



**WATERBIRD BREEDING
COLONIES IN THE TOP
END OF THE NORTHERN
TERRITORY**

Ray Chatto



Parks and Wildlife Commission
of the Northern Territory

**TECHNICAL
REPORT**

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Cover photograph: Intermediate Egret *Ardea intermedia*, standing on nest in the East Alligator River colony in 1989. Photograph by G. Miles.

EXECUTIVE SUMMARY

This is the first report in a series that will document the location and status of selected faunal assemblages on the Northern Territory coastline, offshore islands and Top End floodplains. It addresses colonial waterbird breeding sites and includes species of egrets, herons, cormorants and ibises, and the Australian Pelican, Darter and Royal Spoonbill.

Little information existed on the location and status of waterbird breeding colonies in the Top End (north of latitude 16° 35'S) of the Northern Territory prior to 1990. Information gathered during aerial and ground surveys primarily between 1990 and 1999 have subsequently shown that the coast and major floodplains of the Top End have nationally and globally significant numbers of colonial nesting waterbirds, particularly Intermediate, Great, Little and Cattle Egrets.

Seventy-six colonies, confirmed active during the survey period, are here documented. The majority of these colonies were located during surveys by the author, while a few were listed from evidence provided by reliable informants during the survey period.

Colonies were distributed around most of the coast and larger coastal floodplains, extending inland for no further than about 40 kilometres. The most important areas for colonial waterbird breeding were the floodplains between the Moyle and Finnis Rivers and between the Adelaide River and Murganella Creek. The least important areas were the Tiwi Islands, Cobourg Peninsular, Groote Eylandt and most of the northern part of the Gulf of Carpentaria. Apart from two small colonies on Low Rock and Haul Round Island, no islands supported colonial waterbird breeding (their importance was for seabird breeding and will be discussed in a subsequent report).

The vast majority of the colonies were located on either Aboriginal land or pastoral leasehold land. Only 5% of colonies occurred on conservation reserves. This is an issue in need of consideration in the future.

Stands of mangrove or paperbark trees were strongly preferred as breeding sites, with some species of waterbird preferring one or the other for nesting sites, while others were found breeding equally in both types.

Fifteen species of waterbird breed at these sites, with individual sites having between 1 and 11 species. Colony sizes varied from the low tens to 15000+ adults. As well as having nationally significant numbers of colonies and numbers of birds within them, Top End colonies are important because most are active every year, unlike many colonies in southern Australia.

Breeding begins as early as November when Cattle Egrets commence nesting, and continues through to October when the later-breeding Darter, Australian White Ibis and Royal Spoonbill are finishing. The longest duration of any single colony was from November to August.

A further 52 colonies, which are not discussed in the main body of the report, have been listed as confirmed breeding colonies in the past, or possible breeding colonies at present. These mostly include colonies that were located from the air but require further investigation for confirmation, and sites appearing in historical records (ie prior to 1990) that may no longer be used, or were unable to be located from the information available.

All confirmed colonies are individually detailed in Appendix B and possible colonies in Appendix C.

The fauna of the Top End of the Northern Territory is in a very unique position. Not only is there an immense amount of habitat which holds large populations of many species, but most of the area is very remote and has not been subject to many of the pressures associated with large human populations. Although this is likely to remain the case for at least the short term, it is equally likely that the pressures of human expansion within Australia will see some of this area targeted for development at some stage in the more distant future. It is for this eventuality that we must be prepared. We must ensure the security of the more significant of these colonies before problems arise.

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Last but not least I would like to thank my wife and family for putting up with the large amount of time I was away from home over the years.

BACKGROUND AND OBJECTIVES

Much of the Northern Territory's Top End (defined here as north of latitude 16° 35'S) is very sparsely settled and relatively undisturbed. While much work has been done in recent years to survey biological values of terrestrial environments, much less has been done to locate and document the faunal values of the coast and floodplains.

In 1990, while conducting transect-based aerial surveys for Magpie Geese, the author began to include additional surveys incorporating the coast and associated habitats during return routes back to overnight locations. These surveys revealed significant aggregations of waterbirds and other fauna that did not appear to have been previously reported.

From these initial results a series of broad ranging aerial and ground surveys was initiated to further inspect the coast, islands, floodplains and larger inland wetlands of the Top End of the Northern Territory. The main objectives of these surveys were to locate and document sites that supported significant assemblages of a range of a selected species of fauna.

This report is the first of a series intended to help correct the deficiency of information about Top End coastal and near coastal sites, whose importance is disproportionate to their size because they often support large aggregations of feeding, roosting or breeding fauna.

This report focuses on sites used by colonial breeding waterbirds. Breeding colonies are very important sites and larger colonies may be of national or global significance. The location and documentation of these colonies is an important first step in ensuring their security in the future.

Aerial survey was essential because road or other forms of access to large parts of the Top End are very difficult, particularly during the breeding season. While this puts some constraints on the detail of information obtained, the overall project (and resultant reports) was primarily designed to provide a robust base from which to develop conservation strategies. Accurate assessment of bird numbers would require a much greater survey effort. Such precision would have seriously curtailed the aim of the overall project, and yet added little to the determination of conservation and management priorities. Hence, precise surveys were left for a later date. This report is intended to provide regional and national context rather than specific precision.



Plate 1. Mixed species colony (No. W055) near Roper River mouth. May 1999. Photo C. Hemple.

STUDY AREA AND ENVIRONMENT

Including islands and estuaries, the coastline of the Northern Territory extends for approximately 10000 kilometres, spanning some 9 degrees of longitude (129° 00'E to 138° 00'E) and just over 5.5 degrees of latitude (11° 00'S to 16° 35'S). Immediately adjacent to this coastline and continuing inland for varying distances of up to approximately 80 kilometres, is a semi-continuous band of tidally inundated saline wetlands and seasonally flooded floodplains. In addition there are a number of separate wetlands, isolated from the main floodplains, that retain water for varying periods. In total these areas cover around one million hectares and are broadly shown in Figure 1. The wetlands vary from highly saline flats with little vegetation, through to well-vegetated freshwater areas (Wilson *et al* 1991).

Wetlands further inland were only partially considered in this report. These consist of the middle and upstream reaches of rivers and streams, and the numerous, though mostly small, inland swamps and waterholes. These were not considered likely to contain significant breeding colonies, and the surveying of such a large area with only scattered wetlands was not considered cost-effective.

The key features of the hydrology of Top End wetlands are the seasonality of the large amount of rainfall and the influence of the large tidal range. Most of the Top End coast and hinterland receives an average of at least 1200mm of rainfall annually with the north-west receiving more than the east and south (Figure 2). Rainfall is highly seasonal, so that the wetlands are flooded annually during each wet season from December to March; followed by an extended drying out phase from April to October. Tidally induced/enhanced flooding is also a feature of many of the Top End coastal wetlands. Mean spring tidal ranges increase from the eastern Top End (where they average 2.2m) to the west (Darwin has an average range of 5.6m) and then further increases along the coast to the Western Australian border (Wyndham has an average range of 6.5m). Consequently, in the western parts of the Top End in particular, macro-tidal regimes can have significant influences on the flooding characteristics of coastal wetland systems.



Plate 2. Part of the East Alligator colony (W035), 1989 breeding season. Photo G. Miles

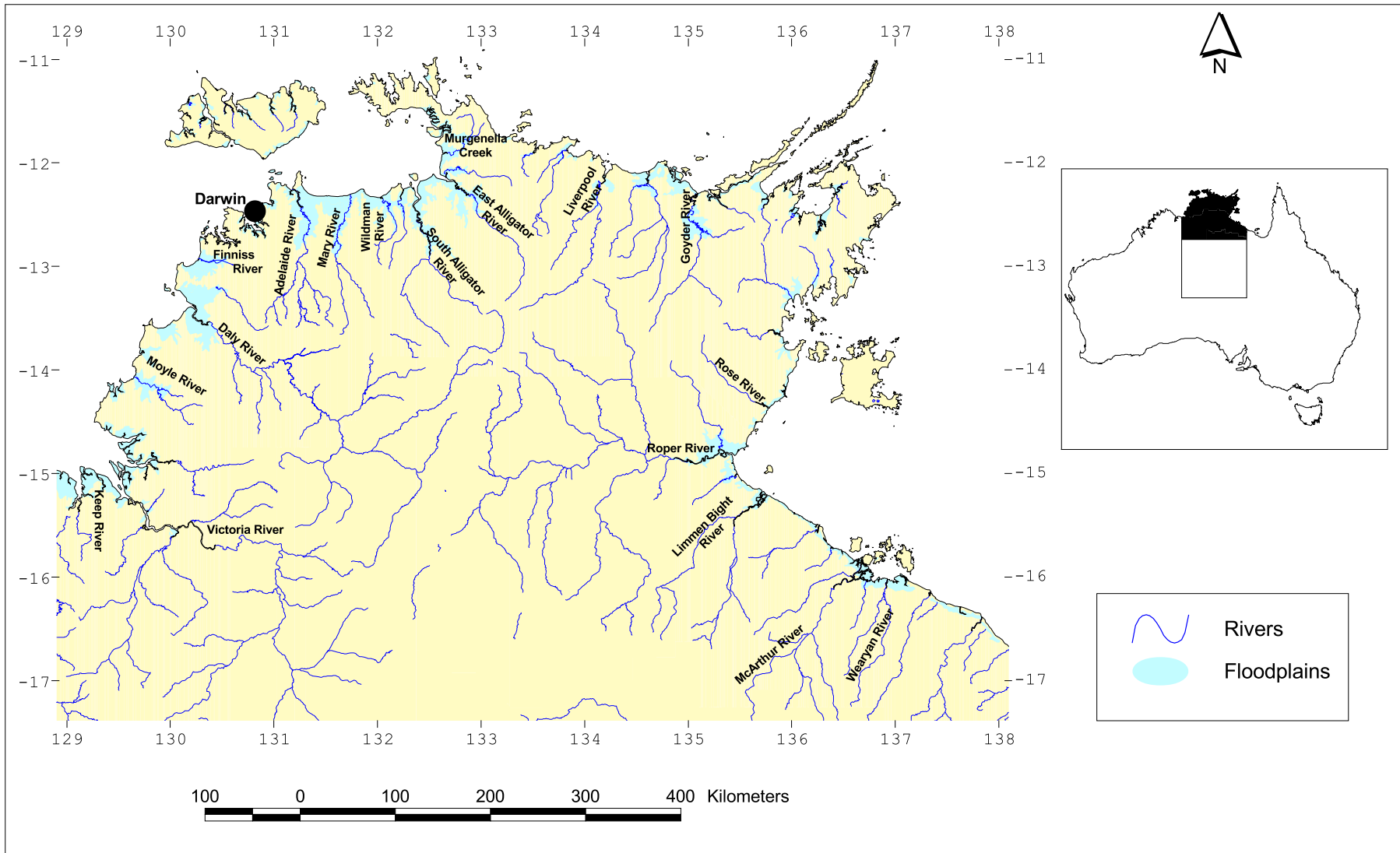


Figure 1. Major wetlands and rivers in the Top End of the Northern Territory.

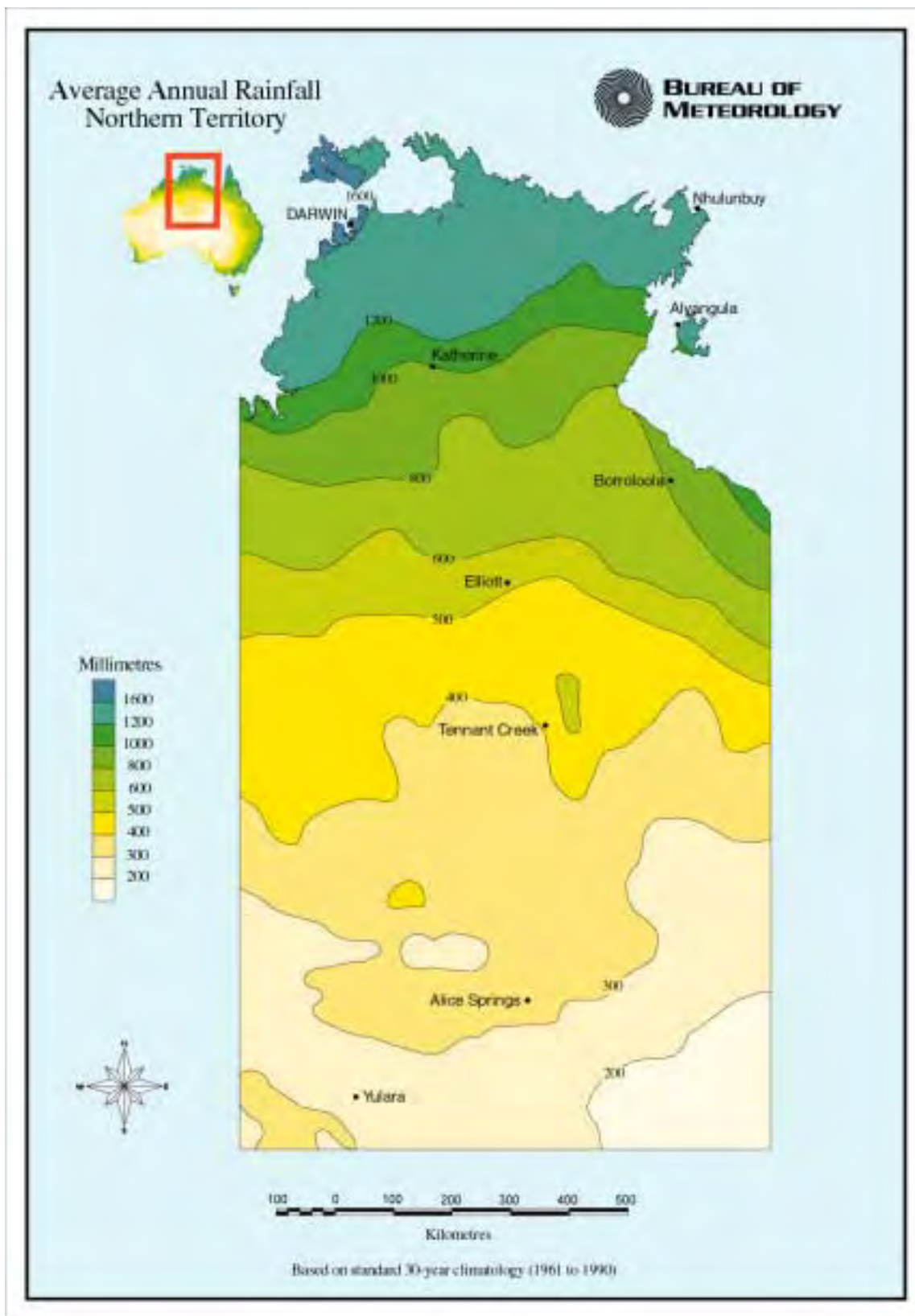


Figure 2. Average annual rainfall isohyets (mm) in the Northern Territory.

SPECIES SELECTED

The birds included in this report are listed in Table 1. They are all waterbirds that have been recorded breeding in large numbers in tightly packed breeding colonies in the Top End. The Glossy and Straw-necked Ibis are not regular breeders but are included among these birds because when they do breed in the NT they do so in large numbers and in the same colonies as these other species.

Other birds, common to the Top End, may also fit the definition of colonially breeding waterbirds at times. Some of these species such as *Tachybaptus novaehollandiae* Australasian Grebe, *Grus rubicunda* Brolga, *Irediparra gallinacea* Comb-crested Jacana, *Fulica atra* Eurasian Coot, *Himantopus himantopus* Black-winged Stilt and some of the ducks, have been recorded breeding in the Top End by the author, but not in large, tightly-packed colonies. Other colonial breeders such as *Recurvirostra novaehollandiae* Red-necked Avocet, *Sterna nilotica* Gull-billed Tern and *Chlidonias hybridus* Whiskered Tern have not been recorded by the author to breed in the Top End. Some of these species are briefly mentioned in this report.

Another colonial breeding waterbird, *Anseranas semipalmata* Magpie Geese, has not been included here as their breeding has been well described in other papers.

Other species such as *Sterna caspia* Caspian Tern, *Larus novaehollandiae* Silver Gull, *Egretta sacra* Eastern Reef Egret and *Butorides striatus* Striated Heron which have been observed by the author to breed in colonies in the Top End of the Northern Territory, will be covered in a later report concentrating on seabird breeding colonies.

Table 1. Species list

Order	Family	Species	Common name
Pelecaniformes	Anhingidae	<i>Anhinga melanogaster</i>	Australian Darter
		Phalacrocoracidae	<i>Phalacrocorax melanoleucos</i>
	<i>Phalacrocorax sulcirostris</i>		Little Black Cormorant
	<i>Phalacrocorax varius</i>		Pied Cormorant
	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican
Ciconiiformes	Ardeidae	<i>Ardea alba</i>	Great Egret
		<i>Ardea intermedia</i>	Intermediate Egret
		<i>Ardea garzetta</i>	Little Egret
		<i>Ardea ibis</i>	Cattle Egret
		<i>Ardea picata</i>	Pied Heron
		<i>Nycticorax caledonicus</i>	Nankeen Night Heron
	Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis
		<i>Threskiornis spinicollis</i>	Straw-necked Ibis
		<i>Plegadis falcinellus</i>	Glossy Ibis
		<i>Platalea regia</i>	Royal Spoonbill

METHODS

General Summary

Information presented in this report is taken from a long term and complex series of surveys with a number of methodologies, designed to encompass collection of data on a great deal more than just waterbird breeding colonies. Between 1990 and 1999 the author spent more than 500 field days conducting aerial and ground fieldwork to collect information on a variety of fauna. (A field day being any day on which a survey involved observations carried out for of at least one hour). Although limited searching was done in 1990 and 1997, the main surveys dealing with waterbird breeding colonies were conducted between March 1991 and September 1996, and in March/April of 1999. Although some sampling was specifically designed to target waterbird breeding colonies, the majority of field days also included surveys where other species or combinations of species were also targeted.

To accurately define the amount of time spent searching for and/or surveying waterbird breeding colonies is very difficult, particularly as the surveys also involved work on other groups of species. However, approximately 13 field days (mostly in 1993 & 1994) were spent with waterbird breeding colonies as the sole or primary purpose of the field time, and approximately 263 field days had at least some level of survey for waterbird breeding colonies. These figures include surveys done at different times of the year (discussed below under 'Temporal Coverage') and over many parts of the Top End coast and wetlands (discussed under 'Geographic Coverage'), and spanned sites and seasons sufficient to establish the limits of breeding activity with reasonable certainty. Table 2 shows the survey effort per year for the duration of the project.

Confirmed colonies were visited from the ground or air on 337 occasions, with individual colonies being visited up to 20 times over the survey period. The minimum observation during these visits was to record 'colony active' or 'colony inactive'. Surveys involving counts at active colonies or verification of current inactivity at a known site occurred on 113 of the total 263 field days, indicating that 150 days did not include observations on any of the confirmed colonies. These days were occupied with unsuccessful searches, including those directed at yet to be confirmed colonies, or checking now extinct colonies.

Table 2. Number of survey days for each year.

Year	Breeding colony dominated field days	Combination field days that included some breeding colony searching
1990	0	10
1991	0	31
1992	0	49
1993	7	52
1994	4	36
1995	0	19
1996	0	40
1997	0	2
1998	1	12
1999	1	12
TOTAL	13	263

Survey Types

Colonies were located and surveyed using fixed wing aircraft, helicopters, boats and airboats. The main methods used were:

1. Observations made while doing fixed wing transect surveys on the major Top End floodplains during the annual Magpie Goose surveys. The methods of these surveys are further described in Saalfeld (1990). Incidental observations of suspected waterbird breeding colonies sighted during the Magpie Goose surveys were recorded and re-flown for a better assessment following the completion of the day's goose surveys.
2. Fixed wing, broad scale searches around all of the Northern Territory coast and the major floodplains of the Top End. Smaller inland wetlands were only occasionally searched. These broad scale surveys were usually done in conjunction with searches or surveys also dealing with other species (eg migratory waders, seabirds or marine turtles). However, when mainly targeting waterbird breeding colonies, two main methods were used. When searching the coast or along rivers, the entire length was flown at a height averaging approximately 200 feet. When searching large floodplains, a height of between 500 and 1000 feet was flown to locate areas of potential breeding habitat (eg patches of *Melaleucas*). These were then searched at a lower height (around 200 feet), if suitable species of waterbird could be seen to be present. Because of the complex and varying shapes of the large floodplains, search patterns varied, but where appropriate some transect searching was done.
3. Fixed wing, helicopter, boat or airboat surveys of previously located sites. In these surveys, GPS-documented locations were targeted. Depending on the accessibility of the sites, varying amounts of time, from a few minutes of flying around the site to two hours on the ground, were spent estimating numbers, species and state of breeding.

Geographic Coverage

The area under consideration for these surveys included the coast and near coastal wetlands of the Top End of the Northern Territory north of latitude 16°35'S, and between longitudes 129°00'E and 138°00'E. This area incorporates a band extending inland from the coast for approximately 80 km from the Western Australian border around to the Queensland border. All off-shore islands were also included however these were of little importance to waterbird breeding colonies. Rivers were followed inland as far as the adjacent floodplains extended, or, if lacking adjacent floodplains or wetlands, as far as suitable mangroves or paperbarks extended. All of the Top End floodplains and larger wetlands were searched - some many times, others only once or twice. Smaller isolated inland wetlands were only randomly sampled, usually when they lay along the flight paths to and from targeted survey areas. Figure 3 shows the approximate area covered in the surveys.

Temporal Coverage

Due to the large size and remoteness of the survey area, logistic and cost constraints prevented regular visits to known colonies, or frequent searches of potential breeding sites. Consequently it was necessary to program regional surveys in conjunction with other targeted species, and try to achieve visits at 2-3 key times during the year. When specific waterbird breeding colony surveys were done, they were concentrated in the period December to June when most breeding occurs. However searches of potential areas were also done as often as possible at other times of the year.

The net result was that many sites known to support breeding were unable to be visited at the peak of their breeding. Consequently some sites were under-estimated in terms of colony size and species diversity. Nevertheless the general patterns are likely to be robust, and provide a sound basis for more comprehensive surveys should this eventually be deemed necessary.

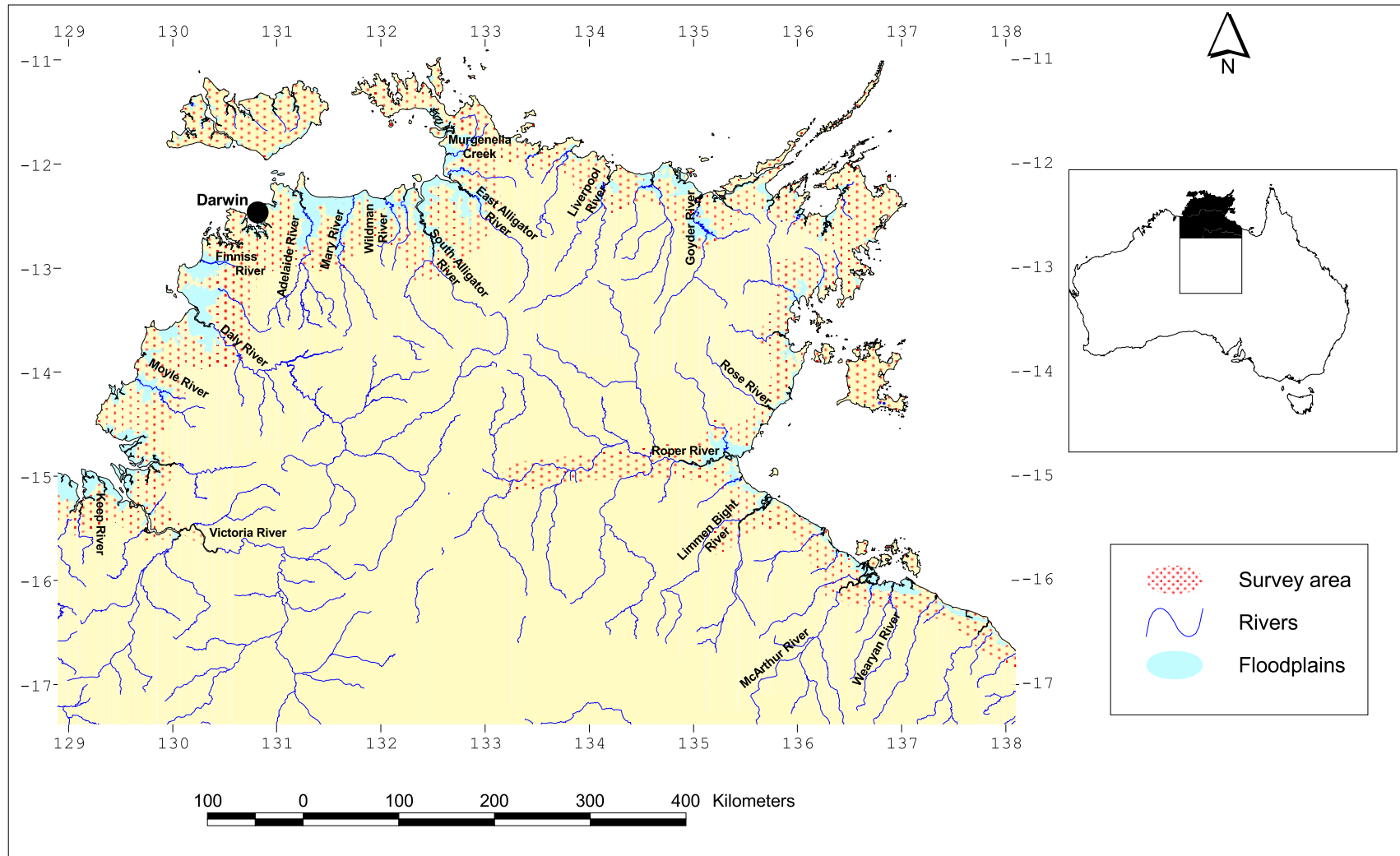


Figure 3. Survey area.

Quality of Numerical Estimates

Obtaining accurate estimates of the size of a large, mixed species waterbird breeding colony, in terms of either the number of breeding birds or the number of nests, is very difficult even under the best conditions. Mostly this is due to the difficulty of observing all birds/nests in a colony at a given time, whether from the ground or the air, but other contributing problems include:

- the varying degrees of parental absence from the colony between different species at different stages of the colony's breeding cycle and different times of the day,
- the differences between species and sites in terms of the number of birds that become visible from under tree canopies or behind vegetation as a result of aerial or ground disturbance,
- the asynchrony between and within species in timing of breeding,
- the ground access to most Top End colonies being both physically difficult, costly and subject to dangers caused by large estuarine crocodiles and wild pigs,
- the need to cover much area and many colonies in short periods of time, and thus spend only short periods of time at any one colony, because of the expense of helicopter hire and the many other species needing allocated time during these surveys to remote areas.

Except in the very few, small, easily accessible colonies, no attempts were made to accurately count the number of nests or pairs breeding in the colonies during this project. Instead, numerical estimates (either from ground or air) were based on the approximate number of adult birds that could be visibly seen flying around, and perching/sitting in the colony at the time of sampling. These estimates are not claimed to be anything else other than purely estimates by eye. They were not subject to any calibration or scientifically tested sampling procedures. They are however based on over 20 years of experience by the author estimating numbers of waterbirds during aerial and ground surveys. Methods used in the past by the author to estimate numbers, and hence develop skills in such estimations have included counting groups of birds in the field after first making an estimate, and comparing eyeball estimates with numbers counted off photographs.

Research has shown that both experienced and, more so, inexperienced observers, usually underestimate the number of birds visible in large groups (Garnett and Carruthers 1982; Morgan 1986; Bajzak and Piatt 1990; author, pers. obs.). With this in mind, and the points made above, it is more likely that the numbers given in this report are underestimates rather than overestimates.

Estimates in these surveys were made as either a minimum figure or a range estimate. This minimum estimate, or the middle of the range estimate, was then taken to represent the colony size (in terms of the number of adults present) for that survey. When a colony had more than one estimate in a season, the estimates most likely to be representative of the peak numbers of each species were used to allocate a seasonal size to that colony. To allocate an overall colony size to each colony over the period of the project (considering only the years that they were active), an average of each of the individual seasonal estimates ascertained over the years was used. Estimates that were clearly made very early or very late in the season were not included if they were the only estimate for that colony in that year.

Each final allocated colony size was then converted to a range to avoid unreliable impressions of precision. Ranges used in this report for total colony size were: 2–50 birds, 51–100, 101–500, 501–1000, 1001–5000, 5001–10000, 10001–15000 and 15000+. The last of these size classes was the largest chosen (even though a small number of colonies may have as many as 30000 birds) because of the difficulty of estimating numbers in such large colonies. The colony sizes during individual seasons are included in Table A1 of Appendix A. The 'allocated colony size' is also included in this table, as well as being included in the individual colony summaries of Appendixes B and C and the distribution map shown in Figure 4.

As well as estimates being made of the total colony (all species combined), they were also made of sub-groups (such as egret species) and/or of individual species. For most colonies the best method of estimating total colony numbers was from the air. However, individual species estimates usually had to include ground-based surveys as well. Estimating sub-groups or individual species numbers was more difficult than total colony size numbers. However, for most colonies, an estimate was attempted

for each species in the colony. Because the numbers for individual species were usually considerably less than the total colony size, different values were used to represent their ranges. The ranges for the individual species estimates were: 2–100, 101–500, 501–3000 and 3000+. [When a particular species (eg Great Egret) was confirmed among a sub-group (eg egret species), but no number estimate for that individual species was possible, a '?' was used to indicate number unknown, but that the species was present]. Individual species were also given totals for each season and an allocated overall size for within each colony during the survey period. Numbers of individual species, when able to be done, are included Tables A2, A4, A5, A6, A8, A10, A11, A13, A15, A17, A19, A21, A23 and A25 of Appendix A and the individual distribution maps (Figures 8–21).

In this report colony sizes are primarily discussed using estimates of the number of adult birds present in the colony. Clearly this is not as good as discussing colony sizes in terms of the number of pairs breeding or clutches present. Attempting to derive the number of breeding pairs by halving the number of birds would be unsound. Nevertheless, on the odd occasion when the aerial estimate of birds was compared with a subsequent ground estimate of nests, it was found that the number of nests was more than half the number of birds seen. Furthermore, there was little evidence to suggest that there were large numbers of birds present in the colonies that were not involved in breeding.

Separation of Species in Surveys

As previously stated, numerical estimates were based on the entire colony (ie all species combined), species groups (such as egret species) or individual species. Because it was not possible to accurately count all species separately from the air, it was often necessary to derive estimates from small sample counts. This was done by sampling one or more parts of the colony from accessible positions on the ground to determine relative abundances of each species within the samples. These relative abundances were then used to derive estimates of absolute abundance from the estimate of total colony, or species group, figures. For example an estimate of 2000+ egrets made from the air was then divided into individual species based on a smaller sample counted and identified to species level from the ground check. In many colonies access difficulties prevented sampling parts of the colony, so it is possible that there may be some bias if species were substantially segregated between visible and non-sampled parts of the colony.

In some cases estimates of species groups such as 'egrets' or 'cormorants' were unable to be further divided into separate species because a sample ground count was not possible. In the individual species tables for these species (Appendix A) such a situation is recorded as EB (egret breeding) or CDB (cormorant/darter breeding). This means that the respective species groups were breeding in the colony that year but no further information was obtained on which species were present.



Plate 3. Intermediate Egret fledgling, colony W033, South Alligator R. 1993. Photo G. Miles.

THE SITES

A total of 76 sites were confirmed to have colonial waterbird breeding between 1990 and 1999 in the Top End of the Northern Territory. All confirmed colony sites are individually numbered (W001 to W076) and detailed in Appendix B. A further 52 unconfirmed and/or historical colony sites that are not discussed in the body of this report, are individually numbered (W901 to W956, with W911, 14, 18 and 25 not currently allocated to a site because of recent confirmation of them not being a colony). These are detailed in Appendix C. For the purposes of indicating the location of these sites on the maps in this report (Figure B1, Appendix B and Figure C1, Appendix C), the 'W0' and 'W9' have been left off so as to reduce congestion on the maps.

No detailed assessment has been made of the floristic composition of the nesting sites, however the majority of colonies were in either mangroves or paperbark trees. Both of these habitats were commonly associated with the larger wetlands where most of the colonies were, but there were also considerable areas of other habitats types of habitats which were not chosen as nesting sites. Australian White Ibis sometimes nested in *Phragmites australis* and the Australian Pelican colony was on bare sand, but these were the only species not using trees to nest. Table 3 summarises the habitats in which nests were built.

Only three colonies and part of a fourth colony were located within declared Parks or Reserves (all in Kakadu National Park), the remainder being on Aboriginal land or pastoral leasehold. Tenures of the sites are given in Table 4.

Table 3. Habitats in which nests were built.

Nesting habitats	Number of colonies
Mangroves	37
Paperbark (<i>Melaleuca spp.</i>)	28
<i>Phragmites australis</i>	2
Rainforest	1
Bare sand	1
Eucalypts sp.	1
Paperbark/ <i>Mimosa pigra</i>	1
Rainforest/Mangroves	1
Freshwater mangroves/Reeds	2
Not described	2

Table 4. Land tenure of colony sites.

TENURE	NUMBER
Aboriginal land	45 (59%)
Pastoral leasehold	27.5 (36%)
Declared park/reserve	3.5 (5%)

THE COLONIES

Geographic Distribution

With the exception of one small cormorant colony, all 76 confirmed waterbird breeding colonies documented here were located on, or within about 40 kilometres of the coast, in a band that continues around most of the Top End. Although this was the area in which most of the survey work was concentrated, areas of floodplain and other major wetlands extending further inland than 40 kilometres were also surveyed. There may have been additional smaller colonies that were missed in these inland areas, but it is unlikely that many large colonies would have escaped detection. Two possible areas of exception may be the inland Roper River system which was only surveyed once (and probably too late in the season) and the inland part of the Victoria River, in the area of the junction of the Baines River.

Two colonies (both Pied Cormorant) were located on offshore islands, the remainder were on the mainland or mangrove islands very near to the mainland. Both island colonies supported more than 100 birds, and of the remaining 59 colonies to also support more than 100 birds, all were located on or adjacent to the bigger floodplain wetlands in the Top End. Twenty-seven of these 59 colonies were located directly on the coast or along rivers within one km of the coast, 10 were located along rivers a little further in from the coast but adjacent to large wetlands and 22 were located in large wetlands.

The coast and coastal floodplains in the western half of the Top End (west of 133° 00'E) were far more significant for waterbird breeding colonies than the eastern half. There was not a great deal of difference in the actual number of colonies in each half (42 in the west compared with 34 in the east), however many more of the larger colonies were located on the western side. For example, in this report, 23 colonies on the western side of the Top End were allocated a national significance rating for the purposes of this report (see Appendix B) compared with 4 on the eastern side.

Of the 27 colonies allocated a national significance level, 12 were found in the area between the Finnis River and the Moyle River, and 8 were between the Adelaide River and Murganella Creek. In terms of numbers, 11 of the 15 largest colonies were found in these areas, while in terms of species diversity, 12 of the 16 colonies containing eight or more species were here. These are the largest floodplains in the Top End and their importance for colonial waterbird breeding is very clear. Other significant areas include the Keep River estuary, floodplains from Maningrida east to the Goyder River in the Arafura Swamp, and the Port McArthur area. Areas where few or no colonies were found include the Tiwi Islands, the area between the Murganella floodplains and the Blythe/Cadell River floodplains, the northern part of the Gulf of Carpentaria and Groote Eylandt.

The location of all colonies is shown in Figure 4.

Numbers

Colonies ranged in size from a few birds to the largest single colony (W025 on the Adelaide River), which was allocated the maximum size range of 15000+. It is likely this colony supported nearer 30000 birds, but as already discussed, the largest allocated size was 15000+. Of the 76 colonies, the most common size class was 1001-5000 birds (Figure 5). Six colonies had in excess of 10000 birds.

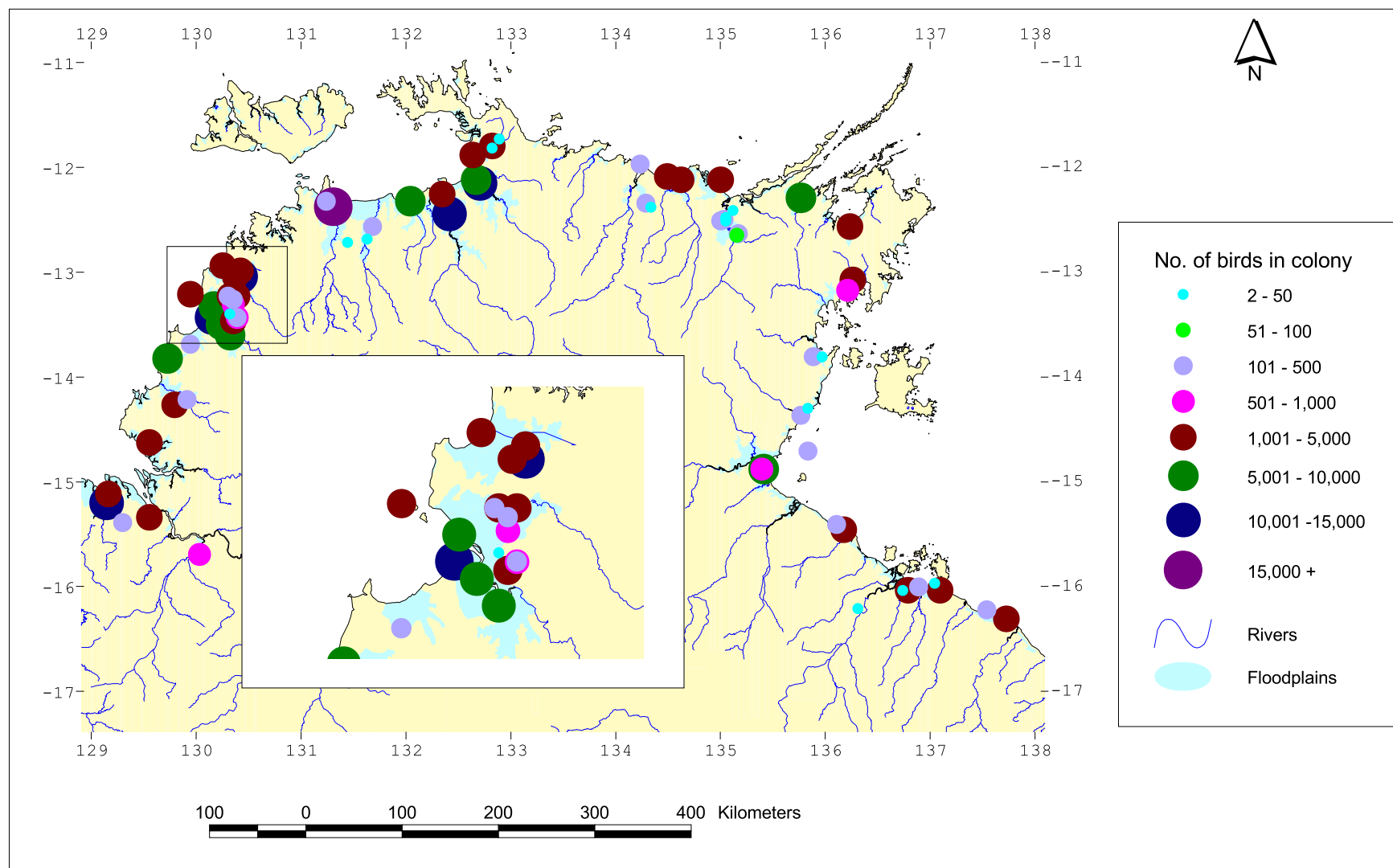


Figure 4. Location of colonies by total numbers of birds of all species combined per colony.

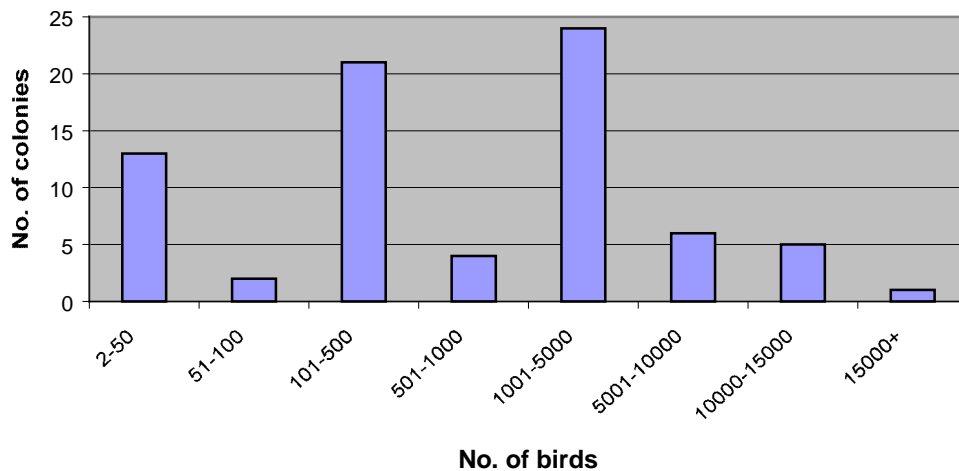


Figure 5. Frequency of occurrence of colonies with differing numbers of birds (of all species combined).

Individual numbers of adult birds present in each colony during each year it was visited, along with the overall average size class allocated to each colony, are presented in Table A1 of Appendix A.

In 1993, one of the main waterbird colony surveying years, a total of 33 colonies were estimated to have supported over 130000 birds at an average of nearly 4000 per colony. Of the other 43 colonies active or possibly active in this year, one was recorded as active but no number estimate was made, and the rest were not visited. If all colonies were active in this year, then applying the above average gives a possible total of 300000 breeding birds in Top End waterbird colonies for the 1993 season. In the author's opinion this figure is well under the peak number of these species occurring in the Top End during the breeding season. This may indicate that there are many large colonies that have not been found as yet, but this is doubtful. Alternatively it may be because a significant numbers of birds do not breed in a given year. However, it may simply be that the estimates of the number of birds in these colonies are very much under the true number.

As previously mentioned, the floodplains between the Daly and Finnis Rivers and between the Adelaide River and Murgella Creek had the majority of the Top End's colonial waterbird breeding, in terms of the number of colonies. This is also true for the numbers of birds in these colonies. At least two thirds of all birds located breeding in colonies in the Top End during these surveys bred in these two areas.

Further details of the number of birds of each species in all colonies can be found in Table 5 and the number of size classes for each species in Table 6.

Seasonality

The timing of breeding in all colonies varied from commencing as early as November (Cattle Egret) to finishing as late as October (Darter, Australian White Ibis and Royal Spoonbill), and involved all months in between. The longest duration of any single colony was from November through to August. In the main, individual colonies tended to be active at around the same time each year. The months of use are more specifically discussed under the individual species sections below. However, Table 7 summarizes the main breeding season for each species in the Top End.

Table 5. Allocated size classes for each species in each colony.

Colony Number	Intermediate Egret	Great Egret	Little Egret	Cattle Egret	Little Pied Cormorant	Little Black Cormorant	Pied Cormorant	Darter	Pied Heron	Nankeen Night Heron	Australian White Ibis	Glossy Ibis	Royal Spoonbill	Australian Pelican	Number of species present
W001								●			●				2
W002	●	●	●	●	●	●			●	●	●				9
W003													●		1
W004	●	●	●	●	●	●		●	●	●	●				10
W005					●						●		●		3
W006	●	●	●	●	●	●	●	●			●		●		10
W007	●	●	●		●				●	●	●		●		8
W008					●	?		?			●		●		3-5
W009					●	●		●			●		●		5
W010					●			●			●		●		4
W011	●	●	●	●	●				●	●	●				8
W012	●	●	●	●	●	●			●		●				8
W013					●	●									2
W014											●				1
W015								●		●					2
W016					●						●		●		3
W017											●				1
W018		●			●	●		●			●		●		6
W019	●	●	?		●	●		●			●		●		7-8
W020	●	●	●		●	●		●	●	●	●		●		10
W021														●	1
W022								●			●		●		3
W023					●			●							2
W024	●	●	●		●				●		●				6





 3000+ birds present in colony on average;
  500-3000 birds present in colony on average
 100-500 birds present in colony on average;
  <100 birds present in colony on average.
 ? Likely to be present but not confirmed.

Table 5 (cont.). Allocated size classes for each species in each colony.

Colony Number	Intermediate Egret	Great Egret	Little Egret	Cattle Egret	Little Pied Cormorant	Little Black Cormorant	Pied Cormorant	Darter	Pied Heron	Nankeen Night Heron	Australian White Ibis	Glossy Ibis	Royal Spoonbill	Australian Pelican	Number of species present
W025	●	●	●	●	●	●			●	●	●		●		10
W026											●		●		2
W027					●	●	●						●		4
W028										●					1
W029	●	●	●	●	●				●	●	●				8
W030							●								1
W031							●								1
W032					?	?		?							1-3
W033	●	●	●	●	●	●			●		●				8
W034	●	●	●	●	●	●		●	●	●	●		●		11
W035	●	●	●	●	●	●		●	●	●	●				10
W036	●	●	●		●				●		●				6
W037	●	●	?	●	●	●			●	●	●		●		9-10
W038	●	●	●		●	?		●	●	●	●		●		9-10
W039	●	●	●	●					●						5
W040	●	●	●	●					●	●					6
W041											●		●		2
W042	●	●	●		●	?			●	●	●				7-8
W043													●		1
W044	?	?	?		●	●		●							4-6
W045	●	●	●		●										4
W046					●			●							2
W047					?	?		?							1-3
W048	?	?	?						●						2-4

● 3000+ birds present in colony on average;
 ● 500-3000 birds present in colony on average
● 100-500 birds present in colony on average;
 ● <100 birds present in colony on average.
 ? Likely to be present but not confirmed.

Table 5 (cont.). Allocated size classes for each species in each colony.

Colony Number	Intermediate Egret	Great Egret	Little Egret	Cattle Egret	Little Pied Cormorant	Little Black Cormorant	Pied Cormorant	Darter	Pied Heron	Nankeen Night Heron	Australian White Ibis	Glossy Ibis	Royal Spoonbill	Australian Pelican	Number of species present
W049	?	?	?								●		●		2-5
W050					●	?		●		●			●		4-5
W051					●	?									1-2
W052										●	●				2
W053	●	●	●		●				●	●	●	●			8
W054					?	?					●		●		3-4
W055	●	●	●		●			●	●	●	●				8
W056							●								1
W057	?	?	?		●	?				●	●				4-7
W058					●	●		●					●		4
W059													●		1
W060						●	●								2
W061	●	●	●						●	●	●				6
W062								●							1
W063								●							1
W064	●	●	●						●						4
W065								●							1
W066								●							1
W067	●	●	●												3
W068								●		●					2
W069								●							1
W070										●	●				2
W071	?	?	?							●					2-4
W072							●								1
W073	?	●	●				●								3-4
W074	?	●	●							●					3-4
W075								●			●				2
W076					●			●		●					3
TOTAL	26-33	29-34	26-33	13	36-39	18-29	8	27-30	23	26	39	1	25	1	Av.4.0-5.2 Sp/Col









 3000+ birds present in colony on average;
  500-3000 birds present in colony on average
 100-500 birds present in colony on average;
  <100 birds present in colony on average.
 ? Likely to be present but not confirmed.

Table 6. The number of colonies with size classes for each species.

Species	No. of colonies of each size				
					?
Intermediate Egret	8	12	4	2	7
Great Egret	0	14	12	3	5
Little Egret	1	4	15	6	7
Cattle Egret	4	4	0	5	0
Little Pied Cormorant	0	13	10	13	3
Little Black Cormorant	2	2	7	7	9
Pied Cormorant	1	0	5	2	0
Darter	0	2	7	18	3
Pied Heron	0	16	4	3	0
Nankeen Night Heron	1	6	11	8	0
Australian White Ibis	3	11	12	13	0
Glossy Ibis	1	0	0	0	0
Royal Spoonbill	0	1	16	8	0
Australian Pelican	1	0	0	0	0
Total	22	85	103	88	34


















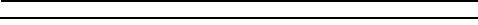
-  3000+ birds present in colony on average;
-  500-3000 birds present in colony on average
-  100-500 birds present in colony on average;
-  <100 birds present in colony on average.
- ? Likely to be present but not confirmed.

Table 7. Seasonality of breeding for each species.

Species	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Intermediate Egret												
Great Egret												
Little Egret												
Cattle Egret												
Little Pied Cormorant												
Little Black Cormorant												
Darter												
Pied Cormorant												
Pied Heron												
Nankeen Night Heron												
Australian White Ibis												
Glossy Ibis												
Royal Spoonbill												
Australian Pelican												

THE SPECIES

Fourteen species were found to breed in Top End colonies during the period of the surveys. Each colony supported between 1 and 11 species, with colonies of only 1 or 2 species being the most frequent. The average number of species per colony was approximately 4 (Figure 6).

Two species (Australian Pelican and Glossy Ibis) were found in only one colony each. Pied Cormorants were found in 8 colonies and Cattle Egrets were found in 13 colonies. The remaining 10 species were found in between 23 to 39 colonies each, with the Australian White Ibis breeding in more colonies (39) than any other species. (The Straw-necked Ibis, which is included in this report, is not represented in any tables or maps because it was not found breeding during the course of these surveys. It has, however, been confirmed breeding in a mixed species colony in the survey area prior to these surveys).

The distribution of colonies, showing the number of species per colony is illustrated in Figure 7.

All species, except Australian Pelican, nested most frequently in paperbarks or mangroves with other habitats being of minor importance (Table 8).

The most frequent size class for an individual species was 101-500 birds. However, the size classes <100 and 501-3000 were also well represented. Twenty-one colonies were recorded to have more than 3000 individuals of a single species present. Eight of these involved Intermediate Egrets, 4 involved Cattle Egret and 3 involved Australian White Ibis.

Each species is discussed individually in following sections. It should be noted that there is some repetition in these sections, but this is because the discussion on each species is designed so that they can stand alone.

Further details can also be found in the individual species tables in Appendix A.

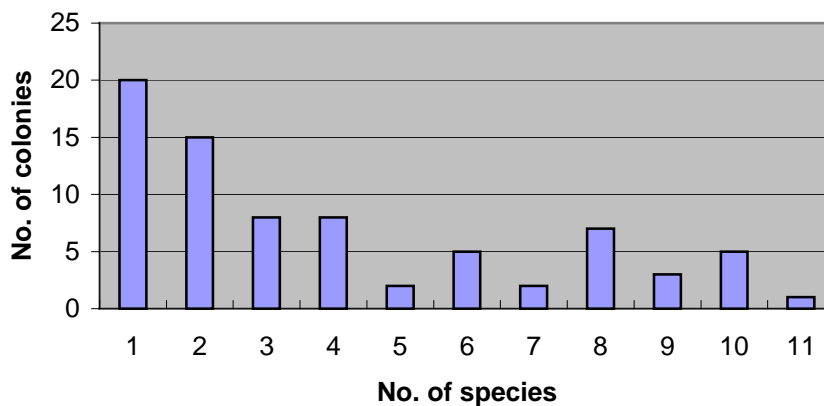


Figure 6. Frequency of occurrence of numbers of species per colonies.

Table 8. Nesting habitat choice of individual species.

Species	Number of usages of each habitat.									
	Mangroves	Paperbark	Reeds	Rainforest	Bare Sand	Eucalypts Sp.	Paperbark/Mimosa	Rainforest/Mangroves	Freshwater Mangroves	Not described
Intermediate Egret	21	3					1	1		
Great Egret	24	3					1	1		
Little Egret	23	1					1	1		
Cattle Egret	12	1								
Little Pied Cormorant	19	13				1	1	1		1
Little Black Cormorant	10	7					1			
Pied Cormorant	6	2								
Darter	8	17					1			1
Pied Heron	20	1					1	1		
Nankeen Night Heron	20	2		1			1	1		1
Australian White Ibis	18	15	2				1	1	2	
Glossy Ibis	1									
Royal Spoonbill	6	15						1	2	1
Australian Pelican					1					



Plate 4. Mixed species colony (W020) in paperbark trees and *Mimosa pigra* on the Finnis River floodplain, March 1999. Photo D. Milne.

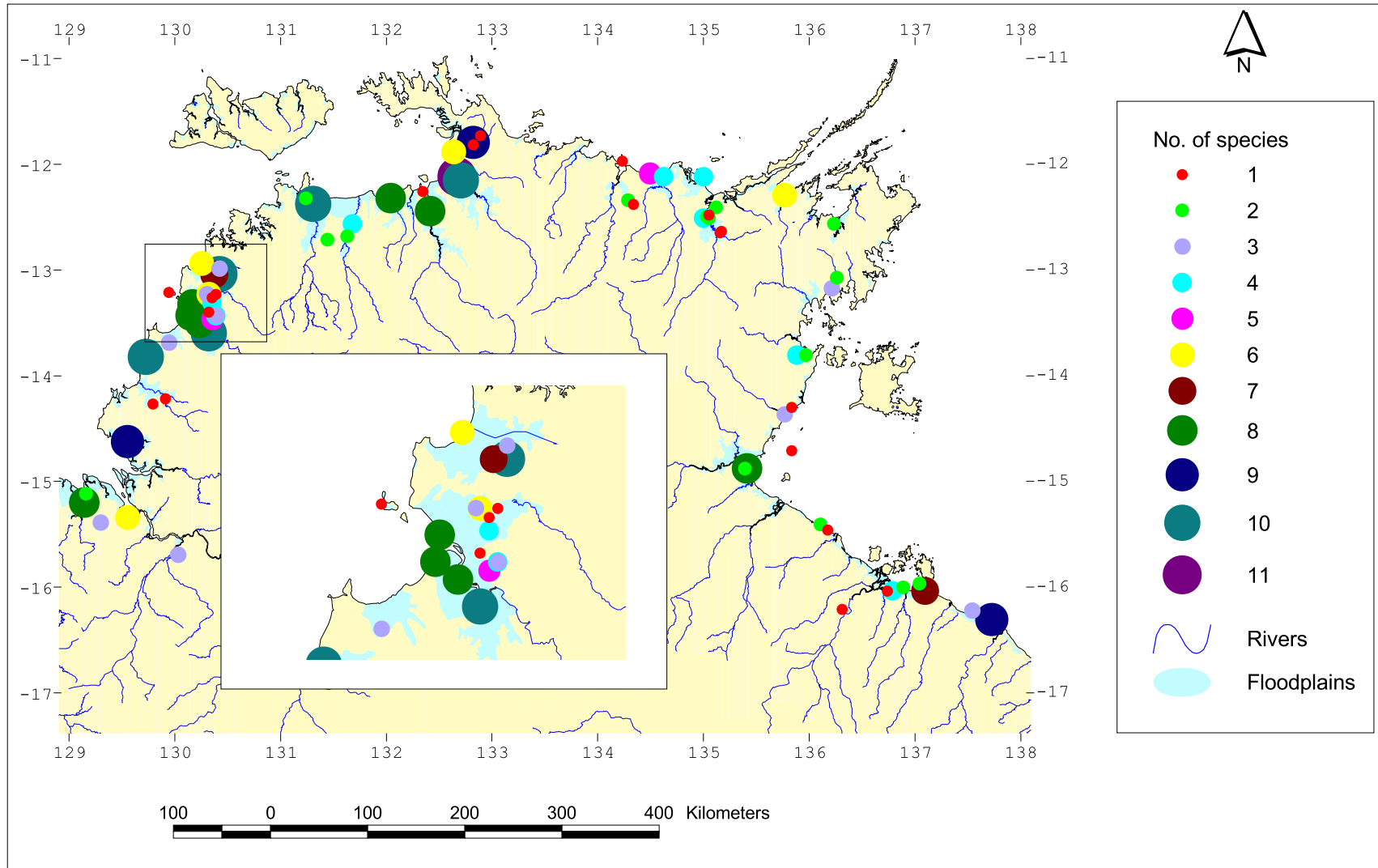


Figure 7. Location of colonies by total number of species per colony.

TOP END BREEDERS

INTERMEDIATE EGRET

Geographic Distribution

Mixed egret breeding colonies were located around most of the Top End coast and adjacent coastal floodplains. In nearly all regions where colonial waterbird breeding occurred, there was at least some egret breeding. Egret breeding sites were all within about 15 km of the coast, with none being found in searches upstream (inland) of the major coastal floodplains. Egrets strongly preferred (74% of the colonies) to nest in the mangroves along the shoreline of the coast (usually associated with the mouths of rivers or creeks) or along the banks of rivers not far in from the coast. Nevertheless these were always in places of close proximity to large areas of freshwater floodplain. Whereas species such as ibis and cormorants would nest in these coastal mangroves with the egrets, it was much less common for the egrets to nest with these other species when they chose to nest in the paperbarks out in the large floodplains instead of the coastal mangroves.

As Intermediate Egrets were present in most of the mixed egret colonies, their breeding distribution is essentially the same as mentioned for egrets in general (Figure 8). As with the other egrets, the majority of Intermediate Egret breeding was in the north-western part of the Top End. This is particularly the case for the area between the Moyle and Finniss Rivers, and between the Adelaide River and Murgengella Creek, which had all of the 8 largest Intermediate Egret breeding sites. Three of these colonies were within 20 km of each other around the mouth of the Daly River and 4 were within 70 of each other between the East Alligator River and the Wildman River.

Numbers

When present, Intermediate Egrets were usually the most numerous egret, and often the most numerous breeding bird of any species, in the colony. However this was not always the case. Intermediate Egrets are much less inclined to feed on the coast or in the more saline wetlands just behind the coast, than either Great or Little Egrets. Consequently, where there was less freshwater floodplain nearby, Intermediate Egrets were not as numerically dominant among the egrets. White (1917) reported that a significant colony (now extinct) at the mouth of the Roper River (W910, Appendix C) had much smaller numbers of Intermediate Egret compared to either Great or Little Egret. There is much saline floodplain in the vicinity of this former site.

Intermediate Egrets were confirmed breeding in 26 out of the 34 egret colonies located. It is likely that they were present in most of the other egret colonies for which it was not possible to individually confirm species identities. There was only one colony, in paperbarks trees out on the Reynolds River floodplain (W018), in which a ground survey could confirm only Great Egrets breeding.

At least 8 Intermediate Egrets colonies supported in excess of 3000 birds. There were 12 colonies in the range of 501-3000 birds and only 2 colonies that were confirmed to have less than 100 birds. These latter two colonies were both at sites where Great and Little Egrets were more strongly represented among the egrets. Of all species considered in these surveys, Intermediate Egrets had the most colonies in the 501-3000 range.

The largest estimated number of adults in a single colony was in excess of 6000 birds in 1994. This was part of a mixed species colony (W025) that was in a tributary off the Adelaide River and is further detailed in Appendix B.

In 1993, twelve of the colonies with breeding Intermediate Egrets were estimated to have more than 40000 adult birds present and an average for all colonies of over 3300 per colony. In the only other year in which such a calculation was possible (1994) the figures were 27000 and 3900 respectively. Applying these averages to the total number of confirmed Intermediate Egret breeding colonies (26), the total number of Intermediate Egrets breeding in the Top End in those years could be suggested to be over 93000 birds if all colonies were active. These are at best very rough figures, however they are to date, the only such attempts at estimating the number of Intermediate Egrets breeding in the Top End.

The numbers of Intermediate Egrets regularly breeding in Top End colonies appears much higher than the colonies outside the Top End, both in the rest of the Northern Territory, and the rest of Australia. Intermediate Egret colonies reported by a number of other authors, for example, in the sub-humid

tropics of the Northern Territory (Jaensch, 1994), along the northern NSW coast (Baxter, 1984), and Australia in general (Marchant and Higgins, 1990, Blakers *et al.*, 1984), were considerably smaller than those found in these surveys. The Gwydir Wetlands in north-east NSW may have breeding colonies of Intermediate Egrets approaching Top End colony sizes (McKosker, pers. comm.). However, there are not as many colonies here and they are not as regular.

Further details of the estimated number of Intermediate Egrets present in each colony during each year that an estimation was made, are shown in Table A2 of Appendix A.

Seasonality.

Top End egret colonies are used very consistently, with most colonies being active in every year they were checked. Without including the visit that initially located each of the colonies, the 34 egret colonies (excluding Cattle Egret) had more than 70 further checks done in subsequent years. There were only 3 instances where it was confirmed that an egret colony was not active in a season.

The surveys were unable to obtain much information to separate the breeding times of the three egrets (Intermediate, Great and Little Egret) that breed together. Cattle Egrets, as discussed below, usually start much earlier. However, the other three species breed at essentially the same time. Observations during these surveys indicated that Great Egrets may start slightly earlier, but as this was only marginally so, the following comments are indicative of Intermediate, Great and Little Egrets.

The earliest record of egret eggs (not including Cattle Egrets) was on 20 January (1994), however no earlier surveys were done in the month of January. Two surveys of two colonies in mid December revealed only Cattle Egrets breeding, whereas the three other egret species were breeding in both of these colonies in late January. There were no young egrets (except Cattle Egrets) seen in any surveys around the mid January period, so it is assumed that few eggs could have been laid prior to January. The latest record of eggs present during these surveys was on 31 March (1999), although F. Woerle (pers. comm.) reports eggs on 13 April (1975).

Some egrets continue to be on eggs through to early April. However, most birds are fairly synchronous, with peak laying for Intermediate Egrets being from late January to early February. This results in the colonies having young present through March and April, with the earliest fledglings leaving the nest by about mid April, and the last young leaving the nest by late June.

This concurs with White's (1917) report of the former very large colony at the mouth of the Roper River, and Crawford (1972) who suspected Intermediate Egret breeding (because of bill colour changes) in January to March on the floodplains east of Darwin. Frith and Davies (1961) reported this species commencing breeding between February and May.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Intermediate, Great or Little Egret breeding between years in the same colony. However seven colonies located between the Daly River and the East Alligator River suggested similar timing for egrets in each respective colony over two consecutive years which had quite large differences in seasonal rainfall. There also appeared to be little variation in the timing of egret colonies in different parts of the Top End during any one season.

Comments relating to the timing of breeding of egrets (other than Cattle Egrets), as summarised from field notes, are given in Table A3 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Intermediate Egret breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), found only 2 small breeding colonies of Intermediate Egrets (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant egret breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 5. Intermediate Egret nestling in a colony (W007) on the Daly River floodplain, March 1999. Photo D. Milne.

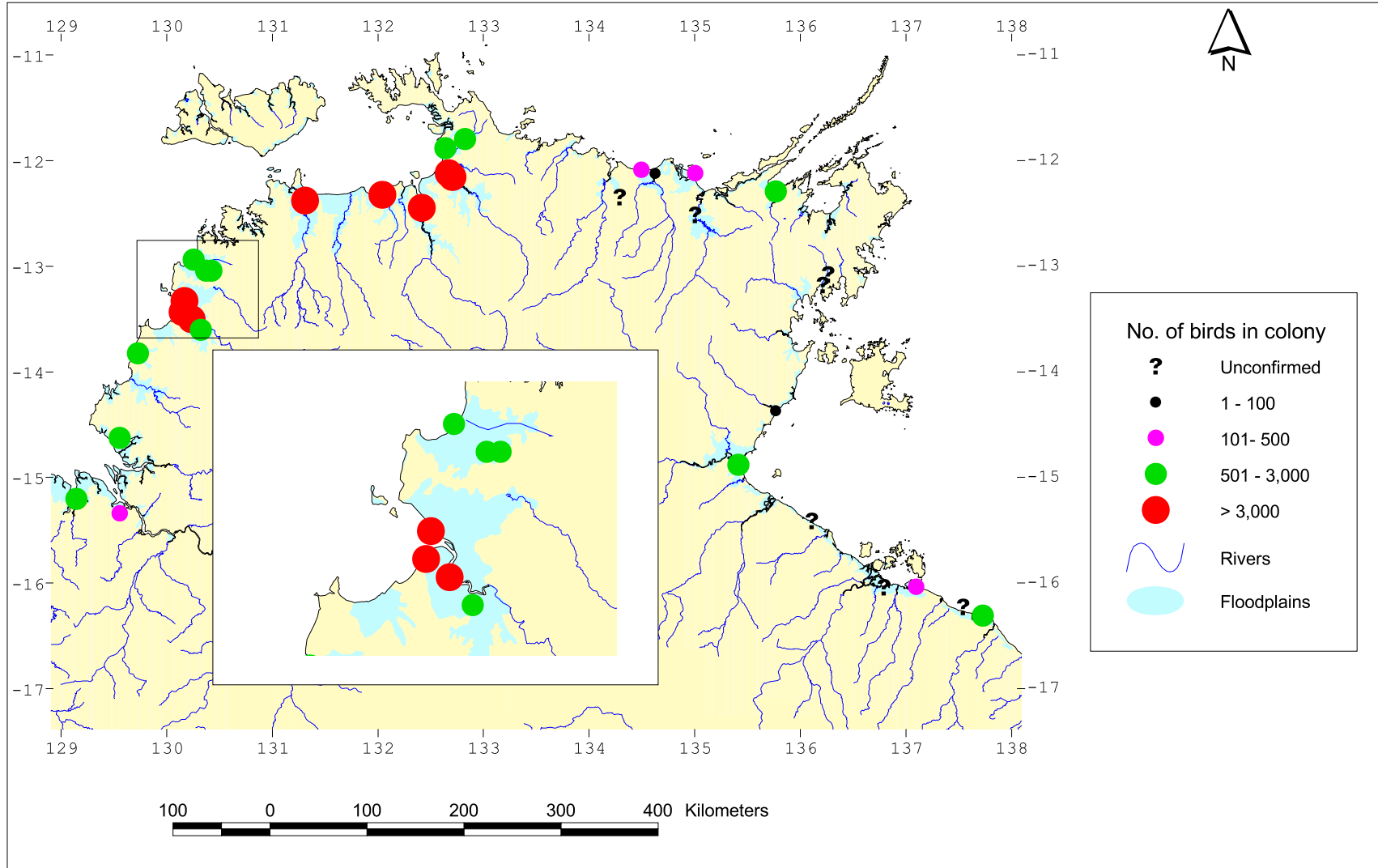


Figure 8. Location and size of colonies containing Intermediate Egrets.

GREAT EGRET

Geographic Distribution

Mixed egret breeding colonies were located around most of the Top End coast and adjacent coastal floodplains. In nearly all regions where colonial waterbird breeding occurred, there was at least some egret breeding. Egret breeding sites were all within about 15 km of the coast, with none being found in searches upstream (inland) of the major coastal floodplains. Egrets strongly preferred (74% of the colonies) to nest in the mangroves along the shoreline of the coast (usually associated with the mouths of rivers or creeks) or along the banks of rivers not far in from the coast. Nevertheless these were always in places of close proximity to large areas of freshwater floodplain. Whereas species such as ibis and cormorants would nest in these coastal mangroves with the egrets, it was much less common for the egrets to nest with these other species when they chose to nest in the paperbarks out in the large floodplains instead of the coastal mangroves.

As Great Egrets were present in most of the mixed egret colonies, their breeding distribution is essentially the same as mentioned for egrets in general (Figure 9). As with the other egrets, the majority of Great Egret breeding was in the north-western part of the Top End, particularly the area between the Moyle and Finnis Rivers, and between the Adelaide River and Murgarella Creek. Nine out of the 13 largest Great Egret breeding sites were located in these two areas, and as with the Intermediate Egrets, there were several colonies in very close proximity to each other in a couple of locations.

Numbers

Great Egrets were usually the second most numerous egret species (not including Cattle Egrets) in each of the colonies where egrets were present. However this was not always the case. Although all egret species predominantly feed in the freshwater wetlands and floodplains, Great Egrets, along with Little Egrets will feed on the coast or in the more saline wetlands near the coast, whereas Intermediate and Cattle Egrets rarely do so. Consequently, where there was less freshwater floodplain in the vicinity of the colony, Great and Little Egrets were better represented, instead of the normally dominant Intermediate Egret. In some of these colonies the Great Egret was the dominant egret, while at a lesser number of sites the Little Egret was the most numerous egret.

Great Egrets were confirmed breeding in 29 out of the 34 mixed egret colonies located. It is likely that they would have been present in most of the other 5 colonies, for which it was not possible to individually confirm species identities. There were no colonies in which it could be confirmed that Great Egrets were not present.

There were no colonies in which Great Egrets were allocated a colony size class in excess of 3000 birds, however there were 14 colonies in the range of 501-3000 birds and only 3 colonies confirmed to have less than 100 birds. The largest estimated number of adults in a single colony was 2800 birds. This was in a mixed species colony (W012) in 1994, on the coast at the mouth of the Daly River, and is further detailed in Appendix B.

In 1993, twelve of the colonies with Great Egrets were estimated to total in excess of 8000 adult birds, at an average of over 670 per colony. In the only other year where such calculation was possible, 1994, the corresponding figures were 11000 and 1500. Applying these averages to the total number of known Great Egret breeding colonies (29), the total number of Great Egrets breeding in the Top End in those years is estimated as over 31000 birds if all colonies were active. These are at best very rough figures, however they are to date, the only such attempts at estimating the number of Great Egrets breeding in the Top End.

The numbers of Great Egrets regularly breeding in Top End colonies appear much higher than the colonies outside the Top End, both in the rest of the Northern Territory, and the rest of Australia. Great Egret colonies reported by a number of other authors, for example, in the sub-humid tropics of the Northern Territory (Jaensch, 1994), along the northern NSW coast (Baxter, 1984), the Narran Lake Nature Reserve (Ley, 1998), in Western Australia (Jaensch, 1989), the Gwydir Wetlands (McKosker, pers. comm.) and Australia in general (Marchant and Higgins, 1990, Blakers *et al.*, 1984), were considerably smaller than those found in these surveys.

Further details of the estimated number of Great Egrets present in each colony during each year that an estimation was made, is shown in Table A4 in Appendix A.

Seasonality.

Top End egret colonies are used very consistently, with most colonies being active in every year they were checked. Without including the visit that initially located each of the colonies, the 34 egret colonies (excluding Cattle Egret) had more than 70 further checks done in subsequent years. There were only 3 instances where it was confirmed that an egret colony was not active in a season.

The surveys were unable to obtain much information to separate the breeding times of the three egrets (Intermediate, Great and Little Egret) that breed together. Cattle Egrets, as discussed below, usually start much earlier. However, the other three species breed at essentially the same time. Observations during these surveys indicated that Great Egrets may start slightly earlier, but as this was only marginally so, the following comments are indicative of Intermediate, Great and Little Egrets.

The earliest record of egret eggs (not including Cattle Egrets) was on 20 January (1994), however no earlier surveys were done in the month of January. Two surveys of two colonies in mid December revealed only Cattle Egrets breeding, whereas the three other egret species were breeding in both of these colonies in late January. There were no young egrets (except Cattle Egrets) seen in any surveys around the mid January period, so it is assumed that few eggs could have been laid prior to January. The latest record of eggs present during these surveys was on 31 March (1999), although F. Woerle (pers. comm.) reports eggs on 13 April (1975).

Some egrets continue to be on eggs through to early April. However, most birds are fairly synchronous, with peak laying for Great Egrets being from mid January to early February. This results in the colonies having young present through March and April, with the earliest fledglings leaving the nest by about mid April, and the last young leaving the nest by late June.

This concurs with White's (1917) report of the former very large colony at the mouth of the Roper River, and Crawford (1972) who suspected Great Egret breeding (because of bill colour changes) in December to March on the floodplains east of Darwin. Frith and Davies (1961) reported Great Egrets as starting a little earlier than both the Intermediate and Little Egrets.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Intermediate, Great or Little Egret breeding between years in the same colony. However seven colonies located between the Daly River and the East Alligator River suggested similar timing for egrets in each respective colony over two consecutive years which had quite large differences in seasonal rainfall. There also appeared to be little variation in the timing of egret colonies in different parts of the Top End during any one season.

Comments relating to the timing of breeding of egrets (other than Cattle Egrets), as summarised from field notes, are given in Table A3 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Great Egret breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), found only 2 small breeding colonies of Great Egrets (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant egret breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

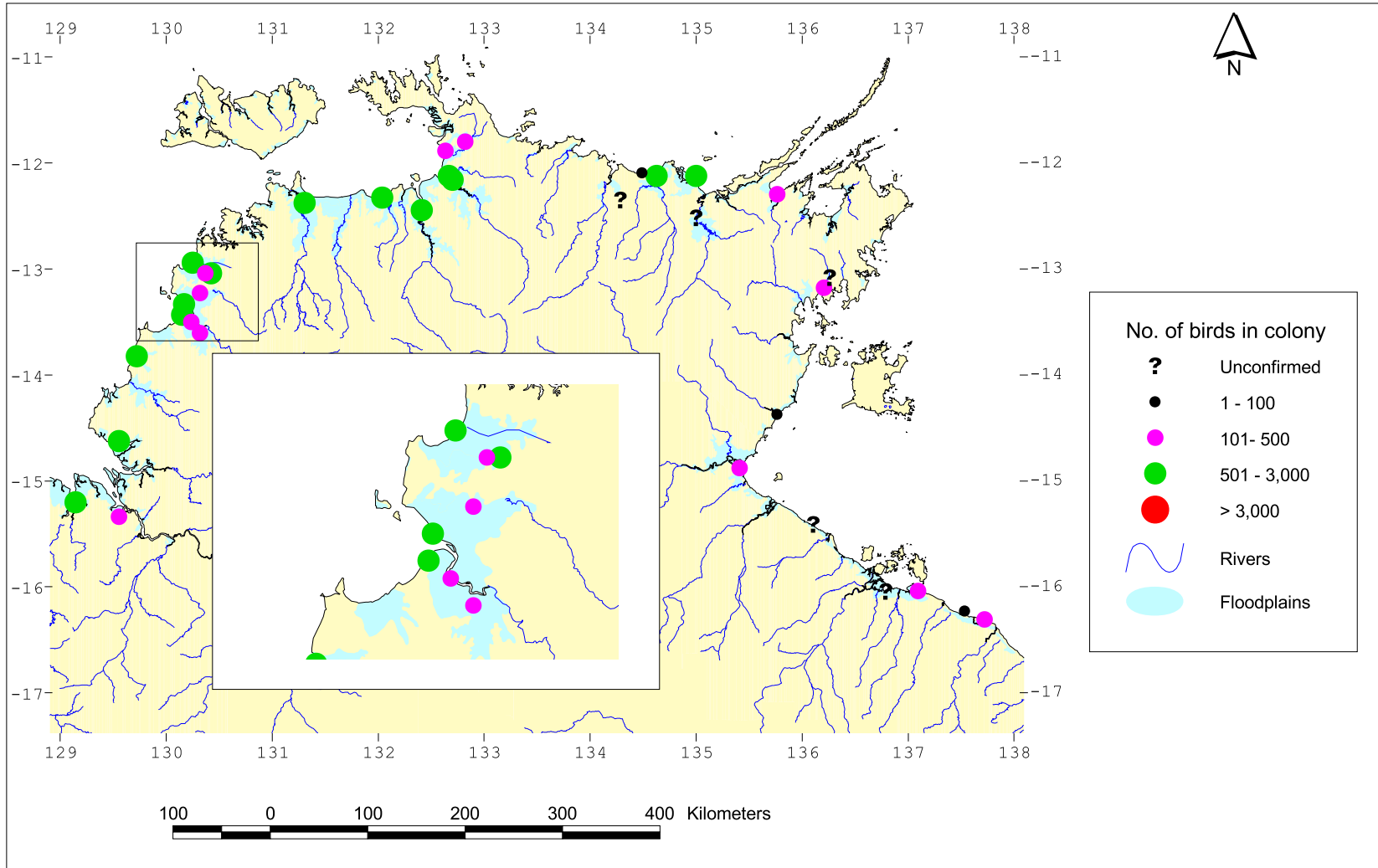


Figure 9. Location and size of colonies containing Great Egrets.

LITTLE EGRET

Geographic Distribution

Mixed egret breeding colonies were located around most of the Top End coast and adjacent coastal floodplains. In nearly all regions where colonial waterbird breeding occurred, there was at least some egret breeding. Egret breeding sites were all within about 15 km of the coast, with none being found in searches upstream (inland) of the major coastal floodplains. Egrets strongly preferred (74% of the colonies) to nest in the mangroves along the shoreline of the coast (usually associated with the mouths of rivers or creeks) or along the banks of rivers not far in from the coast. Nevertheless these were always in places of close proximity to large areas of freshwater floodplain. Whereas species such as ibis and cormorants would nest in these coastal mangroves with the egrets, it was much less common for the egrets to nest with these other species when they chose to nest in the paperbarks out in the large floodplains instead of the coastal mangroves.

As Little Egrets were present in most of the mixed egret colonies, their breeding distribution is essentially the same as mentioned for egrets in general (Figure 10). As with the other egrets, the majority of Little Egret breeding was in the north-western part of the Top End, particularly the area between the Moyle and Finnis Rivers, and between the Adelaide River and Murgengella Creek. Although 3 out of the 5 largest Little Egret colonies were in this area, it was not quite as important an area for this species as it was for Intermediate or Great Egrets.

Numbers

Little Egrets were usually the least numerous of the egret species in each of the colonies where egrets were breeding. However this was not always the case. Little Egrets, along with Great Egrets, will feed on the coast or in the more saline wetlands near the coast as well as the freshwater wetlands to which Intermediate Egrets are more restricted. Consequently, there were a few coastal egret colonies where Little Egrets outnumbered the normally dominant Intermediate Egret. In most of these colonies where Intermediate Egrets were not the dominant egret, Great Egrets were the most numerous egret. However, there was the occasional colony, such as one in the Port McArthur area (W042) in which the Little Egret was the dominant egret present.

Little Egrets were confirmed breeding in 26 out of the 34 egret colonies located, and it is likely that they would have been present in most of the other 8 colonies for which it was not possible to individually confirm species identities. There were no colonies in which it could be confirmed that Little Egrets were not present, although there were a number in which they were only present in small numbers.

There was only one Little Egret colony that supported in excess of 3000 birds, with the majority having less than 500 birds. The largest estimated number in a single colony was around 4500 birds, however this was an exceptionally large egret colony. It was part of a mixed species colony (W025) visited in 1993, that was in a tributary off the Adelaide River and is further detailed in Appendix B.

In 1993, eleven of the colonies with breeding Little Egrets were estimated to have a total of 6700 adult birds present and an average of over 600 per colony. In the only other year where such a calculation was possible (1994) the corresponding figures were 4100 and 800 respectively. Applying these averages to the total number of known Little Egret breeding colonies, the total number of Little Egrets breeding in the Top End in those years is estimated as over 18000 birds if all colonies were active. These are at best very rough figures, however they are to date, the only such attempts at estimating the number of Little Egrets breeding in the Top End.

The numbers of Little Egrets regularly breeding in Top End colonies appears much higher than the colonies outside the Top End, both in the rest of the Northern Territory, and the rest of Australia. Little Egret colonies reported by a number of other authors, for example, in the sub-humid tropics of the Northern Territory (Jaensch, 1994), along the northern NSW coast (Baxter, 1984), the Gwydir Wetlands (McKosker, pers. comm.) and Australia in general (Marchant and Higgins, 1990 and Blakers *et al.* 1984), were considerably smaller than those found in these surveys.

Further details of the estimated number of Little Egrets present in each colony during each year that an estimation was made, is shown in Table A5 of Appendix A.

Seasonality.

Top End egret colonies are used very consistently, with most colonies being active in every year they were checked. Without including the visit that initially located each of the colonies, the 34 egret colonies (excluding Cattle Egret) had more than 70 further checks done in subsequent years. There were only 3 instances where it was confirmed that an egret colony was not active in a season.

The surveys were unable to obtain much information to separate the breeding times of the three egrets (Intermediate, Great and Little Egret) that breed together. Cattle Egrets, as discussed below, usually start much earlier. However, the other three species breed at essentially the same time. Observations during these surveys indicated that Great Egrets may start slightly earlier, but as this was only marginally so, the following comments are indicative of Intermediate, Great and Little Egrets.

The earliest record of egret eggs (not including Cattle Egrets) was on 20 January (1994), however no earlier surveys were done in the month of January. Two surveys of two colonies in mid December revealed only Cattle Egrets breeding, whereas the three other egret species were breeding in both of these colonies in late January. There were no young egrets (except Cattle Egrets) seen in any surveys around the mid January period, so it is assumed that few eggs could have been laid prior to January. The latest record of eggs present during these surveys was on 31 March (1999), although F. Woerle (pers. comm.) reports eggs on 13 April (1975).

Some egrets continue to be on eggs through to early April. However, most birds are fairly synchronous, with peak laying for Little Egrets being from late January to early February. This results in the colonies having young present through March and April, with the earliest fledglings leaving the nest by about mid April, and the last young leaving the nest by late June.

This concurs with White's (1917) report of the former very large colony at the mouth of the Roper River and Frith and Davies (1961) who reported Little Egrets commencing breeding between February and March.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Intermediate, Great or Little Egret breeding between years in the same colony. However, seven colonies located between the Daly River and the East Alligator River suggested similar timing for egrets in each respective colony over two consecutive years which had quite large differences in seasonal rainfall. There also appeared to be little variation in the timing of egret colonies in different parts of the Top End during any one season.

Comments relating to the timing of breeding of egrets (other than Cattle Egrets), as summarised from field notes, are given in Table A3 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Little Egret breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), found only 2 small breeding colonies of Little Egrets (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant egret breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

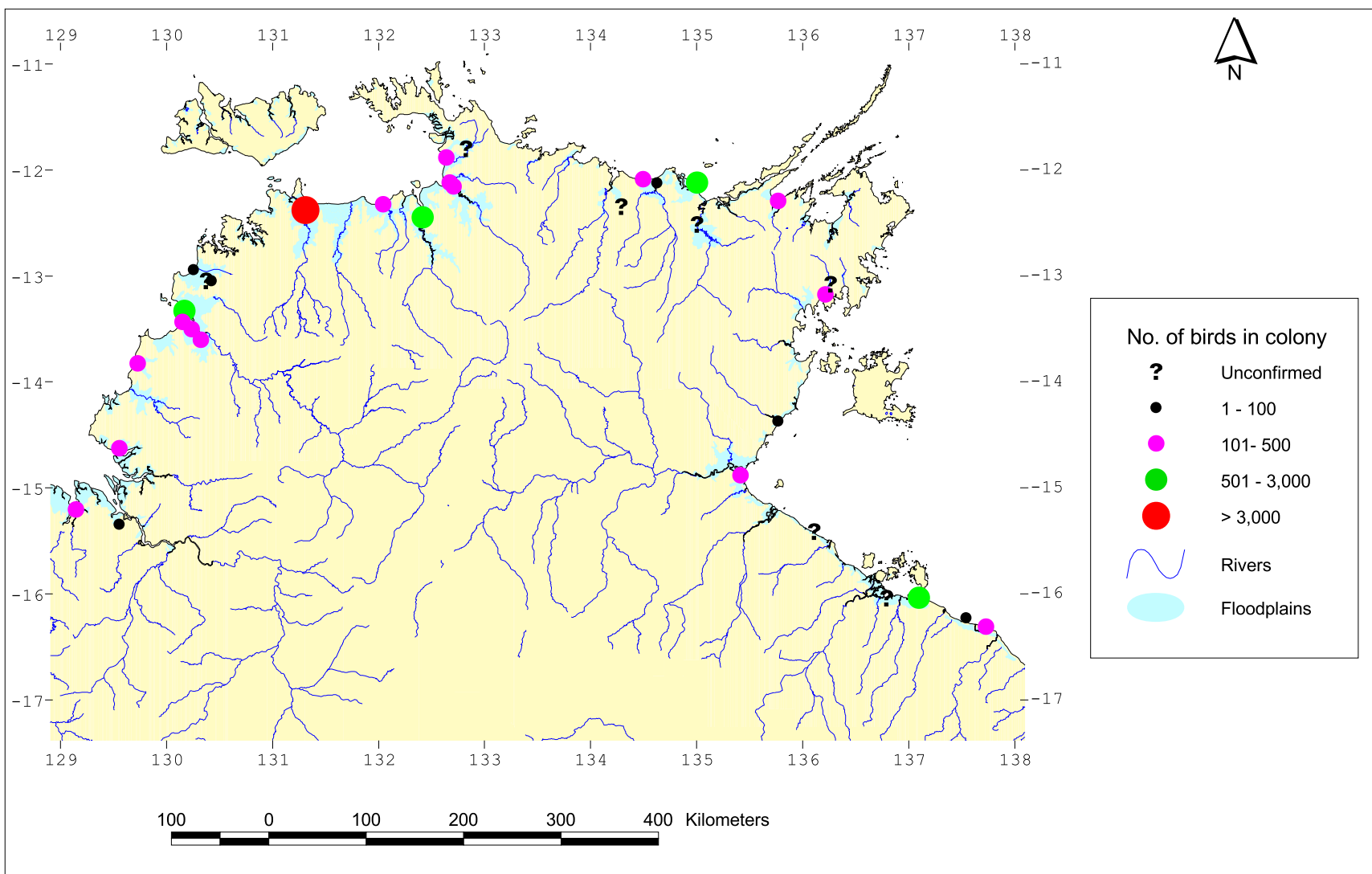


Figure 10. Location and size of colonies containing Little Egrets.

CATTLE EGRET

Geographic Distribution

Although the other egret species were found to breed around most of the Top End coast and adjacent floodplains, Cattle Egret breeding was largely restricted to the north-west (Figure 11). There were no Cattle Egret breeding colonies found around the eastern coast of the Top End and very small numbers south of the Moyle floodplain or east of Murgarella. This corresponds to areas of the Top End where few Cattle Egrets are seen among the other egrets. Nearly all Cattle Egret breeding was located in the area between the Moyle and the Finnis Rivers, and between the Adelaide River and Murgarella Creek. All 8 of the colonies supporting more than 500 birds were in this area, along with a couple of smaller ones. There were only 3 other colonies of Cattle Egrets located outside of this area, and all supported less than 100 birds.

Cattle Egrets always used the same colonies as other species of egrets, though usually later in the season. Consequently, Cattle Egret also strongly preferred to nest in mangrove trees. Cattle Egret breeding colonies were also either on, or within about 15 km of the coast.

Not all mixed egret colonies were used by Cattle Egrets. Cattle Egrets tended to choose colonies that were associated with a combination of large floodplains and large numbers of cattle and/or buffalo. Further expansion in the breeding range of Cattle Egrets in the Top End may occur in the future because of the apparent increasing numbers of buffalos and pigs observed during these surveys in certain areas, particularly in the east where there currently are few Cattle Egrets.

Numbers

Cattle Egrets are probably the most numerous breeding egret species in the Top End, after the Intermediate Egret. This is certainly the case in the north-west of the Top End where most egret breeding occurs.

Thirteen Cattle Egret colonies were confirmed during these surveys, however some of the other sites where egret breeding was confirmed but species not identified may have also had Cattle Egrets present. The largest estimated number of adults in a single colony was in excess of 7500. This was observed in 1999 prior to the other species of egrets commencing, in a colony (W025) that was on a tributary of the Adelaide River. A count of more than 9800 observed here in 1994 was possibly larger but it included flying juveniles.

At least 4 Cattle Egret colonies had in excess of 3000 birds, while another 4 were in the range of 501-3000 birds. As previously mentioned, fewer surveys were done at the time of the year when Cattle Egrets were breeding, except for the 1994 season. In this year 9 colonies had in excess of 21000 breeding Cattle Egrets, at an average of over 2300 per colony. Applying this average to the total number of known Cattle Egret breeding colonies, the total number of Cattle Egrets breeding in the Top End in that year is estimated as over 30000 birds if all colonies were active. These are at best very rough figures, however they are to date, the only such attempts at estimating the number of Cattle Egrets breeding in the Top End.

The numbers of Cattle Egrets regularly breeding in Top End colonies appears much higher than the colonies outside the Top End, both in the rest of the Northern Territory, and the rest of Australia. Cattle Egret colonies reported by other authors, for example, in the Gwydir Wetlands (McKosker, pers. comm.) and Australia in general (Marchant and Higgins, 1990 and Blakers *et al.*, 1984) were considerably smaller than those found in these surveys. Baxter (1994) reports over 9000 Cattle Egret nests in 12 colonies along nearly 500 kilometres of the northern New South Wales coast.

Further details of the numbers of Cattle Egrets present in each colony during each year that an estimation was made, are shown in Table A6 of Appendix A.

Seasonality.

Cattle Egret breeding colonies were used very consistently, with most colonies being active in every year that they were checked. Cattle Egrets always used the same sites that were used by other species of egrets later in the season, though always with an overlap.

Most Cattle Egrets commence breeding in late November to early December. Surveys carried out in mid December showed only Cattle Egrets breeding, while surveys in late January showed Cattle Egrets had well advanced young while other species of egrets were on eggs (eg. colonies W011 and W012,

which are further detailed in Appendix B). Whereas this was always the case for the larger Cattle Egret breeding colonies, there were some egret colonies that had all 4 species of egrets on eggs in late January, but these only contained small numbers of Cattle Egrets (eg. W033 and W035, which are further detailed in Appendix B). This suggests that when Cattle Egrets are breeding in large numbers they commence in November/December, but when breeding in small numbers they commence later to breed in synchrony with the other egrets.

No detailed work was undertaken to accurately ascertain whether there was any variation in the timing of Cattle Egret breeding between seasons within the same colony. Nevertheless, three colonies located between the Daly River and the East Alligator River in which the stage of breeding was recorded for Cattle Egrets over two different years, suggested similar timing for each respective colony over those two years. As the breeding range of Cattle Egrets is fairly limited in the Top End, commenting on any variation in timing over this breeding range is of little value.

Comments relating to the timing of breeding of Cattle Egrets, as summarised from field notes, are given in Table A7 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Cattle Egret breeding south of the Top End of the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), failed to find any breeding colonies of Cattle Egrets (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Cattle Egret breeding colonies south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

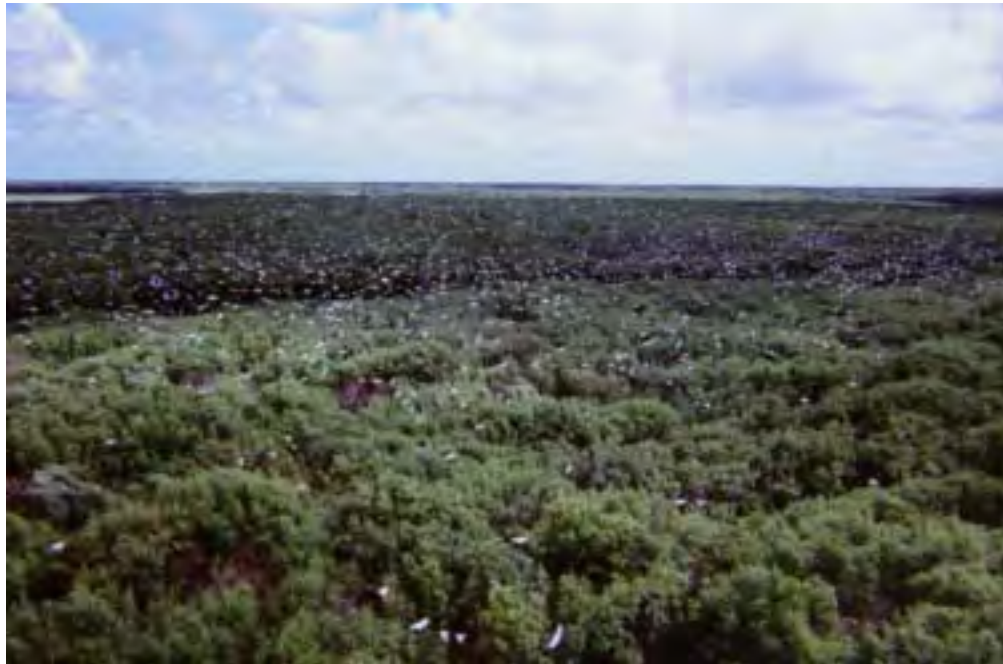


Plate 6. Cattle Egret breeding in a colony (W025) in a tributary of the Adelaide River, November 1998. Photo R. Chatto.

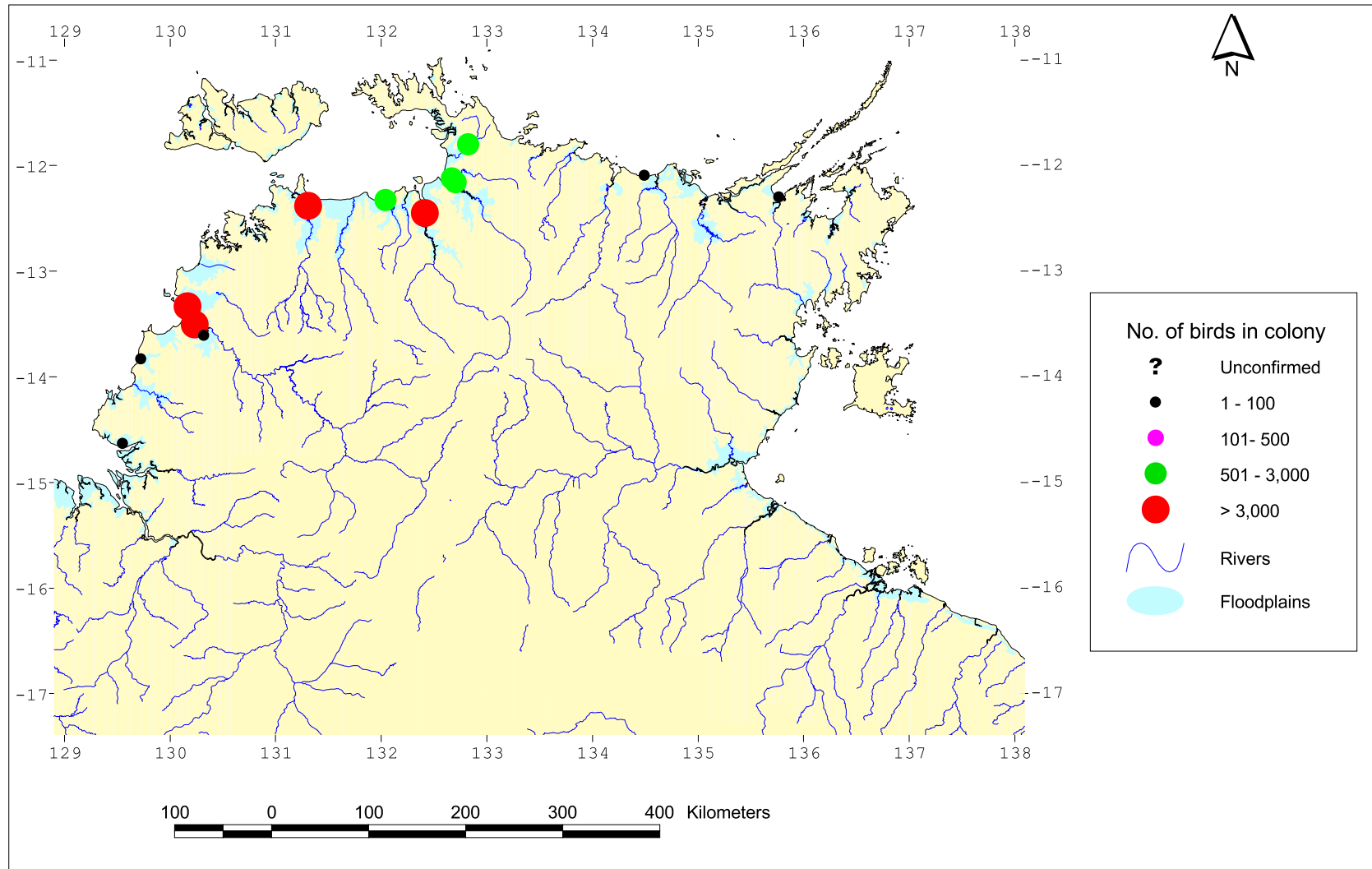


Figure 11. Location and size of colonies containing Cattle Egrets.

LITTLE PIED CORMORANT

Geographic Distribution

Little Pied Cormorant breeding colonies were located around most of the Top End coast and adjacent floodplains (Figure 12). With the exception of NE Arnhemland, breeding occurred in most areas that supported colonial waterbird breeding. Colonies were either on the coast or within approximately 40 km of the coast.

The most important breeding areas in the Top End for cormorants were similar to that for egrets. Most Little Pied Cormorants bred in the north-western part of the Top End, with the area between the Moyle and Finnis Rivers, and between the Adelaide River and Murganella Creek being the most important. Twelve of the 13 largest Little Pied Cormorant breeding sites were within these two areas, with numerous colonies being in close proximity to each other in several locations.

Little Pied Cormorants bred in the large mixed species, egret dominated, colonies in mangroves along the coast as well as among the colonies in paperbarks on the floodplains in which cormorants tended to make up a greater percentage of the species present. Mangrove nesting tended to occur a little more frequently (Table 8). Although nesting in mangroves along the coast, Little Pied Cormorants, are the species least likely of all the cormorants found in the Top End to feed in coastal waters, so they usually flew inland from the colonies to feed.

Cormorants and the Darter are more likely than egrets to breed in the smaller wetlands that are further inland. Although it is likely that most of the significant Top End Little Pied Cormorant colonies were located during these surveys, it is probable that there would be smaller colonies further inland which were not located.

Numbers.

Little Pied Cormorants were found in most colonies where cormorants were breeding. They bred in more colonies, and in larger overall numbers, than any others of the cormorant/darter group. Little Pied Cormorants were confirmed breeding in 36 colonies and likely in another 3 colonies for which their presence could not be confirmed. This is second only to the 39 Australian White Ibis colonies in terms of the number of different sites used.

Although there were no Little Pied Cormorant colonies of 3000+ birds (whereas there was 1 Pied Cormorant and 2 Little Black Cormorant colonies with numbers of this size) most mixed cormorant colonies were numerically dominated by Little Pied Cormorants. Thirteen colonies were in the range of 501-3000 Little Pied Cormorants, compared to 2 for Little Black and none for Pied Cormorants. The largest number of adults recorded in a single colony was around 3000 birds in 1994. This colony (W006) was located on the Daly River floodplain just south of the river and is further detailed in Appendix B.

Of 14 colonies where it was possible to estimate Little Pied Cormorant numbers in the 1993 season, 10400 birds were totalled, at an average of around 550 birds per colony. Corresponding figures for 1994 and 1995 were 8300 at nearly 600 per colony, and 3300 at 360 per colony. Multiplying the average of these 3 estimates of the number of birds per colony, by the 36 confirmed colonies gives a total of over 18500 Little Pied Cormorants present in all colonies if active. These figures are of course very rough, and they do not consider possible smaller inland colonies, however, they are the only such attempts at estimating the number of Little Pied Cormorants breeding in the Top End.

There are a large number of Little Pied Cormorant colonies reported in the literature throughout Australia (eg Jaensch, 1994 Blakers *et al.* 1984, and Marchant and Higgins, 1990). Nevertheless the regular seasonal use of the large Little Pied Cormorant colonies in the Top End appears to suggest that this area is very significant for the breeding of Little Pied Cormorants in Australia.

Further details of the estimated number of Little Pied Cormorants present in each colony during each year that an estimation was made, are shown in Table A8 of Appendix A.

Seasonality.

Little Pied Cormorant colonies do not seem to have quite the consistency of regular annual use as do the egret colonies, nevertheless most colonies were active in most years. Of 47 visits to establish Little Pied Cormorant use of a known colony in a given season, there were only 7 instances of a colony not being active for a season.

Little Pied Cormorants appear to be less synchronous with regard to the commencement of breeding compared with the egrets, although this could be related more to differences between colonies rather than within the same colony over repetitive years. For example, small cormorants breeding in egret-dominated colonies tended to breed earlier than when they bred with later nesting species such as Royal Spoonbills.

Most Little Pied Cormorants have a slightly later breeding season to that of Great, Intermediate and Little Egrets, but slightly earlier than Little Black Cormorants or Darters. The breeding season of Little Pied Cormorants mostly occurs between February and June, however this was not always the case. In the large mixed species colonies that included many egrets, Little Pied Cormorant eggs were mostly laid in February/March, with most young leaving the nest by late May. In colonies with species such as Royal Spoonbills, or the Cormorant-Darter dominated colonies, Little Pied Cormorants tended to breed later, often still being on eggs in early May. Le Soeuf (1902) recorded both cormorants with eggs in colonies in the Port of Darwin in May and June.

No detailed work was done to accurately ascertain whether there was any variation between the timing of Little Pied Cormorant breeding between seasons in the same colony. Further, assessing Little Pied Cormorant seasonal breeding consistency is made more difficult because of variations caused by the influence of the other different species that nest within a given colony. Nevertheless four colonies located between the Daly and Finnis Rivers suggested similar timing for each respective colony over the two years. Two of these colonies did show a slightly extended range of breeding in a third season, however this may have been because there were more of the later nesting Little Black Cormorant present in that season. There also did not seem to be a large amount of variation in seasonal timing based on geographical location differences.

Comments relating to the timing of breeding of the two smaller species of cormorants can be found in Table A9 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Little Pied Cormorants breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 5 breeding colonies of Little Pied Cormorants, however all were 30 pairs or less (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Little Pied Cormorant breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

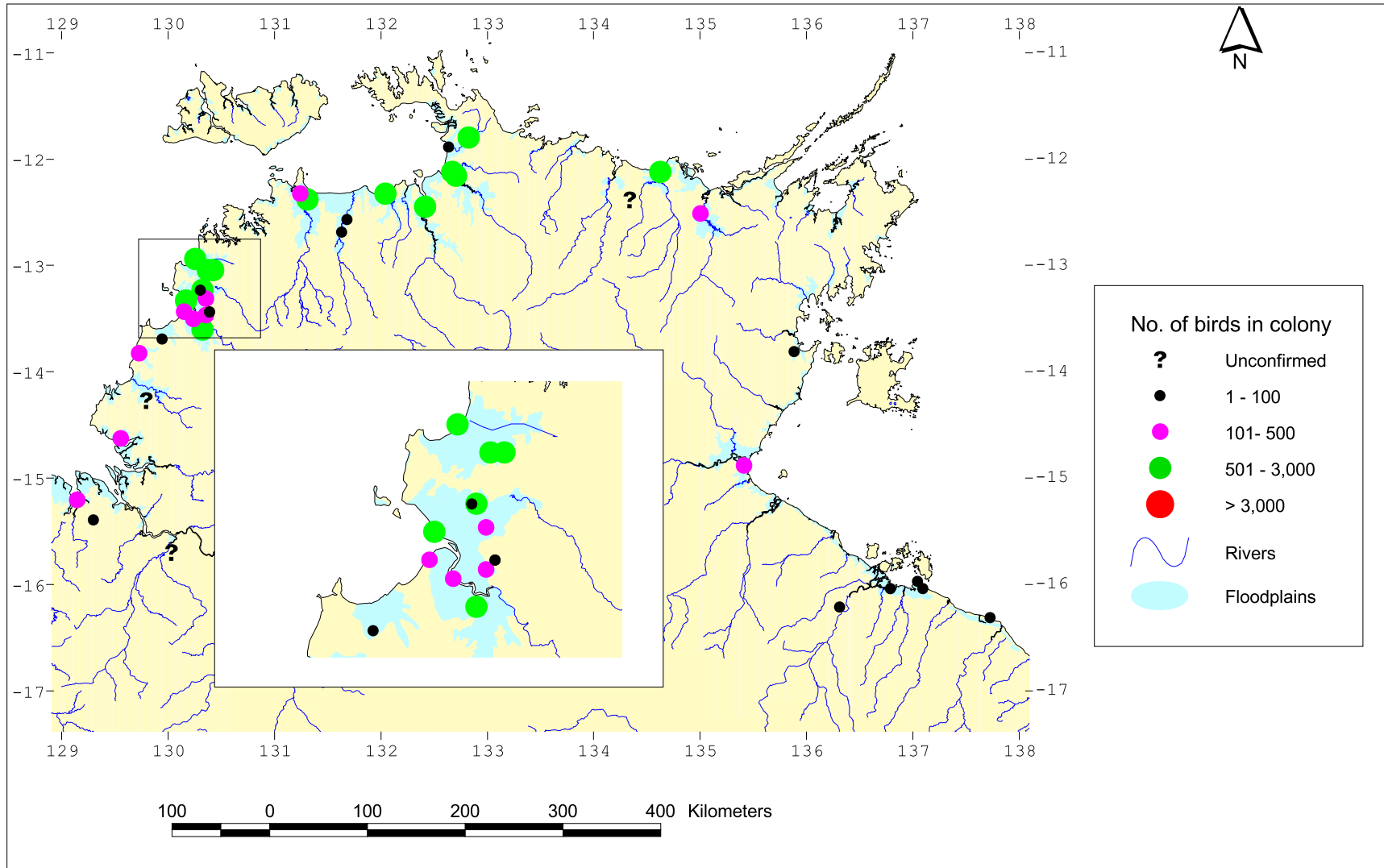


Figure 12. Location and size of colonies containing Little Pied Cormorants.

LITTLE BLACK CORMORANT

Geographic Distribution

With the exception of the Port McArthur area in the south-east, the vast majority of the Little Black Cormorant breeding colonies were located in the western half of the Top End (Figure 13). Most were located in the north-west of the Top End, with the area between the Moyle and Finnis Rivers being the most important. All 4 of the largest Little Black Cormorant breeding colonies were within approximately 60 km of each other in the Daly, Reynolds and Finnis River area. Unlike most other waterbirds discussed in this report the area between the Adelaide River and Murgarella Creek was not of similar significance for Little Black Cormorant breeding.

Colonies were either on the coast or within approximately 40 km of the coast, and Little Black Cormorants were found to breed in large, mixed species colonies through to smaller colonies with only cormorants present. Little Black Cormorants were less likely than Little Pied Cormorants to nest in the large egret dominated colonies on the coast, preferring the floodplains or along rivers a little in from the coast. Nevertheless mangroves were more frequently used than paperbarks.

As cormorants and darters are more likely to breed on smaller, inland wetlands, it is possible that more Little Black Cormorant breeding sites could exist in the Top End than are reported here.

Little Black Cormorants may have also been present within some of the breeding colonies in which Little Pied Cormorants were confirmed. Whereas a flash of white seen from the air could confirm the presence of Little Pied Cormorants, it was sometimes more difficult to confirm Little Black Cormorants among the small cormorants seen in such situations.

Numbers.

Little Black Cormorants were confirmed breeding in at least 18 colonies and possibly in another 11 for which their presence could not be confirmed among small cormorants seen from the air. The largest number of adults recorded in a single colony was in excess of 5800 birds in 1994. This colony (W020) was located on the Finnis River floodplain and is further detailed in Appendix B.

Two Little Black Cormorant colonies (W006 and W020) on the Daly and Finnis River floodplains supported in excess of 3000 birds however, the majority of colonies had less than 500 birds.

In 1993, fourteen colonies were estimated to have more than 5600 birds at an average of around 470 birds per colony. Applying this average to the total number of known Little Black Cormorant breeding colonies, the total number of Little Black Cormorant breeding in the Top End in that year is estimated as over 8500 birds if all colonies were active. These are at best very rough figures, however they are to date, the only such attempts at estimating the number of Little Black Cormorants breeding in the Top End.

There are a large number of Little Black Cormorant colonies reported in the literature and they are spread throughout Australia (eg Blakers *et al.* 1984, and Marchant and Higgins, 1990). This may mean that the total numbers of this species breeding in the Top End is not of overall national significance, as is the case with the egrets. However, the two large and consistently used colonies mentioned above certainly seem to be significant in terms of individual colonies.

Jaensch and Vervest (1990) reported 11 colonies containing a minimum of 8000 breeding pairs of Little Black Cormorants at Lake Gregory in northern Western Australia during 1986. Combining these figures, with what are likely to be a similar number of breeding Little Black Cormorants in the north-west part of the Top End, seems to suggest that north-west Australia is significant for the breeding of this species.

Further details of the estimated number of Little Black Cormorants present in each colony during each year that an estimation was made, are shown in Table A10 of Appendix A.

Seasonality.

Little Black Cormorant colonies do not seem to have the consistency of regular annual use as do the egret colonies, nevertheless most colonies are active in most years. Of 21 visits to establish Little Black Cormorant use of a known colony in a given season, there were only 5 instances of a colony not being active for a season.

Little Black Cormorants appear to be a little less synchronous with regard to the commencement of breeding compared to the egrets, although this could be related more to differences between colonies rather than within the same colony over repetitive years. For example, Little Black Cormorants breeding in egret-dominated colonies tended to breed earlier than when they bred with later-nesting species such as Royal Spoonbills.

On most occasions little attempt was made to separate the breeding seasons of the two smaller cormorants and the Darter, so it is not possible from these surveys to clearly indicate a specific breeding season for Little Black Cormorants. Most of the observations of the timing of small cormorant breeding in which Little Black Cormorants were noted as being the dominant species present, tended to suggest they were on eggs from late February to early May, with young seen from mid April to late June. One colony, however, (W018 in the Finnis/Daly floodplain area) had many young still present in mid August, and another in the same area (W020) had many Little Black Cormorant young still present after most of the Little Pied Cormorants had left the colony. Nevertheless, the main part of the breeding season for most Little Black Cormorants appears to be from March to July. Le Soeuf (1902) recorded both cormorants with eggs in colonies in the Port of Darwin in May and June.

No detailed work was done to accurately ascertain whether there was any variation between the timing of Little Black Cormorant breeding between seasons in the same colony. However, data from 4 colonies between the Daly and Finnis Rivers indicated that the timing of breeding varied little over the two years. Although little can be confidently said about any variation in the timing of Little Black Cormorant breeding in different parts of the Top End in the one year, no great variation due to geographical location was evident.

Further details relating to the timing of breeding of the two smaller species of cormorants can be found in Table A9 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Little Black Cormorants breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 4 breeding colonies of Little Black Cormorants (Jaensch 1994). All except one of these colonies (that had over 2000 clutches) were small. These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Little Black Cormorant breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

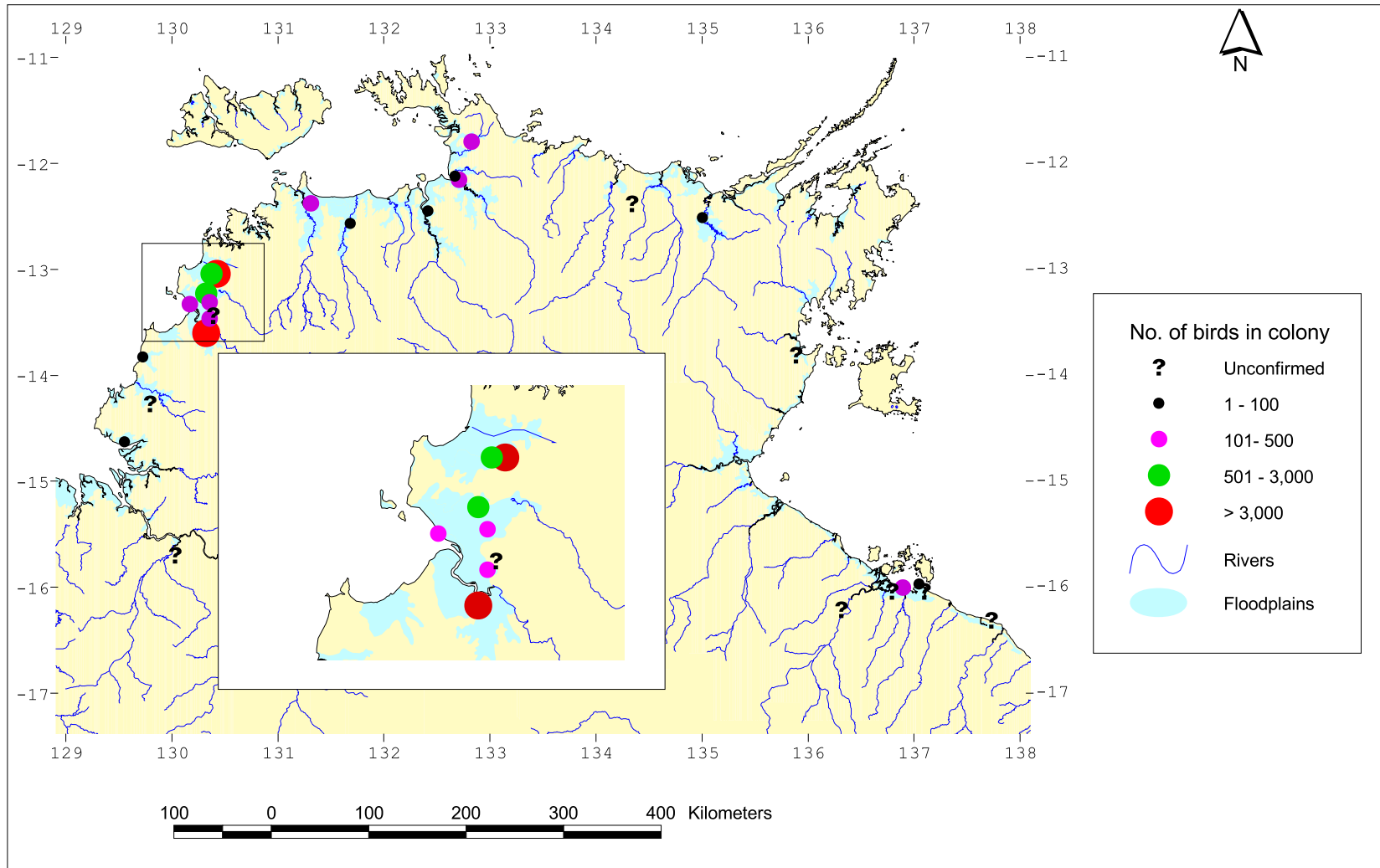


Figure 13. Location and size of colonies containing Little Black Cormorants.

PIED CORMORANT

Geographic Distribution

Pied Cormorant breeding colonies were sparsely distributed around the Top End, however most colonies and the largest number of birds were found in the south-west of the Gulf of Carpentaria (Figure 14). Four of the 6 largest colonies were in this area. The colonies are predominantly on, or just in from the coast, and their distribution reflects the greater tendency of Pied Cormorants compared with the other cormorants, to utilise marine waters in the Top End.

Pied Cormorant breeding colonies occurred at six mainland locations and on two offshore islands. With the exception of one Australian Pelican colony, the Pied Cormorant was the only species considered here to be confirmed breeding on offshore islands during these surveys. This does not include the small mangrove islands in or near river mouths. There are some historical records (Coastal Resource Atlas of the Northern Territory) indicating cormorant and/or darter breeding on other islands but it appears none of these sites were active during these surveys.

Pied Cormorants nested alone in half of their colonies and with other species in the other half. It is possible however, that other sites attributed to Little Pied Cormorants may have had small numbers of Pied Cormorant among them, thus increasing the number of Pied Cormorant breeding sites.

Pied Cormorants preferred to nest in mangroves, with only two colonies (both small) choosing to nest in different habitats (Table 8).

The cormorant species and Darters are likely to also breed in the vicinity of the smaller inland wetlands. Although it is likely that most of the significant Top End Pied Cormorant colonies were located during these surveys, it is possible that there are smaller inland colonies that were not located.

Numbers.

All of the Pied Cormorant colonies located during these surveys, with one exception, were found to support less than 400 birds. The one large colony (W056), located in the south-west Gulf of Carpentaria, had in excess of 3000 birds and appeared to be used each year. As the total number of Pied Cormorants found breeding in these surveys was around 4000 birds, the significance of this large colony is clear.

With the exception of the one large colony, these results do not indicate the Top End to be of particularly high significance for Pied Cormorant breeding (eg 1994 Blakers *et al.* 1984, and Marchant and Higgins, 1990).

Further details of the estimated number of Pied Cormorants present in each colony during each year that an estimation was made, are shown in Table A11 of Appendix A.

Seasonality.

Without considering the small number of Pied Cormorants breeding in mixed species colonies in which the other species may influence their timing, the Pied Cormorant breeding season was found to extend from about late March to July. Observations made on the large colony (W056) also showed eggs, small young and large young present at the one time, indicating an extended laying season.

The earliest record of sitting birds was late March (W056), with this colony being finished by late July. However other records showed eggs present in late May (W073) and young still present in late July (W060).

The largest colony (W056) was confirmed active in 2 out of 2 years, however observation outside the breeding season in other years tended to indicate it was a colony that was active in most seasons. There were no instances of a known site being confirmed as not active in a season, however the small number of sites and visits does limit the value of such a statement.

Further details relating to timing of breeding of Pied Cormorants, as summarised from field notes, can be found in Table A12 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Pied Cormorants breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 3 breeding colonies (all less than 150 clutches) of Pied Cormorants (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Pied Cormorant breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 7. Part of the large Pied Cormorant colony (W056) in the SW Gulf of Carpentaria, May 1999. Photo R. Chatto.

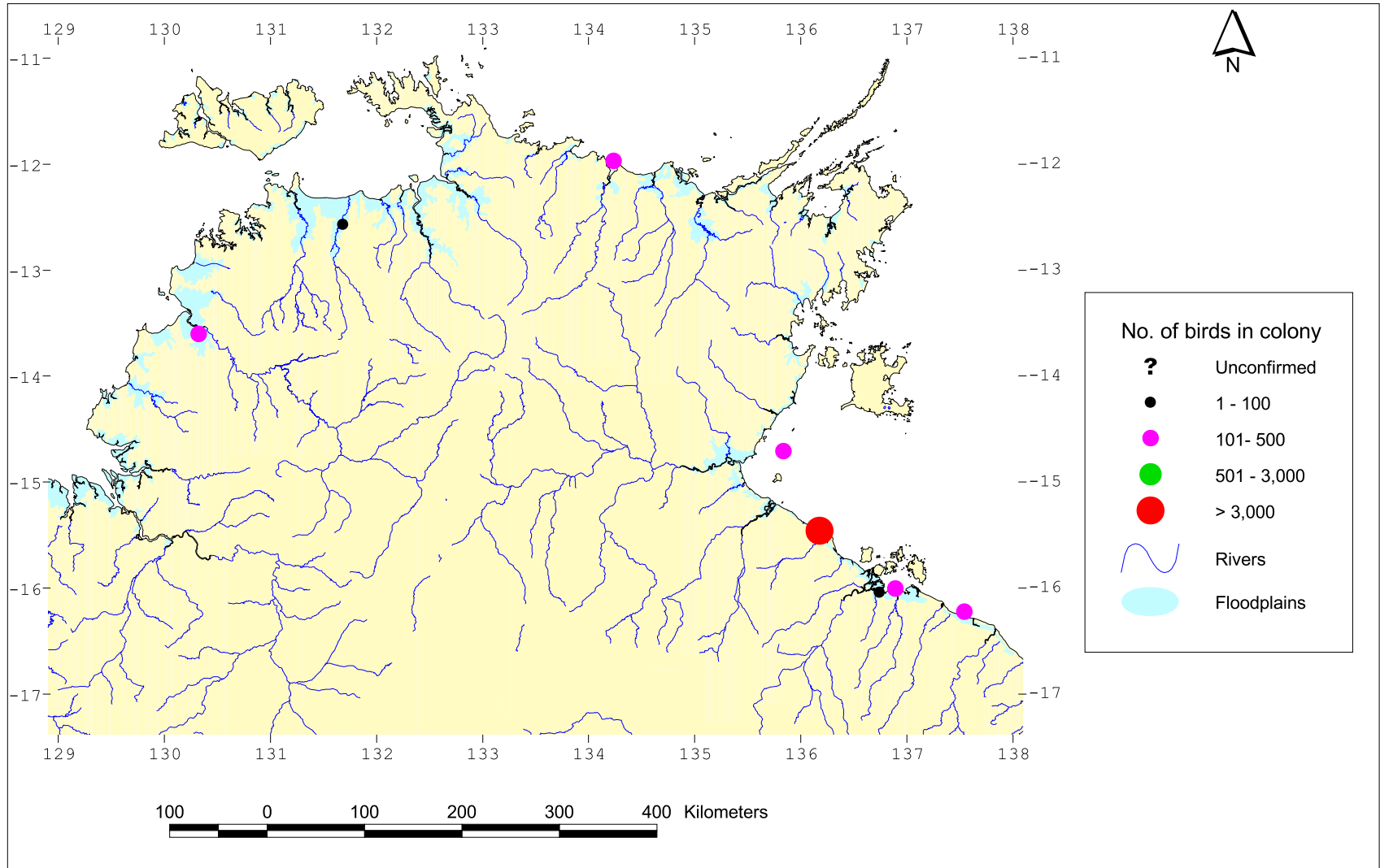


Figure 14. Location and size of colonies containing Pied Cormorants.

DARTER

Geographic Distribution

Darter breeding colonies were located around most of the Top End coast and floodplains, with most being within approximately 40 km of the coast (Figure 15). Confirmed Darter breeding occurred in large, mixed species colonies through to smaller colonies with only Darters present. They preferred to nest in paperbarks or mangroves, with the former being their most frequently used nesting substrate (Table 8).

Although the small groups of Darters often nest in the mangroves along creeks near the coast, the majority of Darter breeding was associated with the floodplains and smaller wetlands inland from the coast. As with most of the species discussed in this report, most Darter breeding colonies were located in the north-west, with the area between the Moyle and Finnis Rivers being the most important area. Seven of the 9 largest Darter colonies were located in this area and they were all within about 60 km of each other. As with the Little Black Cormorant, the area between the Adelaide River and Murgella Creek was not of great significance for Darter breeding.

As Darters also breed in small colonies, on small inland wetlands and watercourses or small mangrove-lined coastal creeks, they are difficult to locate. Hence numbers of this species (along with the Nankeen Night Heron) probably have the highest level of under-estimation of all the species reported here. Also it was sometimes difficult to distinguish Darters from the small cormorants in mixed colonies. Whereas a flash of white seen from the air could confirm the presence of Little Pied Cormorants, it was often more difficult to confirm Little Black Cormorants and Darters among the small 'cormorants' seen in such situations. Consequently it is possible that more of the Little Pied Cormorant and/or Little Black Cormorants sites could have also included Darters.

Numbers.

Darters were confirmed breeding in 27 colonies and possibly in another 3 colonies for which their presence could not be confirmed among small cormorants seen from the air, or reported by other sources, as a 'cormorant' colony. The colonies with the larger numbers of Darters tended to be when they were associated with Little Pied and/or Little Black Cormorant breeding. The largest number of adults recorded in a single colony was in excess of 1600 birds in 1999. This colony (W020) was located on the Finnis River floodplain and is further detailed in Appendix B.

Two Darter colonies supported 501-3000 birds and a few were in the range of 101-500 birds, however the majority of colonies supported less than 100 birds. The two large colonies (W018 and W020) were on the Daly and Finnis River floodplains.

Of 8 colonies where it was possible to do an estimate of numbers in the 1993 season, a total of over 830 birds were present, at an average of around 100 birds per colony. In 1999, after a number of new colonies were located, 13 colonies totalled 3100 at an average of around 240 birds per colony. Multiplying this average of these two years by the 27 confirmed colonies gives a total of around 4700 Darters present in all colonies if active. These figures are of course very rough, and they do not consider possible smaller inland colonies or the unconfirmed sites, however, they are the only such attempts at estimating the of Darters breeding in the Top End.

There are a large number of Darter colonies reported throughout Australia in the literature (eg Blakers *et al.* 1984, and Marchant and Higgins, 1990). This may mean that the total numbers of this species breeding in the Top End may not be of overall national significance, as is the case with the egrets. However, the two large colonies mentioned above seem to be significant in terms of individual colonies.

Further details of the estimated number of Darters present in each colony during each year that an estimation was made, are shown in Table A13 of Appendix A.

Seasonality.

Fewer observations were made on the specific breeding stages of Darters compared to most of the other species covered in these surveys. Darters were recorded breeding between February and August, however most of the breeding was concentrated between March and July. With observations showing eggs present in February, March, June and July, it appears Darters had more variation in their seasonal timing than most of the other species. Some of the smaller colonies of solely Darters tended to be the

later breeding examples, so it may be that Darters breeding in mixed species colonies were influenced to start when most of the other species started.

Le Souef (1902) reported Darter nests with fresh eggs in Northern Australia in May and June.

Repetitive seasonal use of the same colonies appeared less consistent with Darters than most other species reported here, as confirmed non-use of previously located colonies was observed to occur on as many occasions and re-use was observed.

Little work was done to accurately ascertain whether there was any variation in the timing of Darter breeding between seasons in the same colony. Part of the reason for this is because in many of the Darter colonies it was difficult to confidently separate Darters and their nests from the other small cormorants in terms of the stage of breeding. Nevertheless observations of two large, mixed species colonies with Darters present, in the area of the Daly and Finnis Rivers, showed similar breeding times over the 1993 and 1994 seasons. Insufficient information was collected to comment on the effects of geographic variation on timing of breeding.

Further details relating to timing of breeding of Darters, as recorded in field notes can be found in Table A14 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Darters breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 6 small breeding colonies of Darters (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Darter breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 8. One of a group of single trees with Darter breeding in a colony (W058) on the Daly River floodplain, March 1999. Photo D. Milne.

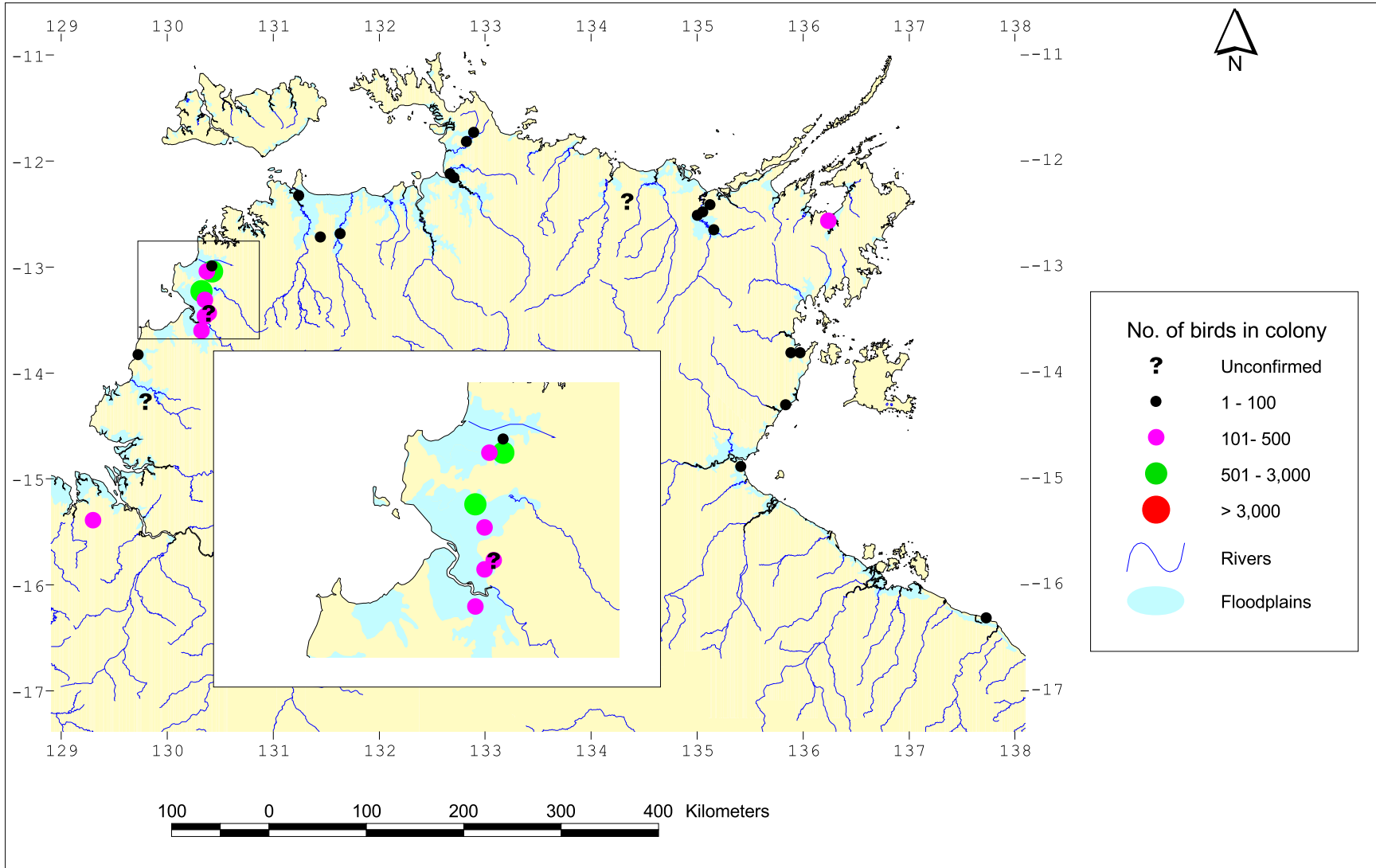


Figure 15. Location and size of colonies containing Darters.

PIED HERON

Geographic Distribution

Pied Heron breeding colonies were located around most of the Top End coast and adjacent floodplains, although colonies on the eastern side of the Top End were significantly smaller (Figure 16). All colonies were found to be either on the coast or within about 15 km of the coast. In nearly all areas where colonial waterbird breeding occurred, there were Pied Herons breeding in the vicinity. They always bred in mixed species colonies, all of which included egrets.

As with the majority of species covered in these surveys, most Pied Heron breeding was in the north-western part of the Top End, and particularly on the floodplains between the Moyle and Finnis Rivers, and between the Adelaide River and Murgarella Creek. This area contained 12 of the 16 largest colonies of Pied Herons.

Nearly all Pied Heron colonies were in mangroves along the coast or short distances up rivers. At one site Pied Herons nested in mimosa that had partly invaded a previously paperbark-dominated site.

Although these surveys did not involve much checking of smaller, inland wetlands, there was no evidence of any Pied Heron breeding upstream (inland) of the major coastal floodplains.

Numbers

As Pied Herons usually nest in lower sections of the trees than the other species breeding in the large mixed species colonies, they are often later or less prone to take to the air during surveys of the site. This may lead to a greater under-estimation of the number of birds present in the colony compared with the other species.

Pied Herons were confirmed breeding in 23 colonies, and although no individual colonies were in excess of 3000 birds, there were 16 in the range of 501-3000 birds. The largest number of Pied Herons in a colony was around 3000, but numbers in the 1000-2000 range were consistently recorded in nearly all colonies (excluding the generally smaller colonies in the east).

Fifteen colonies counted in 1993 supported over 14800 birds at an average of 990 per colony, while nine colonies in 1994 totalled over 9100 birds at an average of 1010, and eleven colonies in 1999 totalled 10530 at an average of around 950. Averaging these three years and multiplying this by the number of confirmed colonies gives a total of over 22600 Pied Herons present in all colonies if active. Again these are at best very rough figures, however they are to date, the only such attempts at estimating the number of Pied Herons breeding in the Top End.

The numbers of all Pied Herons regularly breeding in Top End colonies appears much higher than colonies outside of the Top End (eg 1994 Blakers *et al.* 1984, and Marchant and Higgins, 1990) but of course their Australian range does not extend much further.

Further details of the estimated number of Pied Herons present in each colony during each year that an estimation was made, is shown in Table A15 of Appendix A.

Seasonality.

Top End Pied Heron breeding colonies are very regular, with most colonies being active in every year they were checked. Without including the visit that initially located the colonies, the 23 Pied Heron colonies had more than 40 further checks done in subsequent years. There were only 5 instances where it was confirmed that Pied Herons were not breeding in a known colony, and this was usually because the entire colony (all species) was not active that year.

The earliest record of Pied Heron eggs was on 20 January (1994), however no earlier surveys were done in the month of January. No young were seen in any surveys in January, so it is assumed that few, if any, eggs were laid prior to January. The latest record of eggs observed was on 31 March (1999), although F. Woerle (pers. comm.) reports them on 13 April (1975) so Pied Herons can continue to be on eggs through to early April. However, most are fairly synchronous with peak laying from late January to early February. This is essentially the same as the egrets (not including Cattle Egrets), resulting in colonies having young present in significant numbers through March and April. The earliest fledglings leave the nest by mid April, and the last young leave the nest by late June.

White (1917) recorded similar timing in the large colony at the mouth of the Roper River, and Crawford (1972) also reported breeding in March/April, in a former colony on the Adelaide River. Frith and Davies (1961) reported Pied Herons commencing breeding in January/February.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Pied Heron breeding between seasons in the same colony, although it appears fairly consistent. Records of 5 colonies located between the Daly River and the East Alligator River suggested similar timing for Pied Herons in each respective colony over two consecutive years. There also appeared little variation in the timing of Pied Heron colonies in different parts of the Top End during any one season.

Comments relating to the timing of breeding of Pied Heron, as summarised from field notes, are given in Table A16 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

There are no records of Pied Heron breeding south of the Top End.



Plate 9. Newly hatched Pied Heron chick in a colony (W025) along a tributary of the Adelaide River, March 1993. Photo R. Chatto.

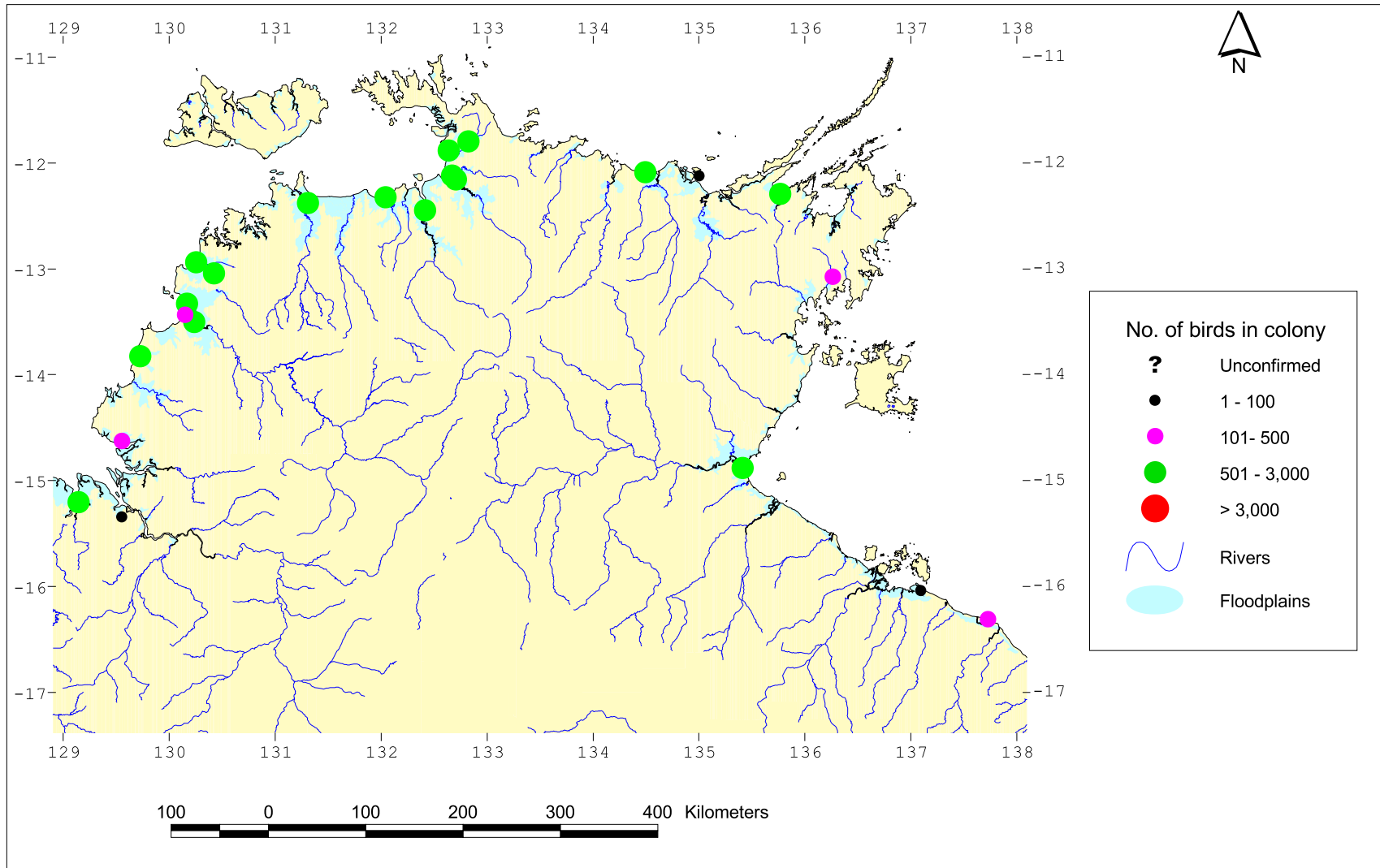


Figure 16. Location and size of colonies containing Pied Herons.

NANKEEN NIGHT HERON

Geographic Distribution

Confirmation of Nankeen Night Heron breeding was more difficult compared to the other species because they are daytime colonial roosting birds. Separating non-nesting daytime roosts from actual breeding colonies during aerial surveys was often difficult because nests are usually hidden under the tree canopy. Nankeen Night Herons were recorded as breeding at sites that only received aerial surveying when they were present in mixed species colonies for which other species were confirmed as breeding. Although it is possible that they may have only been roosting among the other breeding birds, all of the colonies that were able to be given a follow up ground check showed the Night Herons to be breeding not just roosting. No aggregations of Nankeen Night Herons were recorded as breeding colonies when only this species was present, unless nests were seen being used. Thus it is likely that many of the sites recorded solely as roosts during aerial surveys, may have also been breeding colonies. Further, their resistance to flush when flown over may also mean that other breeding colonies could have been missed because the birds were not detected.

Nankeen Night Heron breeding colonies were mostly located around the eastern and western sides of the Top End and they were either on or within about 40 km of the coast (Figure 17). However, this may be a reflection of the distribution of other species colonies because Nankeen Night Herons were mostly recorded as breeding when found among the colonies of these other species. Although none were confirmed between the Murgarella floodplains and Buckingham Bay, it is possible that many of the solely Nankeen Night Heron roosts seen in places such as the Arafura Swamp (Goyder River) during the breeding season, and were unable to be ground checked, may have also been breeding colonies.

Nankeen Night Herons most frequently nested in mangroves (Table 8).

Unlike the other species discussed here, there did not appear to be any area in the Top End that was more important for Nankeen Night Heron breeding than others. These surveys did not involve much checking of smaller, inland wetlands, but no evidence was found of any Nankeen Night Heron breeding upstream (inland) of the major coastal floodplains. This, however, cannot be ruled out with this species.

Numbers

As mentioned above, Nankeen Night Herons usually nest under canopies and are very reluctant to flush out into the open when flown over. Consequently, estimations of their numbers are more unreliable than for the other species. This will have undoubtedly led to greater under-estimations of the number of birds present in colonies compared with the other species.

Nankeen Night Herons were confirmed breeding in 26 colonies, however there were also many other sites where this species was recorded roosting that may have also been breeding colonies. Most of the colonies had less than 500 birds with the largest number of Nankeen Night Herons in a colony recorded as around 4000. This colony (W053) was located in 1999 and was in mangroves just behind the coast on the eastern side of the Keep River estuary. It is further detailed in Appendix B.

In 1999, fifteen colonies with breeding Nankeen Night Herons were estimated to have more than 11000 birds at an average of just over 700 per colony. A similar average was calculated from five colonies in 1993. Applying this average to the total number of known Nankeen Night Heron colonies, the total number of Nankeen Night Herons breeding in the Top End in those years is estimated as 19000 birds if all colonies were active. Again these are at best very rough figures, however they are to date, the only such attempts at estimating the number of Nankeen Night Herons breeding in the Top End.

It is not easy to make comparisons with the numbers of Nankeen Night Heron breeding in the Top End with other parts of Australia using the results from these surveys due to likely underestimations in the number of colonies and the number of birds in them. Nevertheless comparing Top End breeding numbers with colonies reported in the literature throughout Australia (eg Blakers *et al.* 1984, and Marchant and Higgins, 1990) shows they appear significant in a national context.

Further details of the estimated number of Nankeen Night Herons present in each colony during each year that an estimation was made, are shown in Table A17 of Appendix A.

Seasonality.

As discussed above, it was difficult to accurately define timing of breeding events for Nankeen Night Herons. Eggs were first recorded on 11 March (1994), however old nestlings recorded on 17 March in another colony indicate that eggs were laid in late January to early February in that colony. At the other end of the season, near-fledged young were recorded in mid August. Consequently breeding may take place between January and August. However observations suggest that most breeding occurs between March and June.

There are insufficient observations to say whether most of the Nankeen Night Heron colonies are active in most of the years. Similarly, little can be said on seasonal variation within the same colony over different years, although one colony checked at similar times of the year in consecutive years was found to have breeding at a similar stage in both years. It is also unknown whether seasonal timing is affected by geographical location for this species.

Comments relating to the timing of breeding of Nankeen Night Herons, as summarised from field notes, are given in Table A18 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984) and Marchant and Higgins (1990) indicate Nankeen Night Heron breeding just south of the Top End on the eastern side of the Northern Territory but give no details. Storr (1977) has no Northern Territory reports of Nankeen Night Heron breeding south of the Top End

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 3 small breeding colonies of Nankeen Night Herons (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Nankeen Night Heron breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 10. Young Nankeen Night Heron, near colony (W035) on the East Alligator River . Photo G. Miles.

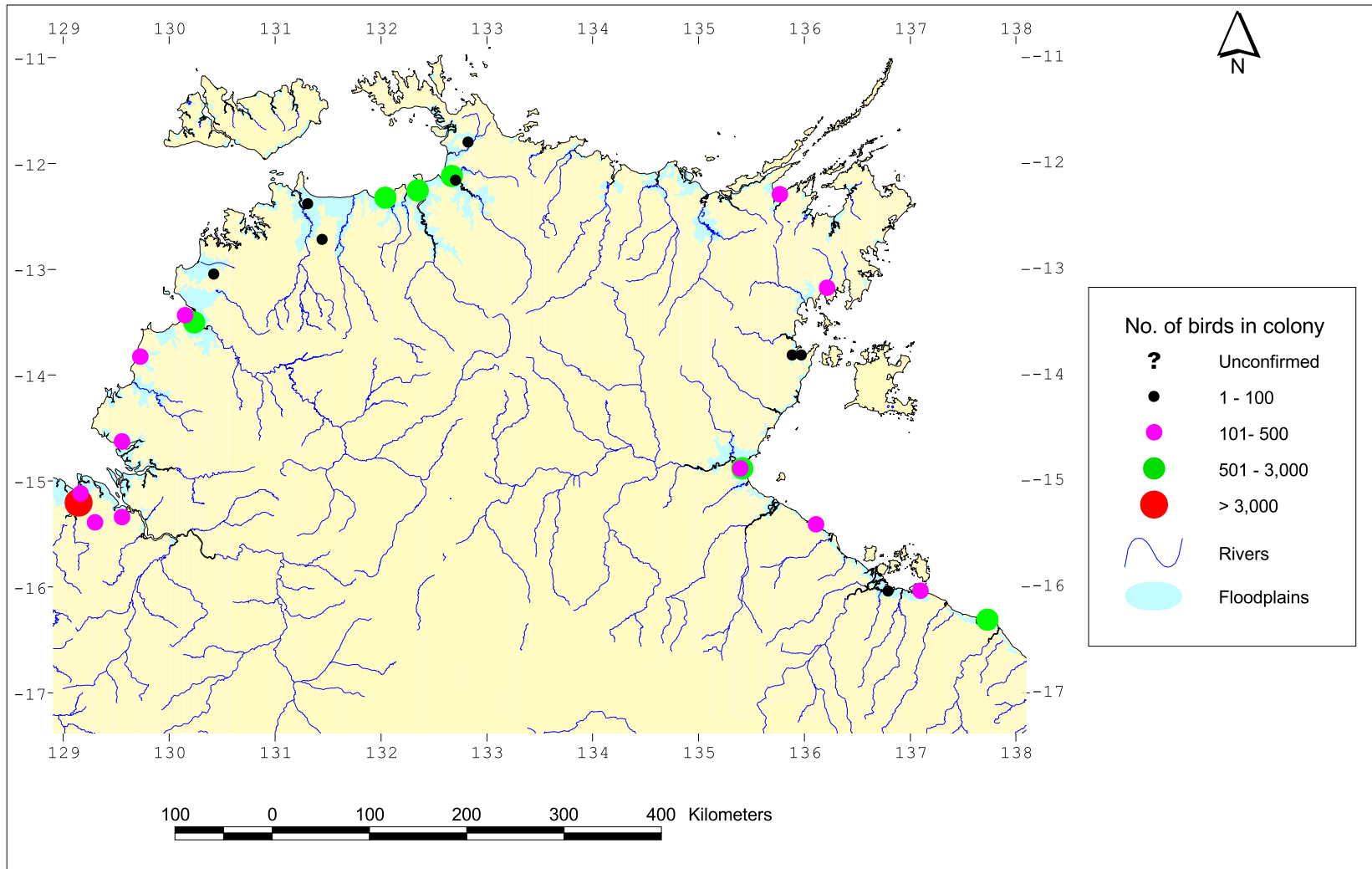


Figure 17. Location and size of colonies containing Nankeen Night Herons.

AUSTRALIAN WHITE IBIS

Geographic Distribution

Australian White Ibis breeding colonies were located around most of the Top End coast and adjacent floodplains, and were found to be either on, or within, about 15 km of the coast (Figure 18). In nearly all areas where colonial waterbird breeding occurred, there was some Australian White Ibis breeding, either on their own or within mixed species colonies.

As with the majority of species covered in these surveys, most Australian White Ibis breeding was in the north-western part of the Top End, particularly on the floodplains between the Moyle and Finnis Rivers, and between the Adelaide River and Murganella Creek. Nine of the 16 largest Australian White Ibis breeding sites were in these areas.

Australian White Ibis nested about equally in the mangroves of the usually egret dominated colonies along the coast and near-coastal riverbanks and in the paperbarks on the floodplains which often involved mixtures of species not dominated by egrets. However, on their own they preferred to nest in *Phragmites australis*. At one site they nested in mimosa that had partly invaded a previously paperbark-dominated site.

Although these surveys did not involve much checking of smaller, inland wetlands, no evidence was found of any Australian White Ibis breeding upstream (inland) of the major coastal floodplains.

Numbers

Australian White Ibis, like Pied Herons, often nest in lower sections of the trees when in mixed species colonies. This tends to lead to under-estimation of the number of birds present in the colony.

Australian White Ibis were confirmed breeding in 39 colonies, with considerable variation in colony size. The largest number of Australian White Ibis in a colony was around 4000, and two other colonies had in excess of 3000 birds. The largest colony (W007) was located in a rainforest patch just in from the coast on the southern side of the Daly River. The two other large colonies are W053 which is on the eastern side of the Keep River estuary and W055 which is located inland a little and just south of the Roper River. These three colonies, which are widely spread around the Top End, are all further detailed in Appendix B. The remaining colonies had a fairly even spread of different size ranges.

In 1993, twenty colonies were estimated to have 12400 birds at an average of 620 per colony, while fourteen in 1995 totalled over 7900 birds at an average of 880, and fifteen in 1999 totalled 17200 at an average of around 1150. Averaging these three years and multiplying this by the number of confirmed colonies gives a total of over 34300 Australian White Ibis present in all colonies if active. Again these are at best very rough figures, however they are to date, the only such attempts at estimating the number of Australian White Ibis breeding in the Top End.

The numbers of all Australian White Ibis regularly breeding in Top End colonies appear much higher than colonies in other parts of the Northern Territory. However, they are not of high significance compared to other colonies in south-eastern Australia (eg Blakers *et al.* 1984, and Marchant and Higgins, 1990).

Further details of the estimated number of Australian White Ibis present in each colony during each year that an estimation was made, are shown in Table A19 of Appendix A.

Seasonality.

Top End Australian White Ibis colonies are used very consistently, with most colonies being active in every year they were checked. Without including the visit that initially located these colonies, the 39 Australian White Ibis colonies had in excess of 54 further checks in subsequent years. There were only 8 occasions where it was confirmed that Australian White Ibis were not breeding in a known colony, and this was usually because the entire colony (all species) was not active that year.

Australian White Ibis breeding in the Top End have one of the most extended breeding seasons of all the species included in this report. This is both within a given colony (with birds in the same colony frequently having eggs through to fledged young at the same time), and over all Top End colonies combined (with eggs being recorded in all months from January to August).

The earliest record of Australian White Ibis eggs was on 20 January (1994), however no earlier surveys were done in the month of January. No young were seen in any surveys in January, so it is

assumed few if any eggs could have been laid prior to January. The latest record of eggs during these surveys was on 17 August (1995). The first young were recorded on 11 March (1993) and the latest on 17 August (1995), although many eggs also present in this last case would indicate young present well into September. Despite this large variation, breeding is mostly concentrated in the four months from March to July.

Frith and Davies (1961) reported Australian White Ibis commencing breeding from March to June in the floodplains to the east of Darwin, and Le Souef (1902) reported them building nests in April and June in northern Australia.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Australian White Ibis breeding between seasons in the same colony. However this becomes somewhat irrelevant when the huge range within a given season is considered for this species. A similar situation would apply if trying to assess any variation due to different geographical locations within the Top End.

Comments relating to the timing of breeding of Australian White Ibis, as summarised from field notes, are given in Table A20 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984) and Marchant and Higgins (1990) do not record Australian White Ibis breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 5 small breeding colonies of Australian White Ibis, the largest of which was 200 clutches (Jaensch 1994). These surveys (some of which were done by R. Chatto) were done between April and September of 1993 after significant regional rains had fallen causing substantial flooding and the attraction of a wide range of waterbirds.

Barnard (1914) reported a small colony of five pairs of Australian White Ibis in the swamps around Brunette Downs.

The existence of regular and significant Australian White Ibis breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 11. Australian White Ibis chick in the colony (W025) along a tributary of the Adelaide River, March 1993. Photo R. Chatto.

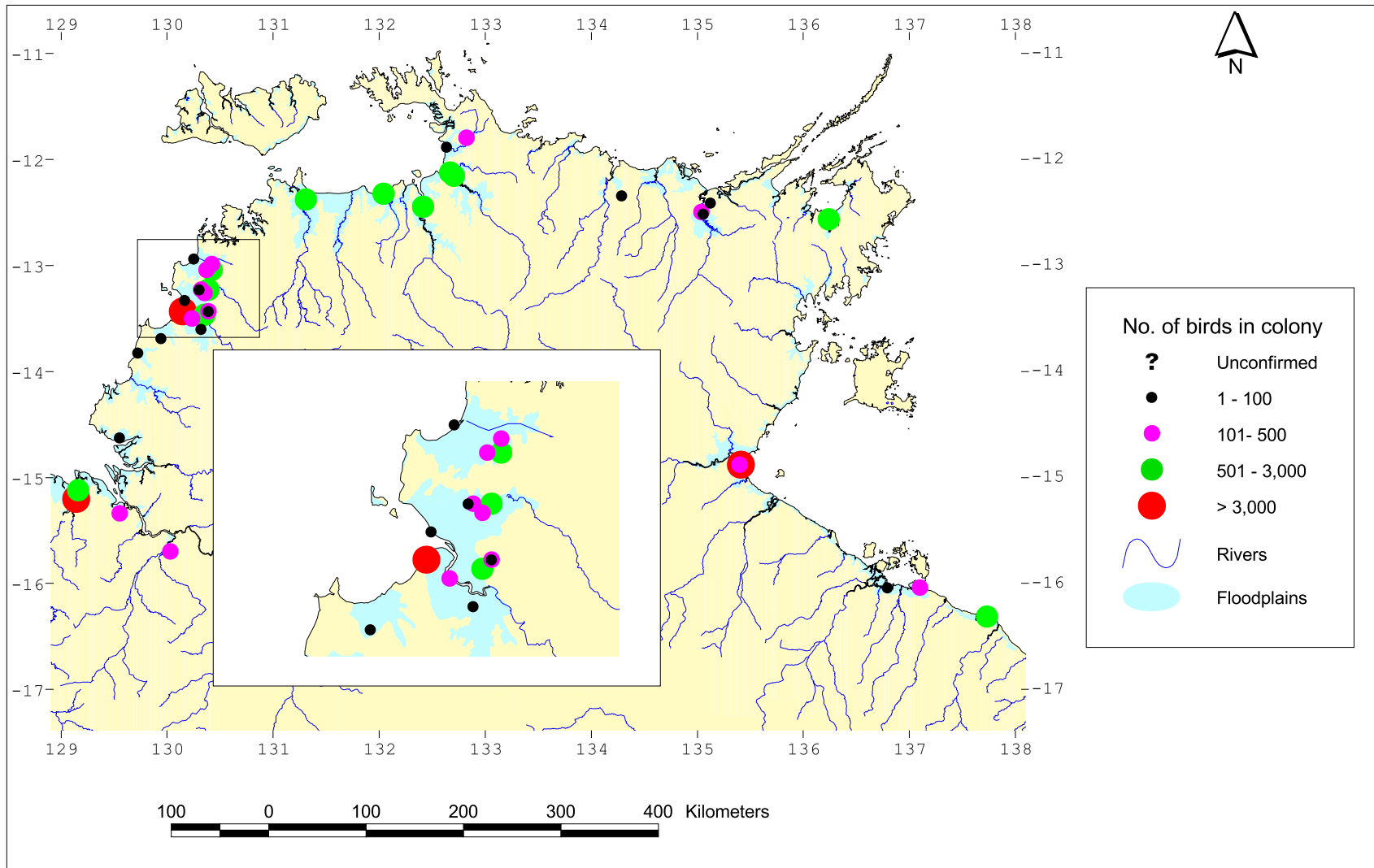


Figure 18. Location and size of colonies containing Australian White Ibis.

GLOSSY IBIS

Geographic Distribution.

Glossy Ibis were found breeding only once during these surveys. This was in a large, mixed species colony (W053) that was in mangroves on the eastern side of the Keep River estuary near the WA border (Figure 19). Whether they were active in this particular colony in other years is unknown, however they were not involved in breeding in any other Top End colony during the period of the surveys.

Although Glossy Ibis are present in large numbers throughout the Top End for most of the year, the majority depart the Top End (and probably the Northern Territory) during part of the wet season to breed elsewhere. Breeding is recorded in north-west Western Australia (Blakers *et al*) but this is unlikely to account for all the birds leaving the Top End.

Numbers.

The only Top End colony had around 5000 birds present, although this colony was only surveyed from the air and on one occasion.

Seasonality.

On 11 March (1999) all that could be seen to indicate seasonal timing were some eggs, however all species had ceased breeding in this colony by 30 June (1999).

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) do not record Glossy Ibis breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 2 small breeding colonies of Glossy Ibis (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Glossy Ibis breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 12. Part of a large mixed colony (W053) with several thousand Glossy Ibis, near the Keep River estuary, March 1999. Photo R. Chatto.

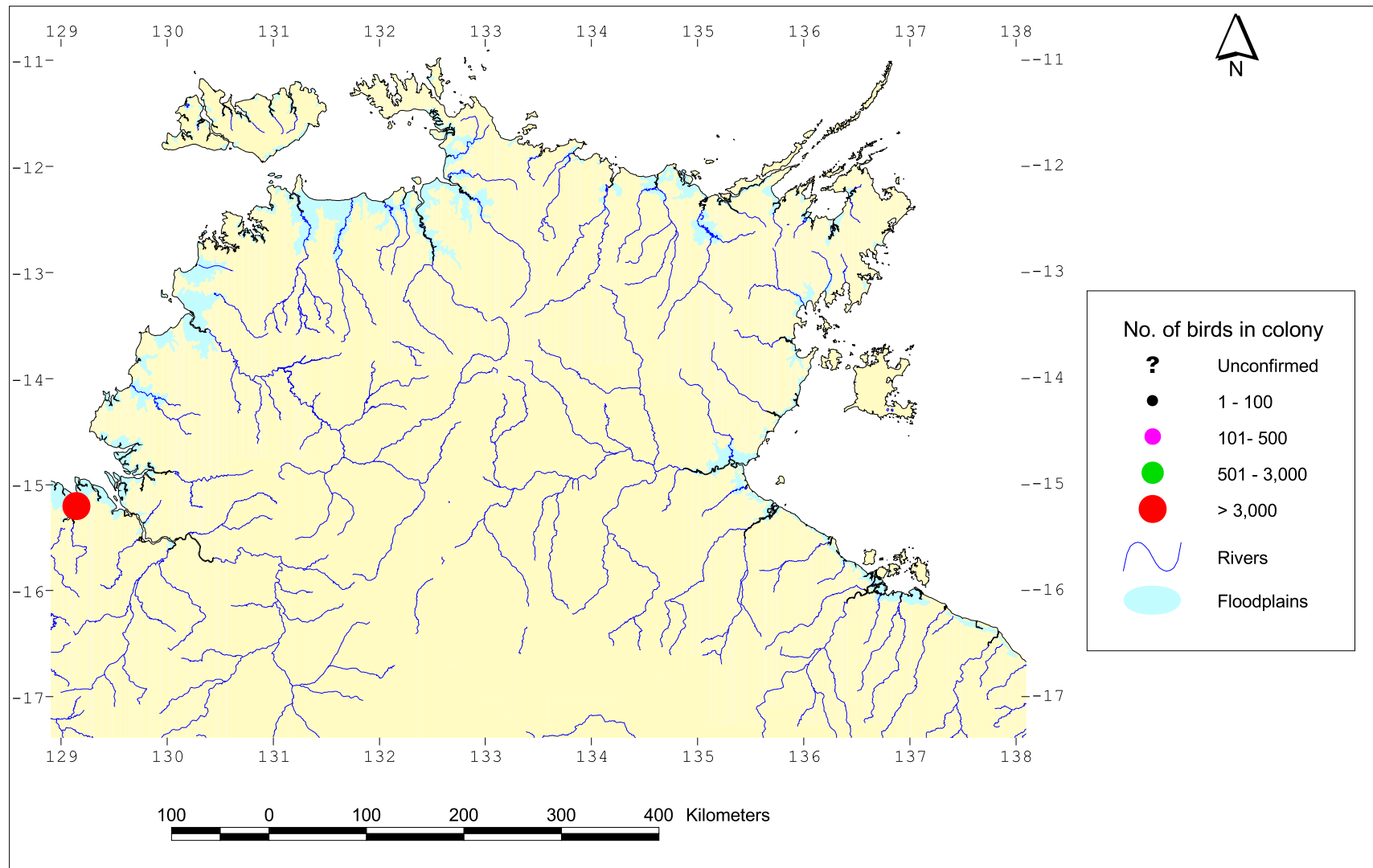


Figure 19. Location and size of colonies containing Glossy Ibis.

STRAW-NECKED IBIS

Geographic Distribution.

Straw-necked Ibis were not found breeding anywhere in the Top End despite the occurrence of wet seasons during the period of the surveys that varied from record wet to record dry. Straw-necked Ibis are included here because the species has been confirmed breeding within a mixed species colony in the survey area on one occasion, prior to the period of these surveys. Frith and Davies (1961) cited a crocodile shooter who reported Straw-necked Ibis breeding in the mixed species colony that was formerly at the mouth of the Adelaide River (W944). Frith and Davies were not able to visit the site, but they did report juveniles in the surrounding floodplains.

In most of the years that these surveys have been conducted, the large populations of Straw-necked Ibis departed the Top End early in the wet season and did not return (complete with juvenile plumage birds) until later in the wet season. Although analysis of waterbird distribution outside of the breeding colonies is yet to be undertaken, field notes in 1991 and 1992, stated that the first 'good numbers' of returning Straw-necked Ibis were seen in mid to late March in both years. In at least one wet season, the driest ever recorded (1990), they did not leave at all. However, even in this year they still did not breed in the Top End. Consequently they may only depart when suitable breeding conditions exist further south of the Top End.

Numbers

No indication was given in Frith and Davies of the number of Straw-necked Ibis reported in the former Adelaide River colony.

Seasonality

Breeding in the colony at the mouth of this former Adelaide River colony was reported as being completed by late May.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) do not record of Straw-necked Ibis breeding south of the Top End in the Northern Territory. Blakers *et al* (1984) also report breeding in north-west Western Australia but this is unlikely to account for the numbers leaving the Top End.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 3 breeding colonies of Straw-necked Ibis, the largest two having 500 clutches (Jaensch 1994). These surveys (some of which were done by R. Chatto) were done between April and September of 1993 after significant regional rains had fallen causing substantial flooding and the attraction of a wide range of waterbirds. Bellchambers (pers. comm.) subsequently reported 2600 to 5000 breeding in this area in 1995 between March and May. This does not coincide with the mass departure of Straw-necked Ibis from the Top End in the wet season and it is unknown whether this involves birds from the Top End or, more likely, local birds.

Barnard (1914) reported thousands of Straw-necked Ibis in the swamps around Brunette Downs, but in only two places was any attempt made to breed. These were only small attempts and at least one failed.

The existence of regular and significant Straw-necked Ibis breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.

ROYAL SPOONBILL

Geographic Distribution

Royal Spoonbill breeding colonies were located around most of the Top End coast and adjacent floodplains, though there were a smaller number of colonies in the east (Figure 20). There was only one colony, near the Calvert River, in the south-east. Although Hill (1914) reports being told by Aborigines that Royal Spoonbills breed in the swamps south-east of the McArthur River, no breeding colonies were located here in these surveys. Morton (1991) also reports small colonies along the South Alligator River, but none were confirmed during the current surveys. However, one possible Royal Spoonbill colony (W902) that was not ground checked may be confirmed in the future to be one of these colonies.

No Royal Spoonbills were found breeding among the colonies in the mangroves along the coast and those in the mangroves along riverbanks tended to be much smaller than those in paperbarks on the floodplains. Nevertheless all Royal Spoonbill breeding found in these surveys were within about 40 km of the coast. As with the majority of species covered in these surveys, most Royal Spoonbill breeding was in the north-western part of the Top End, and particularly on the floodplains between the Moyle and Finnis Rivers. The Arafura Swamp along the Goyder River was also fairly important for breeding. Fourteen of the 17 largest colonies were in these areas.

During these surveys Royal Spoonbills were most frequently recorded nesting in paperbarks, however Le Souef (1902) mentions them breeding in reeds in northern Australia in the company of Australian White Ibis.

Of the species detailed in this report, the Royal Spoonbill is the least likely to breed in large mixed species colonies. It usually breeds in smaller colonies with few other species, often including cormorants, Darters or Australian White Ibis rather than egrets and herons.

Although these surveys did not involve much checking of smaller, inland wetlands, and no evidence was found of any Royal Spoonbill breeding upstream (inland) of the major coastal floodplains, this is a species that may have had inland breeding colonies that were not located.

Numbers

Royal Spoonbills were confirmed breeding in 25 colonies, with the largest having more than 700 birds. This was in 1999 at colony (W022) located on the Finnis River floodplain and is further detailed in Appendix B. There were 16 colonies within the range of 101-500 birds.

In 1993, fourteen colonies were estimated to have 2000 birds at an average of 140 per colony, while ten in 1995 totalled over 3000 birds at an average of 300 per colony. Averaging these two years and multiplying this by the number of confirmed colonies gives a total of over 5500 Royal Spoonbill present in all colonies if active. Again these are at best very rough figures, however they are to date, the only such attempts at estimating the number of Royal Spoonbill breeding in the Top End.

The numbers of all Royal Spoonbill regularly breeding in Top End colonies appears much higher than colonies in other parts of the Northern Territory. Referring to other colonies reported in the literature throughout Australia (eg Blakers *et al.* 1984, and Marchant and Higgins, 1990) it appears that the numbers of Royal Spoonbill breeding in the Top End are of national significance.

Further details of the estimated number of Royal Spoonbill present in each colony during each year that an estimation was made, are shown in Table A23 of Appendix A.

Seasonality.

Most of the Royal Spoonbill colonies were found to be active in more years than not. Without including the visit that initially located each of the colonies, the 25 colonies had in excess of 25 further checks done in subsequent years. There were 8 instances where it was confirmed that Royal Spoonbill were not breeding in a known colony, and this was usually when the entire mixed species colony was not active that year.

Royal Spoonbills tended to be the last species to start breeding. They regularly commenced later, whereas other species such as Australian White Ibis and Darter had both early and late starting colonies. The earliest record of Royal Spoonbill eggs was on 3 May (1993), however there were also old young in some nests indicating that eggs were probably present in March. The latest record of eggs

present (inferred because of tightly-sitting adults) was on 17 August (1995). Despite this large variation, breeding is concentrated in the four months from April to July.

No detailed work was done to accurately ascertain whether there was any variation in the timing of Royal Spoonbill breeding between seasons in the same colony. However observations of 3 colonies in the Daly/Finniss River area over two different seasons showed similar breeding times each year. Similarly there is not a lot of information to accurately compare nesting times for colonies in different geographical locations within the Top End. Nevertheless a small number of observations of colonies on the eastern side showed them to be breeding at a similar time to those in the north-west of the Top End.

Comments relating to the timing of breeding of Royal Spoonbill, as summarised from field notes, are given in Table A24 of Appendix A.

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) have no Northern Territory records of Royal Spoonbill breeding south of the Top End.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 4 breeding colonies of Royal Spoonbill, the largest of which was 120 clutches (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds.

The existence of regular and significant Royal Spoonbill breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 13. Part of the large colony (W007) in rainforest on the coast just south of the Daly River mouth which includes several hundred Royal Spoonbill, March 1999. Photo D. Milne.

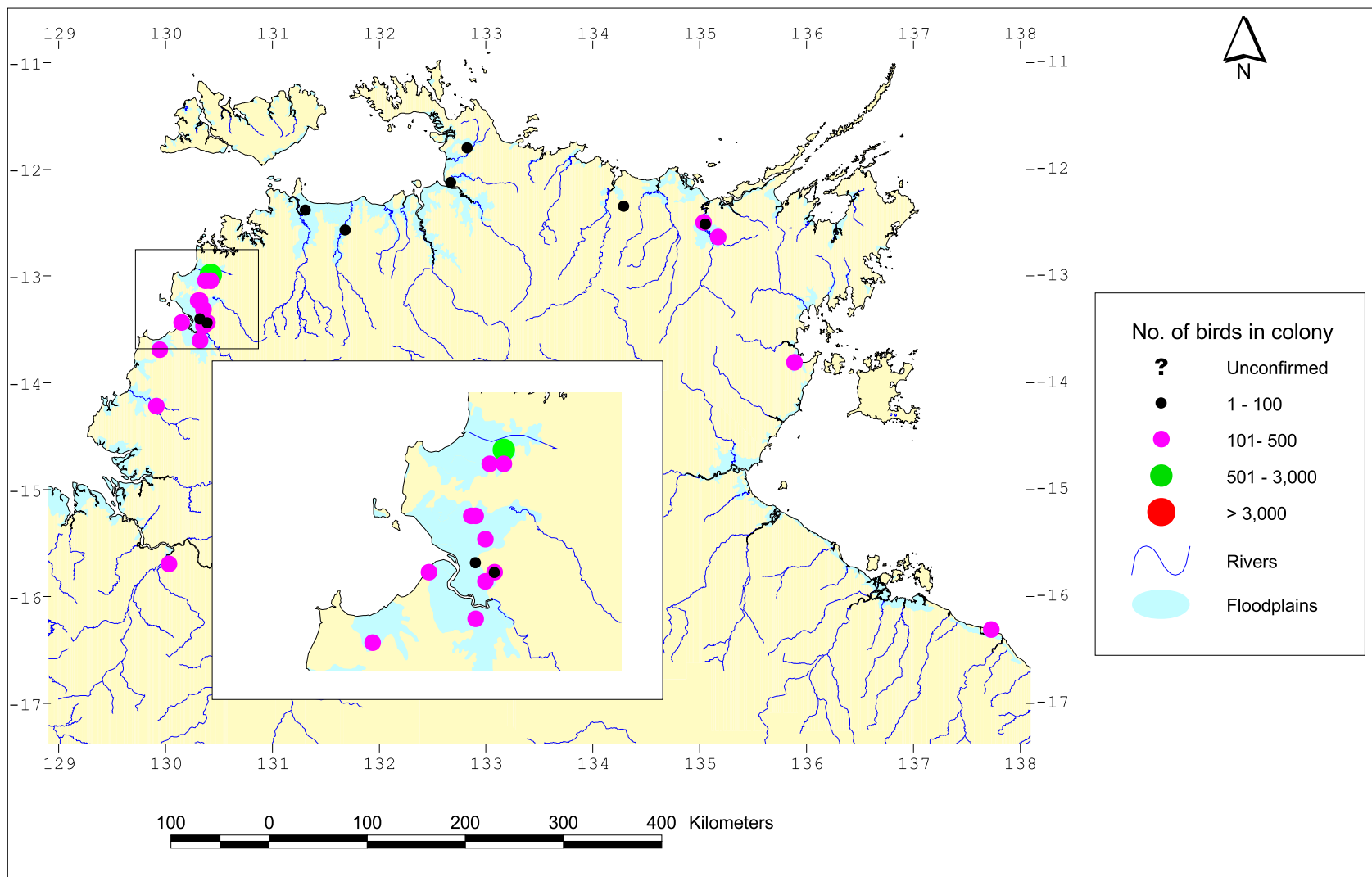


Figure 20. Location and size of colonies containing Royal Spoonbills.

AUSTRALIAN PELICAN

Geographic Distribution

There was only one Australian Pelican breeding colony found during these surveys, despite these birds being distributed throughout the survey area. This is likely to be the only colony that was active during the period of these surveys, it was certainly the only large one. This colony is located on North Peron Island, on the western side of the Top End (Figure 21).

Numbers

No other species were involved in this colony. The largest estimated number of adults was in excess of 6000 birds and the average number over the years was at least 2200 adults.

Although there have been other Australian Pelican breeding colonies with far greater numbers, for example in Lake Eyre in 1990, such colonies are neither regular or frequent. As the North Perron Island colony was active and highly successful in nearly every year and consistently involved low thousands of birds, it appears to be of national significance.

Seasonality

Pelican breeding at this colony was very consistent over the years, beginning in March and ending in September. Further details can be found in Chatto (1995).

Other Reports of Breeding in the NT (south of the Top End)

Blakers *et al* (1984), Marchant and Higgins (1990) and Storr (1977) did not record Australian Pelican breeding south of the Top End in the Northern Territory.

Extensive surveys conducted in the wetlands of the sub-humid tropics of the Northern Territory (defined as the section of the Northern Territory between the 15 and 20 degree latitudes), located 2 breeding colonies of Australian Pelicans, the largest having 5000 clutches (Jaensch 1994). These surveys (some of which were done by R. Chatto) were carried out between April and September of 1993 after significant regional rains had caused substantial flooding and attracted a large number of waterbirds. It may be that this large colony is not regularly or frequently used, unlike the colony on North Peron Island.

The existence of regular significant Australian Pelican breeding colonies further south of latitude 20 degrees in the Northern Territory is unlikely due to the lack of suitable wetlands.



Plate 14. Australian Pelican chicks in the colony (W021) on North Perron Island, June 1995. Photo D. Schultz.

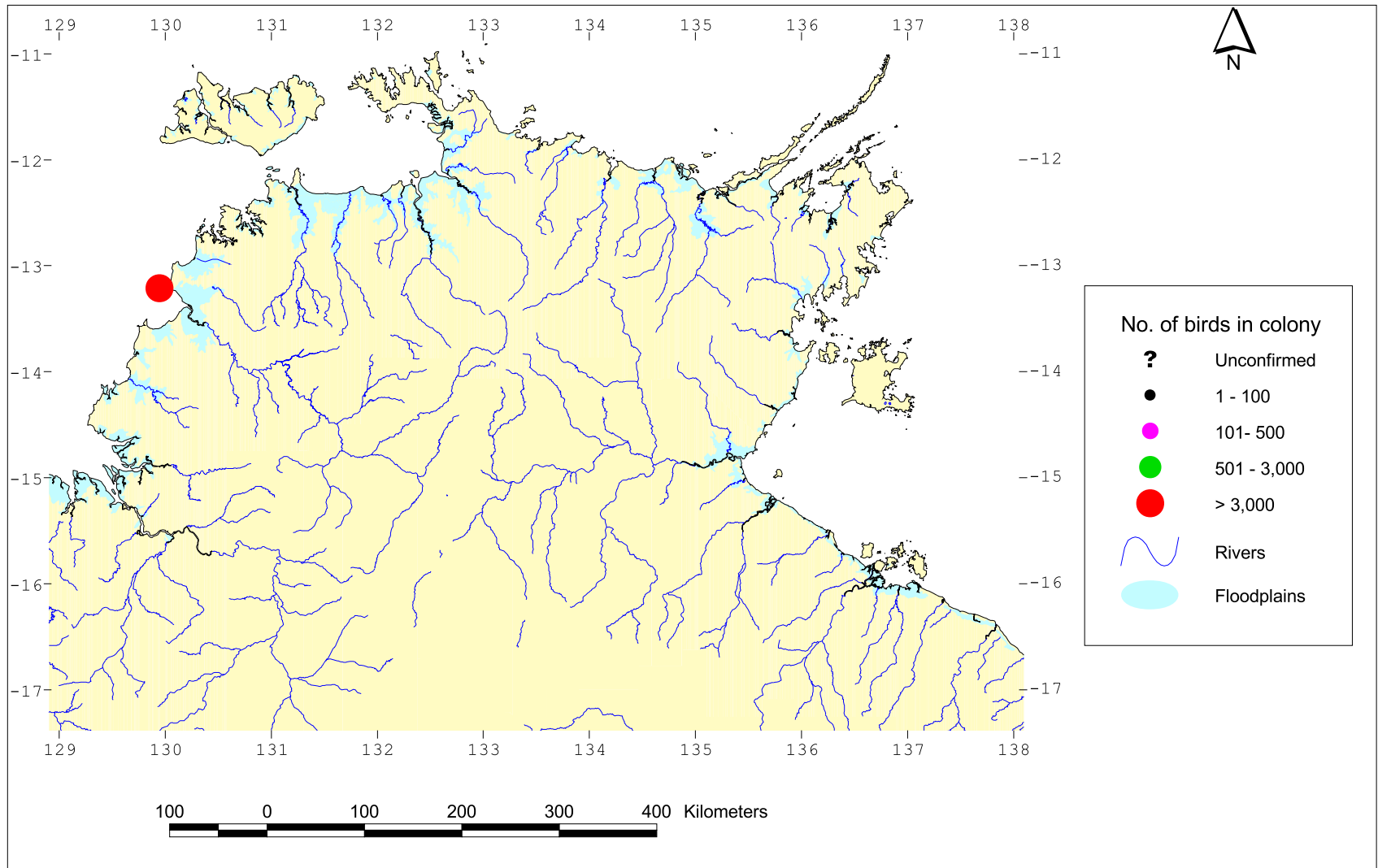


Figure 21. Location and size of colonies containing Australian Pelicans.

COLONIAL BREEDING WATERBIRDS THAT DO NOT NEST COLONIALY IN THE TOP END

The following species are mentioned briefly because they are often regarded as colonial nesting waterbirds and they do occur in the Top End, but do not regularly breed in colonies there.

GREAT CORMORANT

This species was very rarely observed during the current surveys and not confirmed breeding at any of the colonies. It is possible that some Great Cormorants could be sparsely mixed within the large mixed species colonies, as the author has seen in breeding colonies in Victoria, but it is unlikely that this would involve significant numbers. The only record of Great Cormorants (40 birds) breeding in the Northern Territory was at Lake Woods in May 1993 (Jaensch 1994).

EURASIAN COOT

Although arguably not a true colonial nesting species, Eurasian Coots may nest in loose colonies. The species was uncommonly seen during these surveys and was not found to be breeding. Greater numbers were seen in the wetlands near the Western Australian border, and as this area was not well surveyed, it is possible that breeding may occur in this area. Jaensch (1994) recorded only 59 pairs breeding in wetlands of the sub-humid tropics of the Northern Territory. This remains the only breeding record for the Northern Territory. Although Le Souef (1902) seems to suggest that they commonly breed in northern Australia, he does not specifically mention the Northern Territory.

PURPLE SWAMPHEN

Although also arguably not a true colonial nesting species, Purple Swamphens also often nest in loose colonies. The species is seen fairly regularly in the Top End but it is patchily distributed and usually not seen in large numbers. The author made only one observation of this species breeding during the surveys, though it is possible that small colonies of this species were missed from the air. Approximately 500 birds were observed from the air among an unknown number of nests on the Murgendela Creek floodplain on 20 April 1994. The nests were among rushes (possibly *Eleocharis sp.*).

Whitehead (pers. comm) reports seeing young Purple Swamphens on Opium Creek, east of Darwin, in March 1988, and Frith and Davies (1961) reported them to breed between February and July in the floodplains between Darwin and western Arnhemland. This latter report suggested that breeding was not an uncommon event. Jaensch (1994) recorded only 16 pairs breeding in wetlands of the sub-humid tropics of the Northern Territory, but suggested there could be more breeding in the region.

BLACK-WINGED STILT

Another species arguably not a true colonial nester, nevertheless it is also mentioned here because they often nest in loose colonies. Despite large numbers of Black-winged Stilt present throughout the survey area for most of the year, this species was only recorded breeding on the one occasion. This colony involved about 10 birds breeding in a small wetland adjacent to Blue Mud Bay in May 1999. It is possible that other small colonies could have been missed, but it is doubtful that many large colonies would have been missed. Presumably most Black-winged Stilts leave the Top End to breed. As this species often breeds on intermittent inland swamps, it is likely that their movements in and out of the Top End will not be as regular or as seasonal as Straw-necked and Glossy Ibis movements.

Jaensch (1994) recorded only 37 pairs of Black-winged Stilt breeding in the Barkly Tableland wetlands of the Northern Territory, while Marchant and Higgins (1990) documented only two breeding records in the Northern Territory for this species.

RED-NECKED AVOCET, GULL-BILLED TERN AND WHISKERED TERN

These are species that were commonly recorded, at times in large numbers, over most of the Top End wetlands during current surveys. However, none were observed breeding during the surveys, and there have not been any documented records of these species breeding in the Top End. Jaensch (1994) recorded only 3 pairs of Red-necked Avocet and 7 pairs of Whiskered Tern breeding in the Barkly Tableland wetlands of the Northern Territory. K. Bellchambers (pers. comm.) reported about 800 nests, at 3 sites for Gull-billed Tern in this area subsequent to Jaensch's surveys. Marchant and Higgins (1990) did not document any breeding records in the Northern Territory for any of these species. As these species usually breed on intermittent inland swamps, it is likely that their movements in and out of the Top End will not be as regular or as seasonal, as Straw-necked and Glossy Ibis movements.



Plate 15. Gull-billed Tern, Buffalo Creek near Darwin, dry season 1999. Photo G. Miles.

FUTURE MANAGEMENT

This report has concentrated on the location and status of the breeding colonies, rather than discussing research and management issues in detail. Some of these will now be addressed in a preliminary manner.

The Top End of the Northern Territory is in a unique position with regard to much of its flora and fauna. Not only is there an immense amount of habitat which holds large populations of many species, but most of the area is remote and has not been subject to many of the pressures associated with large human populations. Nevertheless there are issues related to weeds (particularly introduced pasture grasses and *Mimosa pigra*), fire and feral animals. These have the potential to cause problems in the future to colony nesting habitat (and feeding areas, which are not discussed in this report). This is particularly the case for the freshwater floodplain areas as the colonies associated with the coastal mangrove areas are not likely to be as greatly affected by such issues.

Although the surveys showed at least one example of some species nesting in *Mimosa pigra*, this was more an overflow from an established paperbark area that was invaded by the weed rather than an initial choice by the birds to nest there. The invasion of paperbark or reed areas by this weed is more likely to lead to sub-optimal nesting habitat for the colonies. The areas most adversely affected by *M. pigra* coincide with the best waterbird colony breeding areas in the Top End. In addition introduced pasture grasses including Para Grass (*Brachiaria mutica*) and Olive Hymenachne (*Hymenachne amplexicaulis*) are rapidly invading floodplains and replacing native vegetation communities with grossly-simplified monocultures of these weeds.

Fires usually burn outside the breeding season and are unlikely to cause direct mortality. However, the extensiveness of burning in the Top End could eventually reduce the area available for breeding sites. Current populations of feral mammals are not seen as a major problem, but uncontrolled increase in their numbers will also lead to the reduction of nesting habitat. The expected arrival of cane toads into the major Top End wetlands within the next year or two will, however, be likely to have a significant effect on most of the waterbirds discussed in this report. Although populations of these waterbirds will probably eventually stabilize again, there may be an initial reduction in numbers upon the arrival of the cane toads.

Although the current security of most of the colonies from developmental pressures is likely to remain the case for at least the short term, it is likely that these pressures will eventually increase.

Presumably the significance of the Top End for colonial waterbird breeding is due to both the amount of habitat, and the lack of disturbance. The immediate future of these colonies depends on maintenance of this situation. It is unlikely that the amount of habitat is going to change considerably in the near future, so we must ensure that the disturbance at these sites is kept at a low level. Such disturbance may also include tourism and even scientific research. Although important information can be obtained by studying such colonies in greater detail, it is easy to cause significant disturbance to sites such as breeding colonies, by simply visiting them. Consequently, such research should be controlled and restricted to a small number of colonies, leaving the majority undisturbed.

The top priority for the future management of these colonies in the immediate future should be to minimize disturbance of the sites. There are some colonies which need a little more ground work to establish a better understanding of the numbers and species involved - these are discussed under the individual colonies in Appendix B. There are also a small number of colonies which require some specific management (also documented individually in Appendix B). However, most of the remainder need only to be monitored to the extent necessary to establish they are active and not declining.

Individual Top End colonial waterbird breeding sites tend to be used for many years, so the information in this report is likely to remain relevant for future development proposals in the years to come. The national importance of these colonies, because of their frequency of use and their potential to re-populate other parts of Australia, cannot be stressed highly enough.

REFERENCES

- Bajzak, D. and Piatt, J.F. (1990). Computer-aided procedure for counting waterfowl on aerial photographs. *Wildl. Soc. Bull.* 18:125-129, 1990.
- Barnard, H. G. (1914). Birds of Brunette Downs, (NT). *Emu* 14, 207 & 208.
- Baxter, G. S. (1994). The Location and Status of Egret Colonies on Coastal New South Wales. *Emu* 94, 255-262.
- Blakers, M., Davies, S. J. J. F. and Reilly, P. N. (1984). *The Atlas of Australian Birds*. Melbourne University Press, Melbourne.
- Braithwaite, R.W. and Esterbergs, J.A. (1982). Discovery of a Nankeen Night Heron colony in the Northern Territory. *NT Naturalist* 5, 20.
- Chatto, R. (1995). The Effects of Fire on a Breeding Colony of Australian Pelicans. *Corrella*, 19(2),70.
- Christidis, L. and Boles, W. E. (1994). *The Taxonomy and Species of Birds of Australia and Its Territories*. RAOU Monograph 2.
- Coastal Resources Atlas of the Northern Territory (Referred to as C.R.A. in text). Parks and Wildlife Commission of the Northern Territory, Darwin
- Crawford, D. N. (1972). Birds of Darwin area, with some records from other parts of Northern Territory. *Emu* 72, 131-148.
- Frith H. J. and Davies S. J. J. F. (1961). Breeding seasons of birds in subcoastal Northern Territory. *Emu* 61, 97-111.
- Garnett, S. and Carruthers, I. (1982). Error in aerial surveys of wading birds. *The Stilt*. No. 3. Spring 1982.
- Hill, G.F. (1913). Ornithological Notes, Barclay Expedition. *Emu*. 14, 239-262.
- Jaensch, R. J. and Vervest, R. M. (1989). Breeding colonies of the Great Egret in Western Australia. RAOU Report No. 33.
- Jaensch, R. J. and Vervest, R. M. (1990). Waterbirds at remote wetlands in Western Australia, 1986-88. Part One: Lake Argyle and Lake Gregory. RAOU Report No. 32.
- Jaensch, R. J. (1994). An inventory of wetlands of the sub-humid tropics of the Northern Territory. Report to the Conservation Commission of the Northern Territory, Darwin.
- Le Soeuf, D. (1902). Description of birds eggs from the Port Darwin District, north Australia. *Emu* 2, 139-159.
- Ley, A. J. (1998). Waterbirds at Narran Lake Nature Reserve, New South Wales, in 1996. *Australian Bird Watcher* 17, 219-233.
- Marchant S. and Higgins P.J. (1990). *Handbook of Australian, New Zealand and Antarctic Birds*. Volume 1, Part A. Oxford University Press. Melbourne.
- Matthews, G. M. (1914). On birds of Melville Island. *Ibis* 2, 91-132.
- Morgan, D.G. (1986). Estimating vertebrate population densities by line transect methods. Melbourne College of Advanced Education Occasional Papers No. 11, March 1986.
- Morton, S. R. *et al.* (1991). Distribution and abundance of waterbirds on the Alligator Rivers Region, Northern Territory. Open File Record No. 86. Office of Supervising Scientists for the Alligator Region. Jabaru.
- Nest Record Scheme (Referred to as N.R.S. in text). Environment Australia. Canberra.

- Saalfeld, W. K. (1990). Aerial survey of magpie goose populations and nesting in the Top end of the Northern Territory - Wet Season 1990. Technical Report Number 50, Conservation Commission of the Northern Territory. Darwin.
- Schultz, M. (1989). The importance of wetlands in Kakadu National Park to selected waterbirds. A Report to the Australian National Parks and Wildlife Service. Canberra.
- Sites of Conservation and Recreational Significance Register. (Referred to as S.C.R.S.R. in text). Parks and Wildlife Commission of the Northern Territory. Darwin.
- Storr, G. M. (1977). Birds of the Northern Territory. Western Australian Museum Special Publication No. 7. Perth.
- Thompson, H. A. F. (1977). Notes on birds in the Darwin and northern areas of the Northern Territory. Sunbird 8, 83-91.
- Wilson, B. A., Broklehurst, P. A. and Whitehead, P. J. (1991). Classification, distribution and environmental relationships of coastal floodplain vegetation, Northern Territory, Australia. Technical Memorandum 91/2, Conservation Commission of the Northern Territory. Darwin
- White, S. A. (1917). North Australian Birds. Emu 17, 117-157.

PERSONAL COMMUNICATIONS

- Belchambers, K. (Former) Parks and Wildlife Commission, Alice Springs.
- Barramala, R. Traditional Owner, Maningrida Area.
- Bond, D. Maningrida Aboriginal Corporation.
- Estebergs, J. (Former) CSIRO, Darwin.
- Johnson, S. Traditional Owner, Vanderlin Island.
- Joshua, L. Traditional Owner, Numbulwar.
- Liddy, K. Stock Inspector, Nhulunbuy.
- McKosker, R. New South Wales NPWS consultant.
- Oliver, K. Commercial Fisherman, Borrooloola.
- Ottley, B. Wildlife Management Australia, Darwin.
- Spring, A. (Former) Parks and Wildlife Commission ranger, Murguella.
- Wagg, A. Lanhnupuy Aviation Pilot, Nhulunbuy.
- Whitehead, P. (Former) Parks and Wildlife Commission, Darwin.
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- Woerle, F. (Former) Parks and Wildlife Commission ranger, Murguella.

APPENDICES

APPENDIX A.

SUMMARY TABLES

The tables detailed in this appendix are:

- Estimate of the total numbers of adults of all species combined that were present in each colony for that season, and an average for all years (Table A1).
- Estimate of the highest numbers of adults of each individual species present in each colony for that season, and an average for all years. Also for the individual species (or in some cases, species groups) there is an additional table with information on the timing of breeding .

(NB. Straw-necked Ibis do not appear in these tables because they were not found breeding in the Top End during the survey period).

In these tables the following codes or attachments to number estimates are used:

NV	Not visited during breeding season.
NIL	Colony confirmed as not being used that year, either for the entire colony or a particular species.
BP	Birds present at site but either in breeding plumage and not yet started or uncertain whether breeding at the time of recording the birds present. (This latter often applies to colonies that were not confirmed until later years).
NSCA	None of that particular species seen even though colony was active, often because the colony was visited at the incorrect time of the season for that species, but also there could have been only a small number present that were not detected. Differs from NIL in that it cannot confidently be said that none of that species were breeding.
P	Present and breeding but unable to give reliable estimate of numbers.
EB	Egrets breeding but numbers of individual species present unable to be confirmed.
EBNC	As above but few, if any, Cattle Egrets present at time of survey(s). This does not rule out Cattle Egret breeding that may have occurred prior to these surveys.
CDB	Cormorants/Darters breeding but number of individual species present unknown. In some cases the number of cormorants/darters are recorded with the CDB code.
<	Estimate made at time of year when numbers likely to be significantly short of peak numbers. Used as an attachment to yearly number estimates.
>	Estimate includes flying young. Used as an attachment to yearly number estimates.
?	Where a group species (eg egrets) is confirmed, but although an individual species (eg Intermediate Egret) is likely to be present, they were unable to be separated in terms of numbers present to allocate a size-class for that species in that colony. Used only in 'Allocated Size Class' column of the individual species tables, as opposed to P, EB, EBNC, CDB entries that are used for each different year in all tables except those referring to timing of breeding.

NB. Map B1 in Appendix B shows the location of each of the colonies by number, as given in the following tables.

Table A1. Approximate numbers of birds in colony for years when surveyed – all species combined.

Colony No.	ESTIMATED ADULT BIRDS							Average No. (no of yearly estimates used)	Allocated colony size
	1991	1992	1993	1994	1995	1996	1999		
W001	NV	NV	NV	NV	NV	40	P	40(1)	2-50
W002	NV	NV	2400>	NV	250<	NV	5200	3800(2)	1001-5000
W003	NV	NV	130<	NV	NV	NV	NIL	100 (1)	101-500
W004	P	NIL	5600	1500<	P	2100<	P	5600 (1)	10001-15000
W005	NV	NV	100<	NV	NV	NV	NIL	100 (1)	101-500
W006	5000	NV	6050	8750	NV	NV	NV	6600 (3)	5001-10000
W007	NV	NV	7300>	600<	7500>	P	10120>	8300(3)	10001-15000
W008	NV	NV	1000<	NV	250	NV	100<	250 (1)	501-1000
W009	200<	NV	1300	1050<	1200	NV	NV	1250 (3)	1001-5000
W010	NV	NV	150	NV	NV	NV	400	275(2)	101-500
W011	3500	NIL	7500<	11250>	NIL	NV	14500	7420(3)	5001-10000
W012	4000	7000<	15000	9500	14000>	2500<	P	9500 (3)	5001-10000
W013	NV	NV	NV	NV	NV	NV	NV		2-50
W014	50<	NV	50<	NV	350	NV	NV	350 (1)	101-500
W015	NV	NV	NV	NV	40	NV	NV	40(1)	2-50
W016	NV	NV	100<	NV	360	NV	NV	360 (1)	101-500
W017	NV	NV	300<	NV	1000	NV	NV	1000 (1)	1001-5000
W018	NV	NV	1060>	NIL	4000>	NV	3620	2890(3)	1001-5000
W019	NV	NV	4000	4500	5000>	NV	NIL	4500 (3)	1001-5000
W020	NV	NV	4000>	3250<	14000>	P	12000<	8310(4)	10001-15000
W021	400<	2000	4500	300	6000	100	NV	2220 (6)	1001-5000
W022	NV	NV	100<	NV	885	NV	20<	885 (1)	501-1000
W023	NV	NV	NV	NV	NV	NV	NV	50 (1)	2-50
W024	NV	NV	2200	540<	NV	NV	3100	2650(2)	1001-5000
W025	4500<	10000	20000	20000	NV	NV	7500<	13620(4)	15000+
W026	NV	NV	NV	NV	NV	20	NV	20(1)	2-50
W027	NV	NV	200	NV	NIL	NV	NV	200 (1)	101-500
W028	NV	NV	P	NV	NV	NV	NV	2000 (1)	1001-5000
W029	4500	NV	9300	8500<	3000<	NV	P	6320 (2)	5001-10000
W030	NV	NV	NV	100	NV	NV	NV	100(1)	101-500
W031	NV	NV	50<	200	NV	300>	NV	200(1)	101-500
W032	NV	NV	NV	NV	NV	NV	NV		2-50
W033	NV	NV	9000	12000<	5000<	NV	NV	10500 (2)	10001-15000
W034	200	2500	7500<	10000<	5000<	NV	NV	5040 (5)	5001-10000
W035	10000	2300	11500	4000<	3000<	NV	P	6160 (5)	10001-15000
W036	NV	NV	3500>	NV	2000>	NV	NV	2750 (2)	1001-5000
W037	NV	NV	3700	1400<	4000	NV	NV	3850 (2)	1001-5000
W038	NV	NV	NV	NV	1650>	NV	4180>	2910(2)	1001-5000
W039	NV	NV	1000	NV	1500>	NV	2000	1500(3)	1001-5000
W040	NV	NV	2000	450	1000	1000<	5500	1800(5)	1001-5000
W041	NV	NV	200	NV	NV	NV	NV	200 (1)	101-500

Table A1 (cont.). Approximate numbers of birds in colony for years when surveyed – all species combined.

Colony No.	ESTIMATED ADULT BIRDS							Average No. (no of yearly estimates used)	Allocated colony size
	1991	1992	1993	1994	1995	1996	1999		
W042	NV	NV	NV	NV	800>	NV	3000>	1900(2)	1001-5000
W043	NV	NV	NV	NV	300	NV	NV	300(1)	101-500
W044	NV	NV	NV	NV	50	160	NV	100(2)	101-500
W045	NV	NV	NV	NV	750>	NV	2000	1375(2)	1001-5000
W046	NV	NV	NV	NV	150	NV	NV	150(1)	101-500
W047	NV	NV	NV	NV	NV	NV	NV	1000(1)	1001-5000
W048	NV	NV	NV	NV	1250	NV	NV	1250(1)	1001-5000
W049	NV	NV	NV	NV	250	NV	NV	250(1)	101-500
W050	NV	NV	NV	NV	60	NV	NV	60(1)	51-100
W051	NV	NV	20	NV	NV	NV	NV	20(1)	2-50
W052	NV	NV	NV	NV	500<	NV	2500	1500 (2)	1001-5000
W053	NV	NV	NV	NV	3000	NV	20000	11500(2)	10001-15000
W054	NV	NV	NV	NV	500<	NV	NV	500 (1)	501-1000
W055	NV	NV	NV	2000	3300	NV	9600	4970(3)	1001-5000
W056	NV	NV	NV	1750	4000	P	NV	2870 (2)	1001-5000
W057	NV	NV	NV	200	2050<	NV	P	1125 (2)	1001-5000
W058	NV	NV	NV	NV	700>	NV	100	400(2)	101-500
W059	NV	NV	NV	NV	20	NV	NV	20 (1)	2-50
W060	NV	NV	NV	NV	BP(350)	NV	200	200(1)	101-500
W061	NV	NV	NV	NV	NV	NV	1320	1320(1)	1001-5000
W062	NV	NV	NV	NV	NV	NV	40	40(1)	51-100
W063	NV	NV	NV	NV	NV	NV	10	10(1)	2-50
W064	NV	VW	BP	NV	BP	NV	2050	2050(1)	1001-5000
W065	NV	NV	NV	NV	NV	NV	20	20(1)	2-50
W066	NV	NV	NV	NV	NV	NV	20	20(1)	2-50
W067	NV	NV	NV	NV	NV	NV	300	300(1)	101-500
W068	NV	NV	NV	NV	NV	NV	110	110(1)	101-500
W069	NV	NV	NV	NV	NV	NV	24	24(1)	2-50
W070	NV	NV	NV	NV	NV	NV	500	500(1)	101-500
W071	NV	NV	NV	350>	NV	NV	200>	275(2)	101-500
W072	NV	NV	NV	NV	NV	NV	20	20(1)	2-50
W073	NV	NV	NV	NV	60	NV	400	230(2)	101-500
W074	NV	NV	NV	NV	NV	NV	500	500(1)	101-500
W075	NV	NV	NV	NV	NV	NV	1650	1650(1)	1001-5000
W076	NV	NV	NV	NV	NV	NV	520>	520(1)	101-500
*Total			130380	102190	101405			160739	
No sites			33	23	41			74	
Average			3950	4440	2470			2172	

* For some years where a reasonable estimation of numbers of birds could be done at selected colonies, the total number of birds (total) was divided by the no of sites (No. sites) to give an average colony size of all colonies surveyed (Average) for that year.

Table A2. Approximate numbers of birds in colony for years when surveyed – Intermediate Egret.

Colony Number	ESTIMATED ADULT BIRDS							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	EBNC 2000>	NV	EBNC 100<	NV	2600	501-3000
W004	EB	NIL	2840	EB 1450<	EB	EBNC 2000<	EB	501-3000
W006	NV	NV	1800	EBNC 1000	NV	NV	NV	501-3000
W007	NV	NV	2550>	EBNC 500<	EBNC 3000>	EB	4000>	3000+
W011	EB 2500	NIL	3600	2450	NIL	NV	EBNC 3800	3000+
W012	EB 2500	EB	5950	4800<	EB 10000>	EB 2000<	NSCA	3000+
W019	NV	NV	EBNC 1500>	EBNC 1000	EBNC 1500-6500*	NV	NIL	501-3000
W020	NV	NV	EBNC 1200>	EBNC 750	EBNC 7500>	EB	700	501-3000
W024	NV	NV	1050	EBNC 475<	EBNC	EB 500<	600	501-3000
W025	EB 4000	EB 3000	4500	6265	NV	NV	NV	3000+
W029	EB 3000	NV	4600	4760<	EBNC	NV	NSCA	3000+
W033	NV	NV	4000	4000<	EBNC	NV	NV	3000+
W034	EB	EBNC 2000	3000	4800<	EBNC 1000'S	NV	NV	3000+
W035	EBNC 1000'S	EBNC 750	4500	450<	EBNC 1000'S	NV	NSCA	3000+
W036	NV	NV	1875>	NV	EBNC	NV	NV	501-3000
W037	NV	NV	EBNC 2000	EBNC 300<	EBNC	NV	NV	501-3000
W038	NV	NV	NV	NV	EBNC 750>	NV	1400>	501-3000
W039	NV	NV	EBNC 800	NV	EBNC 750>	NV	500	101-500
W040	NV	NV	EBNC 1750	EBNC 450	EBNC 1000	EBNC 1000<	2250	501-3000
W042	NV	NV	NV	NV	EBNC 750>	NV	300>	101-500
W044	NV	NV	NV	NV	NSCA	NV	NV	?
W045	NV	NV	NV	NV	EBNC	NSCA	50	2-100
W048	NV	NV	NV	EB 1000	EB 1000	NV	NV	?
W049	NV	NV	NV	NV	NV	NV	NV	?
W053	NV	NV	NV	NV	EB 2500	NV	EBNC 5000	501-3000

*

Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A2 (cont.). Approximate numbers of birds in colony for years when surveyed – Intermediate Egret.

Colony Number	ESTIMATED ADULT BIRDS							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W055	NV	NV	NV	EBNC 2000	EBNC 3000>	NV	2550>	501-3000
W057	NV	NV	NV	EBNC 200	EBNC 2000>	NV	NSCA	?
W061	NV	NV	NV	NV	NV	NV	350	101-500
W064	NV	NV	BP	NV	BP	NV	EBNC 2000	101-500
W067	NV	NV	NV	NV	NV	NV	EBNC 300	2-100
W071	NV	NV	NV	EBNC 350>	NV	NV	EBNC 100	?
W073	NV	NV	NV	NV	EBNC 10	NV	EBNC 20	?
W074	NV	NV	NV	NV	NV	NV	ENBC 250	?

* Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A3. Observations of timing of breeding – Intermediate, Great and Little Egret combined.

Date	Colony Number	Comments
20.1.94	W011	All eggs, numbers may still be building up.
21.1.94	W034	Mostly eggs.
27.1.94	W012	Eggs.
28.1.94	W029	All eggs.
28.1.94	W033	All eggs.
28.1.94	W035	Eggs.
1.2.94	W025	Most 1-3 eggs, bringing in fresh nest material.
11.3.93	W025	Most young.
11.3.94	W011	Most eggs.
23.3.93	W004	Most young
23.3.93	W024	Most young.
24.3.93	W033	Most young.
24.3.93	W029	Most eggs, some young.
24.3.93	W034	Most young.
24.3.93	W035	Most young.
24.3.99	W040	Some eggs but mostly young.
31.3.99	W020	Most young.
31.3.99	W024	Eggs through to chicks of all ages.
3.5.93	W019	Young.
12.5.95	W019	Most fledged.
12.5.95	W020	Most fledged.
23.5.99	W055	Colony still active, fledged birds seen.
24.5.99	W042	Colony still active.
24.5.99	W071	Near fledged young present.
27.5.99	W074	Some eggs seen.

Table A4. Approximate numbers of birds in colony for years when surveyed – Great Egret.

Colony Number	ESTIMATED ADULT BIRDS							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	EBNC 2000>	NV	EBNC 100<	NV	1000	501-3000
W004	EB	NIL	760	EB 1450<	EB	EBNC 2000<	EB	501-3000
W006	NV	NV	475	EBNC 1000	NV	NV	NV	101-500
W007	NV	NV	450>	EBNC 500<	EBNC 3000>	EB	750	501-3000
W011	EB 2500	NIL	200	700	NIL	NV	EBNC 3800	101-500
W012	EB 2500	EB	840	2800<	EB 10000>	EB 2000<	NSCA	501-3000
W018	NV	NV	NIL	NIL	EBNC 500>	NV	300	101-500
W019	NV	NV	EBNC 1500>	EBNC 1000	EBNC 1500-6500*	NV	NIL	101-500
W020	NV	NV	EBNC 1200>	EBNC 750	EBNC 7500>	EB	1200	501-3000
W024	NV	NV	300	EBNC 475<	EBNC	EB 500<	825	501-3000
W025	EB 4000	EB 3000	1500	895	NV	NV	NV	501-3000
W029	EB 3000	NV	825	1400	EBNC	NV	NSCA	501-3000
W033	NV	NV	500	1800<	EBNC	NV	NV	501-3000
W034	EB	EBNC 2000	800	960<	EBNC 1000'S	NV	NV	501-3000
W035	EBNC 1000'S	EBNC 750	1200	2400	EBNC 1000'S	NV	NSCA	501-3000
W036	NV	NV	500>	NV	EBNC	NV	NV	101-500
W037	NV	NV	EBNC 2000	EBNC 300<	EBNC	NV	NV	101-500
W038	NV	NV	NV	NV	EBNC 750>	NV	400>	101-500
W039	NV	NV	EBNC 800	NV	EBNC 750>	NV	100	2-100
W040	NV	NV	EBNC 1750	EBNC 450	EBNC 1000	EBNC 1000<	240	101-500
W042	NV	NV	NV	NV	EBNC 750>	NV	200>	101-500
W044	NV	NV	NV	NV	NSCA	NV	NV	?
W045	NV	NV	NV	NV	EBNC	NSCA	900	501-3000
W048	NV	NV	NV	EBNC 1000	EB 1000	NV	NV	?

* Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A4 (cont.). Approximate numbers of birds in colony for years when surveyed – Great Egret.

Colony Number	ESTIMATED ADULT BIRDS							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W049	NV	NV	NV	NV	NV	NV	NV	?
W053	NV	NV	NV	NV	EB 2500	NV	EBNC 5000	501-3000
W055	NV	NV	NV	EBNC 2000	EBNC 3000>	NV	240>	101-500
W057	NV	NV	P	EBNC 200	EBNC 2000>	NV	NSCA	?
W061	NV	NV	NV	NV	NV	NV	125	101-500
W064	NV	NV	BP	NV	BP	NV	EBNC 2000	501-3000
W067	NV	NV	NV	NV	NV	NV	EBNC 300	2-100
W071	NV	NV	NV	EBNC 350>	NV	NV	EBNC 100	?
W073	NV	NV	NV	NV	EBNC 10	NV	EBNC 20	2-100
W074	NV	NV	NV	NV	NV	NV	ENBC 250	101-500

* Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A5. Approximate numbers of birds in colony for years when surveyed – Little Egret.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	EBNC 2000>	NV	EBNC 100<	NV	360	101-500
W004	EB	NIL	320	EB 1450<	EB	EBNC 2000<	EB	101-500
W006	NV	NV	200	EBNC 1000	NV	NV	NV	101-500
W007	NV	NV	EBNC 3000>	EBNC 500<	EBNC 3000>	EB	250	101-500
W011	EB 2500	NIL	200	350	NIL	NV	EBNC 3800	101-500
W012	EB 2500	EB	210	NSCA	EB 10000>	EB 2000<	NSCA	501-3000
W019	NV	NV	EBNC 1500>	EBNC 1000	EBNC 1500-6500*	NV	NIL	?
W020	NV	NV	EBNC 1200>	EBNC 750	EBNC 7500>	EB	100	2-100
W024	NV	NV	120	EBNC 475<	EBNC	EB 500<	75	2-100
W025	EB 4000	EB 3000	4500	2685	NV	NV	NV	3000+
W029	EB 3000	NV	75	140	EBNC	NV	NSCA	101-500
W033	NV	NV	450	700<	EBNC	NV	NV	501-3000
W034	EB	EBNC 2000	200	240<	EBNC	NV	NV	101-500
W035	EBNC 1000'S	EBNC 750	300	NSCA	EBNC 1000'S	NV	NSCA	101-500
W036	NV	NV	125>	NV	EBNC	NV	NV	101-500
W037	NV	NV	EBNC 2000	EBNC 300<	EBNC	NV	NV	?
W038	NV	NV	NV	NV	EBNC 750>	NV	200>	101-500
W039	NV	NV	EBNC 800	NV	EBNC 750>	NV	350	101-500
W040	NV	NV	EBNC 1750	EBNC 450	EBNC 1000	EBNC 1000<	450	101-500
W042	NV	NV	NV	NV	EBNC 750>	NV	1500>	501-3000
W044	NV	NV	NV	NV	NSCA	NV	NV	?
W045	NV	NV	NV	NV	EBNC	NSCA	50	2-100
W048	NV	NV	NV	EB 1000	EB 1000	NV	NV	?
W049	NV	NV	NV	NV	NV	NV	NV	?

- Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A5 (cont.). Approximate numbers of birds in colony for years when surveyed – Little Egret.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W053	NV	NV	NV	NV	EB 2500	NV	EBNC 5000	101-500
W055	NV	NV	NV	EBNC 2000	EBNC 3000>	NV	240>	101-500
W057	NV	NV	NV	EBNC 200	EBNC 2000>	NV	NSCA	?
W061	NV	NV	NV	NV	NV	NV	25	2-100
W064	NV	NV	BP	NV	BP	NV	EBNC 2000	501-3000
W067	NV	NV	NV	NV	NV	NV	EBNC 300	2-100
W071	NV	NV	NV	EBNC 350>	NV	NV	EBNC 100	?
W073	NV	NV	NV	NV	EBNC 10	NV	EBNC 20	2-100
W074	NV	NV	NV	NV	NV	NV	ENBC 250	101-500

* Approximately 1500 still in colony with a further 5000 in floodplain around it. Obviously includes fledged young (May count).

Table A6. Approximate numbers of birds in colony for years when surveyed – Cattle Egret.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	EBNC 2000>	NV	EBNC 100<	NV	40	2-100
W004	NV	NV	NSCA	150<	NV	NSCA	EB	2-100
W006	NSCA	NV	4<	NSCA	NV	NV	NV	2-100
W011	NSCA	NIL	NSCA	3150	NIL	NV	7500	3000+
W012	NSCA	NSCA	7000	400<	NSCA	NSCA	NSCA	3000+
W025	NSCA	NSCA	6<	9845>	NV	NV	7500	3000+
W029	NSCA	NV	NSCA	700	NSCA	NV	NV	501-3000
W033	NV	NV	50<	3500	NSCA	NV	NV	3000+
W034	NSCA	NSCA	3000>	2000	NSCA	NV	NV	501-3000
W035	NSCA	NSCA	2000>	150<	NSCA	NV	NV	501-3000
W037	NV	NV	NSCA	1200	NSCA	NV	NV	501-3000
W039	NV	NV	NV	NV	NV	NV	50	2-100
W040	NV	NV	NSCA	NSCA	P	NSCA	60	2-100

NB. Although Cattle Egrets commence in Nov/Dec., their breeding season is listed in the year following, with the other birds. For example Cattle Egrets recorded breeding in December of 1992 are listed in the 1993 column.

Table A7. Observations of timing of breeding – Cattle Egret.

Date	Colony Number	Comments
18.11.98	W025	Only Cattle Egrets, all eggs (clutches of 1-5).
19.11.98	W011	Only Cattle Egrets, sitting.
16.12.92	W034	Only Cattle Egrets, eggs.
20.12.92	W012	Only Cattle Egrets, eggs.
20.1.94	W011	Small section eggs, most young, fledged or near-fledged.
27.1.94	W012	Colony all eggs but only 5% Cattle Egret.
28.1.94	W025	Young, most near to fledged. (Other egrets all eggs).
28.1.94	W029	Colony all eggs but only 10% Cattle Egret.
28.1.94	W033	Colony all eggs, 35% Cattle Egrets.
28.1.94	W034	Young through to fledged or nearly, other egrets all eggs.
28.1.94	W035	Colony all eggs, but only 5% Cattle Egret.
1.2.94	W025	No fresh eggs, some small young but most half grown or larger.
11.2.93	W034	Increase in egret numbers since 16.12.92 with other species involved, but still mostly Cattle Egrets.
11.3.94	W011	Young, most fledged or near to fledged.
24.3.93	W034	Still large no.s egrets but Cattle Egrets now gone since 11.2.93.
24.3.99	W040	Some eggs but mostly young.

Table A8. Approximate numbers of birds in colony for years when surveyed –Little Pied Cormorant.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	NSCA	NV	NSCA	NV	285	101-500
W004	P	NIL	225	70<	NSCA	NSCA	NSCA	101-500
W005	NV	NV	P	NV	NV	NV	NIL	2-100
W006	P	NV	70	3000	NV	NV	NV	501-3000
W007	NV	NV	200>	75<	200>	NSCA	20	101-500
W008	NV	NV	NSCA	NIL	CDB 100>	NV	100	2-100
W009	NIL	NIL	P	420	CDB 350	NV	NV	101-500
W010	NV	NV	10	NIL	NIL	NV	80	2-100
W011	NSCA	NIL	200	50	NIL	NV	500	101-500
W012	P	P	1425	750<	CDB 4000	CDB 400<	NSCA	501-3000
W013	NV	NV	NV	NV	NSCA	NV	NV	2-100
W016	NV	NV	NSCA	NV	10	NV	NV	2-100
W018	NV	NV	100>	NIL	CDB 3000>	NV	1290	501-3000
W019	NV	NV	1200>	CDB 3500>	1410>	NV	NIL	501-3000
W020	NV	NV	640>	875	1150>	NV	2600	501-3000
W023*	NV	NV	NV	NV	NV	NV	NV	2-100
W024	NV	NV	700	50<	NV	P	600	501-3000
W025	P	P	600	P	P	NV	NV	501-3000
W027	NV	NV	50	NV	NIL	NV	NV	2-100
W029	P	NV	800	500	NSCA	NV	NSCA	501-3000
W032	NV	NV	NV	NV	NV	NV	NV	?
W033	NV	NV	1425	580<	P	NV	NV	501-3000
W034	NSCA	NSCA	475	500	NSCA	NV	NV	501-3000
W035	P	P	1600	800<	P	NV	NSCA	501-3000
W036	NV	NV	50>	NV	NSCA	NV	NV	2-100
W037	NV	NV	600	250>	NSCA	NV	NV	501-3000
W038	NV	NV	NV	NV	CDB 50>	NV	30>	2-100
W042	NV	NV	NV	NV	75	NV	NIL	2-100
W044	NV	NV	NV	NV	170	150	NV	101-500
W045	NV	NV	NV	NV	NSCA	NV	1000	501-3000
W046	NV	NV	NV	NV	190	NV	NV	101-500
W047	VN	NV	NV	NV	NV	NV	NV	?
W050	NV	NV	NV	NV	10	NV	NV	2-100

* At least one pair recorded in 1997.

Table A8 (cont.). Approximate numbers of birds in colony for years when surveyed –Little Pied Cormorant.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W051	NV	NV	20	NV	NV	NV	NV	2-100
W053	NV	NV	NV	NV	NSCA	NV	300	101-500
W054	NV	NV	NSCA	NV	NSCA	NV	NV	?
W055	NV	NV	NV	NSCA	P	NV	100>	101-500
W057	NV	NV	NV	NIL	50	NV	P	2-100
W058	NV	NV	NV	NV	CDB 500>	NV	NIL	101-500
W076	NV	NV	NV	NV	NV	NV	20	2-100

* At least one pair recorded in 1997.

Table A9. Observations of timing of breeding – Little Pied and Little Black Cormorant.

Date	Colony Number	Comments
21.1.94	W034	Only eggs seen. No LBCO or Darter seen.
27.1.94	W012	Eggs. Vast majority of CDSP in colony were LPCO.
28.1.94	W029	Eggs. Only LPCO seen of CDSP in colony.
28.1.94	W035	Eggs. Many LPCO, no LBCO or Darter seen.
25.2.75	W034	Eggs only in most nests. LPCO & LBCO present but unsure of numbers of each (F. Woerle, pers. Comm.).
25.2.75	W035	Eggs only in most nests. LPCO & LBCO present but unsure of numbers of each (F. Woerle, pers. Comm.).
11.3.94	W006	Eggs to third grown young, but good numbers of all Cormorants and Darters in colony. .
11.3.94	W019	Mostly eggs but Cormorants/Darter breakdown unknown.
11.3.93	W025	Most young for LPCO checked.
15.3.75	W034	“Cormorant” chicks feathered (F. Woerle, pers. Comm.).
15.3.75	W035	“Cormorant” chicks feathered (F. Woerle, pers. Comm.).
23.3.93	W004	Most eggs some young. Most of CDSP in colony were LPCO.
23.3.93	W006	Most eggs some chicks. CDSP in colony most LBCO, some LPCO and odd Darter.
23.3.93	W012	Most chicks. Vast majority of CDSP were LPCO.
24.3.93	W033	Most chicks. CDSP nearly all LPCO
24.3.93	W034	Most chicks. CDSP mostly LPCO
24.3.93	W035	Most chicks. CDSP mostly LPCO
31.3.99	W008	All LPCO and all eggs.
31.3.99	W020	Mostly young, mostly LBCO, but many LPCO & DART
31.3.99	W024	Eggs and chicks of all ages. All LPCO.
13.4.75	W034	Darters and Cormorants 100's of eggs and chicks. (F. Woerle, pers. comm.)
13.4.75	W035	Darters and Cormorants 100's of eggs and chicks. (F. Woerle, pers. comm.).
3.5.93	W018	Still plenty of eggs. CDSP in colony were mostly Darter with some LBCO and LPCO.
3.5.93	W019	Mostly with young. Colony CDSP breakdown mostly LPCO and LBCO.
12.5.95	W012	Young. Uncertain of no.s LPCO cf. LBCO.
12.5.95	W019	Lots half to three-quarter grown young. CDSP breakdown of colony included lots of both LPCO & LBCO, and few Darter.
12.5.95	W020	Lots of older chicks and some fledged young. CDSP part of colony mostly LBCO but some LPCO & a few Darter.
23.5.99	W055	Colony still active.
30.6.95	W020	1000's of older cormorant/darter young. CDSP part of colony mostly LBCO but some LPCO & a few Darter.
17.8.95	W018	Still lots LBCO breeding. Darter with young.
17.8.95	W020	Most LPCO gone (but still lots of LBCO older young).

Table A10. Approximate numbers of birds in colony for years when surveyed – Little Black Cormorant.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	NSCA	NV	NSCA	NV	15	2-100
W004	NSCA	NIL	22	NSCA	NSCA	NSCA	NSCA	2-100
W006	P	NV	3150	3750	NV	NV	NV	3000+
W008	NV	NV	NSCA	NIL	CDB 100>	NV	NIL	?
W009	NIL	NIL	NSCA	400	CDB 350	NV	NV	101-500
W012	P	P	75	NSCA	CDB 4000	CDB 400<	NSCA	101-500
W013	NV	NV	NV	NIL	NSCA	NV	NV	2-100
W018	NV	NV	200>	NIL	CDB 3000>	NV	885	501-3000
W019	NV	NV	780>	CDB 3500	1410>	NV	NIL	501-3000
W020	NV	NV	640>	1625	3750>	NV	5800	3000+
W025	NSCA	NSCA	150	P	NV	NV	NV	101-500
W027	NV	NV	50	NV	NIL	NV	NV	2-100
W032	NV	NV	NV	NV	NV	NV	NV	?
W033	NV	NV	75	20<	P	NV	NV	2-100
W034	NSCA	NSCA	20	NIL	NSCA	NV	NV	2-100
W035	P	NSCA	360	NIL	NSCA	NV	NSCA	101-500
W037	NV	NV	150	P	P	NV	NV	101-500
W038	NV	NV	NV	NV	CDB 50>	NV	NSCA	?
W042	NV	NV	NV	NV	NSCA	NV	NIL	?
W044	NV	NV	NV	NV	30	P	NV	2-100
W047	NV	NV	NV	NV	NV	NV	NV	?
W050	NV	NV	NV	NV	NSCA	NV	NV	?
W051	NV	NV	NSCA	NV	NV	NV	NV	?
W054	NV	NV	NSCA	NV	NSCA	NV	NV	?
W057	NV	NV	NV	NIL	NSCA	NV	NSCA	?
W058	NV	NV	NV	NV	CDB 500>	NV	NIL	101-500
W060	NV	NV	NV	NV	300>	NV	NIL	101-500

Table A11. Approximate numbers of birds in colony for years when surveyed – Pied Cormorant.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W006	NSCA	NV	210	375	NV	NV	NV	101-500
W027	NV	NV	50	NV	NIL	NV	NV	2-100
W030	NV	NV	NV	100	NV	NV	NV	101-500
W031	NV	NV	50<	200	NV	300>	NV	101-500
W056	NV	NV	NV	2000	4000>	NV	NV	3000+
W060	NV	NV	NV	NV	BP 50	NV	200	101-500
W072	NV	NV	NV	NV	NV	NV	20	2-100
W073	NV	NV	NV	NV	60	NV	400	101-500

Table A12. Observations of timing of breeding – Pied Cormorant.

Date	Colony Number	Comments
30.3.94	W056	Birds sitting.
3.5.94	W030	One nest with small young the rest with 2-4 eggs.
17.5.95	W056	Birds sitting.
24.5.99	W060	Well developed young.
26.5.99	W073	Eggs.
13.6.96	W031	Well developed young.
21.7.98	W056	Colony finished.
23.7.98	W060	Large young.
27.9.94	W056	Birds in area, but colony finished.
30.9.94	W030	Colony finished.

Table A13. Approximate numbers of birds in colony for years when surveyed – Darter.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W001	NV	NV	NV	NV	NV	NSCA	P	2-100
W004	NSCA	NIL	4	NIL	NSCA	NSCA	NSCA	2-100
W006	NSCA	NV	70	375	NV	NV	NV	101-500
W008	NV	NV	NSCA	NIL	CDB 100>	NV	NIL	?
W009	NIL	NIL	P	80	CDB 350	NSCA	NV	101-500
W010	NV	NV	40	NIL	NIL	NV	120	101-500
W012	NSCA	CDB	NIL	NIL	CDB 4000	CDB 400<	NSCA	?
W015	NV	NV	NV	NV	20	NV	NV	2-100
W018	NV	NV	700>	NIL	CDB 3000>	NV	825	501-3000
W019	NV	NV	20>	CDB 3500>	80>	NV	NIL	101-500
W020	NV	NV	20>	NSCA	100>	NV	1600	501-3000
W022	NV	NV	NIL	NV	60	NV	NIL	2-100
W023*	NV	NV	NV	NV	NV	NV	NV	2-100
W032	NV	NV	NV	NV	NV	NV	NV	?
W034	NSCA	NSCA	10	NIL	NSCA	NV	NV	2-100
W035	P	P	40	NSCA	NSCA	NV	NSCA	2-100
W038	NV	NV	NV	NV	P	NV	NIL	2-100
W044	NV	NV	NV	NV	P	NV	NV	2-100
W046	NV	NV	NV	NV	P	NV	NV	2-100
W047	NV	NV	NV	NV	NV	NV	NV	?
W050	NV	NV	NV	NV	20	NV	NV	2-100
W055	NV	NV	NV	NSCA	NSCA	NV	2	2-100
W058	NV	NV	NV	NV	CDB 500>	NV	100	101-500
W062	NV	NV	NV	NV	NV	NV	40	2-100
W063	NV	NV	NV	NV	NV	NV	10	2-100
W065	NV	NV	NV	NV	NV	NV	20	2-100
W066	NV	NV	NV	NV	NV	NV	20	2-100
W068	NV	NV	NV	NV	NV	NV	10	2-100
W069	NV	NV	NV	NV	NV	NV	20	2-100
W075	NV	NV	NV	NV	NV	NV	150	101-500
W076	NV	NV	NV	NV	NV	NV	200>	101-500

* Colony W023 was found in 1997 and had approximately 15 Darter nests active.

Table A14. Observations of timing of breeding – Darter.

Date	Colony Number	Comments
17.2.74	W034	Breeding. (F. Woerle, pers. comm.).
11.3.94	W006	Eggs to small young.
23.3.93	W009	Eggs seen.
24.3.99	W062	Well developed young present.
24.3.99	W063	Eggs seen.
29.3.75	W034	Chicks starting to hatch out. (F. Woerle, pers. comm.).
31.3.99	W020	Mostly young.
29.3.75	W035	Chicks starting to hatch out. (F. Woerle, pers. comm.).
31.3.99	W058	Mostly eggs.
23.5.99	W068	Well developed young.
23.6.99	W075	Eggs and young present.
30.6.99	W076	Fledged young and recently finished used nests.
5.7.99	W015	Near fledged young present.
15.8.95	W015	One nest of eggs seen.

Table A15. Approximate numbers of birds in colony for years when surveyed – Pied Heron.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	400	NV	P	NV	400	101-500
W004	P	NIL	1000	NSCA	P	NSCA	NSCA	501-3000
W007	NV	NV	400>	NSCA	NIL	NSCA	100	101-500
W011	P	NIL	1500	1000	NIL	NV	2500	501-3000
W012	NSCA	NSCA	400	1000<	NSCA	NSCA	NSCA	501-3000
W020	NV	NV	640>	NSCA	1000>	NV	60	501-3000
W024	NV	NV	NSCA	NSCA	NSCA	NSCA	900	501-3000
W025	P	P	1500	2000	NSCA	NV	NV	501-3000
W029	P	NV	1000	1000	NSCA	NV	NSCA	501-3000
W033	NV	NV	1500	1500<	P	NV	NV	501-3000
W034	NSCA	250	2000	2000	P	NV	NV	501-3000
W035	P	P	2000	200<	NSCA	NV	NSCA	501-3000
W036	NV	NV	1000>	NV	P	NV	NV	501-3000
W037	NV	NV	750	150>	NSCA	NV	NV	501-3000
W038	NV	NV	NV	NV	100	NV	NIL	101-500
W039	NV	NV	250	NV	750	NV	1000	501-3000
W040	NV	NV	500	NSCA	NSCA	NSCA	2000	501-3000
W042	NV	NV	NV	NV	75	NV	P	2-100
W048	NV	NV	NV	250	250	NV	NV	101-500
W053	NV	NV	NV	NV	NSCA	NV	3000	501-3000
W055	NV	NV	NV	NIL	200>	NV	500>	501-3000
W061	NV	NV	NV	NV	NV	NV	20	2-100
W064	NV	NV	BP	NV	BP	NV	50	2-100

Table A16. Observations of timing of breeding – Pied Heron.

Date	Colony Number	Comments
20.1.94	W011	Eggs, no.s of birds still building up.
27.1.94	W012	Eggs present.
28.1.94	W024	Eggs present.
28.1.94	W029	Eggs present.
28.1.94	W034	Only eggs seen.
28.1.94	W035	Only eggs seen.
11.3.94	W011	Most young but not near fledging.
11.3.93	W025	Mostly chicks.
23.3.93	W004	Most eggs but some young.
23.3.93	W011	Eggs and young.
23.3.93	W012	Mostly chicks.
24.3.93	W033	Mostly chicks.
24.3.93	W034	Mostly chicks.
24.3.93	W035	Mostly chicks.
24.3.93	W040	Some eggs but mostly young.
31.3.99	W024	Eggs and chicks of all ages.
13.4.75	W034	Young and some eggs. (F. Woerle, pers. comm.).
13.4.75	W035	Young and some eggs. (F. Woerle, pers. comm.).
23.5.99	W055	Colony still active.

Table A17. Approximate numbers of birds in colony for years when surveyed – Nankeen Night Heron.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W002	NV	NV	NSCA	NV	NSCA	NV	510	101-500
W004	P	NIL	300	NSCA	NSCA	NSCA	P	101-500
W007	NV	NV	300>	12<	300>	NSCA	500	101-500
W011	P	NIL	1500	750	NIL	NV	NIL	501-3000
W015	NV	NV	NV	NV	20	NV	NV	2-100
W020	NV	NV	NIL	NIL	200>	NV	NIL	2-100
W025	P	P	NSCA	NIL	NSCA	NV	NV	2-100
W028	NV	NV	P	NV	NV	NV	NV	501-3000
W029	NSCA	NV	1000	NSCA	NSCA	NV	NSCA	501-3000
W034	NSCA	NSCA	500	NSCA	NSCA	NV	NV	501-3000
W035	NSCA	NSCA	P	NSCA	NSCA	NV	NSCA	2-100
W037	NV	NV	P	NSCA	NSCA	NV	NV	2-100
W038	NV	NV	NV	NV	NIL	NV	1000	501-3000
W040	NV	NV	NSCA	NSCA	NSCA	NSCA	500	101-500
W042	NV	NV	NV	NV	NSCA	NV	500>	101-500
W050	NV	NV	NV	NV	NIL	NV	P	2-100
W052	NV	NV	NV	NV	NIL	NV	500	101-500
W053	NV	NV	NV	NV	NSCA	NV	4000	3000+
W055	NV	NV	NV	NIL	NIL	NV	2000>	501-3000
W057	NV	NV	NV	NSCA	NSCA	NV	100	2-100
W061	NV	NV	NV	NV	NV	NV	500	101-500
W068	NV	NV	NV	NV	NV	NV	100	2-100
W070	NV	NV	NV	NV	NV	NV	200	101-500
W071	NV	NV	NV	P	NV	NV	100>	101-500
W074	NV	NV	NV	NV	NV	NV	250	101-500
W076	NV	NV	NV	NV	NV	NV	300	101-500

Table A18. Observations of timing of breeding – Nankeen Night Heron.

Date	Colony Identifier	Comments
20.1.94	W011	No birds present.
11.3.94	W011	Birds now present, some nests with eggs.
17.3.81	W028	Most half grown young, but small number of eggs and a few large feathered chicks (Braithwaite and Estbergs, 1982).
23.3.93	W011	Eggs seen.
23.5.99	W055	Colony still active.
23.5.99	W068	Recently fledged young present.
23.5.99	W070	Recently fledged young present.
24.5.99	W071	Near fledged young present.
26.5.99	W042	Colony still active.
30.6.99	W076	Fledged young and recently finished used nests.
17.8.95	W020	Fledged or near fledged young present.

Table A19. Approximate numbers of birds in colony for years when surveyed – Australian White Ibis.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W001	NV	NV	NV	NV	NV	40	NSCA	2-100
W002	NV	NV	50	NV	50	NV	NIL	2-100
W004	P	NIL	50	NSCA	NSCA	P	NSCA	2-100
W005	NV	NV	60<	NV	NV	NV	NIL	2-100
W006	P	NV	50<	50<	NV	NV	NV	2-100
W007	NV	NV	3000>	NSCA	3000>	NSCA	4000	3000+
W008	NV	NV	NSCA	NV	75	NV	NIL	2-100
W009	100<	P	1000	450<	1000	NV	NV	501-3000
W010	NV	NV	NIL	NV	NIL	NV	200	101-500
W011	P	NV	300<	50	NIL	NV	200<	101-500
W012	NSCA	P	P	NSCA	NSCA	NSCA	NSCA	2-100
W014	50<	NV	NV	NV	350	NV	NV	101-500
W016	NV	NV	NSCA	NV	50	NV	NIL	2-100
W017	NV	NV	300<	NV	1000	NV	NV	501-3000
W018	NV	NV	NIL	NV	200	NV	20<	101-500
W019	NV	NV	200	NSCA	40	NV	NIL	101-500
W020	NV	NV	600	NSCA	500	NV	NIL	501-3000
W022	NV	NV	NSCA	NV	150	NV	20<	101-500
W024	NV	NV	10<	NSCA	NSCA	NSCA	100	2-100
W025	P	P	2250<	35<	P	NV	NV	501-3000
W026	NV	NV	NV	NV	NV	40	NV	2-100
W029	P	NV	1000	50<	P	NV	NSCA	501-3000
W033	NV	NV	1000	75<	P	NV	NV	501-3000
W034	P	250<	500<	20<	P	NV	NV	501-3000
W035	P	1500<	1500	10	P	NV	NSCA	501-3000
W036	NV	NV	P	NV	P	NV	NV	2-100
W037	NV	NV	200>	50>	P	NV	NV	101-500
W038	NV	NV	NV	NV	750	NV	1000	501-3000
W041	NV	NV	200	NV	NSCA	NV	NV	101-500
W042	NV	NV	NV	NV	NIL	NV	500>	101-500
W049	NV	NV	NV	NV	NV	NV	NV	2-100
W052	NV	NV	NV	NV	500<	NV	2000	501-3000
W053	NV	NV	NV	NV	P	NV	3000	3000+
W054	NV	NV	100	NV	250<	NV	NV	101-500
W055	NV	NV	NV	P	50<	NV	4000>	3000+
W057	NV	NV	NV	NSCA	NSCA	NV	100	2-100
W061	NV	NV	NV	NV	NV	NV	300	101-500
W070	NV	NV	NV	NV	NV	NV	300	101-500
W075	NV	NV	NV	NV	NV	NV	1500	501-3000

Table A20. Observations of timing of breeding – Australian White Ibis.

Date	Colony Number	Comments
28.1.94	W025	Eggs present.
28.1.94	W033	Eggs present, but not all birds started.
1.2.94	W025	Eggs present.
11.3.93	W025	Most eggs, some small young.
11.3.99	W052	1-2 eggs through to fledged young.
17.3.75	W034 & W035	Starting to lay eggs (F. Woerle, pers. comm.).
23.3.93	W017	All eggs, clutches of 1-3.
23.3.93	W011	Most eggs, some patches of half grown young.
24.3.93	W033	Most eggs.
24.3.93	W034 & W035	Most eggs.
31.3.99	W022	All eggs.
31.3.99	W010	Mostly eggs, some young.
13.4.75	W034 & W035	Eggs through to large young.
12.5.95	W009	500-1000 nests with eggs through to near fledged young.
12.5.95	W019	Eggs.
12.5.95	W022	Eggs through to large chicks.
12.5.72	W034 & W035	Chicks, most other species finished breeding (F. Woerle, pers. comm.).
23.5.99	W055	Colony still active, fledged birds present.
23.6.99	W074	Eggs and young present.
17.8.95	W017	Some old young still not fledged, no eggs.
17.8.95	W018	Young present.
17.8.95	W020	Lots of young, small through to just about fledged, but also still plenty of eggs.

Table A21. Approximate numbers of birds in colony for years when surveyed – Glossy Ibis.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W053	NV	NV	NV	NV	NSCA	NV	5000	3000+

Table A22. Observations of timing of breeding – Glossy Ibis.

Date	Colony Number	Comments
11.3.99	W053	Eggs seen but unable to say whether dominant stage.

Table A23. Approximate numbers of birds in colony for years when surveyed – Royal Spoonbill.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W003	NV	NV	100<	NV	NV	NV	NIL	101-500
W005	NV	NV	100<	NV	NV	NV	NIL	101-500
W006	P	NV	50<	200<	NV	NV	NV	101-500
W007	NV	NV	400>	NSCA	300	NSCA	500	101-500
W008	NV	NV	NSCA	NV	75	NV	NIL	2-100
W009	100<	100<	200	350<	100	NV	NV	101-500
W010	NV	NV	100	NV	NV	NV	NIL	101-500
W016	NV	NV	100<	NV	300	NV	NV	101-500
W018	NV	NV	60	NV	300	NV	300<	101-500
W019	NV	NV	330	NSCA	400	NV	NIL	101-500
W020	NV	NV	200	NSCA	P	NV	2<	101-500
W022	NV	NV	100<	NV	710	NV	NIL	501-3000
W025	NSCA	NSCA	20	NSCA	P	NV	NV	2-100
W026	NV	NV	NV	NV	NV	20	NV	2-100
W027	NV	NV	50	NV	NIL	NV	NV	2-100
W034	P	NSCA	NSCA	NSCA	NSCA	NV	NV	2-100
W037	NV	NV	NIL	NSCA	P	NV	NV	2-100
W038	NV	NV	NV	NV	NSCA	NV	150	101-500
W041	NV	NV	200	NV	NSCA	NV	NV	101-500
W043	NV	NV	NV	NV	300	NV	NV	101-500
W049	NV	NV	NV	NV	NV	NV	NV	101-500
W050	NV	NV	NV	NV	P	NV	NIL	2-100
W054	NV	NV	NSCA	NV	350	NV	NV	101-500
W058	NV	NV	NV	NV	200	NV	NSCA	101-500
W059	NV	NV	NV	NV	20	NV	NV	2-100

Table A24. Observations of timing of breeding – Royal Spoonbill.

Date	Colony Number	Comments
31.3.99	W022	Birds standing around in breeding plumage but not started
31.3.99	W008	Birds standing around in breeding plumage but not started
31.3.99	W059	Birds standing around in breeding plumage but not started
3.5.93	W018	Lots of eggs present.
3.5.93	W019	Most eggs.
12.5.95	W016	Eggs through to about half grown young.
12.5.95	W019	Eggs through half grown to fledged or near fledged young.
12.5.95	W022	Some eggs, but also large young.
23.5.99	W050	Nests with 1-5 eggs.
15.8.95	W025	Still some pre-fledged young present.
17.8.95	W018	Young present.
17.8.95	W020	Some sitting birds (presumably on eggs or small young), also young on nests and fledged young present.
17.8.95	W022	Still some young present.

Table A25. Approximate numbers of birds in colony for years when surveyed – Australian Pelican.

Colony Number	ESTIMATED ADULT NUMBER							Allocated Size Class
	1991	1992	1993	1994	1995	1996	1999	
W021	400<	2000	4500	300	6000	100	NV	3000+

Table A26. Observations of timing of breeding – Australian Pelican.

Date	Colony Number	Comments
14.3.91	W021	Eggs.
5.3.92	W021	Birds in area but no eggs yet.
1.4.92	W021	Eggs.
23.3.03	W021	Most nests with 2 eggs.
11.6.93	W021	Many half grown young, some sitting adults.
20.7.93	W021	Most young full size.
7.9.93	W021	Most nesting finished, possible odd non fledged young still present.
10.3.95	W021	Just getting started.
12.5.95	W021	Eggs and small young, some nests still being constructed.
30.6.95	W021	Some eggs, most walking young.
17.8.95	W021	Young half grown to near fledged.
5.7.96	W021	Most, near-fledged young.

APPENDIX B

INDIVIDUAL COLONY BREAKDOWN FOR CONFIRMED COLONIES (W001-W076).

INDIVIDUAL COLONY BREAKDOWN FOR CONFIRMED COLONIES

This appendix gives a separate summary of each confirmed colony which are assigned a unique colony number (between W001 and W076), which is prefixed by the letter 'W' (for waterbird). It was not possible to utilise the colony numbering system in any particular geographic or date order as there was a continual transfer from possible to confirmed colony allocation. Each colony is characterised by a number of descriptors. The content of some of these is obvious but most are given further explanation below.

Note: In this version of this report Appendices B and C do not contain the colony latitudes and longitudes, these can be requested from the Darwin office of the Parks and Wildlife Commission of the Northern Territory.

Historical Documentation. Refers to a search of previous reports in the scientific literature, explorers' journals, or other non-scientific sources. Where no other record was found, the colonies are recorded as being located during current surveys. The majority of the colonies reported here were actually located during the current surveys.

Survey dates. Month and year that some form of survey was carried out. These included any sort of brief aerial observation or report by a reliable informant, through to detailed ground surveys. Although primary reference is from the period of the surveys (1990-1999), some observation prior to and subsequent to this period are also included.

Years confirmed active. Refers only to years in which the colony was checked and recorded as active during the current surveys, extracted from historical references or reported to the author by reliable observers.

Years confirmed inactive. Refers only to a known site that previously supported breeding but was definitely inactive during the year reported. Where years are not mentioned as either active or inactive it means the colony was not checked (or known about) and may or may not have been active. A colony that was recorded active for 3 years, and not recorded inactive at all (and this may have been due to the site not being visited in other years), is taken as active 3 out of 3 years, and thus a 'regularly used' colony.

Status. (Significance) Refers to an attempt by the author, within this report, to indicate an approximate level of significance to each colony. It is based purely on numbers and regularity of use in comparison with other colonies documented throughout Australia. Three levels of significance have been chosen. 'Low' indicates that the colony is only small and not of considerable significance for any of the species involved ie only a few birds involved. 'Regionally high' indicates that one or more species within the colony are breeding in numbers thought to be of high significance for the region, ie high hundreds for most species covered here. 'National' indicates that one or more species within the colony are breeding in numbers thought to be of high significance at least at a national level, ie low thousands and above for most species. Some of these colonies would probably also qualify for international significance but they have not been separated from those listed as national. The most significant species in the colony denotes the allocation to that colony. Species such as Royal Spoonbill which nest in much smaller numbers than the other species considered here, qualify for a higher listing with lower numbers. For example a regular colony of 500 Royal Spoonbills and 500 Intermediate Egrets is considered here to be of national significance because of the Royal Spoonbills, but a colony of 100 Royal Spoonbills and 500 Intermediate Egrets would only be of regional significance.

Species confirmed breeding. Species have been listed here as confirmed to be breeding by observation of a number of things. When a species was observed sitting, or when eggs and/or young were seen there was obviously no doubt of confirmation. However species were also recorded as confirmed to be breeding when they were observed to be present in a colony known to be currently active, as it was not always possible to see eggs and/or young of every species. Historically referenced colonies or observations reported to the author during the current surveys by reliable observers were also listed as confirmed. Where a 'species group' has not been reliably separated into individual species, then that group name is recorded as what is confirmed breeding, however as soon as a particular species was

observed to be present in any subsequent survey, it was then listed as confirmed. The bracketed number and date attached to each species in this section indicates the highest estimate made in any survey for that species, at that colony.

Species probably breeding. This includes species considered in this report that were observed near the colony, and individual species from a species group that was listed as confirmed breeding. For example a confirmed observation of “egret species” breeding would then have the known likely individual species of egrets listed as here as probably breeding.

Highest no. birds recorded. This section refers to the highest (all species combined) single count for that colony.

Highest estimated annual usage. This section attempts to approximate the highest total number of birds to have used the colony in a particular breeding season (ie full annual cycle). This differs from the above estimate in that it takes into account the different timing of breeding of the individual species over a complete breeding season and totals each when at their particular highest.

Allocated colony size. This has been previously discussed in detail in the section entitled 'Quality of Numerical Estimates' (P9). Based on all the information collected, each colony is allocated a minimum size.

Months likely to be active. This section approximates the months of the year that the colony is likely to be active. This is based on observations of the stage of breeding of each of the species during field surveys and known incubation/fledging times, and/or documented or reliable information.

Photographs. This section indicates whether photographs of the colony had been taken at the time of writing this report. These photographs have been numbered and recorded on a database named Photoind.dbf, stored in the Parks and Wildlife Commission PCCOMM network.

Ground access. This section gives details of the method and ease of access to the colony, or to a position offering a reasonable view, for ground truthing. This applies to the wet season when the birds are mostly breeding, and when access is mostly from the air or from boat. Access in the dry season is usually a different matter and can often be done via a vehicle or quad, but as my knowledge of accessing most of these colonies from the land is limited I have not made much comment on this. It should be kept in mind that virtually all of these colonies are frequented by numbers of Estuarine Crocodiles and wild pigs, both feeding on fallen or overly adventurous birds. Consequently a firearm should be carried and extreme care taken, especially if walking in water.

Comments. This section contains an overall summary of the colony with explanations of some of the figures/statements made in the above sections, as well as additional comments not included under the previous headings.

Future surveying needed. This section concerns the author’s view of the specific work still needed to upgrade the quality of the information on that particular colony. The overall need to monitor the continuing general status of all larger colonies, as was discussed above in Future Management is taken as accepted and not repeated for each colony in this section. Similarly the need for detailed floristic or structural descriptions of the vegetation of all of the colonies, which has not yet been attempted, is not repeated for each colony. For all future work, priority should be given to larger or more significant colonies. A “high priority” means that it is important to survey/re-survey the colony because we have insufficient knowledge of its status. A “medium priority” means that sufficient is known to provide an adequate appreciation of the site’s status, but it would be desirable to obtain some more information on certain aspects of the colony status. This applies to sites that have to date only been surveyed from the air. A “low priority” is where sufficient information is known about the colony to be able to define its status and management requirements, even if an important colony. It does not need to be specifically targeted for checking in the near future unless in the area on other tasks or if there is some extreme development that may place the colony in jeopardy.

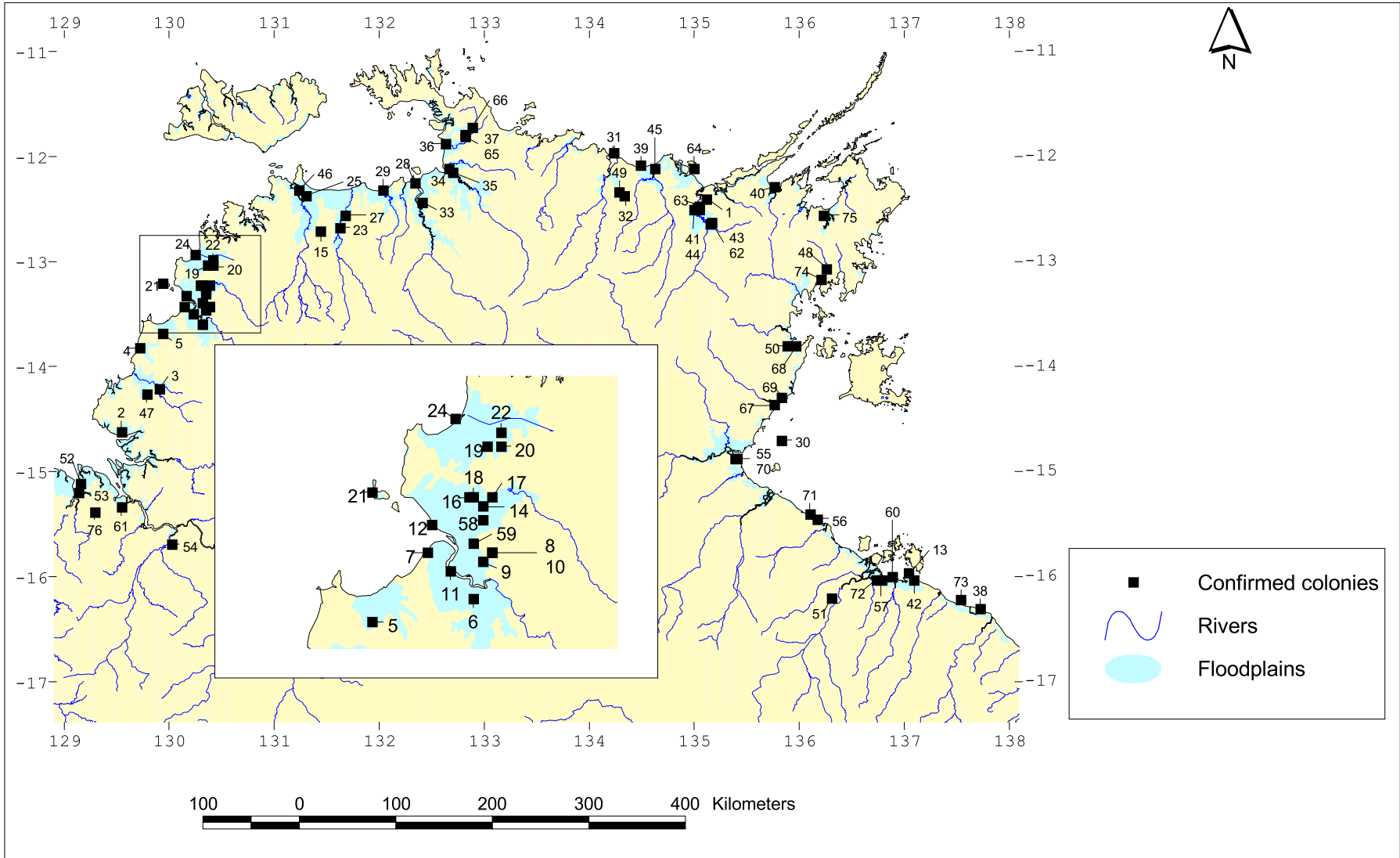


Figure B1. Location of colonies by colony number - confirmed colonies.

Colony identifier:	W001.
General location:	East side of the Arafura Swamp (Goyder R.), approx. 13 kilometre south of the coast.
Historical documentation:	J. Wilson (pers. comm.). Site also visited by author during current surveys.
Land tenure:	Aboriginal Land [Arnhem Aboriginal Land Trust (A.L.T.)].
Nesting habitat:	Paperbarks.
Survey dates:	August 1996, March 1999.
Years confirmed active:	1996, (Wilson, pers. comm.), 1999.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Australian White Ibis (40+ August 1996), Wilson (pers. comm.), Darter ('few' March 1999).
Species probably breeding:	
Highest no. of birds recorded:	40+ (August 1996), Wilson, (pers. comm.).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys.
Allocated colony size:	2-50.
Months likely to be active:	March and August to October at least.
Photographs:	5829-30.
Ground access:	Not recorded.
Comments:	Small Australian White Ibis colony reported on 22 August 1996 by Joe Wilson that was the day he located it. The colony is one of a cluster of at least seven small to medium sized colonies in the Arafura wetlands area. All nests, which were in paperbarks leaning out over a waterhole, had eggs which is definitely later than normal and whether they were going to succeed is questionable. The possibility of this being a second nesting of these birds also needs to be considered. Wilson reported that the Arafura wetlands still retained water but there had been no exceptional dry season rains this year. When checked by author in March 99 there were 200+ Darter in area and a few nests, but may have been a little early for all birds to be nesting.
Future surveying needed:	Low priority. A small colony which is probably difficult to access, however a check of Darter breeding should be done mid year.
Colony identifier:	W002.
General location:	On shoreline of New Moon Inlet, Joseph Bonaparte Gulf (north of Victoria R. mouth).
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	July 1993, March 1995, March 1999, July 1999.
Years confirmed active:	1993, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(9). Intermediate Egret (1950+, March 1999), Great Egret (750+, March 1999), Little Egret (270+, March 1999), Cattle Egret (30+, March 1999), Little Pied Cormorant (285+, March 1999), Little Black Cormorant (15+, March 1999), Pied Heron (400+, May 1993 & March 1999), Nankeen Night Heron (10+, March 1999) and Australian White Ibis (a few, May 1993).
Species probably breeding:	
Highest no. of birds recorded:	3700+ (March 1999).
Highest estimated annual usage:	3700+
Allocated colony size:	1001-5000.
Months likely to be active:	At least February to May.
Photographs:	3042, 5770-78, 5780-81.
Ground Access:	Access possible by landing in a helicopter and walking from the inland side; thus best at low tide. Access via boat probably best at high tide.
Comments:	A moderate sized mixed species colony located in mangroves on the Joseph Bonaparte Gulf coast. Found to be active in March and May surveys, but not in early July of a year that was active.
Future surveying needed:	Medium priority. This is a reasonably significant colony that has only been ground checked once. A ground check later in the season would be desirable to assess bird numbers and species composition at that time.

Colony identifier:	W003.
General location:	Moyle River floodplain, west of Pepperminati
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March 1993, January 1994, March 1999.
Years confirmed active:	1993.
Years confirmed inactive:	1999.
Status:	Regionally high.
Species confirmed breeding:	(1). Royal Spoonbill (100+, March 1993)
Species probably breeding:	
Highest no. of birds recorded:	100+ (March, 1993).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys.
Allocated colony size:	101-500.
Months likely to be active:	At least March to May.
Photographs:	No.
Ground access:	Access uncertain as this colony has not been ground surveyed. Its position on the floodplain indicates that a substantial area of water would have to be crossed during wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	Small colony located from the air during a Magpie Goose (transect) survey and flown on two other occasions only. Located in sparse paperbarks on the Moyle River floodplain. Probably Royal Spoonbill only, and as such, March (1993) estimate of numbers probably underestimates peak usage. Absence of activity in mid January (1994) is further evidence that Egrets, Cormorants and Pied Heron are not involved because they have normally started nesting by January.
Future surveying needed:	Medium priority. This is a reasonably significant colony which should have its location and status checked. Recording species would require at least one ground truthing survey in May. However two surveys would be preferable; one in April and one in June.
Colony identifier:	W004.
General location:	Island and adjacent shoreline in inlet north of Moyle R. mouth.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	March 1991, April & August 1992, February, March, May & July 1993, January 1994, March 1995, February 1996, March 1999.
Years confirmed active:	1991, 1993, 1994, 1995, 1996, 1999.
Years confirmed inactive:	1992.
Status:	National.
Species confirmed breeding:	(10). Egrets (4000+ March 1993, consisting of mostly Intermediate, some Great and a few Little), Cattle Egret (140+, January 1994), Little Pied Cormorant (200+, March 1993), Little Black Cormorant (25+, March 1993), Darter (5+, March 1993), Pied Heron (1000+, March 1993), Australian White Ibis (few, March 1993) and Nankeen Night Heron (300+, March 1993).
Species probably breeding:	
Highest no. of birds recorded:	5600+ (March 1993).
Highest estimated annual usage:	Unknown but would have been in excess of the above figure for 1993, as Australian White Ibis, Nankeen Night Heron and Cattle Egrets were not estimated at peak times.
Allocated colony size:	5001-10000.
Months likely to be active:	January to May at least.
Photographs:	5719-20.
Ground access:	Access on foot from boat, or helicopter landing on exposed beach is possible at low tide, though the walk from the boat is longer due to shallow water in the vicinity at low tide. Higher tides allow access to the by boat right to the colony but then water is too deep to safely get out of the boat.
Comments:	A large and regularly used multi-species colony with mostly egrets, located on the coast between the Daly and Moyle Rivers. Most of the colony is situated on an island in an inlet but nesting also occurs on the adjacent mainland, in some years at least. Last survey (1999) showed the island colony to have shrunk considerably and the mainland section expanded considerably. Estimate of numbers was done in March, so the Australian White Ibis numbers using the colony are probably underestimated. Egrets at this time were recorded as mostly having small young, while Pied Herons and Cormorants had mostly eggs with some small young. There were more Nankeen Night Heron in the mainland section of the colony but being well down under the vegetation canopy, meant the estimation of number was very rough. Surveys indicated activity between early February and May with a mid July survey showing no activity. As Cattle Egrets were present the colony it could have been active well before February.
Future surveying needed:	Medium priority. A significant colony which has had reasonable coverage. However a ground survey in December/January for Cattle Egrets, and a March/April ground check for Nankeen Night Herons would be valuable.

Colony identifier:	W005.
General location:	Daly River floodplain, south of Anson Bay.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March 1993, January 1994, March 1999.
Years confirmed active:	1993.
Years confirmed inactive:	Possibly 1999, but may have been a little early.
Status:	Regionally high.
Species confirmed breeding:	(3). Royal Spoonbill (100+, March 1993), Little Pied Cormorant (few, March 1993), Australian White Ibis (30, March 1993).
Species probably breeding:	
Highest no. of birds recorded:	140+ (March 1993).
Highest estimated annual usage:	Unknown due to lack of temporal coverage of surveys but would likely be in excess of the above figure during the 1993 season as Australian White Ibis and Royal Spoonbill were probably estimated prior to their peak numbers.
Allocated colony size:	101-500.
Months likely to be active:	March to May at least.
Photographs:	No.
Ground access:	Access uncertain as this colony has not been ground surveyed. Its position on the floodplain indicates that a substantial area of water would have to be crossed during wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	Small colony located on one of the Magpie Goose (transect) surveys, but not seen again. Total numbers are probably an underestimate because as Australian White Ibis and Royal Spoonbill involved, and colony would have been in early stages during March. Active late March (1993) but not mid January (1994) or mid March (1999).
Future surveying needed:	Medium priority. A significant colony which should first have its location and status re-checked from the air. Should this prove favourable then at least one ground truthing survey done in May, or preferably two, one in April and one in June should be done to confirm status.
Colony identifier:	W006.
General location:	Daly River floodplain, SE of Billawock Hill.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March 1991, March 1992, March 1993, January & March 1994.
Years confirmed active:	1991, 1993, 1994.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(10). Great Egret, Intermediate Egret, Little Egret, Cattle Egret (no individual species estimates but 3,000+ Egrets in total, March 1991), Little Black Cormorant (3700+, March 1994), Little Pied Cormorant (3000+, March 1994), Pied Cormorant (370+, March 1994), Darter (370+, March 1994), Royal Spoonbill (200+, March 1994), and Australian White Ibis (40+, March 1994).
Species probably breeding:	
Highest no. of birds recorded:	8750+ (March 1994).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys, but would likely have been higher than above figure in 1994 as Royal Spoonbill and Australian White Ibis were probably not estimated at their peak.
Allocated colony size:	5001-10000.
Months likely to be active:	January to May at least.
Photographs:	No.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	A large multi-species colony located in a patch of paperbarks on the Daly River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. It supports large numbers of Cormorants, particularly Little Pied and Little Black Cormorants. Surveys have only been done between mid January and late March however the colony would be also active either side of these dates. Counts of birds would not include young for any species except perhaps some Cattle Egrets. January (1994) surveys showed no Royal Spoonbill or Australian White Ibis. Mid March (1993 & 1994) surveys revealed some of these species but no surveys were done after March when the numbers of these species would most likely have been higher. Mid January (1994) and early March (1991&1994) surveys both showed many Egrets using the colony. No Cattle Egrets were seen in aerial checks in January (1994) and March (1994). A March (1993) check showed only a few present. However the other three Egret species were present at these times in large numbers and mostly on eggs or with small young. Like the three egrets (aside from Cattle Egrets) the cormorants appear to commence nesting mostly around February in this colony.
Future surveying needed:	Medium priority. A very significant colony which should be ground truthed and re-checked from time to time to determine its status.

Colony identifier:	W007.
General location:	Daly River floodplain, near Cliff Head.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Rainforest and mangroves.
Survey dates:	April, May & July 1993, January 1994, May 1995, February 1996, March 1999.
Years confirmed active:	1993, 1994, 1995, 1996, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(8). Australian White Ibis (4,000+, March 1999), Intermediate Egret (4,000+, March 1999), Great Egret (750+, March 1999), Little Egret (250+, March 1999), Royal Spoonbill (500+, March 1999), Pied Heron (400+, May 1993), Nankeen Night Heron (500+, March 1999), Little Pied Cormorant (200+, May 1993).
Species probably breeding:	
Highest no. of birds recorded:	The maximum estimate of 10,120 birds was made at the end of March 1999, so considerable numbers of fledged or near fledged young are probably included in this count. Even the presence of young may be offset to a certain degree by the large proportion of adults away from the colony collecting food for young, compared to the numbers present when most were on eggs. This estimate should be treated with caution with respect to numbers of adults.
Highest estimated annual usage:	10,000+ (1999).
Allocated colony size:	5001-10000.
Months likely to be active:	January to June at least, (recorded as finished by mid July in 1993).
Photographs:	3044-3047, 5883-86.
Ground access:	Access by foot from helicopter landing near by, is feasible regardless of tides. There are plenty of wild pigs under and around this colony. Access on foot from a boat coming to the coast adjacent to the colony appears feasible but would require a much longer walk and would need to be done at high tide.
Comments:	A large, regularly used colony with a number of species breeding in significant numbers. One of the few waterbird colonies located in woody vegetation other than mangroves or paperbark, being mostly in rainforest located between the floodplain and the coast. Not observed in numerous flights in the area between 1990 and 1992 and hence appears to have been new in 1993 when first located. The numbers given in the species confirmed section above could include fledged and near fledged young, although the May (1995) survey did record eggs and fledged young present. The eggs and smaller young are more likely associated with the Australian White Ibis and Royal Spoonbill. A late January (1994) check showed much smaller numbers of birds, with only Egrets and Cormorants present, with Royal Spoonbill, Australian White Ibis and Nankeen Night Heron not appearing in any significant numbers until around March as seen from other surveys (1993,95,99). By mid July (1993) however the colony had finished.
Future surveying needed:	Low priority. A very significant colony which should be re-checked from time to time to determine its status.
Colony identifier:	W008.
General location:	Daly River floodplain, near Darkies Hole.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station).
Nesting habitat:	Paperbark.
Survey dates:	May 1993, January & March 1994, May 1995, March 1999.
Years confirmed active:	1993, 1995, 1999.
Years confirmed inactive:	1994.
Status:	Regionally high.
Species confirmed breeding:	(3+). Royal Spoonbill (50+, May 1995), Australian White Ibis (50+, May 1995), Little Pied Cormorant (100+, March 1999).
Species probably breeding:	Little Black Cormorant, Darter.
Highest no. of birds recorded:	250+ (May 1995), but 1000+ birds (June 1993) after most had fledged indicate a larger colony on that year.
Highest estimated annual usage:	Unknown due to insufficient temporal coverage during surveys.
Allocated colony size:	501-1,000.
Months likely to be active:	May at least.
Photographs:	5878-5880 & possibly 3048.
Ground access:	Landed beside colony in helicopter with floats in late March (1999), but colony is surrounded by a substantial area of water and hence the only way for detailed observation would be this method or an airboat. Telescope observations from some adjacent high ground would give a reasonable view of the colony.
Comments:	Small, possibly intermittently used colony that does not include breeding egrets. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. It is located in a small isolated patch of paperbarks in a "bay" of the Daly River floodplain. May have been significantly larger in 1993 as 1000+ birds still in area in mid June. This figure would have included fledged young and may also have included roosting birds not involved with the colony. Eggs and young present in May (1995) which would be expected with Royal Spoonbill and Australian White Ibis involved. 100+ Royal Spoonbill were present in breeding plumage in late

Future surveying needed:	March (1999) but had not commenced nesting, whereas the Little Pied Cormorants were on eggs (which is later than what they normally are in large mixed species colonies). Medium priority. Not a highly significant colony but needs better description and recording of species. Requires further ground truthing in May or June. It is also noteworthy that it is one of 3 (including W009 & W010) colonies in close proximity.
Colony identifier:	W009.
General location:	Daly River floodplain, near Darkies Hole.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station).
Nesting habitat:	Paperbark.
Survey dates:	March 1991, March 1992, March, May & June 1993, January & March 1994, May 1995.
Years confirmed active:	1991, 1992, 1993, 1994, 1995.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(5). Australian White Ibis (1000+, May 1995), Royal Spoonbill (200+, May 1993), Little Pied Cormorant (350+, March 1994), Darter (150+, March 1993), Little Black Cormorant (some, May 1995).
Species probably breeding:	
Highest no. of birds recorded:	1000+ (March 1994) when Australian White Ibis and Royal Spoonbill not at highest numbers, and 1400+ (May 1995) when Cormorants and Darters would have had fledged young among.
Highest estimated annual usage:	1000+ (Would apply to 1993,94,95).
Allocated colony size:	1001-5000.
Months likely to be active:	February to June at least.
Photographs:	3049.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	A substantial and regularly used colony located in two closely associated small patches on the Daly River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. In addition to the colonial species covered in this report, a pair of Black-necked Storks were recorded breeding among colony on two occasions. They may have been present and not reported in other years. Also a kite (whistling or black) was present on a nest on at least one occasion. The colony was not active in late January (1994) but this is expected with a predominantly Royal Spoonbill and Australian White Ibis using the colony. Cormorant, Darter and Australian White Ibis at were on eggs by mid March (1994), while by mid May (1995) had Australian White Ibis had eggs through to near fledged young and cormorants and Darters mostly with older young. Yet to fledge Royal Spoonbill young were seen in mid June (1993).
Future surveying needed:	Medium priority. Reasonably significant colony which has not been surveyed from the ground during the core of breeding. Requires at least one ground truthing visit in April, or preferably two, one in March and one in May.
Colony identifier:	W010
General location:	Daly River floodplain, near Darkies Hole
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station)
Nesting habitat:	Paperbark
Survey dates:	March, May & June 1993, January & March 1994, May 1995, March 1999.
Years confirmed active:	1993, 1999.
Years confirmed inactive:	Nil
Status:	Regionally high.
Species confirmed breeding:	(4). Royal Spoonbill (100+, May 1993), Little Pied Cormorant (80, March 1999), Darter (120, March 1999) and Australian White Ibis (200, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	400+ (March 1999).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage during surveys.
Allocated colony size:	101-500.
Months likely to be active:	March to June at least.
Photographs:	5882.
Ground access:	Access uncertain as has only been surveyed from the air. Although close to the edge of the floodplain, crossing substantial areas of water would be necessary in the wet. Detailed observation would require an airboat or helicopter with floats.
Comments:	Small colony, which may have had a little breeding in 1994 and 1995. Sited in a small patch of sparse paperbarks on the Daly River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. Darter and Little Pied Cormorant at least, had eggs in late March (1993) but nothing was still on nests in mid June (1993), though birds of species that bred there were still present in the colony. Australian White Ibis did not breed in 1993 but did in 1999.
Future surveying needed:	Low priority. Not a highly significant colony. A survey to improve species breakdowns should be carried out in conjunction with the 2 other nearby colonies (ie W008 & W009).

Colony identifier:	W011.
General location:	Daly River, south bank 20 kilometres upstream from mouth.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	March 1991, March 1992, March & May 1993, January & March 1994, March 1999.
Years confirmed active:	1991, 1993, 1994, 1999.
Years confirmed inactive:	1992, 1995.
Status:	National.
Species confirmed breeding:	(8). Intermediate Egret (3600+, March 1993), Cattle Egret (7500+, November 1998), Great Egret (700+, January 1994), Little Egret (300+, January 1994), Nankeen Night Heron (1500+, March 1993), Pied Heron (2500+, March 1999), Australian White Ibis (300+, March 1993), Little Pied Cormorant (500+, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	8000+ (January 1994), though 7500 Cattle Egrets in November 1998 and 7000 other waterbirds in March 1999 are part of the same breeding season and combined give a colony size that season of 14,500+.
Highest estimated annual usage:	14,500+ (1998/9), but this underestimates Australian White Ibis that were only beginning to nest at the last survey for that year.
Allocated colony size:	10001-15000.
Months likely to be active:	November to June at least.
Photographs:	5887-88.
Ground access:	Access on foot from either helicopter or boat is quite easy. Lower tides are best for walking into the colony.
Comments:	Very large, mixed species colony that seemed to be active in about two out of each three years. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. It is located in mangroves along the southern side of the Daly River and extending in along a tributary off the Daly River. Very significant for Nankeen Night Heron. Uncertain of Cattle Egret breeding in 1991, but they certainly were not breeding in the 1993 season. In the 1994 season a small section of the colony on the end had Cattle Egrets on eggs in late January, but most of the rest of the colony were with well developed young, though with few fledged. This would indicate a start in November. The above Cattle Egret count was of adults and there were also 2000+ young in nests. The number of adults estimated from the air was less than 60% of the ground count, mainly because fewer birds were flushed from the lower nests. The only pre-January survey (mid November 1998) showed 5-10,000 Cattle Egrets. Other Egrets were on eggs in late January (1994) and many still in mid March (1994), so the above counts reflect adults present in the colony. Pied Herons appeared to have a timing similar to the Egrets (excluding Cattle Egrets) though perhaps a little earlier as they had a higher percentage of chicks by mid March (1994). The majority of the other Egrets, which started after the Cattle Egrets, formed a different section of the colony. Nankeen Night Herons seemed to mostly arrive between late January (1994) and mid March (1994), by which stage they were mostly on eggs. This is for the years that they breed in this colony at least, as none were present in late March (1999) when the colony was active. Australian White Ibis were mostly on eggs in mid March (1993), but there were some advanced sections with half grown chicks, and even the odd near fledged young. They had not started nesting by early March of 1992 or 1999, in which no other species had started. The only report of Little Pied Cormorant timing was of eggs present in mid March (1994).
Future surveying needed:	Low priority. A very significant colony but has been reasonably well surveyed. However being one of the few major breeding colonies that seems to be inactive in more than just the odd year, it would be desirable to ascertain what percentage of years this one is active. It is on a river with frequent boat visitation which may affect its inactivity in some years.
Colony identifier:	W012.
General location:	Coast just north of Daly River mouth.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Downs Station).
Nesting habitat:	Mangroves.
Survey dates:	March 1991, March, April, June, August & December 1992, February, March, May, June & July 1993, January 1994, May & October 1995, February 1996.
Years confirmed active:	1991, 1993, 1994, 1995, 1996 (and 1999, Alex Julius, pers. comm.).
Years confirmed inactive:	1992.
Status:	National.
Species confirmed breeding:	(8). Intermediate Egret (5900+, March 1993), Great Egret (2500+, January 1994), Cattle Egret (6500+, December 1992), Little Egret (200+, March 1993), Little Pied Cormorant (1400+, March 1993), Little Black Cormorant (70+, March 1993), [2000+ Cormorants nests with young were recorded in May 1995, but no species breakdown was recorded.] Pied Heron (1000+, January 1994), Australian White Ibis (few, March 1993).
Species probably breeding:	
Highest no. of birds recorded:	9700+ (late January 1994).
Highest estimated annual usage:	15000+ (1993).
Allocated colony size:	5001-10000.

Months likely to be active:	December to June at least.
Photographs:	3050, 3051, 5718.
Ground access:	Access is possible by helicopter and walking in from the inland side at low tide. Access to the general area of the colony by boat would be possible at high tide, but as the colony is inland from the coast by about 50 metres viewing would not be very good. Attempting to walk in from the coast at high tide would be difficult because of the soft mud and dangerous because of the crocodiles, thus not advised.
Comments:	Large, regular colony that is dominated by egrets. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. It extends half a kilometre or more in the mangroves along the coast, just north of the mouth of the Daly River. Normally active from December through to June. All above quoted counts would have contained only a small proportion of flying young at most. Cattle Egrets were essentially finished by early March (1993), but some, at least in one year (1994) were on eggs with the other species of egrets in late January. Other species, eg Pied Heron and Little Pied Cormorant were seen on eggs in late January (1994), but most had chicks by late March (1993), with still much of the colony with young in nests in early May (1995).
Future surveying needed:	Low priority. A very significant colony but one that has been reasonably well assessed in terms of its status, however a specific ground check in December/January to assess status of Cattle Egret breeding would be desirable.

Colony identifier:	W013.
General location:	Mangrove island adjacent mainland east of mouth of Wearyan River.
Historical documentation:	S. Johnson (pers. comm). Site not observed during current surveys.
Land tenure:	Pastoral lease (Greenbank Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995, July 1996.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Little Pied Cormorant and Little Black Cormorant (Steve Johnson, pers. comm.).
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	2-50.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unsure of ground access but would suspect only close approach would be achieved by boat.
Comments:	Confirmed as a Little Pied Cormorant breeding colony by Steve Johnson (traditional owner on Vanderlin Island). No other details as yet. It is one of 5 colonies along the coast in the Port McArthur area.
Future surveying needed:	High priority. Although only a small colony this one has had very little observation from the air and none from the ground. It is listed mainly from information supplied by a local fisherman. It is also one of a number of colonies in the Port McArthur area which have not been ground checked, and which could all be included in the one trip around April, or preferably two, one in March and one in April.

Colony identifier:	W014.
General location:	Floodplain between Daly and Finnis Rivers, west of Welltree station homestead.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Downs Station).
Nesting habitat:	Reeds.
Survey dates:	March 1991, January 1994, May 1995.
Years confirmed active:	1991, 1995.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(1). Australian White Ibis (350+, May 1995).
Species probably breeding:	
Highest no. of birds recorded:	350+ (May 1995).
Highest estimated annual usage:	350+ (1995).
Allocated colony size:	101-500.
Months likely to be active:	March to June at least.
Photographs:	No.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats. Being an Australian White Ibis colony and often going well into August, some access by quad may be possible in the later part of it season.
Comments:	Small Australian White Ibis colony that appears to regularly use a small patch of reeds on the Reynolds River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. All birds on eggs mid May (1995), with some starting as early as late March (1991).

Future surveying needed: Low priority. As this colony is only Australian White Ibis it can be reasonably assessed from the air, and hence not in need of ground checking for details of species composition. However as it has not been checked in many seasons, aerial observations in May are required to detail its frequency of use.

Colony identifier:	W015.
General location:	Creek between Adelaide and Mary Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Marrakai Station).
Nesting habitat:	Paperbark.
Survey dates:	June, July & August 1995.
Years confirmed active:	1995.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Darter (20+, June 1995), Nankeen Night Heron (30+, June 1995).
Species probably breeding:	
Highest no. of birds recorded:	40+ (June 1995).
Highest estimated annual usage:	Unknown due to insufficient surveying.
Allocated colony size:	2-50.
Months likely to be active:	May to September at least.
Photographs:	No.
Ground access:	Access by vehicle to site possible but view of colony better from the water via boat or airboat.
Comments:	Small and relatively insignificant Darter and Nankeen Night Heron colony situated along a tributary of the Mary River system. This is one of surprisingly only 3 small colonies situated between the Adelaide and Wildman Rivers, which is an area of quite extensive floodplain. There are, however, large colonies east and west of this area. Nests with near fledged Darter young seen late June (1995), and at least one nest with eggs in mid August (1995). Recently fledged Nankeen Night Heron young in early July (1995). Nesting commencement time of small colonies may be later than for the same species in the large multi-species colonies.
Future surveying needed:	Low priority. Access not difficult and it has not been checked very often, but as it is such a small and insignificant colony intermittent checks linked to other work would be all that is necessary.

Colony identifier:	W016.
General location:	Floodplain between Daly and Finnis Rivers, north of Bob's Knob.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Downs Station).
Nesting habitat:	Paperbark.
Survey dates:	March 1993, January & March 1994, May & August 1995.
Years confirmed active:	1993, 1995.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(3). Royal Spoonbill (300+, May 1995), Australian White Ibis (50+, May 1995), Little Pied Cormorant (15+, May 1995).
Species probably breeding:	
Highest no. of birds recorded:	365+ (May 1995).
Highest estimated annual usage:	365+ (1995).
Allocated colony size:	101-500.
Months likely to be active:	March to June at least.
Photographs:	No.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	Reasonably important Royal Spoonbill, and small Australian White Ibis and Little Pied Cormorant, colony active on two seasons out of two checked. Likely to have just been about to commence the third season it was surveyed. Fairly spread out colony on the west edge of a patch of paperbark on the Reynolds River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. Late March (1993) visit showed some Royal Spoonbill but no Australian White Ibis in the area and with little nesting under way, while a mid May (1995) visit showed up to half grown spoonbill chicks and eggs of both spoonbill and ibis were present. A single late March (1999) visit showed 20+ Royal Spoonbill in breeding plumage and keen to remain at the nesting site, which had nests present, but had not started yet. It is likely they would have bred in that year.
Future surveying needed:	Medium priority. Reasonably significant Royal Spoonbill (and small Australian White Ibis and Little Pied Cormorant) colony which has not been ground checked. This would be advisable to be done in May, however two checks, one in April and one in June, would give better detail on species and status.

Colony identifier:	W017.
General location:	Floodplain between Daly and Finnis Rivers, west of Welltree Station.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Station).
Nesting habitat:	Reeds along edge of paperbark.
Survey dates:	March 1993, January & March 1994, May & August 1995.
Years confirmed active:	1993, 1995.
Years confirmed inactive:	Nil
Status:	Regionally high.
Species confirmed breeding:	(1). Australian White Ibis (1000+, May 1995)
Species probably breeding:	
Highest no. of birds recorded:	1000+ (May 1995).
Highest estimated annual usage:	1000+ (1995).
Allocated colony size:	1001-5000.
Months likely to be active:	March to August at least.
Photographs:	3052-3055.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats. Being an Australian White Ibis colony and often going well into August, some access by quad may be possible in the later part of it season.
Comments:	Reasonably important Australian White Ibis colony (by Top End standards) in trampled down reeds along the side of a patch of paperbark on the Reynolds River floodplain. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. Active in both seasons checked. Late March (1993) survey showed 1 to 3 eggs present indicating it had just commenced (with around 300 birds present) while a mid May (1995) survey showed 1000+ birds present which were still mostly on eggs. A mid August (1995) survey showed a few young too small to fly were still present. Consequently Australian White Ibis at this colony can be seen to have a quite an extended breeding season building up through the season and varying a little on starting time.
Future surveying needed:	Low priority. This colony is all Australian White Ibis and hence not in need of ground checking to ascertain species composition. However as it has not been checked in many seasons, aerial observations in May just to observe its regularity of use would be desirable.
Colony identifier:	W018.
General location:	Floodplain between Daly and Finnis Rivers, east of Bob's Knob.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Station).
Nesting habitat:	Sparse paperbark.
Survey dates:	May 1993, January 1994, May & August 1995, March 1999.
Years confirmed active:	1993, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(6). Darter, Little Black and Little Pied Cormorant (3000+, May 1995, March 1999), Little Black Cormorant (1000+, August 1995), Darter (825+, March 1999), Little Pied Cormorant (1290+, March 1999), Royal Spoonbill (300+, May 1995, March 1999), Australian White Ibis (200+, May 1995), Egret species (500+, May 1995), Great Egret (300, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	4000+ (May 1995).
Highest estimated annual usage:	4000+ (1995).
Allocated colony size:	1001-5000.
Months likely to be active:	March to August at least.
Photographs:	3056-3062, 5889.
Ground access:	Surrounded by deep water in the wet season, this colony could only be accessed by airboat or helicopter with floats attached. This latter method was used successfully in March (1999). The colony was ground checked in the dry season (mid August), by which stage the floodplains had dried back considerably and most of the colony had finished. At that time the ground under the colony was dry allowing easy walking. This is one of very few dry season visits to a floodplain colony and the conditions of ground access mentioned for this colony at this time are probably similar to the others.
Comments:	Large multi-species colony with a high level of significance for Little Pied and Little Black Cormorant, Darter (which were all well represented in the 3000+ estimates of May, 1995 and March, 1999) and Royal Spoonbill. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. It is located in several patches of sparse trees along the northern section of a large area of paperbark on the Reynolds River floodplain. One mid March (1994) survey showed no activity however other surveys show the colony active from at least April to late August. Near fledged young (egrets at least) were present in early May while Royal Spoonbill, Australian White Ibis, Darter and Little Black Cormorant at least still had nest young in mid August. Adult and recently fledged Pied Heron were seen feeding under the colony in mid August but so were Straw-necked Ibis which definitely do not breed there so it is probable that these Pied Herons bred elsewhere.
Future surveying needed:	Low priority. Very significant colony that has only been ground surveyed once, but this has given significant insight into this colony.

Colony identifier:	W019.
General location:	Finniss River floodplain, near Hatter Hill.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March & May 1993, January & March 1994, May, June & August 1995, March 1999.
Years confirmed active:	1993, 1994, 1995.
Years confirmed inactive:	1999.
Status:	National.
Species confirmed breeding:	(7+). Egret species (1500+, May 1995 including Intermediate and Great at least), Royal Spoonbill (400+, May 1995), Australian White Ibis (200+, May 1993), Little Pied Cormorant (1400+, May 1995), Little Black Cormorant (1400+, May 1995), Darter (80+, May 1995), Nankeen Night Heron (few, August, 1995).
Species probably breeding:	Little Egret.
Highest no. of birds recorded:	5000+ (May 1995).
Highest estimated annual usage:	5000+ (1995).
Allocated colony size:	1001-5000.
Months likely to be active:	February to June at least.
Photographs:	3063-3066, 5867.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats, although telescope observation is possible from high ground approximately 200 metres away.
Comments:	Large multi-species colony with particular significance for Little Pied and Little Black Cormorant and Royal Spoonbill. It is one of three significant colonies in close proximity to each other and amid an area between the Daly and Finniss Rivers with the largest cluster of colonies in the Top End. Located in an isolated single patch of paperbarks on the Finniss River floodplain. Active from at least March to late August. A March (1995) survey showed egret, cormorant and Darter in large numbers on eggs but only a few Royal Spoonbill. An August (1995) survey showed that at least some Royal Spoonbill were half grown but other species mostly finished and gone. No Australian White Ibis were seen to be present on either survey. Cormorant numbers would include some young. However a mid March (1994) estimate (without species breakdown) of combined cormorant and Darter numbers, when few if any young would have been present, was still in excess of 3000. May (1995) egret estimates are probably conservative as there were 5000+ egrets feeding in the immediate vicinity of the colony surrounds at the time of the survey, which were not included in the count. These would have almost certainly included birds from the colony.
Future surveying needed:	Medium priority. A highly significance colony which has had only one limited ground survey from about 200metres, which gave visual access to only one section of the colony. One survey in April or preferably two, one in March and one in May, should be done to provide information on species using the site and timing of nesting.
Colony identifier:	W020.
General location:	Finniss River floodplain, NE of Mt. Johns.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Paperbark and Mimosa pigra.
Survey dates:	March & May 1993, January & March 1994, May, June & August 1995, February 1996, March 1999.
Years confirmed active:	1993, 1994, 1995, 1996, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(10). Egret species (5000+, May 1995 - mostly Intermediate but also some Great Egrets and a smaller number of Little Egrets), Great Egret (1200, March 1999), Intermediate Egret (700, March 1999), Little Egret (100, March 1999), Little Black Cormorant (5800, March 1999), Little Pied Cormorant (2600, March 1999), Darter (1600, March 1999), Pied Heron (1000+, May 1995), Australian White Ibis (600+, May 1995), Royal Spoonbill (200+, May 1993, although 350+ were present in breeding plumage in March 1999 and looking like going to nest in the colony), Nankeen Night Heron (200+, August 1995) .
Species probably breeding:	
Highest no. of birds recorded:	13,500+ (May 1995). Estimate would include some fledged young. One of 12,000+ in March 1999 had few if any fledged young and did not include 350+ Royal Spoonbill that appeared to be going to nest there.
Highest estimated annual usage:	12,000+ (1999).
Allocated colony size:	10001-15000.
Months likely to be active:	February to August at least.
Photographs:	3067-3070, 5868-72, 5795-96.
Ground access:	Ground access is only possible using airboat or a helicopter with floats in the wet season. Some telescope observation is possible on one side of the colony however the distance of approximately 500 metres to the nearest high ground gives fairly limited view.

Comments:	Very large, multi-species colony, with high significance for a number of species. It is one of three significant colonies in close proximity to each other and amid an area between the Daly and Finnis Rivers with the largest cluster of colonies in the Top End. Active from mid February to late August at least in good years. Have no records of Cattle Egret, so mid February (1996) activity probably involves other egret species. The colony increased in size over the years of observation. The estimates for egrets and cormorants in May (1995) would have included young for all species, however the March (1999) estimates did not, and hence the colony can be confirmed as very large. In contrast the May estimates for Royal Spoonbill and Australian White Ibis would have had very few young present, and the March estimate was probably prior to them getting started. Whereas egret and cormorant species were on eggs in early March at least, there were still many 1000's of cormorant chicks in nests in late June. Consequently cormorants continued to lay eggs well after March unlike the egrets. By mid August (1995) Royal Spoonbill and Australian White Ibis had fledged many young but both species also still had young in nests and adults sitting on eggs. Australian White Ibis in particular remained on eggs in quite substantial numbers. The paperbark area of the colony was surrounded by an increasing amount of <i>Mimosa pigra</i> , in which the egrets, Australian White Ibis and Pied Heron in particular were nesting.
Future surveying needed:	Low priority. There has been sufficient survey to prove this a very significant colony.

Colony identifier:	W021.
General location:	North Peron Island, off the mouth of the Daly River.
Historical documentation:	None located in literature but reported by Victor Moffat (pers. comm.) as being active for many years. Information supplied in this report is all from author's surveys between 1990 and 1996.
Land tenure:	Aboriginal land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Sand, grass.
Survey dates:	March 1991, March, April, June, August & December 1992, February, March, May, June, July & September 1993, January, June & July 1994, March, May, June & August 1995, June & July 1996.
Years confirmed active:	1991, 1992, 1993, 1994, 1995.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(1). Pelican (5000+ adults, May 1995, 10000+ young, June 1995).
Species probably breeding:	No other species involved.
Highest no. of birds recorded:	5000+ (May 1995).
Highest estimated annual usage:	5000+ (1995).
Allocated colony size:	1001-5000.
Months likely to be active:	March to September.
Photographs:	3096, 3128-3249.
Ground access:	Requires helicopter or boat to access island, but subsequent access to colony is then simple and safe.
Comments:	Large and regularly used pelican colony with minimum of low 1000's of adults involved each season. This colony has been active for many years prior to these surveys according to a local traditional owner, Victor Moffat. Located in two or three sections at the southern end of the west side of North Peron Island on the primary dunes. Nests are on bare sand, some having a small grass nest. Part of the colony area is becoming overgrown with the weed <i>Callotropis</i> . As this has established itself in the colony area only, the pelicans may have brought it in themselves. A low woody bush, it is certainly spreading over the formerly open sand dune area preferred by the pelicans for nesting, and may need control in the future. This is the only colony known in the Top End and possibly one of the biggest regular colonies in the world for this species. A colony referred to in Storr(1977) as an unconfirmed one off Cape Cockburn, has not existed, at least since the early 1970's (Woerle pers. comm.). Another colony said to exist off Vanderlin Island has not been used in at least the last 60 years (Johnson, pers. comm.). The North Peron colony regularly commences in March and goes through until September. In 1992 the colony commenced but probably failed, due to disturbance - the area was devoid of birds and burnt out in June when it should have been in full swing after being seen to be well under way in April. In 1994 there was less than normal success again due to disturbance. The 1994 situation is described further in Chatto (1996).
Future surveying needed:	Low priority. There has been sufficient survey to prove this a very significant colony.

Colony identifier:	W022.
General location:	Old river channel of the Finnis River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March & May 1993, March 1994, May & August 1995, March 1999.
Years confirmed active:	1993, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.

Species confirmed breeding:	(3). Royal Spoonbill (700+, May 1995), Australian White Ibis (150+, May 1995), Darter (50+, May 1995).
Species probably breeding:	Little Black Cormorant.
Highest no. of birds recorded:	900+ (May 1995).
Highest estimated annual usage:	900+ (1995).
Allocated colony size:	500-1,000.
Months likely to be active:	March to August at least.
Photographs:	3071, 5866.
Ground access:	Ground access is only possible using airboat or a helicopter with floats in the wet season.
Comments:	Very significant Royal Spoonbill colony located in three sections within the one patch of paperbark on an old river channel of the Finnis River. It is one of three significant colonies in close proximity to each other and amid an area between the Daly and Finnis Rivers with the largest cluster of colonies in the Top End. Spoonbill eggs through to large chicks recorded in mid May (1995), indicating commencement in at least late March in 1995. This included at least one nest with 4 large chicks which, along with the long breeding season in many of the other colonies this year, indicates good breeding conditions during the 1995 season. There were still some Royal Spoonbill chicks present in mid August (1995). (In late March, 1999 they had not commenced laying, but appeared very close to starting). Darter were also present in August (1995) with at least one nest still active, but there were no longer Australian White Ibis remaining at this time.
Future surveying needed:	Medium priority. A highly significant Royal Spoonbill colony that has not been ground surveyed at an appropriate time. Because it is significant for one species, detailed ground observations are not required to clarify ambiguous aerial observations. However they are required to obtain better information on nesting timing. Consequently a survey in May, or preferably two, one in April and one in June, from airboat or helicopter with floats would be desirable.

Colony identifier:	W023.
General location:	Mary River floodplain NW of Wildman River station.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Marrakai Station).
Nesting habitat:	Paperbark.
Survey dates:	March 1997.
Years confirmed active:	1997.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Darter (40+, March 1997), Little Pied Cormorant (2+, March 1997)..
Species probably breeding:	
Highest no. of birds recorded:	40+ (March 1997).
Highest estimated annual usage:	40+ (1997).
Allocated colony size:	2-50.
Months likely to be active:	March/May at least.
Photographs:	No.
Ground access:	Access only by airboat or helicopter with floats.
Comments:	Small Darter colony with odd pair of Little Pied Cormorants (Peter Whitehead, pers. comm.), as active in 1997 and probably in previous years also. It is in two sections. This is one of surprisingly only 3 small colonies situated between the Adelaide and Wildman Rivers, which is an area of quite extensive floodplain. There are, however, large colonies east and west of this area.
Future surveying needed:	Low priority. Only a small colony with at least one ground visit done, and should only be visited again if in the area on other tasks.

Colony identifier:	W024.
General location:	Shoreline south of mouth of Finnis River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	March & July 1993, May & August 1995, February & June 1996, March 1999.
Years confirmed active:	1993, 1994, 1995, 1996, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(6). Intermediate Egret (600, March 1999), Great Egret (1000+, March 1993), Little Egret (75, March 1999), Little Pied Cormorant (600+, March 1993 & 1999), Australian White Ibis (100, March 1999), Pied Heron (900, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	3100+ (March 1999).
Highest estimated annual usage:	3100+ (1999).
Allocated colony size:	1001-5000.
Months likely to be active:	January to June at least.
Photographs:	No.
Ground access:	Access is possible by helicopter and walking in from the inland side at low tide. Access to the general area of the colony by boat would be possible at high tide but only for a brief period as a large area of mudflat quickly becomes exposed as the tide drops.

Comments:	Attempting to walk in from the coast at high tide would be difficult because of the soft mud and dangerous because of the crocodiles, thus not advised. Reasonably important mixed species colony located in mangroves on the coast just south of the Finniss River mouth. There are more Great Egrets in this colony compared to Intermediate Egrets, which is less common in most Top End colonies. Both egrets and cormorants had mostly young in mid March (1993), but eggs and young in March (1999). In January (1994) there were good number egrets started but not many cormorants, hence both groups but particularly the egrets are starting in January. (There were no Cattle Egrets seen). The colony was still active in mid June but had completely finished by a mid August check.
Future surveying needed:	Low priority. Not a highly significant colony that has been ground truthed twice, so any future ground work should probably only be done if in area.
Colony identifier: W025.	
General location:	Approximately 5 kilometres up a tributary entering the Adelaide River from the east and approximately 15 kilometres (by river) in from its mouth.
Historical documentation:	None found, site located by author during current surveys. Reference is made to another colony on the Adelaide River (see W944) however this was at the mouth and is no longer active. As this former location is within 20 kilometres of the current location it is unlikely that the two colonies existed simultaneously, and that the current colony involves a shift of breeding activity from the historical one. All information here is from author's surveys.
Land tenure:	Pastoral lease (Woolner Station).
Nesting habitat:	Mangroves.
Survey dates:	March 1991, February & March 1993, January & February 1994, May & August 1995, November 1999.
Years confirmed active:	1991, 1992, 1993, 1994, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(10). Egret species, all 4 (17000+, January 1994), Intermediate Egret (6000+, February 1994), Little Egret (4500+, March 1993), Great Egret (1500+, March 1993), Cattle Egret (9500+, February 1994), Pied Heron (2000+, February 1994), Little Pied Cormorant (600+, March 1993), Little Black Cormorant (150+, March 1993), Australian White Ibis (2000+, March 1993), Nankeen Night Heron (500+, March 1993), Royal Spoonbill (75+, August 1995).
Species probably breeding:	
Highest no. of birds recorded:	Approximately 20000 (January 1994).
Highest estimated annual usage:	20000+ (1993, 1994).
Allocated colony size:	15000+.
Months likely to be active:	November to late August at least.
Photographs:	3072-3095, 5541-51.
Ground access:	Access to this colony is difficult, even by helicopter as there is nowhere to land. The best access is by boating up the tributary. This can only be done in a short time span of high tide so consequently does not allow much time at the colony. Further, because it is high tide walking through the water under the colony is dangerous because of the many estuarine crocodiles, and so observations are essentially confined to views obtained from the boat in the narrow channel which runs through only a small section of the colony. This severely restricts observation of the majority of the colony.
Comments:	This is the largest colony in the Top End and is likely to have nearer 30000 birds. It is dominated by egrets, and is probably the largest, regular egret colony in Australia. It occupies a number of hectares of mangroves along and between tributaries of the Adelaide River on its eastern side. It appears to have grown in size over the years of observation. Estimation of total numbers is very difficult because of the large size and restricted access. Active from at least early November, when Cattle Egrets start nesting through to late August when Royal Spoonbills and Australian White Ibises are fledging the last young. Estimations of 17000+ egrets in late January (1994) had few flying Cattle Egret young but the colony may not yet have had the full numbers of other egret using the colony by then. A late March (1993) estimate of 15000+ (mostly egrets) had most Cattle Egrets finished and gone. Despite the difficulties of obtaining number estimates in this colony there is clearly a nationally significant number of Egrets using this colony. A ground check of small section of colony at the beginning of February (1994) showed a little over half the egrets were Cattle Egrets. They had mostly half grown to near full grown young, with the section of the tributary accessible having 3000+ chicks still in nests. The other egret species were mostly on 1 - 3 eggs. Cattle Egrets preferred nesting in the lower parts of the trees compared to the other egret species. Some Australian White Ibis were also present with eggs at this time (February 1994), however they were also observed in August (1995) with young. A ground check in mid March (1993) showed that Cattle Egret were finished and gone, while other egret species, Pied Heron and Little Pied Cormorants had chicks. Australian White Ibis at this time were seen to have both eggs and chicks.
Future surveying needed:	Medium priority. Although this colony has had some ground work done it has been confined to areas adjacent to the channel which samples only part of the colony. However as it is such a highly significant colony, further attempts should be made to establish methods of monitoring this colony in a more comprehensive way.

Colony identifier:	W026.
General location:	Along a billabong below a hill in the Muckaninnie Plains of the Arafura Swamp (Goyder River).
Historical documentation:	J. Wilson (pers. comm.). Site not observed during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	August 1996.
Years confirmed active:	1996, Wilson (pers. comm.).
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Royal Spoonbill (20+, August 1996), Australian White Ibis (40+, August 1996), Wilson (pers. comm.).
Species probably breeding:	
Highest no. of birds recorded:	60+ (30+ nests), August 1996, Wilson (pers. comm.).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys.
Allocated colony size:	2-50.
Months likely to be active:	June to October at least.
Photographs:	No.
Ground access:	Unknown, site not yet observed by author.
Comments:	Small Royal Spoonbill and Australian White Ibis colony which is one of a cluster of at least seven small to medium sized colonies in the Arafura wetlands area. Located on 20/8/96 by Joe Wilson with Royal Spoonbill having well grown young present at this time, so these nests appear to have not been commenced until late June. Whether these are just the last of others now finished and gone or just a small slightly later colony is unknown. The Australian White Ibis were potentially going to be active for even longer as they were on eggs at the time. Success of birds being on eggs as late as August may be a little dubious, although Wilson reported that the area was still fairly wet at that time. This was despite nothing exceptional in the way of dry season rains for that year.
Future surveying needed:	Low priority. Only a small colony which, considering the general area, is probably not easily accessible. Should only be checked if in the area on other tasks.
Colony identifier:	W027.
General location:	Mary River, south of Shady Camp.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Opium Creek Station).
Nesting habitat:	Paperbark.
Survey dates:	April 1993, May 1995.
Years confirmed active:	1993.
Years confirmed inactive:	1995.
Status:	Regionally high.
Species confirmed breeding:	(4). Royal Spoonbill (50+, April 1993), Little Pied Cormorant (50+, April 1993), Pied Cormorant (50+, April 1993), Little Black Cormorant (50+, April 1993)
Species probably breeding:	
Highest no. of birds recorded:	100+ (April 1993).
Highest estimated annual usage:	100+ (1993).
Allocated colony size:	101-500.
Months likely to be active:	April at least.
Photographs:	No.
Ground access:	Ground access uncertain as this colony has not been ground checked. Its position on the floodplain indicates that a substantial area of water would have to be crossed during the wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	Small colony located in two small patches of paperbark on the floodplain. Found during fixed wing survey in April 1993. It has only had one other check since, in May 1995, when it was found not to be active. This is one of surprisingly only 3 small colonies situated between the Adelaide and Wildman Rivers, which is an area of quite extensive floodplain. There are, however, large colonies east and west of this area.
Future surveying needed:	Medium priority. Not a big colony but as it may have a higher percentage of Pied Cormorants compared to other inland cormorant colonies a more detailed examination is desirable.
Colony identifier:	W028.
General location:	North of Mt. Hooper near the mouth of the South Alligator River.
Historical documentation:	Braithwaite and Estbergs (1982). Information supplied in this report is from this source and authors surveys.
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Rainforest.
Survey dates:	March 1993.
Years confirmed active:	1980, 1981, 1993.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(1). Nankeen Night Heron (difficult to estimate but at least many hundreds, March 1993).

Species probably breeding:	
Highest no. of birds recorded:	Many hundreds at least (March 1993).
Highest estimated annual usage:	Unknown due to limited surveys.
Allocated colony size:	1001-5000.
Months likely to be active:	March at least.
Photographs:	No.
Ground access:	Not ground checked during these surveys, but it was in 1981 by Braithwaite and Estbergs. Access is very difficult from the South Alligator River. A vehicle track passes near the western side of the colony allowing walking access, however the accessibility of this track for vehicles in the wet season is not known.
Comments:	Significant Nankeen Night Heron colony that was located in 1981. Also active in 1993, it may have been active for many years. Several of the other confirmed Top End night heron breeding sites were adjacent to sites of other species breeding and some mixed among other species, but this was the only site located in these surveys with this species breeding on its own. However some of the many other night heron roosts that were also recorded in these surveys but not able to be confirmed as breeding sites may also be single species night heron breeding sites. This colony is approximately 400 by 200 metres. Originally located in 1981 with an estimate of 2000 night herons breeding. A visit in mid January of that year showed the colony had not yet begun, with most of the nests from the previous year having fallen down and no night herons present. (This may indicate that the birds do not always roost in the same area outside the breeding season). By mid March of that year most nests contained half grown young, but a small number of nest contained eggs or well feathered young. Adults were flying east, apparently to feed some distance from the colony. Nests of this colony are in the lower canopy, as are the birds, and are not easily visible from the air. Only checked once at the appropriate time (March 1993), during this survey period. This visit was from the air and although a number of birds were disturbed by repeated fly overs, actual breeding could not be confirmed from the air, even though highly likely.
Future surveying needed:	High priority. A highly significant Nankeen Night Heron colony which is very difficult to assess from the air, and which has not been ground checked during these surveys. Requires at least one ground truthing survey done in April, or preferably two, one in March and one in May to be done over a few seasons to assess the numbers of Nankeen Night Heron there and the regularity of use.
Colony identifier:	W029.
General location:	Along the Wildman River just in from the mouth.
Historical documentation:	None found, site located by author during current surveys. Reference is made to another colony on the Wildman River (see W919) however this was approximately 5 kilometres in from its mouth and appears to no longer be active. As this historical reference is quite close to the current location it is highly unlikely that the two colonies existed simultaneously. The current colony probably involves the same regional populations of birds, and it is likely that it is just a small shift from the historical one.
Land tenure:	Part pastoral lease (Carmor Plains Station), and part Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Mangroves.
Survey dates:	March 1991, March 1993, January 1994, May 1995.
Years confirmed active:	1991, 1994, 1995 (1998, Andrew Wellings pers. comm. and 1999, Alex Julius, pers. comm.).
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(8). Intermediate Egret (4,700+, January 1994), Great Egret (1400+, January 1994), Little Egret (140+, January 1994), Cattle Egret (700+, January 1994), Pied Heron (1000+, March 93 and January 1994), Nankeen Night Heron (1000+, March 1993), Little Pied Cormorant (800+, March 1993), and Australian White Ibis (1000+, March 1993).
Species probably breeding:	
Highest no. of birds recorded:	9300+ (March 1993).
Highest estimated annual usage:	9300+ (1993).
Allocated colony size:	5001-10000.
Months likely to be active:	January to May at least.
Photographs:	3097-3101.
Ground access:	The best method of access on foot from helicopter landing on the inland side of the colony at low tide, however some vision of part of the colony is possible by boat from the river.
Comments:	Large and regular colony along the Wildman River around the second bend in from the mouth. The colony is on both sides of the river, which runs east/west at this point, but the majority is on the southern side extending further upstream, around the bend in better years. Colony dominated by egrets, especially early in the season. Three of the Egret species on eggs in late January (1994) check. It is unknown whether the small number of Cattle Egrets present were also on eggs. Pied Herons were also on eggs in late January (1994) in good numbers. The breeding stage of the Little Pied Cormorants and Australian White Ibis present is not known, however they birds of both species were sitting on nests. Nankeen Night Herons were not present in January (1994) but were in March (1993) so unless they did not nest in 1994, they appear to start later than the above species. The colony was still

active in a late May (1995) check, with “thousands” of birds still present. Late January (1994) and late March (1993) air and ground estimates of egrets (other than Cattle Egrets) were similar in number, and as few young were present on either occasion, these would be close to adults only estimates. No Cattle Egrets were present in late March (1993) so they had either finished or did not nest that year, however Cattle Egrets were never reported as numerous in this colony.

Future surveying needed: Low priority. Certainly a significant colony but has been reasonably well assessed.

Colony identifier:	W030.
General location:	Low Rock, approximately 45 kilometres out to sea to the east of the mouth of the Roper River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	December 1993, March, May & September 1994.
Years confirmed active:	1994.
Years confirmed inactive:	Nil.
Status:	Regionally High.
Species confirmed breeding:	(1). Pied Cormorant (100+, May 1994).
Species probably breeding:	Nil.
Highest no. of birds recorded:	100+ (May 1994).
Highest estimated annual usage:	100+ (1994).
Allocated colony size:	101-500.
Months likely to be active:	March to June at least.
Photographs:	294 & 295.
Ground access:	Access to island by helicopter or boat is feasible, then access to colony by foot is simple and safe.
Comments:	Small to medium sized Pied Cormorant colony in the stand of mangroves growing in the middle of an essentially sand and rock island which also has large number of breeding seabirds. (S063, to be detailed in a future report in this series dealing with significant seabird breeding colonies). Aerial and ground counts in early May (1994) showed most of the 50 - 60 nests with 2 to 4 eggs. Two nests with two eggs were also observed from the air in late September (1994) but these were probably added eggs from the earlier nesting. Ten birds were observed from the air in a survey in late March so it appears that nesting begins in about April.
Future surveying needed:	Low priority. Single species colony that has been surveyed from the ground. Future surveys to confirm frequency of use could be done in conjunction with monitoring of the seabird colonies on the same island, which are highly significant.

Colony identifier:	W031.
General location:	Haul Round Island off Maningrida (mouth of Liverpool R.).
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April & November 1993, June 1995, February & June 1996.
Years confirmed active:	1993, 1994 and 1996.
Years confirmed inactive:	Nil.
Status:	Regionally High.
Species confirmed breeding:	(1). Pied Cormorant (200+, May 1994).
Species probably breeding:	Nil.
Highest no. of birds recorded:	200+ (May 1994).
Highest estimated annual usage:	200+ (1994).
Allocated colony size:	101-500.
Months likely to be active:	April to June at least.
Photographs:	3126 & 3127.
Ground access:	Needs helicopter or boat to get to island but landing and subsequent access to the colony is simple and safe.
Comments:	Reasonably sized, apparently regular Pied Cormorant colony in mangroves on a rocky area a little to the east of the main section of Haul Round Island which is a major seabird breeding colony (S012). A 1994 May survey had 100+ nests with eggs (mostly) through to 3 near grown young. David Bond (pers. comm.) reports that the island has had good, regular seabird and cormorant breeding for the 20 years, despite regular egg collecting of the seabird eggs by Aboriginal residents from the mainland.
Future surveying needed:	Low priority. Single species colony that has been sufficiently ground checked to ascertain species and numbers. Future surveys to confirm frequency of use could be done in conjunction with monitoring of the seabird colonies on the same island, which are highly significant.

Colony identifier:	W032.
General location:	Small tributary of the Tomkinson River, approximately 35 kilometres SSE of Maningrida (mouth of Liverpool R.).
Historical documentation:	R. Baramala (pers. comm.). Site not observed during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(1+). Cormorant species, (Baramala, pers. comm.).
Species probably breeding:	Little Pied and Little Black Cormorant, Darter.
Highest no. of birds recorded:	Unknown
Highest estimated annual usage:	Unknown.
Allocated colony size:	2-50.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown, not visited.
Comments:	Reported as a cormorant colony on a creek. No further information at this stage.
Future surveying needed:	Low priority. Although the size and nature of this colony is unknown, it is reported as a small colony. A visit to the site should be included with other surveys needed to be done on the region.
Colony identifier:	W033.
General location:	Located on an old river course on the east of South Alligator River, approximately 15 kilometres from its mouth.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land managed as part of Kakadu National Park.
Nesting habitat:	Mangroves.
Survey dates:	March 1993, January 1994, May 1995.
Years confirmed active:	1993, 1994, 1995.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(8). Intermediate Egret (4000+, January 1994), Cattle Egret (3500+, January 1994), Great Egret (1800+, January 1994), Little Egret (700+, January 1994), Pied Heron (1500+, March 1993 and January 1994), Little Pied Cormorant (1400+, March 1993), Little Black Cormorant (75+, March 1993), Australian White Ibis (1000+, March 1993).
Species probably breeding:	
Highest no. of birds recorded:	12000+ (January 1994)
Highest estimated annual usage:	13000+ (1994 - assuming Australian White Ibis built up later in season to similar numbers that nested in the 1993 season).
Allocated colony size:	10001-15000.
Months likely to be active:	January to May at least.
Photographs:	3102-3104.
Ground access:	Access on foot from a helicopter that is able to land beside the colony is good. This best done at low tide but not essential. Access on foot from boat in South Alligator River is possible but requires a walk of several kilometres. Access is also possible on quad bikes from vehicle track on high ground to east, but this need checking.
Comments:	A large multi-species colony dominated by egrets. Possibly formed after a large, regularly active colony (W908) which was a little further up the South Alligator River ceased being used in 1988 (Schultz, 1989). Tour boat disturbance is likely to have influenced the desertion of this former colony. The current colony was not located until 1993. Pied Heron, Australian White Ibis and all species of egrets and cormorants, were on eggs in a late January 1994, while in late March 1993 most birds of all species except Australian White Ibis had chicks. Australian White Ibis had eggs only and were in much larger numbers in the March compared to the January surveys. No Nankeen Night Herons have been observed in this colony, however it is not far from a large night heron colony (W028) near the mouth of the South Alligator River.
Future surveying needed:	Low priority. Certainly a significant colony but one that has had reasonably detailed observation.
Colony identifier:	W034.
General location:	Coopers Creek, which runs off the East Alligator River near its mouth.
Historical documentation:	Reported as active 1972 to 1975 but not in 1981 (Woerle, F. pers. comm.). Unsure of status between 1976 and 1980. Further reported as active in 1982 (Morton et al 1991) and 1988 (Schultz, 1989), but no references have been found to document status between these years, or for 1989 and 1990. Information supplied here is all from author's surveys, unless referenced.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1991, March, April, August & December 1992, February & March 1993, January 1994, May 1995.

Years confirmed active:	1991, 1992, 1993, 1994, 1995 (1996, 1997, 1998 & 1999, Andrew Wellings, pers. comm.).
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(11). Intermediate Egret (4800+, January 1994), Cattle Egret (3000+, December 1992), Great Egret (960+, January 1994), Little Egret (240+, January 94), Pied Heron (2000+, March 1993 & January 1994), Little Pied Cormorant (500+, January 1994), Little Black Cormorant (20+, March 1993), Darter (5+, March 1993), Australian White Ibis (500+, March 1993), Nankeen Night Heron (500+, March 1993), Royal Spoonbill (1+, 1991).
Species probably breeding:	
Highest no. of birds recorded:	10000+ (January 1994).
Highest estimated annual usage:	11000+ (1994 – assuming Australian White Ibis and Nankeen Night Heron numbers built up later in season towards the numbers that nested in the 1993 season).
Allocated colony size:	5001-10000.
Months likely to be active:	December to June at least.
Photographs:	3105.
Ground access:	Access on foot from a helicopter landing beside the colony is good, though better at low tide. Access on foot from boat in Coopers Creek possible but harder. As colony is along river observation direct from boat would also be good.
Comments:	Large multi-species colony located on the eastern side of Coopers Creek 2 kilometres upstream from its junction with the East Alligator River. This colony along with colony W035, the large colony along the East Alligator River, which is only about 5 kilometres away has been active for at least the last 10 years without missing a season. This is obviously very important. The Coopers Creek colony has been present from at least 1972 though may have had some years of inactivity. Cattle Egrets were observed to be nesting in large numbers by mid December 1992, but none were still present by late March 1993, when other egret species mostly had chicks. Similarly in the 1993/4 season, a late January check showed Cattle Egrets with young of various ages through to fledged, but the other egret species just with eggs. Consequently it appears this colony is one in which the Cattle Egrets begin and finish earlier than the other species. F. Woerle (pers. comm.) reports Little Egret chicks hatching 1 March in 1975 and egret chicks of all stages from newly hatched to near flying on 29 March in 1975. Late March (1993) had Pied Heron, Little Pied and Little Black Cormorants and Darter with mostly young while a January (1994) check showed these species to be on eggs. F. Woerle (pers. comm.) also reports feathered Pied Heron and Cormorant young in mid March (1975) but also some still with eggs in mid April. Nankeen Night Heron were present in the colony in late March (1993) but their nesting state was not recorded. Australian White Ibis were on eggs at this time whereas in late January (1994) there were only a few that had arrived. F. Woerle (pers. comm.) reports Australian White Ibis beginning to lay eggs in late March and that they usually breed after other species have finished - taking over and enlarging their nests. However he also reports eggs through to large Australian White Ibis chicks mid April (1975), suggesting some earlier breeding, which I have also found in other colonies.
Future surveying needed:	Low priority. Certainly a significant colony but has been reasonably well assessed.
Colony identifier:	W035.
General location:	Along the banks of the East Alligator and extending up a tributary, approximately 15 kilometres in from the mouth and on the southern side.
Historical documentation:	Well known and documented colony active since 1972 at least. All information supplied here is from author's surveys, unless referenced.
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Mangroves.
Survey dates:	April 1994, March, April & December 1992, February & March 1993, January 1994, May 1995.
Years confirmed active:	1991, 1992, 1993, 1994, 1995, (1996, 1997 & 1998, Andrew Wellings, pers. comm. and 1999, Alex Julius, pers. comm.).
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(10). Intermediate Egret (4500+, March 1993), Great Egret (2400+, January 1994), Little Egret (300+, March 1993) [Morton reports 1000 Little Egrets in March 1982], Cattle Egret (150+, January 1994) [N.R.S. reports 3500+ Cattle Egrets in January 1980], Little Pied Cormorant (1600+, March 1993), Little Black Cormorant (360+, March 1993), [Morton reports 1600+ Little Black Cormorants March 1982], Darter (40+, March 1993), [Morton reports 100+ Darter March 1982], Pied Heron (2000+, March 1993), [Morton reports 3000+ Pied Heron March 1982], Australian White Ibis (1500+, March 1993), Nankeen Night Heron "a few" (April 1992) [Schulz reports 24 Nankeen Night Heron April 1988].
Species probably breeding:	Royal Spoonbill.
Highest no. of birds recorded:	11500+ (March 1993).
Highest estimated annual usage:	The 1993 season would have had numbers a little higher than the above (March) figure which does not include Cattle Egrets.
Allocated colony size:	10001-15000.
Months likely to be active:	December to June at least.
Photographs:	3106-3108.

Ground access:	Access on foot from a helicopter landing beside the colony is good, though best at low tide. Access on foot from boat in East Alligator River possible but harder. As colony is along river observation direct from boat would be good.
Comments:	A large multi-species colony that is located about 5 kilometres from another large multi-species colony (W034) on Coopers Creek. Both of these colonies have been large and active for each of the last ten years at least, without missing a season. This is obviously very important. This colony has been active since 1972 at least, with no references found to indicate failure to nest in any of the years through to 1999. Counts of birds were done with few if any young fledged and so represent estimates of adults in the colony. A mid December (1992) survey showed no activity, a mid February survey (1993) showed nesting well under way, and a late March (1993) survey showed a larger number of birds now involved. This sequence indicates a continued build up of numbers between February and March. Surveys done around the end of March over three consecutive years showed the size of the colony was large in 1991, small in 1992 and large again in 1993. This coincides with a delayed and relatively dry wet season in 1992 and fair to good wets in the other two years. A large number of Great Egrets compared to Intermediate Egrets were seen in January 1994. This is unusual for this colony and most colonies in the Top End and may reflect bias due to the ground count taking in only a portion of the colony that may have been dominated by Great Egrets. Another possibility is that Great Egrets may have started earlier. Australian White Ibis were again later nesters than the other species, being mostly on eggs when the other species were with young, and had not arrived when these other species were on eggs. These Australian White Ibis still have lots of chicks in late May, when other species have fledged most of their young. F. Woerle reported a small number of Royal Spoonbill in the colony in March 1981 for the first time in his experience but, was unable to confirm nesting.
Future surveying needed:	Low priority. Certainly a significant colony but has been reasonably well assessed.

Colony identifier:	W036.
General location:	Along a tributary of Salt Water Creek, near Murgarella Creek.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1993, January 1994, May 1995.
Years confirmed active:	1993, 1995.
Years confirmed inactive:	1994.
Status:	National.
Species confirmed breeding:	(6). Intermediate Egret (1800+, May 1993), Great Egret (500+, May 1993), Little Egret (120+, May 1993), Pied Heron (1000+, May 1993), Little Pied Cormorant (20+, May 1993), and Australian White Ibis (20+, May 1993).
Species probably breeding:	
Highest no. of birds recorded:	3600+ (May 1993), however this would include flying young. No estimates have been made for this colony that would not have included flying young.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	1001-5000.
Months likely to be active:	March to May at least. Surveys of colony when active, were only done in the month of May.
Photographs:	No.
Ground access:	Access is possible on foot from a helicopter landing close to the colony. This is best done at low tide. A view of the colony is also possible by boating up Salt Water Creek.
Comments:	Multi-species colony dominated by egrets and Pied Herons. Located about 20 kilometres north of the two large colonies around the East Alligator River (W034 & 35). This colony is in an area surrounded by saline mudflat and mangrove lined channels, with no floodplain in the immediate vicinity. It may have been a new colony in 1993 as it is also close to the coast where numerous surveys had been done in previous years without it being sighted. Few surveys have been done of this colony and none done at the appropriate time to get a maximum size.
Future surveying needed:	Medium priority. This is a reasonably significant colony that has had only one ground check done. Thus a further ground check in April, or preferably two, one in March and one in May, would be desirable.

Colony identifier:	W037.
General location:	Upstream section of Murgarella Creek.
Historical documentation:	Not documented, located by author during current surveys. Later informed by Tony Spring (pers. comm.) that this colony was active in late 1980's. All information supplied here is from author's surveys, unless referenced.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	March 1993, January 1994, May 1995.
Years confirmed active:	1993, 1994, 1995.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(9+). Egret species (2000+, March 1993, including some Intermediate and some Great Egret at least), Cattle Egret (1200+, January 1994), cormorant species (750+ March

Species probably breeding:	1993, including mostly Little Pied and some Little Black Cormorant), Pied Heron (750+, March 1993), Australian White Ibis (200+, March 1993) and Nankeen Night Heron (2+, March 1993), Royal Spoonbill (some present, May 1995).
Highest no. of birds recorded:	Little Egret. 3700+ (March 1993). Colony was larger in 1995, but no estimate of numbers was made then.
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys, but likely to be a little higher than the above figure as Cattle Egrets may have finished breeding and by the March 1993 survey (1220+ used the colony in 1994), and Australian White Ibis numbers may have increased later in this 1993 season.
Allocated colony size:	1001-5000.
Months likely to be active:	January to June at least.
Photographs:	3109-3115.
Ground access:	Have landed helicopter in wet season beside colony but may not be able to do a height of wet when airboat or helicopter with floats may be required. A difficult site to survey because of the water beneath it and the large number of crocodiles.
Comments:	Fairly large multi-species colony first located in my surveys in 1993 but known to be active in late 1980's at least (Spring, pers. comm.). Sited about 25 kilometres inland, in a mangrove fringed upstream section of Murgarella Creek as it runs through extensive floodplain. Colony appears to have increased in the area that it covers from the 1993 to the 1995 season. There is also a 200+ Black Flying Fox roost immediately adjacent to it, and these two features have attracted a healthy population of crocodiles.
Future surveying needed:	Medium priority. Reasonably significant colony that has had only one ground check done. A further ground check on this one to better assess its status would be desirable if in the area.

Colony identifier:	W038.
General location:	Along the banks of a creek between the Wearyan River and the Qld/NT border.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Seven Emu Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995, May 1999.
Years confirmed active:	1995, 1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(9+). Australian White Ibis (1000, May 1999), Pied Heron (100+, May 1995), Darter (2+, May 1995), Intermediate Egret (1400, May 1999), Great Egret (400, May 1999), Little Egret (100, May 1999), Nankeen Night Heron (1000, May 1999), Little Pied Cormorant (30, May 1999), Royal Spoonbill (150+, May 1999).
Species probably breeding:	Little Black Cormorant.
Highest no. of birds recorded:	4180 (May 1999).
Highest estimated annual usage:	Unable to say due to insufficient temporal coverage of surveys.
Allocated colony size:	1001-5000.
Months likely to be active:	May at least.
Photographs:	No.
Ground access:	Possible to land near colony but difficult view from ground due to access difficulties. Colony is along creek and close to coast, so high tide boat access is presumably possible.
Comments:	Regionally significant mixed species colony that was the only such colony located during these surveys that was between the eastern side of Port McArthur and the Queensland border. There is also another site a little further upstream (16 13S 137 39E) which may have been a previously used as a breeding or roost site.
Future surveying needed:	High priority. Needs aerial confirmation of seasonal regularity and ground truthing (via boat) to further assess status.

Colony identifier:	W039.
General location:	On the coast between the Liverpool and Goyder Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1993, May 1995, June 1996, December 1998, March 1999.
Years confirmed active:	1993, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(5). Intermediate Egret (500, March 1999), Little Egret (350, March 1999), Great Egret (100, March 1999), Cattle Egret (50, March 1999), Pied Heron (1000, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	2000 (March 1999).
Highest estimated annual usage:	2000 (1999).
Allocated colony size:	1001-5000.
Months likely to be active:	April to May at least.
Photographs:	3116, 5833-34, 5839-42.
Ground access:	Direct ground access uncertain but can land helicopter on opposite side of creek. Colony

Comments:	on coast so boat access possible, best at high tide. Small multi-species coastal colony, first located in 1993. It was not seen when this section of the coast was flown in 1992 for the first time. Only ground checked on one occasion (March 1999) from opposite side of creek where approximate species breakdown done which showed all 4 species of egret and pied heron the only species using the colony at that time. Colony was not active in December of 1998 so the small amount of cattle egret breeding appeared to coincide with the timing of the other egret species rather than earlier as is the case with many larger cattle egret breeding sites.
Future surveying needed:	Medium priority. Not a large colony and one that has been roughly ground checked on one occasion from the opposite bank, but would benefit from a boat survey during the season to better assess status.

Colony identifier:	W040.
General location:	Just in from the coast in the south-west corner of Buckingham Bay (NE Arnhem Land) near the Kalarwoi River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1993, April 1994, March 1995, January & July 1996, December 1998, March and June 1999.
Years confirmed active:	1993, 1994, 1995, 1996, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(6). Intermediate Egret (2250, March 1999), Little Egret (450, March 1999), Great Egret (240, March 1999), Cattle Egrets (60, March 1999), Pied Heron (2000, March 1999), Night Heron (500, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	5500 (March 1999).
Highest estimated annual usage:	5500 (1999).
Allocated colony size:	5001-10000.
Months likely to be active:	January to May.
Photographs:	5626, 5813-17
Ground access:	Easily accessible on foot from a helicopter landing nearby. Visibility from a boat in the river limited as the colony is inland a bit
Comments:	Significant egret and Pied Heron colony located in extensive mangroves just in behind the coastline at the southern end of Buckingham Bay. One of only 2 colonies located during these surveys to be in the area from the eastern side of the Arafura Swamps through NE Arnhemland around to Blue Mud Bay. This area, particularly the country south of Buckingham and Arnhem Bays contains quite a large amount of wetland. This colony was dominated by Intermediate, Great and Little Egrets but small numbers of Cattle Egret also breed here. The latter timing their breeding to be with the other egrets rather than earlier as in other large Cattle Egret breeding colonies. A late January (1996) survey showed 1000+ egrets present with no Cattle Egrets reported, then a December (1998) surveyed showed no birds to have started yet, even though the colony was active in 1999. Colony was found to have finished by late June 1999 after being large and active in that season.
Future surveying needed:	Medium priority. Not a large colony and one that has been ground checked on one occasion, but could do with another survey to obtain more information on Cattle Egret and Nankeen Night Heron status.

Colony identifier:	W041.
General location:	Arafura Swamp (Goyder R.), approximately 5 kilometres east of Old Arafura Station.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhem Land A.L.T.).
Nesting habitat:	Freshwater mangroves and reeds
Survey dates:	April 1993, May 1995.
Years confirmed active:	1993, 1995.
Years confirmed inactive:	Nil.
Status:	Regionally High.
Species confirmed breeding:	(2). Royal Spoonbill (150+, April 1993), Australian White Ibis (20+, April 1993).
Species probably breeding:	
Highest no. of birds recorded:	170+ (April 1993).
Highest estimated annual usage:	Unknown due to limited surveys. There were an additional 200+ Australian White Ibis in close proximity to the colony in the April 1993 aerial count that may have also been preparing to nest.
Allocated colony size:	101-500.
Months likely to be active:	April to June at least.
Photographs:	5461.
Ground access:	Access uncertain, has not been ground visited to date. As the colony is in trees along a water course, vision from a boat would be good, but it is unknown how easy it would be to get a boat there. Ground access to the colony from helicopter would also probably be difficult in the wet season.

Comments: Medium sized Royal Spoonbill colony in freshwater mangroves and small Australian White Ibis colony in reeds adjacent each other along a water course on the Arafura floodplain. The colony is one of a cluster of at least seven small to medium sized colonies in the Arafura Swamps. Colony has only been aerially checked twice and has not been ground checked. Active in late April (1993) and mid May (1995).

Future surveying needed: Low priority. Although not ground checked to date, it is only a small colony and should only be checked if already in the general area.

Colony identifier: W042.

General location: Small inlet just east of Pelican Spit, east of the Wearyan River mouth.

Historical documentation: None found, site located by author during current surveys.

Land tenure: Pastoral lease (Greenbank Station).

Nesting habitat: Mangroves.

Survey dates: May 1995 and 1999.

Years confirmed active: 1995, 1999.

Years confirmed inactive: Nil.

Status: National.

Species confirmed breeding: (7+). Little Egret (1500, May 1999), Intermediate Egret (300, May 1999), Great Egret (200, May 1999), Pied Heron (75+, May 1995), Cormorant species including black and white species, (75+, May 1995), Australian White Ibis (500, May 1999), Nankeen Night Heron (500, May 1999), Little Pied Cormorant (50+, May 1995).

Species probably breeding: Little Black Cormorant, Royal Spoonbill.

Highest no. of birds recorded: 3000 (May 1999).

Highest estimated annual usage: 3000 (1999).

Allocated colony size: 1000-5000.

Months likely to be active: March to May at least.

Photographs: 6078-79.

Ground access: Colony is in a mangrove island, so direct ground access is only possible by boat at high tide. A helicopter can land on the adjacent high ground beside river, but as behind riparian mangroves colony can only be viewed by climbing through thick mangroves. This best done at low tide but viewing position is in mangroves over-hanging river and visibility not good.

Comments: Significant, mixed species colony for the SW Gulf of Carpentaria area. It is one of 5 colonies along the coast in the Port McArthur area and also the only one for which Pied Herons have been recorded in this area.

Future surveying needed: High priority. Needs aerial confirmation of seasonal regularity and boat visit to better assess species status.

Colony identifier: W043.

General location: Muckaninnie Plains in the Arafura Swamp, east of the Goyder River.

Historical documentation: None found, site located by author during current surveys.

Land tenure: Aboriginal land (Arnhem Land A.L.T.).

Nesting habitat: Tall sparse paperbark.

Survey dates: May 1995, March 1999 (though this latter visit was probably too early for Royal Spoonbills to have commenced breeding).

Years confirmed active: 1995.

Years confirmed inactive: Nil.

Status: Regionally high.

Species confirmed breeding: (1). Royal Spoonbill (300+, May 1995).

Species probably breeding:

Highest no. of birds recorded: 300+ (May 1995).

Highest estimated annual usage: 300+ (1995).

Allocated colony size: 101-500.

Months likely to be active: May at least.

Photographs: 3122, 5820.

Ground access: Access uncertain, has not been ground visited to date. Appears only form of access in the wet season would be by airboat or helicopter with floats.

Future surveying needed: Medium priority. Although a significant Royal Spoonbill colony, access will be complex. It should be aerially checked to ascertain seasonal regularity and precise position. Ground surveying would also be desirable, but only if able to be combined with other work in the area.

Colony identifier: W044.

General location: On a billabong in the Arafura Swamp (Goyder River).

Historical documentation: None found, site located by author during current surveys.

Land tenure: Aboriginal land (Arnhem Land A.L.T.).

Nesting habitat: Paperbark.

Survey dates: May & June 1995, June 1996.

Years confirmed active: 1995 and 1996.

Years confirmed inactive: Nil.

Status: Regionally High.

Species confirmed breeding:	(4+). Egret species, (small group, 1995), Little Pied Cormorant (100+, 1996), Little Black Cormorant (50+, 1996) and Darter (<20, 1996).
Species probably breeding:	Great, Little and/or Intermediate Egret.
Highest no. of birds recorded:	160+ (1996).
Highest estimated annual usage:	160+ (1996).
Allocated colony size:	101-500.
Months likely to be active:	May to July at least.
Photographs:	No.
Ground access:	Not accessed from the ground to date by author, but has been viewed by the manager of Old Arafura Station, as colony is close by the homestead. A fixed wing aircraft landing strip is nearby.
Comments:	Small colony in one or two large paperbarks on a billabong adjacent to the Old Arafura Station homestead. The colony is one of a cluster of at least seven small to medium sized colonies in the Arafura Swamps. Limited information obtained by the author's aerial surveys as only flown over once. Information here is mostly from the station manager and his wife (Mr and Mrs J. Wilson). They reported there were approximately 80 nests used by cormorants (mostly Little Pied) during 1996, and in 1995 low hundreds of birds used the colony. This included at least one group of egrets. Aerial survey by the author in May 1995 recorded 500+ egrets in these and nearby trees, during the middle of the day, but it was not possible to confirm how many were nesting.
Future surveying needed:	Low priority. Not a very large colony but one that should be ground surveyed if in the area between March and July. Also contact should be kept with station manager for details of breeding activities. This can be done by phone.

Colony identifier:	W045.
General location:	West bank of the Blythe River, between the Liverpool and Goyder Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1995, December 1998, March 1999.
Years confirmed active:	1995, 1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(4). Great Egret (900, March 1999), Intermediate Egret (50, March 1999), Little Egret (50, March 1999), Little Pied Cormorant (1000, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	2000 (March 1999).
Highest estimated annual usage:	2000 (1999).
Allocated colony size:	1000 - 5000.
Months likely to be active:	March to May at least.
Photographs:	3123, 5843.
Ground access:	Possible to land a helicopter adjacent to colony but difficult to get into or view easily, best access would be from a boat in the river.
Comments:	Significant Little Pied Cormorant and Great Egret colony, with lesser numbers of other species, situated on a bend of the Blythe River not far in from its mouth.
Future surveying needed:	Medium priority. Not well assessed from the ground as yet, and requires a boat visit to better assess status

Colony identifier:	W046.
General location:	Western bank of the Adelaide River, approximately 15 kilometres in from its mouth.
Historical documentation:	B. Ottley (pers. comm.) Site not observed during current surveys.
Land tenure:	Pastoral lease (Koolpinyah Station).
Nesting habitat:	Mangroves.
Survey dates:	June 1995.
Years confirmed active:	1995.(Ottley, pers. comm.).
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Little Black Cormorant (150+ June 1995), Darter (<20 June 1995).
Species probably breeding:	
Highest no. of birds recorded:	160+, June 1995 (Ottley, pers. comm.).
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	101-500.
Months likely to be active:	June at least.
Photographs:	No.
Ground access:	The colony is along the banks of the Adelaide River so could be readily viewed from a boat, but it is not known whether access on foot from a helicopter landing nearby is possible.
Comments:	Small cormorant and Darter colony located near the mouth of the Adelaide River which had not been noticed there prior to 1995 by Ottley, (pers. comm.). This possibly new, small colony is less than 10 kilometres from the other colony near the Adelaide River (W025).
Future surveying needed:	High priority. Not a large colony but one which is not hard to access and that has not been surveyed. Needs aerial confirmation of seasonal regularity and ground truthing to assess status.

Colony identifier:	W047.
General location:	On a billabong of the Moyle River, south of Tom Turner Creek junction.
Historical documentation:	B. Ottley (pers. comm.). Site not observed during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	None during current surveys, but 1987 by Ottley.
Years confirmed active:	1987 (Ottley, pers. comm.).
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(2+). Darter and cormorants, in their high hundreds to low thousands in July 1987 (Ottley, pers. comm.).
Species probably breeding:	Little Pied, Little Black and Pied Cormorant.
Highest no. of birds recorded:	No numbers recorded to date.
Highest estimated annual usage:	Unknown.
Allocated colony size:	1001-5000.
Months likely to be active:	July at least.
Photographs:	No.
Ground access:	Unknown, site not observed during current surveys.
Comments:	Large cormorant and Darter colony reported to the author in 1995 by B. Ottley (pers. comm.) from a observations he made in 1987. Activity since 1987 is unknown. Author did not observed this colony during aerial surveys in the area.
Future surveying needed:	High priority. This would be a significant colony if still active. Confirmation of the continued existence of this colony is required, followed by further assessment of numbers and timing of breeding is required.

Colony identifier:	W048.
General location:	Durabudboi River floodplain, about 10 kilometres north of the northern point of Grindall Bay (NE Arnhem Land).
Historical documentation:	K. Liddy (pers. comm.). Site not observed during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	Nil during current surveys.
Years confirmed active:	1993 and 'several' years prior to this. (Liddy, pers. comm.)
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(2+). Egret species, (1000+ April 1993) Pied Heron, (250+ April 1993.).
Species probably breeding:	Great, Intermediate and Little Egret.
Highest no. of birds recorded:	1250+, 1993 (Liddy, pers. comm.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	1001-5000.
Months likely to be active:	Around April.
Photographs:	No.
Ground access:	Unknown, colony not yet observed by author.
Comments:	The local stock inspector, Mr. K. Liddy, reported the colony to me on 17/5/95. It was reported as a big egret and Pied Heron colony that was active for at least several years prior to, and including 1993, which was the last time he visited the area. Appears to be, or has been, one of few waterbird breeding colonies between Nhulunbuy and the Roper River on the eastern side of the Top End. Located in paperbark in one of the few larger freshwater floodplains in this area. (This floodplain and the one north of the adjacent Myaoola Bay to the east, have very large number of waterbirds, particularly Magpie Geese, congregating in them during the late wet).
Future surveying needed:	High priority. This colony definitely needs to be located and its exact position recorded. If still active it needs aerial confirmation of seasonal regularity and ground truthing to assess species numbers and timing of breeding. Ground truthing of colonies such as this are also important because very little ground truthing has been done in any colonies in the north-eastern part of the Top End.

Colony identifier:	W049.
General location:	Approximately 5 kilometres north of the road crossing the south end of the Tomkinson River floodplain between the Liverpool and Goyder Rivers.
Historical documentation:	D. Bond (pers. comm.). Site not observed during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Small paperbarks.
Survey dates:	June 1995.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(3+). Egret species, (200+), Australian White Ibis (<50) and Royal Spoonbill (1+).
Species probably breeding:	Great, Intermediate and Little Egret.
Highest no. of birds recorded:	200+, Bond (pers. comm.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	101-500.
Months likely to be active:	Usually finished by mid June (Bond, pers. comm.).
Photographs:	No.

Ground access:	Unknown, colony not yet observed by author.
Comments:	One of few colonies between the East Alligator and Arafura floodplains, despite there being quite a few freshwater floodplains/swamps in that area. Colony has not been observed during the current surveys, but was reported by Bond to be regularly active prior to my 1995 discussion with him.
Future surveying needed:	High priority. This colony needs to be located and its exact position recorded. If still active it needs aerial confirmation of seasonal regularity and ground truthing to assess status. Ground truthing of colonies such as this are also important because very little ground truthing has been done in any colonies in the eastern part of the Top End.

Colony identifier:	W050.
General location:	Harris Creek wetland, south of Bennet Bay, north of the Rose River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Paperbark or mangrove.
Survey dates:	May 1995.
Years confirmed active:	1995.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(4). Darter (<50, May 1995), Little Pied Cormorant (<50, May 1995), Royal Spoonbill (450+, May 1999), Nankeen Night Heron (small numbers, May 1999).
Species probably breeding:	Little Black Cormorant.
Highest no. of birds recorded:	60+ (May 1995).
Highest estimated annual usage:	60+ (1995).
Allocated colony size:	101-500.
Months likely to be active:	May at least.
Photographs:	5966-69.
Ground access:	Access only possible via airboat or helicopter with floats as out in floodplain.
Comments:	A significant Royal Spoonbill, and small Little Pied Cormorant, Darter and Nankeen Night Heron colony that is only one of only a few known waterbird breeding colonies currently active between Nhulunbuy and the Roper River. 200+ egret species and a few Australian White Ibis seen in the vicinity of the colony during 1995 may also have been breeding, but these were not seen in the 1999 survey.
Future surveying needed:	Medium priority. A significant colony, but one which has had one ground survey, and is now more in need of aerial checking to assess seasonal regularity.

Colony identifier:	W051.
General location:	Bittern Woodland Swamp, 10 km south-west of Borroloola (inland McArthur R.).
Historical documentation:	R. Jaensch (1994). Not observed during current surveys.
Land tenure:	Aboriginal land (Narwinbi A.L.T.).
Nesting habitat:	Mainly Eucalypt species (Jaensch).
Survey dates:	March 1993.
Years confirmed active:	1993 (Jaensch).
Years confirmed inactive:	Nil, but area not covered during current surveys or outside of 1993 by Jaensch.
Status:	Low.
Species confirmed breeding:	(1) Little Pied Cormorant, (20+, March 1993, Jaensch, 1994.).
Species probably breeding:	Little Black Cormorant (Jaensch, 1994.).
Highest no. of birds recorded:	20+ (March 1993).
Highest estimated annual usage:	Unknown.
Allocated colony size:	2-50.
Months likely to be active:	March and April at least.
Photographs:	No.
Ground access:	Vehicle accessed by Jaensch in March 1993.
Comments:	Small Little Pied Cormorant colony in a swamp about 0.5 metres deep. Also present was a pair of White-faced Heron with large nestlings, and approximately 50 Little Black Cormorants that may also nest in the colony, but could not confirm breeding on the 30 March 1993 visit. This colony is documented in Jaensch (1994), however is included in this report as it is within the bounds of the Top End area for which the current surveys extend.
Future surveying needed:	Low priority. Small colony that should only be checked if in the area on other tasks. However as it is close to the Borroloola Parks and Wildlife Commission office, it could may easily be monitored by local rangers.

Colony identifier:	W052.
General location:	East side of the Keep River estuary.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Legune Station).
Nesting habitat:	Mangroves.
Survey dates:	March 1995 and 1999, June 1999.
Years confirmed active:	1995, 1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(2). Australian White Ibis (2000+, March 1999), Nankeen Night Heron (500+, March 1999).

Species probably breeding:	
Highest no. of birds recorded:	2500 (March 1999).
Highest estimated annual usage:	2500 (1999)
Allocated colony size:	1001-5000.
Months likely to be active:	February to May at least.
Photographs:	5734-35.
Ground access:	Access uncertain, not visited on the ground to date. Colony is in mangroves along the shoreline, so observation from a boat at high tide would probably be possible. The colony is amongst a large area of mangroves so foot access from a landed helicopter would be difficult.
Comments:	Australian White Ibis colony seen as active in March 1995 and 1999, with Nankeen Night Heron also present in 1999. This time of the year is normally prior to peak usage for this species, so this colony may be larger than recorded in these two observations, although the colony had finished by late June, 1999. This colony is located about 10 kilometres to the north of another large mixed species colony (W053) in similar habitat and that includes Australian White Ibis and egrets.
Future surveying needed:	Medium priority. Should have aerial confirmation of seasonal regularity and ground truthing to assess status. Ground truthing of colonies such as this are also important because very little ground truthing has been done in any colonies in this part of the Top End.

Colony identifier:	W053.
General location:	Eastern side of the Keep River estuary, near the mouth of the Keep River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease, (Legune Station).
Nesting habitat:	Mangroves.
Survey dates:	March 1995, November 1998, March 1999, June 1999.
Years confirmed active:	1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(8). Egret species, (5000+, March 1999, including many Intermediate and Great Egrets and some Little Egrets), Australian White Ibis (3000+, March 1999), Glossy Ibis (5000+, March 1999), Nankeen Night Heron (4000+, March 1999), Pied Heron (3000+, March 1999), Little Pied Cormorant (low 100's, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	20000+ (March 1999).
Highest estimated annual usage:	20000 (1999).
Allocated colony size:	15000+.
Months likely to be active:	February to May at least.
Photographs:	5737-43.
Ground access:	Access extremely difficult during wet season. Large area of inundated mangroves would need to be negotiated from the nearest helicopter landing location before even getting to the colony, and little of the colony would be visible from a boat.
Comments:	Extremely significant, mixed species colony at the end of a spit in the southern end of the Keep River estuary, and within ten kilometres of another colony (W052). This colony has large numbers of egrets, ibis and herons, and is the largest colony in the Top End for Nankeen Night Heron, Pied Heron and Glossy Ibis. It is the only Top End breeding colony for the latter species. It is very remote and extremely difficult to access, making it very safe from human disturbance.
Future surveying needed:	High priority. This colony is in need of a better ground assessment of species numbers but this would be a difficult operation.

Colony identifier:	W054.
General location:	Auvergne Lagoon, inland Victoria River area.
Historical documentation:	Site 25.013 in Sites of Conservation and Recreational Significance Register of the Northern Territory (in future referred to as SCRSR) by P. Whelan; Jaensch (1994).
Land tenure:	Pastoral lease (Auvergne Station).
Nesting habitat:	Freshwater mangroves (Barringtonia sp.).
Survey dates:	March 1993 and 1995.
Years confirmed active:	1993 (Jaensch), 1995 (these surveys).
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(3+). Australian White Ibis (250+, March 1995) Royal Spoonbill (350+ March 1995), small Cormorant species (66+, 1993).
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	600+ (March 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	501-1,000.
Months likely to be active:	March at least, but finished and gone by early September.
Photographs:	3117.
Ground access:	Uncertain, however was ground visited by Jaensch in September 1993. The only colony check in the current surveys was by air.
Comments:	Reported as large and very attractive colony of Australian White Ibis and other species by Whelan. Checked by Jaensch in September 1993, at which stage there was evidence of 48 Australian White Ibis nests and 33 small Cormorant species nests used earlier in

Future surveying needed:	that year. Aerially surveyed by author in March 1995 at which time there were 200-300 Royal Spoonbill in one section and 200-300 Australian White Ibis and 100 Royal Spoonbill in another section about half a kilometre further along. Consequently it appears the 1993 colony must have been smaller and lacking the Royal Spoonbills compared to the 1995 check, and Whelan's comments. Medium priority. Should have aerial confirmation of seasonal regularity and ground truthing to assess species numbers and timing of breeding.
Colony identifier: W055.	
General location:	Nayarnni Creek just in from the coast and approximately 10 kilometres south of the mouth of the Roper River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Marra A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1994, May 1995 and 1999.
Years confirmed active:	1994, 1995, 1999.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(8). Intermediate Egret (2550+, May 1999), Great Egret (240+, May 1999), Little Egret (240+, May 1999), Pied Heron (500+, May 1999), Nankeen Night Heron (2000+, May 1999), Australian White Ibis (4000+, May 1999), Little Pied Cormorant (100+, May 1999) and Darter (2+, May 1999).
Species probably breeding:	Little Black Cormorant.
Highest no. of birds recorded:	9600+ (May 1999)
Highest estimated annual usage:	9600+ (1999)
Allocated colony size:	5001- 10000.
Months likely to be active:	March to May at least.
Photographs:	5990-94, 6103
Ground access:	It is possible to land a helicopter nearby but access not easy and visibility of colony not good. Best access would be from a boat along the creek.
Comments:	Large, mixed species colony in the southern sections of the very extensive Roper River floodplain area. This colony was the only one located after extensive searches of the area around the site of the large colony (W910) formerly located along the Roper River near its mouth. (White, 1917). It is not known when this former colony became extinct, however it has not been active since 1990 at least.
Future surveying needed:	High priority. This colony is in need of a better ground assessment of species numbers but this would be a difficult operation.
Colony identifier: W056	
General location:	Mangrove lined tributary just in from the coast approximately 9 kilometres north-west of Rosie Creek, between the Limmen Bight and McArthur Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Lorella Station).
Nesting habitat:	Mangroves.
Survey dates:	March, May & September 1994, May 1995, February, July & October 1996.
Years confirmed active:	1994, 1995 and 1996.
Years confirmed inactive:	Nil.
Status:	National.
Species confirmed breeding:	(1). Pied Cormorant (4000+, May 1995)
Species probably breeding:	No other species involved.
Highest no. of birds recorded:	1000+ (March 1994).
Highest estimated annual usage:	2000+ (1994). This is based on an estimation of 1000+ nests when rookery had finished in September 1994.
Allocated colony size:	1001-5000.
Months likely to be active:	March to June.
Photographs:	3118-20, 5435, 6011-12.
Ground access:	Not yet accessed from the ground. As this colony is on a water channel connected to the sea and not far inland, access via boat at high tide should be feasible. Access on foot from a helicopter would probably be impossible given the large amount of water and mangroves, and lack of high ground in the vicinity.
Comments:	Large and significant, single species colony located in an extensive maize of mangrove lined channels just in behind the coast. It is the largest Pied Cormorant colony located to date in the Northern Territory, and among the largest regularly active colonies in Australia (Marchant and Higgins, 1990). A count of 1000+ adults in March 1994 is possibly an underestimation of adults, based on the estimated 1000+ used nests seen at the end of that breeding season. There were no young present in this estimate but perhaps other adults were out at sea feeding or roosting nearby - roosts of 200+ birds are often seen in this part of the Gulf of Carpentaria coastline. At a later part of the season in the following year (1995) there were between 3000 and 5000 Pied Cormorants in the general colony area and close by roosts. This would have undoubtedly included flying young, so if the number of breeding adults for this colony is between 1000 and 2000 birds, and all the 3-5000 birds seen were associated with the colony, then it appears the colony may have been very successful in 1995. Birds were reported actively nesting in late March (1994) and late May (1995 & 1996), and in the area of the colony but essentially finished

in mid July (1996). They however were not present in the colony area in February (1996), late September (1994) and October (1996). Consequently it appears they remain in the colony area between March and July or August, but leave the area for the remainder of the year, which may account for the many, scattered Pied Cormorant roosts observed along the coast and islands in this area, in the non-breeding time of the year.

Future surveying needed: High priority. Although only a single species colony, it a significant Pied Cormorant colony which appears active in most if not all years. Consequently ground truthing in March and May to better establish status.

Colony identifier:	W057.
General location:	Coastline near the mouth of the McArthur River.
Historical documentation:	Reported in 1994 as an unconfirmed Egret colony by Jaensch (1994).
Land tenure:	Pastoral lease (Manangoora Station).
Nesting habitat:	Mangroves.
Survey dates:	March 1993 and 1994, May 1995 and 1999.
Years confirmed active:	1994, 1995, 1999. Almost certainly active in 1993 (Jaensch, 1994) and said to have been large and active in 1984 at least, by local professional fisherman (K. Oliver, pers. comm.).
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(4+). Egret species (2000+, May 1995, including Great Egret) and cormorant species (50+, May 1995, including Little Pied Cormorant), Australian White Ibis (100+, May 1999), Nankeen Hight Heron (100, May 1999).
Species probably breeding:	Intermediate Egret, Little Egret, Little Black Cormorant.
Highest no. of birds recorded:	2150+ (May 1995). This estimate would include flying young.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	1001-5000.
Months likely to be active:	March to May at least.
Photographs:	5670.
Ground access:	Access uncertain, as colony not yet ground checked. However as it is along the shoreline, access to the site by boat at high tide would be possible. The possibility of walking in from a landed helicopter is unknown.
Comments:	Small to medium sized colony of mainly egrets (possibly dominated by Great Egrets), and a small number of cormorants (mostly Little Pied Cormorant), Australian White Ibis and Nankeen Night Heron. It is one of 5 colonies along the coast in the Port McArthur area. No ground surveys have been of this colony and the only aerial surveys done have been after late March when the colony was already active.
Future surveying needed:	High priority. Significant colony, especially for area, which has not been ground checked. Should be done to access species and timing of breeding.

Colony identifier:	W058.
General location:	Approx. 5 km south-east of Bob's Knob between the Daly and Moyle Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Labelle Downs Station).
Nesting habitat:	Paperbark.
Survey dates:	May 1995, March 1999.
Years confirmed active:	1995, 1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(4). Cormorant/Darter (500+, May 1995, including Darter, Little Black and Little Pied Cormorant) and Royal Spoonbill (200+, May 1995).
Species probably breeding:	
Highest no. of birds recorded:	700+ (May 1995). Count would have included flying young of the cormorants and Darter.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	501-1000.
Months likely to be active:	March to May.
Photographs:	3121, 5876-77.
Ground access:	Not yet ground checked but appears a helicopter could land near enough to get a good view in all but flooded times, otherwise an airboat or helicopter with floats would be needed.
Comments:	Reasonable sized Royal Spoonbill, Darter, Little Pied and Little Black Cormorant colony located in three sections among paperbark patches along both sides of a channel and not far from a number of other colonies in the Reynolds River floodplain area. It is one of the colonies within an area between the Daly and Finnis Rivers that has the largest cluster of colonies in the Top End. Not located until 1995, however unable to be sure whether it was active prior to this and not observed, or a new colony that year.
Future surveying needed:	High priority. A reasonably significant cormorant and Royal Spoonbill colony, that may also include some egret breeding. Should be aerielly surveyed over a couple of seasons to assess regularity of use, and ground checked to assess status.

Colony identifier:	W059.
General location:	Approximately 5 kilometres east of the mouth of the Daly River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station).
Nesting habitat:	Paperbark.
Survey dates:	May 1995, March 1999.
Years confirmed active:	1995.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(1). Royal Spoonbill (<20, May 1995).
Species probably breeding:	Little Pied Cormorant.
Highest no. of birds recorded:	<20, May 1995. (50 Royal Spoonbills standing around trees in breeding plumage with some nests visible in March 1999 were almost certainly just about to commence breeding).
Highest estimated annual usage:	Unable to say due to limited surveys at appropriate time.
Allocated colony size:	2-50.
Months likely to be active:	May at least.
Photographs:	No.
Ground access:	Access uncertain as this colony has not been ground surveyed. Its position on the floodplain indicates that a substantial area of water would have to be crossed during wet season. Detailed observation would require airboat access or a helicopter with floats.
Comments:	Small Royal Spoonbill colony on the west side of an area of paperbark along the eastern side of the northern part of the Daly River floodplain. A March survey (1999) showed a few Little Pied Cormorants present in the colony with the Royal Spoonbill which were in breeding plumage. Neither were confirmed to have commenced but both were likely to be going to begin shortly as newer looking nests were seen.
Future surveying needed:	Low priority. Probably only a small insignificant colony that should only be checked if in area.
Colony identifier:	W060.
General location:	Near mouth of Wearyan River.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Manangoora Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995, July 1996, July 1998, December 1998, May 1999.
Years confirmed active:	1998 and 1999, and possibly 1995 and 1996.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(2). Pied Cormorant (200+, May 1999), Little Black Cormorant (350+, May 1995).
Species probably breeding:	
Highest no. of birds recorded:	350+ (May 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	101-500.
Months likely to be active:	April to August.
Photographs:	5439, 6019-20.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat would be possible, however access on foot from a landed helicopter is unknown, but likely to be difficult.
Comments:	Medium sized Pied Cormorant colony which may have other cormorant species breeding in it in some seasons. It is one of 5 colonies along the coast in the Port McArthur area. Not confirmed as an active colony until 1998 and 1999 where only Pied Cormorants were recorded. Likely to have also been active in 1995 and 1996 where Little Black Cormorants were also present.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm species present.
Colony identifier:	W061.
General location:	Coastline just to the NW of Indian Hill on the southern side of the entrance to the Victoria River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral Lease (Legune Station).
Nesting habitat:	Mangroves.
Survey dates:	March and June 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(6). Nankeen Night Heron (500, March 1999), Australian White Ibis (300, March 1999), Intermediate Egret (350, March 1999), Great Egret (125, March 1999), Little Egret (25, March 1999), Pied Heron (20, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	1320 (March 1999).
Highest estimated annual usage:	1320 (1999).
Allocated colony size:	1001-5000.

Months likely to be active:	February to April at least.
Photographs:	5726.
Ground access:	Colony is along shoreline so high tide boat access will give a good view of the colony. Can land a helicopter on open saline flats adjacent the colony but very difficult to walk through mangroves to get to colony site and cannot get good view from the saline flats.
Comments:	One of a few reasonably sized, mixed species colonies in Joseph Bonaparte Gulf. Possibly a new site in 1999 as not observed in previous surveys, although colony could easily be missed from the air because birds mostly under canopy of thick mangroves. Only visited twice (both in 1999) which showed it to be active with chicks present in mid March and finished by late June.
Future surveying needed:	Medium Priority. Colony needs to be checked over a few years to establish its regularity of use and average size, and a better check of the species breakdown needs to be done via a boat survey.

Colony identifier:	W062.
General location:	Arafura Swamp (Goyder River), a few km NW of Mirrangadja Village.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhem A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low
Species confirmed breeding:	(1). Darter (40, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	40, March (1999).
Highest estimated annual usage:	40 (1999).
Allocated colony size:	2-50.
Months likely to be active:	February to April.
Photographs:	5821-23.
Ground access:	Only possible via air boat of helicopter with floats.
Comments:	Small Darter colony located during 1999 aerial survey. The colony is one of a cluster of at least seven small to medium sized colonies in the Arafura Swamps. Well developed young present in late March (1999). Colony consists of 20 or so nests in 2-3 paperbarks growing in open water in the wet season.
Future surveying needed:	Low priority. Small, single species colony of low significance. Aerially check if in area to establish any variation in future years.

Colony identifier:	W063.
General location:	Along Goyder River, close to the junction with the Glyde River.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhem A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	March, 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low
Species confirmed breeding:	(1). Darter (less than 20, March 1999).
Species probably breeding:	
Highest no. of birds recorded:	Less than 20 (March 1999).
Highest estimated annual usage:	Less than 20 (1999).
Allocated colony size:	2-50.
Months likely to be active:	March to May.
Photographs:	5824-25.
Ground access:	Probably only by boat along the river.
Comments:	Small Darter colony located during 1999 aerial survey. The colony is one of a cluster of at least seven small to medium sized colonies in the Arafura Swamps. Eggs observed in nests in late March (1999).
Future surveying needed:	Low priority. Small, single species colony of low significance. Aerially check if in area to establish any variation in future years.

Colony identifier:	W064.
General location:	Island just off Millingimbi, west of Goyder River.
Historical documentation:	Lahnapy Aviation pilot (pers. comm.).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1993, June 1995 (Lahnapy Aviation pilot, pers. comm.), March 1999.
Years confirmed active:	1999, possibly 1993 and 1995.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(4). Egret species (2000, March 1999, including good numbers of Great and Little Egret and smaller numbers of Intermediate Egret), Pied Heron (50, March 1999).
Species probably breeding:	

Highest no. of birds recorded:	2050 (March 1999).
Highest estimated annual usage:	2050 (1999).
Allocated colony size:	1001-5000.
Months likely to be active:	February to June at least.
Photographs:	5855-5858.
Ground access:	Can only be accessed by boat.
Comments:	Reasonably sized egret colony with a small number of Pied Herons. First suspected of being an active colony in 1993, then reported as a mangrove island covered with white birds during the day by a pilot that had flown aerial searches with author and seen other colonies. Confirmed as an active colony in 1999. Located on a small mangrove island. It has relatively small numbers of Intermediate Egrets and large numbers of Little Egrets compared to most egret colonies in the Top End.
Future surveying needed:	Medium priority. Site needs to be checked from a boat survey to better assess species present.

Colony identifier:	W065.
General location:	Murgenella Creek floodplain.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	April 1994.
Years confirmed active:	1994.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2+). Cormorant species and Darter (A few, April 1994).
Species probably breeding:	Little Pied and/or Little Black Cormorant.
Highest no. of birds recorded:	Less than 10 (April 1994).
Highest estimated annual usage:	Less than 10 (1994).
Allocated colony size:	2-50.
Months likely to be active:	April at least.
Photographs:	No.
Ground access:	Access would only be by airboat or helicopter with floats in the wet season.
Comments:	Small number of nests in 1-2 trees observed with small cormorant species in attendance. Only observed once in a quick flyover.
Future surveying needed:	Low priority. Small breeding site not worth checking unless in area on other business.

Colony identifier:	W066.
General location:	Murgenella Creek floodplain.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	April 1994.
Years confirmed active:	1994.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2+). Cormorant species and Darter (A few, April 1994).
Species probably breeding:	Little Pied and/or Little Black Cormorant.
Highest no. of birds recorded:	Less than 10 (April 1994).
Highest estimated annual usage:	Less than 10 (1994).
Allocated colony size:	2-50.
Months likely to be active:	April at least.
Photographs:	No.
Ground access:	Access would only be by airboat or helicopter with floats in the wet season.
Comments:	Small number of nests in single tree observed with small cormorant species in attendance. Only observed once in a quick flyover.
Future surveying needed:	Low priority. Small breeding site not worth checking unless in area on other business.

Colony identifier:	W067.
General location:	South shoreline of the mouth of the Rose River, Numbulwar.
Historical documentation:	Two small islands in the mouth of the Rose River close to this site were reported by local Traditional Owner, Lindsay Joshua, to have been regularly used by egrets to breed up until about 10 years ago. Then a large flying fox roost established on these islands, and this disturbance led to the egrets ceasing breeding in large numbers on these islands to then breed in smaller numbers at less regularity at the current site.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May, 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(3). Egret species (300, May 1999, including some Great and Little and smaller numbers of Intermediate Egret).
Species probably breeding:	

Highest no. of birds recorded:	300, May 1999.
Highest estimated annual usage:	300 (1999).
Allocated colony size:	101-500.
Months likely to be active:	May at least.
Photographs:	6104.
Ground access:	Only possible by boat.
Comments:	In its current location it is a small, possibly irregular, egret colony. May have been larger and more regular when located on two nearby islands which were moved onto by a large roost of flying foxes.
Future surveying needed:	Medium priority. Needs to be accessed from a boat to ascertain better information on species using colony, and checked over a few years to establish regularity of use.

Colony identifier: W068.

General location:	Mangrove lined creek south of Bennett Bay (north of Rose R.), Gulf of Carpentaria.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(2). Darter (10, May 1999), Nankeen Night Heron (100+, May 1999).
Species probably breeding:	
Highest no. of birds recorded:	(110, May 1999).
Highest estimated annual usage:	(110, 1999).
Allocated colony size:	100-500.
Months likely to be active:	April to June at least.
Photographs:	5965.
Ground access:	Possible, but not easy, to access colony via high tide boating up creek system from Bennett Bay, but not possible to land in a helicopter in the area in the wet season.
Comments:	Nankeen Night Heron and small Darter colony first located in 1999. Unable to say whether active in previous years because small and only located by chance.
Future surveying needed:	Medium priority. Colony needs to be checked for better assessment of Nankeen Night Heron breeding.

Colony identifier: W069.

General location:	Mangrove lined creek north of Rose River, Gulf of Carpentaria.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(1). Darter (24, May 1999).
Species probably breeding:	
Highest no. of birds recorded:	(24, May 1999).
Highest estimated annual usage:	(24, 1999).
Allocated colony size:	2-50.
Months likely to be active:	April to June at least.
Photographs:	No.
Ground access:	Possible, but not easy, to access colony via high tide boating up creek system, but not possible to land in a helicopter in the area in the wet season.
Comments:	Small Darter colony first located in 1999. Unable to say whether active in previous years because small and only located by chance. 12+ nests stretched along up to a kilometre of creek.
Future surveying needed:	Low priority. Small single species colony that is difficult to access. Aerial assessment to assess seasonal regularity could be done if in area.

Colony identifier: W070.

General location:	Mangroves along Nayarnni Creek, approx. 10 km south of the Roper River. (A few km further inland than W055).
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal Land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Regionally High.
Species confirmed breeding:	(2). Australian White Ibis (300+, May 1999), Nankeen Night Heron (200, May 1999).
Species probably breeding:	
Highest no. of birds recorded:	500+ (May 1999).
Highest estimated annual usage:	500+ (1999).
Allocated colony size:	101-500.

Months likely to be active:	May.
Photographs:	No.
Ground access:	Possible, but not easy, to access colony via high tide boating up creek system. Uncertain about possibility of landing in a helicopter in the area in the wet season.
Comments:	Nankeen Night Heron and Australian White Ibis colony first located in 1999. Unable to say whether active in previous years because small and only located by chance.
Future surveying needed:	Medium priority. Colony needs to be ground checked for better assessment.
Colony identifier: W071.	
General location:	Approx. 18 km west of Rosie Creek, between Limmen Bight and McArthur Rivers.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Lorella Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1994, July 1996, May 1999.
Years confirmed active:	1999 and possibly 1994.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2+). Nankeen Night Heron and egret species
Species probably breeding:	Great, Intermediate and Little Egret, and Pied Cormorant.
Highest no. of birds recorded:	350+ (May 1994).
Highest estimated annual usage:	Unknown, due to insufficient temporal coverage of surveys.
Allocated colony size:	101-500.
Months likely to be active:	April to June at least.
Photographs:	6010.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat would be possible but access walking in from a landed helicopter is unknown.
Comments:	Small egret and Nankeen Night Heron colony that was first confirmed in 1999 but was likely to have been active in 1994 as well. 300+ Pied Cormorant were also observed in the vicinity of the site in May 1994 and these birds may have been breeding. A further 400-500 Pied Cormorants were roosting in another location a little to the west (15 19S 136 03E). Only one Pied Cormorant observed in the vicinity in a July 1996 survey.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and June by helicopter or boat to ground confirm species active in the colony, and by air over a few seasons to assess regularity of use.
Colony identifier: W072.	
General location:	Crooked Creek, between McArthur and Wearyan Rivers.
Historical documentation:	None found, site located by D. Baker during current surveys.
Land tenure:	Pastoral lease (Manangoora Station).
Nesting habitat:	Mangroves.
Survey dates:	April, 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Low.
Species confirmed breeding:	(1). Pied Cormorant (20+, April 1999).
Species probably breeding:	
Highest no. of birds recorded:	20+, April 1999.
Highest estimated annual usage:	Unknown due to insufficient temporal coverage of surveys.
Allocated colony size:	2-50.
Months likely to be active:	April.
Photographs:	No.
Ground access:	Access possible by boat, however ground access from landing a helicopter nearby is unknown as author has not visited site.
Comments:	Small Pied Cormorant colony only located in 1999, so previous history of site unknown. It is one of 5 colonies along the coast in the Port McArthur area.
Future surveying needed:	Medium priority. Needs to be better assessed for seasonal numbers and whether any other species also use the site, but appears only a small and fairly insignificant colony.
Colony identifier: W073.	
General location:	Stockyard Creek, between the Wearyan River and the Qld/NT border.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Seven Emu Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995 and 1999.
Years confirmed active:	1999 and possibly 1995.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(3+). Pied Cormorant (400+, May 1995), egret species (20+, May 1999, including Great and Little Egret).
Species probably breeding:	Intermediate Egret.
Highest no. of birds recorded:	420+ (May 1999).
Highest estimated annual usage:	Unknown due to insufficient temporal coverage.
Allocated colony size:	101-500.
Months likely to be active:	May to July at least.

Photographs:	6089.
Ground access:	Uncertain, site not well assessed for potential ground access during current surveys. Access by boat possible but access on foot from a landed helicopter is unknown.
Comments:	Small Pied Cormorant and egret species colony confirmed active in 1999, but may have been active in 1995 as well. Most if not all nests had eggs in late May (1999).
Future surveying needed:	Medium priority. Needs to be better assessed for seasonal numbers and species composition, but appears only a relative small colony for Pied Cormorants and a very insignificant colony for other species.

Colony identifier:	W074.
General location:	Along NE shoreline of Grindal Bay (north of Rose River), Gulf of Carpentaria.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(3+). Nankeen Night Heron (up to 500, May 1999), egret species (up to 500, May 1999, including Great and Little Egret).
Species probably breeding:	Intermediate Egret.
Highest no. of birds recorded:	Up to 1000, May 1999.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	101-500.
Months likely to be active:	May to July at least.
Photographs:	6112.
Ground access:	Not ground checked during surveys, however only means of ground assessing colony would be from boating along shoreline at high tide. The possibility of walking in through the mangroves from a helicopter landing on the nearest high ground is uncertain but would probably be very difficult.
Comments:	Egret and Nankeen Night Heron colony first located in 1999. Nests were well in under an extensive mangrove. Past surveys of this area may have over-looked this site as few birds were obvious until repetitively flown over in the helicopter. Size was also difficult to assess because of this reason. A large Little Red Flying Fox colony was also present adjacent the bird colony.
Future surveying needed:	High priority. This is one of few waterbird colonies located in this area and needs to be better assessed for species numbers and composition, and regularity of seasonal use.

Colony identifier:	W075.
General location:	Near the mouth of the Goromuru River (NE Arnhem Land).
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	June 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(2). Australian White Ibis (up to 3000, June 1999), Darter (up to 300, June 1999).
Species probably breeding:	Egrets, Pied Heron, Nankeen Night Heron.
Highest no. of birds recorded:	Up to 3500, June 1999.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	1001-5000.
Months likely to be active:	April to August at least.
Photographs:	6256-60.
Ground access:	Not well assessed during surveys but appears only access to colony would be using an airboat of helicopter with floats.
Comments:	Significant Australian White Ibis and Darter colony located in 1999 and only briefly flown over in the late afternoon because of time restrictions. 100+ Pied Heron, and a few egrets and Nankeen Night Heron were also observed in the area of the colony. However, these species have not been included as breeding species here because the openness of this particular colony allowed good vision of many nests and only Australian White Ibis and Darter nests were observed. This is one of only 2 colonies located during these surveys to be in the area from the eastern side of the Arafura Swamps through NE Arnhemland around to Blue Mud Bay. This area, particularly the country south of Buckingham and Arnhem Bays contains quite a large amount of wetland.
Future surveying needed:	High priority. This is one of few waterbird colonies located in this area and needs to be better assessed for species numbers and composition, and regularity of seasonal use.

Colony identifier:	W076.
General location:	Alligator Springs Waterhole, SW of Legune Station (Keep River area).
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Legune Station).
Nesting habitat:	Paperbark.
Survey dates:	June 1999.
Years confirmed active:	1999.
Years confirmed inactive:	Nil.
Status:	Regionally high.
Species confirmed breeding:	(3). Nankeen Night Heron (300+, June 1999), Darter (200+, June 1999) and Little Pied Cormorant (20+, June 1999).
Species probably breeding:	
Highest no. of birds recorded:	520, June 1999.
Highest estimated annual usage:	Unknown due to insufficient surveys.
Allocated colony size:	101-500.
Months likely to be active:	April to June at least.
Photographs:	No.
Ground access:	Uncertain as not well assessed during single survey of site. Possibly able to land a helicopter in area and view colony. Many crocodiles in waterhole.
Comments:	Medium sized Nankeen Night Heron and Darter colony that has only briefly been assessed from the air, and only after much of the breeding had finished.
Future surveying needed:	Medium priority. Needs to be better assessed for species numbers and composition, and regularity of seasonal use.

APPENDIX C

INDIVIDUAL COLONY BREAKDOWN FOR POSSIBLE AND/OR HISTORIC COLONIES (W901-W956).

INDIVIDUAL COLONY BREAKDOWN FOR POSSIBLE AND/OR HISTORIC COLONIES

This appendix gives a separate summary for each of 52 unconfirmed colonies that are assigned a unique colony number (between W901 and W956, less W911, 14, 18 and 25 which have been withdrawn following recent surveys). These are prefixed by the letter 'W' (for waterbird). It was not possible to utilise the colony numbering system in any particular geographic or date order as there was a continual transfer from possible to confirmed colony allocation. Each colony is characterised by a number of descriptors. The content of some of these is obvious but most are given further explanation below.

Note: In this version of this report Appendices B and C do not contain the colony latitudes and longitudes, these can be requested from the Darwin office of the Parks and Wildlife Commission of the Northern Territory.

Historical Documentation. Refers to a search of previous reports in the scientific literature, explorers' journals, or other non-scientific sources. Where no other record was found, the colonies are recorded as being located during current surveys. The majority of the colonies reported here were actually located during the current surveys.

Survey dates. Month and year that some form of survey was carried out. These included any sort of brief aerial observation or report by a reliable informant, through to detailed ground surveys. Although primary reference is from the period of the surveys (1990-1999), some observation prior to and subsequent to this period are also included.

Years confirmed active. Refers only to years in which the colony was checked and recorded as active during the current surveys, extracted from historical references or reported to the author by reliable observers.

Years confirmed inactive. Refers to a site that is definitely inactive during the year(s) reported. This may relate to a known site that previously supported breeding (historic) or a possible site that was located at some stage during the surveys. As for the confirmed colonies, where years are not mentioned as either active or inactive it means the site was not checked (or known about) and may or may not have been active.

Species confirmed breeding. As each colony in this section is either a possible or an historic colony, reference to confirmed breeding can only apply to the latter type, otherwise the colony would have been shifted to the confirmed colony (W001-W076) group in Appendix B. Historical reference, or reliable personal observations, of colonies reported to the author as active prior to the current surveys are recorded as confirmed species in this section. As for the confirmed colony section, reference to a 'species group' which had not been reliably separated into individual species, was recorded as that group name that was confirmed breeding. The bracketed number and date attached to each species in this section indicates the highest estimate made in any survey for that species, at that colony.

Species probably breeding. This includes separately identified species (or individual species from a group) observed near the possible colony, or recorded as possible species from historic documentation.

Highest no. birds recorded. This section refers to the highest (all species combined) single count for that colony.

Highest estimated annual usage. This section attempts to approximate the highest total number of birds to have used the colony in a particular breeding season (ie full annual cycle). This differs from the above estimate in that it takes into account the different timing of breeding of the individual species over a complete breeding season and totals each when at their particular highest.

Allocated colony size. This has been previously discussed in detail in the section entitled 'Quality of Numerical Estimates' (P10). Based on all the information collected, each colony is allocated a minimum size.

Months likely to be active. This section approximates the months of the year that the colony is likely to be active. This is based on observations of the stage of breeding of each of the species during field surveys and known incubation/fledging times, and/or documented or reliable information.

Photographs. This section indicates whether photographs of the colony had been taken at the time of writing this report. These photographs have been numbered and recorded on a database named Photoind.dbf, stored in the Parks and Wildlife Commission PCCOMM network.

Ground access. This section gives details of the method and ease of access to the colony, or to a position offering a reasonable view, for ground truthing. This applies to the wet season when the birds are mostly breeding, and when access is mostly from the air or from boat. Access in the dry season is usually a different matter and can often be done via a vehicle or quad, but as my knowledge of accessing most of these colonies from the land is limited I have not made much comment on this. It should be kept in mind that virtually all of these colonies are frequented by numbers of Estuarine Crocodiles and wild pigs, both feeding on fallen or overly adventurous birds. Consequently a firearm should be carried and extreme care taken, especially if walking in water.

Comments. This section contains an overall summary of the colony with explanations of some of the figures/statements made in the above sections, as well as additional comments not included under the previous headings.

Future surveying needed. This section concerns the author's view of the specific work still needed to upgrade the quality of the information on that particular colony. The overall need to monitor the continuing general status of all larger colonies, as was discussed above in Future Management is taken as accepted and not repeated for each colony in this section. Similarly the need for detailed floristic or structural descriptions of the vegetation of all of the colonies, which has not yet been attempted, is not repeated for each colony. For all future work, priority should be given to larger or more significant colonies. A "high priority" means that it is important to survey/re-survey the colony because we have insufficient knowledge of its status. A "medium priority" means that sufficient is known to provide an adequate appreciation of the site's status, but it would be desirable to obtain some more information on certain aspects of the colony status. This applies to sites that have to date only been surveyed from the air. A "low priority" is where sufficient information is known about the colony to be able to define its status and management requirements, even if an important colony. It does not need to be specifically targeted for checking in the near future unless in the area on other tasks or if there is some extreme development that may place the colony in jeopardy.

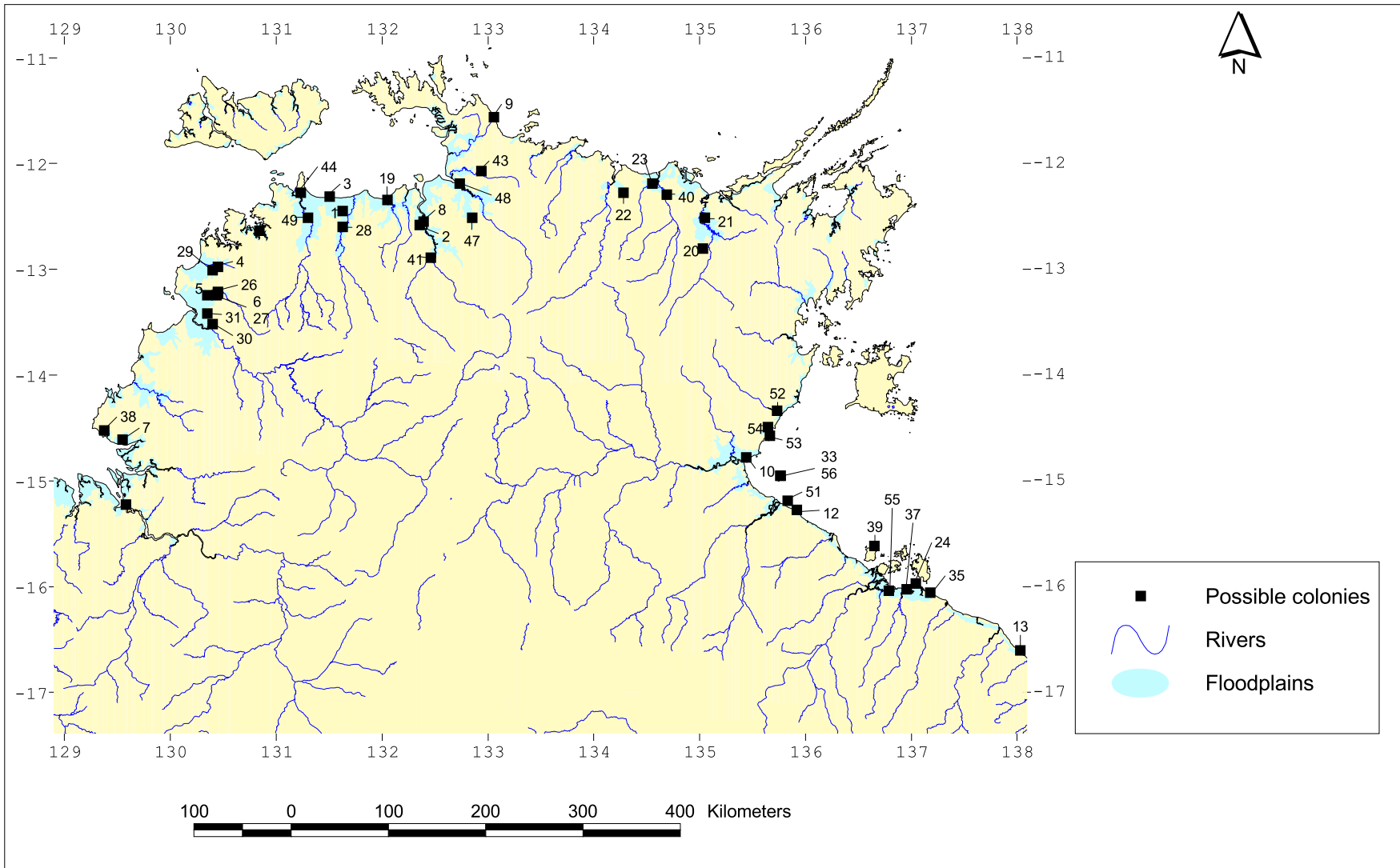


Figure C1. Location of colonies by colony number - extinct and possible colonies.

Colony identifier:	W901.
General location:	Mary River floodplain.
Historical documentation:	Recorded in the Sites of Conservation and Recreational Significance Register* (8.043) by P. Mitchell. Site not observed during current surveys.
Land tenure:	Unknown.
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil, although many aerial surveys of the area between 1990 and 1995 did not see this colony.
Species confirmed breeding:	(6). Great, Little and Intermediate Egret, Little Pied Cormorant, Pied Heron and Australian White Ibis (SCRSR).
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Recorded as a very large mixed species colony, of several hectares in size. Fairly confident it has not existed since at least 1990, it certainly has not existed between 1990 and 1993. Birds from this site may well now be involved in other colonies in the region.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
	* Referred to as SCRSR in future.
Colony identifier:	W902.
General location:	5 kilometres to the NE of Kapalga (South Alligator River area).
Historical documentation:	J. Estebergs (pers. comm.).
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Paperbark.
Survey dates:	April 1993.
Years confirmed active:	Nil (possibly 1993).
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	Royal Spoonbill.
Highest no. of birds recorded:	Unknown, but "small".
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unconfirmed, but if active, April at least.
Photographs:	No.
Ground access:	Unknown, site not yet checked.
Comments:	Previously confirmed Royal Spoonbill colony of 300-400 birds active in the 1970's and 1980's (J. Estebergs, pers. comm.) that may still be active today. Recorded by author on the South Alligator Magpie Goose aerial survey of 16 April 1993, (transect 18) as a possible, small Royal Spoonbill colony. Have not re-checked since.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in the area on other tasks (eg future annual Magpie Goose aerial surveys).
Colony identifier:	W903
General location:	Shoreline of Chambers Bay, between Adelaide and Mary Rivers.
Historical documentation:	Recorded in SCRSR(8.014) by J. McKean. Site not observed to be active during current surveys.
Land tenure:	Pastoral lease (Woolner).
Nesting habitat:	Mangroves.
Survey dates:	Area flown numerous times between 1990 and 1996.
Years confirmed active:	Unknown.
Years confirmed inactive:	1990-96.
Species confirmed breeding:	(6). Great, Intermediate, Little and Cattle Egret, Darter, Little Black Cormorant (SCRSR).
Species probably breeding:	Little Pied Cormorant, Pied Heron, Australian White Ibis.
Highest no. of birds recorded:	Unknown
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown, probably would have been viewable from a boat at sea at high tide at least.
Comments:	Reported as the largest egret colony in the NT at the time, being 5-6 kilometres long and 200m wide. Has not existed since at least 1990. Birds from this site may well now be involved in other colonies in the region.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W904.
General location:	Finniss River floodplain.
Historical documentation:	Recorded in SCRSR (8.032) by R. Petherick. Site not observed during current surveys.
Land tenure:	Uncertain, possibly Aboriginal land.
Nesting habitat:	Unknown.
Survey dates:	General area flown March 1991, March 1992, March 1993, March 1994, May 1995.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil, but not observed in many aerial surveys 1990-95.
Species confirmed breeding:	(2+). Egrets and other species (SCRSR).
Species probably breeding:	Could be any of the colony breeding species.
Highest no. of birds recorded:	Unknown
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Reported as small colony of egrets and other species, but have not been able to locate since 1990 in a number of searches. May have been absorbed into other larger colonies currently active in the area.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W905.
General location:	Floodplain between Daly and Finniss Rivers.
Historical documentation:	Recorded in SCRSR (8.006) by R. Petherick. Site not observed in current surveys.
Land tenure:	Pastoral lease (Welltree Station, La Belle Station or Litchfield Station).
Nesting habitat:	Unknown.
Survey dates:	General area flown in March 1991, March 1993, January & March 1994, May 1995.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil, however a number of aerial searches between 1991-95 did not see it.
Species confirmed breeding:	(4+). Pied Heron, egret species, Darter and cormorant species (SCRSR).
Species probably breeding:	Any of the egrets or cormorant species.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Reported as one of the largest mixed species colonies in the region, but appears not to have been active since at least since 1991. Other large colonies, not referred to by Petherick, are now in this area, so some shifting of colony sites over the years appears likely.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W906.
General location:	Floodplain between Daly and Finniss Rivers.
Historical documentation:	Recorded in SCRSR(14.013) by R. Petherick. Site not observed during current surveys.
Land tenure:	Pastoral lease (Welltree Station or Litchfield Station).
Nesting habitat:	Unknown.
Survey dates:	General area flown in March 1993, January & March 1994, May 1995.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil. Although some aerial searches (January and March) may have been a little early, suspect colony not active 1993-95 at least.
Species confirmed breeding:	(1). Royal Spoonbill (SCRSR).
Species probably breeding:	Unknown.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Reported as a locally significant Royal Spoonbill colony (Petherick). Appears not to have been active since at least since 1993. Other Royal Spoonbill colonies, not referred to by Petherick, are now in this area, so some shifting of colony sites over the years appears likely.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W907.
General location:	Small mangrove island in New Moon Inlet of Joseph Bonaparte Gulf (Victoria R.).
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	May 1995.
Years confirmed active:	Nil, possibly 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	Egret species, Pied Heron, Nankeen Night Heron.
Highest no. of birds recorded:	200+ (March 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	March at least, if active.
Photographs:	No.
Ground access:	Uncertain, but would certainly require a boat or helicopter.
Comments:	Small roost or possible colony, located during an aerial survey 10 March 1995. Likely to be a small colony of excess birds from a nearby large confirmed colony (W002) that is located a few kilometres away. May only be used in better breeding years.
Future surveying needed:	Low priority. Only check if information becomes available confirming it as a colony, or if in the area on other work.
Colony identifier:	W908.
General location:	South Alligator River shoreline.
Historical documentation:	Recorded in SCRSR(9.038) by A Hertog, Schultz (1989), and N.R.S. in 1980 & 1981 by J. McKean and A. Hertog.
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Mangroves.
Survey dates:	Numerous flights over general area between 1990 and 1996, with one survey (1991) specifically following South Alligator River from mouth to well inland past approximate previous colony location.
Years confirmed active:	1979, 80, 81 84 at least (combined references listed above).
Years confirmed inactive:	1987,88 (Schultz). From current surveys, almost certainly from 1991 to 1995 at least.
Species confirmed breeding:	(10). Great, Intermediate, Little and Cattle Egret, Little Pied and Little Black Cormorant, Darter, Pied Heron, Australian White Ibis, Royal Spoonbill (combined references).
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	December to May at least.
Photographs:	No.
Ground access:	Not recorded, but boat access would have been possible.
Comments:	Large and significant mixed species colony that is now extinct. The colony was recorded as several thousands (N.R.S.), with individual species such as Pied Heron 1200+ nests, Intermediate Egret 1800+ nests, Little, Great and Cattle Egret 500+ nests and Little Pied Cormorant 230+ nests (N.R.S.) Another large and significant mixed species colony (W033) was located in 1993 during current surveys which is almost certainly the new site for this former colony. Further, the new site is in a location not accessible to tour boats that used to visit the former site at least twice a day. This significant disturbance which must have been caused by this may have lead to the colony needing to shift location.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W909.
General location:	Small creek, approximately 3 kilometres south of Brogden Point.
Historical documentation:	F. Woerle (pers. comm.).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown, but only reported seen in one year (Woerle).
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Nankeen Night Heron (Woerle).
Species probably breeding:	
Highest no. of birds recorded:	<50. (date not reported).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Small Nankeen Night Heron colony reported as seen once by PWCNT ranger F. Woerle. Not observed during current surveys, but not specifically looked for.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again or if in area on other work.

Colony identifier:	W910.
General location:	North shoreline of the Roper River about 5 kilometres in from the mouth.
Historical documentation:	Recorded in SCRSR (23.002) by M. Reed, Storr (1977), Blakers et al (1984), White (1917).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	General area flown several times between 1992 and 1996, with major effort specifically searching the Roper River and surrounding floodplains done in May 1995.
Years confirmed active:	1917 (White), but reported to be active between 1901 to 1950 (Blakers et al.).
Years confirmed inactive:	From current surveys, 1992 to 1996 at least.
Species confirmed breeding:	(6). Great, Intermediate and Little Egret, Little Pied and Little Black Cormorant and Pied Heron (White).
Species probably breeding:	
Highest no. adults involved:	“Many thousands” (White).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	February to March at least (White).
Photographs:	No.
Ground access:	Uncertain, site not observed, but access would have been possible by boat or helicopter.
Comments:	A very large mixed species colony that has not been active since at least the early 1990's. Reported (White) to have nests of Great and Little Egrets in great profusion and a few Intermediate Egrets. No comment was made on numbers of cormorants. Pied Heron were present in numbers but nests were not confirmed. On 17 February (1917), White reported all birds were on eggs, with clutches not yet finished. Colony was said to be half one mile (800 metres.) long by 80 yards (73 metres) wide. This colony is no longer active, and there are now no other large colonies along the river in the vicinity. With human disturbance unlikely to be a factor, it appears the surrounding habitat may no longer support the number of colonial nesting waterbirds that it did when huge numbers used this colony. Perhaps an increase in salinity has led to a change in the numbers and diversity of species of waterbirds using this area, and this has been to the detriment of the species discussed in this report.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W911 – Not currently allocated to a site.
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Colony identifier:	W912.
General location:	Nyanantu Creek, south of the Limmen River mouth.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Nathan River Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1994, May 1995, July 1996.
Years confirmed active:	Nil, possibly 1994 and 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Pied Cormorant.
Species probably breeding:	
Highest no. of birds recorded:	750+ (May 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	May at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat would be possible, but uncertain of access on foot from landed helicopter.
Comments:	Large numbers of Pied Cormorants observed in mangroves on two occasions in two years. Unconfirmed as a breeding site, but definitely a roost site at least. Observed in 1994 and 1995 during May with up to 1000 birds present. No nests were able to be confirmed from the air. Only 50 birds present in July 1996, indicating the movement away from the site later in the season.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.

Colony identifier:	W913.
General location:	Running Creek, near Queensland border.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Wollogoorang Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995.
Years confirmed active:	Nil, possibly 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2+). Pied Cormorant, Darter.
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	200+ (May 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	May at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat possible, but foot access from a landed helicopter is unknown.
Comments:	Pied Cormorant, Darter and possibly other Cormorant species roost at least. No nests were able to be confirmed from the air.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.
Colony identifier:	W914 – Not currently allocated to a site.
Colony identifier:	W915.
General location:	Fogg Dam, west side Adelaide River (inland). Not included on Fig. C1.
Historical documentation:	Recorded in Goodfellow (unpublished), Marchant and Higgins (1990).
Land tenure:	Conservation Reserve.
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	1977 (Marchant and Higgins) and 1991 (Goodfellow).
Years confirmed inactive:	Nil. Numerous flights over the general area between 1990 to 1996 failed to observe this colony, however as it is only a small colony it is possible that it could have been missed.
Species confirmed breeding:	(2). Intermediate Egret (Goodfellow) and Royal Spoonbill (Marchant and Higgins).
Species probably breeding:	
Highest no. of birds recorded:	Unknown for the Intermediate Egrets reported by Goodfellow, but 8+ was reported for Royal Spoonbills in May 1977 in Marchant and Higgins.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	As reported, July (Intermediate Egret) and May (Royal Spoonbill).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Small breeding site for Royal Spoonbill and presumably small site for Intermediate Egret, somewhere in the vicinity of the Fogg Dam Reserve. No such site was observed during the current surveys, so if not missed breeding here could be irregular at best.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W916.
General location:	Swim Creek channel, near Mary River mouth. Not shown on Fig C1.
Historical documentation:	Goodfellow (unpublished) and McKean (unpublished).
Land tenure:	Pastoral lease (Swim Creek Station).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	1984 (McKean).
Years confirmed inactive:	Nil. Current surveys indicate it was inactive 1990 to 1996, however such a small colony could have been missed.
Species confirmed breeding:	(3). Little Pied and Little Black Cormorant and Darter (McKean).
Species probably breeding:	
Highest no. of birds recorded:	20+, June 1984 (McKean).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	June at least (McKean).
Photographs:	No.
Ground access:	Unknown, site not observed during current surveys.
Comments:	Small cormorant and Darter colony reported on at least two occasions, though the date of the second report is not known. The colony was not seen during current surveys though such small colonies, whose sites are not accurately documented, can easily be missed during aerial surveys.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W917.
General location:	Point Stuart area, near Mary River mouth. Not shown on Fig C1.
Historical documentation:	J. McKean in Goodfellow(unpublished). Site not observed during current surveys.
Land tenure:	Uncertain, either Conservation Reserve (NT Por 4435) or pastoral lease (Swim Creek Station).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil. Numerous aerial surveys of general area between 1990 to 1996 failed to see the colony, however a small colony could have been missed.
Species confirmed breeding:	(2). Little Pied Cormorant and Darter (McKean).
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown, site not observed during current surveys.
Comments:	A small cormorant and Darter colony but no other details available. Not seen during current surveys so unable to confirm current status. Such small colonies can easily be missed during surveys.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W918. Not currently assigned to a colony.
Colony identifier:	W919.
General location:	Wildman River.
Historical documentation:	Reported in Coastal Resource Atlas of the Northern Territory (in future referred to as C.R.A.) as site 19BD0013 by A. Hertog.
Land tenure:	Uncertain, either pastoral lease (Carmor Plains Station) or Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	1987 (Hertog).
Years confirmed inactive:	Uncertain, numerous aerial surveys between 1991 to 1995 failed to locate it.
Species confirmed breeding:	(8+). Great, Intermediate and Little Egret, Pied Heron, Darter, Australian White Ibis and Cormorant species (Hertog).
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Large mixed species colony that is more than likely the former site of the now, slightly further downstream, current Wildman River colony (W029). It is also possible that if the location given in this reference is a little inaccurate, it could be referring to the current colony.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W920.
General location:	Southern part of the Arafura Swamp (Goyder River).
Historical documentation:	K. Liddy (pers. comm.).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	June 1995 (Liddy).
Years confirmed active:	Nil, possibly 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1+). Egret species (Liddy).
Species probably breeding:	Great, Intermediate and Little Egret.
Highest no. of birds recorded:	2000+, June 1995 (Liddy).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	June at least, if active (Liddy).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Roost of 2000+ egrets observed by K. Liddy at 1730 hours on 16 June 1995. There were lots of egrets seen feeding in the channels earlier during the day but he was uncertain if the concentration of birds were present in the trees at that stage. If not perhaps the site is a night roost rather than a breeding colony.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.

Colony identifier:	W921.
General location:	Arafura Swamp (Goyder River), approximately 6 km east of Old Arafura Station.
Historical documentation:	K. Liddy (pers. comm.)
Land tenure:	Aboriginal land.
Nesting habitat:	Paperbark.
Survey dates:	June 1995.
Years confirmed active:	Nil, possibly 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(4+). Pied Heron, Darter, egret and cormorant species (Liddy).
Species probably breeding:	Great, Intermediate and Little Egret, Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	2700+, June 1995 (Liddy).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	June at least, if active (Liddy).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Report of 2000+ egrets, 500+ Pied Heron and 200+ cormorants and/or Darters in and near area of paperbark, but did not get close enough to confirm breeding.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.
Colony identifier:	W922.
General location:	Tomkinson River, between Liverpool and Goyder Rivers.
Historical documentation:	Located by author during current surveys, however a N.R.S. record from 1975 may refer to the same site.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	May 1995.
Years confirmed active:	1975 (N.R.S) and possibly 1995.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2+). Darter and cormorant species.
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	5845.
Ground access:	Uncertain, site not well observed during current surveys.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.
Colony identifier:	W923.
General location:	Cadell River, , between Liverpool and Goyder Rivers.
Historical documentation:	D. Bond (pers. comm.)
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1+). Egret species (Bond).
Species probably breeding:	Great, Intermediate and Little Egret.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as possible egret colony. No further information known.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or in area on other tasks.

Colony identifier:	W924.
General location:	Coastline, east of the mouth of the Wearyan River.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Greenbank Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1995, July 1996.
Years confirmed active:	Nil, possibly 1995 and 1996.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2+). Little Pied Cormorant and egret species.
Species probably breeding:	Great, Intermediate and Little Egret, Little Black Cormorant.
Highest no. of birds recorded:	80+ (May 1995).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	May at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat would be possible, however access by foot from a landed helicopter is unknown.
Comments:	Recorded as egrets and cormorants roosting in a group in the mangroves during the day on two occasions, May 1995 and July 1996. Unable to confirm nests from the air, so may just be a roost.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.
Colony identifier:	W925 – Not currently allocated to a site.
Colony identifier:	W926.
General location:	Floodplain between Daly and Finiss Rivers, south of La Belle Station.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (probably Welltree Station).
Nesting habitat:	Paperbark.
Survey dates:	March 1994.
Years confirmed active:	Nil, possibly 1994.
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	5873-4.
Ground access:	Uncertain, site terrain cannot be recalled from current surveys.
Comments:	Recorded as a possible colony during 1994 Magpie Goose surveys. No further information available at present.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active or if in area on other tasks.
Colony identifier:	W927.
General location:	Floodplain between the Daly and Finiss Rivers.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (probably Welltree Station).
Nesting habitat:	Paperbark.
Survey dates:	March 1994.
Years confirmed active:	Nil, possibly 1994.
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site terrain cannot be recalled from current surveys.
Comments:	Recorded as a possible colony during 1994 Magpie Goose surveys. No further information available at present.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active or if in area on other tasks.

Colony identifier:	W928.
General location:	Mary River floodplain, just south-east of Shady Camp.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Marrakai Station).
Nesting habitat:	Mangroves.
Survey dates:	June 1993.
Years confirmed active:	Nil, possibly 1993.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(4+). Nankeen Night Heron, Little Pied Cormorant, Great and Intermediate Egret.
Species probably breeding:	Little Egret.
Highest no. of birds recorded:	400+ (June 1993).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	June at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys.
Comments:	Recorded as 200+ Nankeen Night Heron, 200+ egrets and a few Little Pied Cormorants roosting together during the day in mangroves along a creek. Unable to confirm nests from air, so may be just a roost. Another site of many Nankeen Night Herons approximately half a kilometre away may have been a second associated roost/colony.
Future surveying needed:	Medium priority. Site needs to be checked more thoroughly between February and May by helicopter or boat to confirm activity, if in area on other tasks.
Colony identifier:	W929.
General location:	Finniss River floodplain.
Historical documentation:	Yes, but uncertain of reference origin.
Land tenure:	Aboriginal land (Delissaville/Wagait/Larrakia A.L.T.).
Nesting habitat:	Reported as “on ground” so probably in reeds.
Survey dates:	Unknown.
Years confirmed active:	One year between 1939 and 1945.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1).
Species probably breeding:	Australian White Ibis.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as a stick nest ground colony found by a lost airman. Have the name John Hazlett in notes as either the lost airman or the author of the note.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W930.
General location:	Just north of the Daly River.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station).
Nesting habitat:	Unknown.
Survey dates:	March 1992.
Years confirmed active:	Nil, possibly 1992.
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	Unknown.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	March at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys.
Comments:	Reported during 1992 Magpie Goose surveys as a big day time roost at least. No further information at present.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.

Colony identifier:	W931.
General location:	Just north of the Daly River.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Litchfield Station).
Nesting habitat:	Unknown.
Survey dates:	March 1992.
Years confirmed active:	Nil, possibly 1992.
Years confirmed inactive:	Nil.
Species confirmed breeding:	Unknown.
Species probably breeding:	Egret species.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	March at least, if active.
Photographs:	5881.
Ground access:	Uncertain, site not well observed during current surveys.
Comments:	Reported as a big day time roost at least, during 1992 Magpie Goose surveys. No further information at present.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.
Colony identifier:	W932.
General location:	Marrakai Creek, inland between the Adelaide and Mary Rivers. Not shown on Fig C1.
Historical documentation:	Thomas (1947).
Land tenure:	Unknown.
Nesting habitat:	Unknown.
Survey dates:	Between January 1944 and January 1945.
Years confirmed active:	1944 and/or 1945.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Nankeen Night Heron (Thomas).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	100+ (Thomas).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Nankeen Night Heron breeding site reported as active sometime between January 1944 and January 1945 in the trees somewhere along Marrakai Creek.
Future surveying needed:	Medium priority. This seems a reasonably significant Nankeen Night Heron colony that should be attempted to be located and assessed.
Colony identifier:	W933.
General location:	Maria Island off the mouth of the Roper River.
Historical documentation:	None found, site reported to author, (pers. comm. Steve Johnson).
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Sand.
Survey dates:	A number of surveys of Maria Island during the period of the project indicated that no colony was active during this period.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Unknown.
Species confirmed breeding:	(1). Pelican
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unknown.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Would be okay by boat or helicopter.
Comments:	Reported to author as a former Australian Pelican colony by Steve Johnson (TO, Vanderlin Island). A number of surveys of the island were conducted during the course of the project. Such a colony would be easy to locate but it was not seen in these surveys and is unlikely to have been active between 1992 and 1999.
Future surveying needed:	Low priority. Only investigate if further evidence becomes available indicating it is again active.

Colony identifier:	W934.
General location:	Small rock outcrop near Oyster Rock in Haycock Reach of Middle Arm, Darwin Harbour.
Historical documentation:	Reported in N.R.S. (1986) by J. McKean.
Land tenure:	Crown land?
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	1986 (N.R.S.).
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Pied Cormorant (N.R.S.).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	12+, April 1986 (N.R.S.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to done at present.
Months likely to be active:	April to May at least (N.R.S.).
Photographs:	No.
Ground access:	Access possible by boat.
Comments:	Small Pied Cormorant colony on rocky outcrop in Middle Arm. Not sighted by author during current surveys but have not put much time into this area at the correct time of the year. Unable to comment on current status but probably no longer be active, at least on a regular basis.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W935.
General location:	Mainland coast near mouth of Robinson River, east of the Wearyan River.
Historical documentation:	S. Johnson (pers. comm.).
Land tenure:	Pastoral lease (Greenbank Station).
Nesting habitat:	Sand.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	1993 to 1996.
Species confirmed breeding:	(1). Pelican (Johnson).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys, but would be accessible to either boat or helicopter.
Comments:	Reported as an occasionally active pelican breeding colony. Said that pelicans have never bred on Vanderlin Island, as has been reported by some authors.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W936.
General location:	Island in the mouth of the Victoria River.
Historical documentation:	D. Woodward, Brolga Air pilot (pers. comm.).
Land tenure:	Crown Lease Perpetual.
Nesting habitat:	Mangroves.
Survey dates:	"Late 1980's" (Woodward).
Years confirmed active:	Nil, possibly once in late 1980's.
Years confirmed inactive:	1995.
Species confirmed breeding:	(1+). White species.
Species probably breeding:	Great, Intermediate and Little Egret, Australian White Ibis.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, but would require boat or helicopter if possible to access.
Comments:	Reported as an island covered in white birds during the day. No further details.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W937.
General location:	Coastline east of the Wearyan River mouth.
Historical documentation:	None found, located by author during current surveys.
Land tenure:	Pastoral lease (Greenbank Station).
Nesting habitat:	Mangroves.
Survey dates:	July 1996.
Years confirmed active:	Nil, possibly 1996.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1+). Cormorant species.
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	100+ (July 1996).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	July at least, if active.
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys. Access by boat would be possible, but foot access from a landed helicopter is unknown.
Comments:	100+ cormorant species seen together in a group in mangroves during the day. Nests were not able to be confirmed from the air and possible a little late in the year for cormorants to still be breeding, so may only be a roost.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.
Colony identifier:	W938.
General location:	Upper reaches of Catfish Creek, northern Joseph Bonaparte Gulf (Victoria R.).
Historical documentation:	Reported in Dames and Moore (1994).
Land tenure:	Aboriginal land (Daly River/Port Keats A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Nankeen Night Heron (Dames and Moore).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	No other details other than a Nankeen Night Heron colony reported in the upper reaches of Catfish Creek.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.
Colony identifier:	W939.
General location:	Small island off the north-east of West Island (off the mouth of the McArthur R.).
Historical documentation:	Recorded in N.R.S. (1966) by J. McKean.
Land tenure:	Aboriginal land (Wurralibi A.L.T.).
Nesting habitat:	Sticks/twigs on top of sandstone rock.
Survey dates:	July 1966.
Years confirmed active:	1966 (N.R.S.).
Years confirmed inactive:	Nil, but a few surveys in the area during the current surveys have not seen it active.
Species confirmed breeding:	(1). Pied Cormorant (N.R.S.).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	38, July 1966 (N.R.S.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	June to August at least (N.R.S.).
Photographs:	No.
Ground access:	Uncertain, site not well observed during current surveys. Access is probable by boat but the possibility of a helicopter landing there is unknown.
Comments:	Reported as a small Pied Cormorant colony on a small rocky outcrop off West Island on 11 July 1966. There were 19 nests with a mixture of eggs (1-3) and young (1-4). Have flown this area on at least one occasion during this part of the year in the current surveys but did not see any activity.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W940.
General location:	Approx. 30 km upstream on Blythe River (between the Liverpool and Goyder Rivers).
Historical documentation:	Recorded in N.R.S. (1976), by D. Grace.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	April 1976.
Years confirmed active:	1976 (N.R.S.).
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2). Darter and Little Pied Cormorant (N.R.S.).
Species probably breeding:	
Highest no. of birds recorded:	14+, April 1976 (N.R.S.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	April to June at least.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as small Darter colony with one pair of Little Pied Cormorants, all on eggs in mid April. Not seen during surveys, but small colonies such as this especially well inland are not likely to be found from current aerial surveys.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W941.
General location:	Red Lily Billabong, Kapalga (Kakadu National Park).
Historical documentation:	Recorded in N.R.S. (1988) by D. Baker-Gabb.
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Paperbark.
Survey dates:	August 1988.
Years confirmed active:	1988 (N.R.S.).
Years confirmed inactive:	Nil.
Species confirmed breeding:	Darter (N.R.S.).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	2+, August 1988 (N.R.S.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	July and August (N.R.S.).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Single pair, included here as may be more involved in other years or nearby unchecked locations.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W942.
General location:	Block Waterhole, south-east of Borroloola (inland McArthur River).
Historical documentation:	N.R.S. (1967), by J. McKean.
Land tenure:	Aboriginal land (Waanyi/Garawa A.L.T.).
Nesting habitat:	Paperbark.
Survey dates:	August 1967.
Years confirmed active:	1967 (N.R.S.).
Years confirmed inactive:	Nil, but current surveys unlikely to have gone near this location.
Species confirmed breeding:	(1). Darter (N.R.S.).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	30+, August 1967 (N.R.S.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	July to September (N.R.S.).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported Darter colony. Not observed during current surveys and no further information.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W943.
General location:	Coopers Creek, upstream from Murgarella Road crossing.
Historical documentation:	F. Woerle (monthly ranger report).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	May 1976.
Years confirmed active:	1976 (Woerle).
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Darter (Woerle).

Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	May (Woerle)
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Darter breeding site of unreported size, active on 11 May 1976. No further information.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier: W944.	
General location:	Adelaide River, near mouth.
Historical documentation:	Storr (1977). Frith and Davies (1961).
Land tenure:	Pastoral lease (Koolpinyah or Woolner Stations) or Cape Hotham Reserve.
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	1990 to 1996.
Species confirmed breeding:	(6). Pied Heron, Great, Intermediate, Little and Cattle Egret, Australian White Ibis and Cormorant (Frith and Davies).
Species probably breeding:	Little Pied and Little Black Cormorant.
Highest no. of birds recorded:	Uncertain but from Frith and Davies must be in excess of 10,000 birds.
Highest estimated annual usage:	Uncertain but from Frith and Davies probably well in excess of 15,000.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	November to July (Frith and Davies).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Very large mixed species colony formerly near the mouth of the Adelaide River, but definitely now extinct. The following information is taken from Frith and Davies (1961). On December 23 1957, 10,000 Cattle Egrets were present, with most incubating eggs. They were first noted in breeding plumage in the first week of November while the young had left the nest by January 20. Following the Cattle Egret the colony (February 1958) was occupied by several thousand of each of Pied Herons, Little and Great Egret, and a few Intermediate Egrets, Australian White Ibis and Cormorants. Pied Heron began first. Great Egrets began a little after the herons but had a more extended breeding season, and in May all stages from fresh eggs to fully fledged young were present. Intermediate and Little Egret began together about 3 weeks after the Pied Heron which was after the Great Egrets. Australian White Ibis used the same colony as the Egrets, Herons and Cormorants, as well as several smaller colonies along the Adelaide River. In 1957 Australian White Ibis were seen to lay eggs in March and April. A local crocodile shooter (MR G Palmer) reported to Frith and Davies that Straw-necked Ibis had bred in the colony and been finished by late May but this could not be confirmed by these authors. They were only able to confirm juveniles in the surrounding floodplains, but this does not confirm they bred in this colony. No other references seem to report Straw-necked Ibis breeding in the Top End and the author of this paper has not only not seen this species breed up here from 1990 to 1996. However in most of those years virtually all Straw-necked Ibis departed the Top End during the breeding season, while juveniles could be seen when they returned in the late wet to early dry season. Consequently young seen by Frith and Davies may have moved in from southern breeding colonies.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier: W945.	
General location:	Banks of the Roper River between the mouth and Ngukurr. Not shown in Fig. C1.
Historical documentation:	White (1917).
Land tenure:	Aboriginal land (Arnhem Land or Yutpundji/Djindiwirritj A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	February 1915.
Years confirmed active:	1915 (White).
Years confirmed inactive:	Nil.
Species confirmed breeding:	Nankeen Night Heron (White).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	February, if active (White).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Possible Nankeen Night Heron colony reported by White as he travelled up the Roper from the large colony at the mouth (W910) to Ngukurr. Exact location not mentioned. No further information.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.

Colony identifier:	W946.
General location:	Banks of the Roper River between the mouth and Ngukurr. Not shown in Fig. C1.
Historical documentation:	White (1917).
Land tenure:	Aboriginal land (Arnhem Land or Yutpundji/Djindiwirritj A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	February 1915.
Years confirmed active:	1915 (White)
Years confirmed inactive:	Nil.
Species confirmed breeding:	(2+). Darter, Cormorant species (White).
Species probably breeding:	Little Pied, Little Black Cormorant.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	February, if active (White).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Darter and Cormorant species colony just commencing to nest. Reported by White as he travelled up the Roper from the large colony at the mouth (W910) to Ngukurr. Exact location not mentioned. No further information.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active, or if in area on other tasks.
Colony identifier:	W947.
General location:	Leichhardt Billabong, Magella floodplain (East Alligator River).
Historical documentation:	Morton et al. (1991).
Land tenure:	Aboriginal land managed as Kakadu National Park.
Nesting habitat:	Paperbark.
Survey dates:	Unknown.
Years confirmed active:	1981, 1982, 1983, 1984 (Morton et al.).
Years confirmed inactive:	Nil.
Species confirmed breeding:	(1). Darter (Morton et al.).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Several sites of loose aggregations of up to 40 nests (Morton et al.).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported to consist of a number of loose aggregations of up to 40 Darter nests around the Leichhardt Billabong area, probably totalling low hundreds of birds all up. If this is the case then this site is a fairly significant Top End Darter breeding area.
Future surveying needed:	Medium priority. Should confirm if still active and if so assess seasonal regularity, timing and success.
Colony identifier:	W948.
General location:	East Alligator River.
Historical documentation:	Schultz (1982).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	April 1988.
Years confirmed active:	Nil, possibly 1988 (Schultz).
Years confirmed inactive:	Nil.
Species confirmed breeding:	Nil.
Species probably breeding:	Nankeen Night Heron (Schultz).
Highest no. of birds recorded:	50+ (Schultz).
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	April, if active (Schultz).
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as a suspected Nankeen Night Heron colony on the East Alligator River, with 50+ adults and 10+ immature birds present on 2 April 1988. Said to be probably a colony but it was not checked to confirm a breeding site rather than just a roost.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W949.
General location:	Adelaide River north-east of Tommy Policeman Lagoon.
Historical documentation:	SCRSR (08:050) by P. Whelan.
Land tenure:	Uncertain, possibly pastoral lease (Woolner Station).
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil, but not observed in a number of surveys 1990-96.
Species confirmed breeding:	Hérons, Australian White Ibis and Royal Spoonbills (SCRSR).
Species probably breeding:	
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as a very dense mixed species colony over 100 metres long on the Adelaide River. It is interesting to note Whelan reported Straw-necked Ibis were breeding in this colony. This has not been found to be the case in any of the Top End colonies surveyed during the current surveys. The colony is unlikely to be active now and birds from this site probably now use the current large colony near the Adelaide River (W025).
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.
Colony identifier:	W950.
General location:	Middle Arm/Blackmore River area in Darwin Harbour.
Historical documentation:	Reported in CRA (14BD0017) by J. McKean.
Land tenure:	Unknown.
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Unknown.
Species confirmed breeding:	(1). Little Pied Cormorant (CRA).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Uncertain, site not observed during current surveys.
Comments:	Reported as one of only three known Little Pied Cormorant breeding colonies in the Northern Territory (something the current surveys have shown not to be the case). Probably a small colony up one of the mangrove upper arms of Middle Arm. Current status uncertain but may no longer exist, at least as a regular colony.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active.
Colony identifier:	W951.
General location:	Beatrice Island off mouth of Limmen Bight River.
Historical documentation:	Reported in CRA (60BD0004) by M. Reed.
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil, but not seen to be active in a number of surveys from 1992-96.
Species confirmed breeding:	(2+). Cormorant and egret species (CRA).
Species probably breeding:	Little Pied, Pied and Little Black Cormorant, Great, Intermediate and Little Egret.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Access possible by boat or helicopter.
Comments:	Reported only as Cormorant species and Egret species colony. No other details given. Unlikely to be active now, at least on a regular basis.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.

Colony identifier:	W952.
General location:	North branch of Rose River.
Historical documentation:	None found, site reported to author during current surveys (L. Joshua, pers. comm.).
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Unknown.
Species confirmed breeding:	Cormorant species.
Species probably breeding:	Darter.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unknown.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Small probable cormorant and/or Darter colony reported by Lindsay Joshua (TO, Numbulwar) as formerly, and possibly still, active. Not observed during current surveys, however a small colony such as this may only be located if flown directly over.
Future surveying needed:	Low priority. Appears only a small colony, check only if in area on other tasks.
Colony identifier:	W953.
General location:	Edward Island, south of Numbulwar (mouth of Rose River).
Historical documentation:	None found, site reported to author during current surveys (L. Joshua, pers. comm.).
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Unknown.
Species confirmed breeding:	Cormorant species.
Species probably breeding:	Darter.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unknown.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Would be possible by boat or helicopter.
Comments:	Small probable cormorant and/or Darter colony reported by Lindsay Joshua (TO, Numbulwar) as formerly active. Not observed during current surveys despite a number of aerial visits to this island. Unlikely to have been active in any size between 1993 and 1999.
Future surveying needed:	Low priority. Appears only a small colony, check only if in area on other tasks.
Colony identifier:	W954.
General location:	Miyangkala Creek, south of Numbulwar (mouth of Rose River).
Historical documentation:	None found, site reported to author during current surveys (L. Joshua, pers. comm.).
Land tenure:	Aboriginal land (Arnhemland A.L.T.).
Nesting habitat:	Unknown.
Survey dates:	Unknown.
Years confirmed active:	Unknown.
Years confirmed inactive:	Nil.
Status:	Unknown.
Species confirmed breeding:	Cormorant species.
Species probably breeding:	Darter.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unknown.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Unknown.
Comments:	Small probable cormorant and/or Darter colony reported by Lindsay Joshua (TO, Numbulwar) as formerly, and possibly still, active. Not observed during current surveys, however a small colony such as this may only be located if flown directly over.
Future surveying needed:	Low priority. Appears only a small colony, check only if in area on other tasks.

Colony identifier:	W955.
General location:	Small creek between the Wearyan and McArthur Rivers.
Historical documentation:	None found, site located by author during current surveys.
Land tenure:	Pastoral lease (Manangoora Station).
Nesting habitat:	Mangroves.
Survey dates:	May 1999.
Years confirmed active:	Nil.
Years confirmed inactive:	Nil.
Status:	Unknown.
Species confirmed breeding:	
Species probably breeding:	Australian White Ibis and Nankeen Night Heron.
Highest no. of birds recorded:	Approx 600.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unknown.
Months likely to be active:	May.
Photographs:	No.
Ground access:	Unknown.
Comments:	Medium sized possible Australian White Ibis and Nankeen Night Heron colony with 150+ of the former and mid hundreds of the latter being present, complete with juvenile plumage birds, being observed in May 1999. Not able to sight any nests, and although likely a breeding colony, not yet able to have been confirmed.
Future surveying needed:	Medium priority. Appears likely to be a reasonably significant colony that needs to be ground assessed to confirm if active, and checked for species present and regularity of use.
Colony identifier:	W956.
General location:	Maria Island off mouth of the Roper River.
Historical documentation:	Reported by J. McKean in Thompson(1977).
Land tenure:	Aboriginal land (Arnhem Land A.L.T.).
Nesting habitat:	Mangroves.
Survey dates:	Unknown.
Years confirmed active:	Unknown
Years confirmed inactive:	Nil, although several surveys 1992-96 have not observed this site to be active.
Species confirmed breeding:	(1). Pied Cormorant (Thompson).
Species probably breeding:	Nil other.
Highest no. of birds recorded:	Unknown.
Highest estimated annual usage:	Unknown.
Allocated colony size:	Unable to be done at present.
Months likely to be active:	Unknown.
Photographs:	No.
Ground access:	Access possible by boat or helicopter.
Comments:	Reported only as signs of a past Pied Cormorant colony. No other details given. Unlikely to be active now, at least on a regular basis.
Future surveying needed:	Low priority. Only survey if information comes to hand indicating it is active again.