

# PRESENCE OF THE PERUVIAN PELICAN *PELECANUS THAGUS* IN SEABIRD COLONIES OF CHILEAN PATAGONIA

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## SUMMARY

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Over the past few years, an increase in Peruvian Pelican *Pelecanus thagus* presence has occurred in southern Chile, along the coast of the Los Lagos region, at the southern end of its range. We evaluate the presence of the pelicans in seabird colonies of this region and describe their behavior and interactions with other seabird species. Three colonies were surveyed: San Pedro Bay Islets (40°55'S), Kaikué-Lagartija Island (41°48'S) and Caicura Island (41°42'S). Counts were carried out from boats, and age structure was determined based on plumage color. Pelicans were found to be numerous and included a high proportion of juveniles. With the exception of one pelican egg (unhatched) found at Caicura Island in December 2013, there was no evidence of pelican nesting. Potential competitive interactions between the pelicans and other seabirds were evident.

Keywords: Chile, competitive interactions, foraging in seabird colonies, Peruvian Pelican, range expansion

## INTRODUCTION

The Peruvian pelican *Pelecanus thagus* (hereafter, pelican) typically inhabits the Pacific Coast of South America, from southern Ecuador (3°S) to Chiloé, in southern Chile (42°S), with breeding range extending from Foca Island (5°S), in northern Peru, to Mocha Island (38°S), in central Chile (Goodall *et al.* 1957, Figueroa & Stucchi 2012, Jeyasingham *et al.* 2013; Fig. 1).

The coast of the Los Lagos region (40–44°S), in Chile, forms an intermediate biogeographic zone that sits between the Humboldt Current and the Sub-Antarctic Current systems, where there is a mixture of seabirds from both systems (Schlatter & Simeone 1999, Cursach *et al.* 2011). In the years of significant ENSO (El Niño-Southern Oscillation), an increased abundance of seabird species typical of the Humboldt Current system is observed in the Los Lagos region. These species include Peruvian Boobies *Sula variegata*, Inca Terns *Larosterna inca* and Gray Gulls *Larus modestus* (Clark 2008, R. Schlatter and A. von Meyer, pers. comm.). Once the ENSO dissipates, the seabird fauna of Los Lagos returns to its usual composition.

A different situation is apparent among pelicans in this region. In the mid-20th century, the southernmost observations of pelicans did not extend beyond Chiloé (43°S; Goodall *et al.* 1957, Jehl 1973). However, over the last 30 years, pelicans have regularly occurred south of 44°S and, occasionally, even south of 46°S, from San Rafael Lagoon to 49°S, on Wellington Island (Imberti 2005, R. Schlatter and C. Suazo, unpubl. data). Preliminary analysis of ornithological records in this region indicates a progressive increase in pelican presence southward. The current study aimed to evaluate

the presence of Peruvian pelicans in the Los Lagos region, within the southernmost end of their extensive range, and to describe their behavioral displays and potential inter-specific relationships with other seabirds of southern Chile.

## METHODS

### Study area

The Los Lagos region, in southern Chile, has a variety of typical ecosystems and microclimates. For this study, we selected three colonies of seabirds, located on a coastal gradient: i) the San Pedro Bay Islets (40°55'S, 73°53'W), in the part of the Pacific Coast region that is exposed; ii) Kaikué-Lagartija Island (41°48'S, 73°17'W), a colony with intermediate exposure, located in the Chacao Strait; and iii) Caicura Island (41°42'S, 72°41'W), representing the interior sea of Reloncaví Sound (Fig. 1).

### Surveys

Monthly visits were made to the San Pedro Bay Islets from October to December 2014. Pelican counts were conducted from boats navigating San Pedro Cove (40°56.48'S, 73°51.88'W). Kaikué-Lagartija Island was visited during two non-consecutive breeding seasons: the first visits were conducted from October 2012 to January 2013 (except December 2012) and the second from August 2014 to January 2015. Pelican counts were conducted by boat from Calbuco (41°46.63'S, 73°07.98'W) to Kaikué-Lagartija Island, during both outbound and the inbound legs of the trip; in addition, we landed and walked along a transect around the entire perimeter of the island. Visits to Caicura Island were made during

consecutive seasons: 2013–2014 and 2014–2015. The first season went from November 2013 to January 2014, and the second went from November 2014 to January 2015. Counts were made from the boat, departing from La Arena Cove (41°43.44'S, 72°41.22'W) and circumnavigating the island; we disembarked at two sites. When possible, the age structure of the pelicans was determined based on their plumage patterns, particularly on the white coloration on the neck and head of the adults, which in juveniles are generally grayish-brown (Couve & Vidal 2003). Observations were aided by binoculars (16×50) and a telescope (40×60). In addition to counts, general observations were also made about the behavior of the pelicans, including interactions with other species.

## RESULTS

### San Pedro Bay Islets

During the breeding season, we observed pelicans in the nesting areas of other seabirds, on rocks and in the adjacent sea (Table 1).

**TABLE 1**  
Number of Peruvian pelicans observed in the area of San Pedro Bay Islets, Purranque coast, region of Los Lagos, Chile

Date	Adults	Juveniles	Total
12 October 2014	193+	1	194+
16 November 2014	111	7	118
21 December 2014	10	5	15

A decline in the number of pelicans was observed as summer progressed (Table 1). Adults dominated the population (Table 1), and they used the higher gentle slopes, where they congregated and perched. On one occasion, a pelican was observed standing on the edge of a colony of South American Terns *Sterna hirundinacea*, displaying no obvious behavioral interaction.

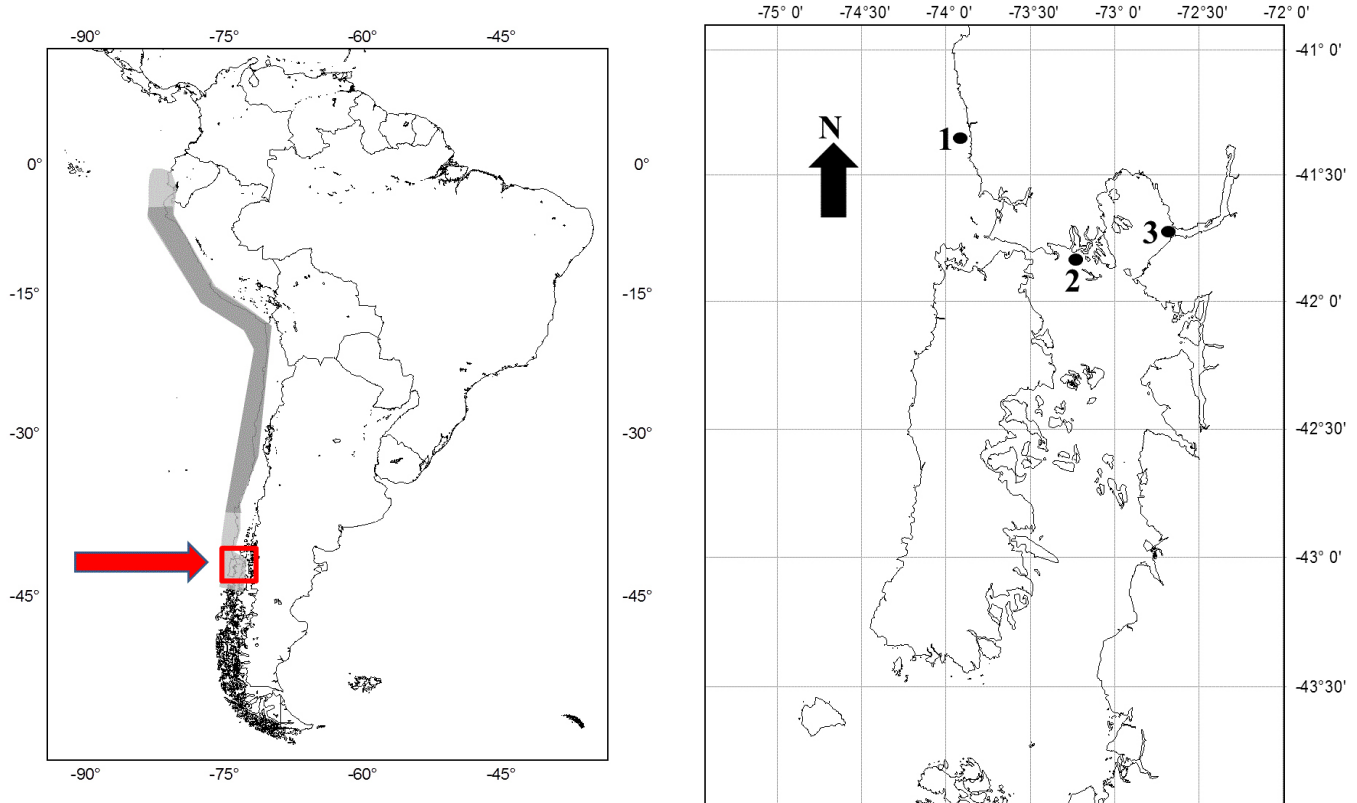
### Kaikué-Lagartija Island

During the breeding seasons when Kaikué-Lagartija Island was visited (2012 to 2015), pelicans were observed in the nesting areas of other seabirds, on beaches and in the sea adjacent to the island (Table 2). The number of pelicans declined as summer progressed; juveniles dominated the population (Table 2).

Pelican abundance on the island and in surrounding areas was greater during the second period, 2014–2015, than during the first period, 2012–2013 (Table 2). During the second period, pelicans used the higher portions of gentle slopes along the southern perimeter of the island; during the first period, when pelicans were less abundant, these areas were used by nesting Imperial Cormorants *Phalacrocorax atriceps*. In November 2014, pelicans settled around the “arrivals” track created by Magellanic Penguins *Spheniscus magellanicus* arriving in the area; no behavioral interactions were observed between pelicans and penguins.

### Caicura Island

During the two breeding seasons when we visited Caicura Island, pelicans were observed in the nesting areas of other seabirds,



**Fig. 1.** Left panel: locations of the seabird colonies studied in the region of Los Lagos, southern Chile — 1: San Pedro Bay Islets; 2: Kaikué-Lagartija Island; and 3: Caicura Island. Right panel, area assessed and distribution of the Peruvian pelican: light gray total range, dark gray breeding range.

on rocks and in the adjacent sea (Table 3). In the first season, 2013–2014, both total-pelican abundance and the proportion of adults observed were higher than in the second season, 2014–2015 (Table 3), and the number of pelicans decreased as summer progressed (Table 3). One Peruvian-pelican egg was found in one of the “departure” areas (41°42′58.08″S, 72°41′16.42″W) in December 2013, deposited directly on the rocky substrate (Fig. 2). During the following visit in January 2014, it was determined that this egg had not hatched, since the area had been taken over by South American sea lions *Otaria flavescens*.

In the second season, we recorded a greater number of juvenile pelicans than in the first (Table 3). Several juveniles were recorded in a colony of Imperial Cormorants (41°42′56.81″S, 72°41′16.24″W); at that time (January 2015) there was only one active cormorant nest (one adult with its chick), which was surrounded by pelicans. The cormorant displayed a defensive behavior toward the invaders (Fig. 3). Although pelicans did not directly attack the cormorant and its chick, other pelicans were observed pecking and feeding on adjacent nests (already emptied); it was not possible to determine exactly what they were eating.

**TABLE 2**  
Number of Peruvian pelicans observed at Kaikué-Lagartija Island, coast of Calbuco, region of Los Lagos, Chile

Date	Adults <sup>a</sup>	Juveniles <sup>a</sup>	Total
13 October 2012			125
12 November 2012			105
27 November 2012			65
16 January 2013			48
27 August 2014			46
30 September 2014			1 010+
28 October 2014			663+
25 November 2014	26	356+	382+
30 December 2014	172	230+	402+
20 January 2015	132	571	703

<sup>a</sup> Distribution of adults and juveniles was not recorded until November 2014.

**TABLE 3**  
Number of Peruvian pelicans (adult and juvenile) observed in the Caicura Island, coast of Puerto Montt, Los Lagos region, Chile

Date	Adults	Juveniles	Total
2 November 2013	213	159	372
15 December 2013	13	20	33
11 January 2014	2	8	10
20 November 2014	15	55	70
23 December 2014	21	80	101
22 January 2015	11	33	44

## DISCUSSION

The presence of Peruvian pelicans among colonies of other seabirds of the Los Lagos region appears to have increased, consisting mostly of juveniles.

With the exception of the one egg (unhatched) recorded in Caicura Island in December 2013, there was no evidence of pelican nesting in the Los Lagos region. The southernmost true-nesting site that had been described for this species is at Mocha Island (38°25′S, 73°55′W), more than 400 km to the north (Fig. 1).

The recording of Imperial Cormorant nesting pairs at Kaikué-Lagartija Island, which were subsequently displaced by pelicans, is the first indication of competitive interactions between pelicans and other seabirds of Patagonia. The pelicans are well known for their aggressive behavior toward other seabird species in the Humboldt Current region, including often usurping nests (Duffy



**Fig. 2.** The Peruvian pelican egg found in Caicura Island, southern Chile, in December 2013.



**Fig. 3.** Behavioral displays of an Imperial Cormorant defending its clutch in the presence of a juvenile Peruvian Pelican (Caicura Island, southern Chile).

1983). Peruvian pelicans rest and/or nest on flat areas in higher grounds of the colonies, as their long wings cannot negotiate a safe landing on cliffs (Duffy 1983). However, the Imperial Cormorant also uses gentle slopes for nesting (Cursach *et al.* 2010); as a result, a greater frequency of competitive interactions for perching and/or nesting space would be expected between these two species in the Los Lagos region. Due to the potential disturbance caused by our presence, our study did not collect data on the effects pelicans might have on the colonies of South American Terns or Magellanic Penguins.

Our observations of Peruvian pelicans preying on cormorant nestlings are not unusual; in general, they are known predators of other seabirds, feeding on eggs, chicks, young, as well as on adults, attacking nearby nesting birds or moving in groups from one colony to another in search of prey (de Ponte Machado 2007, Mwema *et al.* 2010). Such behavior has also been seen among other pelican species. A summary of pelican predation in seabird colonies (de Ponte Machado 2007) indicates that California Brown Pelicans *Pelecanus occidentalis* have been seen preying on herons and Common Murres *Uria aalge*; in southern Africa, Great White Pelicans *Pelecanus onocrotalus* feed on the chicks of boobies, cormorants, gulls and terns; and, in Australia, the Australian Pelican *Pelecanus conspicillatus* has been reported preying on ducks. In Chile, photographic records show young Peruvian pelicans preying on juvenile Peruvian Diving-Petrels *Pelecanoides garnotii* and on Gray Gulls off the coast of the IV Region de Coquimbo (REVAM 2014), as well as attacking and consuming conspecifics in a colony off the central coast (Daigre *et al.* 2012).

Data collected in this study indicate that the range of the Peruvian pelican expanded southward and point to the existence of competitive and trophic interactions with other species. Therefore, efforts should be directed toward maintaining and expanding monitoring activities in the seabird colonies of the Los Lagos region, particularly given that several species are now of conservation concern.

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