

Killer whales in Papua New Guinea waters

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ABSTRACT

Although typically considered a temperate to cold water species, killer whales (*Orcinus orca*) have been reported intermittently in tropical waters. Research on Papua New Guinea killer whales is only in its infancy with surveys conducted intermittently off West New Britain Province since 2002. The main concentrations of sightings were clustered in the Kimbe Bay area. Photo-identification images were collected for 14 individuals. Resightings were made of two animals, one of which was resighted 16 months after initial discovery. Killer whales from Papua New Guinea waters have been observed feeding on four species of elasmobranchs and four species of fin-fish. The occurrence of calves peaked in April.

KEYWORDS: KILLER WHALE; *ORCINUS ORCA*; PAPUA NEW GUINEA; PHOTO-ID; POPULATION STRUCTURE; ABUNDANCE; DIET; FISHERIES INTERACTION; MARINE PROTECTED AREA (MPA)

INTRODUCTION

Dedicated research began on Papua New Guinea (PNG) killer whales in 2002, with surveys conducted intermittently off West New Britain focusing primarily on the Kimbe Bay area (Visser & Bonaccorso 2003). Very limited data are available about this species in PNG waters, however, they are known to frequent the area for at least 10 months of the year (Visser & Bonaccorso 2003). Until recently killer whales were not officially listed as present in the waters surrounding PNG (IUCN 2000), however, that has now been updated (IUCN 2006).

METHODS

The data presented here comes primarily from Visser & Bonaccorso (2003) with additional sightings collected from anecdotal reports and photographs, following their methods. An additional survey was conducted in April 2006, but no killer whales were encountered during the 14 on-effort days. Research has only been conducted intermittently, to date, due to logistical and financial constraints.

RESULTS & DISCUSSIONS

Distribution

A total of 94 sightings of killer whales in PNG waters were compiled by Visser & Bonaccorso (2003). These were divided into two main types 'data-deficient' ($n = 57$) and 'complete' ($n = 37$). The 'complete' records were from 1987 to July 2002. Twenty-seven records had either photographs or videotape to confirm species identification. The earliest reference to killer whales in this region was from 1956, when they were recorded taking fish off long-lines (Iwashita *et al.* 1963). The main concentration of sightings were clustered in the Kimbe Bay area (Visser & Bonaccorso 2003) and further records indicate a similar distribution (Table 1). This may be, as indicated in Visser & Bonaccorso (2003), a result of observer bias; this area is one of only a few places in PNG where dive boats make daily trips more than 5 N mi from base.

Abundance

Photo-identification images were collected for 14 individuals and a catalogue established (Visser & Bonaccorso 2003). Resightings were made for two animals – a female sighted approximately 30 N mi and two days apart and a sub-adult male sighted in the same region 16 months apart. Some killer whales from these waters have been observed with grey underflukes (Visser & Bonaccorso 2003) in contrast to white, which is typically described for this species (Dahlheim & Heyning 1999). No fresh wounds or healed scars from cookie cutter sharks (*Isistius sp.*) have been observed on PNG killer whales as, seen on other killer whales in the general South Pacific region (Visser 1999, Visser 2007, Visser unpubl. data). It is possible that the PNG killer whales are frequenting adjacent waters. Comparisons have been made between the New Zealand photo-ID catalogue and a limited number of images of killer whales from Australian and Tongan waters (Visser unpubl. data), but no matches have been made.

Table 1. New records of sightings of killer whales in PNG waters (see Visser & Bonaccorso (2003) for a full review).

Date & Time	Location / Latitude & Longitude	Photo, Video	Number, sex / age	Other Details	Source (<i>p.c.</i> = <i>personal communication</i>)
<i>Circa</i> Dec 1996	Near Cape Hollman, West NB* 04° 55' S, 150° 07' E	No	Not stated		Boat <i>Febrina</i> , <i>via</i> D. Doyle ¹ <i>p.c.</i>
3 Mar 1997 0800 hr	Krakafat, Lama Shoals, West NB* 04° 42' S, 149° 33' E	No	3, 2 adults, 1 calf		P. Huges, <i>via</i> D. Doyle ¹ <i>p.c.</i>
17 April 1997 0900 hr	Mouth of Johan Albrecht Harbour, Witu Islands, West NB* 04° 42' S, 149° 30' E	No	'several'		M. Peel, <i>via</i> D. Doyle ¹ <i>p.c.</i>
Nov 2003	South Coast of West NB*	Yes			Boat <i>Febrina</i> , T. Picklow, <i>via</i> T. Peluso ² <i>p.c.</i>
28 Nov 2003 1100 hr	Near Susan's Reef, Kimbe Bay, West NB*, 05° 15' S, 150° 08' E	No		Traveling SE	T. Peluso ² <i>p.c.</i>
05 Jan 2004	Near mouth of Manilo River, near Tol Point, Wide Bay, East NB*	No	4, 1 adult male		D. Doyle ¹ <i>p.c.</i>
18 Jan 2004	Sanambret Island, Lihir Group, New Ireland, 03° 00' S, 152° 40' E	Yes	At least 2	Approach ed boat	Papua New Guinea, Post- Courier (2004)
08 July 2004 1300 hr	Out from Walindi Plantation Resort, Kimbe Bay, West NB*	Yes	6, 2 adult males, 1 calf	Approach ed boat	J. Johnson & D. Lewis, <i>via</i> J. Mills ³ <i>p.c.</i> M. Benjamin ⁴ <i>p.c.</i>

* = New Britain

¹ Dick Doyle, Dicky's Place Dive Resort, Witu Island, West New Britain Island, West New Britain Province, Papua New Guinea.² Tammy Peluso, 32 Beltana Crescent, Buddina, QLD 4575, Australia³ Janene Mills, 18a Macpherson Street, Meadowbank, Auckland, 1072, New Zealand⁴ Max Benjamin, Walindi Plantation Resort, P.O. Box 4, Kimbe Bay, West New Britain Island, Papua New Guinea.

Habitat Degradation

Until recently, the PNG marine environment was under minimal stress, threatened only by a small human population. Now, however, there are increasing signs of habitat degradation due to land-based activities and over-harvesting, particularly of sedentary marine resources. PNG waters contain some of the best examples of undisturbed coral reefs in the entire Coral Triangle region, making it vitally important that both government agencies and communities respond to these threats (Allen *et al.* 2000). Kimbe Bay alone is home to at least 860 species of reef fish and 360 species of coral (Jones *et al.* 2004) and this marine diversity exceeds species known to the Australian Great Barrier Reef, the Hawaiian Islands and the Caribbean Ocean combined. Kimbe Bay is also one of the main areas for killer whale sightings (Visser & Bonaccorso 2003).

Ecology

Killer whales from PNG waters have been observed feeding on four species of elasmobranchs (scalloped-hammerhead shark, *Sphyrna lewini*; grey reef shark, *Carcharhinus amblyrhynchos*; manta ray, *Manta birostris*; and blue-spotted ray, *Dasyatis kuhlii*) and four species of fin-fish (yellow-fin tuna, *Thunnus albacares*; big-eye tuna, *Thunnus obesus*; Indo-Pacific sailfish, *Istiophorus platypterus*; and sunfish, *Mola mola*). Killer whales in these waters have been reported in association with two species of cetaceans (sperm whales, *Physeter macrocephalus*; and spinner dolphins, *Stenella longirostris*).

Calves were recorded during 13 sightings in March-May, July-Oct, with a peak April ($n = 5$) (Visser & Bonaccorso 2003, Visser unpubl. data). Of all the calf sightings nine of the 13 were recorded in the Kimbe Bay area (Visser & Bonaccorso 2003, Visser unpubl. data).

CONCLUSIONS

Although very little is known about this population of killer whales, this lack of knowledge does not justify ignoring potential impacts. They should at least be afforded some level of status and a declared Conservation Management Plan. Given their place in the marine ecosystem as apex predators, killer whales can serve as indicator species. Less than three percent of marine species worldwide have been assessed by the IUCN Red List of Threatened Species (IUCN 2006). The IUCN Global Marine Species Assessment (GMSA) aims to address this by focusing on species of particular importance to fisheries, species of importance to community structure and those which have intrinsic vulnerability due to life history strategy (IUCN 2006). Killer whales in PNG waters fit all these categories.

Preventative measures as well as mitigation of the impacts which have the greatest potential to threaten the population are of priority; *i.e.*, 1) Fisheries Interactions (long-line fish removal, prey reduction) and 2) Habitat Degradation (coastal run-off, dynamite fishing) are of importance. Increasing the amount of Protected Marine Areas, particularly in areas which killer whales are known to frequent, may facilitate both of these objectives. The total marine area of PNG is 312, 000, 000 ha, yet less than 0.1% is under protection (including littoral areas). The protection of marine areas has become paramount worldwide (Anonymous 2007) and is of no less importance for a developing country such as PNG, where waters can be considered relatively pristine (Allen *et al.* 2000). Areas critical to the PNG killer whales, such as Kimbe Bay, require immediate protection.

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