

## THREATS FACING BERMUDA'S BREEDING SEABIRDS: MEASURES TO ASSIST FUTURE BREEDING SUCCESS

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*Abstract.* There are three species of breeding seabirds in Bermuda. All are migrants: the Bermuda Petrel or Cahow (*Pterodroma cahow*); the White-tailed Tropicbird (*Phaethon lepturus catsbyii*); and the Common Tern (*Sterna hirundo*). These seabirds face a number of common threats to their breeding success. The problems include hurricanes and tropical storms, rising sea level, invasive animal species, and loss of habitat. Conservation measures have been implemented in an effort to conserve these species. Artificial nest sites have been created for both the Cahow and White-tailed Tropicbird. A translocation project has been carried out for the Cahow. The Cahow breeding grounds and the most important breeding areas for the White-tailed Tropicbird have been incorporated into a national park and the area has been designated an Important Bird Area.

*Key Words:* Bermuda, Nonsuch Island, *Phaethon lepturus catsbyii*, *Pterodroma cahow*, *Sterna hirundo*, translocation.

### AMENAZAS QUE ENFRENTAN LAS AVES MARINAS DE REPRODUCCIÓN EN BERMUDAS: MEDIDAS PARA AYUDAR AL ÉXITO DE SU CRÍA EN EL FUTURO

*Resumen.* Existen tres especies de aves marinas de reproducción en Bermudas. Todas son migratorias: el Petrel de Bermuda o Cahow (*Pterodroma cahow*); el Rabijunco Menor (*Phaethon lepturus catsbyii*); y el Charrán Común (*Sterna hirundo*). Estas aves marinas enfrentan una serie de amenazas comunes a su éxito de cría. Los problemas incluyen huracanes y tormentas tropicales, aumento del nivel del mar, especies de animales invasivos y pérdida del hábitat. Varias medidas de conservación han sido implementadas aquí en un esfuerzo por conservar estas especies. Zonas de nidos artificiales han sido creadas para el Petrel y el Rabijunco Menor. Un proyecto de translocación se ha llevado a cabo específicamente para el Petrel. Las áreas de reproducción y cría del Petrel y las más importantes zonas de cría del Rabijunco Menor, han sido incorporadas a un parque nacional y la zona ha sido designada como Área Importante para la Conservación de Aves (AICA).

### INTRODUCTION

Only three species of seabird breed on Bermuda. All are migrants and absent at different times of the year. The Bermuda Petrel or Cahow (*Pterodroma cahow*) breeds from late October to mid-June; the White-tailed Tropicbird (*Phaethon lepturus catsbyii*) breeds from March to September; and the Common Tern (*Sterna hirundo*) breeds from April to August.

At least three additional seabird species have been extirpated from Bermuda since the mid-1800s—the Audubon's Shearwater (*Puffinus l'herminieri*) with a last confirmed nesting about 1980, Roseate Tern (*Sterna dougallii*) with a last nesting confirmed in the

1840s, and Least Tern (*Sterna antillarum*) which last nested in the 1970s (Bradlee and Mowbray 1931, Dobson 2002).

### THE BIG THREAT

Since 1990, there have been more than six major floodings of the nesting islands of the Cahow, as a result of hurricane and tropical storm activity. Hurricane Fabian (category three) in 2003 over-washed three of the four breeding islets. Cliff collapse and erosion destroyed nine burrows and damaged the remaining Cahow nesting burrows and scores of tropicbird nest sites. The hurricane also decimated the local population of Common Terns. (Madeiros 2004).

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## THE CAHOW OR BERMUDA PETREL

The Cahow is endemic to Bermuda with 85 established pairs in the 2007-2008 breeding season. When it was re-discovered in 1951, breeding was found to be restricted to four small islands. The species is classified as 'endangered' (IUCN 2007 Red List category) and the total population is estimated at 255 individual birds (Dobson and Madeiros 2008).

### THREATS FACING THE CAHOW

Habitat loss has continued since human settlement in 1609. Bermuda's present population of 65 000 on 57 km<sup>2</sup> is over 1000 per km<sup>2</sup>. The present day breeding grounds are therefore confined to uninhabitable rocky islets. Global warming is probably the reason for the serious natural events affecting the breeding islands. Flooding of nesting burrows has happened many times in the last 25 years. This has often been the result of more frequent and more intense hurricanes which have led to the destruction of nesting burrows.

Perhaps as an evolutionary response to the hurricane season, the Cahows are out at sea at that time. As habitat has become scarcer for both the Cahow and White-tailed Tropicbird, there is competition for nest sites from the aggressive White-tailed Tropicbirds. Tropicbirds can nest in the entrance to Cahow burrows.

In addition, Black Rat (*Rattus rattus*) and Brown Rat (*Rattus norvegicus*) have posed a serious threat to the breeding success of the islands as they are capable of swimming to the small islands from the mainland. In March 2008, four Cahow chicks were eaten by one Black Rat. Cane Toads (*Bufo marinus*) are considered a potential threat to the Cahows as they are capable of occupying burrows.

### CONSERVATION MEASURES

A Cahow recovery program was started in 1961 by Dr. David Wingate (Wingate 1985). The Castle Harbour islands (including Nonsuch Island) are a designated National Park and Nature Reserve. Artificial burrows have been provided on the nesting islands with inspection lids allowing regular monitoring of the birds. A wooden baffle at the entrance of the burrow allows Cahows to enter, but keeps out tropicbirds. The islands are monitored for rats and baited regularly. Toads have been kept off the breeding islands and have been collected and removed from Nonsuch Island.

Since 2004, young Cahows have been translocated to Nonsuch Island in an attempt to create a new breeding colony. There is an active management plan through the Terrestrial Conservation Division (Department of Conservation Services). All three species of breeding seabirds are protected under the Protection of Birds Act 1975. The area was declared an Important Bird Area, part of the global initiative by BirdLife International (Dobson and Madeiros 2006).

### CAHOW TRANSLOCATION PROJECT

Scores of artificial burrows have been constructed on the higher, larger and more suitable Nonsuch Island. Between 2004 and 2008, a total of 100 Cahow chicks have been placed in these artificial burrows before they leave their burrows on the small nesting islets. When the birds finally exit the burrows and eventually depart, it is hoped that Nonsuch Island will be imprinted on the birds, and they will return there to breed. This method has already been used with great success on the similar Gould's Petrel (*Pterodroma leucoptera*) in Australia (Madeiros 2007).

Nocturnal playback calls are being used to lure potential breeding birds to Nonsuch Island. Justification of the project was heralded in February 2008 with much aerial courtship over Nonsuch Island. Between February and April, four translocated chicks returned to burrows on Nonsuch (Madeiros 2008).

As of April 2008, the breeding population has increased to a record high number of 85 established active nest sites (nests where pairs of Cahows and nesting activity, such as nest-building or egg-laying has been recorded). This represents an almost five-fold increase from the 18 nesting pairs that comprised the entire breeding population in 1960 (see Fig. 1).

## THE WHITE-TAILED TROPICBIRD

The breeding White-tailed Tropicbirds in Bermuda form the most northerly nesting colony of tropicbirds in the world. There is estimated to be a total population of about 2000 breeding pairs – down 50% since the 1960s. The largest remaining population is on the Castle Harbour Islands Nature Reserve, with approximately 700 nesting pairs (Dobson and Madeiros 2006).

### THREATS FACING THE WHITE-TAILED TROPICBIRD

The tropicbird also faces a continuing threat from habitat loss, especially the urbanization of coastal areas. Global warming and the associated rising sea-level have led to regular flooding

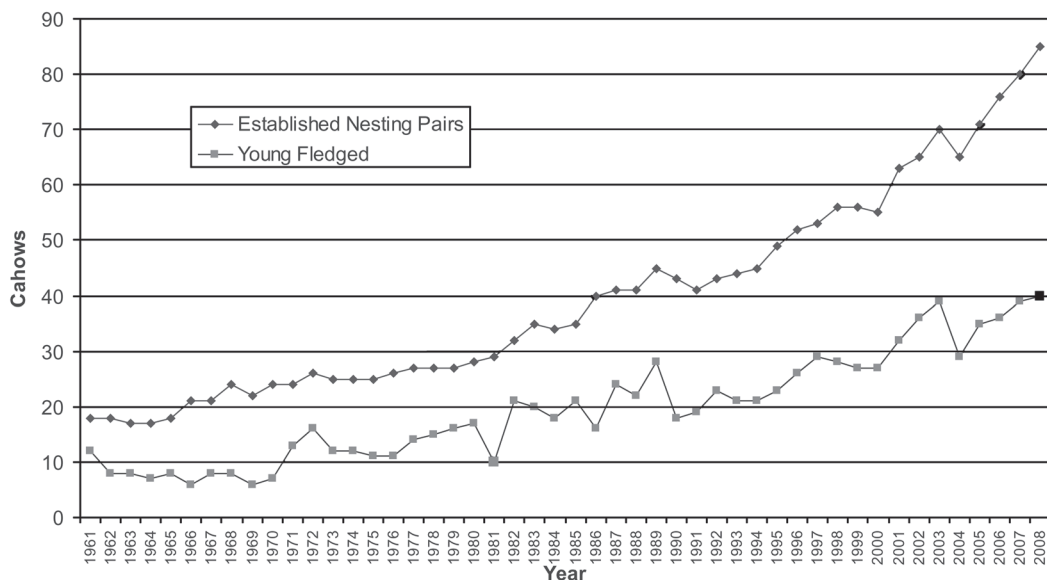


FIGURE 1. Number of established active Cahow nest sites and number of fledged young in Bermuda. Adapted from (Madeiros 2007).

of nesting burrows. There also is an increasing frequency of hurricanes destroying nesting burrows. Up to 75% of nest sites were destroyed on some Castle Harbour islands by Hurricane Fabian in 2003. Competition for nest sites from feral Rock Pigeons (*Columba livia*) is compounded by the pigeons' year-long presence.

#### CONSERVATION MEASURES

With the largest concentration of Bermuda's tropicbirds being centered on the Castle Harbour islands, the species also benefits from the area's designation as a National Park and Nature Reserve. A conservation program involving the production and installation of hundreds of artificial 'igloos' has been spearheaded by the Bermuda Audubon Society. The Terrestrial Conservation Division (Department of Conservation Services) has assisted with this and the removal of mammal predators and culling of feral pigeons.

#### THE COMMON TERN

The number of breeding pairs reached 31 in the 1980s, but Hurricane Fabian in 2003 decimated the small breeding population. In 2004, eight pairs had no breeding success. By 2007, there had been a slight improvement with four of eight pairs raising 11 chicks in total.

#### THREATS FACING THE COMMON TERN

Similar threats face the Common Tern, especially habitat loss and global warming and the associated rising sea-level flooding nesting islets. Predation by rats is always a potential threat. With so few breeding pairs, human disturbance, especially by boating traffic is a concern.

#### CONSERVATION MEASURES

The breeding islets are protected as nature reserves. Any invasive plants are removed from nesting islets to maintain an ideal nesting environment. During the breeding season there is close monitoring of all nesting colonies including the banding of chicks. Further research is required to determine if the tern is an endemic subspecies which might afford further protection (Wingate 2007).

It is hoped that the conservation measures used to assist Bermuda's seabirds may be of value in other countries.

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