

## Research and management priorities for the Christmas Island frigatebird

Summary of outcomes from workshop, Canberra, 8 March 2018

### In brief

The Christmas Island frigatebird breeds only on Christmas Island and is listed as Endangered under the EPBC Act, and listed globally as Critically Endangered. The species is one of the most threatened species on Parks Australia's estate and is a specially listed priority bird species in the Australian Government's Threatened Species Strategy.

To provide guidance to Parks Australia and other caretakers of this species, this project held a

workshop in March 2018 involving national and international experts to collate information about the threats and population trajectory of the frigatebird and to propose future research and management priorities.

The recommendations of the workshop informed a new conservation advice for the species, and have informed direction for the ongoing management, monitoring and research requirements necessary for its long-term conservation.

### Project aim

To support the conservation and recovery of the Christmas Island frigatebird, the project aimed to:

- draw together knowledge on population trends and their main drivers;
- identify the main current and potential future threats and

how to mitigate or eliminate those threats;

- identify priority monitoring and management actions; and
- support the development of a conservation advice or recovery plan.



*A juvenile Christmas Island frigatebird.*  
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### What happened

A workshop brought together experts from Australia and Indonesia with an interest in and knowledge of the frigatebird. The workshop was held in Canberra on 8 March 2018 and some participants attended remotely (phone or video calls).

The organisations involved in the workshop include:

- Australian Government Department of Agriculture Water and Environment, including:
- Director of National Parks (Parks Australia)
- Charles Darwin University
- The University of Melbourne
- The University of Hamburg
- CSIRO
- Australasian Seabird Group
- Seabirds Indonesia (Burung Laut Indonesia)
- Government of Indonesia



*A Christmas Island frigatebird.*  
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## Actions Identified

Priority actions identified through the workshop include:

### **Species champion**

Parks Australia will coordinate efforts to understand and conserve the frigatebird. This could usefully include developing a program logic for activities relating to the species conservation.

### **Conservation Advice**

DAWE Migratory Species Section is driving development of conservation advices on several Christmas Island taxa including the Christmas Island frigatebird. The advice will include recommendations for future ongoing monitoring of the breeding population on Christmas Island

### **Monitoring**

- i. Establish a group to guide monitoring and provide statistical guidance.
- ii. Determine how many adults and immatures can be “lost” each year under a range of realistic assumptions about life history parameters (Potential Biological Removal analysis).
- iii. To establish and monitor population trends, determine how often and in what detail monitoring data should be collected to indicate trends in either the population or breeding success.
- iv. Test unmanned aerial vehicles (drones) to determine

effectiveness at providing an index of abundance or even a count of nests within the breeding colony, compare the effectiveness with ground-based methods.

- v. Review analysis and reporting of 2003–05 nest count data to establish baseline.
- vi. Determine which life history parameters would yield the greatest value for monitoring effort expended.
- vii. Undertake a one-day survey of the north coast from a boat in late April or May (when males have inflated gular pouches) to determine if a new CIFB colony is establishing there and the approximate scale of the colony.

### **Food availability in non-breeding areas**

Investigate potential for research on diet adequacy of frigatebirds in Jakarta Bay, potentially utilising fishing poles to weigh birds.

### **Feather analysis**

- i. Investigate whether pollutants are impacting birds, particularly the potential for cadmium in drinking water on Christmas Island or high levels of mercury in fish in coastal feeding areas.
- ii. Genetic analysis can inform estimates of total population size through a form of capture mark recapture analysis. Genetic

markers are not yet available for this species, but feather collection, noting time and place, could be established now as a resource for future analysis.

### **Roost sites across South-East Asia**

Inventory the population size, location and condition of roost sites in Indonesia, Thailand, Philippines and Sabah, Malaysia and the key threats they face.

### **Survey of non-breeding sites**

Establish the best time and frequency for surveys in Jakarta Bay ensuring adequate statistical power to detect changes in abundance over time. Investigate funding sources for these surveys.

### **Threats on Christmas Island**

Parks Australia to investigate the occurrence of threats (such as mine site pools, bird strike on overhead wires, disturbance from burning on the golf course and weed invasion), their proximity to the breeding colonies and their impacts (such as broken wings and dead birds) and then assess the impact on the population.

### **New disease**

Development and implement a quarantine policy.

### **Hunting at Jakarta Bay**

Ensure compliance with wildlife protection laws at the main roost sites.

## Threat matrix

Table 1 presents a threat matrix for the species. Threat impacts were assessed using the IUCN Red List measures of threat impact. The priorities emerge from combining threat impact scores with scores for progress in managing the threats.

Climate change, temperature extremes, shifts in food as a result of ocean warming and mine dust were previously suspected to be threats but are now considered of limited or no significant impact.

Since the workshop, this threat list has been further refined during the development of the Conservation Advice and drafting of a species summary for the Action Plan for Australian Birds 2020.



**Table 1:** Threat matrix for the Christmas Island frigatebird. The table includes confidence and consequences results from a complementary workshop facilitated by Sylvana Maas, formerly of the Department of Agriculture, Water and the Environment Migratory Species Section, Biodiversity Conservation Division.

| Threat type  | Confidence                    | Consequences | Timing <sup>1</sup> | Extent <sup>2</sup> | Severity <sup>3</sup>     | Potential threat impact and rank |    |
|--|-------------------------------|--------------|---------------------|---------------------|---------------------------|----------------------------------|----|
| Tourism and recreation areas (clearing of habitat for golf course) | No longer considered a threat |              | Distant future      | 1-50% of range      | Not negligible but <20%   | Low                              | 8  |
| Utility & service lines (bird strike)                              | Likely                        | Minor        | Continuing/ongoing  | <1% of range        | Negligible declines (<1%) | Negligible                       | 15 |
| Hunting (in non-breeding areas)                                    | Almost certain                | Minor        | Continuing/ongoing  | 50-90% of range     | Not negligible but <20%   | Low                              | 2  |
| Unknown fishing (bycatch from recreational fishing)                | Almost certain                | Minor        | Continuing/ongoing  | 50-90% of range     | 20-29%                    | Medium                           | 1  |
| Unintentional effects of small scale fishing (prey depletion)      | Almost certain                | Moderate     | Continuing/ongoing  | 50-90% of range     | Not negligible but <20%   | Low                              | 2  |
| Disturbance: Work & other activities (burning off in golf course)  | Possible                      | Moderate     | Continuing/ongoing  | 1-50% of range      | Not negligible but <20%   | Low                              | 6  |
| Small dams (Drowning & Injury in artificial water sources)         | Almost certain                | Minor        | Continuing/ongoing  | 1-50% of range      | Negligible declines (<1%) | Negligible                       | 11 |
| Weeds (invasive vines - breeding area)                             | Possible                      | Minor        | Continuing/ongoing  | 1-50% of range      | Negligible declines (<1%) | Negligible                       | 11 |
| Weeds (invasive vines - non-breeding roost sites)                  | Almost certain                | Minor        | Continuing/ongoing  | 1-50% of range      | 20-29%                    | Low                              | 4  |
| Yellow crazy ant <i>Anoplolepis gracilipes</i>                     | No longer considered a threat |              | Continuing/ongoing  | <1% of range        | Negligible declines (<1%) | Low                              | 15 |
| Invasive species (unknown disease)                                 | Possible                      | Major        | Near future         | 1-50% of range      | 20-29%                    | Low                              | 5  |
| Seepage from mining (Cadmium)                                      | Unknown                       | Moderate     | Continuing/ongoing  | 1-50% of range      | Negligible declines (<1%) | Negligible                       | 11 |
| Seepage from mining (Mercury)                                      | Unknown                       | Moderate     | Continuing/ongoing  | 1-50% of range      | Negligible declines (<1%) | Negligible                       | 11 |
| Garbage and solid waste (plastics)                                 | Unknown                       | Moderate     | Continuing/ongoing  | 50-90% of range     | Negligible declines (<1%) | Negligible                       | 10 |
| Mine dust  | No longer considered a threat |              | Continuing/ongoing  | 1-50% of range      | Not negligible but <20%   | Low                              | 6  |
| Shift in distribution of food                                      | No longer considered a threat |              | Distant future      | <1% of range        | Negligible declines (<1%) | Negligible                       | 17 |
| Temperature extremes   | No longer considered a threat |              | Distant future      | <1% of range        | Negligible declines (<1%) | Low                              | 17 |
| Storms & flooding  | No longer considered a threat |              | Continuing/ongoing  | >90% of range       | Negligible declines (<1%) | Negligible                       | 9  |

<sup>1</sup>TIMING: Continuing/ongoing (includes former threat no longer causing impact but likely to be occurring had there been no management); near future: any occurrence probable within one generation; distant future: any occurrence likely to be further than one generation into the future (includes former threat no longer causing impact and unlikely to recur).

<sup>2</sup>EXTENT: The percentage of the existing range directly affected by the threat in question, now, in the past or within the next 10 years or three generations, whichever is longer.

<sup>3</sup>SEVERITY: Over the whole existing population, what rate of decline would it cause without management (over 10 years or three generations, whichever is longer).

## Outcomes

The Christmas Island frigatebird has long been identified as a species requiring targeted conservation attention. This workshop has assembled all the people with an interest in the species and knowledge of the threats to discuss research and management needs for the first time.

The most significant achievement of the workshop was reaching agreement on priority issues and actions and identification of relevant organisations to lead those actions subject to resources being available.

It became apparent during discussions that many of the threats previously identified or mooted were probably not particularly severe and any decline in the number of breeding pairs is likely to be gradual. Also encouraging was the range of good ideas on how to tackle research questions that need to be answered if threats are to be managed.

The findings of the workshop have been critical in informing a Conservation Advice for the species. Together with other conservation planning for Christmas Island the Conservation Advice will guide future policy with respect to managing the frigatebird.

The workshop also initiated a number of new management and research collaborations both on Christmas Island and in non-breeding habitat in Indonesia.

## Measuring feeding success in non-breeding habitat in Indonesia

Christmas Island frigatebirds spend the non-breeding period in heavily populated coastal seas in South-East Asia. One concern for population viability is availability of prey during this non-breeding period but there is a general lack of knowledge about this.

In Jakarta Bay, Indonesia, the frigatebirds utilise tall bamboo poles, which are part of fishing gear in the region, for roosting overnight and during the day for roosting and social interaction (particularly among juveniles).

This behaviour offers a unique non-invasive sampling opportunity to investigate prey availability and foraging success by attaching small waterproof weight loggers to the top of fishing poles. Measuring daily weight changes can be used as

an indicator of foraging success in non-breeding habitat.

Although birds do not return to the same pole each time, attaching 10–20 weighing devices on poles would provide a sufficiently large sample size for robust analysis and conclusions. The devices could be deployed continuously over the breeding season or in bursts several times across the breeding season.

This research will provide insight into relative foraging success over a season, and in time, across years and offers the potential for new conservation and population management responses.

This research proposal was put forward in partnership by scientists from Seabirds Indonesia (Burung Laut Indonesia) and CSIRO.



*Workshop participants.*

## Further Information

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