

Further Evidence for the Past Residency of Spot-Billed Pelicans (Pelecaniformes: Pelecanus philippensis) in China

Authors: Stidham, Thomas A., and Song, Gang

Source: *Waterbirds*, 44(1) : 104-108

Published By: The Waterbird Society

URL: <https://doi.org/10.1675/063.044.0111>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Further Evidence for the Past Residency of Spot-Billed Pelicans (Pelecaniformes: *Pelecanus philippensis*) in China

THOMAS A. STIDHAM^{1,2,3,*} AND GANGSONG⁴

¹Key Laboratory of Vertebrate Paleontology and Human Origins of the Chinese Academy of Sciences, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, 100044, China

²CAS - Center for Excellence in Life and Paleoenvironment, Beijing, 100044, China

³University of Chinese Academy of Sciences, Beijing, 100049, China

⁴Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing, 100101, China

*Corresponding author; E-mail: presbyornis@gmail.com

Abstract.—The Spot-billed Pelican (*Pelecanus philippensis*) is a threatened species of Pelecanidae that was extirpated during the 20th century across much of its Asian geographic distribution, including in the Philippines and China. The idea that this species did not reside in China is in conflict with published reports from the early 20th century and data from museum specimens. Verification of additional museum specimens as Spot-billed Pelicans includes the first record of the species in Sichuan Province, over 600 km from the nearest coastline, and additional occurrence in November, December, and June within China. These verified specimens document the Spot-billed Pelican in China across eight months of the year (in all seasons), including five of the seven months of the typical breeding season. These data overlap with published reports of residency in coastal areas of China (particularly Fujian Province), and also suggest a wider (interior) past geographic distribution in China, contrasting with ideas that the species was restricted solely to coastal regions. Received 28 May 2020, accepted 24 May 2021.

Key words.— China, distribution, extirpation, near threatened, residency, Spot-Billed Pelican

Waterbirds 44(1): 104-108, 2021

The Spot-billed Pelican (*Pelecanus philippensis*) was once widespread across southeastern Asia, from the Philippines and China in the east to India and Pakistan in the west, but the species experienced a significant decline across that geographic distribution during the late 20th century (BirdLife International 2001). This reduction includes the extinction and extirpation of the population in its type area in the Philippines and elsewhere across southeastern Asia (BirdLife International 2001). The Spot-billed Pelican is categorized as near threatened; it is one of the most vulnerable species among all pelicans (Johnsgard 1993; BirdLife International 2001). While breeding populations are present currently in India, Sri Lanka, Cambodia, and Indonesia (BirdLife International 2001, 2021; Kannan and Pandiyan 2013), the status of this species across its former geographic range is not well known, in particular that of past and present breeding sites outside of India and Sri Lanka. One of the further complications in assessing the past geographic range and decline of the

Spot-billed Pelican is its variable taxonomy over the last 100 years (Johnsgard 1993; Stidham and Song 2020). What we recognize today as the Dalmatian Pelican (*P. crispus*) (sister species to Spot-billed Pelican; Kennedy *et al.* 2013) previously was considered a subspecies of the Spot-billed Pelican. Additionally, the Spot-billed Pelican previously was called *P. roseus*, which is now considered a junior synonym of the Eastern White Pelican (*P. onocrotalus*) (Johnsgard 1993). The confusion over names obfuscates accurate reconstruction of past observations and specimen records from across the region.

The status in China of the past and potential future of this species is impacted by the scarcity of data available. While there are a number of published observational and specimen records from China in the late nineteenth and early twentieth centuries, those data are limited in their temporal and geographic distribution, with most seeming to derive from coastal areas of China (BirdLife International 2001; Stidham and Song 2020). The last records of this species

in China are from the 1960s (BirdLife International 2001; Stidham and Song 2020), and specimen records are rare from the nearly 20 years (from 1930's through most of the first decade of the foundation of the People's Republic of China in the 1950's) prior to its extirpation (BirdLife International 2001; Stidham and Song 2020). Prior to the 1963 record (the last known specimen record in China) and the newly verified record from 1956 in Fujian Province, the most recent verified specimen record from China appears to be from Shanghai in 1931 (specimen number IOZ 21030; Stidham and Song 2020), although unverified specimens reportedly from 1934, 1936, and sometime in the 1960s (Fujian Province) are referred to by BirdLife International (2001). Despite published observational reports of the species being resident and even nesting in China in Yunnan, Fujian, Guangdong, Jiangsu (Shanghai), and Anhui Provinces during the 19th and 20th centuries (Styan 1894; La Touche 1925-1934; Gee *et al.* 1926-1927; Caldwell and Caldwell 1931; Sowerby 1943; BirdLife International 2001), the species is mostly considered today to not have been a resident or breeder in China (e.g., BirdLife International 2001, 2021). Based on those recent opinions, the Spot-billed Pelican is not considered a conservation priority in China. However, recent work to identify museum specimens with known dates and locations appears to at least partially corroborate published visual reports and records of the species in certain areas of China (Stidham and Song 2020), and additional museum data of verified specimens continues to expand knowledge of the species' distribution in time and space within China.

MATERIALS AND METHODS

Specimens of three Spot-billed Pelicans were visually checked to confirm identity by T. A. Stidham at the National Museum of Natural History Ornithology collection in Washington, D.C., USA (USNM). During this time when international travel is severely curtailed, additional collection's managers have graciously provided images or written verification of the species identification of specimens in the Museum of Comparative Zoology at Harvard University in Cambridge, USA (MCZ)

(Jeremiah Tremble, pers. commun.), the Natural History Museum (NHMO) at the University of Oslo, Norway (Lars Erik Johannessen, images and revised sex data), and the collections at Northeastern Forestry University (NEFU) in Harbin, China (images and information are archived in the National Animal Collection Resource Center, Institute of Zoology, Chinese Academy of Sciences). These specimens add to the data provided by previously discussed specimens located in the Institute of Zoology of the Chinese Academy of Sciences, Beijing, China (IOZ; Stidham and Song 2020).

RESULTS

Specimens from multiple museums have collection information (dates and localities) that can be used to examine the past presence of the Spot-billed Pelican in China (Table 1). The three Chinese study skins (USNM 276458, 297646, and 303060; Table 1) in the ornithology collection at the USNM were confirmed visually as being members of the Spot-billed Pelican species because they have the diagnostic spots on the bill that is absent in its sister species (see Stidham and Song 2020). While two of the individuals are from Fuzhou, Fujian Province (where the majority of known specimens in collections were collected), one individual is the first record of the species in Sichuan Province (USNM 297646; Fig. 1). The Fujian Province specimens were collected by A. Sowerby in Fuzhou on 12 September 1923 (male study skin USNM 303060) and 12 June 1922 (female study skin USNM 276458). The sole record from Sichuan Province was collected by D. Graham at Yibin (Suifu) on 16 November 1923 (male study skin USNM 297646), more than 600 km from the nearest coast.

The study skin housed in the collections in Harbin (NEFU D01001_1, National Animal collection Resource Center ID 2123CX001200000507) was collected by W. Lu in a suburban area of Fuzhou, Fujian Province on 3 December 1956, and it is of an unknown sex. It represents the second youngest verified individual known from China and points to the importance of the Fuzhou area to this species.

There are three study skins of the Spot-billed Pelican housed in the MCZ. Specimen MCZ Orn 132451 was collected on 24 Octo-

Table 1. Monthly occurrences of known Spot-Billed Pelican (*Pelecanus philippensis*) specimens in China. Months in bold indicate time of the typical breeding season. Italicized information refers to individuals listed by BirdLife International (2001) that we have not located and confirmed. Institutional abbreviations: IOZ: Institute of Zoology, Chinese Academy of Sciences, Beijing, China; MCZ: Museum of Comparative Zoology, Harvard University, Cambridge, USA; NEFU: Northeastern Forestry University, Harbin, China; NHMO-BI: Natural History Museum of the University of Oslo, Norway; USNM: National Museum of Natural History, Washington, D.C., USA.

Month	Gender	Province	Specimens
January	F	Fujian	MCZ 132234
February	–	–	–
March	F	Shanghai	IOZ 21030
April	–	–	–
May	–	–	–
June	F	Fujian	USNM 276458
July	M, ?	Fujian, Shanghai	NHMO BI-64637, ?
August	?	Fujian, Guangxi	?
September	?, M, F	Fujian, Guangxi	MCZ 132235, USNM 303060, IOZ 44412, ?
October	F, ?	Yunnan, Fujian	MCZ 132451, ?
November	M	Sichuan	USNM 297646
December	?	Fujian	NEFU D01001_1

ber 1920 in Wenlanzhen (Wenlan), Yunnan Province and is from the La Touche collection. This specimen of an immature female is the only known museum record of this species from Yunnan Province (BirdLife International 2001), but it supports historical observations of its occurrence in that province (Gee *et al.* 1926-1927). The other two MCZ specimens are: MCZ Orn 132235 of an unknown sex collected 11 September 1897 in Fuzhou, Fujian Province; and MCZ Orn 132234 a female collected 1 January 1896 in Fuzhou, Fujian Province.

NHMO BI-64637 is the study skin of a male collected sometime in July 1886 in Fu-

zhou, Fujian Province. We have not been able to verify or obtain information on the specimen reportedly housed in Wuhan, China (Birdlife International 2001).

Together, the specimens from the IOZ, MCZ, NEFU, NHMO, and USNM constitute 10 individuals with collection dates and localities (Stidham and Song 2020). These are not the only specimens of this pelican species in museum collections, but many specimens lack or have problematic collection dates and locality data (e.g., Stidham and Song 2020). Those include the Spot-billed Pelican taxidermy mount on display at the Shanghai Museum of Natural History (T.A. Stidham, pers. obs.) and the additional IOZ specimens of the Spot-billed Pelican from Fuzhou which lack a collection date within 1897 (IOZ 21032 and 21033, Stidham and Song 2020). Sadly, those specimens cannot greatly aid the larger discussion about the historical biology and status of the species in China.

DISCUSSION

While there are a relatively small number of Spot-billed Pelican specimens from China in museum collections, these specimens provide valuable data reflecting their past in China. The current opinion appears to be that Spot-billed Pelicans were not resi-



Figure 1. Map of mainland China provinces highlighting the locations of Spot-Billed Pelican (*Pelecanus philippensis*) specimen collection sites.

dent or nesters in China (in contradiction of some published reports of their time; e.g., Sowerby 1943), and that their records in China were merely the result of non-native vagrant, non-breeding visitors, or a summering population (BirdLife International 2001). However, taken as a group, there appear to be specimens in public institutions collected from across eight months of a calendar year, with the bulk of those specimens from Fuzhou or its neighbor, Meihua (Table 1; Stidham and Song 2020), and those specimens derive from five of the seven-month-long period of the typical breeding season between April and October (Table 1; Johnsgard 1993). While that temporal distribution is not definitive proof of breeding or residency, the occurrence of the species through most of the calendar year, including the breeding season, is consistent with previous reports of their residency in China.

The large proportion of specimens from a nearly 50-year time span (1886-1923) in the Fuzhou area also seem to indicate a sustained population over time (Table 1). The NEFU specimen collected in 1956 extends that history to near its final records in China. However, it is a bit unusual that the majority of these specimens are females as compared to three known males (with collection dates and localities; Table 1). We do not know what might have driven this sex bias in the collections. However, with females present in China during the breeding season, it is possible that nesting occurred or was attempted.

The specimen from Sichuan Province appears to be a unique record and outside of its reported historic geographic distribution (BirdLife International 2001). However, its occurrence over 600 km from the coastline is similar to the habitation by Spot-billed Pelicans of more interior parts of southern Asia, such as Pakistan (BirdLife International 2001). This record may help to support the hypothesis of Stidham and Song (2020) that published observational records of the Spot-billed Pelican in China might have been biased towards coastal areas visited more frequently by foreign researchers in the late 19th and early 20th centuries. Therefore, the observational records might not reflect

the entire past geographic distribution of this species in China.

With this assemblage of ten verified specimens from China, other research directions are possible with the potential study of population genetics and stable isotopes derived from the specimens representing an extinct population. If this species was a resident and nester in China, it is likely that a population genetic signal, as well as an isotopic signal in its feathers (available on various specimens from throughout a calendar year) could be detected to help support the hypothesis of past residency in China. As pointed out by Stidham and Song (2020), the support for wetland conservation and protection has improved greatly in recent years in China and elsewhere, and an attempt at reintroduction of the Spot-billed Pelican into this non-migratory species' formerly wide geographic range could be made (particularly near Fujian), helping to insulate the species from future declines.

ACKNOWLEDGMENTS

We thank Chris Milensky and Helen James (USNM) for their valuable assistance with access to the USNM material and information discussed in this manuscript. Jeremiah Tremble graciously checked the relevant pelican specimens in the MCZ. We thank Peng He and Dali Li in the National Animal Collection Resource Center, Institute of Zoology, Chinese Academy of Sciences for facilitating access to check the species via the database. Lars Erik Johannessen provided valuable images and revised data about the specimen in the NHMO. We also thank the editor and anonymous reviewers for helpful suggestions on an earlier draft. TAS and GS are funded by the National Natural Sciences Foundation of China (NSFC 41772013, 31572291).

LITERATURE CITED

- BirdLife International. 2001. Threatened birds of Asia: The BirdLife International Red Data Book. BirdLife International, Cambridge, England, U.K.
- BirdLife International. 2021. Species factsheet: *Pelecanus philippensis*. BirdLife International, Cambridge, England, U.K. <http://www.birdlife.org>, accessed 18 January 2021.
- Caldwell, H. R. and J. C. Caldwell. 1931. South China Birds. Hester May Vanderburgh, Shanghai, China.
- Gee, D., L. I. Moffett and G. D. Wilder. 1926-1927. A tentative list of Chinese birds. Peking Society of Natural History Bulletin 1: 1-370.

- Johnsgard, P. A. 1993. Cormorants, Darters, and Pelicans of the World. Smithsonian Institution Press, Washington, D.C., USA.
- Kannan, V. and J. Pandiyan. 2013. A review of the Spot-billed pelican *Pelecanus philippensis* literature. *Frontiers in Biology* 8: 333-352.
- Kennedy, M., S. A. Taylor, P. Nádvorník and H. G. Spencer. 2013. The phylogenetic relationships of the extant pelicans inferred from DNA sequence data. *Molecular Phylogenetics and Evolution* 66: 215-222.
- La Touche, J. D. D. 1925-1934. A Handbook of the Birds of Eastern China, 1 and 2. Taylor and Francis, London, England, U.K.
- Sowerby, A. de C. 1943. Birds recorded from or known to occur in the Shanghai area. *Notes d'Ornithologie Musee Heude* 1: 1-207.
- Stidham, T. A. and G. Song. 2020. The biology and past distribution of the near-threatened Spot-billed Pelican (*Pelecanus philippensis*) based on verified historical specimens in China. *Waterbirds* 42: 446-450.
- Styan, F. W. 1894. Notes on the ornithology of China. *Ibis* 6: 329-337.