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Recreational Fishing-Related Injuries to Australian Pelicans (*Pelecanus Conspicillatus*) and Other Seabirds in a South Australian Estuarine and River Area

Research Article

Carapetis ER[1,2], Machado A[2], Braun K[2], Byard RW [1,2*]

[1] Discipline of Anatomy & Pathology, The University of Adelaide, Frome Rd, Adelaide, Australia.
[2] Australian Marine Wildlife Research and Rescue Organisation (AMWRRO), Torrens Island, Adelaide, Australia.

Abstract

113 seabirds treated over 5.5 years had 132 fishing-related injuries that included entanglement with line only (N=35/132; 26.5%), entanglement with line and an associated hook (N=47/132; 35.6%), embedded hooks only (N=34/132; 25.7%) and foreign body ingestion (N=16/132; 12.1%). The percentage of fishing-related injuries ranged from 0.9% for banded stilts (*Cladorhynchus leucocephalus*), pacific gulls (*Larus pacificus*) and masked lapwing plovers (*Vanellus miles*), to 59.3% for Australian pelicans (*Pelecanus conspicillatus*). Entanglement and/or embedded hooks were present more often than injuries from ingestion; i.e. 97% (70/72) of pelicans had entanglement and/or embedded hook injuries; of these 35/72 [48.6%] were entangled with line and hooks, 24/72 [33.3%] had embedded hooks alone and 11/72 [15.3%] were entangled with lines only, with only 3% (2/72) having injuries from ingestion. A count of sea and river birds in close proximity to fishers revealed that the majority were pelicans (33.9%), compared to pied cormorants (28.6%), silver gulls (21.4%) and black swans (16.1%). Regular removal of discarded fishing material along local shores resulted in no reduction in the numbers of entangled or hooked seabirds. It appears likely, therefore, that such injuries may result from seabird proximity to active recreational fishing, rather than from entanglement in discarded material.

Key Words: Recreational Fishing; Seabird; Australian Pelican; Entanglement; Fishing Hook; Ingestion.

***Corresponding Author**:
Byard RW
Discipline of Anatomy & Pathology,
Level 3 Medical School North Building,
The University of Adelaide, Frome Road, Adelaide, Australia.
Tel: (618) 8313 5341; Fax: (618) 8313 4408
E-mail: roger.byard@sa.gov.au

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Introduction

One of the many problems encountered by wild birds living along coastal and river regions is entanglement and hooking in fishing gear. Such entanglement is often attributed to discarded fishing lines with attached hooks and sinkers [1]. Unfortunately there is very little published data to verify this assertion, and observations by local wild bird rescue and rehabilitation personnel in South Australia have not supported this view. To examine this issue further the following study was undertaken to look at the specific types of injuries that occur amongst particularly Australian pelicans and their relationship to discarded material and to local recreational fishing activity.

Materials and Methods

Seabird case note data prospectively collected over 5.5 years (January 2004 - June 2009) from the Australian Marine Wildlife Research and Rescue Organisation (AMWRRO) at Torrens Island, South Australia were reviewed. The term seabird was used to include all bird species found near, or in an ocean environment. Australian pelicans, the predominant group, generally came from around Adelaide and the immediate environs.

All files documented the types of injury and/or ingestion with recording of the date of capture, sex, species, location and time of capture, physical condition, treatment and outcome. All cases were assessed and treated at the rescue centre, and in the event of fatality the causes and mechanisms of death were determined. Initially all seabirds were evaluated before data pertaining to pelicans was selected for closer study.

All birds with fishing-related injuries were separated into two broad groups: i) entanglement and embedded hook injuries and ii) ingestion injuries. The first group was then subdivided into birds entangled with line only, entangled with line and a hook, or with only an embedded hook.

A field study was also conducted at various coastal and estuarine areas around the city of Adelaide counting pelicans in the presence of, or within close proximity (5 metres) to, active recreational fishing. The date, location, number of birds and number of fishers were recorded.

Results

A total of 266 sea birds were treated at AMWRRO over the period of the study, of which 113 (42.5%) had fishing-related injuries (the latter included 72 pelicans). Eighty-six (32.3%) of all cases had 'other' injuries (for example animal or traffic related), and the remaining 67 (25.2%) had non-traumatic conditions. Of the 113 fishing-related cases for all species, a total of 132 injuries were recorded that included entanglement with line only (N = 35/132; 26.5%), entanglement with line and an associated hook (N = 47/132; 35.6%), embedded hooks only (N = 34/132; 25.7%) and foreign body ingestion (N = 16/132; 12.1%).

The percentage of fishing-related injuries varied by species ranging from 0.9% for the group of banded stilts (*Cladorhynchus leucocephalus*), pacific gulls (*Larus pacificus*) and masked lapwing plovers (*Vanellus miles*), to 59.3% for Australian pelicans (*Pelecanus conspicillatus*). Injured pelicans were followed by pied cormorants (*Phalacrocroax varius*) (22.1%), silver gulls (*Chroicocephaus noraehollandiae*) (8.0%) and finally black swans (*Cygnus atratus*) (4.4%). Black-faced cormorants (*Phalacrocroax fuscescens*) and crested terns (*Sterna bergii*) were much less likely to be treated for fishing gear entanglement. Entanglement and/or embedded hooks were more likely be found than injuries from ingestion. For example, 97% (70 of 72) of pelicans had entanglement and/or embedded hook injuries; of these 35/72 [48.6%] were entangled with line and hooks, 24/72 [33.3%] had embedded hooks alone and 11/72 [15.3%] were entangled with lines only, with only 3% (2 of 72) having injuries from ingestion.

The locations of injuries were recorded for entanglement with lines and/or associated hooks and for embedded hook injuries among the top four seabird species.

Entanglement with line and/or associated hooks

Forty-three percent of entanglements with line and/or associated hooks involved the wing, followed by 23.7% in the legs and feet (Fig. 1). The head and neck area was entangled/hooked in 13.2%. Other areas with injuries involved the chest, abdomen, tail, trachea, pouch, pelvis, back, and eyes. The beak was involved in only 3.9% of cases.

Embedded hook injuries alone

Close to 56% of embedded hook injuries involved the leg, followed by the wing (in 14.7%) of pelicans, pied cormorants and silver gulls. The head/neck area was injured in nearly 12% of cases. As with entanglements with line and/or associated hooks, the beak was much less likely to be affected (2.9%). Injuries to the chest/abdominal occurred in 8.8% and to 'other' areas of the body in 5.9%. There were no embedded hook injuries among black-faced cormorant and black swans. Rare cases involved more than one bird (Fig. 2).

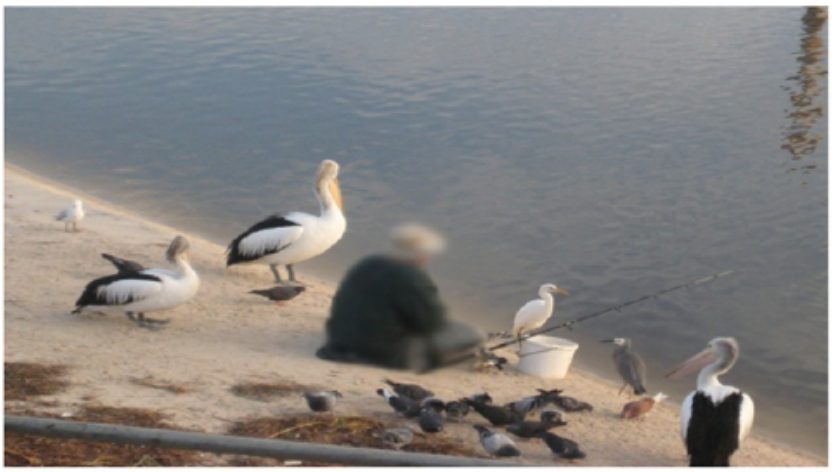
Seasonal trends and outcomes

Pelicans were more likely to be admitted to the rescue centre during winter than any other season. In most entanglement cases, pelicans were successfully rehabilitated and released (91.3%; 42/46). All pelicans with embedded hook injuries were released

Figure 1. An Australian pelican with a fishing hook injury to the leg, with the attached line forming a ligature. Failure to remove the line may have resulted in deep infection and/or amputation.

Figure 2. Two silver gulls joined by line and embedded hooks. The bird on the left was hooked in the wing and the immature bird in the right had ingested line with a hook. The bird on the right subsequently died following surgical removal of the hook that had perforated the esophagus.

Figure 3. Three pelicans, a silver gull, an egret, a white-faced heron and eighteen pigeons around a fisher at Torrens River Catchment, Henley Beach. In addition to feeding the seabirds, the fisher was also feeding pigeons.



(24 of 24)

Repeat offenders

A number of pelicans were injured more than once from fishing-related activities. These cases were classified as 'repeat offenders' and were identified with a unique tag. There were 22 cases, with two birds having annual admissions for entanglement and hook injuries (AMWRRO #507 and 693). On one occasion pelican # 693 actually walked in to the rescue centre with multiple embedded hook injuries.

Field study

A count of sea and river birds in close proximity to fishers in coastal and estuarine areas of Adelaide revealed that the majority were pelicans (33.9% of 56 birds), compared to pied cormorants (28.6%), silver gulls (21.4%) and black swans (16.1%). An average of two birds in the presence of three fishers was observed, although often more than one fishing device was operated at a time. Although a single species was usually present around a group or individual fisher, this was not always the case (Fig. 3). The type of species varied with the location; for example, pied cormorants were most prevalent around West Lakes, with pelicans being most prevalent around fishers at the River Torrens Catchment area.

A number of fishing-related injuries observed to silver gulls and pelicans in the study occurred near Bower Road bridge off West Lakes. Due to fishing practices in the area, numerous fishing lines have been cast over overhanging power lines resulting in masses of suspended line and hooks that entangle and injure birds.

Discussion

Australian pelicans and pied cormorants are common species in the Gulf of St Vincent in South Australia. Both species typically feed in shallow waters along the shores of the Gulf in areas such as the Barker-Inlet estuary and the causeway of Torrens Island [2]. They are also known to feed in other coastal areas of Adelaide such as the Torrens Catchment area at Henley Beach and along the River Torrens.

During foraging, pelicans and pied cormorants use their long necks and hooked bills to plunge into water and capture their prey (usually fish and crustaceans) [2,3]. These feeding methods may expose birds to fishing hooks and line, leaving them vulnerable to injury. As pelicans and pied cormorants rely on their totipalmate feet (feet with webbing that connects all four toes) during feeding [2,3] this may explain why the wings and legs were more commonly injured sites than the beaks. Pelicans also use their beating wings to drive fish into concentrated areas during feeding which may again explain the predominance of injuries to the wings and feet. It is also possible that ingestion injuries are more likely to be rapidly lethal as they may result in perforation of the upper gastrointestinal tract with damage to the heart or adjacent blood vessels with hemorrhage, or in lethal sepsis. Ingested material may also significantly interfere with feeding behaviour, as occurred in the case of a pied cormorant that had two ingested fishing hooks which had embedded in the esophagus. The bird was underweight, shocked and soon died. It had been unable to extend its neck for diving, feeding and/or flying. As in this case it is likely that birds with these types of injuries will not survive long enough to be rescued and successfully treated [4]. This was also be demonstrated in Figure 2 where the seagull with the hooked wing survived, whereas the bird with the ingested hook did not.

Pelicans have learnt to associate people with food and were often observed congregating around recreational fishers during the field study waiting for any discards or fish that may be offered. They also often waited for a line to be cast or hauled in before attempting to scavenge the bait or catch. Pelican breeding can occur at anytime of the year in the Gulf of St Vincent, however, it is usually at its peak between June and September when rainfall is most likely [2]. During this time there is a need to provide food for their young which results in adults foraging more frequently and for longer periods of time. This may account for the increase in pelican injury rates during the winter months.

It has been proposed that active recreational fishing was the main cause of estuarine seabird entanglements in New South Wales, with a ten year study (1992-2002) by Australian Seabird Rescue documenting that 40 seabirds (predominantly Australian pelicans) became entangled in fishing tackle annually from foraging near set lines and unattended set lines [5,6]. However during a closure of the Richmond River to recreational fishing for three months during 2001 no seabirds were reported to be entangled or hooked in fishing tackle, despite it also being the period when the pelican population was at its highest. Once the river was re-opened to recreational fishing, seven pelicans and other seabirds became en-

tangled and hooked in fishing tackle over the following week, with seabird injuries continuing to increase for several months [5,6].

The type of bait used in recreational fishing may also influence the species of birds injured in particular areas (Dr Ross James, personal communication). Bait such as honey on bread or corn used for fishing in the Torrens River attracts swans, whereas fish, or fish surrogates (lures), will attract pelicans. Certainly, deep sea bird injuries associated with commercial fishing activities, are often due to active scavenging at the time of fishing [7-10]. The method of line setting may also contribute to injury, with unattended lines being more hazardous, as it is easier to scavenge from them in the absence of a fisher. These lines may also not be seen by flying or swimming birds if a fisher absent.

If discarded fishing material was a significant factor in causing local seabird entanglements/injuries then clearing beaches and estuaries of this material would be expected to reduce the numbers of injured birds. However, following regular clean-ups of the shores of the Port River area between 1999 and 2002 by AMWRRO volunteers removing debris and discarded fishing material, no reduction in the numbers of entangled or hooked seabirds admitted to the centre was observed. It is not clear why this result is not consistent with a study by Dau et al. who proposed that fishing debris was a more significant cause of seabird entanglements in California [1]. Entanglement injuries in the Richmond River in New South Wales ceasing when recreational fishing was banned would, however, be more in keeping with entanglement from active fishing than from shore fishing debris. This is not to suggest that discarded fishing tackle is not a problem, as was clearly demonstrated on Bower Road bridge where seabirds became entangled in fishing gear hanging from power lines. In addition, some bird species have been known to use large tufts of discarded fishing line to help construct nests which has then entangled the young.

One point that should be made is that the data in this study cannot provide an epidemiological indication of seabird numbers and the overall rate of injury for each species. This is because the number of injured birds is likely significantly underestimated as many would not be captured and brought in for care, and the most severely traumatized birds, such as those with severe ingestion injuries, would be more likely to die than to be rescued. In addition, an injured solitary pelican may be more obvious to bystanders than a smaller bird in a large flock, and a large hook may be more injurious to a smaller bird [1].

This study has shown that native estuarine and river birds are suffering significant injuries from fishing gear and that many of these entanglements appear to be related to foraging behaviour around active recreational fishing. Avoiding feeding wild seabirds bait and caught fish may be one way of breaking the cycle of dependence on human fishing for food, with its attendant danger of entanglement and hooking.

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Ethical Agreement

This study was fully approved by the Australian Marine Wildlife Research and Rescue Organisation (AMWRRO) and complied with national ethical guidelines.

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