The conservation and management activities for sea turtles in Japan

HIROAKI MATSUNAGA and HIDEKI NAKANO
National Research Institute of Far Seas Fisheries, Fisheries Research Agency of Japan
Shizuoka 424-8633, JAPAN
Email: matsuh@fra.affrc.go.jp, hnakano@fra.affrc.go.jp

ABSTRACT
Five species of sea turtles are found in Japan. These are the loggerhead turtle, green turtle, hawksbill turtle, leatherback turtle and olive ridley turtle. The loggerhead, green and hawksbill turtle nest in Japan while the leatherback and olive ridley only inhabit the waters of Japan. Conservation of sea turtles in Japan by NGOs became popular in the late 1980s and the Government of Japan also got involved in the conservation and management of sea turtles. Conservation and research activities on sea turtles including monitoring of nesting sites, egg transplant, tagging by flipper tags, passive integrated transponders, and platform terminal transmitters, monitoring of sea turtle by-catch by tuna longline fishery, studies on mitigating sea turtle by-catch, and education campaigns regarding sea turtle conservation. These are conducted by NGOs, the Fisheries Agency, the Fisheries Research Agency, and the academe.

KEYWORDS: **sea turtles, loggerhead turtle, green turtle, hawksbill turtle, leatherback turtle, olive ridley turtle, conservation, management, Japan**

INTRODUCTION

Sea turtles are very familiar to the Japanese through legends and old tales from ancient times. The eggs and meat of sea turtles are consumed in Japan even today. Tortoiseshell of hawksbill turtles (bekko) has been used since the Edo era (about 300 years ago) and the tradition of high-grade skill of carving was established. However, many fishermen release unintentionally captured sea turtles with a tradition of sprinkling liquor as a welcome ceremony to the god of happiness.

Due to the decline of sea turtle nesting, conservation of sea turtles by non-government organizations (NGOs) became popular in the late 1980s. Conservation activities by NGOs include monitoring of nesting sea turtle beaches and sea turtle egg protection. The government of Japan also became involved in the conservation and management of sea turtles and promoted several conservation programs, which complemented the NGOs sea turtle conservation activities.

Sea Turtle Distribution

Five species of sea turtles are found in Japanese waters, the loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*), and the olive ridley turtle (*Lepidochelys olivacea*). The loggerhead turtle, green turtle, and hawksbill turtle nest in Japan while the leatherback and olive ridley turtle only inhabit the waters of Japan.

Assessments of loggerhead nestings at major beaches in Japan, such as Yakushima Is. and Miyazaki, have been much conducted since the mid-1980s. The number of nesting increased in the late-1980s, then decreased in the early-1990s and at the bottom in the mid-1990s and it increased since then (Kamezaki et al. 2003, Shiode 2002). The early increase of nesting loggerhead turtle might be due to the increase of research effort.

Green turtles were abundant in the Ogasawara Islands in the 1800s as compared today. It has been harvested in the 19th century. The number of green turtles harvested decreased from around 1,500 in 1880 to 1900 to around 100 in 1980-1990 (Suganuma 1994). At present, the harvest of green turtle in the Ogasawara Islands is under regulation and managed by the Tokyo Metropolitan government since 1965. The Tokyo Metropolitan government promotes the sustainable use of sea turtle resource.

Hawksbill turtles are distributed around the Okinawa Islands of Japan and are historically harvested. The number of harvest ranged from about 50-120 during 1989 to 1993 (Kamezaki 1994).

Threats to Sea Turtle Survival

The different general threats to sea turtle survival on all its life stages both on the nesting area and at sea are summarized in Table 1. The different threats both in the nesting area and at sea are categorized to biotic factors,

abiotic factors, and human activities.

Threats on the nesting site under biotic factors include predation, which affects the eggs and hatchlings, diseases and parasites, vegetation which affects the hatchlings, and other nesting turtles. In other nesting turtles, it does not pose a threat to sea turtle survival since the number of nesting in Japan is not large.

The abiotic factors include erosion and accretion, tidal inundation, heavy rains and typhoon, and thermal stress. Erosion and accretion is also caused by human activities. The construction of a barrier near the river to control soil erosion affects the supply of sand on the beach.

Threats of human activities in the nesting area include transplant of eggs, beach development, dredging, direct harvest, beach lighting, pollution, disturbance, collision with boats, and garbage. Beach development, like the use of tetrapods on beaches, pose a major threat on the eggs, hatchings, and nesters.

The general biotic threat factors at sea include predation, and diseases and parasites. The abiotic factors at sea are not yet identified. Factors at sea under human activities include artificial debris, direct fishery, coastal set and gill net, purse seine, tuna longline fishery, drift gillnet, trawl fishery, and collision with boats. Direct fisheries include those in the Ogasawara Islands where green turtles are harvested under regulation and in the Okinawa Islands where hawksbill turtles are harvested.

Table 1. Threats to sea turtles in Japan.

Factors	Life Stages Eggs	Hatchling	Juveniles	Adults	Breeders
Nesting site					
Biotic factor					
Predation	Yes	Yes	-	-	No
Diseases and parasites	?	?	-	-	No
Other nesting turtles	No	No	-	-	No
Vegetation	?	Yes	-	-	No
Abiotic factor					
Erosion, Accretion	Yes	No	-	-	Yes
Tidal inundation	Yes	No	-	-	No
Heavy Rains, Typhoon	Yes	No	-	-	No
Thermal Stress	Yes	Yes	-	-	No
Human activity					
Transplantation	Yes/No	?	-	-	-
Beach Development	Yes	Yes	-	-	Yes
Dredging	Yes	Yes	-	-	Yes
Direct harvest	Yes	No	-	Yes	Previously
Beach lighting	No	Yes	-	-	Yes
Pollution	?	?	-	?	?
Disturbance	No	Yes	-	-	Yes
Collisions with boat	No	No	-	Yes	Yes
Garbage	No	Yes	-	-	Yes
At Sea					
Biotic factor					
Predation	-	Yes	Yes	Yes	Yes
Diseases and parasites	-	Yes	Yes	Yes	Yes
Abiotic factor					
?					
Human activity					
Artificial debris	-	Yes	Yes	Yes	Yes
Direct fishery	-	-	Yes	Yes	Yes
Coastal set net	-	Yes	Yes	Yes	Yes
Coastal gill net	-	-	Yes	Yes	Yes
Purse seine	-	-	Yes	Yes	Yes
Tuna longline	-	-	Yes	Yes	Yes
Drift gillnet	-	-	Yes	Yes	Yes
Trawl fishery	-	-	Yes	Yes	Yes
Collisions with boat	-	-	Yes	Yes	Yes

Conservation Efforts/Measures (Table 2)

A. Protection by law

Several laws regarding and related to the protection of sea turtles have been enacted in Japan. These are the Fisheries Resources Protection Act of 1951, the Natural Monument Protection Act of 1919, and other local legislations within Japan.

In the Ogasawara Islands, the Tokyo Metropolitan Government manages the regulated harvest of green turtles. In the Okinawa Islands, the hawksbill fishery is managed by local government.

B. Cooperation and collaboration between the Government of Japan and NGOs

The government agencies involved in the conservation and management of sea turtles are the Ministry of Environment, the Ministry of Land, Infrastructure and Transport, the Fisheries Agency, and other local governments. The Ministry of Environment supports and promotes the conservation activities of the NGOs. The Ministry of Land, Infrastructure and Transport promotes the creation of gentle slope shores rather than the use of tetrapods for the protection of nesting sea turtles. The Fisheries Agency monitors fishery by-catch and promotes the development of methods to mitigate sea turtle by-catch by tuna longline fishery.

Research activities, such as tag and release and satellite tracking, have been conducted by the Fisheries Research Agency (FRA), Universities, Aquariums, and NGOs.

C. Monitoring of nesting areas

NGOs lead the monitoring of sea turtle nesting areas in Japan. The Japanese Society of Sea Turtle for example monitors the sea turtle nesting beaches in order to have an estimate of an annual number of nesting in Japan. Along with the monitoring activities, transplantations of eggs are also conducted for those eggs in danger of poaching, inundation, and predation. In the monitoring activities, the biometrics of the nesters are recorded and tagging is also conducted. In collaboration and cooperation with research institutes and Universities, monitoring of marine turtle movements by tagging and satellite telemetry are also conducted. Tracking loggerhead turtles by the use of satellite telemetry, conventional external flipper tags, and Passive Integrate Transponders (PIT) are being conducted by the National Research Institute of Far Seas Fisheries (NRIFSF), which belongs to FRA.

A study on the use of beach lights with different intensities had been conducted by the Ministry of Land, Infrastructure and Transport. It was recommended that low intensity lights should be used in sea turtle nesting beaches since nesting sea turtles prefer these instead of high intensity lights.

D. Monitoring sea turtle by-catch

The NRIFSF together with the Fisheries Agency conducts monitoring of sea turtle by-catch by tuna longline fishery and conducts studies to mitigate the by-catch.

Ishigaki branch of the Seikai National Fisheries Research Institute under the FRA conducts experiments for the modification of set nets to exclude sea turtle by-catch (Abe *et al.* 2003).

E. Other activities and studies

The NRIFSF and ELNA (Ever Lasting Nature; NGO) has been conducting satellite tracking of leatherback turtles in Papua, Iryan Jaya, Indonesia and also protects the nesting area of the leatherback turtles in Papua Iryan Jaya.

The National Center for Stock Enhancement of FRA conducts captive-breeding experiments on sea turtles in the Ishigaki Island of Okinawa.

Information and Education Campaign

The NRIFSF together with other government agencies and the Global Guardian Trust (NGO) conducted an Information and Education Campaign regarding sea turtles conservation in several places in Japan. The NRIFSF and the Fisheries Agency distributed sea turtle release manual to fisherman of tuna longline fishery in order to increase survivorship of sea turtles. Species identification sheets were also distributed to fisherman in order to improve the accuracy of species identification in sea turtle by-catch.

International Cooperation

A joint research program between Japan and Thailand, "SEASTAR2000" mainly focuses on the research of post-nesting movements/migration of green turtles from the Gulf of Thailand and the Andaman Sea. It showed that the migration paths of the post-nesters included the South China Sea, Sulu Sea, and the Java Sea. These migration paths showed the need for an international cooperation between various countries.

The World Tuna Longline Fishery Conference (WTLFC) held in Tokyo, on 26-27 August, 2003 reviewed the current situation surrounding the tuna longline fishing activities including the issue related to the sea turtle incidental catch. Representatives of major tuna longline fishing organizations in the world including Japan, Chinese Taipei, Korea, the Philippines, Indonesia and China and other relevant fisheries authorities were the participants of the WTLFC. After serious discussion, the participants of the WTLFC conference agreed to appeal internationally their legal fishing activities and to take actions to promote responsible fishing, jointly and cooperatively. The WTLFC adopted the joint declaration.

The FAO (Food and Agriculture Organization of United Nations) Inter-governmental Consultation for the conservation of sea turtles is going to be held in Thailand in 2004 sponsored by the Japanese Trust Fund.

Table 2. The conservation, management and research activities for sea turtles.

Conservation and management	
Ministry of Environment	
	Support and promotion for the conservation activities of the NGOs
Ministry of Land, Infrastructure and Transport	
	Creation of sandy beach rather than tetrapod
	Use of more weak streetlight along the beach
Fisheries Agency	
	Monitors for fishery by-catches
	Promotion for the development of methods to mitigate by-catches by tuna longline fishery
	Education (Species ID sheet, Release Manual)
Local Governments	
	Management for the harvest
NGOs	
	Monitoring of nesting female and eggs
	Protection of nesting female and eggs (transplantation)
	Estimation of annual nesting number
Research	
Fisheries Research Agency	
	Monitoring of by-catch by tuna longline fishery
	Experiment to avoid sea turtle by-catch (Circle-Hook)
	Satellite tracking, tag and release
	Experiment for the modification of trap net
	Experiment of stock enhancement
Universities, Aquariums and NGOs	
	Biological measurement of nesting female
	Tag and release and satellite tracking of nesting female

REFERENCES

Abe O., Shibuno T., Takada Y. and Hashimoto K. (2003). Preliminary study to prevent incidental capture of sea turtles by pound net. Proceedings of the 3rd Workshop on SEASTAE2000, 35-38.

Kamazaki N. (1994). Hawksbill turtle. The data base of the wild aquatic animals rarely seen in Japan, Fisheries Agency, 479-491.

Kamezaki N., Matsuzawa Y., Abe O., Asakawa H., Fujii T., Goto K., Hagino S., Hayami M., Ishii M., Iwamoto T., Kamata T., Kato H., Kodama I., Kondo Y., Miyawaki I., Mizobuchi K., Nakamura Y., Nakashima Y., Naruse H., Omuta K., Samejima M., Suganuma H., Takeshita H., Takeshita T., Toji T., Uematsu M., Yamamoto A., Yamato T. and Wakabayashi I. (2003). Loggerhead Turtle Nesting in Japan. Loggerhead Sea Turtles. Ed. Bolton A. B. and B. E. Witherington. Smithonian Books, Washington, 210-217.

Shiode D. (2002). Research on the nesting beaches of Loggerhead turtle in Japan. Enyo 110, 21-26.

Suganuma H. (1994). Green turtle. The data base of the wild aquatic animals rarely seen in Japan, Fisheries Agency, 469-478.