, *Sea Turtle Migration: Evidence from Tag Returns, in* BIOLOGY AND CONSERVATION OF SEA TURTLES 91 (K.A. Bjorndal ed., 1982); A.B. Meylan et al., *Sea Turtles Nesting at Melbourne Beach, Florida, II. Post-Nesting Movements of Caretta caretta*, 26 BIOLOGICAL CONSERVATION 79 (1983).

[62] 61 Fed. Reg. 4722, 4725 (Feb. 7, 1996)

[63] *Id*. at 4723.

acknowledges that it may look to the significance of the discrete segment to the overall ecosystem as an indication of its importance.[64]

Each population segment's significance must be analyzed on a case-by-case basis.[65] While there is no concrete standard by which a population segment may prove its significance to the population at large, NMFS has suggested that the following considerations may mandate a listing: 1) "Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon," 2) "Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon," 3) "Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range," or 4) "Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics."[66] Since NMFS and FWS created this list only as a guide, other factors may also warrant a DPS designation.[67]

Both the Northern and Florida Panhandle subpopulations are significant because loss of either one would result in a significant gap in the range of the greater U.S. loggerhead population.[68] As noted above, NMFS itself has stated that each nesting assemblage is vulnerable to extirpation, and if extirpation occurs, the assemblage could not be re-established through regional dispersal even after thousands of years.[69] Thus, if the Northern subpopulation were to

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[64] *See id.*
[65] *Id*. at 4725.
[66] *Id*. at 4725.
[67] *Id*.
[68] *See* Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.
[69] *Id.* at 41; Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) and Loggerhead (*Caretta caretta*) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp. at 63, 47 n.1.

become extinct, the loggerhead would lose that portion of its historic range for thousands of years.[70]

In addition, the higher percentage of males in the Northern population segment is crucial to continued reproductive success for the overall population. The nesting season for the Northern subpopulation is shorter and cooler than that for the south, producing a substantially higher percentage of males. Since there is no basin separation according to nuclear DNA studies, the males of all subpopulations provide conduits for gene flow across subpopulations. Thus, the existence of northern males as a source of genetic diversity is not only significant to the overall population of loggerhead turtles, but is, in fact, crucial to its continued survival.

C. Conservation Status

Where NMFS finds a population segment to be both discrete and significant, it evaluates the status of this DPS through the five listing factors in 16 U.S.C. § 1533(a)(1).[71] These factors are: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural or manmade factors affecting its continued existence.[72]

A DPS may be listed as threatened or endangered if it satisfies any one or more of these factors.[73] If a DPS is in "danger of extinction throughout all or a significant portion of its range," then it should attain endangered status in order to ensure its recovery.[74] The "best

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[70] *See* Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.
[71] 61 Fed. Reg. 4722, 4725 (Feb. 7, 1996).
[72] 16 U.S.C. § 1533(a)(1).
[73] *Id*.
[74] 16 U.S.C. § 1532(6).

scientific and commercial data available" should be the sole basis for a finding of endangered status.[75]

The Northern and Florida Panhandle subpopulations of the loggerhead sea turtle are endangered because they are in imminent danger of extirpation from their ranges. For example, because the northern subpopulation of loggerheads is small compared to other subpopulations, comprising only 9 % of loggerhead nesting in the U.S.,[76] and may be declining,[77] measures to reduce mortality are critically needed. Numerous human impacts are known to threaten loggerheads throughout their range.[78] NMFS itself has determined that it must address conservation measures by using nesting assemblages as the base unit for overall population protection, and has implied that it is presently processing a formal Endangered DPS designation.[79] Thus, without protection as endangered species, these subpopulations face extinction as a result of anthropogenic activities such as commercial fishing, coastal development and pollution. However, NMFS has not actively sought to modify existing fishery management plans to reflect accurately the loggerhead's population structure and to protect adequately the declining subpopulations. Threats to the loggerhead sea turtle must be mitigated by NMFS.

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[75] 16 U.S.C. § 1533(b)(1)(A).

[76] C.J. Sears et al., *Demographic Composition of the Feeding Population of Juvenile Loggerhead Sea Turtles (Caretta caretta) off Charleston, South Carolina: Evidence from Mitochondrial DNA Markers*, 123 MARINE BIOLOGY 869 (1995).

[77] Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) and Loggerhead (*Caretta caretta*) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp. at 63; Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 41.

[78] NAT'L MARINE FISHERIES SERVICE AND U.S. FISH AND WILDLIFE SERVICE, RECOVERY PLAN FOR U.S. POPULATIONS OF LOGGERHEAD TURTLE *CARETTA CARETTA*, (1991); M. Lutcavage et al., *Human Impacts on Sea Turtle Survival, in* THE BIOLOGY OF SEA TURTLES 387 (P. Lutz & J. Musick, eds.) (1996); Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries (June 8, 2001).

[79] *See* Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries (June 8, 2001).

1. Sources of Mortality

Loggerhead sea turtles suffer a wide variety of terrestrial and marine mortality sources, primarily from humans. While few anthropogenic sources of mortality other than shrimp trawls have been accurately quantified, the TEWG has identified some particular sources of concern, such as longline and coastal gillnet fisheries and marine debris and pollution. The TEWG analyzes these hazards according to turtle life stage, first pelagic and then benthic.

a. Nesting Impacts

Eggs, hatchlings, and nesting turtles are incredibly sensitive to harm from, and are deserving of stringent protections against, a wide variety of human activities. Erosion of nesting beaches can result in the loss of nesting habitat. Development of beach fronts with fortification to protect property from erosion results in the loss of dry nesting beach. Fortification can also prevent females from getting to any remaining nesting sites.

Beach nourishment impacts turtles by burying nests, disturbing nesting turtles, and affecting embryo development through increased sand compaction and temperature changes. Since both adults and hatchlings are attracted to light, artificial lighting increases their chances of death or injury when it disorients the turtles on their way to the ocean. Additionally, females avoid areas with intense lighting, so highly developed areas may lessen turtle nesting. Repeated mechanical raking of nesting beaches by heavy machinery can result in compacted sand and tire ruts, which may hinder or trap hatchlings. Rakes can penetrate the surface to disturb nests, uncover nests, or transfer debris over nests and alter nest temperature. Nighttime beach use disturbs nesting females. Heavy utilization of nesting beaches by humans may also compact the sand, resulting in lowered hatchling success.

The placement of physical obstacles on a beach can hamper or deter nesting attempts as

well as interfere with incubating eggs and the sea approach of hatchlings. The use of off-road vehicles on beaches is a serious problem in that it compacts sand, directly kills hatchlings, and leaves tire ruts that increase a hatchling's difficulty in reaching the ocean. Finally, the invasion of a nesting site by non-native beach vegetation can lead to increased erosion and destruction of nesting habitat, and trees can shade nests, lowering temperatures and altering the natural sex ratio of the hatchlings.

b. Pelagic Mortality

Since pelagic loggerhead juveniles circumnavigate the Atlantic Ocean, they experience numerous threats during this sensitive stage in their development. For example, pelagic juveniles become subject to a series of longline fisheries aimed at swordfish and tuna.[80] Experts have estimated that the Mediterranean portion of the Spanish swordfish longline fleet captures approximately 10,700 juvenile loggerheads each year, half of which come from the southeastern U.S.[81] In another study, sea turtle mortality in the Mexican tuna longline fishery in the Gulf of Mexico was found to be 33%.[82] Because the U.S. Atlantic pelagic longline fishery alone captured an estimated 7,891 loggerhead turtles from 1992 to 1999, NMFS concluded that the operation of this fishery jeopardized the continued existence of loggerheads and leatherbacks[83] and closed a vast area of the western north Atlantic Ocean to the U.S. pelagic longline fishery for

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[80] R.J. Aguilar et al., *Impact of Spanish Swordfish Longline Fisheries on the Loggerhead Sea Turtle Caretta caretta Populations in the Western Mediterranean*, U.S. DEP'T. COMMERCE NOAA TECH. MEM. NMFS-SEFSC-361 at 1-6 (1995).

[81] *Id*.; B.W. Bowen et al., *Population Structure of Loggerhead Turtles (Caretta caretta) in the Northwestern Atlantic Ocean and Mediterranean*, 7 CONSERVATION BIOLOGY 834 (1993); *see generally* L. Laurent et al., *Molecular Resolution of the Marine Turtle Stock Composition in Fishery Bycatch: A Case Study in the Mediterranean*, 7 MOLECULAR ECOLOGY 1529 (1998).

[82] P.A. Ulloa Ramirez et al., *Incidence of Marine Turtles in the Mexican Longline Tuna Fishery in the Gulf of Mexico*, U.S. DEP'T. COMMERCE NOAA TECH. MEM. NMFS-SEFSC-436 110 (2000).

[83] Nat'l Marine Fisheries Service Southeast Fisheries Science Center, *Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic*, NOAA, NMFS-SEFSC CONTRIBUTION PRD-00/01-08 Parts I-III and Appendices I-VI (2001).

a six-month period.[84] Because seventeen other countries are known to fish these waters and the U.S. fishery accounts for just 5 to 8 % of the overall pelagic longline fishing effort in the Atlantic Ocean,[85] this regulatory action alone will not eliminate the threat from longline fisheries. Other observers found that 21 of 4,808 loggerheads captured by the U.S. fleet between 1992 and 1997 were killed, and logbooks showed that loggerheads readily ingested hooks.[86] Thus, longline fisheries have a significant impact on juvenile loggerheads and an even greater impact on the species as a whole because these young are killed before reaching sexual maturity.

Just as these juveniles will ingest hooks, they will feed on other abiotic materials they find in the ocean. NMFS stated in its 2000 Assessment update that "[p]reliminary indications are that approximately 15% of pelagic post-hatchling loggerheads from Florida beaches have ingested plastics and approximately 46% have ingested tar within the first few weeks of pelagic foraging."[87]

c. Benthic Mortality

Loggerheads face many equally harmful impacts during their benthic feeding stages. Commercial fishing kills vast numbers of juvenile and sub-adult benthic turtles each year. Shrimp trawling alone kills more benthic sea turtles than all other human activities combined, at 5,000 to 50,000 loggerheads each year.[88] All other human-related mortality is estimated at between 500 and 5,000 deaths a year. The National Research Council Committee on Sea Turtle

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[84] 66 Fed. Reg. no. 135, 36711 (July 13, 2001) (to be codified at 50 C.F.R. pt. 635).
[85] F. CAROCCI & J. MAJKOWSKI, ATLAS OF TUNA AND BILLFISH CATCHES, CD-ROM version 1.0. FAO, Rome, Italy (1998).
[86] D.R. Johnson et al. 1999. Estimates of Marine Mammal and Marine Turtle Bycatch by the U.S. Atlantic Pelagic Longline Fleet in 1992-1997, U.S. DEP'T. COMMERCE NOAA TECH. MEM. NMFS-SEFSC-418 70 pp.; W.N. Witzell, *Distribution and Relative Abundance of Sea Turtles Caught Incidentally by U.S. Longline Fleet in the Western North Atlantic Ocean, 1992-1995*, 97 FISHERY BULLETIN 200 (1999).
[87] Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 72 (citing B.E. Witherington, *Flotsam, Jetsam, Post-Hatchling Loggerheads, and the Advecting Surface Smorgasbord*, U.S. DEP'T. COMMERCE NOAA TECH. MEM. NMFS-SEFSC-351, at 166-168 (1994)).
[88] NAT'L RESEARCH COUNCIL, DECLINE OF THE SEA TURTLES: CAUSES AND PREVENTION, (1990).

Conservation found that 70 to 80% of sea turtle strandings during shrimping season were a direct result of shrimp trawls.[89] Since the National Council determined in 1994 that tools such as TEDs can reduce mortality, they have been implemented regularly.[90] However, as mortality continues in this sensitive species, NMFS should take a closer look at the shrimp industry and require additional safeguards.

The summer flounder fishery is also a significant source of loggerhead mortality, having directly killed from 89 to 191 turtles over four months.[91] To combat this, NMFS has required TEDs to be used south of Cape Charles on a year-round basis since 1992.[92] There appears to be no survey of the success of these devices in the summer flounder fishery.

Gillnet fisheries are a special source of mortality for sea turtles. While some states have prohibited nearshore gill netting, New Jersey, Delaware, Maryland, Virginia, North Carolina and federal waters are still open to gillnet fisheries. Since federal waters begin just three miles from the shore, the overwhelming majority of sea turtles reside in gillnetting territory. Annual peak strandings occur in early summer and late fall, in concert with increased gillnetting activity.[93] While two gillnet fisheries off the North Carolina coast have been temporarily closed over the last two years due to elevated strandings, a DPS determination will facilitate a more comprehensive approach that can prevent harmful take from occurring, rather than merely addressing a situation after the take has already exceeded acceptable amounts. Moreover,

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[89] *Id*.
[90] Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 73.
[91] S.P. Epperly et al., *Beach Strandings As an Indicator of At-Sea Mortality of Sea Turtles*, 59 BULLETIN OF MARINE SCIENCE 289 (1996); S.P. Epperly et al., *Winter Distribution of Sea Turtles in the Vicinity of Cape Hatteras and Their Interactions with the Summer Flounder Trawl Fishery*, 56 BULLETIN OF MARINE SCIENCE 547 (1995).
[92] 59 Fed. Reg. 19584 (Mar. 7 1994).
[93] NMFS Office of Protected Resources, *Loggerhead Sea Turtles*, www.nmfs.noaa.gov/prot_res/species/turtles/loggerhead.html (last accessed Nov. 16, 2001); Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp. at 74.

uplisting of the Northern and Florida Panhandle subpopulations to endangered status will enhance the agencies' ability under the ESA to protect them from the harmful impacts of these fisheries.

Finally, there exist a variety of disconnected threats to turtle populations.[94] Channel dredging results in incidental capture of loggerheads;[95] dredging can generally destroy resting or foraging habitats, and hopper dredges, specifically, can kill turtles caught in their dragheads. Overharvesting of horseshoe crabs (*Limulus polyphemus*) in Delaware Bay deprives loggerhead turtles of an important food source.[96] Loggerheads eat a wide variety of marine debris which interfere with their metabolism and gut function, such as plastic bags, plastic and styrofoam pieces, tar balls, balloons and raw plastic pellets. Turtles suffer from propeller and collision injuries in areas where recreational boating and ship traffic is intense. When encountering an oil spill, sea turtles may suffer harm to their respiration, skin, blood chemistry and salt glands. Pesticides, heavy metals and PCBs have been detected in turtles and eggs, and while the effects are as yet unquantified, they are harmful. Marina and dock development can cause foraging habitat to be destroyed or damaged, in addition to the impacts of increased boat traffic. Saltwater intake systems for coastal power plants kill an estimated 2% of captured turtles each year. Underwater explosions kill and harm turtles. While the effects of offshore lighting are unknown, they may attract hatchlings and interfere with proper offshore orientation (as on

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[94] *See* Nat'l. Marine Fisheries Service, Biological Opinion, Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries (June 8, 2001); NMFS Office of Protected Resources, *Loggerhead Sea Turtles*, www.nmfs.noaa.gov/prot_res/species/turtles/loggerhead.html (last accessed Nov. 16, 2001); Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Dep't Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp.

[95] M. Lutcavage et al., *Human Impacts on Sea Turtle Survival, in* THE BIOLOGY OF SEA TURTLES 387 (P. Lutz & J. Musick, eds.) (1996).

[96] M.E. Lutcavage & J.A. Musick, *Aspects of the Biology of Sea Turtles in Virginia*, 2 COPEIA 449 (1985).

land)and increase the risk of predation. Finally, turtle deaths from entanglement in discarded fishing gear are thought to be significant.

D. Critical Habitat

Petitioners request that critical habitat be designated for the loggerhead sea turtle throughout its range along the Eastern and Gulf Coasts of the United States pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12. The anthropogenic impacts on nesting habitat are increasing as human visits to, and development of, beaches increases. In addition, benthic feeding grounds host the great majority of adult loggerheads at any given time and must be preserved. Although loggerhead turtles do not nest along the northeastern shore of the U.S., reproductive post-nesting northern loggerheads feed in northeastern U.S. waters.[97] However, this region has not been deemed important sea turtle habitat.[98] The NMFS and FWS Recovery Plan for U.S. populations of the loggerhead should include identifying and mitigating threats to the species in northeast U.S. waters. Critical habitat designation and effective recovery efforts are necessary to prevent the Northern and Florida Panhandle distinct population segments of the loggerhead sea turtle from extinction.

V. Conclusion

NMFS and FWS should list the Northern and Florida Panhandle subpopulations of the loggerhead sea turtle as distinct population segments deserving of increased Endangered Species status protection from the many threats to their continued existence. These subpopulations are clearly distinct, significant and dwindling in size, thereby mandating separate Endangered Species status from the population as a whole. In fact, NMFS has already informally recognized

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[97] P.T. Plotkin & J.R. Spotila, *Post-Nesting Migrations of Loggerhead Turtles Caretta caretta from Georgia, U.S.A.: Conservation Implications for a Genetically Distinct Subpopulation*, ORYX (in press).
[98] NAT'L MARINE FISHERIES SERVICE AND U.S. FISH AND WILDLIFE SERVICE, RECOVERY PLAN FOR U.S. POPULATIONS OF LOGGERHEAD TURTLE *CARETTA CARETTA* (1991).

this fact in its Biological Opinion for the Atlantic Highly Migratory Species Fishery Management Plan. In particular, genetic evidence proves that these loggerhead subpopulations are distinct due to the female nesting fidelity that brings them and their female progeny back to the same beaches year after year. Additionally, these loggerhead subpopulations are significant because they extend the range of the overall loggerhead population. If they were to disappear, thousands of years would pass before their nesting beaches are repopulated. Finally, the subpopulations are composed of few turtles and their numbers are continuing to decline. Accordingly, uplisting of these two subpopulations to Endangered Species status is consistent with the agencies' DPS policy and designation of critical habitat for each is warranted under the ESA.

Additionally, there may be other distinct loggerhead subpopulations, such as the subpopulation nesting in the Dry Tortugas, (Brian Bowen, pers. comm.), that merit consideration for DPS status based on small size and preliminary data suggesting distinctiveness. Thus, a complete examination of all population segments for possible listing as separate endangered DPS status and for development of critical habitat is also requested in this petition.

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EARTHJUSTICE LEGAL DEFENSE FUND

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