

EASTERN CURLEW DISTRIBUTION IN WESTERN AUSTRALIA — PART 1. Perth — Esperance District

The Eastern Curlew, *Numenius madagascariensis*, is now recognised as critically endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), partly because the population reaching Australia has more than halved since the 1980s (Vine and Weller 2015). This is therefore an opportune time to see how Western Australia's Eastern Curlew population is faring.

A general overview of the distribution of the Eastern Curlew in south-west Western Australia in recent decades is provided below, and covers the area from Perth to the Eyre Bird Observatory.

Large tidal estuaries are the habitat of choice for the Eastern Curlew in the lower south-west of Western Australia. The main estuaries can be found at the Peel-Harvey Inlet (Mandurah), Leschenault Inlet (Bunbury) and Oyster Harbour (Albany).

My records indicate that few Eastern Curlews venture south past Shark Bay and those that do are concentrated at the Peel-Harvey Inlet. There are unlikely to be more than 10/15 Eastern Curlews annually that migrate past Shark Bay to the south western corner of Western Australia.

South West

Perth (32° 02' S, 115° 49' E)

The Eastern Curlew was never common around the Swan River though in the past there was a greater habitat range available. These days sightings in and around Perth are extremely rare. The most recent sightings come from the Alfred Cove mudflats, on the Swan River. Two Eastern Curlews were sighted here during the 1981/1985 waterbird survey and one was seen on 6 November 2002. At Woodman Point two beach sightings were made in March 1997 and March 2002. These were possibly birds on their northward migration. There is one sighting from Rottnest Island in February 1989 and one from Garden Island of two Eastern Curlews in February 2010.

D.L. Serventy (1948, p. 266) commented that on occasions one or two birds at most may be seen on the Swan River Estuary. Historical Eastern Curlew sites around Perth are Herdsman Lake (1902), Lake Monger (1968-1969), Pelican Point (1936, 1955) and the South Perth foreshore (1959). Some historical records from the Rockingham district are White Lake (January 1939) and Lake Richmond (January 1941), both single birds seen in January (Sedgwick 1942).

There is an interesting report (1969) of an Eastern Curlew patrolling the grassed margins of Lake Monger (eastern side) catching grasshoppers. A local resident

had reported that two birds had been observed in the area for several days (Jenkins 1969).

During 1961 to 1965 one or two Eastern Curlews were recorded on 18 occasions between September and March at the now non-existent Causeway salt marshes, located near Heirisson Island (Tarburton 1974).



Eastern Curlew feeding at Lower King River, Albany. Photo by Steve Elson

Mandurah (32° 33' S, 115° 42' E)

The Peel Harvey Estuary is the most important site for Eastern Curlew in the southern part of Western Australia. Mandurah Quay Island, also known as One Tree Island, is located in Sticks Channel and is an important roosting site for Eastern Curlews. They arrive in late August and like to shelter and roost among the island's samphire. This habitat makes them very hard to detect as they are totally submerged in the samphire scrub and their presence is often only revealed by a

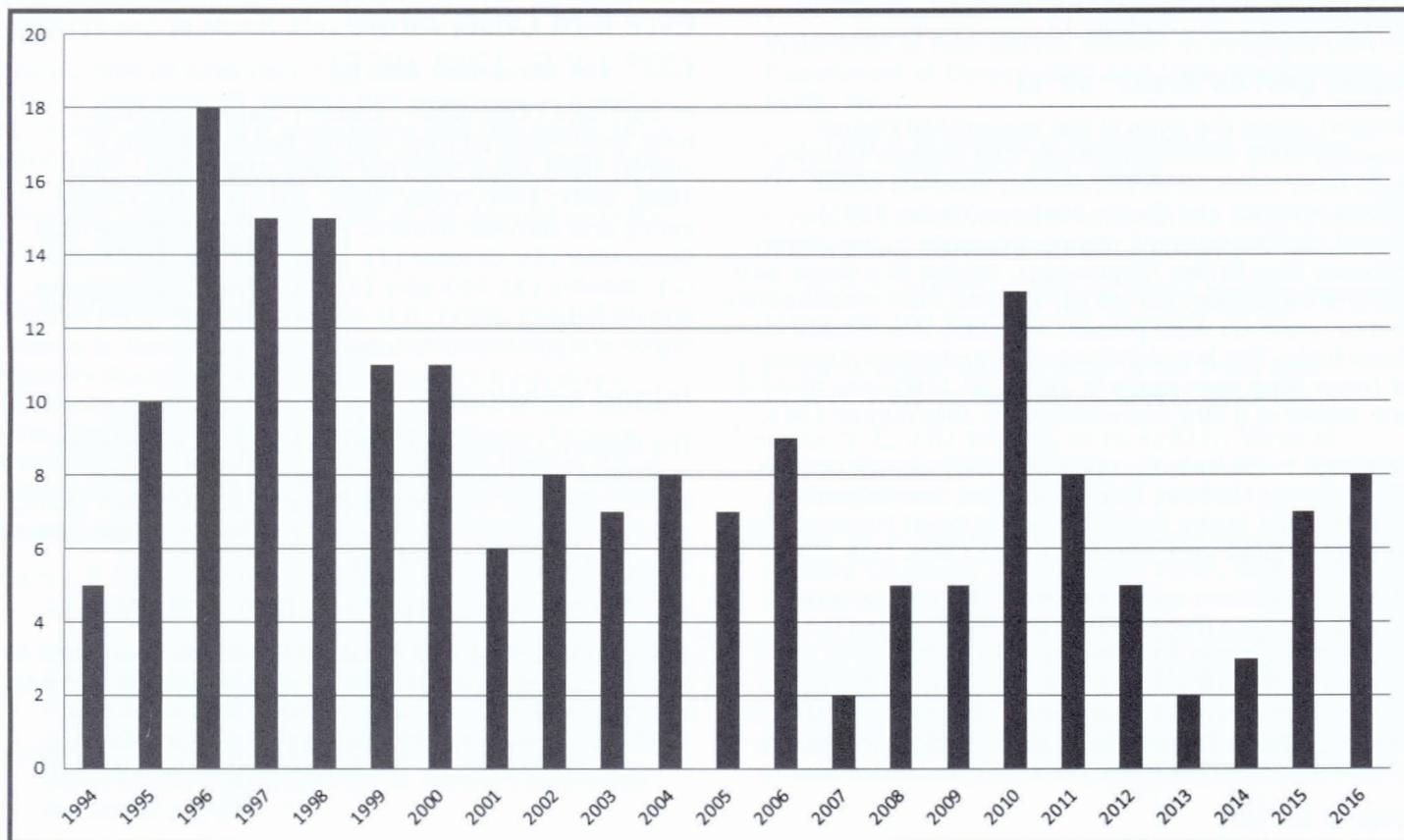
protruding head or when alarmed by a raptor passing overhead. At low tides the Eastern Curlews move to nearby Boundary flats to feed. These mud flats are located between Channel Island and Boundary Island and are a valuable and frequently used wader feeding site. Soldiers Cove is another site used, as are the mudflats south of Creery Island. The connection of Eastern Curlew with the Peel Inlet extends back into time as they were known to the local indigenous people, who knew the species as wid-joo-on-ong (Serventy and Whittell 1976).

The Eastern Curlew has been recorded in the samphire flats fringing the narrow entrance between the Peel Inlet and Mandurah back to 1928. Serventy (1930) mentioned that in those days the Peel Inlet connected with the ocean by means of a narrow channel with a sand bar at the mouth.

Extensive development in the northern Peel Inlet has reduced the amount of suitable wader habitat. There used to be a long shallow sandbank (approximately 300 metres long and 20 metres wide) in the middle of the main Mandurah Estuary channel that ran parallel to Fairbridge Road. This was a wader roost used by one or two Eastern Curlews until it was removed by dredging (G. Baker *pers. comm.*). Dolphin Pool was another site in Mandurah that supported Eastern Curlews but it has since been developed into a marina. Large sections of the Creery wetlands have been turned into the Mariners Cove canal development.

Surveys conducted by the Department of Parks and Wildlife showed that the maximum number of Eastern Curlew counted throughout the Peel-Harvey Estuary during 1996-1997 was 19 and during 1998-1999 was 24 (Lane *et al.* 2002a, b). Sector counts were conducted

Figure 1. Highest annual counts for Eastern Curlews at Peel Inlet, 1994 to 2016.



over different days and did not account for any Eastern Curlew movements. Maximum counts for these periods are more likely to be 18 and 15.

The population of Eastern Curlew in the northern Peel Inlet appears to be declining (Figure 1). The maximum number, seen in the past six years has been below ten birds. A maximum of five Eastern Curlews, presumably young birds, have overwintered at Peel Inlet. They do not overwinter each year and it is usually only single birds that remain. Eastern Curlews were present in the winters of 1996, 1997, 1998, 2008, 2010, 2011, 2013 and 2015 (Rule 2011). The winter months were restricted to June and July for analysis purposes as the first Eastern Curlews arrive back from the northern regions in August at the Peel Inlet. Maximum monthly counts for the period 1994 to 2016 are shown in Figure 2.

Eastern Curlew observations come from a range of different locations such as Creery wetlands, Soldiers Cove, Samphire Cove, Mandurah Quay Island, Serpentine River Reserve, Austen Bay, Boundary Flats, South Yunderup, Murray River delta and Channel Island. Most of these sites are under considerable pressure due to disturbance from recreational activities.

At present Eastern Curlew behaviour shows that they feed in the Creery wetlands, Mandurah Quay, Samphire Cove and Soldiers Cove and then congregate back at the Creery wetlands in the afternoon to roost.

Bunbury (33° 18' S, 115° 41' E)

The Eastern Curlew is seen at both Leschenault Estuary and Leschenault Inlet, an estuarine lagoon, though in lesser numbers these days. Eastern Curlews at Leschenault Inlet probably form part of the same core population that frequents the Peel-Harvey Inlet. Locations at Leschenault Inlet have changed over the years. Whitlock (1939) mentions small numbers feeding in the quieter parts of the estuary. In the eighties the mouth of the Preston River was a favourite location. These days most records come from the spit of land extending into the estuary on the northern side of the Collie River in the vicinity of Point Douro. Most sightings are of solitary birds, although up to four were sighted in 2016 and five in 2005. The highest count was 15 in February 1998. Records come from a variety of sites such as Preston River mouth, Point Douro, Pelican Point, Eaton, Leschenault Inlet, Australind, Point Mornington and Victoria Bay.

There are three sightings from Yalgorup National Park, located to the north of Leschenault Inlet and west of the Peel-Harvey estuary. One Eastern Curlew was sighted south of the causeway at Lake Preston on 28 November 1998, and was probably in transit to one of the adjacent estuaries. One bird was flying north at Preston Beach in August 1995 and one at Lake Preston in January 2010.

Eastern Curlew distribution in Western Australia — Part 1. Perth — Esperance District, ctd

Maximum monthly counts for the period 1991 to 2016 are shown in Figure 3. The data show a strong bias for February as this coincides with the annual shorebird counts.

Albany (35° 03' S, 117° 52' E)

A report about the birds of the Broome Hill District covering 1903 to 1913 mentions that Eastern Curlews were fairly common on the shallow mudflats about Albany Harbour and Oyster Harbour (Carter 1923). Recent sightings around Albany, generally in the vicinity of Lower King Bridge (Esplanade), consist of a single bird. Reports throughout the period 1960 to 1980 mention that one or two birds were present at Albany and occasionally three birds. The last sightings of three Eastern Curlews at Lower King were made in 1989 and 1990, and there is one record of a bird overwintering in July/August 1988.

Sightings come from a variety of locations such as Emu Point, Oyster Harbour, King River Inlet, the Kalgan mudflats and Rushy Point at Princess Royal Harbour. The few sightings at Rushy Point coincided with high tides.

The south western coastline covers the area between Albany and Eyre Bird Observatory, representing the southern migration limit for the Eastern Curlew in this state, with sightings to the east rare, and confined to estuaries and inlets. Solitary birds were seen at Pallinup Estuary (1926), Stokes Inlet (1983), Wellstead Estuary (2008) and Beaufort Inlet (2008). One bird was seen on

Morley Beach at Wilson Inlet (2012) which is to the west of Albany.

Eyre Bird Observatory (32° 14' S, 126° 19' E)

At Eyre Bird Observatory, Eastern Curlew sightings have been reported from Kanidal Beach. Records of solitary birds come from the years 1980, 1981, 1983, 1985, 1987, 1990, 1996, 2003, 2012 and 2013 in the spring and summer months. Monthly sightings are from September (1), October (1), November (1), December (2), January (3), February (1) and April (1) (de Rebeira and de Rebeira 2005). It is an uncommon migrant in this region and not seen each year.

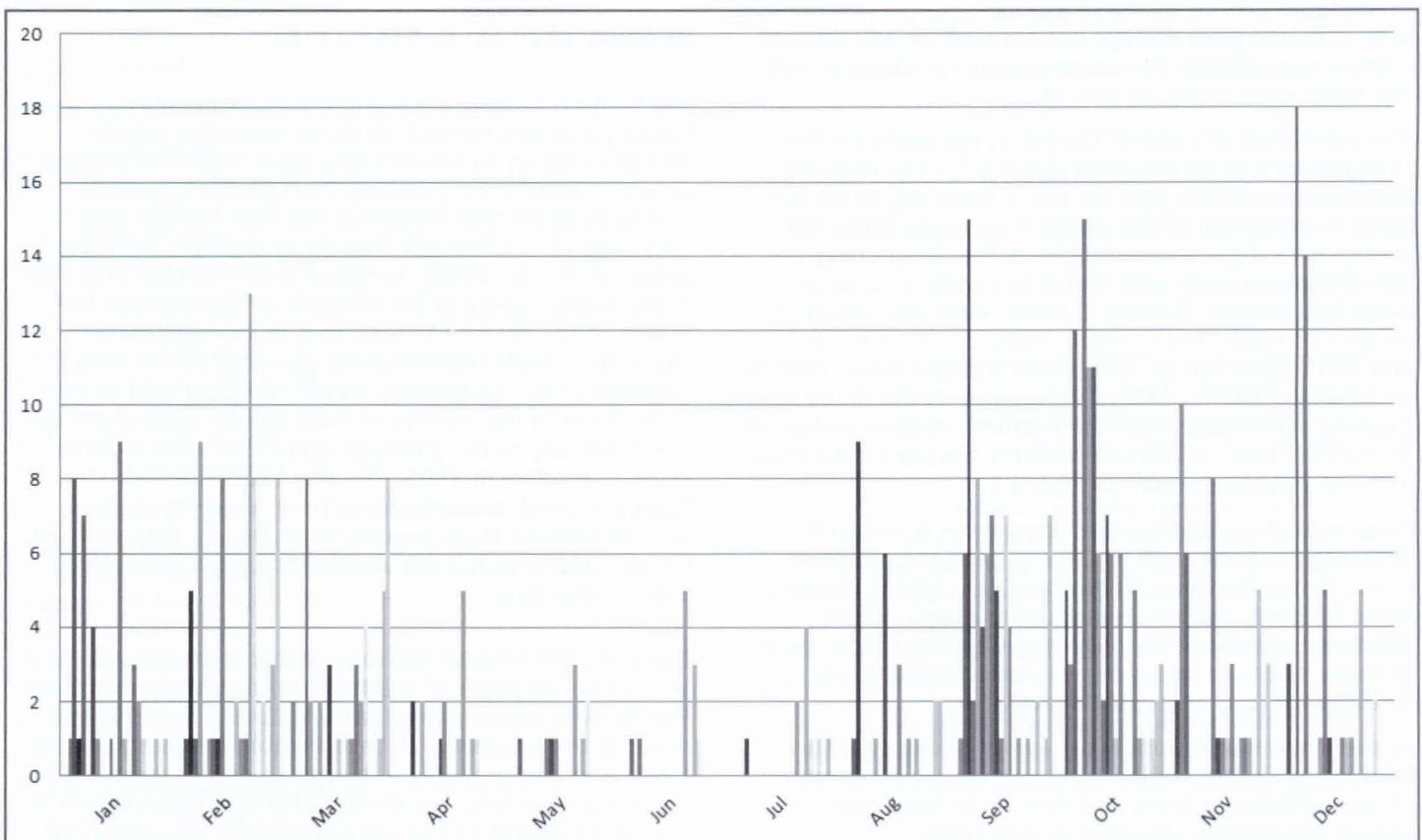
Inland sightings

The Eastern Curlew rarely ventures far from the West Australian coast line, as shown by the few available inland sightings. Two were sighted at Station Lake (June, 1981), 5 km inland, and one at Lake Bambun near Gingin (March, 1983), 37 km inland.

Western Australian migration pattern

At Peel Inlet the earliest return dates are from the last week in August onwards. This is based on limited records showing increased numbers in August e.g. 23 August 1997 (8); 31 August 1997 (9) and 23 August 2003 (6) indicating new birds for the season had arrived back at

Figure 2. Maximum monthly counts for Eastern Curlews at Peel Inlet, 1994 to 2016.



Eastern Curlew distribution in Western Australia — Part 1. Perth — Esperance District, ctd

the Peel Inlet. Departure seems to be during March, often late March. There are records of birds still present at Peel Inlet in late March e.g. 29 March 1987 (10), 26 March 1998 (8) and 24 March 2016 (4).

The number of birds returning each year to the Peel Harvey Inlet is small, making this population vulnerable to change, especially if considering that shorebirds show strong site fidelity and these are possibly the same birds that return each year. The number of Eastern Curlew overwintering might be an indication of the recruitment rate for this specific population.

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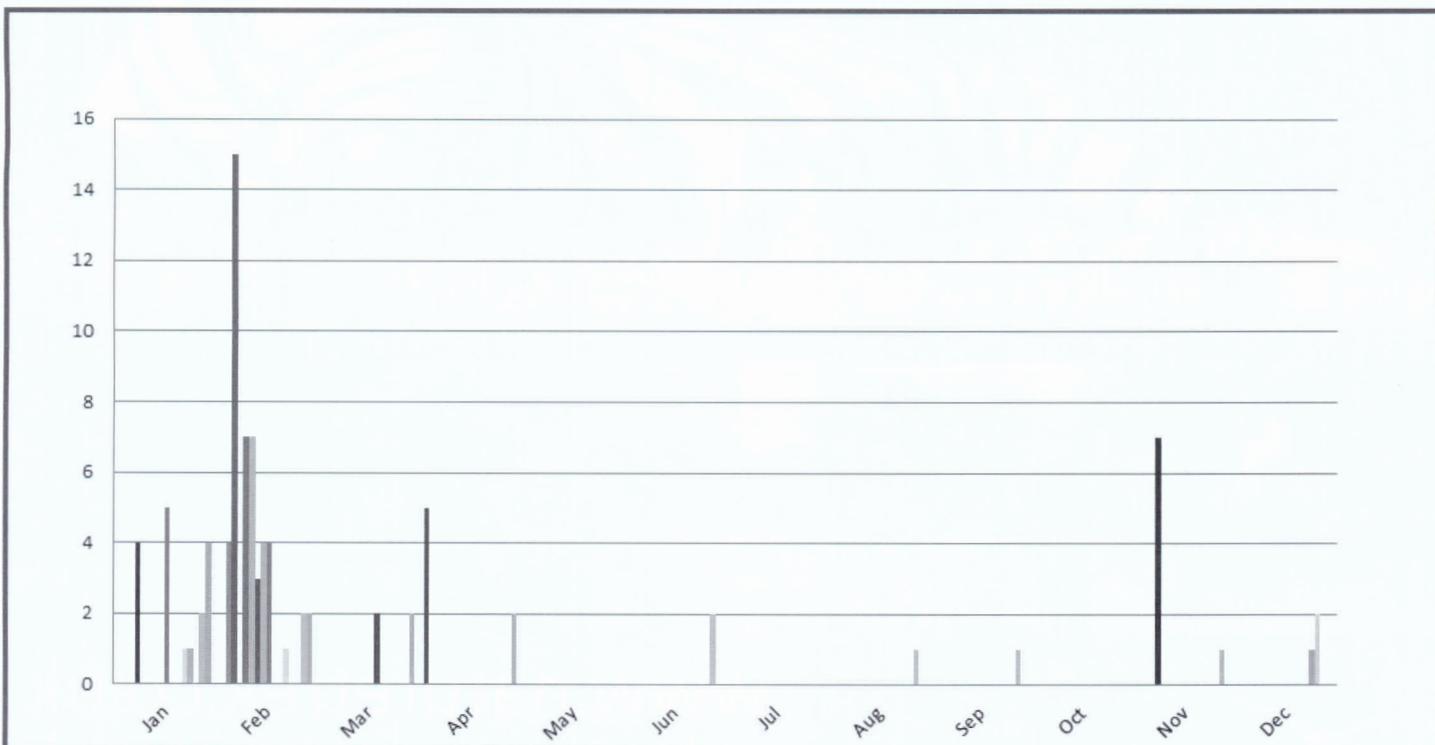
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Figure 3. Maximum monthly counts for Eastern Curlews at Leschenault Inlet, 1991 to 2016.



EASTERN CURLEW DISTRIBUTION IN WESTERN AUSTRALIA — PART 2

Geraldton – Shark Bay District – Carnarvon – Exmouth

The Eastern Curlew, *Numenius madagascariensis*, is now recognised as Critically Endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), partly because the population reaching Australia has more than halved since the 1980s (Vine and Weller 2015). This is therefore an opportune time to see how Western Australia's Eastern Curlew population is faring.

A general overview of the distribution of the Eastern Curlew for the Perth to Esperance region in recent decades was provided by Singor (2016), and the current contribution covers the area from Geraldton to Exmouth.

The West Australian coast line between Perth and Shark Bay is largely devoid of suitable habitat for the Eastern Curlew. As a consequence, there are few sightings from this part of the coast.

Mangroves with tidal sand or mudflats provide the preferred habitat for the Eastern Curlew and such habitats occur naturally in most coastal areas of Western Australia north of Shark Bay. Birds using these areas eat crustaceans, specially crabs, extracted from deep in the mud. This might be the reason this bird was once called Sea Curlew. At high tide Eastern Curlews can sometimes be found in lagoons and samphire behind the mangrove belt.

Geraldton

The Houtman Abrolhos is a group of islands located off shore from Geraldton. There are stands of mangrove on the islands, providing suitable habitat for Eastern Curlews. Records from the Western Australian Museum show the Eastern Curlew is a scarce visitor to the islands from September to June; usually single birds are seen, for example one Eastern Curlew from Pelsaert Island in February 1981, though one party of six was reported from Pelsaert Island (Storr *et al.* 1986).

Kevin Coate made visits to the Abrolhos, twice a year from 1987 to 2007, mainly in November and December and lasting between two and four days, visiting Pelsaert, Gun, Square, Wooded, Morley, Serventy, Alexander and Leo Islands. On the four day trips, West Wallabi, Beacon and Long Islands were included (K. Coate pers. comm.). On these visits he only recorded one sighting of an Eastern Curlew on Gun Island, Pelsaert Group in March 2005. The most recent record available is one

Eastern Curlew on North Island on 11 December 2013. This suggests that the Eastern Curlew may not be as prevalent on the Abrolhos Islands these days.

Hutt Lagoon is near the township of Gregory, midway between Geraldton and Kalbarri. The Hutt River reaches the Indian Ocean six kilometres south-east of Port Gregory and has a closed river estuary when flow is reduced. Eastern Curlews have been seen at these locations. Solitary birds were observed in February 1983, July 1983 and March 2007.

At Kalbarri one Eastern Curlew was seen in February 2003 near Red Bluff. An historical record noted two Eastern Curlews on a reef at the Murchison River mouth in September 1948.

Shark Bay

Shark Bay is the most southern location on the West Australian coast where reasonable numbers of Eastern Curlew can be found. The mangroves of Shark Bay comprise only one species, the white or grey mangrove, *Avicennia marina*, and these trees occur around the coastline in widely dispersed and often isolated stands of varying size (Rule *et al.* 2012). There are Eastern Curlew records covering most months of the year, although higher numbers are reported over the summer months.

BirdLife Western Australia has been conducting annual surveys of shorebird populations on Faure Island since 2008 (Mather 2015). Here, Eastern Curlews were mostly found at the northern end at the mouth of 'the tadpole', named after a distinctive geographical feature, and at the Eastern Creek area. Counts were held at shorebird roosts. The number recorded during these surveys is shown in Table 1.

Hamelin Pool, the southern basin of Shark Bay, located to the south of Faure Island, is hyper-saline and Eastern Curlews seem to avoid this section as observations come only from the northern basin.

Eastern Curlew observations come from a range of different locations around Shark Bay such as Faure Island, Little Lagoon (1), Useless Loop, 14 Mile Creek (5), Dirk Hartog Island, Quoin Bluff (7), Peron Peninsula, Guichenault Point (2), Herald Bight (1), Debaut Point to Rocky Corner (6) and Pelican Island (23) (Storr 1985). In a ground survey conducted from 4 October 1987 to 9 October 1987, 313 Eastern Curlews were recorded at Shark Bay (Jaensch and Vervest 1990). Although counts have not been that high since, good numbers are still seen, as indicated by the Faure Island surveys. F. H. Whitlock spent June to September 1920 on Dirk Hartog Island and part of September and October 1920 around Denham. He reported that Eastern Curlews were often heard calling at Dirk Hartog Island and Peron Peninsula and a few pairs were seen (Whitlock 1921). There is also a historical record from Bernier Island in September 1910 (Lipfert 1912).

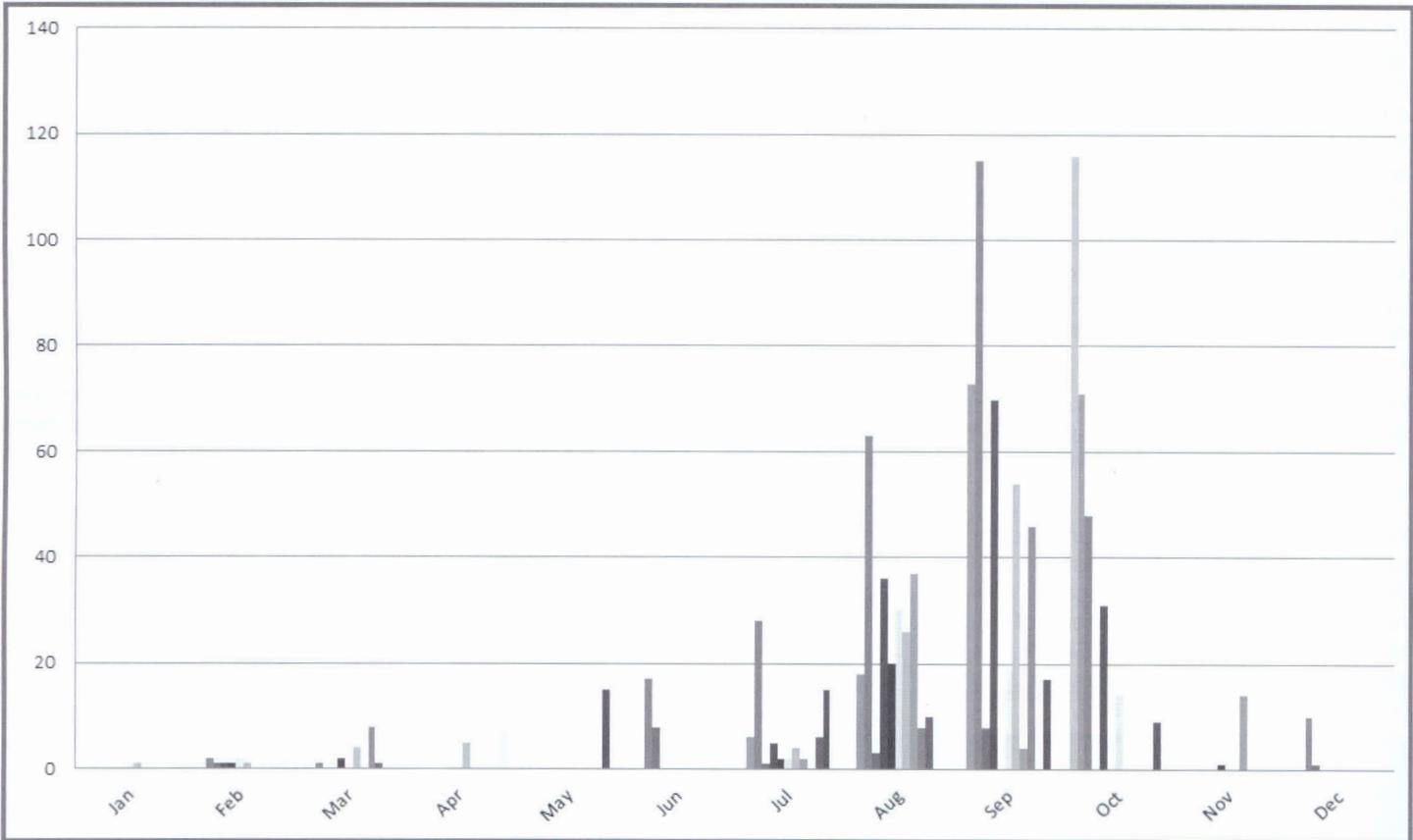


Eastern Curlew, Derby. Photo by Lou Leidwinger

Table 1. Eastern Curlew population counts from Faure Island, 2008-2015.

Date	November 2008	September 2009	October 2010	October 2012	October 2013	October 2014	October 2015
Number of birds	66	69	78	131	37	12	31

Figure 1. The Maximum monthly counts of Eastern Curlew at Boat Harbour, Carnarvon 2004-2016.



Carnarvon (24° 52' S, 113° 40' E)

The greater Carnarvon region, for the purposes of this article, covers sites between Miaboolya (8 km to the north of Carnarvon) and Long Point (70 km to the south of Carnarvon). The observation records for this stretch of coastline are shown in Figure 2 and include records from Boat Harbour. Les George has been conducting regular shorebird counts in this area for over a decade and has gathered detailed information on the local Eastern Curlew population (George 2009).

The maximum numbers of Eastern Curlew seen at each of the sites between Miaboolya and Long Point are shown in Table 2. These surveys show that Eastern Curlews frequent numerous coastal sites between Carnarvon and Shark Bay. Access to some of these sites can be difficult. A small population (20 to 40) spends the austral winter (breeding season) along this part of the coast.

Carnarvon Boat Harbour (also known as Pickles Point), was surveyed from 2004 to 2016. Records from this site show a gradual build up in Eastern Curlew numbers over August, peaking in September and October, with birds showing a preference for this site when they arrive in Carnarvon.

It is likely the Eastern Curlew population then disperse south wards along the coast between Carnarvon and Shark Bay. Numbers at Boat Harbour remained low from November through to May with a slight increase over the winter months of June and July. Overall numbers observed at the Boat Harbour have reduced in comparison to past surveys. The maximum monthly counts at Boat Harbour, Carnarvon for the period 2004 to 2016 are shown in Figure 1.

Oyster Creek and the marshes south of Uendoo Creek support good numbers (30-120) of Eastern Curlew both at the start and end of the migration cycle.

Indications are that this part of the coast line warrants closer investigation.-

McNeill Claypan is an extensive samphire covered floodplain to the south of Carnarvon and about 5 km inland. One Eastern Curlew was sighted here in October 2011 in the south-eastern part.

Lake MacLeod, which is located to the north of Carnarvon, has had nine shorebird surveys conducted between 1999 to 2004 and covering various months. Only one sighting of an Eastern Curlew was made at Lake MacLeod in September 2000. Lake MacLeod has extensive mudflats and mangroves and is situated about 10 km inland.

Figure 2. Maximum monthly counts of Eastern Curlew - Greater Carnarvon region 2004-2016.

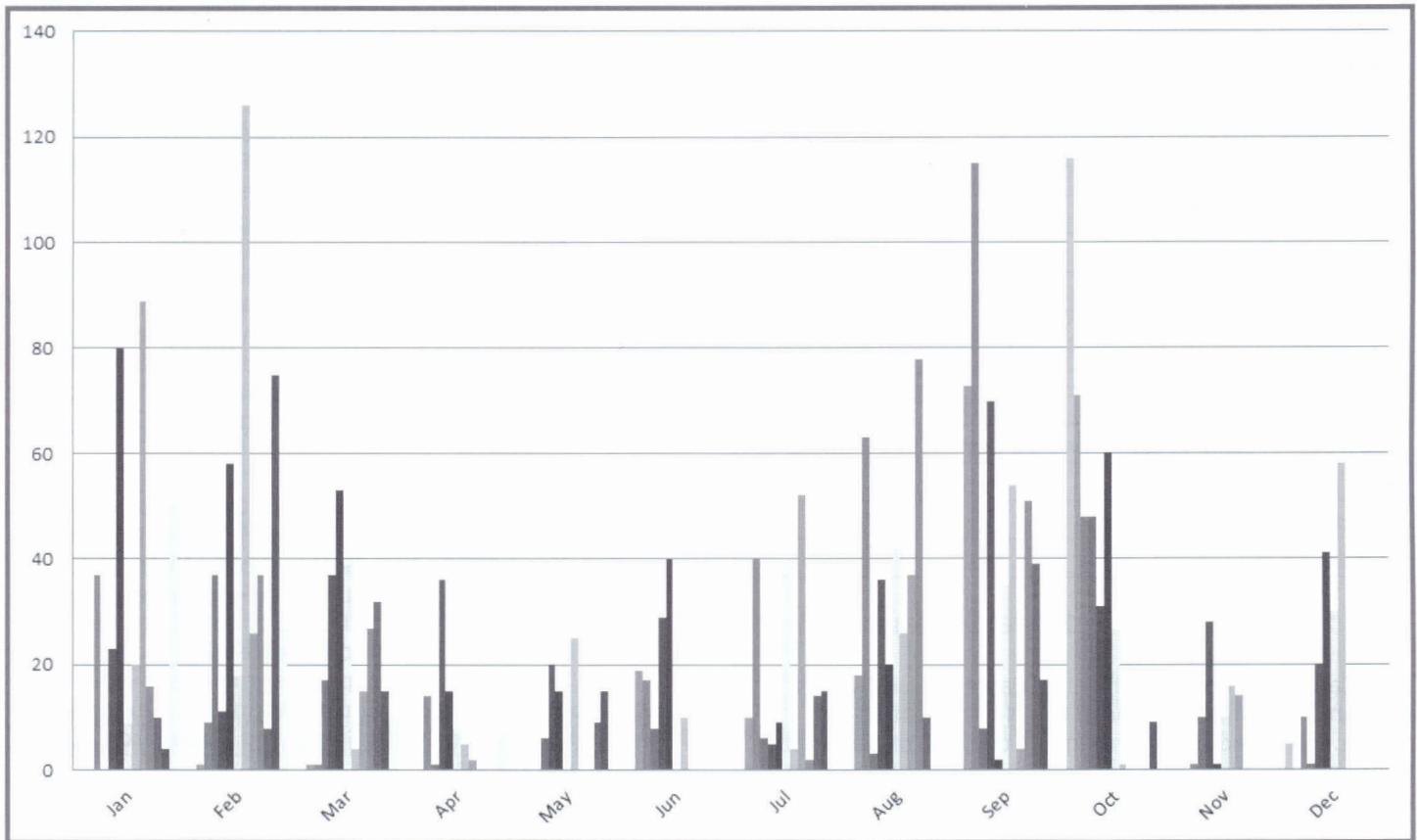


Table 2. Maximum counts for Eastern Curlew at sites in the greater Carnarvon region 2004-2016.

Miaboolya	1	Feb. 2008	Greenough Point	4	Nov. 1982
Middle Creek	4	Feb. 2014	Denham Hummock	6	Nov. 1982
North Water	51	Sept. 2013	Iddy Biddy Creek	12	Feb. 2016
Pelican Point	28	Apr. 2004	Roundabout	17	Dec. 2009
Boat Harbour	116	Oct. 2004	Redcliffe	27	Mar. 2013
Carnarvon South	126	Feb. 2012	Telstra T north	18	Mar. 2014
Massey Bay Marsh	75	Feb. 2015	Telstra T south	18	Feb. 2010
Uendoo Creek	43	Sept. 2006	Rocky Corner	4	Mar. 2012
25th Marshes	80	Jan. 2009	Boundary Creek	19	Feb. 2016
New Beach	20	Dec. 2008	Long Point on Edagee	14	Feb. 2016
Bush Bay	19	Feb. 2012			

Exmouth

Few shorebird surveys have been conducted in Exmouth Gulf, although these have identified locations where Eastern Curlew were present. There are extensive mangroves and mudflats on the eastern side of Exmouth Gulf and most observations come from this area. However, the relative importance of each site still requires further investigation. Sites where Eastern Curlew have been recorded in the Exmouth Gulf are listed in Table 3. A few overwintering birds have been recorded in May and June.

Shorebird surveys were held in January, March and August 2004 on the eastern side of Exmouth Gulf, in connection with the Yannarie salt project (Biota 2005). Eastern Curlews were widespread and recorded from all islands, except Wagtail, Dean and Scott Creek and all sections of the Gulf except the south. The mudflats to the north and south-west (creek mouth) of Hope Point were used for foraging at low tide. Eastern Curlew was recorded in all three surveys with a maximum of 189 in August and a minimum of nine individuals in March. They were seen in groups of up to 124 (Biota 2005).

Table 3. Maximum counts for Eastern Curlew at sites surveyed in Exmouth Gulf in recent decades.

Location	Months present	Maximum number
Bay of Rest, North	Feb, Mar, May, Oct	29
Bay of Rest, South	Nov	2
Gales Bay	Nov	9
Doole Island	Jun, Oct, Nov	26
Point Maxwell	Nov	1
Sandalwood Peninsula	Feb, Oct	2
Giralia Bay	Feb, Nov	2
Dean Creek	Jan, Mar	12
Scott Creek	Jan, Oct	26
Coast east of Islam Islets	Oct	22
Hope Creek, Hope Point	Jan, Mar, Aug	17
Burnside Island	Oct	1
Tent Island	Oct	3

Tom Carter commented that the Eastern Curlew was a common summer visitor in the North West Cape region. He found them arriving at the end of September, although odd birds remained all winter and large flocks were noted near North West Cape in July and August 1902 (Carter 1903). Further historical records (1916) come from Point Cloates in the Ningaloo Marine Park. Small numbers (11) have been sighted at Mangrove Bay in Cape Range National Park. Records come from the months August, September, January, May and July between 2000 and 2006.

Western Australian migration pattern

The migration pattern of Eastern Curlew in the mid-west of Western Australia is not clear.

Northward migration

The Eastern Curlew migration from the north-west of Australia commences in early March with the bulk of migration occurring during the second half of March, with some departures continuing into early April. This information is based on visible flock departures at Broome and the earliest sighting of a flagged bird overseas.

Eastern Curlews from the Carnarvon region are likely to follow a similar migration pattern as their Eastern States counter parts. This being the case, breeding birds would depart from the Carnarvon region on a non-stop flight to China/South Korea in March. A portion of non-breeding birds remains as shown by the winter surveys. It is unknown if part of the non-breeding population moves further north (Minton *et al.* 2011).

Southward migration

Eastern Curlews arrive back in the north-west of Australia in late July though more frequently from early August onwards. On the southward migration they are likely to fly direct to north-western Australia and then disperse to their final destination in a staged approach. This could mean that Eastern Curlews at Carnarvon either

arrive direct from overseas or move down from Roebuck Bay, the number increasing at Carnarvon from early August (George 2009).

Eastern Curlews have been leg flagged during the annual north-west Australia wader expeditions. Most banding and leg-flagging was done at Roebuck Bay, Broome and Eighty Mile Beach. There have been six sightings of Eastern Curlew with yellow leg flags at Carnarvon. Some had a yellow flag on their right leg and some had yellow flags on both legs. Sightings were made during the months July, August, September and October in the years 2005 and 2006. Records were obtained from the leg flag sighting database from the Australian Wader Study Group (AWSG).

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(e.g. Barbary Dove, Musk Lorikeet) and those that are rarely seen (e.g. Zebra Finch, European Goldfinch) or whose establishment or otherwise cannot yet be judged (e.g. Major Mitchell's Cockatoo, Ring-necked Parakeet) are generally unknown. Further, the degree of survival, persistence and rates of increase after introduction are not readily obtainable. So it is worthwhile presenting the information known up until 2013.

The Perth District

Abbreviations

HAD: Historical Atlas Database, 1900-1976. 1704 surveys.
 1FAD: First Atlas Database, 1977-1981. 1394 surveys.
 2FAD: Second Atlas Database, 1998-2002. 4704 surveys.
 NAD: New Atlas Database, 2003-2013 to date. 6341 surveys.
 RR: Reporting Rate (%).

The Birds (see Table 1 below)

THE STATUS OF INTRODUCED BIRDS IN THE PERTH AND MANDURAH DISTRICTS

Introduction

All birdwatchers know the commoner introduced species in the Perth and Mandurah districts (as defined by Stranger (2003a, b)), but those that did not survive

The Mandurah District-

Abbreviations

HAD: 416 surveys. 1FAD: 373 surveys. 2FAD: 1403 surveys. NAD: 1086 surveys.

The Birds (see Table 2 p27).

Table 1. The status of introduced birds in the Perth District.

Species	HAD records	HAD RR%	1FAD records	1FAD RR%	2FAD records	2FAD RR%	NAD records	NAD RR%
Brown Quail. Presumably aviary escapees (Storr 1991:46) and/or their progeny, and a local roadkill had the plumage typical of the Pilbara population (Ron Johnstone, W.A. Museum). Kimber (1972) observed the species as far south as Dwellingup and there are other observations in the Mandurah district (Stranger 2003a:10)	2	0.12	1	0.07	13	0.28	11	0.17
King Quail. Aviary escapees (Storr 1991:46) or releases and/or their progeny								
Indian Peafowl. Feral on Rottnest Island since ca 1912 (Storr 1991:47)							24	0.38
Common Pheasant. Feral on Rottnest Island since 1928 (Storr 1991:46)	7	0.41	13	0.93	66	1.40	27	0.43
Domestic Turkey. Briefly feral on Garden Island (Storr 1991:46)								
Mute Swan. Presumably vagrants from the Northam population, which was established in the early part of the 20 th century (Storr 1991:33)	2	0.12	8	0.57			1	0.02
Canada Goose. Origin unknown							2	0.03
Greylag Goose and its domestic derivatives					56	1.19	412	6.50
Muscovy Duck. Escapees from domestic situations					46	0.98	20	0.32
Northern Mallard and its derivatives. Escapees from domestic situations, and/or their progeny	2	0.12	28	2.01	272	5.78	67	1.06

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