Chapter 13

Loggerhead Turtles Nesting in Japan

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Although loggerhead sea turtles are distributed throughout the tropical and temperate waters of the world (Dodd 1988), the loggerhead's breeding distribution within the Pacific Ocean basin is relatively restricted. Within the North Pacific area, loggerhead nesting beaches are found only in Japan, whereas juvenile and some adult-sized turtles are found in the waters near Baja California and within the Gulf of California (Marquez 1990). Bowen et al. (1995) reported on mtDNA analysis that revealed that loggerheads in the North Pacific Ocean are genetically separated from an Australian nesting population.

The principal focus of status assessment in this chapter is on nesting of loggerheads in Japan. The authors feel that until the obstacles to counting sea turtles in the water are sufficiently overcome, these nesting beach assessments will continue to provide the best data on loggerhead abundance.

Nishimura (1967) originally reported that the species of sea turtle known to nest on mainland Japan was the loggerhead, and he compiled loggerhead nesting data from 42 Japanese nesting beaches. However, some of these nesting rookeries have been extirpated since Nishimura's report. Uchida and Nishiwaki (1982) presented a coarsely defined distribution map that indicated the location of loggerhead rookeries in Japan, but this summary did not include beach names. Although sea turtle research and conservation in Japan is growing and is resulting in more widespread beach surveys, only imited reports in Japanese describe the rookeries and the current status of loggerheads in Japan.

In this chapter, the authors introduce a current description of loggerhead rookeries in Japan and summarize population trends based on nesting data from the most consistently monitored beaches. The authors hope to provide a better understanding of the current status of Japanese loggerheads and of threats to their populations.

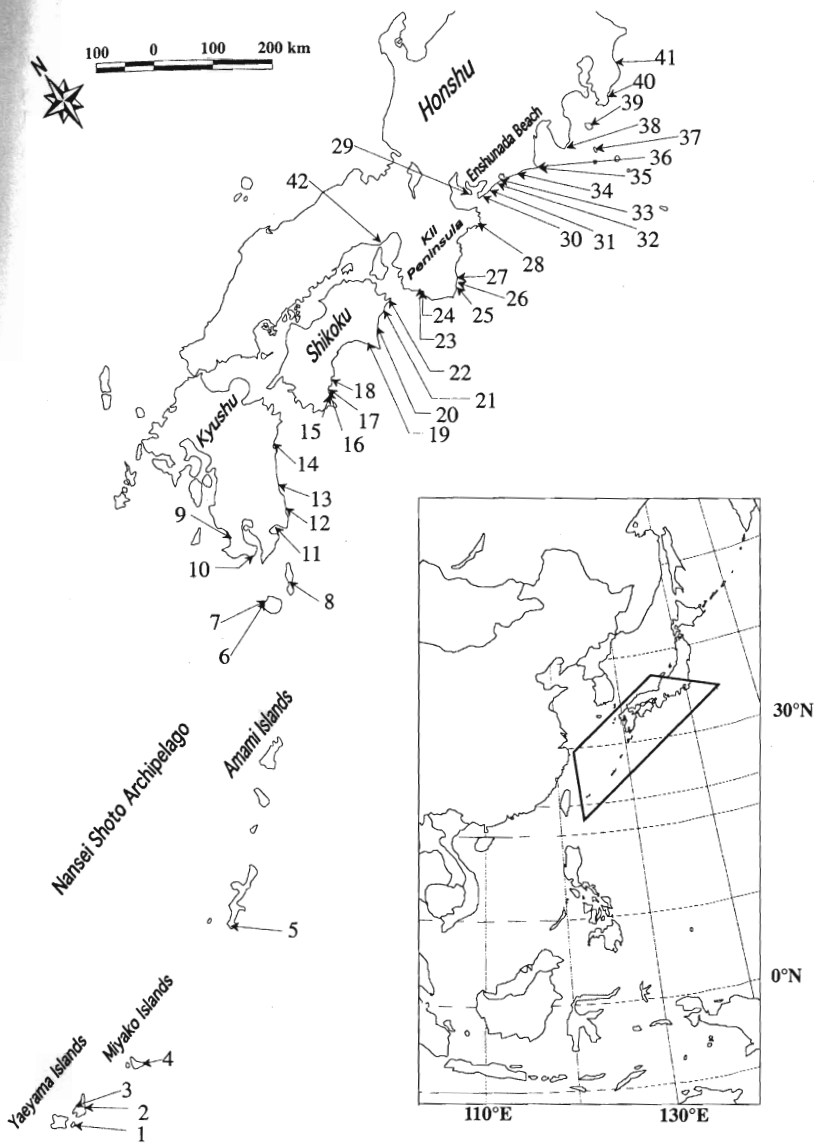


Figure 13.1. Rookeries for loggerhead turtles in Japan. Loggerhead nesting beaches other than those with only sporadic nesting and irregular monitoring: 1. Nishinohama Beach, 2. Ibaruma Beach, 3. Osaki Beach, 4. Gusukube Beach, 5. Itoman Beach, 6. Maehama Beach, 7. Inakahama Beach, 8. Nagahama Beach, 9. Fukiage Beach, 10. Nagasakibana Beach, 11. Shibushi Beach, 12. Nichinan Beach, 13. Miyazaki Beach, 14. Nobeoka Beach, 15. Ohgi Beach, 16. Shimonokae Beach, 17. Okata Beach, 18. Sagasioya Beach, 19. Moto Beach, 20. Kainan Beach, 21. Hiwasa Beach, 22. Kamouda Beach, 23. Minabe Iwashiro Beach, 24. Minabe Senri Beach, 25. Shingu Beach, 26. Kiho Beach, 27. Kumano Beach, 28. Shima Peninsula Beach, 29. Chita Peninsula, 30. Atsumi Beach, 31. Akabane Beach, 32. Toyohashi Beach, 33. Kosai Beach, 34. Hamamatsu Beach, 35. Omaezaki Beach, 36. Sagara Beach, 37. Nijima Island, 38. Izu Peninsula, 39. Izuoshima Island, 40. Boso Peninsula, 41. Kujukuri Beach, and 42. Akashi Beach.

Rookeries

Loggerhead nesting beaches in Japan are widely distributed across 13 degrees of latitude (24° N to 37° N; Figure 13.1). This latitudinal range is similar to that of the North Atlantic population. The authors separate Japanese loggerhead nesting beaches into five geographic areas: the Nansei Shoto Archipelago (Satsunan Islands and Ryukyu Islands), Kyushu, Shikoku, the Kii Peninsula (Honshu), and east-central Honshu and nearby islands.

Nansei Shoto Archipelago (Satsunan Islands and Ryukyu Islands)

Many islands are distributed in the southern ocean area of the Nansei Shoto Archipelago, Japan, between Kyushu and Taiwan. Within this region, the most important loggerhead nesting beaches occur on Yakushima Island. There, Inakahama Beach and Maehama Beach, located on the northwest coast of Yakushima, account for approximately 30% of all loggerhead nesting in Japan (Kamezaki 1989). The Yakushima Sea

Turtle Research Group has monitored nesting on these beaches since 1985. As part of this monitoring, the Yakushima Group tags, identifies, and counts nearly every nesting female that emerges onto Inakahama Beach.

There are many other islands with sandy beaches in the Nansei Shoto Archipelago where loggerhead nesting occurs. At Nagahama Beach, on the western coast of Tanegashima Island, Inatani et al. (2001) reported, with limited data, that more than 100 nests are made per season. At the Amami, Miyako, and Yaeyama island groups, 50–58.5% of sandy beaches were used by loggerheads (Kamezaki 1989, 1991). Nesting beaches are located on the Pacific side of each island, rather than on the sides facing the East China Sea (Kamezaki 1989, 1991). Nesting on Itoman Beach, within the developed southern part of Okinawa Island, has been monitored since 1994 (Wakatsuki and Kobayashi, pers. comm.), but many more females are believed to nest in the northern part of this island (Kikukawa et al. 1996). On Kuroshima Island of the Yaeyama Islands, loggerheads share nesting beaches with green turtles *(Chelonia mydas)* and hawksbills *(Eretmochelys imbricata)*. At Nishinohama Beach on Kuroshima, the Yaeyama Marine Park Research Station has counted the number of nests and emergence tracks since 1975 (Hirate and Iwase 1991; Kondo et al. 2000; Miyawaki 1981). Loggerhead nesting on Kuroshima Island has been decreasing, while green turtle and hawksbill nests have increased. At Ibaruma and Osaki beaches of Ishigakijima Island, the Ishigakijima Sea Turtle Research Group has counted nests and nesting emergences since 1993, and on Gusukube Beach of Miyako Island, the Gusukube Educational Office has monitored nesting between 1992 and 1999 (Gusukube Educational Office 2000).

Although some adult loggerheads migrate through the coastal seas of Taiwan (Cheng and Chen 1997), there are no records of loggerheads nesting on the island. With no information on loggerheads nesting in the Philippines, it appears that the Yaeyama Islands may be the southernmost extent of loggerhead nesting in the western North Pacific.

Kyushu

The major loggerhead nesting beaches of Kyushu are distributed along the western and eastern coasts of the southern portion of the island. The most prominent nesting beach is Fukiagehama, which is located on the western coast of Kyushu and is 35 km long. At this beach, the Kagoshima Prefecture Office and the Sea Turtle Research Group of Kagoshima University have monitored nesting since 1982. The courageous and dedicated actions of these groups in confronting violent sea turtle poachers induced the Kagoshima Prefecture government to establish regulations for sea turtle conservation in 1988. Loggerheads are also known to nest at Nagasakibana Beach, located south of the Satsuma Peninsula (Samejima 1994). The dark sands of Nagasakibana contain a high amount of magnetite, and the eggs that incubate there are subject to high temperatures in situ. The main beaches on the eastern coast of Kyushu are Miyazaki, Nobeoka, Nichinan, and Shibushi. Among these, the most extensive nesting information comes from Miyazaki Beach, which has been surveyed systematically by the Miyazaki Wild Animal Research Group since 1975.

Shikoku

Loggerhead nesting beaches on Shikoku are distributed around the Ashizuri Cape (Ohgi, Shimonokae, Okata, Sagashioya beaches), the Muroto Cape (Moto Beach), and along the southeastern coast (Kainan, Hiwasa, and Kamouda beaches). At Hiwasa Beach (Kondo 1994) and Kamouda beaches (Kamata 1994), nesting attempts have been monitored since the 1950s by the local public school. The resulting half-century data set provides the longest time series of sea turtle nesting numbers in the world.

Kii Peninsula (Honshu)

Although many small beaches are distributed along the coast of the Kii Peninsula (Miyawaki 1998), most loggerhead nesting occurs at

Minabe Senri Beach, where nearly all nesting females are identified by tagging. A similar tagging effort occurs at adjoining Minabe Iwashiro Beach. There has been an obvious decrease in nesting at Minabe Senri Beach (Sato et al. 1997). At Shima Peninsula Beach, loggerhead nests have been counted during each season of the last decade (Wakabayashi 1998); however, monitoring at Shingu Beach, Kiho Beach, and Kumano Beach, has been sporadic.

East-central Honshu and nearby Islands

Other than the Kii Peninsula, the principal nesting beach on Honshu (Japan's main island) is Enshunada Beach, which extends from Atsumi Peninsula to Sagara Beach on Suruga Bay. At this 130 km beach, volunteer groups have counted numbers of nests and nesting attempts on individual stretches including Atsumi, Akabane, Toyohashi, Kosai, Hamamatsu, Omaezaki, and Sagara section beaches. Among these stretches, the Omaezaki section has been monitored the longest, since 1975. Some loggerhead nesting on Honshu occurs on bay beaches that are remote from the ocean, such as Akashi Beach, which is artificially nourished with sand (Kamezaki et al. 1999).

Elsewhere on Honshu and eastern islands, smaller nesting beaches are distributed around the Chita Peninsula, Izu Peninsula, Izuoshima Island, Nijima Island, and Boso Peninsula, which contains Kujukuri Beach. No more than 10 nests per season have been recorded at any of these smaller beaches. Only sporadic nesting of loggerheads has been reported from the beaches of Ibaraki and Fukushima prefectures. These east-central Honshu beaches constitute the northern margin of loggerhead nesting in Japan and correspond in latitude to the northern extent of nesting in the eastern United States (37° N).

Nesting Abundance and Population Trends

As a result of the dedication and hard work of an extensive network involving many independent field teams in Japan, annual census data are available from most nesting beaches. The current population level of Japanese loggerheads is considerably lower than the population levels of other ocean basins. For example, in 1998, 1999, and 2000 seasons, a total of 2,479, 2,255, and 2,589 loggerhead nests, respectively, were recorded on Japanese beaches. Considering multiple renesting in loggerheads, it is probable that there are currently fewer than 1,000 females breeding annually in Japan. Of these total clutches, approximately 75% are deposited on nine major nesting beaches (defined as beaches having at least 100 nests in one season within last decade) and on six submajor nesting beaches (defined as beaches having 10–100 nests in at least one season within last decade). Census data from 12 of these 15 beaches indicate changes in population size over time (Figure 13.2).

Descriptions of the population changes are as follows:

- In the 1990s, there has been a consistent decline in annual nesting, especially in Hiwasa Beach (89% decline) and Minabe (74% decline). For most beaches, the lowest nesting numbers recorded have been during the recent period of 1997–1999.
- In the 1980s, there were increases in nesting numbers. However, nesting at the beginning of the 1980s was in most instances greater than nesting at the same beach some 20 years later at the end of the 1990s.
- There are indications that the 1970s was a period of approximate population stability with respect to breeding numbers.
- For the one population with census data extending back to the 1950s (Kamouda Beach), there is a clear indication that the population has greatly declined.

Given the similarity of population trends across the multiple rookeries for which census data are available, the authors feel that a composite of trends within the above four time periods can be used to describe the long-term trends in loggerhead nesting on Japanese beaches. During the last half of the 20th century, there has been a substantial decline

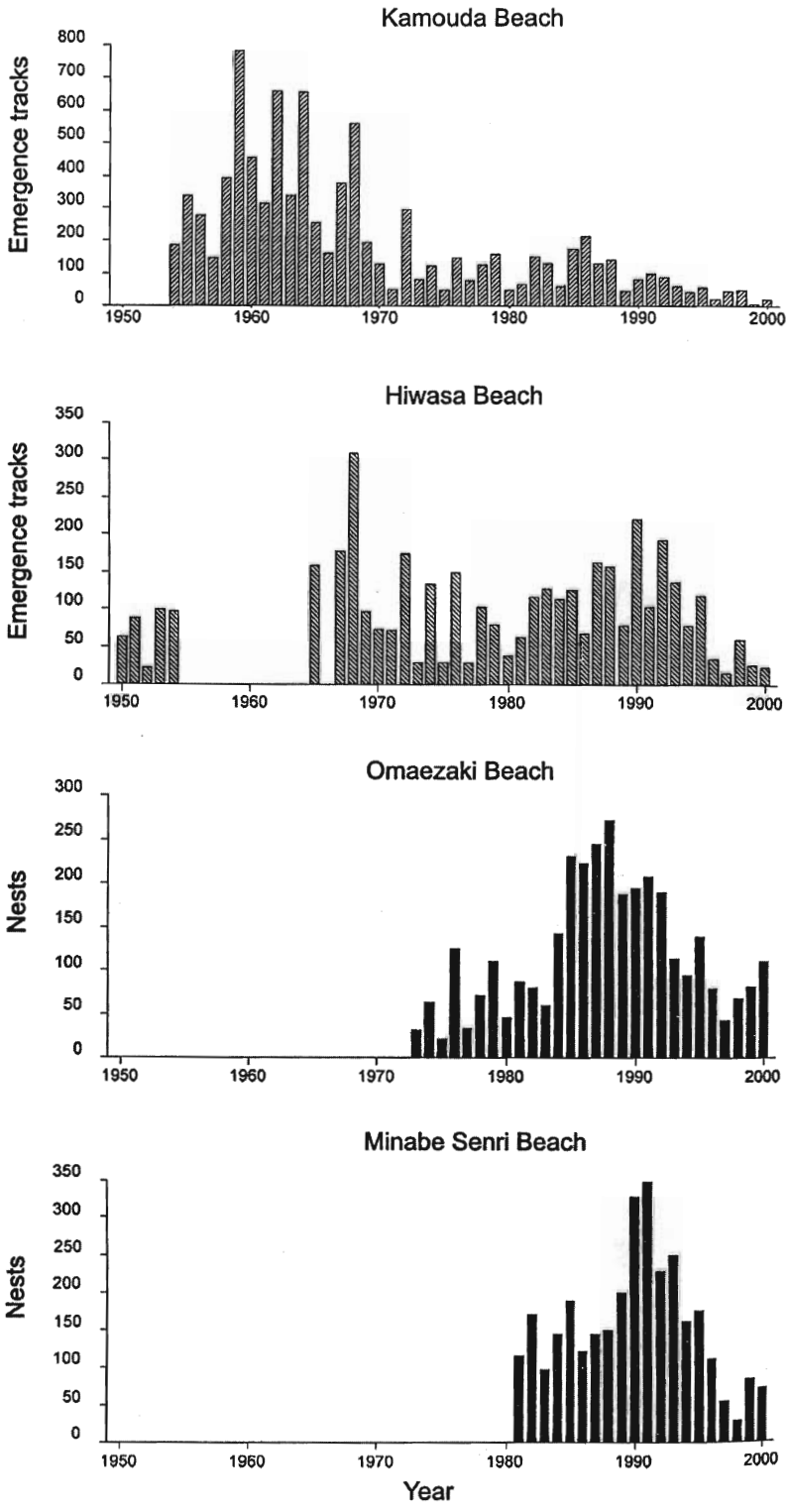
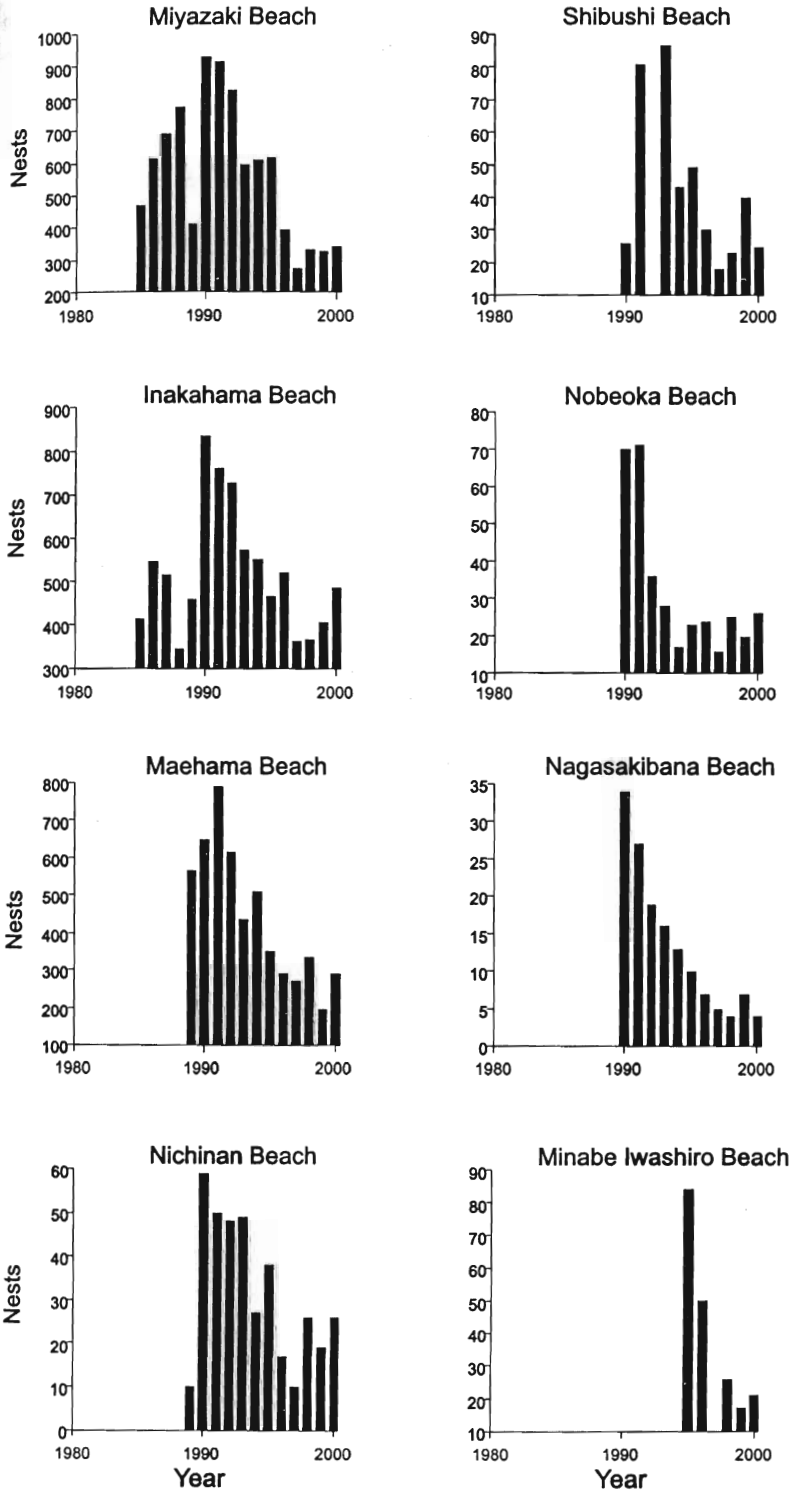


Figure 13.2. Loggerhead nesting trends in Japan. Census data from six major nesting beaches (Hiwasa, Omaezaki, Minabe Senri, Miyazaki, Inakahama, and Maehama) and six submajor nesting beaches (Kamouda, Nichinan, Shibushi, Nobeoka, Nagasakibana, and Minabe Iwashiro) indicate declines in the Japanese loggerhead population. Gaps in data reporting occur for Hiwasa Beach for 1955–1964 and in 1966, for Shibushi Beach in 1992, and for Minabe Iwashiro Beach in 1997. Hatched bars represent census data based on numbers of emergence tracks; solid bars represent census data based on numbers of nests.


Miyazaki Beach
Shibushi Beach
Inakahama Beach
Nobeoka Beach
Maehama Beach
Nagasakibana Beach
Nichinan Beach
Minabe Iwashiro Beach
Nests
Year
1980
1990
2000

(50–90%) in the size of the annual loggerhead nesting population in Japan. This decline, observed over fewer than three generations, qualifies the nesting population within the western North Pacific Ocean for Endangered status, within the 1994 IUCN Red List categories.

Threats

In Japan, loggerhead turtle meat is not popular for food except in some local communities in Kochi and Wakayama prefectures (Sakamoto 1994). Conversely, turtle eggs have been widely consumed in many coastal areas at least during hungry times, and often as a traditional food in some communities. Some Japanese retain the superstition that turtle eggs work as revitalizers or aphrodisiacs, and this misconception provides a demand for poaching and egg selling on the black market. However, egg poaching has nearly disappeared as sea turtle research and conservation efforts have spread throughout Japan.

Egg predation, commonly by raccoon dogs *(Nyctereutes procyonoides)* and weasels *(Mustela itatsi)*, is known from some beaches. However, there are no quantitative data to evaluate the negative impact on loggerhead populations. Although the beaches where loggerheads nest in Japan are, extensively eroded due to upstream dams and dredging, and obstructed by seawalls, there have been no quantitative studies to evaluate the impact of those anthropogenic conditions.

An extensive tagging project led by the Sea Turtle Association of Japan since 1990 and other projects by local groups reveal that most females that have concluded their seasonal nesting migrate to the East China Sea (Iwamoto et al. 1985; Kamezaki et al. 1997). Other tag returns come from South Korea, China, the Philippines, and the mouth of the Mekong River, Vietnam (Sadoyama et al. 1996). These results coincide with results from satellite tracking studies of turtles from Minabe Beach (Sakamoto et al. 1997). These postnesting migrations into the East China Sea, where intensive trawl fishing takes place, are likely to put Japanese nesting loggerheads at great risk from trawl capture and drowning mortality.

Other than overseas recapture reports, many reports of tagged loggerheads came from Japanese coastal waters. Entangling gill nets and entrapping pound nets are common along the coast in Japan, and intensive trawl fisheries for postlarval anchovy are operated offshore of some major rookeries during the summer nesting season. The operation of these coastal fisheries appears to be correlated with sea turtle strandings, and at least 80 mature loggerheads are found stranded every year. This number is not negligible considering the current depleted population level of Japanese loggerheads.

Loggerhead bycatch mortality associated with the extensive high seas longline and driftnet fisheries in the North Pacific may prove to be the greatest threat to the survival of loggerheads in the North Pacific basin. The dramatic decrease in loggerhead nesting in Japan has followed a rise in high seas driftnet fishing. However, in the absence of quantitative bycatch data and mortality rates, it remains difficult to effectively describe this problem.

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Loggerhead
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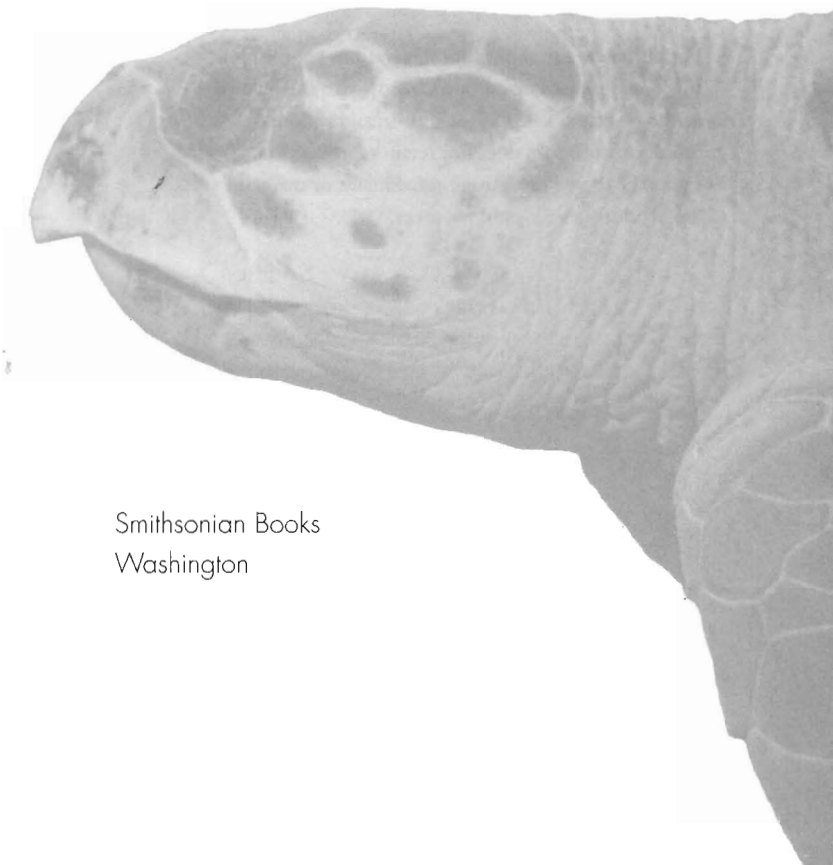

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