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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu Laboratory
P. O. Box 3830
Honolulu, Hawaii 96812

STATUS REVIEW DOCUMENT FOR PACIFIC SEA TURTLES¹

George H. Balazs
Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96812

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BACKGROUND

The purpose of this document is to consolidate all literature and correspondence relevant to Pacific sea turtles since 1978 to provide a biological basis for reviewing the status of the populations. The green, Chelonia mydas, loggerhead, Caretta caretta, and olive ridley, Lepidochelys olivacea, sea turtles were listed in 1978 under the Endangered Species Act (ESA) after 4-1/2 years of evaluations. This initial period culminated in the publication of a Final Environmental Impact Statement (FEIS). The specific action, as stated in the FEIS, was as follows:

"On the basis of the best scientific and commercial data available to NMFS and FWS, the green, loggerhead, and Pacific ridley sea turtles have suffered serious declines, and are thought likely to become endangered species within the foreseeable future throughout a significant portion of their ranges. Consequently the NMFS and the FWS will list and protect these three species under the Endangered Species Act of 1973 (16 U.S.C. 1531-1543) in the following manner: The loggerhead is to be listed as threatened throughout its range. The Pacific ridley is to be listed as threatened throughout its range except for the breeding colony population found on the Pacific coast of Mexico which will be listed as endangered. The green turtle is to be listed as threatened throughout its range except for the breeding colony populations found in Florida and on the Pacific coast of Mexico which will be listed as endangered."

Under "Alternatives to the Action," the FEIS further stated that:

"To not list these animals and provide essential protection would be inconsistent with our responsibilities under the Act. This alternative was not a viable option."

Two other sea turtles in the Pacific, the hawksbill, Eretmochelys imbricata, and the leatherback, Dermochelys coriacea, were listed as endangered under the ESA in 1971. A formal review of the status of these two species was conducted by the Fish and Wildlife Service (FWS) alone in 1979. Relevant literature and correspondence for these turtles in the Pacific dating from 1978 are contained as part of this present document.

The factors given in the FEIS that contributed to the decline of sea turtles, thereby making it necessary to list and protect them under the ESA, are as follows: 1) destruction, modification, or curtailment of habitat or range; 2) commercial overutilization; 3) natural predation and disease; 4) inadequacy of regulatory mechanisms; and 5) manmade factors affecting their existence--including incidental catch by fishermen.

Additional background information on the 1978 listing can be found in C28 of the correspondence dossier.

STATUS OVERVIEW

The most current, complete, and concise status overview presented to date for each of the five species can be found in reference 52 of the literature dossier. The published volume resulting from the World Conference on Sea Turtle Conservation (WCSTC), held in late 1979, contains a substantial number of papers providing a comprehensive and global perspective on biology, status, conservation theory, techniques, and law (33). Included as part of this book is a Sea Turtle Conservation Strategy (34) that was produced by the Conference. Two papers on the options and limitations in conserving sea turtles (47 and 75) describe much of the biological rationale for this conservation strategy.

A Marine Turtle Recovery Team has been established for the Atlantic, Gulf, and Caribbean areas of the United States. A draft recovery plan has been prepared (60) and, in 1982, was being circulated for review. The efforts of this recovery team, and the problems in general of recovering sea turtle populations, are described in 76.

GEOGRAPHICAL AREAS

Eastern Pacific

Sea turtles occur off the west coast of the United States, but very little seems to be known of their status (53, 54, 65, C13).

Papers presented at the WCSTC on the status of sea turtles off the Pacific coast of Mexico, Central and South America include 35, 40, 41, and 51. The FWS has carried out cooperative contracted research on olive ridleys nesting in Costa Rica (42), as well as on the ESA endangered green turtle breeding colony in Mexico (39). A preliminary report on the accidental capture of sea turtles by Mexican shrimp trawlers has also been completed for the FWS (38). An aerial survey of Michoacan on the Mexican Pacific coast has recently revealed nesting by leatherbacks in greater densities than previously documented. However, due to "severe stresses" on all major populations of this species, the author of the paper considers the "endangered" status still justified (78). Both current (51) and historical (49) information have also been published on the status of sea turtles in the Galapagos Islands of the eastern Pacific.

State of Hawaii

Overall accounts of sea turtles in the State of Hawaii (Hawaiian Archipelago) appear in 24 and 25. The green turtle is the most abundant species at this location. Complete summaries of the results of tagging and other research conducted on this population, including most historical aspects, are presented in 18 and 29. These two papers alone provide a

comprehensive review of nearly all available information. The bibliography in reference 18 contains 670 citations for Hawaiian sea turtles dating prior to September 1979. The conservation strategy of the WCSTC designated the Hawaiian green turtle breeding population at French Frigate Shoals as one of eight sea turtle colonies worthy of maximum protection by reason of isolation and unique ecology (basking behavior).

References to literature and correspondence found in the present document are listed as follows for specific aspects of the Hawaiian green turtle population.

Breeding population assessment: See report by Jerry A. Wetherall (1983. Assessment of the stock of green turtles nesting at East Island, French Frigate Shoals. Southwest Fisheries Center Administrative Report H-83-8, 22 p. Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.

Growth rates: Recently shown to be much slower in the wild than what occurs in captivity - 13, 15, 23, and 50; corroborated by workers in Australia (64); see also C1 for possible aging technique.

Habitat usage: A telemetry study determined that the breeding population heavily utilizes the inshore waters of French Frigate Shoals - 3 and 46.

Basking ecology: Increased understanding of the thermal ecology and behavior while basking on land - 95 and 96; more basking on Tern Island after closure of U.S. Coast Guard station - 81.

Migrations: Long distance movements regularly made by adult males and females between French Frigate Shoals and resident feeding areas throughout the Hawaiian chain - 15, 18, and 19; found to be one of the best documented when compared to tagging studies conducted elsewhere (71).

Tags and tagging techniques: Use of Inconel² alloy tags and multiple tags applied to each turtle reduces tag loss - 19 and 29; also discussed in 73. Experimental scute grafting offers promise for permanently marking hatchlings - 56, 57, 59.

Strandings and disease: Reported strandings on the increase, especially for turtles afflicted with fibrous papillomas - 55, 66, and 92; see also 18.

Predator controls: None instituted, but warranted for tiger sharks on a localized experimental basis; see 15 and 18.

²Use of trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Critical habitat designations: None to date, but terrestrial areas used for nesting and basking have been identified in 11; 46 establishes a biological basis for certain marine critical habitat at French Frigate Shoals.

Reproductive biology: Current research results appear in 29; see also 37 and 58 for an international perspective of the Hawaiian green turtle.

Enforcement: Efforts need to be enhanced to reduce illegal take and promote recovery - 25, 69, 93, and C11; State of Hawaii provided full legal protection in April 1982 after deleting 1974 fishery regulation (25, C3, and C21); however this appears to be nominal.

Educational efforts: Public needs to be better informed about the turtles' protected status, ecological requirements, and biological limitations, i.e., see 27.

Nesting habitat enhancement: Southwest Fisheries Center (SWFC) Honolulu Laboratory personnel break up old cement slab at French Frigate Shoals nesting area - 91.

Historical decline: Further information relevant to the main islands (12, 86, C19, C23, C25, and C26) and the Northwestern Hawaiian Islands (62).

Hawaiian cultural aspects: Unable to document use in ponds for fish culture enhancement - C18, C20, C22, and C27.

"Subsistence use" question: Historical overview and analysis given in 26a; also discussed in relation to Hawaii in 25, 68, C2, C3, C6, and C24.

Research needs: Outlined by the SWFC Honolulu Laboratory - 82; summarized by WCSTC - 34; not given priority in 1982 draft of FWS Pacific Islands Strategy Plan - C5.

Value to the ecosystem: Evidence that the green turtle can "short-circuit" the detritus cycle, thereby enhancing marine productivity - 89.

Hawksbills also occur in the State of Hawaii, but their range is limited to the main islands where they are present in relatively few numbers. Very little is known of their status since almost no research has been undertaken. Scattered nesting has been documented on the island of Hawaii (11), and apparently occurs regularly each year at the eastern end of Molokai (C10). Reference 18 contains a bibliography of the Hawaiian hawksbill for all literature prior to 1979.

Leatherbacks regularly occur in the offshore waters of the State of Hawaii where they are sighted by fishermen and sometimes become entangled in fishing gear (21 and 25; see also bibliography in 18). The recent stranding of a specimen on Oahu with all four flippers amputated (66), and an emergence on Maui, possibly for nesting (85), are the only records for

leatherbacks on shore in the Hawaiian Islands. Leatherbacks have recently been discovered in international waters northwest of the Hawaiian Islands (24) where they are impacted to an unknown degree by large drift nets set from foreign fishing vessels (22). Possible nesting areas for these turtles could be Malaysia, or the Pacific Mexican rookery described in 78.

Loggerheads are occasionally recorded in Hawaiian waters (25). One was recovered from the stomach of a tiger shark caught at Kure Atoll at the extreme northwest end of the chain (14). Olive ridleys, though relatively rare in Hawaiian waters, have been recorded in increasing numbers during recent years (25 and 66). Since several of these have been juvenile specimens, it is possible that pelagic waters surrounding the Hawaiian Islands serve as development habitat for the species. Since nesting by olive ridleys (as well as loggerheads) has never been found in Hawaii, the source of these young animals may very well be the ESA endangered breeding colony on the Pacific coast of Mexico.

American Samoa

A summary of all known sea turtle observations at uninhabited Rose Atoll is given in 28. No hawksbills have been found nesting at this location in recent years, and green turtles are only present in small numbers. Except for some scattered nesting by green turtles in the Manua Group, Rose Atoll is the sole breeding colony for this species throughout the entire Samoan Archipelago (American Samoa and Western Samoa). Other recent literature summarizing the status of sea turtles (greens and hawksbills) in Samoa consist of 4, 24, and 74. There are no laws controlling the taking of sea turtles in Western Samoa. A small hatchery project designed to restock hawksbills was operational for 10 years (24), but closed in late 1982.

The subject of subsistence use of sea turtles in American Samoa is discussed in 26a and C29.

Territory of Guam

The known status and conservation problems of Guam's sea turtles are summarized in 77. Green turtles appear to be the main species, but very little research has been conducted. Prior to the ESA listing in 1978, there were no regulatory controls on the taking of green turtles or their eggs on Guam (C16 and C17). However, in 1979 legal protection at the local government level was instituted through the "Endangered Species Act of Guam" (88). Some good efforts toward educating and informing the public about sea turtles have been initiated (1, 2, 10, 30, 31, 32, and C15).

Published reports on the home consumption of seafood (36) and patterns of marine exploitation (61) suggest only a minor and opportunistic interest by Guam residents in taking turtles (see also C8). A recently published Territory of Guam Fisheries Development and Management Plan does not mention sea turtles (5).

The Government of Guam is dissatisfied over the "subsistence use" exemption granted in 1978 to their close neighbors in the Northern Marianas, a part of the Trust Territory (U.N. trusteeship). Under the ESA listing, residents of the Trust Territory may take green turtles in the water for personal consumption "... if such taking is customary, traditional, and necessary for the sustenance of such resident and his immediate family." The apparent viewpoint taken by Guam is that for conservation laws to be effective, they need to be applied to the turtle's full range. Further information on this subject is given in 26a, C7, C12, and C16.

Trust Territory of the Pacific Islands

The most current and complete account of sea turtles throughout this area of the western Pacific appears in 77. No recent scientific explorations or research of sea turtles have been undertaken. The Trust Territory is a large area consisting of about 2,200 islands covering 2 million square miles of ocean with 140,000 native inhabitants, mostly Micronesians.

The traditional aspects of subsistence hunting for green turtles in the Caroline Islands are described in 70. Some traditions involving sea turtles at other locations in the Trust Territory are given in 61a and 69.

Recent records exist of sea turtles being taken by foreign longliners fishing in the Trust Territory (21). The magnitude of this catch is unknown.

In 1982 the Northern Marianas requested that the FWS provide assistance in the restoration of sea turtles (87). No actions are known to have been undertaken to date.

Other Areas

To the extent that it is known, the status of sea turtles is given in 24 for the U.S. Pacific islands of Howland, Baker, Jarvis, Johnston, Kingman Reef, and Wake. Plans have recently been announced for the construction of a major munitions disposal plant on Johnston at a coastal site where turtles frequently forage.

The current status of sea turtles at central and south Pacific islands not administered by the United States is described in 20, 24, 26, 79, 83, and 84.

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- *91. Whitten, H. 1981. Scientists use brawn to assist sea turtles. *Honolulu Star-Bulletin*, 1 April, A:12.
- *92. Whitten, H. 1981. Turtle recuperating at Ala Wai Harbor. *Honolulu Star-Bulletin*, 27 August, A:10.
- *93. Whitten, H. 1982. Man still threatens scarce sea turtles. *Honolulu Star-Bulletin*, 17 September, A:17.
- *94. Whitten, H. 1982. Green sea turtle surprises the experts, nests on Oahu. *Honolulu Star-Bulletin*, 19 November, A:3
- *95. Whittow, G. C., and G. H. Balazs. 1979. The thermal biology of Hawaiian basking green turtles (Chelonia mydas). (Abstr.) *American Zoologist* 19(3):981.
- *96. Whittow, G. C., and G. H. Balazs. 1982. Basking behavior of the Hawaiian green turtle (Chelonia mydas). *Pacific Science* 36(2):129-139.

LIST OF CORRESPONDENCE

- C1. Bada, J. L. 1982. Letter, dated 19 October, to G. H. Balazs from Amino Acid Data Laboratory, Scripps Institution of Oceanography.
- C2. Balazs, G. H. 1978. Letter, dated 27 November, to R. B. Roe, Acting Director, Office of Marine Mammals and Endangered Species, National Marine Fisheries Service (NMFS), Wash., D.C.
- C3. Balazs, G. H. 1982. Memo, dated 21 March, to W. G. Gilmartin, Leader, Marine Mammals and Endangered Species Investigation, Southwest Fisheries Center, Honolulu Laboratory.
- C4. Balazs, G. H. 1982. Memo, dated 28 May, to W. G. Gilmartin, Leader, Marine Mammals and Endangered Species Investigation, Southwest Fisheries Center, Honolulu Laboratory.
- C5. Balazs, G. H. 1982. Letter, dated 28 May, to D. Coggeshall, Pacific Islands Administrator, U.S. Fish and Wildlife Service (review of draft USFWS Strategy Plan).
- C6. Balazs, G. H. 1982. Memo, dated 28 October, to W. G. Gilmartin, Leader, Marine Mammals and Endangered Species Investigation, Southwest Fisheries Center, Honolulu Laboratory.
- C7. Baldrige, M. 1981. Letter, dated 18 September, to P. M. Calvo, Governor of Guam, from the Secretary of Commerce, Wash., D. C.
- C8. Callaghan, P. 1982. Letter, dated 31 August, to G. H. Balazs from the University of Guam.
- C9. Dodd, C. K., Jr. 1982. Letter, dated 27 May, to G. H. Balazs from the Office of Endangered Species, Fish and Wildlife Service, Wash., D. C.
- C10. Dupre et al. 1981. Letter, dated 14 January, to G. H. Balazs from Halawa Valley, Molokai.
- C11. Fish and Wildlife Service. 1978. Memo, dated 14 December, from the Division of Law Enforcement, Honolulu office.
- C12. Gordon, W. G. 1981. Letter, dated 11 December, to P. M. Calvo, Governor of Guam, from the Assistant Administrator for Fisheries, Wash., D.C.
- C13. Guess, R. C. 1983. Letter, dated 11 January, to G. H. Balazs from the Center for Coastal Marine Studies, University of California, Santa Cruz.
- C14. Harter, J. 1981. Letter, dated 30 April, to G. H. Balazs from Jack Harter Helicopters, Lihue, Kauai.

- C15. Hosmer, A. J. 1983. Letter, dated 1 March, to G. H. Balazs from Aquatic and Wildlife Resources, Government of Guam.
- C16. Ikehara, I. I. 1973. Letter, dated 1 February, to G. H. Balazs from the Division of Fish and Wildlife, Government of Guam.
- C17. Ikehara, I. I. 1976. Letter, dated 19 March, to G. H. Balazs from the Division of Fish and Wildlife, Government of Guam.
- C18. Kikuchi, W. K. 1982. Letters, dated 13 April and 17 May, to G. H. Balazs from Kauai Community College.
- C19. Masaki, K. 1982. Letter, dated 7 April, to G. H. Balazs from Waimea, Kauai.
- C20. Nakagawa, S. 1982. Letter, dated 19 April, to G. H. Balazs from fish pond operator, Hilo, Hawaii.
- C21. Ono, S. 1981. Letter, dated 3 April, to G. H. Balazs from the Department of Land and Natural Resources, State of Hawaii.
- C22. Pakele, G. M. 1982. Letter, dated 16 September, to A. Cooper and Sons, Inc., Hilo, Hawaii, from the Hawaiian Legal Corporation.
- C23. Robinson, E. K. 1982. Letter, dated 17 September, to G. H. Balazs from Waimea, Kauai.
- C24. Roe, R. B. 1979. Letter, dated 13 February, to G. H. Balazs from Office of Marine Mammals and Endangered Species, NMFS, Wash., D.C.
- C25. Sylva, R. D. 1982. Letter, dated 28 April, to G. H. Balazs from former turtle fisherman at Paia, Maui.
- C26. TenBruggencate, J. 1980. Letter, dated 29 April, to G. H. Balazs from Lihue, Kauai.
- C27. Thevenin, L. A. 1982-83. Letters, dated 28 April and 11 February, to G. H. Balazs from Puako, Hawaii.
- C28. Wallace, D. H. 1978. Memo, dated 13 January, to R. A. Frank, Administrator of NOAA, Wash., D.C.
- C29. Wass, R. C. 1981. Letter, dated 10 December, to G. H. Balazs from Office of Marine Resources, Government of American Samoa.