



Herons of French Polynesia. Threats, status and conservation

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Abstract

In French Polynesia, only three Ardeidae are present: Cattle Egret (*Bubulcus ibis*), Tahiti Striated Heron (*Butorides striata patruelis*) and Eastern Reef-Heron (*Egretta sacra*), and the last two breed there. The Eastern Reef-Heron is widespread in the Pacific range and its conservation status is least concern. However, the status of the Tahiti Striated Heron is critically endangered on the International Union for the Conservation of Nature Red List. In 2009, only 70 birds were estimated living in Tahiti and thus the entire French Polynesia. Threats are mainly due to the restricted distribution of breeding habitat and habitat destruction. The Tahiti Striated Heron needs coastal and riverine *Hibiscus* forests for foraging and nesting. However, such coastal forests are being destroyed and the heron was found on only 7% of the linear coast. We discuss possible conservation plans for this critically endangered bird including translocation on another island of the Society Archipelago.

Key words: *Butorides striata*; Conservation; *Egretta sacra*; habitat loss; *Hibiscus tiliaceus*; Tahiti; translocation.

Introduction

French Polynesia is a vast territory of 5.5 million km² of maritime domain (exclusive economic zone, EEZ) with five archipelagos (Society, Marquesas, Tuamotu, Gambier and Austral; see Fig. 1) totaling 118 islands. This group of islands is much dispersed and one of the most remote from any continent. Consequently, the terrestrial avi-

fauna is relatively small with few species. Twelve orders, 20 families and 48 species including 13 aliens (30 endemics and 5 natives) are present and breed in this vast area. The Eastern Reef-Heron (also called Pacific Reef-egret) and the Green-backed Heron (*Butorides striata*; also called Striated Heron) are the only breeding herons in French Polynesia. The cattle egret was recorded once in the Marquesas as a visitor

(Thibault and Guyot 1998, Thibault and Cibois 2017). The status of both resident species is listed as Least Concern by the International Union for the Conservation of Nature (IUCN) on their red

list of threatened species (BirdLife International 2016a, 2016b). However, the widely distributed Striated Heron is divided into 25 subspecies (Thibault and Cibois 2017), some of which are

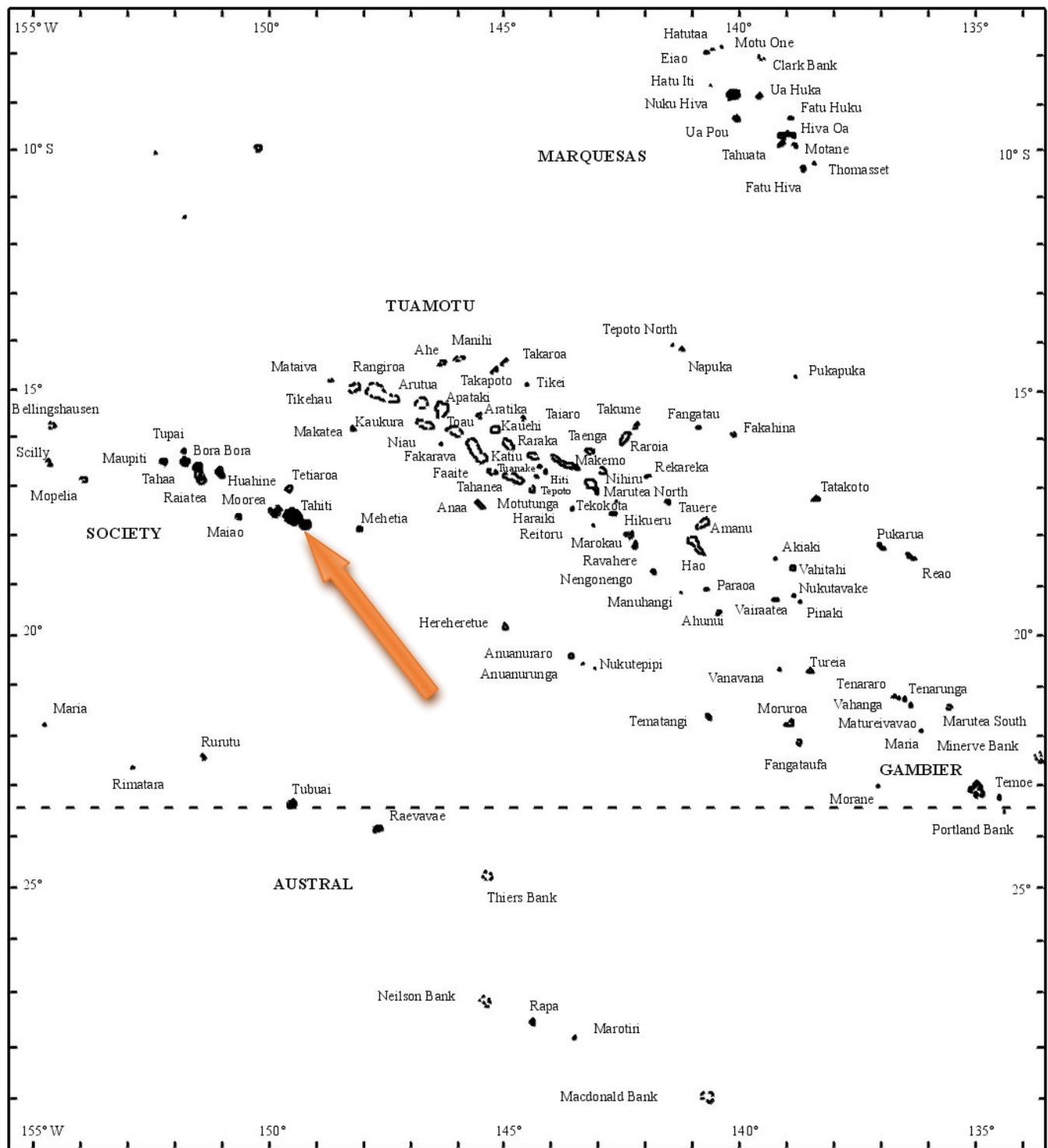


Figure 1. French Polynesia where Tahiti (red arrow) is the sole range of the Tahiti Striated Heron (*Butorides striata patruelis*). One degree represents approximately 111 km.

threatened and in decline. This is the case of the Tahiti Striated Heron. This endemic subspecies breeds solely on Tahiti with a small population dispersed along the coast (del Hoyo and Collar 2014, Thibault and Cibois 2017). In this paper, we describe the two herons' range, threats and next conservation needs, especially for the Tahiti Striated Heron which is critically endangered on the IUCN red list (IUCN France *et al.* 2015).

Eastern Reef-Heron

Distribution

In French Polynesia, the Eastern Reef-Heron (Fig. 2) is widespread and present in all the five archipelagos with white (81% of the morphs) and grey (mainly on the volcanic islands of the Society archipelago) morphs (see Thibault and Cibois 2017 for details).

Status and Conservation

To our knowledge, the Eastern Reef-Heron is not sufficiently different from other world populations to be split into subspecies (Itoh 1991, Thibault and Cibois 2017). The population is widespread with an imprecise estimate of bird numbers in French Polynesia, which constitutes an important area for the species in terms of range and numbers (3,900-7,100 birds) (Thibault and Cibois 2017). Some threats, such as habitat reduction, predation of chicks by Australian or Swamp Harrier (*Circus approximans*) and mortality by pollution, seem to occur but have not been documented (T. Ghestemme, pers. obs.). The species is of Least Concern for conservation. There is no specific protection or conservation action for this bird within the territory. However, we hypothesize that the species could suffer habitat loss from coastal urban development.



Figure 2. Eastern Reef-Heron (*Egretta sacra*), white morph, on the island of Niau, Tuamotu. © D. Lacoste

Tahiti Striated heron

Distribution

The only Striated Heron population present in French Polynesia is the Tahiti Striated Heron (Fig. 3). Sub-fossil bones belonging to that species were retrieved from archeological excavations on Huahine in the Leeward Islands (Steadman and Pahlavan 1992), demonstrating a possible wider range in prehistoric times. The current closest population is the Fijian (3,400 km), which is genetically and morphologically distinct as subspecies (Thibault and Cibois 2017). Thus, the subspecies *patruelis* is endemic to Tahiti, the largest and most populated island of French Polynesia; however, two sightings of probable vagrant birds from Tahiti have been reported on the island of Moorea in the last ten years (J. del Hoyo, pers. comm.).

In 2009, a survey censused the bird's territories around the entire perimeter of the island and along selected rivers (Demay 2009; Ghestemme *et al.* 2009). The birds were located all around the island in the remaining favorable habitats (Fig. 4). Such favorable habitats are forest dominated by *Hibiscus tiliaceus* (Malvales: Malvaceae). There is no mangrove in French Polynesia and *Rhizophora* sp. is introduced and invasive. *H. tiliaceus* is a tree forming dense interlacing of branches above the water (coast and riverbanks). This branching allows the birds to nest and forage directly above the surface. Most of the nests of this solitary nester are built in *Hibiscus* overhanging the water (other trees that are used for nesting are *Casuarina equisetifolia*, *Syzygium cumini* and *Inga edulis*) (Monnet and Varney 1998). At least 20 km of coast were identified as important habitat for the species with *Hibiscus* cover (Ghestemme *et al.* 2009).



Figure 3. A subadult Tahiti Striated Heron (*Butorides striata patruelis*) perched on a *Hibiscus* tree. The subspecies plumage is distinct from other striated herons with irregular white dots, Tahiti Island, 2017. © M. Pirard

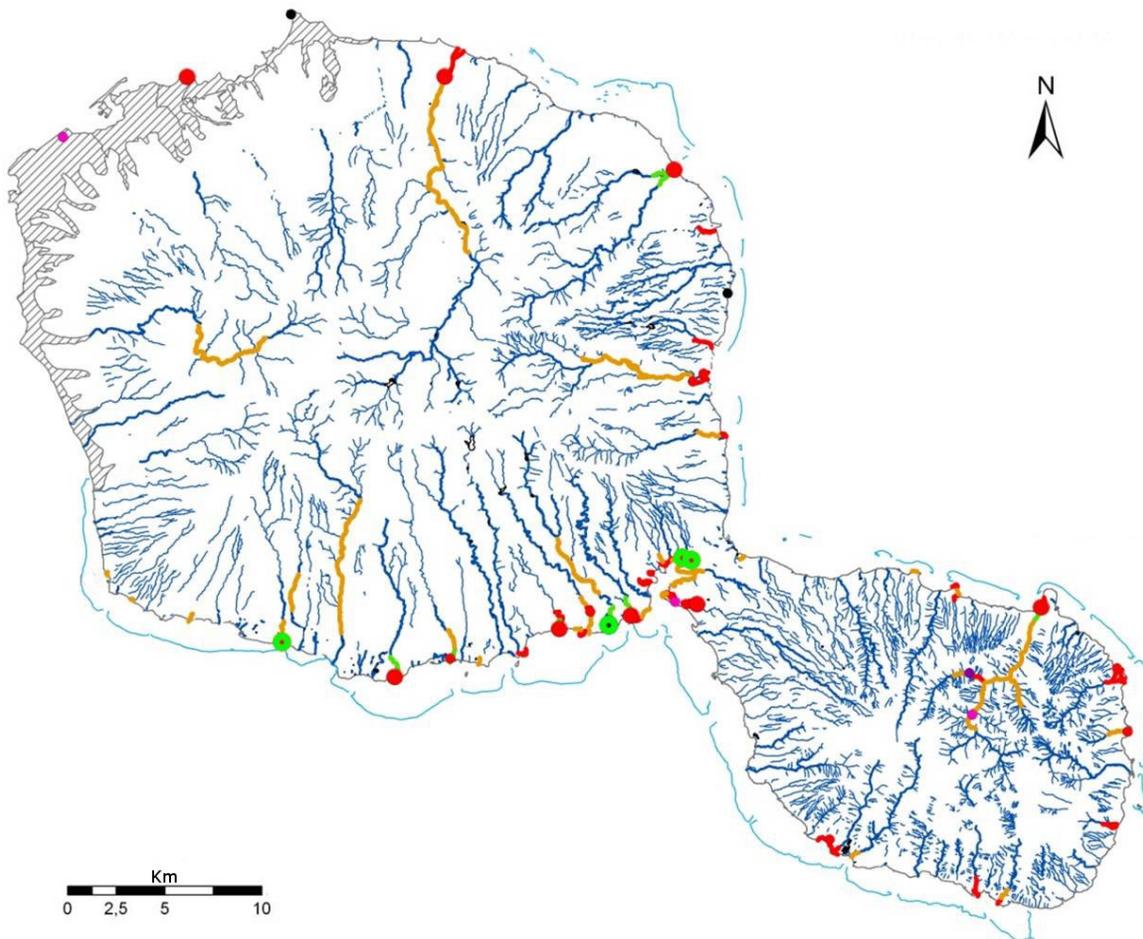


Figure 4. Results of surveys for Tahiti Green-backed Herons in 2009. Rivers that were searched are in orange. Small red dots represent a single adult and large red dots represent pairs. Large green dots with a red dot inside represent pairs with young and those with a black dot inside represent pairs with a subadult. Undetermined, young and subadults are black, violet/pink dots. Urbanised area in striated grey was not surveyed during the study but holds pairs (from J. Demay and T. Ghestemme in Ghestemme *et al.* 2009).

Status and Threats

This heron was described as common and widespread by Wilson (1907) and Quayle (1920-1923), (cited in Holyoak and Thibault 1984). Currently, the population of the Tahiti Striated Heron is small and dispersed; habitat destruction due to urbanization of coast and riverbanks is a major threat. However, some pairs are surviving and breeding in highly degraded habitat in the urban zone of Papeete and surrounding towns (Fig. 5).

The bird is locally protected (listed “category A” by the government) and is critically endangered by the national representative of the International

Union for Conservation of Nature (IUCN *et al.* 2015). The national criterion is C2a (ii) (i.e. population (<250 mature birds) with continued decrease and 90% of the mature birds are in one single sub-population). The most recent survey from 2009 estimated a population of 70 birds (Ghestemme *et al.* 2009). According to IUCN criteria D for a small population, the birds are below the <50 pairs of mature heron threshold. Currently, we can assume that the population is still below the 50 mature pairs since littoral urbanization has continued since 2009 (habitat is probably the limiting factor for a positive population growth rate). The subspecies was described



Figure 5. Observations of Tahiti Striated Heron (yellow pins) in Papeete, Tahiti, during 2003-2017.

as also having a low reproductive success of 20.8% (Monnet and Varney 1998) but a survey of seven monitored nests in 2009-2010 showed 100% nesting success (T. Ghestemme unpub. data). Consequently, the Tahiti Striated Heron is most likely critically endangered now. A new census is required to ensure the status and to assess the population trend (planned in 2017-2018).

Most of the island birds are victims of alien species (Reaser *et al.* 2007). In Tahiti, alien predators of birds include rats, cats, dogs and swamp harriers but, with the exception of dogs and possibly harriers for chicks, this does not apply to herons. The main threat to herons is habitat loss. Tahiti is the largest island of French Polynesia (1,045 km²) and most populated (178,133 in 2007; 283,764 in 2015). Coastal ecosystems were degraded, like most of the coasts of the world (Lotze *et al.* 2006) and only 7% of remaining *Hibiscus* forests were found suitable for the striated

heron in Tahiti (Demay 2009). Furthermore, climate change with subsequent sea level rising affect the coasts and their coastal vegetation.

Three young were ringed but have not been seen since. Our hypothesis is that most of the young fail to find new territories because of the lack of suitable habitat. We should note that herons are often not observed in apparently suitable habitats and thus other failure factors for colonization have to be identified (e.g. disturbance by humans, prey depletion, pollution, fish depletion).

Conservation

To improve the status of the Tahiti Striated Heron, the main objective is to protect and increase the available habitat. Landowner awareness is a target in order to avoid additional *Hibiscus* destruction and land transformation. Where it is possible, habitat should be restored or transformed as *Hibiscus* forest.

Translocation is also being considered. In 2009, Raiatea Island, (not historically inhabited by the heron, but with low urbanisation) with at least 22 km of suitable coast, was selected as a possible translocation site (Ghestemme *et al.* 2009). With the highest heron density found at Tahiti, 2.73 birds/km or 41 on 15 km, we might expect a population of 60 herons on Raiatea (Ghestemme *et al.* 2009). Other limiting factors have to be investigated, as well as support from communities and authorities.

Conclusion

In French Polynesia with only two breeding Ardeidae, the Pacific Reef-heron is widespread and the population does not seem to require conservation actions. However, the Striated Heron is represented in the eastern Pacific by a subspecies, restricted to Tahiti. This subspecies, the Tahiti Striated Heron, is critically endangered by habitat loss and restriction. Actions are required with a conservation plan. This would probably include habitat preservation on Tahiti and possibly the translocation of young on Raiatea to secure a second population on this suitable island.

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Literature Cited

BirdLife International. 2016a. *Egretta sacra*. in The IUCN Red List of Threatened Species 2016.

[online] dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22696980A93596515.en. Accessed November 2017.

BirdLife International. 2016b. *Butorides striata*. in The IUCN Red List of Threatened Species 2016. [online] dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22728182A94973442.en. Accessed November 2017.

del Hoyo, J. and N. J. Collar. 2014. HBW and BirdLife International illustrated checklist of the birds of the world. vol. 1. Lynx Edicions, Barcelona, Spain.

Demay, J. 2009. Statut démographique et caractérisation de l'habitat de la sous-espèce de Héron strié endémique de Tahiti, 'ao', *Butorides striatus patruelis*. M.S. Thesis, Université Montpellier 2, Montpellier, France.

Ghestemme, T., J. Demay, P. Portier, A. Colonne, L. Yan, T. Autai, J. Durieux, T. Opuu, M. Muraton and A. Gouni. 2009. Recensement et conservation de la population menacée de Héron strié ou 'ao', *Butorides striata*. SOP Manu, Taravao, Tahiti, French Polynesia.

Holyoak, D. T. and J. -C. Thibault. 1984. Contribution à l'étude des oiseaux de Polynésie orientale. Mémoires du Muséum National d'Histoire Naturelle: Zoologie. vol. 127. Editions du Muséum, Paris, France.

Itoh, S. 1991. Geographical variation of the plumage polymorphism in the Eastern Reef Heron (*Egretta Sacra*). Condor 93: 383-389.

Lotze, H. K., H. S. Lenihan, B. J. Bourque, R. H. Bradbury, R. G. Cooke, M. C. Kay, S. M. Kidwell, M. X. Kirby, C. H. Peterson and J. B. C. Jackson. 2006. Depletion, degradation, and recovery potential of estuaries and coastal seas. Science 312: 1806-1809.

Monnet, C. and A. Varney. 1998. Notes on the breeding of Striated Heron *Butorides striatus partruelis* in Tahiti, French Polynesia. *Emu* 98: 132-136.

Reaser, J. K., L. A. Meyerson, Q. Cronk, M. De Poorter, L. G. Eldrege, E. Green, M. Kairo, P. Latasi, R. N. Mack and J. Mauremootoo. 2007. Ecological and socioeconomic impacts of invasive alien species in island ecosystems. *Environmental Conservation* 34: 98-111.

Steadman, D. W. and D. S. Pahlavan. 1992. Extinction and biogeography of birds on Huahine, Society Islands, French Polynesia. *Geoarcheolo-*

gy 7: 449-483.

Thibault, J. -C. and I. Guyot. 1998. Le matuku blanc aux îles Marquises. *Te Manu*, 24, 2.

Thibault, J. -C. and A. Cibois. 2017. Birds of Eastern Polynesia: a biogeographic atlas. Lynx Edicions, Barcelona, Spain.

UICN France, MNHN and SOP Manu. 2015. La Liste rouge des espèces menacées en France - chapitre oiseaux de Polynésie française. [online] uicn.fr/liste-rouge-polynesie-francaise/. Accessed 17 November 2017.