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## Hawksbill Turtles in Peruvian Coastal Fisheries

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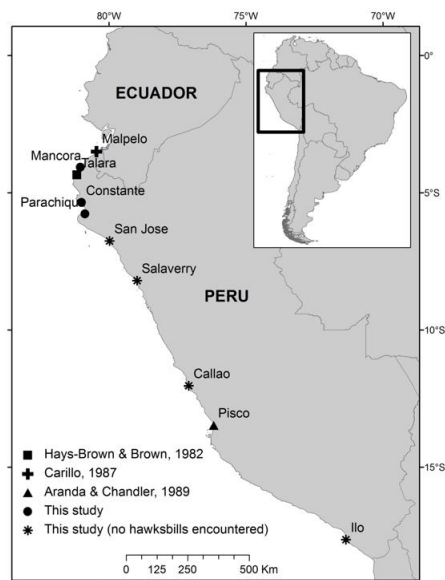
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In the Eastern Pacific Ocean (EP), the hawksbill turtle *Eretmochelys imbricata* has been reported as once 'common' from Mexico to Ecuador, but today is extremely rare (Seminoff *et al.* 2003; Gaos *et al.* 2006; Mortimer & Donnelly 2008). In the southeast Pacific (SEP), this species has been reported but is not common (Hays-Brown & Brown 1982; Aranda & Chandler 1989; Pitman 1990)

and has been documented using the region for both nesting (Green & Ortiz-Crespo 1982) and foraging (Hays-Brown & Brown 1982). In Peru, hawksbill turtles have been reported from Punta Malpelo (3°30'S, 80°27'W) in the north (Carillo 1987) to Pisco (13°44'S, 76°14'W) in the south (Aranda & Chandler 1989) (Figure 1). Since the latter, there have been no subsequent reports of the species

Month	Season	Year	Location	Gillnet type	CCL	SCL
January	Summer	2000	Mancora	Monofilament	ND	ND
January	Summer	2000	Mancora	Monofilament	ND	ND
September	Spring	2000	Mancora	Monofilament	41.5	38.1
September	Spring	2000	Mancora	Monofilament	35.8	34.2
September	Spring	2000	Mancora	Monofilament	36.5	34.5
September	Spring	2000	Mancora	Monofilament	35	33.1
September	Spring	2000	Mancora	Monofilament	37.9	36.1
December	Summer	2000	Mancora	Multifilament	36	ND
May	Autumn	2002	Parachique	Multifilament	ND	ND
July	Winter	2002	Mancora	Monofilament	47	ND
September	Spring	2002	Mancora	Monofilament	49	ND
March	Summer	2003	Parachique	Multifilament	ND	ND
March	Summer	2003	Parachique	Multifilament	ND	ND
August	Winter	2003	Mancora	Multifilament	28.3	ND
October	Spring	2003	Mancora	Multifilament	ND	ND
November	Spring	2005	Parachique	Multifilament	ND	ND
February	Summer	2008	Constante	Multifilament	37.2	35.2
March	Summer	2009	Mancora	Multifilament	43.7	ND

**Table 1.** Data from incidentally caught hawksbill turtles in Peru from 2000-09. ND = no data. Curved and straight carapace lengths (CCL and SCL) in cm.



**Figure 1.** Locations of hawksbill turtle records in Peru from this and previous studies.

in Pisco (ACOREMA 2000; this study). There are no reports of the species in Chile (Frazier & Salas 1982; Chandler 1991), thus Peruvian waters appear to demarcate the southernmost limit of distribution for hawksbill turtles in the EP.

Given the scarcity of current data on the hawksbill turtle in the EP (Gaos *et al.* 2010), here we provide a summary of information on the species for Peru, primarily as a result of interactions with artisanal fisheries. Considering recent calls for better information on hawksbills in the EP (CPPS 2008), the information presented herein on the distribution of this critically endangered species will help inform recovery efforts in this region.

Information on hawksbills and their interactions with artisanal fisheries was collected using shore-based observers at eight fishing ports (N→S): Mancora, Constante, Parachique, San Jose, Salaverry, Callao, Pisco and Ilo (Figure 1). Monitoring was undertaken from July 2000 to November 2005 and was conducted opportunistically during subsequent years (2006-2009). Whenever a turtle was landed, observers recorded the species, date, location of capture, and the fishing gear used (Table 1). Curved carapace length (CCL) from nuchal notch to the end tip of the carapace was recorded

Eighteen hawksbills were observed as incidentally caught by fishers operating out of the three northernmost sites: Mancora (n=13, 04°06'S, 81°04'W), Constante (n=1, 05°45'S, 80°51'W), and Parachique (n=4, 05°44'S, 80°51'W). There were no observations of hawksbills at the southern sites from San Jose to Ilo. The majority of interactions (83%) occurred in spring and summer (Table 1). The CCL for hawksbills ranged from 28.3 to 49 cm (mean=38.9 cm, SD=5.9, n=11). The fishing gear in which hawksbills were caught was coastal gillnets, operating within two nautical miles from shore and generally close to mangrove habitats. Hawksbills were the most infrequently bycaught species, with green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), leatherback (*Dermochelys coriacea*) and loggerhead turtles (*Caretta caretta*) all being observed more often (Alfaro-Shigueto *et al.* 2004, 2007).

Hawksbills of the EP have been the focus of increasing conservation attention. Despite a general presumption that the population is at critically low levels, there is a paucity of information

on the distribution and size classes of turtles found throughout the EP. While in-water studies of hawksbill turtles are clearly needed to elucidate the abundance and distribution of hawksbill turtles in marine habitats of the EP, logistic hurdles and the extreme rarity of hawksbills have limited such efforts. Considering the extensive artisanal fisheries operating in this region, we suggest that substantial amounts of information can be gathered through reports of hawksbill-fisheries interactions. Indeed, the data presented here were gathered through a fisheries observation program, which at present is the only mechanism for collecting data on hawksbill turtles.

The lengths of individuals of the species found in Peruvian waters (Hays-Brown & Brown 1982; Carrillo 1987; this study) suggest that they are mainly juveniles, although adult individuals have also been reported stranded in northern areas of the country (Forsberg 2008). Considering the few records of hawksbills despite nearly a decade of observations, it is clear that hawksbills are uncommon in Peru. Records of hawksbills in the EP extended as far south as Pisco. However, we did not encounter any hawksbills further south than Parachique (approximately 1000 km north of Pisco), which corroborates the findings by ACOREMA (2000) in 1999.

Considering the populations' status as one of the most imperiled in the world (Gaos *et al.* 2010) and that the loss of even a few individuals may represent a significant detriment to recovery efforts, these bycatch data require further consideration. Furthermore, there is an urgent need for an updated assessment of the status of hawksbill turtles throughout the EP to learn more about the species' stock origin, abundance and distribution in the region and thus enable the development and implementation of an effective regional management plan.

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