Avifaunal and Feral Mammal Survey of Diego Garcia, Chagos Archipelago, British Indian Ocean Territory

Prepared by Phillip L. Bruner
Assistant Professor of Biology

Environmental Consultant
Faunal (Bird and Mammal) Surveys

Director, Museum of Natural History
Brigham Young University-Hawaii

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1. INTRODUCTION

The purpose of this report is to summarize the findings of two avifaunal and feral mammal field reconnaissance surveys conducted at Diego Garcia, Chagos Archipelago, British Indian Ocean Territory from 7-24 March and 25 July through 1 August 1995. The primary focus was on portions of the atoll occupied by the U. S. Navy Support Facility on the east and south portions of the atoll. Lands restricted and outside of the boundary of the Naval Support Facility on the eastern side of the atoll were also investigated for comparative purposes. West, Middle, and East Islets at the northern end of the atoll (also restricted areas) were briefly surveyed on July 29, 1995. The goals of the field reconnaissance surveys were to:

1. Determine what birds occur on the atoll and obtain relative abundance estimates of each species.

2. Record all mammal species on the island.

3. Note natural resources important to birds and mammals.

2. METHODS AND SITE DESCRIPTION

2.1 Methods

A review of the most current pertinent literature (Bourne 1971, PACNAVFACENGCOM 1973, Hutson 1975) was undertaken in order to determine the nature and extent of the previous data base on birds and mammals of Diego Garcia.

The 1995 field work was conducted on two separate surveys of eight field days each. These two investigations were designed to update earlier data bases and to provide current information on relative abundance and other life history findings. In addition, the two surveys provided an examination of the occurrence and abundance patterns of migrants as well as reproductive activity of resident birds.

An extensive road system on the U.S. Navy Support Facility provides ready access to all the habitat types that occur on the atoll. Walking trails from the roads to the outer beach or to the lagoon exist throughout the property. Count (census) stations were established at various locations along these roads and trails (Figure 1). Each station was visited at least every other day. A census was conducted as frequently as twice a day at some stations located at wetlands and other areas where a variety of birds were concentrated. The census at areas affected by tidal changes (lagoon sand flats and barrier reefs on the parameter of the atoll) was conducted during tidal conditions that allowed birds to utilize these sites for foraging or resting.

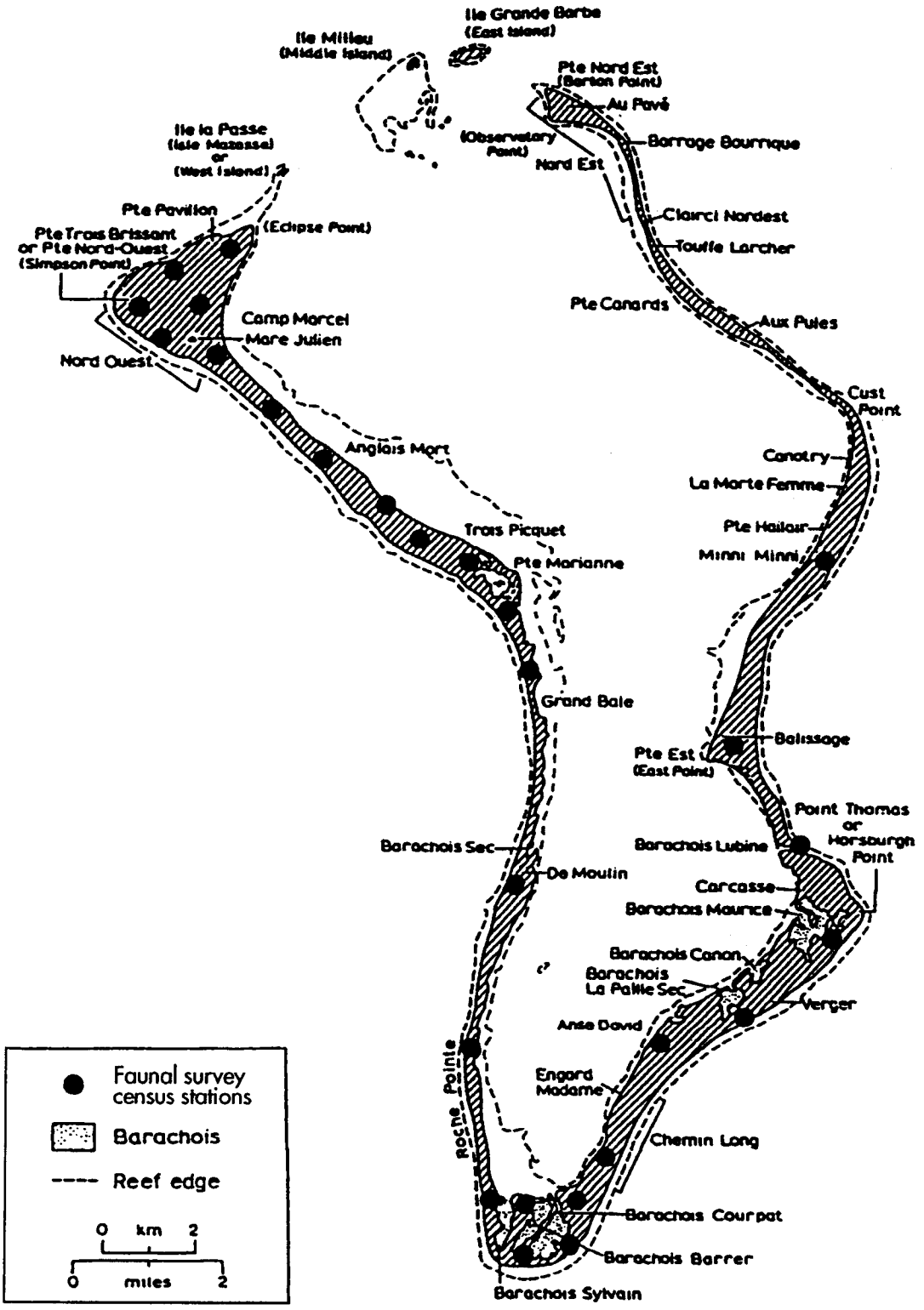

Figure C-1
FAUNAL SURVEY CENSUS STATIONS

Diego Garcia
Natural Resource Management Plan
Prepared by Belt Collins Hawaii, April 1997

All species of birds and mammals seen or heard during a ten-minute period at these count stations were noted and a tally of the number of each species was recorded. Notes on life history information and behavior were also kept. In addition, five driving/walking surveys of portions of the restricted area on the east side of the atoll were conducted in order to obtain a more complete understanding of the abundance and occurrence of birds and mammals on Diego Garcia. A few census stations were also monitored in this sector of the island. Observations of uncommon species or behavior were recorded whenever they were encountered—not only on census stations. One visit was made to the three small islets (West, Middle, and East Island) at the entrance to the lagoon. Observations were made from a boat; no landings were attempted. Numbers, species, and activity of birds were noted.

Relative abundance data (an estimate of the general frequency of occurrence) were calculated by averaging the results of count station data. Rare or uncommon species recorded at times and localities other than on the count stations were also included in estimating abundance. Because count stations and incidental observations occurred in different habitats, data were also obtained on distribution and resource utilization. Interspecific interactions were noted and provided some data on resource partitioning.

Mammal observations were limited to visual sightings, trails, and scat. No trapping of mammals to determine their abundance and distribution patterns was attempted. Data on mammals were obtained by incidental observations or numbers recorded at count stations.

Scientific and common names used in this report follow those given in Penny 1974, Harrison 1983, Hayman et al. 1986, Hails and Jarvis 1987, and Honacki et al. 1982.

Finally, British Representative, Commander Royal Navy, N.J.P. Wraith contributed additional current observations on birds and mammals of Diego Garcia. His assistance in the field during the first survey and between March and July also aided the data collection given in this report.

2.2 General Site Description

Diego Garcia is a "V" shaped atoll 21 km in length and 11 km wide. Figure 1 shows the area occupied by the U.S. Navy Support Facility on the west and south sides, and the restricted area on the east side. A road runs from one end of the atoll to the other, but is poorly maintained north of Minni Minni on the east side. At a low tide, large sand flats are exposed at the southern end of the atoll and at a few locations along the lagoon's east facing shoreline. Beaches along the outer perimeter of the atoll are fronted by a reef flat that is uncovered at a low tide.

Wetland habitats located within the interior of the land mass include: ephemeral ponds that collect rain water in low-lying areas, drainage ditches and ponds with limited emergent vegetation, as well as ponds with extensive vegetation cover. Open habitats with

grass and low vegetation occur at communication, air operation, and cantonment facilities. Densely vegetated habitat covers large areas of the northwest and east sides, as well as patches along the western and southern sectors of the atoll. A forested habitat includes abandoned coconut plantations, thick brush, and some patches of large broadleaf trees. Urban areas—lawns and scattered trees—provide additional wildlife habitat.

During the two surveys weather was warm and clear with little or no rain. The July visit had strong easterly winds. Wetlands during the March survey contained more water than during the July phase of the faunal investigation. In fact, some wetlands were completely dry in July.

3. RESULTS

Four general types of birds occur on Diego Garcia: Seabirds, Migrants and Vagrants, Resident Waterbirds, and Introduced (exotic) birds. This section of the report will present information on occurrence, relative abundance and life history observations. Tables 1, 2, and 3 summarize occurrence and relative abundance data. Separate species accounts for birds found on the 1995 surveys are presented within each of the four groups. Notes on mammal observations are given at the end of the Report Section.

3.1 SEABIRDS

A total of 37 species of seabirds has been recorded on or near Diego Garcia. Table 1 gives a complete listing and indicates that sixteen of these species were found on these 1995 surveys. Three previously unreported species of seabirds were also observed during the 1995 surveys (Table 1).

Species Accounts:

- Audubon's Shearwater (*Puffinus lherminieri*)

Hutson (1975) reports hearing shearwaters (perhaps Audubon's Shearwater) calling at night at several localities (Point Marianne, De Moulin, Roche Point). Up to eight Audubon's Shearwaters were seen flying from West Island on 17 and 18 March 1995. No other observations of this species were obtained. A night search of the Point Marianne areas where Hutson (1975) reported seeing and hearing shearwaters did not find the bird. Hutson (1975) notes that shearwaters were using trees rather than nesting on the ground. This is not typical behavior for shearwaters.

Audubon's Shearwater occurs in all the tropical oceans. Nesting records reveal a year-round breeding cycle. Predator pressure from cats and rats probably limits reproduction at Diego Garcia to offshore predator-free islets.

- White-tailed Tropicbird (*Phaethon lepturus*)

This species has occurred in small numbers during previous surveys (Bourne 1971, Hutson 1975). A pair was seen at the south end of the atoll on four separate occasions over the course of the two 1995 surveys. A third bird was seen once in the northwest sector of the island. No evidence of nesting was recorded. This species has a worldwide distribution in tropical oceans. Nesting can occur year-round (Harrison 1983).

- Red-footed Booby (*Sula sula*)

Both Bourne (1971) and Hutson (1975) mention Red-footed Booby nesting at Diego Garcia. Hutson (1975) reported relatively few (100) birds, all confined to the offshore islet of Ile Grand Barbe. The 1995 surveys found Red-footed Boobies to be the most abundant seabird on Diego Garcia. During the March 1995 survey 600+ birds were seen flying offshore and beginning to gather nest materials. Breeding activity was confined to the three small islets at the lagoon mouth and the area around Barton Point on the east side of the atoll. In July the nesting season was well underway with birds on eggs or with young downy chicks. A one day (29 July 1995) survey of the three islets (West, Middle and East) tallied 5,110 adult Red-footed Boobies. A shoreline count of Barton Point added another 1,800 to the total. These estimates of the Red-footed Booby population are probably on the low side since only those birds seen while circling the islets by boat were counted. Boobies nesting on the interior were not counted.

This species is a common seabird in all the tropical oceans. The many polymorphic color phases of the Red-footed Booby freely interbreed (Harrison 1983). The white morph predominates at Diego Garcia. Only two white-tailed brown morph birds were seen.

- Brown Booby (*Sula leucogaster*)

Bourne (1971) reports this species has been recorded during November and December and was perhaps breeding in the months of December through March. Hutson (1975) does not report this species. No Brown Boobies were recorded on the March 1995 survey. Fifty Brown Boobies were observed on East Island on 29 July 1995. They were seen resting on the ground and in low bushes. There was no evidence of breeding activity.

Brown Boobies are pantropical in their distribution. Nesting records for this species cover most of the year (Harrison 1983).

- Great Frigatebird (*Fregata minor*)

Bourne (1971) and Hutson (1975) give little information on this species. Their reports would indicate that Great Frigatebirds were relatively uncommon on Diego Garcia. Both of the 1995 surveys found Great Frigatebirds. They were seen soaring over the lagoon and

offshore along both the west and east sides of the island. During the July 29, 1995-survey, thirty-eight adult Great Frigatebirds were tallied at East Island. No nesting was observed. Twenty-three juvenile frigates were also seen on East Island. These birds could have been either Great or Lesser Frigates. Juveniles of these two species are difficult to distinguish. Great Frigatebirds occur in the Indo-Pacific and overlap in their distribution with three other species of frigates. They typically nest and roost in colonies of other seabirds where they often are parasitic on boobies, tropicbirds and terns (Harrison 1983).

- Lesser Frigatebird (*Fregata ariel*)

Bourne (1971) and Hutson (1975) note this species as the most abundant of the two frigatebirds seen on Diego Garcia. No Lesser Frigatebirds were observed on the March 1995 survey while sixty adults were tallied on East Island on the July 1995 visit. Undoubtedly more Lesser Frigates were among the 23 juveniles seen on East Island. This species is probably more common than Great Frigatebirds on Diego Garcia.

- Black-naped Tern (*Sterna sumatrana*)

This species was reported as uncommon on Diego Garcia by Hutson (1975). A few pairs were observed nesting during the month of May (Hutson 1975). An average of eight birds was seen at appropriate count stations during the March 1995 survey. Only seven Black-naped Terns were tallied on the July 1995 survey. These seven were seen together on only one day. The habitats utilized by Blacknaped Terns on Diego Garcia were exposed tidal flats in the lagoon, ponds adjoining the airstrip and near building 357. No Black-naped Terns were recorded on the outer reef flats or offshore. This species seems to prefer calmer waters of the lagoon and wetland ponds. No evidence of breeding was noted on either 1995 survey. This species was frequently seen resting with flocks of Little Tern (*Sterna albifrons*). The shallow and ephemeral gravel pit ponds located at the site where coral was being scrapped and piled near the airstrip and the USAF facilities was frequently used by terns and migratory shorebirds during a high tide. Birds would aggregate around the shallow rain-fed ponds and would rest and preen until tidal change exposed sand flats in the lagoon.

Harrison (1983) reports Black-naped Terns occur in the tropical Indian and Pacific Oceans. He also notes that this species breeds in the Chagos Archipelagos. Nesting has been observed virtually year round across the range of this species.

- Common Tern (*Sterna hirundo*)

This species has not been previously recorded on Diego Garcia. Common Terns were seen on three separate days (19, 21, 22 March) during the first 1995 survey. None were found on the second survey in July 1995. The largest number tallied was six birds on the 22 March. All sightings of this species were along the shorelines within the lagoon. All of the Common Terns were adults in non-breeding plumage. They were observed at close range

(5-10 m). Both resting and flying birds were examined. They conformed with all respects to the description and illustrations of Common Terns given in Harrison (1983).

This species has a worldwide distribution. There was no evidence that they were breeding at Diego Garcia. They were frequently seen resting with other terns and shorebirds, particularly in the intertidal area of the lagoon near the airfield control tower.

- Little Tern (*Sterna albifrons*)

Hutson (1975) was the first to record this species at Diego Garcia. Fifteen were seen near Point Marianne during April. Hutson (1975) does not indicate whether or not these birds were in breeding or non-breeding plumage. An average eight adult Little Terns in breeding plumage was seen three separate days during the March survey. Ten adults in non-breeding plumage and two recently fledged juveniles were recorded at the south end of the lagoon near "Turtle Cove"on the 29 July portion of the two part survey. This was the first evidence of breeding by this species at Diego Garcia. All sightings of this species were within the lagoon. No birds were seen offshore or along the outer beaches.

Little Terns are cosmopolitan in their distribution. They utilize rivers as well as marine habitats (Harrison 1983).

- Roseate Tern (*Sterna dougalli*)

Roseate Terns were first reported in Diego Garcia by Hutson (1975). They were seen with flocks of crested terns. Harrison (1983) notes breeding at several localities in the Indian Ocean, but not Diego Garcia. Nine adult Roseate Terns in non-breeding plumage were found resting with other terns at a gravel pit near the airstrip on March 24, 1995. This was the only observation of this species during both 1995 surveys. Such infrequent occurrence suggests Roseate Terns are probably casual visitors to Diego Garcia.

- Great Crested Tern (*Sterna bergii*)

Both Bourne (1971) and Hutson (1975) found Great Crested Terns to be common around the lagoon. Breeding plumaged birds were seen but no nesting was discovered. The two 1995 surveys recorded this species on every survey day. Most sightings were individual foraging birds. At a low tide crested terns were seen in small numbers resting on exposed sand flats. None were recorded outside of the lagoon. Adults in breeding plumage were present in both March and July but no nesting was noted.

Great Crested Terns are distributed primarily in the Indian and Pacific Oceans. They are the largest terns in Diego Garcia. Their distinctive plumage, big head and bill make them easy to identify. The only species with which they may be confused is the Lesser Crested

Tern (*Sterna bengalensis*). Hutson (1975) was the first to confirm this species at Diego Garcia. They were associated with Great Crested Terns. The bright orange bill was used to distinguish this similar species. Future surveys should be aware of the possibility of both species and examine all crested terns carefully.

- Brown or Common Noddy (*Anous stolidus*)

This species was abundant on earlier surveys (Bourne 1971, Hutson 1975). Breeding birds were observed in February (Bourne 1971). Brown Noddies were also numerous on both 1995 surveys (Table 1). No breeding was noted in March but nest construction was underway in July. All nests were in trees. This species forages offshore rather than on the inside lagoon.

The smaller Black Noddy (*Anous tenuirostris*) potentially could be confused with Brown Noddy but are far less common at Diego Garcia.

- Black or Lesser Noddy (*Anous ternuirostris*)

Black Noddy frequent inshore waters, and are seen in mixed flocks with Brown Noddy. Bourne (1971) reports specimens of Black Noddy were collected and breeding birds seen in the months of November and December. Hutson (1975) did not find Black Noddies. The 1995 surveys recorded small numbers on both visits. Birds were seen in the lagoon and along the shoreline of the outer reef. No breeding activity was noted.

Two forms of Black Noddy are known. One (*Anous tenuirostris*) occurs in the tropical Indian Ocean and is the form at Diego Garcia, while the other (*Anous tenuirostris minutus*) is the Pacific and Atlantic Ocean subspecies (Harrison 1983).

- White or Fairy Tern (*Gygis alba*).

This cosmopolitan tropical ocean tern was found to be a common breeding species on previous studies (Bourne 1971, Hutson 1975). Nesting birds were recorded in most months. Breeding and non-breeding birds were also observed in March and July 1995. White Terns forage offshore as well as in the lagoon. There were no days during either 1995 survey where White Terns were not seen resting in trees or flying overhead.

- Whiskered Tern (*Chlidonias hybridus*)

The March 1995 survey was the first to record this species at Diego Garcia. One adult non-breeding plumaged Whiskered Tern was seen resting with other terns and migratory shorebirds on an exposed sand flat on 21 March 1995. No sightings of this individual were obtained on subsequent days.

This species is an Old World tern which frequents inland wetlands and has been recorded only once in the Pacific (Pratt et al. 1987). The bird seen at Diego Garcia was a straggler. No known breeding population occurs near Diego Garcia.

- White-winged Black Tern (*Chlidonias leucopterus*)

N.J.P. Wraith, former British Representative for Diego Garcia, observed several White-winged Terns between the two 1995 surveys (pers. comm.). His description of the bird was adequate enough to identify this clearly marked species. As in the case of the Whiskered Tern, the White-winged Black Tern is an Old World species that occurs on inland waters and should be considered a straggler to Diego Garcia (Harrison 1983).

3.2 MIGRANTS AND VAGRANTS

A total of 26 species of migratory shorebirds and four migrant/vagrant waterbird species have been recorded at Diego Garcia (Table 2). Twelve new shorebird species were added to the list on the 1995 surveys. In addition, only four of the 26 shorebird migrants were not observed on the 1995 surveys. Two of the four migrant/vagrant waterbird species were also new to the list.

Species Accounts:

3.2.1 Migratory Shorebirds:

- Crab Plover (*Dromas ardeola*)

The Crab Plover is a monotypic species of the monotypic family *Dromadidae*. Their breeding biology is unique among shorebirds. They excavate tunnels in sand dunes where they deposit a single large egg. The young are altricial and nidicolous (must be fed by the parents (Hayman et.al.,1986). This species occurs in Indian Ocean coastal habitat. Hayman et al. (1986) report that breeding is restricted to the Gulf of Oman, Gulf of Aden, and the southern Red Sea region. Vagrants have been observed as far east as Malaysia.

Bourne (1971) records that specimens were collected during September-October and in February. He further discounts any reports of nesting activity. Hutson (1975) saw "small numbers" at the southern end of Diego Garcia during April and May. He likewise found no evidence of breeding.

The 1995 surveys and additional 1995 observations by N.J.P. Wraith found few Crab Plover. None were seen on the March survey but two adult plumaged birds were recorded on two separate days (25, 30 July) of the second 1995 survey. Wraith (pers. comm.) found two adults and two juveniles during April 1995. All Crab Plovers were seen foraging or resting within the lagoon area. No breeding activity was noted nor expected. Diego Garcia

represents the southeastern limits of the Crab Plover range and consequently attracts limited numbers of these unique shorebirds.

- Pacific Golden-Plover (*Pluvialis fulva*)

The Pacific Golden-Plover breeds in Western Alaska and Siberia, and winters in the Pacific as far south as New Zealand and along the coasts of SE Asia, Australasia and the northern and eastern edges of the Indian Ocean. Prior to the 1995 surveys, they were not known recorded Diego Garcia. Long-term studies of this species on the wintering range in Hawaii and the breeding grounds in Alaska have yielded a wealth of life history data (Johnson et al. 1981, 1989, 1993). Open short grass fields and lawns are often favored foraging habitat for wintering Pacific Golden-Plover. Shorelines and wetlands are also utilized.

Bourne (1971) and Hutson (1975) did not observe this species. Eleven plovers were seen during the March 1995 survey (seven along the lagoon near the airfield and four on the antenna fields at the Transmitter Site on the south end of the island). One bird was seen on 25 July during the second 1995 survey. The July bird was an over-summering individual that probably was one of the five seen in March which did not migrate to the arctic to breed. Some juveniles remain on the wintering grounds the first year (Johnson et al. 1989). Territorial behavior is typical of wintering Pacific Golden-Plover in Hawaii (Johnson et al. 1981). All of the plovers seen on the Transmitter Site fields at Diego Garcia had well-defined foraging territories. The discovery of this species at Diego Garcia marks an important and exciting extension to the known wintering range.

- Grey or Black-bellied Plover (*Pluvialis squatarola*)

Grey Plovers are the only cosmopolitan plover with breeding occurring circumpolar on a lowland tundra and wintering in coastal environments worldwide (Hayman et al. 1986). The Grey Plover is the largest member of the genus *Pluvialis*. Bourne (1971) and Hutson (1975) report Grey Plover from the Chagos Archipelago. Hutson's (1975) records are the first for Diego Garcia. Bourne (1971) and Hutson (1975) place this species in the genus *Charadrius*. This taxonomic treatment has been revised so that currently Grey Plover are now assigned to the genus *Pluvialis* and *Charadrius* has fallen into synonymy. Hutson's (1975) records from late April through mid-May reveal small numbers of birds scattered around the lagoon. This species was also recorded on both 1995 surveys. A total of 40 Grey Plover were tallied on the March survey and 16 during the July visit. These numbers may reflect some double counts due to movement of the birds between various feeding and resting sites. Hayman et al. (1986) notes than many Grey Plover are territorial on the wintering grounds. No evidence of territorial behavior was observed during the 1995 surveys. Grey Plover were seen both in the lagoon along shorelines and on the outer beach and reef at low tide. No breeding plumaged birds were noted. The 16 individuals seen in July were probably first year birds that over-summered and did not return to the arctic to breed. This behavioral strategy is common in many shorebirds including Grey Plover (Hayman et al. 1986).

- Kentish or Snowy Plover (*Charadrius alexandrinus*)

This small plover is subdivided into six subspecies covering both the New and Old World coastal populations are migratory (Hayman et al. 1986). The March 1995 survey was the first to record this species at Diego Garcia. None were found in July 1995. Ten Kentish Plover were regularly seen resting and foraging at a coral pit with shallow rainwater ponds near the airfield. One bird was also observed at the Transmitter Site near "Turtle Cove." All birds were in non-breeding plumage.

- Lesser Sandplover (*Charadrius mongolus*)

Lesser Sandplover are widely distributed but with fewer records for the Indian Ocean region that the similar Greater Sandplover (*Charadrius leschenaultii*) (Hayman et al. 1986). The March 1995 survey was the first to record Lesser Sandplover at Diego Garcia. None were subsequently seen on the July 1995 survey. A total of three Lesser Sandplover were seen on two days (19, 22 March). They were foraging with other shorebirds on an exposed lagoon sand flat near the airfield. All three birds were in breeding plumage and presumably were destined to be part of the spring migration to the arctic.

- Greater Sandplover (*Charadrius leschenaultii*)

Hutson (1975) was the first to report Greater Sandplover from Diego Garcia. He observed several birds scattered throughout the lagoon during April and May. Hutson (1975) further notes that this species is a common migrant in the Maldives north of the Chagos Archipelago. Hayman et al. (1986) writes that this species is more common than the Lesser Sandplover in Indian Ocean islands. One Greater Sandplover was seen foraging with Lesser Sandplover and other shorebirds on March 22, 1995. This was the only record for this species during the two 1995 surveys. The bird was in breeding plumage and was noticeably larger than the Lesser Sandplover. Other criteria noted in Hayman et al. (1986) were also consulted to correctly identify this species. The bird was not seen on subsequent days of the March survey and likely participated in the spring migration in April-May.

- Black-tailed Godwit (*Limosa limosa*)

The July 1995 survey was the first to record this species on Diego Garcia. Three Black-tailed Godwits were seen on 25 and 30 July on an exposed lagoon sand flat near the airfield. These birds were foraging with other shorebirds including the related Bartailed Godwit (Limosa lapponica). All three birds were in non-breeding plumage and were probably first year birds that over-summered on the wintering range. Breeding shorebirds are in the arctic during July.

Black-tailed Godwits have a wide distribution, including the Seychelles (Hayman et al. 1986). They typically forage on mud and sand flats by probing with their long bill.

- Bar-tailed Godwit (*Limosa lapponica*)

Hutson (1975) first reported Bar-tailed Godwits at Diego Garcia. Two birds were seen in May. The 1995 surveys recorded one Bar-tailed Godwit in March and two in July. All birds were in non-breeding plumage. They were seen foraging and resting on intertidal sand flats within the lagoon. Sightings were made on several days and always at the same location. This apparent site-faithfulness to foraging areas is not unusual behavior for shorebirds. Reliable and economically profitable prey concentrations likely elicit this phenomenon.

Bar-tailed Godwits are known to winter in the Maldive Islands north of Diego Garcia (Hayman et al. 1986). Small numbers likely winter in the Chagos Archipelago including Diego Garcia. The July observation would indicate Bar-tailed Godwits also over-summer on the island.

- Whimbrel (*Numenius phaeopus*)

Whimbrel have been consistently recorded at Diego Garcia (Bourne 1971, Hutson 1975). Birds were found in a variety of habitats including: grasslands; shorelines within the lagoon and on the outer beach and openings in forested habitat. The 1995 surveys found Whimbrel to be one of the most common migrants at Diego Garcia (Table 2). Census counts tallied as many as 35 Whimbrel on some stations during the March 1995 survey.

The July survey had fewer birds but one census station had 17 Whimbrel, indicating a sizeable over-summering population.

Whimbrel breed circumpolar and have the most extensive wintering range of any curlew (Hayman et al. 1986). Indian Ocean records include the Maldive Islands in addition to the Chagos Archipelago. They forage in grasslands, fields, wetlands, and along shorelines. Whimbrel may form flocks when resting or roosting, but will forage singly or in small groups and may exhibit some territoriality.

- Spotted Redshank (*Tringa erythropus*)

Two Spotted Redshank seen on March 19 and 21, 1995 were the first record sightings for this shorebird at Diego Garcia. The birds were alternatively foraging and resting at a shallow rainwater pond near the airfield.

No subsequent sightings of these individuals were obtained. None were found during the July 1995 survey.

Hayman et al. (1986) notes Spotted Redshanks winter in Africa and along coastal Asia. Indian Ocean records include the Seychelles. This Chagos Archipelago observation would indicate a more extensive distribution for this species.

- Redshank (*Tringa totanus*)

Redshank have not been previously found at Diego Garcia. A lone bird in non-breeding plumage was seen March 19 and 23, 1995. None were recorded during the July survey. Both March sightings were at the same locality, a shallow rainwater pond near the airfield. The bird was seen with Spotted Redshank and other shorebirds.

Records from the Maldive Islands, Seychelles and Christmas Island indicate a widespread Indian Ocean distribution (Hayman et al. 1986).

- Greenshank (*Tringa nebularia*)

Greenshank are reported to be frequent visitors to the Maldive Islands but were recorded for the first time by Hutson (1975) during his April visit to Diego Garcia. One bird was seen on three occasions at Point Marianne. Hutson (1975) does not mention whether or not this Greenshank was in breeding plumage or non-breeding plumage. An average of two Greenshank with a high of four birds were seen on every day between 19-24 March 1995. All of these birds were in non-breeding plumage. Six birds were also observed foraging on an exposed lagoon sand flat near the airfield control tower on 25 July 1995. None had breeding plumage. This species is apparently a regular migrant to Diego Garcia with some individuals also over-summering at this site. The low numbers also suggests that Diego Garcia is probably on the edge of the migratory range for this species. The birds at Diego Garcia were seen foraging on inland ponds, intertidal sand flats and grasslands habitats. They were shy and quickly flew off when approached on foot. Observations made from a vehicle were less disturbing and provided the best viewing opportunities.

- Spotted Greenshank (*Tringa guttifer*)

This species has not previously been observed in Diego Garcia. Hayman et al. (1986) reports Spotted Greenshank from areas north and east of this location. Thus it is reasonable to expect this species might occur occasionally at Diego Garcia. On March 21, 1995 three were seen foraging with Greenshanks and other shorebirds at a gravel pit site with shallow rainwater ponds near the airfield. The bird was watched from a distance of 50 meters for 40 minutes. All of the field marks used to distinguish this species from Greenshanks were clearly visible (Hayman et al. 1986). None were recorded during the July 1995 survey.

This species may visit Diego Garcia on a regular basis, albeit in small numbers.

- Common Sandpiper (*Actitis hypoleucos*)

Common Sandpiper were first discovered at Diego Garcia by Hutson (1975). Only two birds were observed at Point Marianne. No mention of breeding plumage status was noted. Hutson (1975) states that this species occurs in "moderate numbers in the Maldives".

Hayman et al. (1986) shows a wide Old World distribution for the winter range including coastal areas surrounding the Indian Ocean.

One Common Sandpiper was seen on March 22, 1995 at an inland pond just south of the Fire Station. The typical bobbing motion as it walked and foraged along with its distinctive plumage made for easy identification. This species often forages alone and avoids areas frequented by large numbers of shorebirds (Hayman et al. 1986).

- Grey-tailed Tattler (*Heteroscelus brevipes*)

The wintering range of this species is generally east of Diego Garcia. The sighting of a single Grey-tailed Tattler foraging around a freshwater pond at the south end of the airfield on March 20,1 995 marks the first and only observation of this species at Diego Garcia. This record also extends the known western range for this tattler. The closely related and similar appearing Wandering Tattler (*Heteroscelus incanus*) winter in the Pacific with a portion of its range overlapping with the Grey-tailed Tattler. Both species usually forage solitarily and utilize a variety of wetland habitats. Hayman et al. (1986) notes Grey-tailed Tattler frequents mud flats and inland areas whereas Wandering Tattler prefer rocky coasts. This distinction may be overstated based on many personal observations of both species in which there was on overlap in habitat choices.

- Ruddy Turnstone (*Arenaria interpres*)

Bourne (1971) and Hutson (1975) both report this species to be common at Diego Garcia. Bourne (1971) mentions that Farquhar (1900) found turnstones breeding on the island. This observation is unlikely to be accurate because the species is only known to breed in the arctic (Hayman et al. 1986). Without better documentation the Farquhar record must be dismissed. Hutson (1975) found as many as 100 birds at Point Marianne. He also observed them around inland ponds, along coastal and lagoon shorelines and in wooded as well as open grass habitat.

Both 1995 surveys likewise found Ruddy Turnstone to be one of the most abundant and widely distributed migrants (Table 2). One interesting observation made during the March survey were Ruddy Turnstone regularly feeding on crushed land crabs that littered the road in the southern end of the island. This convenient food resource was exploited primarily by Turnstones, Whimbrel and Common Myna (*Acridotheres tristis*). During the July survey few crushed land crabs were seen indicating that this bonanza of food may be only temporarily available perhaps during the season when land crabs are reproductively active and inclined to disperse into open habitat such as roads.

- Pintail Snipe (*Callinago stenura*)

Snipe are notoriously difficult to identify. The record reported here is based on two separate observations of three birds each during the first (March) 1995 survey. No snipe

were seen on the July 1995 survey. Both sightings were in grass covered fields, one in the northwest sector of the island and the other at the Transmitter Site (southeast corner of the atoll). Hayman et al. (1986) was consulted during the observations. This species is very similar to Swinhoe's Snipe (*Gallinago megala*). However, based on the fact that Pintail Snipe is known from this region of the Indian Ocean (Maldive Islands) while Swinhoe's Snipe is typically found further east it is probable that the birds seen were Pintail Snipe.

Hutson (1975) found Great Snipe (*Gallinago media*). The birds seen in 1995 did not match Hayman's et al. (1986) description of this species.

- Asiatic Dowitcher (*Limnodromus semipalmutus*)

The single sighting of this species on 17 March 1995 was the only record obtained on either 1995 survey. The bird was seen foraging on an intertidal sand flat near the gas station and on the lagoon side of Building 337. The bird was with other shorebirds that were following the receding tide. Hayman et al. (1986) reports this species from coastal regions north of Diego Garcia. This lone bird may have been a straggler rather than a regular migrant.

The dowitcher type bill and feeding behavior and bodily form of a Bar-tailed Godwit as noted by Hayman et al. (1986) were clearly visible. The bird was not seen on any subsequent survey days.

- Sanderling (*Calidris alba*)

Sanderling were reported by both Bourne (1971) and Hutson (1975). This species winters along the coast of the Indian , Pacific, and Atlantic Oceans. Sanderling also show site fidelity to wintering grounds (Hayman et al. (1986). The March 1995 survey found few Sanderling. The highest station count was nine birds. None were seen during the July survey. All Sanderling were in non-breeding plumage and were observed in mixed flocks of other foraging shorebirds.

This species frequents intertidal habitat and mud flats. They can often been found along wave-swept beaches. Typically, Sanderling remain in small flocks on the wintering grounds.

- Red-necked Stint (*Calidris ruficollis*)

This species is difficult to distinguish from the Little Stint (*Calidris minuta*). No previous researchers have reported this species from Diego Garcia. Two non-breeding plumage Red-necked Stint were seen foraging with five Little Stint on 20 March 1995. Having the two species together for comparison aided in their identification.

These Red-necked Stint were not seen on subsequent survey days. This species may be a straggler to this sector of the Indian Ocean. Future surveys may help resolve its status.

- Little Stint (*Calidris minuta*)

No previous records for this species at Diego Garcia have been obtained. On March 20, 1995 five Little Stint in non-breeding plumage were seen foraging at a shallow pond in a gravel pit near the airfield. This site was frequented by many shorebirds and terns, especially at high tide when intertidal habitat around the lagoon was greatly restricted. Six Little Stint were later (March 22, 1995) seen at the gravel pit ponds. Little Stint are known to winter in areas to the north and west of Diego Garcia (Hayman et al. (1986).

- Curlew Sandpiper (*Calidris ferruginea*)

Curlew Sandpiper are clearly the most abundant shorebird wintering at Diego Garcia (Table 2). Survey counts on both the March and July 1995 visits consistently recorded large numbers of this species. They were found all around the lagoon on intertidal sand flats. Some flocks were also noted at inland locations such as ponds and fields. Bourne (1971) and Hutson (1975) likewise reported Curlew Sandpiper. Hutson (1975) found it to be "outnumbered only by Turnstones." The substantial number of Curlew Sandpiper seen in July 1995 suggests many individuals oversummer. As noted earlier, (Johnson et al. 1989), this phenomenon is common in many shorebirds.

3.2.2 Other Migrants/Vagrants:

- Garganey Teal (*Anas crecca*)

No ducks have been previously reported from Diego Garcia. On March 20 and 23, 1995 four (three female, one male) Garganey Teal were seen on a pond behind Building 337 near the gas station. The drake was in bright breeding plumage. N.J.P. Wraith (pers. comm.) reported seeing these birds earlier in January. They were gone by the July 1995 survey. This Old World species breeds across Europe and Asia but winters in Africa, southeast Asia and India. They frequent shallow freshwater ponds with extensive emergent vegetation. They are sociable and abundant. Vagrants have occurred in the western Pacific, Hawaii, California, Canada and the U. S. mid-west as far south as Kansas (Pratt et al. 1987, Madge and Burn 1988). With such a wide distribution and tendency to wander, the Diego Garcia sightings are not unexpected. Whether or not this species is a vagrant or perhaps a more regular migrant to Diego Garcia remains unknown.

- Glossy Ibis (*Plegadis falcinellus*)

One adult Glossy Ibis was seen and photographed on both 1995 surveys. The bird was consistently seen either on the freshwater ponds that parallel the airfield of the pond behind building 337. The bird was usually observed foraging by itself and occasionally with Cattle Egrets (*Bubulcus ibis*). This vagrant has a worldwide distribution and thus it is not unusual for it to turn up at Diego Garcia. The related White-faced Ibis (*Plegadis chihi*) has in a similar fashion wandered to Hawaii (Pratt 1980). How long this Glossy Ibis will remain at Diego Garcia remains to be seen. The ibis that occurred in Hawaii was observed over several years.

3.3 Residents

Table 3 reports the status (relative abundance) of the resident waterbirds and land birds found on the 1995 surveys as well as those listed in earlier reports.

- Little Green Heron (*Butorides striatus*)

Bourne (1971) and Hutson (1975) both report this species as abundant and widespread. Some have considered the Diego Garcia subspecifically distinct (Bourne 1971). Hutson (1975) trapped and ringed (banded) three adult herons. He also notes that the greatest concentration of birds was at Point Marianne. This species has nearly a worldwide range. Hails and Jarvis (1987) report that they are common in Singapore and King et al (1975) also note an extensive southeast Asian distribution. Little Green Heron are seen along lagoon and outer reef shorelines at Diego Garcia. Birds were also observed in forested habitat, along roadsides and on the small islands at the mouth of the lagoon. An average of three heron were tallied at most census stations. At low tide they frequently foraged on the exposed outer reef. During high tide many were seen preying on schools of small fish along the water's edge in the lagoon. Freshwater wetlands and grass covered fields also contained Little Green Heron. In forested or grassland habitats they were seen catching insects and in one case juvenile Marine Toads (*Bufo marinus*). Both 1995 surveys yielded numerous observations of chases and aggressive interactions between foraging birds. Typically they are solitary and were quick to respond when another heron approached. Juvenile plumaged birds were seen in both March and July. Two examples of adults carrying sticks, presumably for nest construction, were noted during the March survey. The abundance of this species at Diego Garcia suggests the resources critical for survival and reproduction are readily available.

- Cattle Egret (*Bubulcus ibis*)

Cattle Egret were introduced from the Seychelles in 1953 to Diego Garcia, according to Hutson (1975). Bourne (1971) suggests that the asiatic subspecies (*B. i. coromandus*) managed to also colonize the island and have mixed with the Seychelle birds. During the 1970s Cattle Egret were reported to be common, with individual counts at some locations

as high as 50 birds (Hutson 1975). The distinctive white plumage and preference for open habitat make them reasonably easy to census. The 1995 surveys obtained counts as high as 150 birds at the south end of the airfield and 248 birds at the sanitary landfill. The island-wide population must be several hundred strong, based on an average of 25 birds at census stations in appropriate habitat. None were noted on the airstrip but could pose a threat to aircraft as they have elsewhere, such as the Hilo Airport in Hawaii. No nesting was observed during the 1995 surveys, however, time did not permit a search for possible rookeries. Cattle Egret were rarely seen on the outer reef or along the lagoon shoreline. This species preferred inland terrestrial and wetland habitats.

The almost worldwide distribution of this species is the result of recent colonizations and introductions over the last century. The name "Cattle Egret" derives from their behavior of following grazing mammals, which flush insect and rodent prey. Mowing machines and plows are also attractive to Cattle Egrets for the same reason—the exposure of prey. They will also take the eggs and young of other birds and hence can pose a serious challenge to efforts aimed at protecting rare or endangered waterbirds. The extent to which Cattle Egret impact Diego Garcia's avifauna is not known. The species most likely to be effected is the White-breasted Waterhen (*Amaurornis phoenicurus*).

- Domestic Fowl or Chicken (*Gallus gallus*)

Bourne (1971) and Hutson (1975) fail to mention this species at Diego Garcia; they may have considered the bird to be domesticated and not free living. The 1995 surveys found chickens in residential and forested habitat throughout the island, even in the more remote restricted area. The greatest concentrations were, however, in the northwest sector where they may take advantage of human-supplied resources. Their introduction to Diego Garcia likely dates from the early occupation period. They may have been most abundant during the height of the coconut plantation era. Feral cats and rats are likely limiting factors on the chicken population.

- White-breasted Waterhen (*Amaurornis phoenicurus*)

Earlier reports (Bourne 1971, Hutson 1975) hinted at the possibility of this species occurrence. However, both reports suggested that the moorhen (*Gallinula* sp.) may instead be the species in question. Neither Bourne (1971) or Hutson (1975) saw either moorhen or White-breasted Waterhen during their visits. The issue was finally resolved on the 1995 surveys. White-breasted Waterhen were commonly observed at most wetlands and even in forested habitat. Fledged young were noted in July. Pairs exhibited territoriality. Typically, only one or two pair occupied a specific wetland. They were active early and late in the day. Loud vocalizations were also heard during both visits but were most frequent in July. In typical rail fashion they were shy and quickly sought cover when approached. On several occasions birds were seen crossing the road. One roadkill specimen was collected and examined. Ripley (1977) notes that this species forages on the reef in the Maldives Islands. This area is likely the source of birds that colonized Diego

Garcia. Given the abundance and ease with which they were seen in 1995 and their apparent absence in the 1970s suggests the colonization and subsequent population expansion occurred during the last 25 years. Ripley (1977) states the breeding season of this species is generally April to October. He further records the diet consists of seeds, roots, insects, small fish, worms, larvae, molluscs, and spiders.

Foraging was most active at first light and late afternoon till dusk. Some birds were also seen foraging during mid-day. In July

One pair with two recently fledged young located on a small pond at the south end of the airstrip roosted in a patch of dense grass at one corner of the pond. At dusk the parents gave sharp contact calls and the young followed them to the roost. They became silent once they were settled. The same roost site was used throughout the course of the July survey.

The island-wide abundance of White-breasted Waterhen based on survey data from census stations and incidental observations at localities aside from these count sites would suggest that their population may be as high as 200. Whether of not this represents the carrying capacity for this species at Diego Garcia is unknown. Cats, rats, and perhaps Cattle Egrets provide the primary predator pressure. Cats were frequently seen searching the edges of ponds and were also common in forested habitat utilized by White-breasted Waterhen.

- Madagascar Turtle Dove (*Streptopelia picturata*)

Benson (1970) and Penny (1974) note that the Madagascar Turtle Dove in the Chagos Archipelagos may be a hybrid of the nominate subspecies Sp. *picturata* and Sp. *comorensis*. Bourne (1971) considered the Diego Garcia bird an endemic subspecies (Sp. *chuni*) Penny (1974) suggests they were introduced by pirates as "excess food stores." Madagascar Turtle Dove were found throughout the atoll during Hutson's (1975) survey. They were especially abundant in the eastern and southern sectors of the island and on Ile Grande Barbe (East Island). Areas recently cleared of vegetation also attracted flocks of up to 20 birds. The 1995 surveys revealed an interesting and previously unreported observation that could impact population estimates for this species. Turtle Dove counts at census stations in March were low with an average of only two birds per station. The July counts at the same census stations averaged ten birds per station. In addition, birds were more active and visible in July. Vocalizations were also more frequent on the second 1995 survey. If the population estimates were based solely on the March data, the species would be considered uncommon. The reasons for the higher counts in July may be attributed to cooler conditions and hence more active birds or perhaps the onset of the breeding season and thus increased vocalizations. Penny (1974) reports the breeding season in the Seychelles begins in October. Several males were seen courting during the July survey. No nests were located. Numbers of birds and foraging activity were most pronounced in the late afternoon. Birds in urban areas were tame and at some locations, such as behind the Fire Station, were regularly fed such items as bread.

- Zebra or Barred Dove (*Geopelia striata*)

Zebra Dove were first introduced to Diego Garcia from the Seychelles in 1960 by R. Mein. Both Bourne (1971) and Hutson (1975) report this species with the latter author commenting on their uncommon status. The 1995 surveys likewise did not find large numbers of Zebra Dove. The population appeared fragmented with most birds associated with urban habitat. The highest counts were in the northwest sector of the island. These results were somewhat unexpected given the abundant status this species has achieved on other islands such as Hawaii (Pratt et al. 1987). Factors presently suppressing the population are unknown. Predation by rats and cats surely has some impact, but the predator population in Hawaii is also significant; yet, Zebra Dove are one of the most abundant introduced species. Competition with Madagascar Turtle Dove may be another limiting factor. None of these explanations is particularly satisfying because predation and competition in the Seychelles has not significantly impacted the population of Zebra Dove, which Penny (1974) writes is "one of the three most common land birds." Disease and perhaps the effect of inbreeding, as a consequence of a small founder stock (only 12 in original introduced gene pool), are contributing negative selection pressures.

- Common Myna or Indian Mynah (*Acridotheres tristis*)

This species has been introduced to many islands in the Indian and Pacific Oceans. Twelve birds were first introduced to Diego Garcia from Agalega in 1954-55. None were recorded in 1960 during a visit by Loustau-Lalanne but by 1964 were abundant (Bourne 1971). Hutson (1975) described Common Myna as the most abundant land bird on Diego Garcia. They were particularly numerous at East Point where they fed on drying copra. The 1995 surveys likewise found myna in coconut plantation habitat as well as around urban areas. Relatively few were seen in dense forested habitat. The 1995 census data did not confirm Common Myna as the most abundant landbird but they were clearly second in number. At other introduced localities (such as Hawaii and Tahiti) they also are associated with developed habitats such as urban, residential, and agricultural lands (Pratt et al. 1987).

This species forms life-long pair bonds. They are also gregarious and often gather at dusk in large noisy flocks. Their diet is varied. Some introductions of this species were for purposes of insect pest control.

- Madagascar Fody (*Foudia madagascariensis*)

Bourne (1971) reports that Finsch was the first to "notice" the Madagascar Fody at Diego Garcia on 9 July 1884. This colorful species has been introduced to many islands in the Indian Ocean (Penny 1974). The 1995 surveys found this species to be the most abundant landbird. During March 1995 many males were still in brilliant red plumage and young fledglings were common. The July visit was at the time of the post-nuptial molt and less than 10 percent of the males were brightly attired. Census stations recorded fodys in all habitats. Their greatest abundance was in forested and urban habitat. Large numbers were

also seen on lawns and in open fields such as the Transmitter Site at the south end of the island. The forests of the restricted area in the eastern half of the atoll contained a dense population of fodys. The squeek-lure call quickly attracted their attention. Birds in urban areas seemed habituated to humans and were easily approached.

3.4 Extirpated and Questionable Species

- Flamingo (*Phoenicopterus* sp.)

Hutson (1971) reports from second-hand information that a colony of flamingoes occurred in the southern sector of the atoll. He did not find the birds and without further information this record is questionable. The 1995 surveys did not see flamingoes.

- Grey Francolin (*Francolinus pondicerianus*)

The last record for this species at Diego Garcia was in 1964 (Hutson 1975). None were encountered on the 1995 surveys. Its loud distinctive calls easily betray its occurrence. The extinction process may have been driven by an inappropriate climate and ground predators. In Hawaii Grey Francolin are common in dry habitats (Pratt et al. 1987).

- Olivaceous Bulbul (*Hypsipetes borboaicus*)

Hutson (1974) states from second-hand sources that this species was introduced from Mauritius and was common in 1953 but later was extirpated. Without specimens to confirm this identification this record remains questionable. Bulbuls are typically quite successful colonists once introduced to any island, and thus it is surprising that they failed at Diego Garcia.

3.5 Other Unidentified Species:

Bourne (1971) mentions others have seen ducks, raptors, crows, pigeons, and swallows but gives no specific details and thus all such "records" cannot be evaluated. The location of Diego Garcia (south of major avifaunal communities in Asia and India) make it likely that future surveys by competent observers will undoubtedly add to the Diego Garcia list. The number of new species found on the 1995 surveys would seem to support this speculation.

4. MAMMALS

The mammal inventory for Diego Garcia is short and consists entirely of introduced species. No new species were added to the list given in PACNAVFACENGCOM (1973) and Hutson (1975).

- Roof Rat (*Rattus rattus*)

Unfortunately, this ubiquitous species has been introduced to many islands, where it causes significant agricultural damage, destroys native plants, and preys on eggs and chicks. Their population at Diego Garcia has apparently fluctuated (Hutson (1975)). No census data were obtained on the 1995 surveys. Rats were seen at several localities around the island. They were most abundant in the coconut plantations in the northwest and east sectors. Numerous young coconuts with holes chewed in them littered the ground and attested to a significant rat population. Rats can cause much damage in seabird colonies. Whether or not rats are on the three small islets at the mouth of the lagoon was not determined. As noted earlier, these islets support breeding seabirds.

- Cats (*Felix domesticus*)

Feral (wild) and semi-domesticated cats are common on the atoll. The 1995 surveys saw cats in virtually every habitat. They were not restricted to developed areas. Cats were seen stalking waterbirds and shorebirds at ponds and in dense forest. In the northwest sector some cats were tame and on several occasions were observed taking food from dishes provided for them.

Hutson (1975) wrote that cats were common but did not forage far from settled areas. During the 1995 surveys feral cats were seen even at Barton Point. Cats are a serious threat to birds. PACNAVFACENGCOM (1973) notes that "cats probably played a part in eliminating many of the ground nesting seabirds from Diego Garcia." The success of Red-footed Boobies, Common Noddies and White Terns is likely due to the fact that they are nesting in trees that are more difficult for cats to access.

- Horse (*Equus caballus*)

PACNAVFACENGCOM (1973) reported three horses on Diego Garcia. Hutson (1975) does not mention them. The July 1995 survey found one horse near the Plantation House at East Point. The animal was shy and quickly retreated into the forest when approached. According to recent reports (N.J.P. Wraith, pers. comm.) only one horse remains on the atoll.

- Donkey (*Equus asinus*)

Hutson (1975) suggested that approximately 200 donkeys occurred on the atoll, primarily in open dry habitat. PACNAVFACENGCOM (1973) reports that the British Representative on Diego Garcia estimated the donkey population at 250 in July 1973. The report went on to predict that in ten years (1983) the population could grow to 1,500 animals. The donkeys are remnants of the plantation era. The 1995 surveys found donkeys were most commonly seen along the roadside and at the Transmitter Site. The "Donkey Gate" located at the southwest end of the island restricted their entry to the western side. Donkeys were

also seen along the eastern road as far north as Minni Minni. The largest herd observed during July 1995 was 23 animals located on the Transmitter Site. Another small herd of eight was consistently observed on the southwest corner of the island. Based on the amount of usable habitat and the observations obtained in March and July the 1995 population of Donkeys probably does not exceed 100. In retrospect the PACNAVFACENGCOM (1973) prediction of an increasing population which could reach 1,500 by 1983 was obviously incorrect. Donkeys may damage some vegetation, but, from a positive perspective, they help keep the grass down and thus provide improved habitat for migrants such as Ruddy Turnstone, Pacific Golden-Plover, and Whimbrel. The future status of the donkey population at Diego Garcia likely will be limited by resource availability. The dense impenetrable patches of forest may not seem to be suitable habitat for donkeys, but is frequented by them. Open sites in the present area of their confinement are limited primarily to the southern and southeastern portions of the island. Whether or not the 1995 population will remain stable, continue to decline or rebound to earlier estimates, the donkey will always be a reminder of the island's plantation days.

Extirpated Mammals:

- Dogs (*Canis familiaris*)

Hutson (1975) reported dogs as "numerous and widespread." He further noted an extermination program begun in 1972 was still in progress. No feral dogs were found during the 1995 surveys.

5. CONCLUSIONS

Earlier studies (Bourne 1971, Hutson 1975) provided a baseline from which to compare the 1995 occurrence and abundance of birds at Diego Garcia. The two (March, July) visits allowed an examination of bird activity during "summer" and "winter" conditions. During the 20 years hiatus between the 1975 survey and the present surveys human impact on the atoll has been modified by the closure of the plantation operation. The 1970 reports talk of a more active human presence on the east side of the atoll. Today this area is being reclaimed by a secondary forest. Red-footed Booby are nesting along the northeastern sector as well as on the uninhabited islets in the lagoon mouth. This may be an indication of a return of this portion of the atoll to a more natural state. The protection of wildlife under the orders of the British Representative has also undoubtedly had a positive impact.

The number of previously unreported seabirds, migrants and vagrants that were brought to light by the 1995 surveys further confirms the value of periodic inventories to update the faunal picture and clarify the importance of Diego Garcia for wildlife. Clearly this atoll provides habitat for a variety of birds. The disharmonic composition of the resident land birds and waterbirds is typical of islands where introductions and colonizations are driven by chance and the contingent facts of history. For example, the Madagascar Turtle Dove may never have gotten to Diego Garcia if it was not a "food store" of Indian Ocean pirates.

Habitats found on Diego Garcia include: second growth forests, wetlands, open grasslands, intertidal sand flats, reefs, and urban environments. Different species rely on specific habitats for foraging, resting and in resident birds, breeding. The introduced birds primarily utilize forests and urban habitats. Migrants are found on grasslands and intertidal sites. Seabirds nest in forested areas and some (terns) occupy intertidal zones. The wetlands and intertidal habitats are perhaps the most vulnerable to disturbance. Virtually every wetland examined on the 1995 surveys supported resident waterbirds and migrants. At low tide the exposed lagoon sand flats provided foraging opportunities for many migrants and residents like Little Green Heron. The outer reef on the ocean side of the atoll was utilized by fewer birds. This difference in activity was probably the result of lower prey availability and reduced foraging profitability.

The abundance of introduced birds like Madagascar Fody implies suitable habitats and perhaps the absence of competition from congeners. Vagrants such as the Glossy Ibis point to the refugia role small isolated islands play in the widespread and often disjunct distribution of continental species.

Mammals on isolated islands are usually the result of human intervention. This is certainly the case with Diego Garcia. Some species can be particularly damaging to the delicately balanced island ecosystem. Rats and cats are not compatible with island bird communities. Rats can and do damage native plants. These two mammals pose a problem to the native wildlife of Diego Garcia. Donkeys can also be a destructive force to plant communities. At Diego Garcia, the donkeys appear to be declining, based on present numbers and past historical estimates. Their impact on birds is certainly not as negative as rats and cats. As was suggested earlier in the report, donkeys may actually help maintain grassland habitat which migrant and resident birds utilize.

6. RECOMMENDATIONS

The recommendations offered fall into the categories of habitat protection, periodic inventories, education about and protection of Diego Garcia's wildlife, concerns about pestiferous species, and potential problems to Navy operations posed by wildlife.

6.1 Habitat Protection:

1. All wetland habitats should be protected from development and degradation from adjoining human activities. This would mean monitoring water quality and controlling predators. Some, but not all, species of birds can become habituated to humans, but predators like cats are another matter. Another form of degradation to wetlands is encroachment by vegetation. Key wetlands such as those in the region around the airfield should be monitored and, where possible, water levels should be regulated and a mixture of open water and emergent vegetation maintained. This may involve periodic clearing of excessive

vegetation. Shoreline vegetation and islets within the wetland provide refugia and are important to nesting success.

2. Intertidal shoreline habitat is vital to migrants. Grasslands are also extensively utilized by some species. Human disturbance of foraging birds should be avoided.

3. Nesting habitat for Red-footed Boobies and other seabirds should be protected. Reduction of predators such as cats would require trapping or some other removal process. Human visits to nesting colonies can result in loss of chicks and eggs when adults are displaced from nests for extended periods. The three islets and Barton Point should not be disturbed during the breeding season (roughly March through October).

6.2 Periodic Inventories:

1. Inventories of birds and the application of a suitable census technique on a regular, twice a year, basis would provide a much improved baseline assessment of the status of Diego Garcia's wildlife.

2. Records of previously unreported birds should be maintained and are of particular importance in evaluating Diego Garcia's role in the distribution and range of those species.

6.3 Education about wildlife:

1. Signs with pictorial and written descriptions of common birds should be placed in areas where these birds can be seen by the general public. This might include spots alongside the ponds near the airfield and beside roads/trails used for jogging and biking.

2. A pamphlet on the birds of Diego Garcia with a checklist of known species and brief information on common species along with the importance of the island to migrants and seabirds should be produced and made available to all interested personnel. Such a pamphlet can be a valuable education and conservation tool as well as a source of pride for those stationed on the island.

6.4 Pestiferous Species:

1. Cats and rats cause significant damage to island ecosystems. There needs to be an active program designed to keep their numbers in check. Total eradication, while desirable, may be unrealistic—at least in the short term.

2. To start with, control measures should be concentrated around wetlands and breeding colonies such as Barton Point. If the three islets are found to be cat- and rat-free, every effort should be made to restrict their access.

3. The donkey situation seems less critical, and given their low numbers and restriction to primarily open habitat, the prudent approach at present might be to monitor the population and if funds and resources become available, remove them from the island.

6.5 Potential problems from birds:

1. Birds and aircraft are a dangerous mix. During both 1995 visits the question was posed to Air Operations whether or not air strikes were a problem at Diego Garcia. The reply was there had been some infrequent bird strikes but data on what birds were involved were not kept. In the future, all birds struck by aircraft should be collected, frozen, and properly identified. Records of the date, time of strike, and weather conditions should be attached to the specimen. *Editor's note: samples of feathers have been requested to be delivered to the PACDIVNAVFAC biologist for identification purposes as part of the BASH program being developed.*

2. Cattle Egrets have presented problems at airports in Hawaii. This species utilizes the grass margins and wetlands adjoining the Diego Garcia airfield. This species population and activity should be monitored, and if necessary, regulated should it be found to pose a significant threat to aircraft.

7. 1995 RECORDED BIRD SPECIES

The following symbols of are used in Table 1,2, and 3 for the bird species recorded as seen in 1995 at Diego Garcia, Chagos Archipelago, British Indian Ocean Territory.

Status (Relative Abundance) = Average number recorded at census stations in appropriate habitat.

A = Abundant	=	10+
C = Common	=	5-9
U = Uncommon	=	1-4
R = Recorded	=	Observed at only one or two census stations or a single sighting not on a census station. The number which follows is the maximum number recorded.

1995 Records (* = First Records for Diego Garcia)
M = March
J = July
O = Other (N.J.P Wraith Records)

Table 1: Seabirds
Recorded As Seen in 1995

SCIENTIFIC NAME	COMMON NAME	STATUS (Relative Abundance)	1995 RECORDS
Macronectes sp. (Either *M. Giganteus* or *M. Halli*)	Giant Petrel	-	-
Fulmareus glacialoides	Southern Fulmar	-	-
Pachyptila sp.	Prions	-	-
Puffinus carneipes	Flesh-footed Shearwater	-	-
Puffinus pacificus	Wedge-tailed Shearwater	-	-
Puffinus Iherminierii	Audubon's Shearwater	R-8	M
Pterodrama sp.	Gadfly Petrel	-	-
Bulweria bulweri	Bulwer's Petrel	-	-
Bulweria fallax	Jouanin's Petrel	-	-
Oceanodroma matsudairae	Matsudaira's Storm Petrel	-	-
Oceanodroma momorhis	Swinhow's Storm Petrel	-	-
Oceanites oceanicus	Wilson's Storm Petrel	-	-
Pelagodroma marina	White-faced Storm Petrel	-	-
Fregatta grallaria	White-bellied Storm Petrel	-	-
Fregetta tropica	Black-bellied Storm Petrel	-	-
Phaethon acthereus	Red-billed Tropicbird	-	-
Phaethon lepturus	White-tailed Tropicbird	U	M,J
Phaethon rubricauda	Red-tailed Tropicbird	-	-
Sula abbotti	Abbott's Booby	-	-
Sula dactylatra	Blue-faced Booby	-	-
Sula leucogaster	Brown Booby	R-50	J
Sula sula	Red-footed Booby	A	M,J
Fregata ariel	Lesser Frigatebird	R-60	J
Fregata minor	Greater Frigatebird	C	M,J
Catharacta skua	Great Skuka	-	-

SCIENTIFIC NAME	COMMON NAME	STATUS (Relative Abundance)	1995 RECORDS
Sterna albifrons	Little Tern	C	M,J
Sterna bengalensis	Lesser Crested Tern	-	-
Sterna bergii	Great Crested Tern	U	M,J
Sterna dougalli	Roseate Tern	R-9	M
Sterna fuscata	Sooty Tern	-	-
Sterna hirundo	Common Tern	U	M*
Sterna sumatrana	Black-naped Tern	C	M,J
Anous stolidus	Brown or Common Noddy Tern	A	M,J
Anaus tenuirostris	Black or Lesser Noddy Tern	U	M,J
Gygis alba	White or Fairy Tern	A	M,J
Chlidonias hybridus	Whiskered Tern	R-1	M
Chlidonias leucopterus	White-winger Black Tern	R-several	O

Table 2: Migrants And Vagrants Recorded As Seen in 1995

SCIENTIFIC NAME	COMMON NAME	STATUS (Relative Abundance)	1995 RECORDS
Dromas ardeola	Crab Plover	R-2	J,O
Pluvialis fulva	Paacific Golden-Plover	R-5	M*,J
Pluvialis squatarola	Grey or Black-bellied Plover	C	M*
Charadrius alexandrinus	Kentish or Snowy Plover	R-10	M*
Charadrius mongolus	Lesser Sandplover	R-3	M*
Charadrius leschenaultii	Greater Sandplover	R-1	M
Limosa limosa	Black-tailed Godwit	R-3	M,J
Limosa lapponica	Bar-tailed Godwit	R-2	M,J
Numenius phaeopus	Whimbrel	A	M,J

SCIENTIFIC NAME	COMMON NAME	STATUS (Relative Abundance)	1995 RECORDS
Numenius arquata	Eurasian Curlew	-	-
Tringa erythropus	Spotted Redshank	R-2	M*
Tringa totanus	Redshank	R-1	M*
Tringa nebularia	Greenshank	U	M,J
Tringa guttifer	Spotted Greenshank	R-3	M*
Tringa glareola	Wood Sandpiper	-	-
Xenus cinereus	Terek Sandpiper	-	-
Actitis hypoleucos	Common Sandpiper	R-1	M
Heteroscelus brevipes	Grey-tailed Tattler	R-1	M,J
Arenaria interpres	Ruddy Turnstone	A	M,J
Gallinago media	Great Snipe	-	-
Gallinage stenura	Pintail Snipe	R-3	M*
Limnodromus semipalmatus	Asiatic Dowitcher	R-1	M*
Calidris alba	Sanderling	U	M
Calidris ruficollis	Red-necked Stint	R-2	M*
Calidris minuta	Little Stint	R-6	M*
Calidris ferruginea	Curlew Sandpiper	A	M,J
Anas crecca	Garganey Teal	R-4	M*
Ardea cinerea	Grey Heron	-	-
Plegadis falcinellus	Glossy Ibis	R-1	M*,J
Phoenicopterus sp.	Flamingo	-	-

Table 3: Resident Birds
Recorded As Seen in 1995

SCIENTIFIC NAME	COMMON NAME	STATUS (Relative Abundance)	1995 RECORDS
Butorides striatus	Little Green Heron	U	M,J
Bubulcus ibis	Cattle Egret	A	M,J
Francolinus pondicerianus	Grey Francolin	-	-
Gallus gallus	Domestic Fowl or Chicken	C	C,J
Amaurornis phoenicurus	White-breasted Waterhen	U	M,J
Streptopelia picturata	Madagascar Turtle Dove	C	M,J
Geopelia striata	Zebra or Barred Dove	U	M,J
Hypsipetes borbonicus	Olivaceous Bulbul	-	-
Acridotheres tristis	Common Mynah or Indian Mynah	A	M,J
Foudia madagascariensis	Madagascar Fody	A	M,J

8. SOURCES CITED

Bourne, W.R.P. 1971. *The Birds of the Chagos Group, Indian Ocean.* Atoll Res. Bull. 149:175-207.

Farquhar, S. St J. 1900. *One Two Nesting-places of Gannets and Terns in the South Indian Ocean.* Ibis VII, 6:63-67.

Hails, C. and F. Jarvis. 1987. *Birds of Singapore.* Times Editions, Singapore.

Harrison, P. 1983. Seabirds: *An Identification Guide.* Houghton Mifflin Co., Boston.

Honacki, J.H., K.E. Kinmam and J.W. Koeppl. ed. 1982. *Mammal Species of the World: A Taxonomic and Geographic Reference.* Allen Press, Inc. and the Association of Systematic Collections. Lawrence, Kansas.

Hutson, A.M. 1975. *Observations on the Birds of Diego Garcia, Chagos Archipelago, with Notes on other Vertebrates.* Atoll Res. Bull. 175:1-25.

Johnson, O.W., P.M. Johnson and P.L. Bruner. 1981. *Wintering Behavior and Site-Faithfulness of Golden Plovers on Oahu.* 'Elepaio 41(12):123-130.

Johnson, O.W., M.L. Morton, P.L. Bruner and P.M. Johnson. 1989. *Fat Cyclicity, Predicted Migratory Flight Ranges, and Features of Wintering Behavior in Pacific Golden-Plovers.* Condor 91:156-177.

Johnson, O.W., P.L. Bruner, P.G. Connors and J.L. Maron. 1993. *Breeding Ground Fidelity and Mate Retention in the Pacific Golden-Plover.* Wilson Bull. 105(1):60-67.

King, B., M. Woodcock and E.L. Dickinson. 1975. *A Field Guide to the Birds of South-east Asia.* Collins, Great Britain.

Madge, S. and H. Burn. 1988. *Waterfowl: An Identification Guide to the Ducks, Geese and Swans of the World.* Houghton Mifflin Co. Boston.

PACNAVFACENGCOM. 1973. *Wildlife. Natural Resources Conservation Land Management Plan for: Diego Garcia British Indian Ocean Territories.*

Penny, M. 1974. *The Birds of Seychelles and the Outlying Islands.* Taplinger Publishing Co., INC., New York.

Pratt, H.D. 1980. *The White-faced Ibis in Hawaii.* 'Elepaio 41:45-46.

Pratt, H.D., P.L. Bruner and D.G. Berrett. 1987. *A Field Guide to the Birds of Hawaii and the Tropical Pacific.* Princeton University Press, Princeton.

Ripley, S.D. 1977. *Rails of the World.* David R. Godine. Boston.

Avifaunal Survey Summary for Point Count Surveys Conducted July 2003 and March 2004, and Incidental Sightings of July 2003, March 2004 and January 2005, Diego Garcia,British Indian Ocean Territory

Prepared by Ms. Vanessa E. pepi
NAVFAC Pacific

Appendix F2 a

Introduction

The purpose this report is to summarize the avifauna surveys conducted in July 17-24, 2003 and March 7-18, 2004 (please see Appendix F2b) and incidental sightings recorded January 26 – February 3, 2005. These surveys were conducted in order to support the Integrated Natural Resources Management Plan (INRMP) update.

Methods

In July 2003 permanent bird count stations (BCS) were established and recorded using a Global Positioning System (GPS) for the INRMP update surveys. These stations were established based on stations previously described/used by Dr. Phil Bruner (1995) for the 1997 Natural Resources Management Plan for Diego Garcia. At least one 10-minute count was conducted at each bird count station and recorded on a data sheet. All species heard and/or seen were recorded. Any incidental sightings (any sightings not conducted at a bird count station) were recorded in a notebook.

Results

During these recent surveys, a total of 35 species of birds have been recorded on or near Diego Garcia. Tables 1-3 give a complete listing of all species found during these surveys.

Species Accounts – Systematic Listing

- **Audubon's shearwater** (*Puffinus iherminieri*)

Audubon's shearwaters have been recorded previously on Diego Garcia (Bourne 1971) and may have been heard during the survey in 1971 (Hutson 1975). Bruner (1995) observed up to eight individuals flying from West Island during his surveys in March.
Symens (1999) did not record any sightings of Audubon's shearwaters at Diego Garcia in 1996. Individuals were heard vocalizing and then observed in March 2004 (Burr 2005) in the upper parts of coconut trees near BOQ7 (Fig. 1).

Figure 1. Audubon's shearwater in the upper part of a coconut tree.

- **Wedge-tailed shearwater** (*Puffinus pacificus*)

The 1971 ATRB (Bourne 1971) reported that wedge-tailed shearwaters were historically known to breed on Diego Garcia (Fig. 2). However, they were not positively identified (identified only as a shearwater and could have been an Audubon's) during a survey in 1971 (Hutson 1975), not observed in 1995 (Bruner 1995) or in 1996 (Symens 1999). During the July 2003 surveys, Nestor Guzman (CODE) showed us the locations of probable breeding areas. Those areas were mapped using GPS (these maps are Chapter 4, 2005 DG INRMP) and it was noted that predator control was occurring around those nesting areas. Obvious burrows and nesting behavior were observed under the *Pandanus* spp. on the lawn in front of the PWD building in February 2005. Photographs were taken and during that time vocalizations from a chick were also noted.

Figure 2. Wedge-tailed shearwater

- **Red-tailed tropicbird** (*Phaethon rubricauda*)

There is a historical record of red-tailed tropicbird occurrence and nesting on Diego Garcia. Observations made by Finsch during a visit to the atoll on July 8, 1884 noted that he did not observe any tropicbirds, but was told that they occurred in small numbers (Bourne, 1971). Red-tailed tropicbirds were not recorded in field studies until July 2003. N. Guzman showed us the nesting area near the soccer fields and he has observed an increase in their numbers since the first nesting pair was observed in 1996. These birds nest on the ground and predator control occurs around the known nesting area. They breed all year round on Diego Garcia, with the peak in nesting occurring between December and March (Fig. 3).

Figure 3. Juvenile red-tailed tropicbird.

- **White-tailed tropicbird** (*Phaethon lepturus*)

White-tailed tropicbirds have been observed flying during all recent studies (Hutson 1975, Bruner 1995 & Symens 1999) and during the INRMP-update surveys.

- **Lesser frigatebird** (*Fregata ariel*) and **great frigatebird** (*Fregata minor*)

Great and lesser frigatebirds have been recorded previously on Diego Garcia (Bourne 1971 & Hutson 1975). Breeding activity wasn't documented on those two previous studies, but they noted that this activity had been reported in the past. Only lesser frigatebirds were positively identified during the survey in 1971 (Hutson 1975) and in the 1995 surveys (Bruner 1995), but were not observed on Diego Garcia during the 1996 surveys (Symens 1999). In July 2003, lesser

frigatebirds were observed on the east arm of Diego Garcia and off of Middle Island (survey from a boat). They were also observed on East and Middle Island and along the eastern arm of the main island during the March 2004 surveys (Burr 2005). Great frigatebirds were observed during both the 1995 and 1996 surveys, but no breeding was recorded (Bruner 1995 & Symens 1999). In July 2003, great frigatebirds were observed flying over the atoll and in March 2004 observed flying and roosting. The majority of observations occurred above or on the eastern arm of the main island or on Middle Island. Additionally, during the 1995 and 2004 surveys, juvenile frigatebirds were observed on the islets. According to Bruner (1995) and the 2003-04 observations, lesser frigatebirds may be more common than great frigatebirds on Diego Garcia.

- **Red-footed booby** (*Sula sula*)

Relatively small numbers of red-footed boobies nesting on Diego Garcia had been reported by Bourne (1971) and Hutson (1975). During the 1995 NRMP surveys, Bruner (1995) observed larger numbers of birds (in the 1000s) around Diego Garcia. The breeding appeared to be confined to the three islands and to the area around Barton Point. Symens (1999) observed over 8000 boobies around Diego Garcia in 1996 and noted that the populations were flourishing. Observations recorded from 2003 – 2005 indicate that the red-footed boobies are still nesting on the three small islands and at Barton Point. Additionally, the breeding colony has also expanded as far south as Sharks' Cove (about six miles (9.7 km) south of Barton Point) (Fig. 4).

Figure 4. Red-footed booby on a nest.

- **Brown booby** (*Sula leucogaster*)

Brown boobies were previously recorded in Novemeber/December 1960 around Diego Garcia (Bourne 1971), but they were not recorded during Hutson's (1975) report. Fifty individuals were observed on East Island in July of 1995 (Bruner 1995), but were not observed during the February-March 1996 surveys (Symens 1999). One brown booby was observed flying north near the shore along Simpson Point in the morning on 17 July 2003; no sightings were recorded during the March 2004 surveys.

- **Cattle egret** (*Bubulcus ibis*)

The cattle egret was reportedly introduced to Diego Garcia from the Seychelle Islands in 1955 (Bourne 1971) (Fig. 5). However, according to conversations with residents, Hutson (1975) stated that they were introduced in 1953. Cattle egrets were observed very commonly on Diego Garcia in 1995 and Bruner (1995) estimated the island-wide population as several hundred individuals. Cattle egrets were observed most often from the cantonment to the airfield area in July 2003. The main rookery was identified and a global positioning system (GPS) point was recorded (See Figure 1). During the March 2004 surveys, cattle egrets were observed in the same areas as 2003, but also on West and East Islands. Egret culling began in March 2001 to reduce potential BASH hazards and is still active and implemented by the US Air Force and US Navy.

Figure 5. Cattle egret.

- **Dimorphic egret** (*Egretta dimorpha*) (Fig. 6)

This is the first record of the dimorphic egret at Diego Garcia. A single individual was observed and photographed on 1 February 2005 at the sand pit. The most notable item about this sighting is that the bird is banded (ringed).

Figure 6. Dimorphic egret.

- **Yellow bittern** (*Ixobrichus sinensis*)

The March 2004 survey was the first record of the yellow bittern occurring on Diego Garcia. Two individuals were observed foraging on the reef on 9 March 2004 at Station 11 (north of fuel farm), one individual at Station 29 (southern barrachois) on 10 March 2004, two individuals foraging on the ocean-side reef at Station 33B (Horsburgh Point) on 11 March 2004 and one incidental sighting of a yellow bittern flying over the lagoon on 12 March 2004.

- **Little green heron** (*Butorides striatus*)

This species is a resident of Diego Garcia and is considered abundant and widespread (Bourne 1971, Hutson 1975 & Bruner 1995). Little green herons were observed commonly during the 2003-04 surveys (Fig. 7).

Figure 7. Little green heron.

- **White-breasted waterhen** (*Amaurornis phoenicurus*)

A type of gallinule, potentially a moorhen or a white-breasted waterhen, was reported to occur on Diego Garcia (Bourne 1971 & Hutson 1975). Hutson looked for the birds when on Diego Garcia in 1971, but was unable to find any such bird. Bruner (1995) commonly observed waterhens at most wetlands and in some forested habitats during the 1995 surveys. White-breated waterhens were often observed in small numbers along side the road near wetlands and densely forested areas along the southern end of the runway and around Simpson Point during the 2003-04 surveys (Fig. 8).

Figure 8. White-breasted waterhen.

- **Ruddy turnstone** (*Arenaria interpres*)

Historically ubiquitous around all islands of the Chagos group (Bourne 1971, Hutson 1975 & Bruner 1995), ruddy turnstones were observed commonly in a variety of habitats during the 2003–04 surveys (Fig. 9).

Figure 9. Ruddy turnstone.

- **Pacific golden plover** (*Charadrius fulva*)

This species was not observed by Bourne (1971) and Hutson (1975), but was observed by Bruner (1995). Bruner recorded seeing birds in both March and July of 1995. Pacific golden plovers were observed as an incidental sighting at the gravel pit on 9 March 04.

- **Grey plover** (*Pluvialis squatarola*)

Grey plovers have previously been observed within the Chagos Archipelago (Bourne 1971) and were first recorded on Diego Garcia in 1971 by Hutson (1975). Grey plovers were recorded on both surveys in 1995 (March and July) (Bruner 1995) and as an incidental observation in the gravel pit area during the March 2004 survey.

- **Common ringed plover** (*Charadrius hiaticula*)

The March 2004 survey was the first to record this species on Diego Garcia. A single common ringed plover was observed near Station 13 on 7 March 04.

- **Whimbrel** (*Numenius phaeopus*)

Whimbrels were first collected in the late 1800s (Bourne 1971) and were considered common, but in small numbers on Diego Garcia (Hutson 1975). During the 1995 surveys it was determined that whimbrels were common

migrants to Diego Garcia. Whimbrels have been recorded in a variety of habitats all around Diego Garcia. They were commonly observed during the 2003-04 surveys.

- **Eurasian curlew** (*Numenius arquata*)

Bourne (1971) reported that one had been reported shot on Diego Garcia in 1960. Hutson (1975) and Bruner (1995) did not record any sightings of Eurasian curlews during their surveys. A single individual was recorded along the north shore of Middle Island on 16 March 2004.

- **Common greenshank** (*Tringa nebularia*)

Sightings of the common greenshank were not discussed in Bourne (1971). The first record for the Chagos Archipelago was recorded in April 1971 (Hutson 1975). Greenshanks were recorded by Bruner (1995) in March & July of 1995 and were observed during bird count surveys in March 2004 and as incidental sightings at the gravel pit in February 2005 (Fig. 10).

Figure 10. Common greenshank.

- **Greater sandplover** (*Charadrius leschenaultia*)

The greater sandplover was first recorded on Diego Garcia by Hutson (1975) and was observed once in March in 1995 (Bruner 1995). It was observed four times over two days in March 2004.

- **Sanderling** (*Calidris alba*)

Bourne (1971) reported one small sighting in 1960 and Hutson (1975) reported that they were regularly seen in small numbers around the island. Bruner (1995) did not encounter any sanderlings in July, but observed them in small numbers

in March. Small numbers (usually one or two) were observed in July 2003 (incidental sightings), during the March 2004 surveys, and incidentally in January 2005 (Fig. 11).

Figure 11. Sanderlings.

- **Curlew sandpiper** (*Calidris ferruginea*)

Curlew sandpipers were reportedly somewhat common in the late 1800s (Bourne 1971) and were described as a common wader in the barrachois and in pools by Hutson (1975). Bruner (1995) described the curlew sandpiper as the most abundant shorebird at Diego Garcia and recorded large numbers of the birds. Curlew sandpipers were observed in July 2003, March 2004 and in January 2005 (Fig. 12). In a groups of approximately 20 individuals, a male in breeding plumage was observed near Minni Minni on 26 January 2005.

Figure 12. Curlew sandpiper.

- **Great crested tern** (*Sterna bergii*) [called swift terns in Symens (1999)]

Great crested terns have previously been recorded/collected on Diego Garcia (Bourne 1971) and were considered to be very common around the atoll in 1971 (Hutson 1975). They were observed every survey day during the 1995 surveys (Bruner 1995) and individuals with recently fledged juveniles were observed in 1996 (Symens 1999). Birds were observed during the July 2003 and March 2004 surveys. Adults and fledglings were observed in 2004 (Fig. 13). Incidental sightings of great crested terns occurred in July, March (with fledglings) and January.

Figure 13. Juvenile great crested terns.

- **Black-naped tern** (*Sterna sumatrana*)

Black-naped terns were considered common at Diego Garcia in the late 1800's (Bourne 1971), but were listed as uncommon during the 1971 surveys (Hutson 1975). However, breeding by black-naped terns was recorded on Middle Island during those surveys. Small numbers of black-naped terns were observed in the lagoon area, but no nesting was observed during the 1995 surveys (Bruner 1995). Active colonies of black-naped terns were observed on West Island (Symens 1999). Two black-naped terns were observed flying near the piers at a point count station in July 2003. One to two individuals were observed within the barrachois and around West Island during the March 2004 surveys. Incidental sightings of black-naped terns were slightly higher; one sighting of a single individual observed on the ocean side of the island, one on the north end of the eastern side of the lagoon and two mixed in with a group of 30-40 great crested terns at Barton Point in July 2003. A single individual was recorded on the ocean side north of the donkey gate and breeding behavior (dive-bombing) was observed during point count surveys at the fuel pier in March 2004. Nesting by

black-naped terns was confirmed on the roof of Building 428 (Pier Utility Building) at the fuel pier in September 2004 (Burr 2005) (Fig. 14). An incidental sighting of an adult feeding a recently fledged juvenile was occurred at Cannon Point in January 2005. It appears that black-naped terns may breed during a large part of the year (from at least March through February).

Figure 14. Black-naped terns

- **Brown or common noddy** (*Anous stolidus*)

Historically, these birds nested on the ground (associated with sooty terns (*Sterna fuscata*)) and in trees on the main island (Bourne 1971). They were also recorded as nesting on the three islets. Hutson (1975) observed large numbers of birds nesting in coconut trees and seemed to be largely located on the northwest section of the island (above Pt. Marianne). Brown noddies were noted as numerous during both the 1995 and 1996 surveys. All nests on the main island were located in trees while nesting at West Island occurred on the ground (Bruner 1995 & Symens 1999). Brown noddies were observed at a majority of bird count stations on Diego Garcia during the 2003-04 surveys. Nesting was ongoing during both surveys and they were observed nesting on ground on West Island (Fig. 15).

Figure 15. Brown noddy fledgling.

- **Black or lesser noddy** (*Anous tenuirostris*)

This noddy was not considered as common as the brown noddy and may have been overlooked during earlier surveys (Bourne 1971). The lesser noddy was not observed during surveys in 1971 (Hutson 1975), but small numbers were recorded during the 1995 surveys (no breeding activity observed) (Bruner 1995). Breeding pairs were observed on East Island in 1996 (Symens 1999). Lesser noddies were not recorded during July 2003 surveys and were not observed at point count stations or on East Island during the 2004 survey. Incidental sightings of lesser noddies occurred near Station 24 (Burr 2005). A group of 10-15 individuals were observed loafing at the pier near Camp Justice in January 2005 (Fig. 16).

Figure 16. Lesser noddy.

- **Bridled tern** (*Sterna anaethetus*)

Records of bridled terns do not occur in the previous bird surveys at Diego Garcia (Bourne 1971, Hutson 1975, Bruner 1995 & Symens 1999). This appears to be the first record of bridled terns on West Island, Diego Garcia on 15 March 2004 (Burr 2005) (Fig. 17). Adult bridled terns and two nests were observed on West Island.

Figure 17. Bridled tern.

- **Little tern** (*Sterna albifrons*)

Little terns were not discussed in Bourne's (1971) synopsis of the Chagos Group, but were listed as a first record for the Chagos Archipelago at Point Marianne in April 1971 (Hutson 1975). Bruner (1995) observed little terns within the lagoon in breeding plumage in March. In July, individuals in non-breeding plumage and two recently fledged juveniles were recorded at the south end near Turtle Cove. Breeding at Diego Garcia was verified when four nests were observed in the inner lagoon area of East Island during the 1996 surveys (Symens 1999). In March 2004, little terns were observed flying, foraging or roosting during bird count station surveys. Sightings were typically at lagoon-side survey points or at points along or within the south end barrachois and associated with great crested terns along the shore near the channel marker at Barton's Point .

- **White tern** (*Gygis alba*)

White terns are common and nest all over the main island and on the three islets (Bourne 1971, Hutson 1975, Bruner 1995 & Symens 1999) and breeding appears to occur all year round (Fig. 18). During the 2003 and 2004 surveys birds were seen at many of the stations (19 bird count stations in 2003, 39 bird count stations in 2004).

Figure 18. White tern.

- **Zebra or barred dove** (*Geopelia striata*)

Zebra doves were commonly observed in populated and forested areas in small numbers during the 2003-04 surveys. The population of zebra doves on Diego Garcia may have increased since the 1995 surveys (Bruner 1995) due to the increased number of sightings of individuals and more sightings within forested areas (Fig. 19).

Figure 19. Zebra dove.

- **Madagascar turtle dove** (*Streptopelia picturata*)

The status of the Madagascar turtle dove has not changed greatly since the 1995 surveys. The birds were observed most commonly in and around the populated areas, however, they were also observed on the eastern arm of Diego Garcia (Fig 20).

Figure 20. Madagascar turtle dove.

- **Common myna or Indian mynah** (*Acridotheres tristis*)

Common mynas are considered an abundant species around Diego Garcia (Hutson 1975 & Bruner 1995). They were observed at 10 stations (some with groups of 10+ birds) around in the island in July 2003 and 27 stations around the island in March 2004 (Fig. 21).

Figure 21. Common myna.

- **Madagascar Fody** (*Foudia madagascariensis*)

Fodys were recorded as the most abundant landbird on Diego Garcia (Bruner 1995). Fodys were observed at 15 stations within a variety of habitats during the July 2003 surveys and at 37 stations during the March 2004 surveys (Fig. 22). In March, one sighting included a bird carrying nest material.

Figure 22. Madagascar fody.

- **Domestic fowl or chicken** (*Gallus gallus*)

The status of chickens has remained the same since the 1995 surveys (Bruner 1995). They are most commonly observed around all of the populated areas, but may be seen in the forested areas (Fig. 23).

Figure 23. Chicken.

Other Migrants/Vagrants recorded during non-survey efforts (Notes and observations from N. Guzman).

- **Purple heron** (*Ardea purpurea*)

An individual purple heron was observed off and on at the drainage ditch (cattail wetland) near the control tower on Diego Garcia from November 2000 – February 2001.

- **Glossy ibis** (*Pledgadis falcinellus*)

A glossy ibis had resided on Diego Garcia since 1995, but has not been seen since 2003.

- **Australian shelduck** (*Tadorna tadornoides*)

A total of 7 ducks were observed at the R-site sewage lagoon. Five juveniles were observed in September 2002 and two adults were observed October 2002.

- **Amur falcon** (*Falco amurensis*)

The amur falcon was observed on island November – December 2002

- **Peregrine falcon** (*Falco peregrinus*)

The falcon was found dead on the flight line on November 21, 2002 and was recorded as a Bird Air Strike Hazard (BASH) event.

- **House crow** (*Corvus splendens*)

A single individual was observed and heard in a takemaka tree (*Calophyllum inophyllum*) in front of the Central Texas College building from May 2002 – February 2005.

References

Bourne, W.R.P. 1971. The birds of the Chagos Group, Indian Ocean. Atoll Research Bulletin. 149: 175-207.

Burr, T. 2005. Integrated natural resources management plan update Diego Garcia, British Indian Ocean Territory avifaunal survey of 7-18 March 2004. Southwest Division, NAVFACENGCOM. 1-32.

Hutson, A.M. 1975. Observations on the birds of Diego Garcia, Chagos Archipelago, with notes on other vertebrates. Atoll Research Bulletin. 175:1-25.

Symens, P. 1999. Breeding seabirds of the Chagos Archipelago. Pages 257-272 in C. Sheppard and M. Seaward, eds. Ecology of the Chagos Archipelago. Linnean Society Occasional Publications. United Kingdom: Otley, West Yorkshire: Westbury Academic & Scientific Printing.

Table 1. Seabirds recorded on or around Diego Garcia, Chagos Archipelago July 2003, March 2004 and incidental sightings in January/February 2005. The birds listed are all historical observations that have been recorded at Diego Garcia. Bruner, 1995 = Birds recorded during the 1995 survey. Relative Abundance: A = Abundant (Always seen in appropriate habitat); C = Common (Usually seen in appropriate habitat): U = Uncommon (not always seen in appropriate habitat; and R = Rare (hard to find or found in very low numbers; - = Not recorded on survey. OBS = Observed during JUL = July; M = March; J = January.

Species Name	Common Name	Bruner, 1995	Jul-03	Mar-04	Relative Abundance	OBS
Macronectes sp. (Either M. Giganteus or M. Halli)	Giant Petrel	-	-	-		
Fulmareus glacialoides	Southern Fulmar	-	-	-		
Pachyptila sp.	Prions	-	-	-		
Puffinus carneipes	Flesh-footed Shearwater	-	-	-		
Puffinus pacificus	Wedge-tailed Shearwater	-	**X**	-	**U**	**JUL,J**
Puffinus lherminierii	Audubon's Shearwater	**X**	-	**X**	**U**	**M,J**
Pterodrama sp.	Gadfly Petrel	-	-	-		
Bulweria bulweri	Bulwer's Petrel	-	-	-		
Bulweria fallax	Jouanin's Petrel	-	-	-		
Oceanodroma matsudairae	Matsudaira's Storm Petrel	-	-	-		
Oceanodroma momorhis	Swinhow's Storm Petrel	-	-	-		
Oceanites oceanicus	Wilson's Storm Petrel	-	-	-		
Pelagodroma marina	White-faced Storm Petrel	-	-	-		
Fregatta grallaria	White-bellied Storm Petrel	-	-	-		
Fregetta tropica	Black-bellied Storm Petrel	-	-	-		
Phaethon acthereus	Red-billed Tropicbird	-	-	-		
Phaethon lepturus	White-tailed Tropicbird	**X**	**X**	**X**	**U**	**JUL, M**
Phaethon rubricauda	Red-tailed Tropicbird	-	**X**	-	**U**	**JUL, J**
Sula abbotti	Abbott's Booby	-	-	-		
Sula dactylatra	Blue-faced Booby	-	-	-		
Sula leucogaster	Brown Booby	**X**	**X**	-		

Table 1. Continued.

Species Name	Common Name	Bruner, 1995	Jul-03	Mar-04	Relative Abundance	OBS
Sula sula	Red-footed Booby	X	X	X	A	Jul,M, J
Fregata ariel	Lesser Frigatebird	X	X	X	C	Jul,M, J
Fregata minor	Greater Frigatebird	X	X	X	U	Jul,M, J
Catharacta skua	Great Skua	-	-	-		
Sterna albifrons	Little Tern	X	-	X	C	M, J
Sterna bengalensis	Lesser Crested Tern	-	-	-		
Sterna bergii	Great Crested Tern	X	X	X	C	Jul,M, J
Sterna dougalli	Roseate Tern	X	-	-		
Sterna fuscata	Sooty Tern	-	-	-		
Sterna hirundo	Common Tern	X	-	-		
Sterna sumatrana	Black-naped Tern	X	X	X	U	Jul,M
Anous stolidus	Brown or Common Noddy Tern	X	X	X	C TO U	Jul,M, J
Anous tenuirostris	Black or Lesser Noddy Tern	X		X	U	Jul,M, J
Gygis alba	White or Fairy Tern	X	X	X	A	Jul,M, J
Chlidonias hybridus	Whiskered Tern	X	-	-		
Chlidonias leucopterus	White-winged Black Tern	X	-	-		
Sterna anaethetus	Bridled Tern	-	-	X	R	M

Table 2. Migrants and vagrants recorded on or around Diego Garcia, Chagos Archipelago July 2003, March 2004 and incidental sightings in January/February 2005. The birds listed are all historical observations that have been recorded at Diego Garcia. Bruner, 1995 = Birds recorded during the 1995 survey. Relative Abundance: A = Abundant (Always seen in appropriate habitat); C = Common (Usually seen in appropriate habitat): U = Uncommon (not always seen in appropriate habitat; and R = Rare (hard to find or found in very low numbers; - = Not recorded on survey. OBS = Observed during JUL = July; M = March; J = January. New IDs = First record of sighting.

Species Name	Common Name	Bruner, 1995	Jul-03	Mar-04	New IDs	Relative Abundance	OBS
Dromas ardeola	Crab Plover	**X**	-	-	-		
Pluvialis fulva	Pacific Golden-Plover	**X**	-	**X**	-		
Pluvialis squatarola	Grey or Black-bellied Plover	**X**	-	**X**	-	**R**	**M**
Chadrius hiaticula	Common Ringed Plover	**X**	-	**X**	-		
Charadrius alexandrinus	Kentish or Snowy Plover	**X**	-	-	-		
Charadrius mongolus	Lesser Sandplover	**X**	-	-	-		
Charadrius leschenaultii	Greater Sandplover	**X**	-	**X**	-	**U**	**M**
Limosa limosa	Black-tailed Godwit	**X**	-	-	-		
Limosa lapponica	Bar-tailed Godwit	**X**	-	-	-		
Numenius phaeopus	Whimbrel	**X**	**X**	**X**	-	**U**	**Jul,M, J**
Numenius arquata	Eurasian Curlew	-	-	**X**	-	**R**	**M**
Tringa erythropus	Spotted Redshank	**X**	-	-	-		
Tringa totanus	Redshank	**X**	-	-	-		
Tringa nebularia	Greenshank	**X**	-	**X**	-	**U**	**Jul,M, J**
Tringa guttifer	Spotted Greenshank	**X**	-	-	-		
Tringa glareola	Wood Sandpiper	-	-	-	-		
Xenus cinereus	Terek Sandpiper	-	-	-	-		
Actitis hypoleucos	Common Sandpiper	**X**	-	-	-		
Heteroscelus brevipes	Grey-tailed Tattler	**X**	-	-	-		
Arenaria interpres	Ruddy Turnstone	**X**	**X**	**X**	-	**C**	**Jul,M, J**
Gallinago media	Great Snipe	-	-	-	-		

Table 2. Continued.

Species Name	Common Name	Bruner, 1995	Jul-03	Mar-04	New IDs	Relative Abundance	OBS
Gallinage stenura	Pintail Snipe	**X**	-	-			
Limnodromus semipalmatus	Asiatic Dowitcher	**X**	-	-			
Calidris alba	Sanderling	**X**	**X**	**X**		**U**	**Jul,M, J**
Calidris ruficollis	Red-necked Stint	**X**	-	-			
Calidris minuta	Little Stint	**X**	-	-			
Calidris ferruginea	Curlew Sandpiper	**X**	**X**	**X**		**A**	**Jul,M, J**
Anas crecca	Garganey Teal	**X**	-	-			
Ixobrichus sinensis	Yellow Bittern	-	-	**X**	**X**	**R**	**M**
Egretta dimorpha	Dimorphic egret	-	-	-	**X**		
Ardea cinerea	Grey Heron	**X**	-	-			
Plegadis falcinellus	Glossy Ibis	**X**	-	-			
Phoenicopterus sp.	Flamingo	-	-	-			
Falco peregrinus	Peregrine Falcon	-	-	-	**X**		
Corvus splendens	House Crow	-	-	-	**X**		

Table 2. Resident birds recorded on or around Diego Garcia, Chagos Archipelago July 2003, March 2004 and incidental sightings in January/February 2005. The birds listed are all historical observations that have been recorded at Diego Garcia. Bruner, 1995 = Birds recorded during the 1995 survey. Relative Abundance: A = Abundant (Always seen in appropriate habitat); C = Common (Usually seen in appropriate habitat): U = Uncommon (not always seen in appropriate habitat; and R = Rare (hard to find or found in very low numbers; - = Not recorded on survey. OBS = Observed during JUL = July; M = March; J = January. New IDs = First record of sighting.

Species Name	Common Name	Bruner, 1995	Jul-03	Mar-04	Relative Abundance	OBS
Butorides striatus	Little Green Heron	**X**	**X**	**X**	**U**	**Jul,M, J**
Bubulcus ibis	Cattle Egret	**X**	**X**	**X**	**C**	**Jul,M, J**
Francolinus pondicerianus	Grey Francolin	-	-	-	-	-
Gallus gallus	Domestic Fowl or Chicken	**X**	**X**	**X**	**C**	**Jul,M, J**
Amaurornis phoenicurus	White-breasted Waterhen	**X**	**X**	**X**	**C**	**Jul,M, J**
Streptopelia picturata	Madagascar Turtle Dove	**X**	**X**	**X**	**U**	**Jul,M, J**
Geopelia striata	Zebra or Barred Dove	**X**	**X**	**X**	**U**	**Jul,M, J**
Hypsipetes borbonicus	Olivaceous Bulbul	-	-	-	-	-
Acridotheres tristis	Common Mynah or Indian Mynah	**X**	**X**	**X**	**C**	**Jul,M, J**
Foudia madagascariensis	Madagascar Fody	**X**	**X**	**X**	**C**	**Jul,M, J**

Avifaunal Survey, Diego Garcia,
British Indian Ocean Territory

Prepared by Mr. Timothy Burr
NAVFAC Southwest

Appendix F2 b

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE DIEGO GARCIA, BRITISH INDIAN OCEAN TERRITORY AVIFAUNAL SURVEY OF 7-18 MARCH 2004

By

Timothy A. Burr
Senior Wildlife Biologist
Southwest Division, NAVFACENGCOM

INTRODUCTION

As required under OPNAV 5090.1C an update of an Integrated Natural Resources Management Plan (IRMP) is required when conditions change or emergent issues develop from those described in the existing INRMP. A multiple resource survey team visited the Diego Garcia (DG) atoll within the Chagos Archipelago in the British Indian Ocean Territory (BIOT) from 6 – 18 March 2004 to update information on the natural resources of DG as reflected in the 2000 INRMP. The team consisted of the following personnel and their respective expertise:

Ms. Vanessa Pepi	PACNAVFACENGCOM	Leader, sea turtles
Mr. Scott Vogt	PACNAVFACENGCOM	herpetology, mammal, land crabs
Ms. Julie Rivers	PACNAVFACENGCOM	vegetation, wetlands
Mr. Timothy Burr	SOUTHWESTNAVFACENGCOM	birds
Mr. Nestor Guzman	NAVSUPPFAC DIEGO GARCIA	support for all areas

METHODS

Previous avian surveys conducted in July 17 – 24, 2003 established a series of points throughout the entire atoll (with the exception of the barrier islands West, Middle and East) where 10-minute counts had been conducted. These points, based on stations established by P. Bruner (1995), were identified with flagging tape and at the conclusion of the July surveys, were recorded using a Global Positioning System (GPS) for transfer to the DG Geographic Information System (GIS) for documentation purposes as well as to be able to relocate each point in future visits.

Upon arrival at DG on 6 March 2004, the entire survey team conducted a reconnaissance overview of the lands from Canon Point (NW) to the British Gate (SSE and end of general paved road access areas) to familiarize/refamiliarize team members with various landmarks, natural areas and roadways. This continued during 7 and 8 March during which time the bird survey points (BSP) from Cannon Point to the British Gate were located with a GPS and marked with pink flagging with the BSP number to facilitate relocation during the bird surveys.

Bird surveys were initiated on 9 March and continued until 14 March beginning with BSPs at the NW area of DG (Station 1), progressing southward toward Stations 27 and 28, and then northward toward Barton Point (Station 49) at the very north end of the atoll (Figure 1). BSPs from the British Gate (Station 30) northward to Barton Point were marked and surveyed in a

"leap-frog" manner to allow morning surveys to continue while marking the yet-to-be surveyed stations during the remainder of the day, coordinating vehicular and GPS access. Due to the heavy vegetation on the access road north of Station 40, often requiring considerable time to clear an access wide enough for an all terrain vehicle, GPS receivers couldn't always provide locational information. In these cases, a few BSPs were marked using existing ¼ mile signs placed along the Barton Point access road for a foot race along with inter-BSP distances developed during the July 2003 survey.

Due to the extensive cooperation provided by CDR Christopher Davies of the Royal Navy, Governor BIOT, and the Royal Marines serving under him, extended access to the three barrier islands was possible for the first time. West (Station 53) and East (Station 50) Islands were visited on 15 March; due to tides and strong winds, Middle Island (Station 51) could not be visited until 16 March. Between 1.5 (West Is.) and 3.75 (East Is.) hours was spent on each island allowing for a general bird survey as well as general resource observations and photographic documentation of vegetation and prominent topographic features.

At least one 10-minute count was made at each BSP; additional counts were made as time and vehicle access allowed. All species heard and/or seen were recorded. Individuals observed flying or soaring overhead were also counted during the 10-minute count. Observations were conducted using either 10x40 binoculars or a fixed 30x telescope on a "gun stock" mount or both. Observations were conducted during acceptable weather conditions: wind was less than Beaufort 4, no rain, sunny and temperatures less than 100 degrees Fahrenheit. As time and vehicle access allowed, incidental trips were conducted after surveys to investigate areas adjacent to BSPs for additional species. General avian surveys not limited to a 10-minute time period were conducted at all three barrier islands.

Sound recordings were made by the author on 14, 16, 17 and 18 March at various locations. A Marantz PMD 221 and PMD222 cassette tape recorders were used with a Sennheiser ME80 omni directional microphone in a Dan Gibson parabolic reflector. Sound recordings have been archived at the Macaulay Library of Natural Sounds at Cornell University, Ithaca, New York.

FINDINGS

A total of 31 species of birds were observed and/or heard during the surveys at 51 stations on the main atoll and the three barrier islands (Table 1). All stations (1-52) on the main atoll were surveyed once and stations 49 through 40 were surveyed twice for a total of 61 separate surveys (Table 2).

Main Atoll

Probably the species of greatest interest on the main atoll was the Audubon shearwater seen and heard between BEQ 6 and BEQ 5 across the street from the open-air theater (Figure 2). The shearwaters, most likely of the subspecies *nicolae* (Harrison, 1983), were first heard calling about 1940 hours on 16 March while the survey team was walking back to our rooms in BOQ 11. There were multiple calls being given from at least 4-6 birds. All calls were coming from the upper parts of coconut trees and possibly the tops of buildings (Figure 3). Calling did not last long, beginning about 1940 and stopping by a little after 2005 hours. The calling was again heard from the same location on 17 March, the last night observations could be conducted, and lasted about the same time. Nestor Guzman remarked that he believes he has heard the same

calls off and on coming from the Camp Cummins area across from his room in BOQ 7 about the same time of day between May and December 2004. Although this species had not been observed or heard since March of 1995 when up to eight birds were seen flying from West Island (Bruner, 1995), it has probably just been overlooked because of its unusual call, limited distribution, and, apparently, short calling period.

Table 1. Birds Observed During the Integrated Natural Resources Management Plan Update, March 6-18, 2004

Audubon Shearwater	*Puffinus lherminieri*
White –tailed Tropicbird	*Phaethon lepturus*
Red-footed Booby	*Sula sula*
Lesser Frigate	*Fregata ariel*
Greater Frigate	*Fregata minor*
Pacific Golden Plover	*Pluvialis fulva*
Grey Plover	*Pluvialis squatarola*
Common Ringed Plover	*Charadrius biaticula*
Greater Sand Plover	*Charadrius leschenaultia*
Whimbrel	*Numenius phaeopus*
Eurasian Curlew	*Numenius arquata*
Common Greenshank	*Tringa nebularia*
Ruddy Turnstone	*Arenaria interpres*
Sanderling	*Calidris alba*
Curlew Sandpiper	*Calidris ferruginea*
Little Tern	*Sterna albifrons*
Great Crested Tern	*Sterna bergii*
Black-naped Tern	*Sterna sumatrana*
Bridled Tern	*Sterna anaethetus*
Brown Noddy	*Anous stolidus*
Lesser Noddy	*Anous tenuirostris*
Fairy Tern	*Gygis alba*
Green-backed Heron	*Butorides striatus*
Yellow Bittern	*Ixobrychus sinensis*
Cattle Egret	*Bubulcus ibis*
White-breasted Waterhen	*Amaurornis phoenicurus*
Madagascar Turtle Dove	*Streptopelia picturata*
Barred Dove	*Geopelia striata*
Common Myna	*Acridotheres tristis*
Madagascar Fody	*Foudia madagascariensis*

Another notable find on the main atoll was an apparent breeding colony of black-naped terns (BNTE) on the roof of the 2-story building at the "elbow" of the fuel pier (Figure 4A). On 18 March while searching for areas with a low ambient noise level for recording, I drove out on the fuel pier about 0730 hours. As I neared the point where the fuel pier makes a 90-degree turn to the northwest, I saw a number of BNTE flying and landing on the top of the building. During

the nearly 2 hours I spent there recording various calls and photographing the adult birds, I saw approximately 50+ birds. Many would "dive bomb" me as I stood near the building recording. This behavior is typical of terns and other species that are defending a nesting area. I was unable to gain access to the top of the building, however, so nesting could not be verified at that time. However on 22 September 2004, Nestor Guzman was able to get access to the top of this building and confirm that, indeed, BNTE were nesting. He found 19 nests at various stages of development, including eggs (13), chicks (4+) and juveniles (18) near fledging (Figures 9 and 10).
Photographs of other birds observed are presented in Figures 4B through 8B.

Barrier Islands
All three of the barrier islands were visited. West and East Islands were visited on 15 March and Middle Island on 16 March. These visits were possible only through the cooperation and generous support of CDR Davies and the post of British Marines. On both occasions, British Marines provided transportation to and from the islands in their rigid inflatable and aluminum hulled boats. The general weather conditions on both days were overcast skies, a wind of sufficient force to create whitecaps in the lagoon waters, and occasional light to moderate rain squalls.

West Island
West Island was visited on 15 March 2004 from approximately 1000 to 1100 hrs. The individuals participating in the visit included CDR Chris Davies (BOIT representative), Timothy Burr, Vanessa Pepi, Nestor Guzman and Julie Rivers. West Island is the smallest of the three barrier islands and is the closest to the main atoll. Although current BIOT and NAVSUPPFAC regulations prevent access to all three barrier islands, West Island is connected by a continuous reef to the main atoll that, at low tide, makes the island vulnerable to trespass by Diego Garcia residents and much more vulnerable to the introduction of rats and other undesirable land animals and plants.

This island has approximately 4.94 acres (2.0 hectares) of coral limestone and rubble on which the typical coastal littoral plants, dominated by Scaevola (*Scaevola taccada*) and the coconut palm (*Cocos nucifera*), have become established and appear to be healthy (Figures 11-13). An informal, unstructured count was made of all birds encountered as Burr walked around the entire island. No point count stations were established or surveys conducted on West Island.

An estimated 250+ boobies and 400+ noddies were observed; a total of 5 species were recorded on this island. One of the most notable discoveries was the widespread ground nesting by seabirds including brown noddies, red-footed boobies and bridled terns. The abundant ground nesting was a good indication that rats had not yet reached West Island. Indeed, no rats or rat sign were seen by any of the observers during the visit. Additionally, the large coconut or robber crabs were also absent. It is unknown why the coconut crabs were not found on West Island but this may be due to the limited high ground and few coconut trees.

West Island provided the only sightings of the bridled tern during the entire atoll visit. A total of 4 adults were observed (Figure 12). An added bonus was the discovery of two nests each with a single egg at the eastern end of the island near an old metal tower. Hermit crabs of different types were numerous throughout the island.

Middle Island

Middle Island was visited on 16 March 2004 from approximately 1150 to 1345 hours by Timothy Burr, Vanessa Pepi, Nestor Guzman and Julie Rivers. Middle Island is slightly larger than West Island at approximately 12.3 acres (4.98 hectares), and is the most difficult to reach due to the shallow reef along its south shoreline where a landing must be made. A visit to this island must be carefully timed to take full advantage of high tide, though this dependence on high tide can limit the length of stay on the island as well.

Although not much larger than West Island, Middle Island is more than three times wider and has a more developed tree canopy (Figure 14). A shallow pond on the south side of the island (Figure 15) appears to be permanent and, at a minimum, provides foraging and loafing habitat for both resident and migratory shorebirds and wading birds. Near the middle of the island, a series of photographs were taken in the cardinal compass directions, in the order of north, east, south and west, to record vegetation structure and diversity (Figures 16 and 17). Again, an informal, unstructured count was made of all birds encountered as Burr and Guzman walked around the entire island. No point count stations were established or surveys conducted on Middle Island.

A total of 12 species of birds were recorded during the nearly 2 hour visit. Red-footed boobies were the most numerous species and nests were observed with eggs, chicks and young indicating that the breeding season was well underway. A good number of lesser frigatebirds were seen roosting in trees on the lee of the island as well as soaring overhead. Only one greater frigatebird was seen. A larger shorebird component was recorded on Middle Island, probably a reflection of the more expansive foraging and loafing areas in the lee. A single Green-backed (striated) heron and two black-naped terns were observed.

Again, no rats or signs of rats were observed by any member of the team. Despite the apparent lack of rats, no ground nesting by brown noddies or other species was observed. In fact, brown noddies were not recorded, either roosting or flying, during this visit. Coconut crabs were also not observed during this visit, possibly for the same reason as proposed for West Island.

East Island

East Island was visited on 15 March 2004 from approximately 1130 to 1410 hours by CDR Chris Davies, Timothy Burr, Vanessa Pepi, Nestor Guzman and Julie Rivers. East Island is the largest of the three barrier islands, encompassing nearly 18.5 acres (7.49 hectares), and also supports the most extensive and diverse vegetation community (Figures 18-20). The team members landed on the lee or lagoon side of the island approximately two-thirds of the distance to its westernmost end where a sandy beach occurs. As with the other two islands, an informal, unstructured count was made of all birds encountered as Burr walked around the entire island. Because this was the largest island, two survey points were informally (non-permanent) set up and formal (timed) surveys were conducted; one (Station 50B) about midway down the windward side, and one (Station 50A) about midway down the lee side. A series of photographs were taken in the cardinal compass directions, in the order of north, east, south and west, at two points on East Island to record vegetation structure and diversity (Figures 21 - 24).

A total of 11 species of birds were recorded during the 2 hour 40 minute visit. Red-footed boobies were the most numerous species (between 500 and 700 birds) and nests were observed with eggs, chicks and young indicating that the breeding season was well underway. Ruddy

Turnstones and Whimbrels were frequently seen foraging and loafing along the shoreline. A few Fodys (2) were seen by J. Rivers, a first for any of the barrier islands. One possibly two Cattle Egrets were also seen on East Island; one at the start of observations at station 50B and one at photo plot 2.

East Island was unique among the barrier islands in that it supports a sizeable population of coconut crabs (Figure 25A). No estimate of the population size was made, but crabs of different age classes were observed indicating that reproduction was ongoing and the population was not in senescence. As with the other two barrier islands, rock crabs (Figure 25B) and hermit crabs of various colors were frequently seen along the shoreline rocks and interior dry land, respectively.

Again, no rats or signs of rats were observed by any member of the team on East Island. Despite the apparent lack of rats, no ground nesting by brown noddies or other species was observed. In fact, neither brown nor lesser noddies were recorded, either roosting or flying, during this visit.

RECOMMENDATIONS

1. With the ability of invasive species to move easily and rapidly about the globe, early detection and control is extremely important in an island ecosystem. There are currently no surveys occurring on a regular basis on the main island, especially in the vicinity of the airport. A survey protocol and permanent stations should be set up in the vicinity of the airport to monitor avian distribution and diversity. These surveys should occur not less frequently than once a month and could be conducted by existing on-island or PACDIV biologists, or some combination thereof.

2. As mentioned above, there are currently no surveys being conducted on a regular basis on the main island. However, current information on the status of island avifauna and other biota will be needed in the development of environmental documents that may support construction as well as ensure responsible resource management. It is recommended that a protocol be developed to initiate regular avifaunal surveys. The stations used in this survey could easily be maintained and should be surveyed at least 6 times a year, more frequently if possible, utilizing existing on-island or PACDIV biologists, or some combination thereof.

3. No sign of rats was found during the visits to West, Middle and East Islands. This is most likely the result of the water barrier around these islands as well as an “off limits” policy of the current BIOT administration. This is strongly supported and should be continued. For some species like the bridled tern, West Island appears to be their only nesting area. However, without some monitoring, there is no assurance that this rat-free environment will continue. A protocol must be set up as soon as possible to detect an invasion by rats, as well as other invasive plants and animals, and provide for regular visits to the islands by trained biologists. It would be very dangerous to assume they will continue to be rat-free without some way of documenting it.

References Cited

Bruner, P. 1995. Avifaunal and Feral Mammal Survey of Diego Garcia, Chagos Archipelago, British Indian Ocean Territory.

Harrison, P. 1983. Seabirds: An Identification Guide. Croom Helm Ltd, Kent.

Whistler, W. A. 1992. Flowers of the Pacific Island Seashore: A Guide to the Littoral Plants of Hawai'i, Tahiti, Samoa, Tonga, Cook Islands, Fiji, and Micronesia. Everbest Printing Co. Ltd., Hong Kong

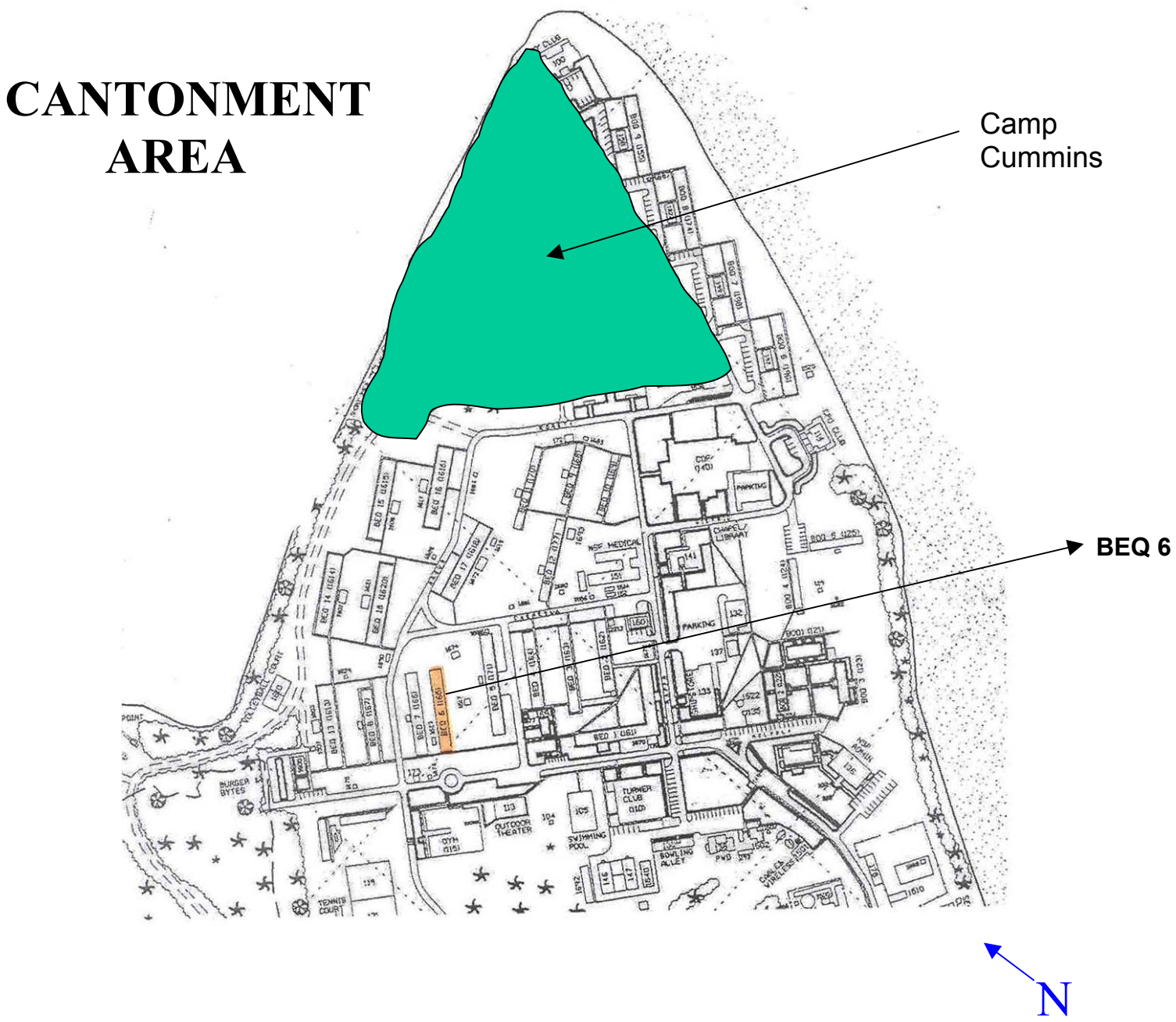

Figure 2. Location of BEQ 6 where Audubon's Shearwater were found.

Figure 3

A. Audubon's Shearwater on ledge of BEQ near outdoor theater. Photo by J. Rivers.

B. Audubon's Shearwater near top of coconut tree near BEQ and outdoor theater. Photo by J. Rivers.

Figure 4

A. Black-naped Tern on railing of fuel pier. Photo by T. Burr.

B. Lesser Noddy in shrubs on lagoon side near Station 24. Photo by T. Burr.

Figure 5

A. Curlew Sandpiper in pond near Station 13 (Gravel Pit). Photo by T. Burr

B. Great Crested Tern - adult (foreground), juvenile (background), with Little Terns in shallow pond near Station 13 (Gravel Pit). Photo by T. Burr

Figure 6

A. Red-footed Boobies near Station 49 at Barton Point. Photo by T. Burr

B. Red-footed Booby and young near Station 49 at Barton Point. Photo by T. Burr

Figure 7

A. White-breasted Waterhen along coral road near Station 13. Photo by T. Burr

B. Whimbrel at rest along road to Canon Point. Photo by T. Burr

Figure 8

A. Madagascar Fody, male (R), female (L) near BOQ 11. Photo by T. Burr

B. Madagascar Turtle Dove near BOQ 11. Photo by T. Burr

Figure 9

A. Black-naped Tern nest with eggs on roof of building on fuel pier, September 22, 2004. Photo by N. Guzman.

B. Black-naped Tern chicks of estimated to be 1-3 days old on roof of building on fuel pier, September 22, 2004. Photo by N. Guzman.

Figure 10

A. Black-naped Tern chick of unknown age on roof of building on fuel pier, September 22, 2004. Photo by N. Guzman.

B. Adult and fledgling Black-naped Terns on roof of building on fuel pier, September 22, 2004. Photo by N. Guzman.

Figure 11

A. Brown Noddy with egg just behind rock in foreground, West Island. Photo by T. Burr.

B. Brown Noddies nesting on ground. Eggs visible beneath Scaveloa on right. West end of West Island. Photo by T. Burr.

Figure 12

A. Bridled Tern, East end of West Island. Photo by T. Burr.

B. Bridled Tern nest with 1 egg, East end of West Island. Photo by T. Burr.

Figure 13

A. South shoreline of West Island looking West, 15 March 2004. Photo by T. Burr.

B. South shoreline of West Island looking East, 15 March 2004. Photo by T. Burr.

Figure 14

Sand spit at south end of Middle Island looking north. Photo by T. Burr

Figure 15

Shallow pond in the central part of the south shoreline on Middle Island. Photo by T. Burr.

Figure 16

A. North view at photo point on Middle Island. Photo by T. Burr

B. East view at photo point on Middle Island. Photo by T. Burr

Figure 17

A. South view at photo point on Middle Island. Photo by T. Burr

B. West view at photo point on Middle Island. Photo by T. Burr

Figure 18

East Island taken from the east end of Middle Island. Photo by T. Burr.

Figure 19

A. Looking west from the landing point on the lee shoreline, East Island. Photo by T. Burr.

B. Windward shore looking west near the west end of East Island. Photo by T. Burr.

Figure 20

A. Windward shore looking east near middle of East Island. Photo by T. Burr.

B. Lee shoreline looking west from the eastern end of East Island. Photo by T. Burr.

Figure 21

A. North view at photo point 1on East Island. Photo by T. Burr.

B. East view at photo point 1on East Island. Photo by T. Burr.

Figure 22

A. South view at photo point 1on East Island. Photo by T. Burr.

B. West view at photo point 1on East Island. Photo by T. Burr.

Figure 23

A. North view at photo point 2 on East Island. Photo by T. Burr.

B. East view at photo point 2 on East Island. Photo by T. Burr.

Figure 24

A. South view at photo point 2 on East Island. Photo by T. Burr.

B. West view at photo point 2 on East Island. Photo by T. Burr.

Figure 25

A. Coconut or Robber Crab in the forest of East Island. Photo by T. Burr.

B. Rock Crab along the windward shoreline on East Island. Photo by T. Burr

Figure 26

A. Juvenile Great-crested Terns on beach at west end of East Island. Photo by T. Burr.