

Southernmost Records of Hawksbill Turtles Along the East Pacific Coast of South America

Javier Quíñones, Jorge Zeballos, Sixto Quispe & Luis Delgado

Laboratorio Costero de Pisco, Instituto del Mar del Perú (IMARPE), Av. Los Libertadores A-12, Urb. El Golf, Paracas, Ica, Perú
(E-mail: jquinones@imarpe.gob.pe)

Despite the fact that the hawksbill turtle (*Eretmochelys imbricata*) is widely distributed in tropical waters throughout the central Atlantic and Indo Pacific region, its worldwide population has declined severely during the last several decades (Mortimer & Donnelly 2008). In the East Pacific (EP), the status of the hawksbill is considered precarious, even with new observations of nesting and foraging groups in the region (Gaos *et al.* 2010). In waters of the EP south of Panama, hawksbill turtles appear to be relatively rare, as summarized below.

In Pacific Colombia, during an extensive survey of 41 beaches survey conducted in 2002 by INVEMAR, a few hawksbills sightings were reported in 30 of the beaches (Ceballos-Fonseca *et al.* 2003). In Tumaco (01°49'N, 78°44'W), several juvenile hawksbill turtles were incidentally captured in 2004 (Barreto *et al.* 2008), and small juveniles were observed in some coral reef beaches of Gorgona island (Amerocho & Reina 2007). In addition hawksbills were reported in the national parks of Utria and Gorgona (Amerocho 2009).

In Ecuador, 11 hawksbill were found stranded between 1994 and 1999 (Alava *et al.* 2005). During surveys in 1999, the occurrence of hawksbill were noted in Esmeraldas in the north (Herrera & Coello 2009). Subsequent surveys of 100 beaches and landing points in mainland Ecuador between 1999 and 2000 reported 12 hawksbills (Herrera 2008). In 2002–2003 two adults hawksbills were captured incidentally in Machalilla by artisanal fisheries (Barragan *et al.* 2009), while in 2007 – 2008 two other hawksbill were founded stranded in playa Mar Bravo, Salinas (Vera 2008). In the Galapagos Islands, hawksbills have been observed in the waters but are not considered common (Pritchard 1971; Zarate *et al.* 2008)

In Peru, data regarding hawksbill turtles are scarce. Hays Brown & Brown (1982), reported that only five carapaces were observed in Peru until late 1970s, with the southernmost report from Talara (04°34'S 81°16'W), one of these five carapaces was reported by Carrillo de Espinoza in 1987. Another carapace (37.5 cm curved carapace length or CCL) was found in Lobitos (04°28'S 81°18'W). Other non specified numbers of carapaces were founded in 1983 by Hays in the surrounding areas of the island “Lobos de Tierra” (06°25'S 80°51'W). In 1989, also a non-specified number of carapaces were found in the southern coast of Lima and in the Pisco area (13°42'S 76°13'W) (Aranda & Chandler 1989). Between 2000–2008, 14 small hawksbills (average CCL = 37.6 cm ±1.6 SD) were observed around artisanal landing sites between Caleta Grau (03°39'S, 80°38'W) and Constante (05°35'S, 80°50'W) on the northern coast of Peru (Alfaro Shigueto *et al.* in press). Finally, one adult hawksbill (75.5 cm CCL) was reported as stranded in the northern coast of Tumbes in 2008 (Forsberg 2008). To date, the Peruvian records of hawksbills were limited to the northern coast of Peru, without strong evidence of occurrence south of 04°34'S.

We collected data on the presence of hawksbill turtles in central and southern Peru during two surveys conducted in 1987 and 2010. For 1987, we visited the landing site for the active sea

turtle fisheries, in San Andrés (13°43'S 76°13'W, Fig 1). Between January and October 1987, we visited the principal turtle landing pier in center of San Andrés, smaller landing sites located up to 1 km north of San Andrés, and the turtle “stockade” where live turtles were stored upside down, in preparation for further distribution and use. For all turtle observed, we verified species and in cases of intact animals, we measured CCL and mass.

From January through November 2010, we conducted informal interviews with local fishermen and local governmental officials in San Andrés, plus twice weekly (minimum) we visited locations where we anticipated finding turtle carapaces: restaurants, homes and even dumps. When we located a hawksbill carapace in homes or businesses, where they were often as decorations, we asked the owner where the carapace came from. All located carapaces were photographed for species confirmation (Fig. 2). Additionally, we occasionally conducted informal interviews and visual surveys in nearby municipalities, including Tambo de Mora, Cerro Azul and Pucusana, the city of Chincha and the beach of Jahuary, all located between 60 and 200 km south of Lima.

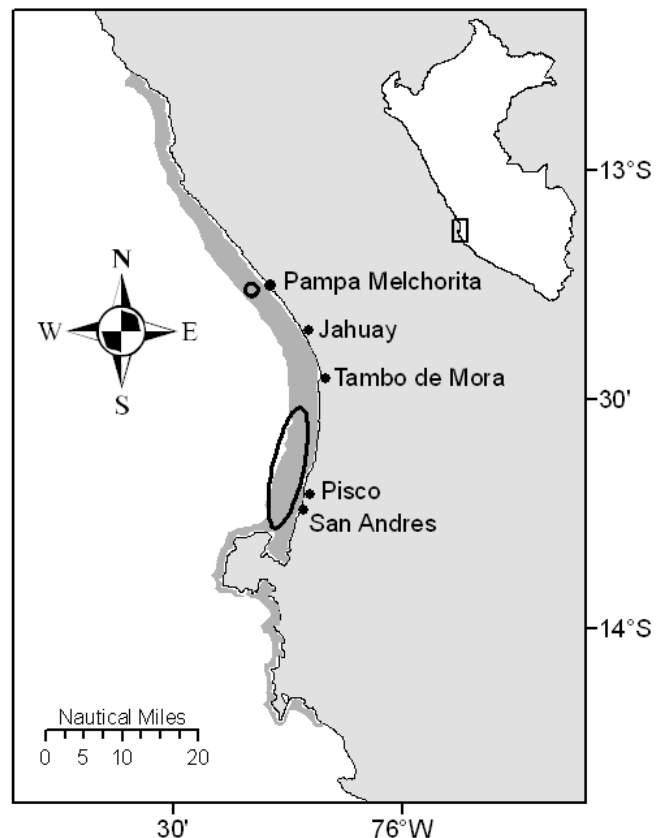


Figure 1. Study area and principal fishing towns in south-central coast of Peru, The principal grounds of the San Andrés turtle fishery during 1987 are shown in dark gray, and black line encircles the places where hawksbills were captured.



Figure 2. Photographs of the hawkbills carapaces found in San Andrés. Each carapace is described below, starting with the first row from left to right and continuing on the bottom row of photographs.

Date recorded	Date captured	Capture Location	Size	Mass	Comments
15-Oct-10	1998	Off San Andrés	43.6	Only carapace	Found in a fisher's house
19-Oct-10	1987	Off San Andrés	45.2	Only carapace	Found in a fisher's house
19-Oct-10	1987	Off San Andrés	45.0	Only carapace	Found in a fisher's house
21-Oct-10	2004	Off Pampa Melchorita	40.4	Preserved animal	Found as decoration in a restaurant in Chincha.
1-Nov-10	unknown	unknown	39.1	Preserved animal	Found in the Natural History Museum at Lima
30-Sep-10	Sep-10	Off San Andrés	51.2	Only carapace	Fresh carapace found in San Andrés beach
17-Jun-87	17-Jun-87	Off San Andrés	45.5	12 kg	Landed at San Andrés pier
18-Jun-87	18-Jun-87	Off San Andrés	46.0	Not weighed	Landed at San Andrés pier

During our 1987 survey, we recorded 1,040 sea turtles total. Of these, 95.9% (N = 998) were black turtles (*Chelonia mydas*), 3.7% (N = 34) were leatherbacks (*Dermochelys coriacea*), 0.3% (N = 3) were olive ridleys (*Lepidochelys olivacea*) and 0.5% (N = 5) to hawkbills. Two hawkbills were measured: 46 and 45.5 cm CCL, one of them weighed 12 kg. All hawkbills were captured by coastal gill nets (1000 – 2000 m long by 6 m high, with 50-65 cm stretched mesh) in the San Andrés area. Anecdotaly, in November 2009, we found two shells in a tourist shop in Tumbes, with 23 and 35 cm CCL. The shop owner said that she bought both from a local fisherman who had captured them close to the “Ocean Plant” pier (04°13’S 81°12’W) located between El Ñuro and Cabo Blanco in the northern coast of the country. We found four carapaces in San Andrés, one in Pampa Melchorita, (Fig. 1), and one was observed

in the Natural History Museum “Javier Prado” in Lima, measuring 39.1 cm, but the provenance is unknown.

Of these 13 previously unreported carapaces, 10 originated from the San Andrés area, >1300 km south of the previously reported most southern record in the EP. Of these 10 southerly records, seven were captured in 1987 which was characterized by an El Niño (EN) event. Warmer water temperatures in summer months are thought to facilitate the occurrence of this species in southern EP waters (Frazier & Salas 1984), and observations of other hard-shelled turtles in Peruvian waters close to San Andrés were associated with increased water temperatures during EN events (Quiñones *et al.* 2010). In 1987, a maximum anomaly of +4.5 (23–24 °C) was observed in Pisco (Rivera 1988), and likely related to the hawkbill presence in the area. Interestingly, the 1997-98 EN

event was even stronger, yet only one hawksbill was reported in the San Andrés area. Likely this was related to reduced fishing effort after stricter controls were implemented by the minister resolution RM-103-95-PE, which banned the capture of all species of marine turtles in Peru (Morales & Vargas 1996). Surprisingly in September 2010 a fresh hawksbill carapace was observed in San Andrés, almost in the middle of the winter time with low temperatures (17.4°-18.4°C), however the natural temperature range for hawksbills range from 15°C to 32°C (Storch *et al.* 2005).

The mean size of the turtles recorded in the San Andrés area was 45.2 cm CCL \pm 3.2 SD (range 40.4 - 51.2, N = 7), which is below the minimum size of nesting females (53-114 cm SCL) worldwide (Marquez 1990). The closest nesting area to Peru is in "Parque Nacional Machalilla," in Mainland Ecuador, located more than 1600 km northw of San Andrés, where the mean size of mature females is 94.3 cm CCL, N = 10 (Peña *et al.* 2009). We hypothesize that juveniles and subadults use the San Andrés area as a foraging ground during "warm" years.

The principal of global decline in hawksbills was directed harvest for trade in carapace scutes (Mortimer & Donnelly 2008). Directed harvest of hawksbills in Peru has existed for decades (Hays Brown & Brown 1982), although all species have been protected by federal law since the 1995. Our observations show that illegal captures of hawksbills (and other species) continue to occur, particularly in the San Andrés region. We recommend that increased monitoring and conservation for sea turtles be conducted in this area in order to protect what appears to be one of the most important aggregations for sea turtles in coastal Peru.

Acknowledgments: We thank the San Andrés fishermen for sharing their information, and allowing us to take photographs of the carapaces, this project was supported by the Instituto del Mar del Perú at Pisco.

ALAVA, J.J., P. JIMÉNEZ, M. PEÑAFIEL, W. AGUIRRE & P. AMADOR. 2005. Sea turtle strandings and mortality in Ecuador: 1994-1999. Marine Turtle Newsletter 108:4-7.

ALFARO-SHIGUETO, J., J. MANGEL, K. FORSBERG, A. RAMANATHAN, C. CACERES, P. DUTTON, J.A. SEMINOFF & B.J. GODLEY. In press. Distribution of hawksbill turtles off Peru and implications for regional conservation efforts. Proceedings of the 29th Symposium for Sea Turtles Biology and Conservation, Brisbane, Australia.

AMOROCHO, D. & R. REINA. 2007. Feeding ecology of the East Pacific green sea turtle *Chelonia mydas agassizii* at Gorgona National Park, Colombia. Endangered Species Research 3: 42-51.

AMOROCHO, D. 2009. Tortugas Marinas migratorias en Colombia. In: L.G. Naranjo & J.D. Amaya (Eds.). Plan Nacional de las especies Migratorias, Diagnóstico e identificación de acciones para la conservación y el manejo sostenible de las especies migratorias de la biodiversidad en Colombia, Ministro de Ambiente, Vivienda y Desarrollo Territorial y WWF Colombia, Bogotá. pp. 77-86.

ARANDA, C. & M. CHANDLER. 1989. Las tortugas marinas del Perú y su situación actual. Boletín de Lima 62: 77-86.

BARRAGÁN, M.J., A. BAQUERO & C. YUMISEVA. 2009. Evaluación Preliminar de Captura Incidental de Tortugas Marinas en el Parque Nacional Machalilla. Resultados preliminares periodo 2002-2003. III Simposio de tortugas marinas del Pacifico Sur Oriental, Santa Elena, Ecuador.

BARRETO, S., A. REYNA & C.R. CORREA. 2008. By catch of sea turtles in Tumaco's fisheries (South Pacific from Colombia). In: A.F. Rees, M. Frick, A. Panagopoulou & K. Williams (Comps.). Proceedings of the 27th

Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech Memo NMFS SEFSC 569, p.188.

CARRILLO, N. 1987. Hallazgo de *Eretmochelys imbricata* (Ruppel) en la costa norte del Perú (Testudinata: Chelonidae). Revista Biota de Ciencias Biológicas 94: 40-45.

CEBALLOS-FONSECA, C., L. MARTINEZ & D. QUIROGA. 2003. Distribución, amenazas y esfuerzos de conservación de las tortugas marinas en el Pacifico Colombiano, Informe Final Instituto de Investigaciones Marinas y Costeras "Jose Benito Vives de Andreis", Santa Marta, Colombia. 78pp.

FORSBERG, K. 2008. Proyecto tortugas marinas: Iniciativas y esfuerzos para la conservación de las tortugas marinas en tumbes. In: S. Kelez, F. Van Oordt, N. de Paz & K. Forsberg (Eds.). Libro de resúmenes II Simposio de tortugas marinas en el Pacifico Sur Oriental, Lima, Peru. pp. 69-70.

FRAZIER, J. & S. SALAS. 1984. Tortugas Marinas del Pacifico Oriental: El recurso que nunca acabara? Simposio Conservacion y Manejo de Fauna Silvestre Neotropical, IX CLAZ Perú. pp. 87-98.

GAOS, A., F.A. ABREU-GROBOIS, J. ALFARO-SHIGUETO, D. AMOROCHO, R. ARAUZ, A. BAQUERO, R. BRISEÑO, D. CHACON, C. DUEÑAS, C. HASBUN, M. LILES, G. MARIONA, C. MUCCIO, J.P. MUÑOZ, W.J. NICHOLS, M. PEÑA, J.A. SEMINOFF, M. VASQUEZ, J. URTEAGA, B. WALLACE, I.L. YAÑEZ & P. ZARATE. 2010. Signs of hope in the Eastern Pacific: international collaboration reveals encouraging status for the severely depleted population of hawksbill turtles *Eretmochelys imbricata*. Oryx 44: 595-601.

HAYS-BROWN, C. & W. BROWN. 1982. Status of sea turtles in the southeastern Pacific: emphasis on Peru. In: K.A. Bjorndal (Ed.). Biology and Conservation of Sea Turtles. Institution Press, Washington D.C. pp. 235-240.

HERRERA, M. 2008. Mortalidad de Tortugas Marinas registradas en las costas de las provincias del Guayas y Manabí en el Ecuador In: S. Kelez, F. Van Oordt, N. de Paz & K. Forsberg (Eds.). Libro de resúmenes II simposio de tortugas marinas en el Pacifico Sur Oriental, Lima, Perú. pp. 88-95.

HERRERA, M. & D. COELLO. 2009. Tortugas Marinas en las costas de la provincia de Esmeraldas-Ecuador: Playas de anidación, amenazas naturales y antropogénicas, III Simposio de tortugas marinas del Pacifico Sur Oriental, Santa Elena, Ecuador.

MARQUEZ, R., 1990. Sea turtles of the world. FAO Species Catalogue 125: 1-81

MORALES, V.R. & P. VARGAS. 1996. Legislation protecting marine turtles in Perú. Marine Turtle Newsletter 75: 22-23.

MORTIMER, J.A. & M. DONNELLY. 2008. *Eretmochelys imbricata*. IUCN Red List of Threatened Species v. 2010.1. www.iucnredlist.org.

PEÑA, M., A. BAQUERO, J. MUÑOZ, F. PUEBLA, V. ALVAREZ & X. CHALEN. 2009. El Parque Nacional Machalilla: zona crítica de anidación para la tortuga carey (*Eretmochelys imbricata*) y verde (*Chelony mydas*) en el Ecuador y el Pacifico Oriental, Temporadas 2007-2009. III Simposio de tortugas marinas del Pacifico Sur Oriental, Santa Elena, Ecuador.

PRITCHARD, P.C.H. 1971. Galapagos sea turtles: preliminary findings. Journal of Herpetology 5: 1-9.

QUIÑONES, J., V. GONZALES CARMAN, J. ZEBALLOS, S. PURCA & H. MIANZAN. 2010. Effects of El Niño-driven environmental variability on black turtle migration to Peruvian foraging grounds. Hydrobiologia 645: 69-79.

RIVERA, T. 1988. Temperaturas del mar frente al Perú durante Enero - Marzo de 1987. In: H. Salzwedel & A. Landa (Eds.). Recursos y Dinámica del Ecosistema de Afloramiento Peruano. Boletín del Instituto del Mar

del Perú. Volumen Extraordinario 11–15.

STORCH, S., R.P. WILSON, Z.M. HILLIS-STARR & D. ADELUNG. 2005. Cold-blooded divers: temperature-dependent dive performance in the wild hawksbill turtle *Eretmochelys imbricata*. *Marine Ecology Progress Series* 293:263-271.

VERA, D. 2008. Mortandad de Tortugas Marinas Registrada en la Playa de Mar Bravo del Cantón Salinas, Provincia de Santa Elena, 2007-

2008. III Simposio de tortugas marinas del Pacifico Sur Oriental, Santa Elena, Ecuador.

ZARATE, P., J.A. SEMINOFF & P. DUTTON. 2008. Assessment of sea turtle foraging areas in the Galapagos Islands. In: R.B. Mast, B.J. Hutchinson & A.H. Hutchinson (Comps.). *Proceedings of the 24th Annual Symposium on Sea Turtle Biology and Conservation NOAA Tech Memo NMFS SEFSC 567*. p.36

Nesting Sea Turtles at Sonadia Island, Bangladesh

M. Zahirul Islam, Foyzal Ehsan & M. Mijanur Rahman

MarineLife Alliance, Judge Building, Baharchara, Sayeman Road, Cox's Bazar 4700, Bangladesh (E-mail: marinelifelife.al@gmail.com)

Five species of sea turtle are reported to occur in the territorial waters of Bangladesh: olive ridley (*Lepidochelys olivacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) (Groombridge *et al.* 1989, Rashid & Islam 2005). Illegal harvesting of turtle eggs, bycatch in offshore fisheries, alterations of sand dunes and nesting beaches have been recognized as the main threats to sea turtles in Bangladesh, and since 1980, nesting populations have declined due to severe exploitation of eggs and killing of adult turtles by fishing and other activities (Islam 1999). All sea turtles were listed in the revised Bangladesh Wildlife Preservation (Amendment) Act in 2010, giving them complete

legal protection. Nevertheless, sea turtles continue to face severe threats along the coast and offshore areas of Bangladesh and many of the nesting rookeries remain poorly studied. In particular, there are few historical data available for sea turtle nesting in the Sonadia and Kutubdia Islands off the southeastern coast and in the Sundarbans, an extensive mangrove complex on the west coast. This report summarizes information on sea turtle nesting at Sonadia Island from 2005-2010 with some incidental data collected in January 2000.

Sonadia Island (21.49262° x 91.87529°) is located 3.5 km northwest of Cox's Bazar, Najirartek (Figure 1). Prior to 1999, sea turtle data from Sonadia Island were collected opportunistically during the annual waterfowl censuses conducted in 1983, 1987 and 1989, and recorded low levels of nesting of olive ridley and green turtles (Rashid & Islam 2005). In January 2000, MarineLife Alliance conducted a preliminary nesting survey of a five km stretch of beach on the southern end of the island, between Moghchar and Purbapara. Surveys were conducted at every night between 6-9 January. During these surveys seven olive ridley and one green turtle nests were recorded in addition to eight false crawls of olive ridley (Islam 2001).

In 2005, MarineLife Alliance started a monitoring and conservation project. Night patrols of nesting beaches were conducted every night between 01 October and 31 May by 4-6 local people trained in surveying. Night surveys spanned >6 hours starting 3 hours before and ending 3 hours after high tide. Twelve km of beach were surveyed each night to record nesting activity and information on threats. In addition, local volunteers collected information on the turtle egg and

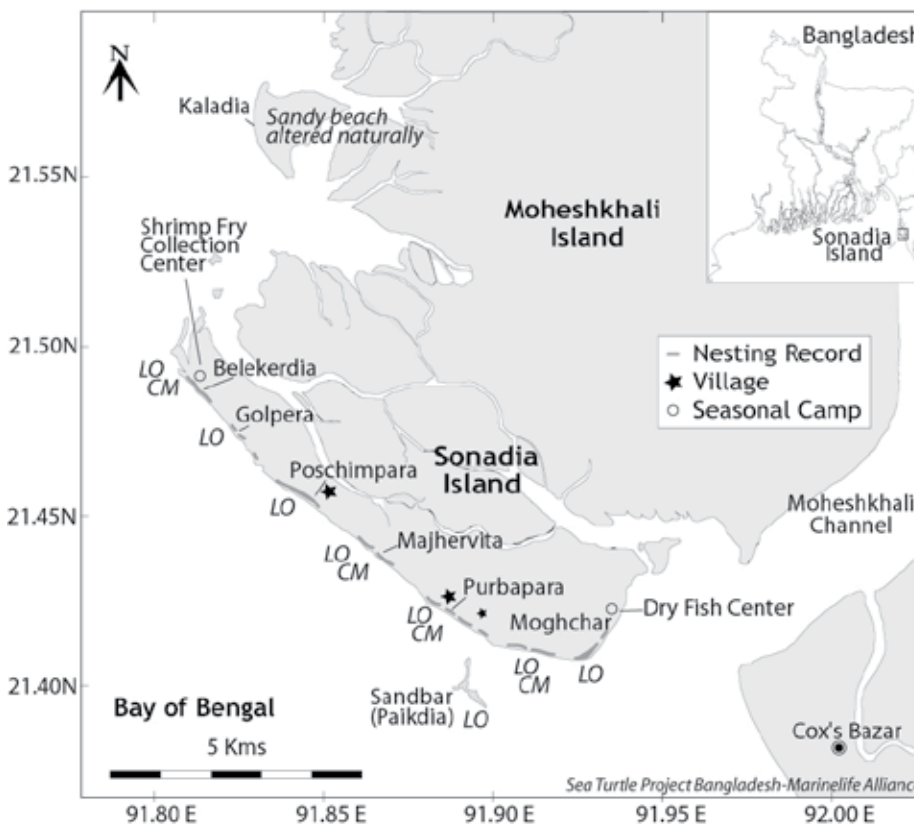


Figure 1. Nesting areas on Sonadia Island, Bangladesh.