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First Confirmed Occurrence of Loggerhead Turtles in Peru

Joanna Alfaro-Shigueto¹, Peter H. Dutton², Jeffrey Mangel^{1,3} & Diana Vega¹

¹*Asociacion Pro Delphinus, Octavio Bernal 572-5. Lima 11. Peru. (Email: joannaalfaro@viabcp.com)*

²*NOAA-Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, CA 92037. USA*

³*Duke University Marine Laboratory, Beaufort, NC 28512. USA*

The loggerhead turtle, *Caretta caretta*, occurs globally in tropical and subtropical waters and in the East Pacific ranges from Alaska to Chile (Carr 1952; Frazier 1981; Marquez 1990). Records from Pacific coasts of the USA and Mexico are well documented (Cliffon et al. 1982; Frazier 1981; Marquez 1969; Nichols et al. 2000, Seminoff et al. in press; Shaw 1947), however reports from Pacific coasts of Central and South America are largely anecdotal. Although loggerheads are mentioned as 'common' in Panama (Cornelius 1982) and Colombia (Green & Ortiz 1982), these accounts are most likely erroneous due to confusion caused by the usage of the spanish word "caguama", which in the Caribbean is the name for loggerheads, but in some Pacific countries is also the word used for sea turtles in general (Frazier 1985). Little information is available on loggerheads along the Pacific coast from Costa Rica to Guatemala (Cornelius 1982). In the southeastern Pacific, documentation of loggerhead occurrence south of Colombia is scarce (Frazier 1981), with no reports of the species along the Ecuador mainland. Although several reports describe the presence of loggerheads in Peru (Aranda & Chandler 1989; Grimwood & Whitmore 1978 cited in Frazier 1981; Koepcke 1961) none of these accounts are substantiated, and many are likely to have been misidentifications (Frazier 1985). As a result this species has not been included among the species of sea turtles that are protected under recent national fisheries legislation in Peru (D.S. No.026-2001-PE), despite being listed as "vulnerable" by an agricultural decree (DS No. 013-99-AG). Frazier (1979; 1981) and Hays-Brown & Brown (1982) suggested that the species is likely to occur along the South Peruvian coast since they were reported to be 'relatively common' in northern Chile (Chandler 1991; Donoso-Barros 1966; see also Frazier & Salas 1984).

In 1993 we initiated annual surveys to estimate sea turtle bycatch mortality in artisanal fisheries along the coast of central Peru. However, after monitoring for seven years we did not encounter any evidence of loggerheads at Pucusana and Chimbote (Figure 1) (Alfaro-Shigueto et al. 2002). Recent confirmed reports of loggerheads captured by longline vessels off northern Chile (Donoso et al. 2000) prompted us to expand our study and focus attention on the artisanal fisheries operating in southern Peru as part of an ongoing, region-wide program to evaluate incidental take of sea turtles in different fisheries (Alfaro-Shigueto et al. in press a & b; Pro Delphinus 2002). Here we report positive identification of loggerhead turtles in waters off the coast of Peru that we have confirmed to date, as well as other evidence of the species' presence.

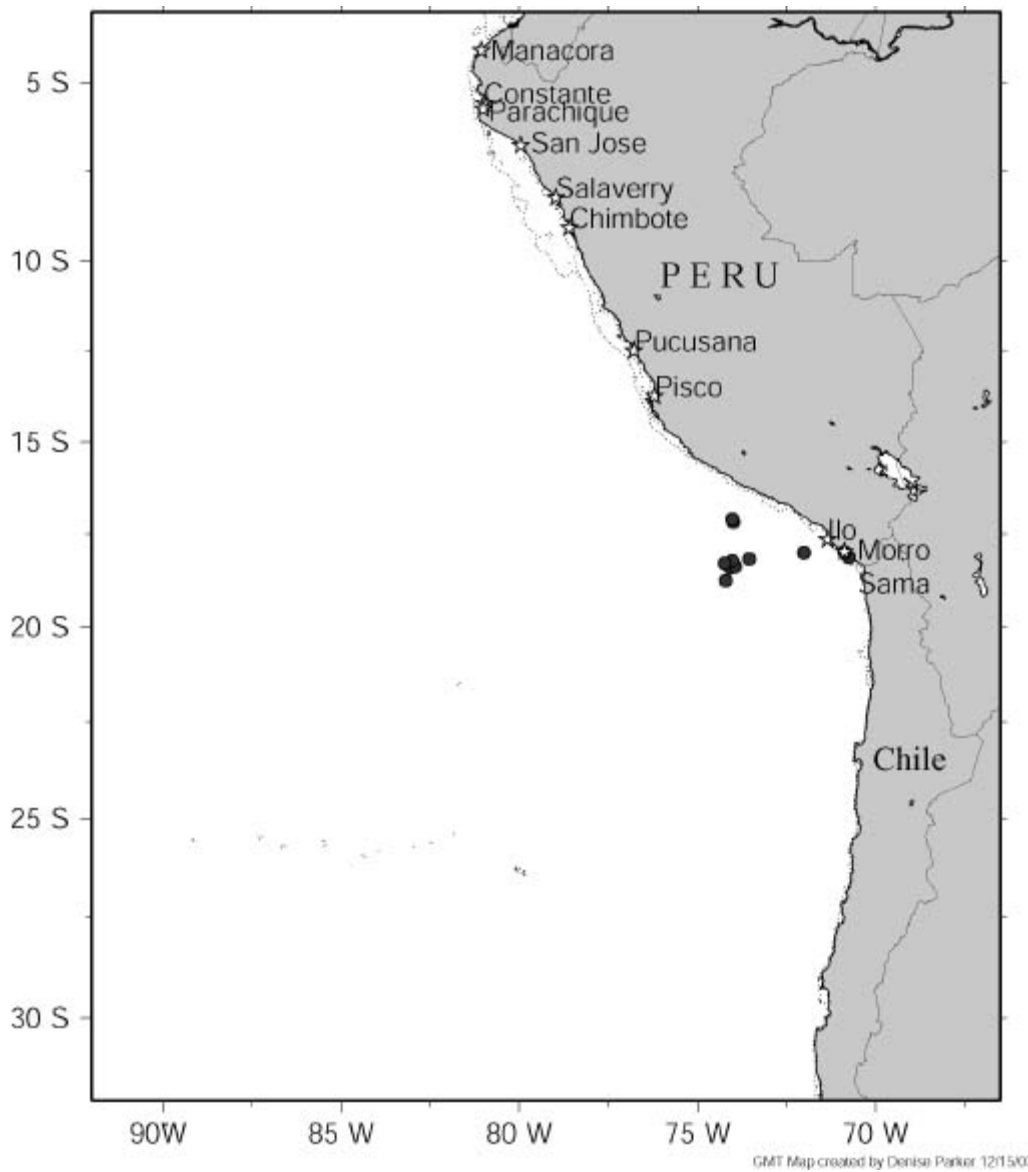


Figure 1. Locations of 11 of the loggerheads captured at sea by artisanal fishing boats operating from the ports of Moro Sama and Ilo in southern Peru. The additional ports that were monitored are indicated. The edge of the continental shelf is shown by the dotted lines.

From June 2001 to April 2003, we monitored the artisanal fisheries operating from eight ports along the Peruvian coast, including Ilo and Morro Sama in the south (see map, Figure 1). With the help of experienced observers, who monitored ports for 20-22 days each month, we obtained information on the date and location of capture, photographed captured turtles, measured and tagged turtles and collected tissue samples for genetic analysis. In addition, carapaces were recovered from slaughtered animals during our port surveys; despite being illegal, sea turtle bycatch is commonly used for human consumption (Alfaro-Shigueto & Van Waerebeek 2001).

To date we have confirmed a total of 25 loggerheads, including 23 recorded when they were captured at sea, and two that were identified from carapaces salvaged in Ilo and Morro Sama (Table 1). One of these carapaces was found during a reconnaissance visit to Morro Sama in December 2000 (Table 1). Species were identified based upon distinguishing external morphology, including: carapace shape and coloration, number of lateral scutes, position of first lateral with respect to the nuchal scute, and head shape and size (Eckert et al. 1999; Wynneken 2001). Field identifications were later confirmed by

photographs and/or carapaces salvaged from dead animals and the results of genetic analysis of mitochondrial DNA (mtDNA) control region sequences (Dutton et al. 1996) (Table 1). Other species were also found, including green turtles (*Chelonia mydas*), olive ridleys (*Lepidochelys olivacea*), leatherbacks (*Dermochelys coriacea*), and hawksbills (*Eretmochelys imbricata*). All the loggerheads were recorded at the two southernmost ports of Ilo (17°39'S, 71°21'W) and Morro Sama (17°59'S, 70°53'W) (Figure 1). The loggerheads were primarily caught in artisanal vessels using longlines that target dolphin fish (*Coryphaena hippurus*), blue shark (*Prionace glauca*), mako shark (*Isurus oxyrinchus*), hammerhead shark (*Sphyrna zygaena*), and thresher shark (*Alopias vulpinus*). Mean (± 1 standard deviation) carapace measurements (n=15) were 54.3 ± 11.1 cm (range = 26.0 - 65.5cm) curved carapace length (CCL notch-to-tip), and 53.3 ± 10.8 cm (range = 27.0 - 64.5cm) curved carapace width (CCW) (Table 1). Locations of capture sites ranged from 29 to 380 nautical miles from shore, which encompass Peru's EEZ as well as international waters off southern Peru and northern Chile (Figure 1).

These are the first confirmed reports of loggerheads in Peruvian waters. In addition, a total of 63 other loggerheads were recorded by fishermen during this same period. Although these additional observations cannot be substantiated by photographs, genetic analysis, or other means, they were based on identifications by onboard observers, trained to use sea turtle identification keys, and we believe them to be largely accurate. In general, fishermen in Ilo and Moro Sama appeared to be familiar with the loggerhead, and told us they had seen them in the past, going back as long as they could remember.

These observations indicate possible widespread presence of loggerheads off southern Peru. It is possible that loggerheads have been misidentified as green turtles or olive ridleys (Frazier pers. comm.), and therefore largely overlooked in the past by researchers. Preliminary results of genetic analysis from three of the specimens collected confirm them to be loggerheads originating from Australian nesting stocks, and additional analysis to confirm species identification and stock origin of the other samples is underway (Dutton et al. unpublished). Ongoing studies in Chile (see Donoso et al. 2000) and our observations suggest the foraging areas of loggerhead nesting stocks in the South Pacific extend into the waters off southern Peru and northern Chile. The results also indicate that loggerheads may be more common in the Southeast Pacific than previously thought.

DATE	Port	CCL(cm)	CCW(cm)	Field ID	Photo	Carapace	mtDNA
12/06/00	SAMA					Y	
02/02/02	SAMA			Y	Y		
02/14/02	SAMA			Y			
02/14/02	SAMA			Y			
05/04/02	SAMA	47.2	45.7	Y	Y	Y	Y
06/02/02	SAMA	64.7	63.0	Y	Y	Y	Y
06/02/02	SAMA	53.9	51.6	Y	Y	Y	Y
06/03/02	SAMA			Y	Y		
06/15/02	SAMA			Y	Y		
03/12/03	ILO			Y	Y		
03/15/03	ILO			Y			
03/16/03	ILO			Y	Y		
03/17/03	ILO	26.0	27.0	Y	Y	Y	
03/18/03	ILO	53.0	55.0	Y	Y	Y	
03/18/03	ILO	65.5	60.5	Y	Y	Y	
03/18/03	ILO	63.1	63.8	Y	Y		
03/18/03	ILO	65.1	64.5	Y	Y		
03/18/03	ILO	48.8	45.7	Y	Y		
03/18/03	ILO	63.9	63.2	Y	Y		
03/18/03	ILO	40.0	40.3	Y	Y		
03/18/03	ILO	51.6	50.1	Y	Y		
03/18/03	ILO	50.3	47.5	Y	Y		
03/18/03	ILO	58.4	58.0	Y	Y		
03/18/03	ILO	63.5	63.1	Y	Y		
05/20/03	ILO					Y	

Table 1. Confirmed records of loggerheads encountered in waters off the coast of Peru, showing port of departure, date of capture, curved carapace length (CCL) and curved carapace width (CCW) and indicating whether specimens were identified by direct observation (Field ID), photograph, from collected carapace and/or by genetic analysis (mtDNA).

The results presented here suggest the need to revise national legislation to provide loggerheads the same protection as other sea turtle species occurring in Peruvian waters and emphasize the need to develop conservation measures at local, regional and international levels. Our ongoing research, which includes genetic and telemetry studies and an international collaboration to evaluate fishery bycatch, will provide further insights to the population status, life history and foraging ecology of loggerheads in the Southeast Pacific.

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