



KAPAR POWER STATION WATERBIRD REPORT 2008

*A report of monthly waterbird counts made at Stesen Janaelektrik Sultan Salahuddin
Abdul Aziz, Kapar, Selangor Darul Ehsan, Malaysia*

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Cover photo: Kapar hosts internationally significant numbers of Lesser Sand-Plovers in December. (David Bakewell/MNS)

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Finally, a special mention must be made of the many unnamed volunteers who have carried out the Malaysian part of the Asian Waterbird Census faithfully since 1987. Without their diligence and effort, far less would be known about the status of waterbirds in the country than is the case.

EXECUTIVE SUMMARY

Monthly counts of waterbirds at Kapar Power Station were conducted for nine months of 2008, the first time the site has received consistent coverage during a calendar year.

Counts of over 15,000 or more migratory waterbirds were made during the period of southward migration and in the months of northern winter season, confirming the international importance of the site. Species diversity among waders was highest during the northward migration, during April.

Internationally significant numbers of seven species were counted, namely Lesser Sand-Plover *Charadrius mongolus* (13% of the estimated East Asia - Australasia Flyway population). Greater Sand-Plover *Charadrius leschenaultii* (2.5%), Eurasian Curlew *Numenius arquata* (14%), Whimbrel *Numenius phaeopus* (2.7%), Common Redshank *Tringa totanus* (3.5%), Nordmann's Greenshank *Tringa guttifer* (4.4%) and Terek Sandpiper *Xenus cinereus* (1%).

Five species of conservation concern were recorded, namely the globally threatened Nordmann's Greenshank (Endangered) and Spoon-billed Sandpiper *Eurynorhynchus pygmaeus* (Critically endangered) and near-threatened Black-tailed Godwit *Limosa limosa*, Asian Dowitcher *Limnodromus semipalmatus* and Eurasian Curlew. Small numbers of a newly described and probably endangered taxon, White-faced Plover *Charadrius (alexandrinus) dealbatus*, were also seen.

Observations of birds with coloured leg-flags which had been attached in China, Thailand and Australia confirmed the significance of Kapar as a key migratory stop-over site for birds traveling along the East Asia-Australasia Flyway.

Comparisons of the 2008 counts with counts made over the previous 18 years indicate that the site is increasing in importance as a safe haven for waterbirds, probably as a result of the destruction of alternative feeding and roosting areas along the west coast of Peninsular Malaysia.

In the light of this, possible future threats to the suitability of the site and its environment for waterbirds are discussed and various counter measures suggested.

1.0 INTRODUCTION

1.1 Background

1.1.1 *The East Asia – Australasia Flyway*

The migration of waders and other waterbirds between the Northern and Southern Hemispheres occurs annually along certain well-defined routes or ‘flyways.’ The flyway that brings these birds to Stesen Janaletrik Sultan Salahuddin Abdul Aziz, Kapar (hereafter referred to as Kapar Power Station), situated on the North-central Selangor coast, is the East Asia–Australasia Flyway (EAA Flyway) (Figure 1).



FIGURE 1. Map showing the East Asia-Australasia Flyway and important waterbird sites on the Flyway. (Illustration: Maki Koyama © 2008 Partnership for EAAF)

Each year, around early July, millions of waders begin to leave their breeding grounds in eastern Siberia and Alaska, central Asia and Mongolia, and head southwards. Prior to setting off, they feed frantically, gaining up to a third of their body weight in fat – the energy that will power their marathon journey south. This migratory journey, which lasts around three months, takes the birds down the East Asian and South-east Asian coastlines. Many continue southwards as far as New Zealand and Australia, while others remain on available feeding grounds in South-east Asia, including the west coast of Peninsular Malaysia.

Six months later the whole process is repeated in reverse, as the birds head northwards towards their breeding grounds through the months of February, March and April.

An estimated one million birds pass through the Straits of Melaka every year, and tens of thousands rely on the biologically rich mudflats of the North-central Selangor coast during the migration seasons and northern winter months.

The coastal plains of East and South-east Asia have been the focus of intense development over the last few decades, and destruction of coastal habitats essential for waterbirds has had an inevitable effect on populations of waterbirds. Asian Waterbird Census results between 1987 and 2007 revealed an estimated reduction in waterbird populations visiting Malaysia of over 22% (Li *et al.* 2007).

1.1.2 Waterbird Studies at Kapar

The ash ponds at Kapar Power Station and the surrounding mudflats have long been recognized as a prime migratory waterbird stopover site in Malaysia.

The site was first identified as an important roosting site for waterbirds in 1988 by the Asian Wetland Bureau (AWB) (now Wetlands International-Malaysia). Counts made at the site (usually during January) as part of the Asian Waterbird Census for the years 1990 – 1995 and annually since 1999 have shown an increasing trend (see Section 4.1).

An intensive study of waterbirds at Kapar, commissioned by Tenaga Nasional Berhad (TNB) and published in 1993, was undertaken by AWB, and included almost daily counts at the site from 2 March to 7 April 1992 (Sebastian *et al.* 1993).

However, as far as is known, this is the first time that counts have been collected throughout a calendar year. Counts were received for nine months of 2008 (Table 1).

TABLE 1. Counts of waterbirds at Kapar Power Station per month in 2008.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No of counts	1	-	1	4	1	2	2	2	1	-	-	2

Though not completely comprehensive, these counts provide some insights into the use of the ash ponds as a waterbird roost and feeding area throughout the year, and provide some interesting comparisons with results of earlier studies.

1.1.3 Kapar in the local, national and the EAA Flyway contexts

It is important to understand that Kapar Power Station ash ponds form part of an ecosystem, and, as far as waterbirds are concerned, would be of very little value apart from the rest of this system.

Kapar Power Station is part of the North-central Selangor coast Important Bird Area (IBA) (Figure 2). IBAs are *sites of international importance for bird conservation at the global, regional or national level, based upon standard, internationally-recognized criteria*, recognized under the BirdLife International IBA Programme (Yeap *et al.* 2007).

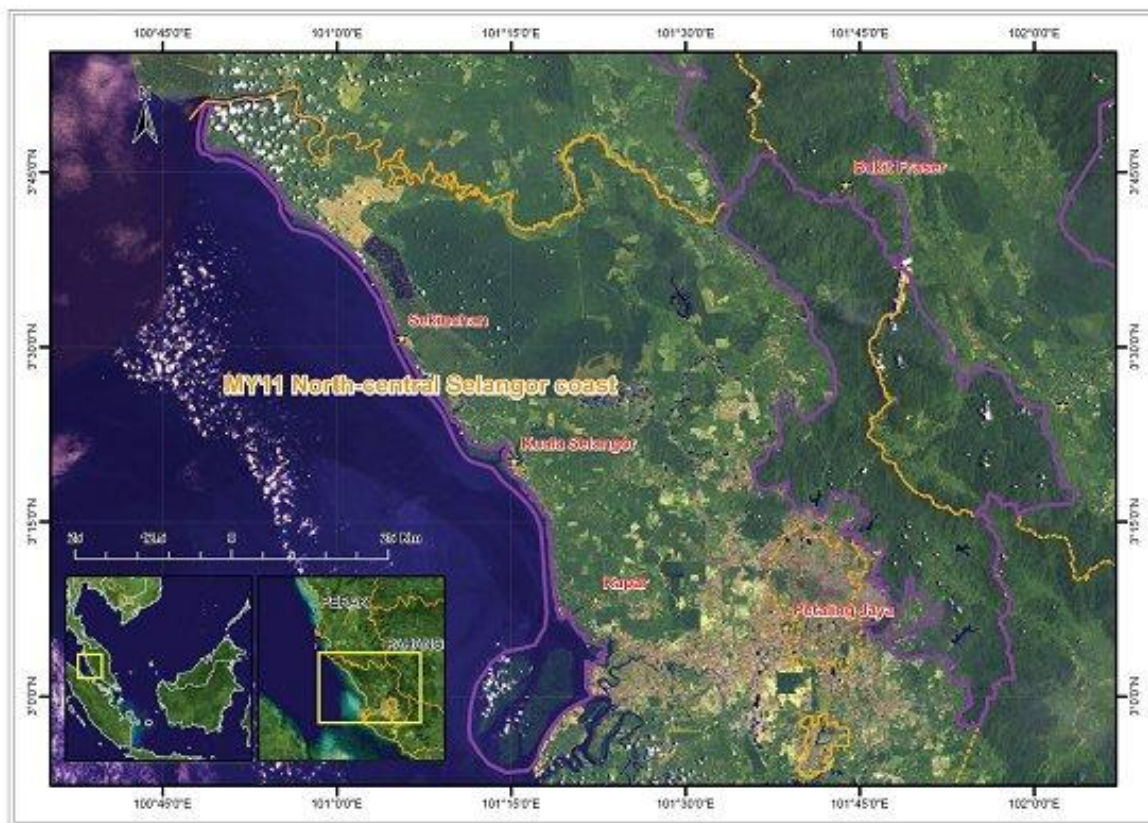


FIGURE 2. Map of the North-central Selangor coast IBA. (Yeap *et al.* 2007)

This site encompasses a complex of secondary forest, mangrove forest and intertidal mudflat habitats. These latter two habitat types are particularly important for waterbirds, as they provide places to feed, roost and breed (for resident species) which they need to survive.

The 1992 AWB study showed that birds using the high tide roost at Kapar Power Station came from low tide feeding areas to the north, south and south-west of the ash ponds (Figure 3).

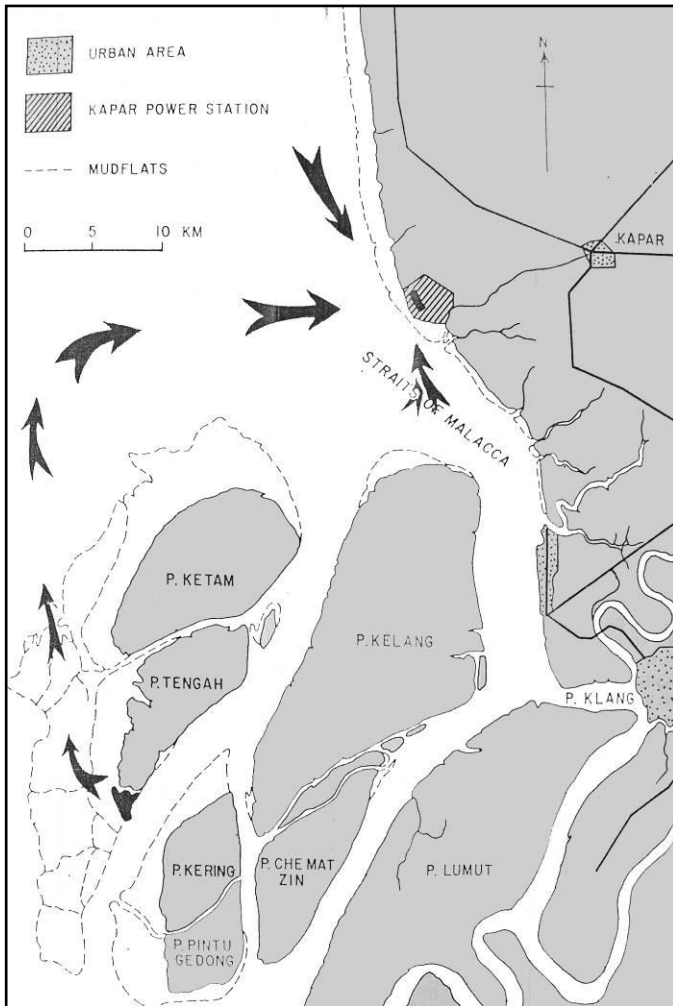


FIGURE 3. Map indicating feeding areas and flight paths of waders arriving at Kapar ash ponds high tide roost (Sebastian *et al.* 1993).

The study showed that, as the tide rose, covering low-tide feeding areas, birds would concentrate at particular favoured areas, or *sub-roosts*, chiefly on the southern tip of Pulau Tengah, one of the Klang Islands. As these were covered by rising water, at 2.4 m and 3.6 m respectively, birds would shift from one sub-roost to the next. When the final sub-roost was covered as the tide reached 4.4 m, the birds took off and flew in the direction of Kapar Power Station ash ponds, arriving some 20–30 minutes later.

Observations at other times suggest that the catchment area for the Kapar roost may extend as far north as Kuala Selangor. Thus, for most waterbirds using the site, Kapar ash ponds are important as a safe place to rest and preen during the times when high tide covers the feeding areas.

It is possible to see spectacular flocks of thousands of birds at Kapar during high tide, but it is important to remember that the numbers of birds there are directly related to the existence of good quality feeding areas along the surrounding North-central Selangor coast.

In the national context, the Asian Waterbird Census (AWC) (Malaysia) has shown in the last 20 years that the North-central Selangor coast is one of the most important sites for waterbirds in the country during the non-breeding season.

Although Figure 4 shows that Kapar Power Station supported only 5,000–19,999 migratory waterbirds over the 20 years of the survey (whereas the Matang coast in Perak recorded more than 20,000 birds), over the last few years, numbers observed at Matang coast have dropped dramatically, while totals at the power station have been steadily rising (see Section 4.1). The North-central Selangor coast may therefore justifiably be regarded as the prime site for waterbirds in the country at present.

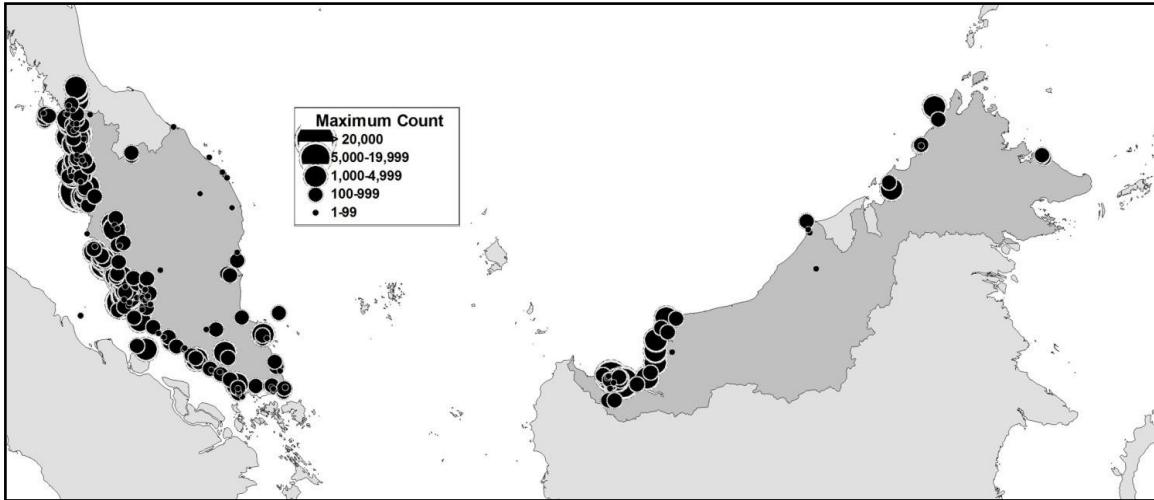


FIGURE 4. Map showing sites in Malaysia covered by the AWC from 1987–2007 (Li *et al.* 2009).

2.0 METHODS

Since the ashponds are mainly used as a roost area during high tide by waterbirds, visits by counters were timed to coincide with high tides. High tides occurring around dawn and dusk provided the best opportunities to view birds under optimal conditions; hence visits took place in the morning, from 0730 hrs to midday, or in the afternoon, from around 1400 hrs till dusk.

Observations and counts were made at two locations within Kapar Power Station compound; sites referred to in Sebastian *et al.* (1993) as Phase II Ash Pond and Still Pond (Figure 5). Phase I Ash Pond, which was the principal study site of the 1993 report, is no longer actively used, either by the power station or consequently by waterbirds.



FIGURE 5. Map of Kapar Power Station Ash Ponds showing former and present study sites.

Counts were made by observers using binoculars (10x magnification) and tripod-mounted telescopes (20 – 80x magnification). As flock sizes were sometimes extremely large, the most common count method was to count in blocks of 100 birds, species by species. Smaller flocks and less common species were counted in groups of 10, or individually.

Counts were systematically made of waders, gulls and terns. Herons and egrets were counted only sporadically. Other non-waterbird species associated with the area were noted opportunistically, but are not included in the body of this report.

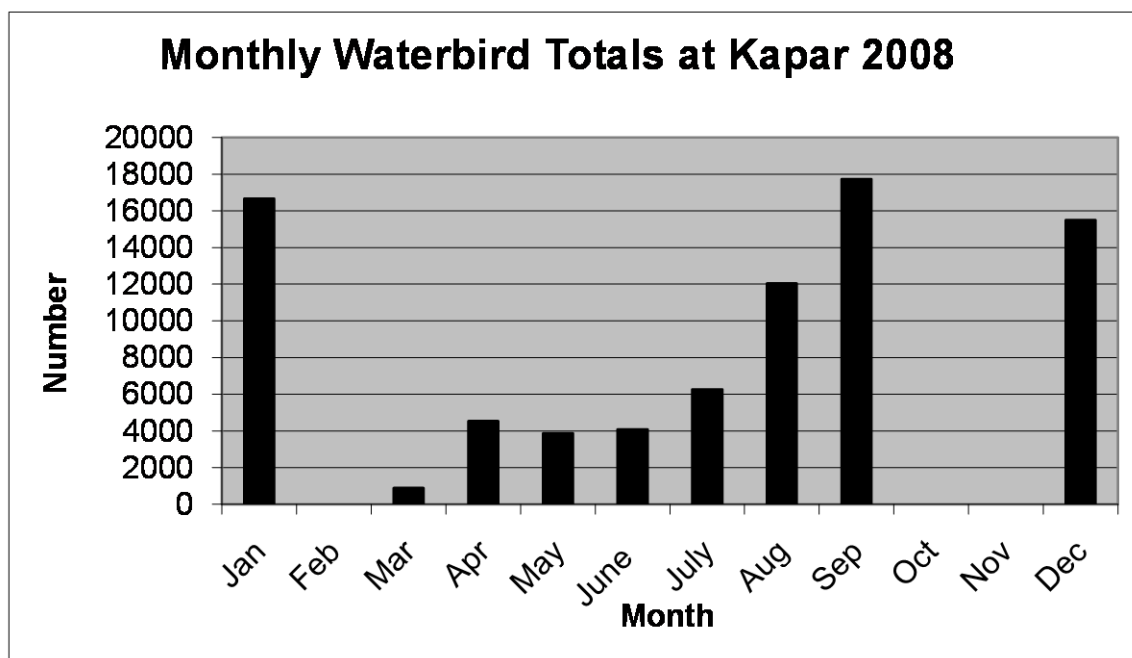
Observers who contributed to the count data used in this report were: Ang Teck Hin, Caroline Ho, David Bakewell, David Lai, John and Jasmine Steed, Nina Cheung, Ooi Chin Hock, Khoo Swee Seng and Yang Chong.

3.0 RESULTS

3.1 Total Overall Numbers and Species

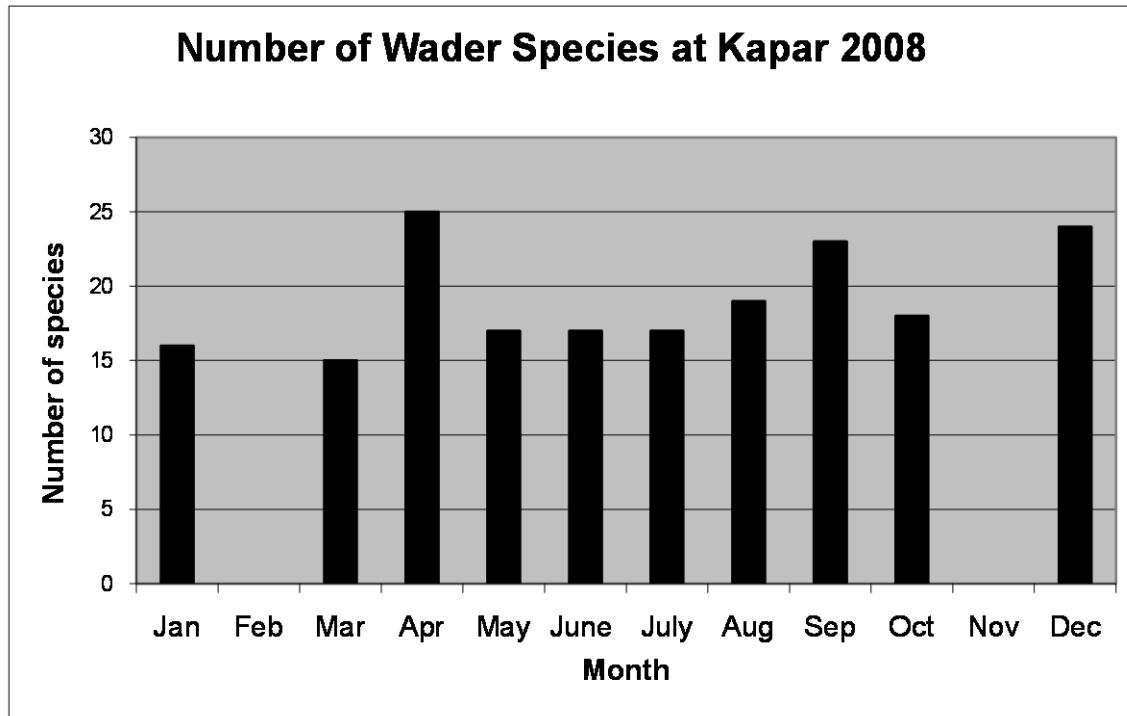
Of the months for which count data is available, peak numbers of birds occurred in January (16,664 individuals), September (17,728) and December (15,490) (Figure 6). The entire period from September to February, that is, from the end of southward migration to the beginning of northward migration, is probably when overall numbers are highest at the Kapar Power Station roost.

FIGURE 6. Overall numbers of waterbirds per month at Kapar in 2008.



Species diversity for gulls and terns (2–5 species) and herons, egrets and storks (3–6 species) varied little throughout the year, but wader species diversity showed seasonal increases during peak migration months - 25 species in April (in a total of only 4,546 birds); 23 species in September and 24 species in December (Figure 7).

FIGURE 7. Wader species diversity at Kapar in 2008.



(Note: No counts were made for October, but species present were noted, and the total is included here.)

3.2 Individual Species Accounts

Taxonomy and nomenclature follows Robson (2008) while the flyway population estimates and 1% thresholds are taken from follows Wetlands International (2006). Conservation status follows the IUCN Red List 2009 (NT = near-threatened; EN = Endangered; CR = Critically endangered).

3.2.1 Waders

Pacific Golden Plover *Pluvialis fulva*

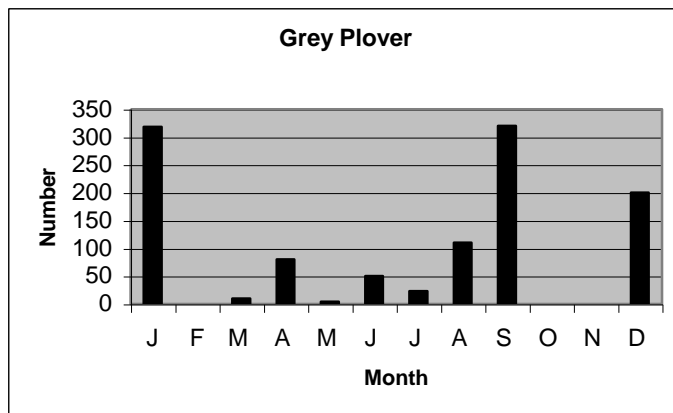
(Flyway population: 100,000; 1% level = 1,000)

This species is a common migrant and non-breeding visitor in Malaysia. However, it does not have a strong association with intertidal mudflats. It was recorded only sporadically and in small numbers at Kapar Power Station. Recorded in April (15 individuals), June (3), July (1), August (5), September (80) and December (3).

Grey Plover *Pluvialis squatarola* (Subspecies: *squatarola*)

(Flyway population: 125,000; 1% level = 1,300)

Peak numbers were recorded in January (318) and September (320). The species was present during every month in which a count was made, and a noteworthy count of 50 birds was made in June. These were birds which did not return to the breeding area but spent the breeding months summering on the Selangor coast. Most of these were subadult birds not yet mature enough for breeding.



In Malaysia this species is an uncommon migrant and non-breeding visitor, and is only recorded in significant numbers on the North-central Selangor coast.

Little Ringed Plover *Charadrius dubius* (Subspecies: *curonicus*)

(Flyway population: 25,000; 1% level = 250)

A common migrant and non-breeding visitor to Malaysia, and one which prefers freshwater habitat. Recorded in September (1) and December (20). This and the following two species tend to utilize the drier areas of the ash ponds, away from the main wader roost areas, at all stages of the tide.

Kentish Plover *Charadrius alexandrinus* (Subspecies: *alexandrinus*, *nihonensis*)

(Flyway population: 100,000; 1% level = 1,000)

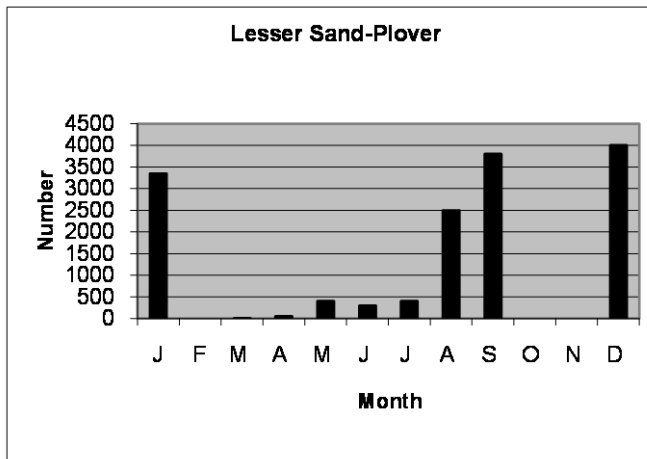
A scarce non-breeding visitor to Malaysia, tending to prefer sandier, drier substrates in coastal areas rather than mudflats. Recorded only in December (2).

White-faced Plover *Charadrius (alexandrinus) dealbatus*
(Flyway population: Unknown; 1% level = Unknown)

A recently rediscovered taxon about which little is known. Certainly rare and probably endangered. Breeds on the South China coast and spends the non-breeding season in South-east Asia (Kennerley *et al.* 2008). Thirteen were present on 28 December, associating with Kentish Plovers. This figure is one of the largest flocks so far recorded anywhere in the world.

Lesser Sand-Plover *Charadrius mongolus* (Subspecies: *schaeferi*)
(Flyway population: 30,000; 1% level = 300)

This species has at least five races, which may be divided into two groups based on the geographical location of their breeding grounds. The eastern group breeds in Eastern Siberia and Kamchatka (Russia), and migrates mainly east of Malaysia to eastern Indonesia and Australia. The western group breeds in Central Asia and the Himalayas and migrates to East Africa, the Middle East and South-east Asia. The *schaeferi* race belongs to this group and is the longest-billed of all the races.



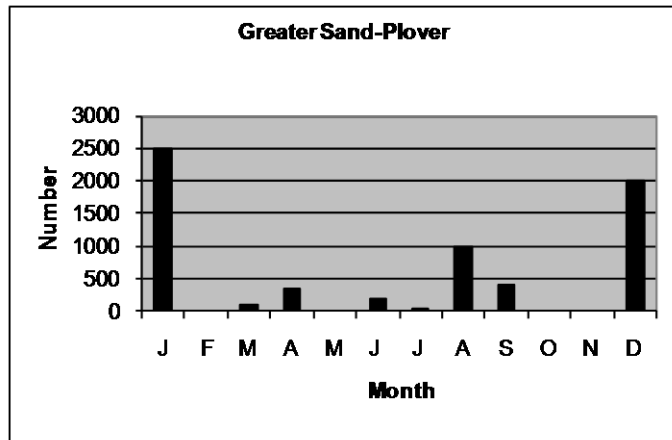
The *schaeferi* race belongs to this group and is the longest-billed of all the races.

In Malaysia, it is one of the most numerous coastal waders in the non-breeding season, and maximum numbers at Kapar Power Station were recorded in January (3,350), September (3,800) and December (4,000). More than 1% of the flyway population was recorded in January (11%), May (1%), June (1%), July (1%), August (8%), September (13%) and December (13%), emphasizing the importance of Kapar Power Station and the North-central Selangor coast for this species.

Greater Sand-Plover *Charadrius leschenaultii* (Subspecies: *leschenaultia*)
(Flyway population: 100,000; 1% level = 1,000)

In Malaysia, consistently less common than the preceding species, though, due to differing breeding areas and time of migration, sometimes occurs in larger numbers.

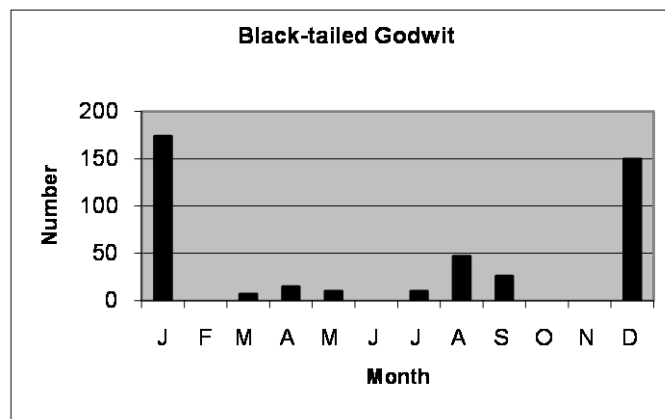
Peak months were January (2,500), August (1,000) and December (2,000). It occurred in higher numbers than Lesser Sand-Plover in late March and early April.



Black-tailed Godwit *Limosa limosa* (Subspecies: *melanuroides*)
(Flyway population: 160,000; 1% level = 1,600) / NT

A scarce non-breeding visitor to Malaysia; not recorded in significant numbers away from the North-central Selangor coast.

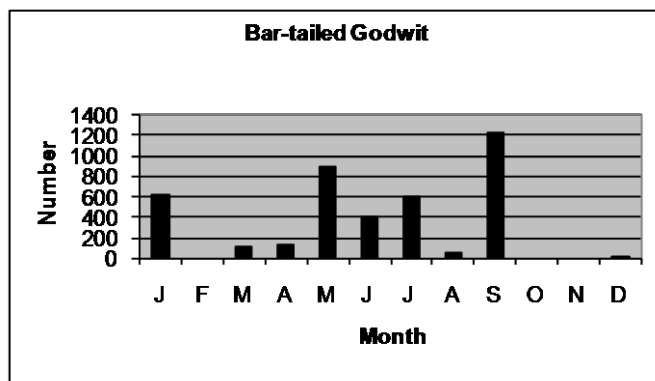
At Kapar Power Station, highest numbers were recorded during the northern winter months of January (174) and December (150).



Bar-tailed Godwit *Limosa lapponica* (Subspecies: *menzbieri*)
(Flyway population: 170,000; 1% level = 1,700)

A non-breeding visitor to Malaysia in small numbers away from the North-central Selangor coast.

The majority of the population spends the northern winter months further south than Malaysia. The January count (614) may represent the local 'wintering' population, and it is likely that the bulk of northward



migration was not recorded. High numbers in late May (900) and June (400) consisted of non-breeding subadult birds which over-summered, and the September count (1220) was no doubt composed mainly of birds on their journey further south.

Asian Dowitcher *Limnodromus semipalmatus*

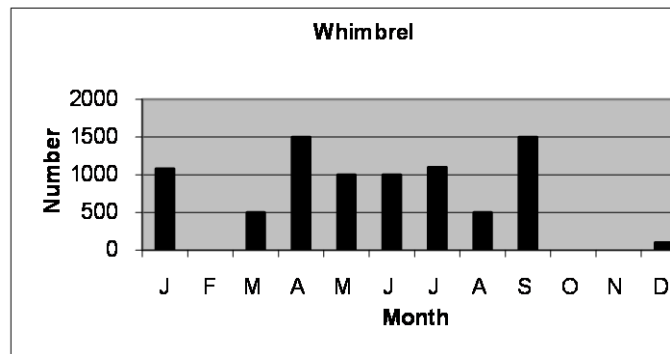
(Flyway population: 23,000; 1% level = 230) / NT

The majority of the non-breeding population spends the northern winter in Sumatra, Indonesia. At Kapar Power Station, small numbers were recorded in both northward and southward migration seasons, as follows: April (3), August (2), September (2).

Whimbrel *Numenius phaeopus* (Subspecies: *phaeopus*, *variegates*)

(Flyway population: 55,000; 1% level = 550)

A widespread non-breeding visitor to Malaysia. At Kapar Power Station, peak months were April (1,500) and September (1,500), with over 1,000 recorded in January and high numbers over-summering in May (1,000) and June (1,000).

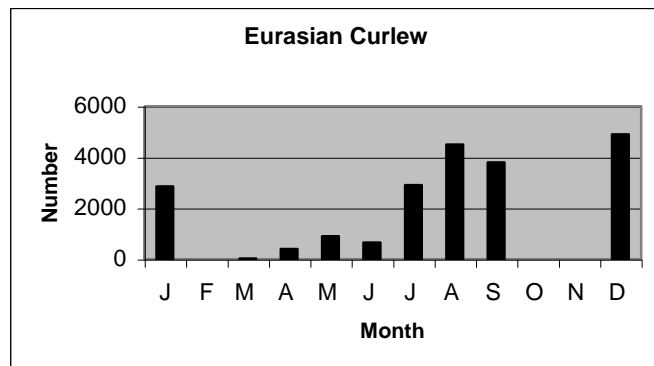


Eurasian Curlew *Numenius arquata* (Subspecies: *orientalis*)

(Flyway population: 35,000; 1% level = 350) / NT

Eurasian Curlew is a scarce non-breeding visitor to Malaysia, occurring nowhere in large numbers away from the North-central Selangor coast.

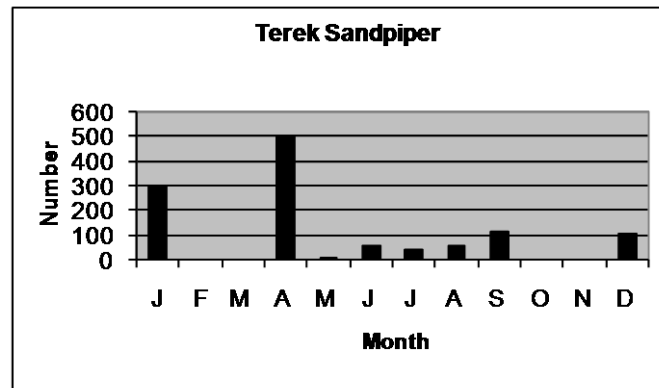
At Kapar Power Station, numbers were internationally significant, with over 5% of the entire flyway population being recorded in January (8%), July (8%), August (13%), September (11%) and December (14%). This species is one of the earliest to arrive in large numbers in the post-breeding southward migration, with 2,300 being present by 20 July. Numbers peaked during the northern winter months, with 4,900 birds in December, demonstrating the importance of the site as a wintering ground for this species. In addition, 500 – 1,000 non-breeding birds over-summered.



Terek Sandpiper *Xenus cinereus*

(Flyway population: 50,000; 1% level 500)

The majority of birds spend the northern winter period further south than Malaysia, although 300 were counted in January. Peak numbers occurred during northward migration in April (500). Numbers seen in the southward migration period were much lower, with a maximum of 110 in September. A widespread non-breeding visitor to Malaysia



Common Sandpiper *Actitis hypoleucos*

(Flyway population: 50,000; 1% level = 500)

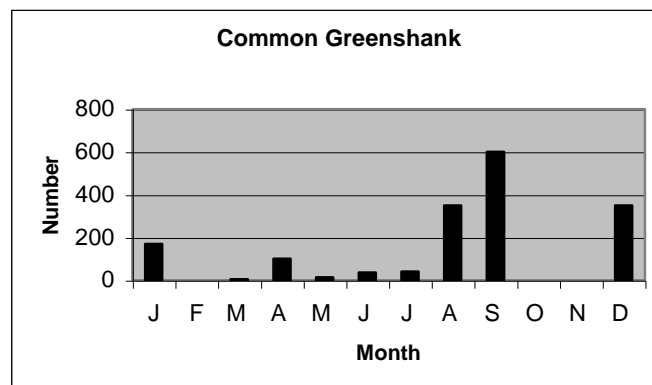
A widespread and common non-breeding visitor to Malaysia, but usually solitary by nature and not especially attracted to the intertidal environment. One to two birds were noted in January to April and August to December.

Common Greenshank *Tringa nebularia*

(Flyway population: 100,000; 1% level = 1,000)

A common non-breeding visitor to Malaysia in low numbers.

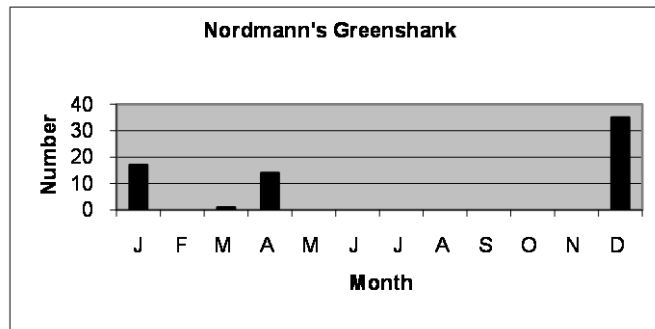
Peak numbers occurred during southward migration in August (350) and September (600), and during the wintering period in December (350).



Nordmann's Greenshank *Tringa guttifer*

(Flyway population: 500 – 1,000; 1% level = 8) / EN

One of the world's rarest waders, a significant percentage of the world population spends the non-breeding period in Malaysia. The North-central Selangor coast is a stronghold for the species.



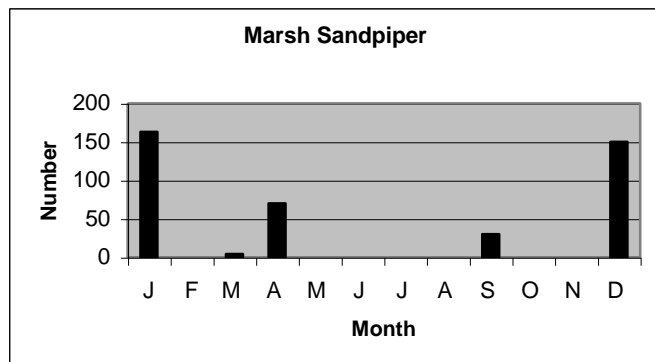
Recorded in four months, in January (17), March (1), April (14) and December (35). The latter count represents over 4% of the world population. This species is one of the earliest to leave in the spring migration and one of the latest to arrive after the breeding season.

Marsh Sandpiper *Tringa stagnatilis*

(Flyway population: 100,000 – 1,000,000; 1% level = 10,000)

A common non-breeding visitor to Malaysia, and one which has a preference for freshwater habitats.

Low numbers were recorded at Kapar Power Station, with peak counts in January (163) and December (150).

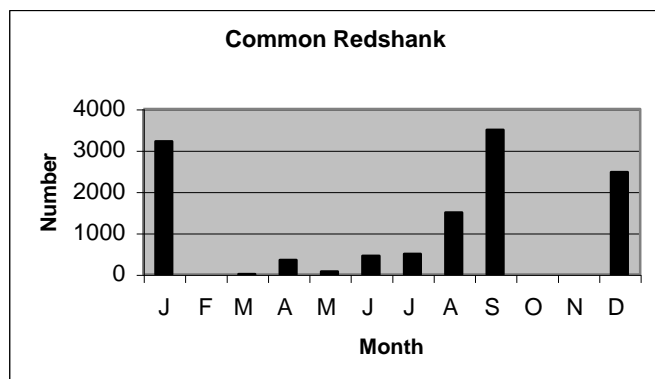


Common Redshank *Tringa totanus* (Subspecies: *craggi*)

(Flyway population: 25,000 - 100,000; 1% level = 1,000)

The commonest *Tringa* sandpiper in Malaysia, occurring in large numbers as a non-breeding visitor. Malaysia is toward the southern limit of the species' wintering range.

Four races, *ussuriensis*, *terrignotae*, *craggi*, *eurhinus* are known to occur in Malaysia, but these are only separable in the field in breeding plumage. Only the race *craggi* was



identified with certainty at Kapar Power Station.

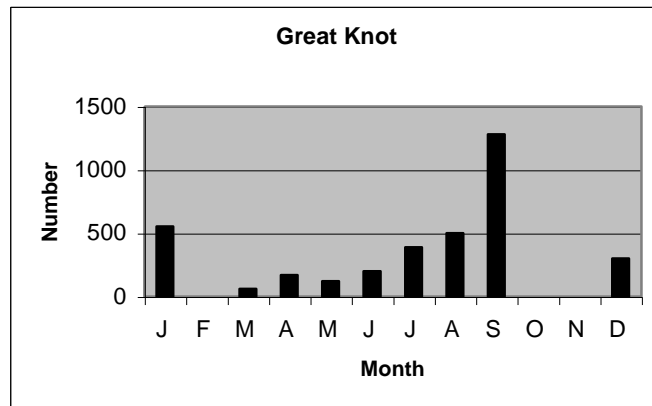
A wintering flock of 3,214 was counted in January, and northward passage numbers peaked in mid-April (350). About 500 birds over-summered, and southward passage saw numbers rise to 1,500 in August and 3,500 in September. By December, just under 2,500 birds were present.

Great Knot *Calidris tenuirostris*

(Flyway population: 380,000; 1% level = 3,800)

Occurs in low numbers as a migrant in Malaysia.

Unlike the preceding species, Great Knot occurred in highest numbers at Kapar Power Station during the southward migration, with a peak in September (1,280). The maximum count in spring was in April (170), and about 200 birds over-summered. The wintering population in January was 550.



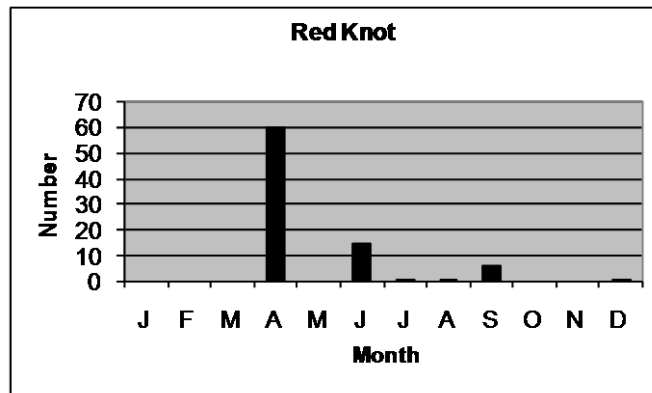
Red Knot *Calidris canutus* (Subspecies: *piersmai*, *rogersi*)

(Flyway population: 220,000; 1% level = 2,200)

An uncommon migrant in Malaysia.

At Kapar Power Station, there was a pronounced peak in mid-April (60) but a much poorer showing during the southward migration.

The commonest race observed in spring is *piersmai*. Most birds of this race winter in western Australia.



Sanderling *Calidris alba*

(Flyway population: 22,000; 1% level = 2,200)

A non-breeding visitor to Malaysia in small numbers, preferring the sandy beaches of the east coast of the Peninsula, and rarely encountered on the west coast. Two first-

year birds were noted in April and through May. Single birds noted in June, July, August and September may have been one of these individuals.

Spoon-billed Sandpiper *Eurynorhynchus pygmaeus*

(Flyway population: 450 – 1,000; 1% level = 5) / CR

One of the world's rarest birds, the small known breeding population has crashed in recent years, making extinction a real possibility (BirdLife International 2009). The main wintering areas are north of Malaysia. This and the declining population make chances of seeing this great rarity in Malaysia increasingly small.

One seen 7 April and 28 December, raising the possibility that a single bird regularly winters on the North-central Selangor coast.

Little Stint *Calidris minuta*

(Flyway population: Unknown; 1% level = Unknown)

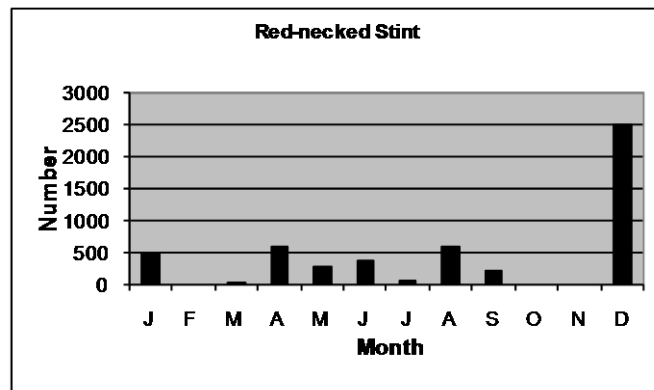
Until recently considered a vagrant, Little Stint has been found to occur annually in Malaysia in small numbers. One bird was present for much of April.

Red-necked Stint *Calidris ruficollis*

(Flyway population: 315,000; 1% level = 3,200)

The commonest *calidrid* sandpiper in Malaysia in the non-breeding and migratory seasons.

Not particularly abundant at Kapar Power Station, given the large numbers of waders usually present. Apart from a pronounced peak in December (2,500), numbers were low, with peaks of 600 in April and September. An over-summering flock of 200-350 birds remained throughout May and June.



Sharp-tailed Sandpiper *Calidris acuminata*

(Flyway population: 160,000; 1% level = 1,600)

Though a common non-breeding visitor to Australia, most birds either overfly Malaysia or pass further east; consequently there is only a small handful of records from the country. One adult was seen on 15 September.

Dunlin *Calidris alpina* (Subspecies: *sakhalina*)

(Flyway population: 100,000 – 1,000,000; 1% level = 10,000)

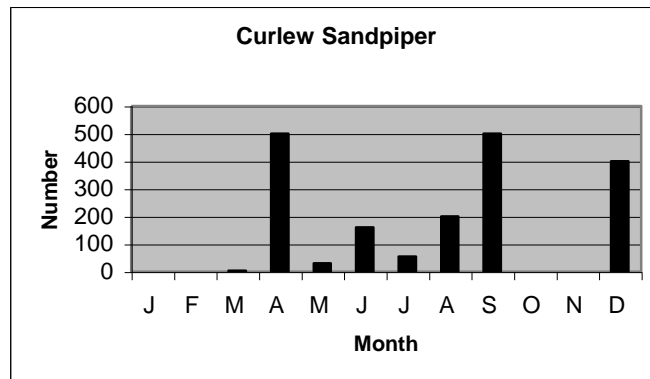
Though one of the commonest waders on the Flyway, most Dunlins only fly as far south as the coast of southern China in the non-breeding season, and are consequently extremely rare in Malaysia. Two birds were observed on 7 April, with one extending its stay until at least 24 May.

Curlew Sandpiper *Calidris ferruginea*

(Flyway population: 180,000; 1% level = 1,800)

After Red-necked Stint, the most abundant *calidrid* visitor to Malaysia.

Two distinct peaks in northward and southward migration, in April (500) and September (500) respectively. Moderate numbers were noted in December (400), and 160 birds over-summered.

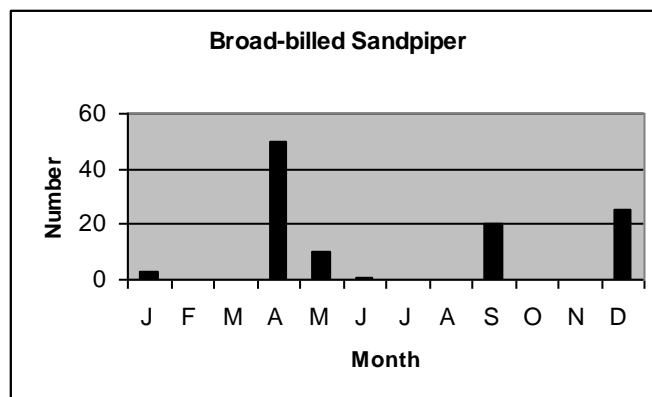


Broad-billed Sandpiper *Limicola falcinellus* (Subspecies: *sibirica*)

(Flyway population: 10,000 – 100,000; 1% level = 1,000)

A non-breeding visitor in low numbers to Malaysia.

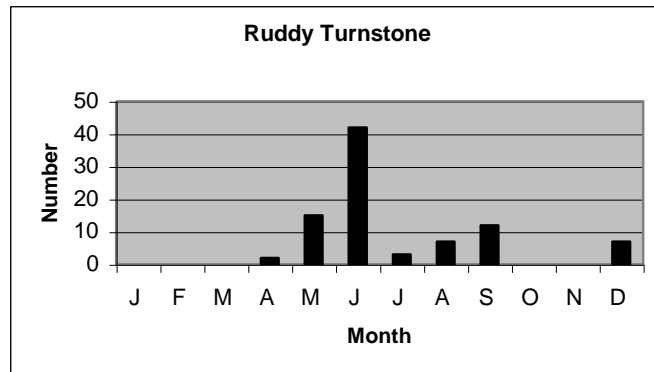
Never particularly numerous at Kapar Power Station, with 50 birds in April being the annual peak. A smaller total was noted in southward migration in September (20) and 25 were seen in December.



Ruddy Turnstone *Arenaria interpres* (Subspecies: *interpres*)
(Flyway population: 25,000 - 100,000; 1% level = 1,000)

A scarce but widespread non-breeding visitor to Malaysia, favouring more rocky habitats.

At Kapar Power Station, low numbers recorded throughout. Scarce in spring migration (maximum, two in April), but numbers built up during May (15) and June (42), suggesting that non-breeders use the site for over-summering. Southward migration numbers peaked in September (12) and up to seven were noted in December.

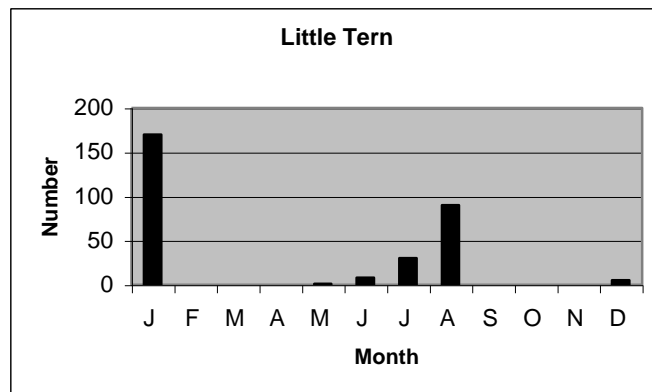


3.2.2 Gulls and Terns

Little Tern *Sterna albifrons* (Subspecies: *sinensis*, *pusilla*?)
(Flyway population: 10,000 – 100,000; 1% level = 1,000)

Numerous offshore non-breeding visitor to Malaysia, with a preference for joining waders at high tide roost sites.

Evidence of a wintering flock was provided by the count in January (170) and of a small southward passage in August (90).

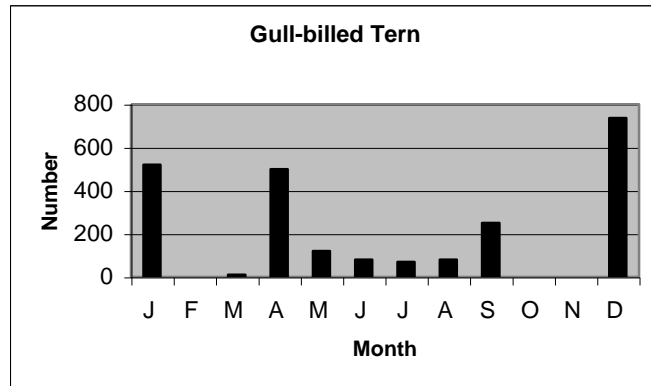


Gull-billed Tern *Gelochelidon nilotica* (Subspecies: *addenda*)

(Flyway population: 10,000 – 100,000; 1% level = 1,000)

Rare non-breeding visitor away from the North-central Selangor coast.

The wintering flock at Kapar Power Station in December numbered 520, and this figure gradually diminished to about 80 birds which remained over the northern summer months.



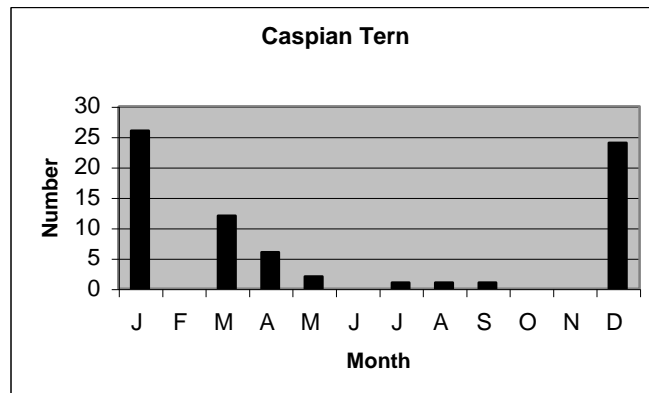
September (250) saw numbers beginning to build up again, to a high in December (736).

Caspian Tern *Hydroprogne caspia*

(Flyway population: 10,000 – 25,000; 1% level = 250)

Rare non-breeding visitor away from the North-central Selangor coast.

A fairly stable wintering population of about 25 birds at Kapar Power Station, with lower numbers at other times.

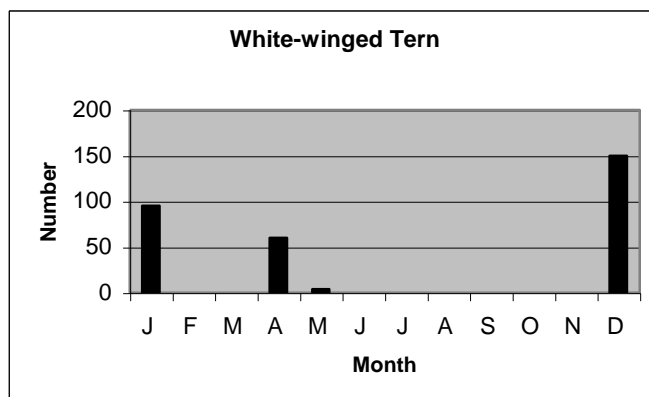


White-winged Tern *Chlidonias leucopterus*

(Flyway population: 25,000 – 1,000,000; 1% level = Unknown)

Very numerous offshore and coastal non-breeding visitor, with no strong preference for intertidal areas.

Counts probably represent coincidental arrivals rather than an accurate representation of numbers using the area. White-



winged Terns rarely spent the duration of high tide at the roost, but tended to drift in and out. The maximum count was 150 in December.

Common Tern *Sterna hirundo* (Subspecies: *tibetana*, *minussensis*, *longipennis*)
(Flyway population: 25,000 – 1,000,000; 1% level = Unknown)

Very numerous non-breeding visitor off the west coast of the Peninsula, less often seen from land, and not dependent on high tide roost areas. Four seen on 17 August was the only sighting.

Black-headed Gull *Larus ridibundus*
(Flyway population: 100,000 - >1,000,000; 1% level = Unknown)

Though very abundant on the EAA Flyway, most of the population winters well north of Malaysia, so a scarce non-breeding visitor. One sighted on 13 January was the only record.

3.3 Leg-flagged Waders

In terms of the EAA Flyway, sightings of birds at Kapar Power Station which have been marked with coloured leg bands or *leg-flags* elsewhere in this Flyway have established that it is an important site along the migration route of several species of shorebirds (Figure 8).

Different wader species are known to adopt different migratory strategies, some making the journey in a series of relatively short 'hops', following the East and Southeast Asian coastline, and others performing amazing long-distance flights traversing oceans.

The shortest and most direct route from the East Asian coastline to Australia would take birds along a route encompassing Taiwan, the Philippines and the islands of the Lesser and Greater Sundas, passing well east of Peninsular Malaysia and Kapar Power Station. No doubt many birds do take this route, but a significant number take the longer 'dog-leg' route following the Thai/Malaysian peninsula, in order to take advantage of the rich coastal mudflats of the west coast of the Peninsula.

During 2008, five birds originally banded on the coast of Shanghai, China, two birds from southern Thailand and two from Victoria, Australia, were sighted at Kapar Power Station (Table 2). These international links highlight the vital importance of preserving waterbird habitats along the entire Flyway in order to preserve waterbird populations. Kapar Power Station and the North-central Selangor coast form one irreplaceable link in a vital chain that allows these amazing annual migrations to continue.

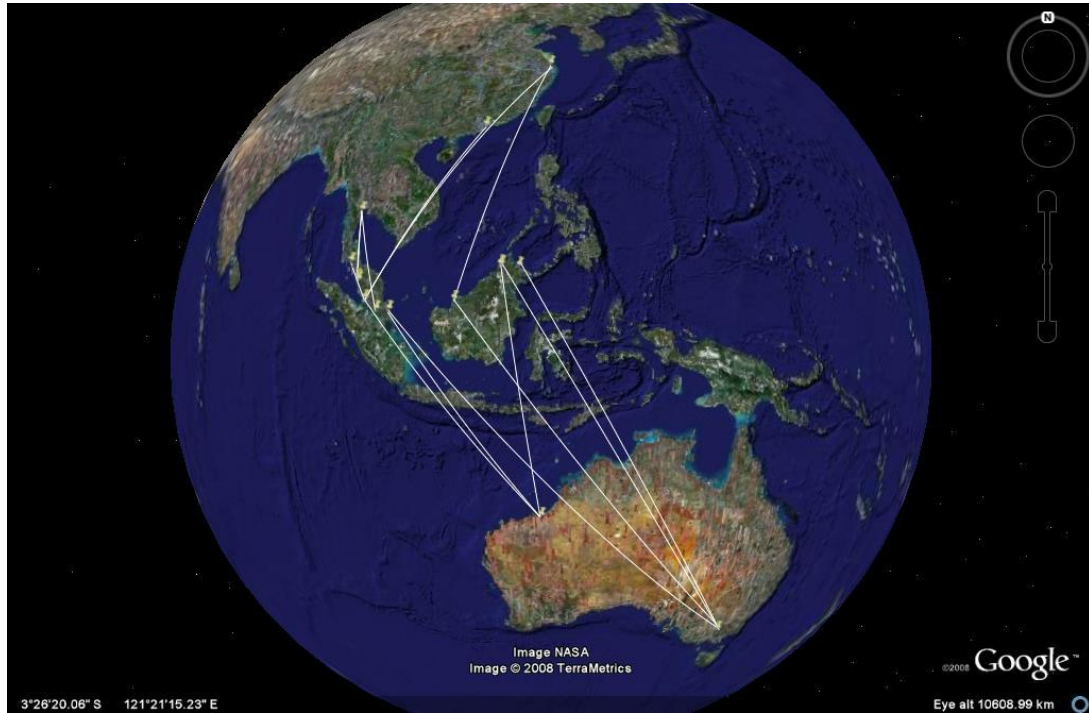


FIGURE 8. Map showing where leg-flagged waders seen in Malaysia were originally banded.

TABLE 2. Leg-flagged waders recorded at Kapar Power Station in 2008.

Species	Number of birds	Sighting date	Flag description	Location of flag origin
Bar-tailed Godwit	1	26 July	Black over white	Chongming Dao, Shanghai, China
	1	17 August	Black over white	Chongming Dao, Shanghai, China
Great Knot	1	26 July	Black over green, triangular	Ko Libong, Southern Thailand
	1	17 August	Black over green, triangular	Ko Libong, Southern Thailand
	2	26 July	Black over white	Chongming Dao, Shanghai, China
	1	17 August	Black over white	Chongming Dao, Shanghai, China
Curlew Sandpiper	1	17 August	Orange	Victoria, Australia
	1	15 Sept	Orange	Victoria, Australia

4.0 DISCUSSION

4.1 Analysis of counts in March/April 2008 with 1992 survey

Maximum counts during the months of March and April in 1992 and 2008 may not be directly comparable due to several factors:

- The 1992 survey was conducted on 20 dates, whereas in 2008, only seven visits were made in the same two months.
- The 1992 survey covered the period 2 March – 7 April; the 2008 visits covered 29 March – 26 April.
- Numbers of birds at the roost are dependent on tide height, weather conditions and many other variables.

Nevertheless, some conclusions may be drawn, especially where totals are drastically different.

The count of **Grey Plover** in 1992 (1,147) was far higher than any count made during 2008 (max 320). This may indicate a reduction in population or a change in wintering area and migration routes. Further data in coming years is needed to confirm or refute this.

1992 counts of **Bar-tailed Godwit**, **Marsh Sandpiper**, **Common Greenshank**, **Ruddy Turnstone**, **Gull-billed Tern** and **White-winged Tern** were also significantly higher than maximum counts for any month in 2008, and may in some cases reveal population declines.

On the other hand, counts of **Greater Sandplover**, **Red-necked Stint** and **Broad-billed Sandpiper** were significantly higher in 2008 than in the survey period for 1992. This may be explained by a difference in migration timing or strategy (perhaps weather-related) between the two periods, and is unlikely to indicate population growth.

Of 32 species for which totals are compared, 17 show a decline between 1992 and 2008, nine of these a marked decline; 11 show an increase, three of which are marked increases; and four show no significant difference in numbers (Table 3).

TABLE 3. Comparison of maximum counts in March/April 1992 (Sebastian *et al.* 1993 and 2008).

Species / Trend	Maximum count recorded in March/April 1992	Maximum count recorded in March/April 2008
MARKED INCREASE (▲)		
Greater Sand-Plover	3	350
Red-necked Stint	180	600
Broad-billed Sandpiper	1	50
INCREASE (▲)		
Whimbrel	1,063	1,500
Black-tailed Godwit	0	15
Nordmann's Greenshank	6	14
Red Knot	33	60
Little Stint	0	1
Dunlin	0	2
Sanderling	0	2
Spoon-billed Sandpiper	0	1
STABLE (◀ ▶)		
Pacific Golden Plover	11	15
Terek Sandpiper	480	500
Asian Dowitcher	1	3
Caspian Tern	10	12
DECLINE (▼)		
Kentish Plover	14	0
Lesser Sand-Plover	240	50
Far Eastern Curlew	3	0
Common Sandpiper	7	2
Great Knot	394	170
Curlew Sandpiper	799	500
Lesser Crested Tern	2	0
Little Tern	156	0
MARKED DECLINE (▼)		
Grey Plover	1,147	80
Eurasian Curlew	1,063	400
Bar-tailed Godwit	1,569	140
Common Redshank	1,780	350
Marsh Sandpiper	387	70
Common Greenshank	840	100
Ruddy Turnstone	83	2
Gull-billed Tern	1,975	500
White-winged Tern	1,110	60

4.2 Analysis of AWC counts 1999 - 2008

Counts conducted for the Asian Waterbird Census (AWC) are designed to eliminate as many variables as possible. They are carried out at the same time each year when populations are relatively stable (usually during the second and third week of January), and from year to year, efforts are made to ensure that the same counting team covers the site, so that variability of observer bias can be minimized (Li *et al* 2009).

A comparison of overall numbers of birds between 1990 and 2008 (not including a gap from 1996 - 1998 when no counts were conducted) shows an increasing trend, from below 5,000 birds in the 1990s to between 10,000 and 17,000 birds in the last four years (Figure 9).

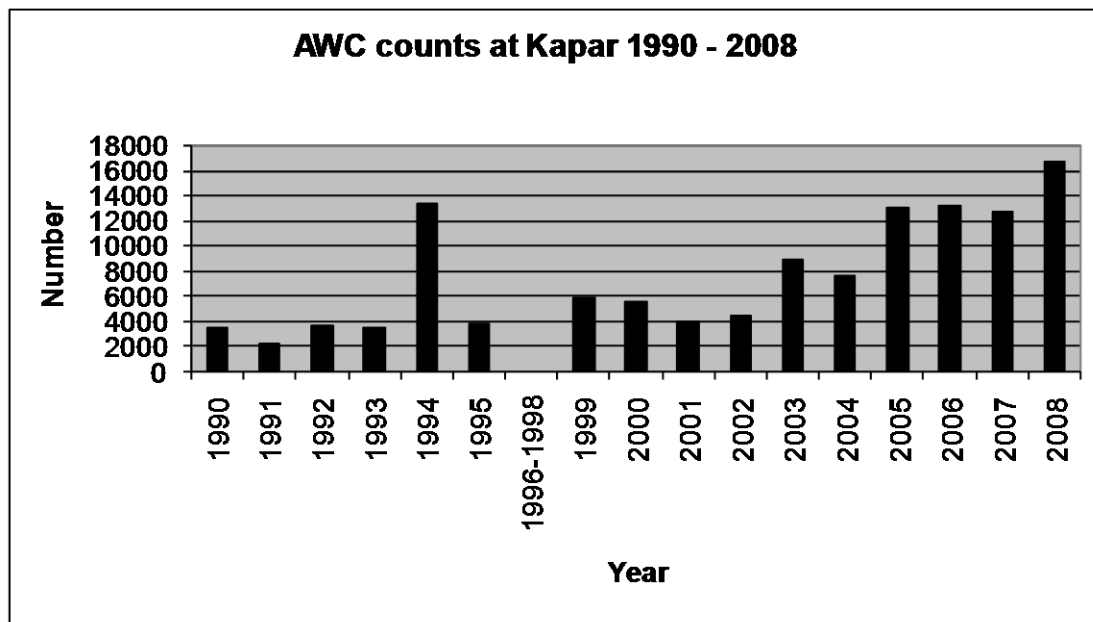


FIGURE 9. AWC counts between 1990 and 2008 (adapted from Li *et al* 2009).

This apparently positive picture may mask several not so positive contributing factors.

Firstly, coastal habitat destruction and modification, including reclamation for development and conversion to aquaculture, has undoubtedly reduced the number of feeding and roosting areas available to migratory waterbirds in Malaysia over the last 18 years. This has resulted not only in declines in overall populations of birds, but has meant that survivors have fewer options to choose from, and are forced to congregate in ever larger numbers at the few remaining feeding and roosting areas. This in turn leads to increased competition for limited resources and makes development of remaining sites especially damaging.

Secondly, the west coast of Peninsular Malaysia is a dynamic ecosystem in a constant state of flux. The coastline, in its natural state, follows an endless cycle of accretion and erosion. Accretion of mudflat-forming silt deposits, which increases good feeding habitat for waterbirds, is inevitably followed by accretion of pioneer mangrove forest, which eventually diminishes available feeding areas. Thus waterbirds need to be flexible, moving around to find the most productive habitat. The decrease in numbers on the Matang coast, and the corresponding increase in numbers on the North-central Selangor coastline may be an example of this.

Both of the above factors are probable contributors to the increase in waterbird numbers at Kapar Power Station over recent years. Thus, the increasing trend is no cause for complacency, but rather a reminder of the vital importance of protecting coastal ecosystems in sufficient quantity to be able to absorb cyclical natural changes and provide a safe haven for waterbirds under ever-increasing pressure from due to destruction of their habitat.

4.2 Analysis of 2008 data

The Ramsar Convention on Wetlands has nine criteria for identifying wetlands of international importance. Two of these relate specifically to waterbirds:

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Though no single count was made in 2008 which equaled or exceeded 20,000 birds, over the course of the year, the site undoubtedly hosted well over 20,000 waterbirds, and it thus qualifies as a site of international importance under Criterion 5.

The counts from Kapar Power Station reveal that Criterion 6 is met by the following seven species:

- Lesser Sand-Plover (13%)
- Greater Sand-Plover (2.5%)
- Eurasian Curlew (14%)
- Whimbrel (2.7%)
- Common Redshank (3.5%)
- Nordmann's Greenshank (4.4%)
- Terek Sandpiper (1%)

In addition to the above, one other Criterion is fulfilled by Kapar Power Station:

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Kapar Power Station supports two globally threatened species i.e. Spoon-billed Sandpiper (Critically endangered) and Nordmann's Greenshank (Endangered), as classified by the IUCN Red List.

The power station joined the East Asian-Australasian Shorebird Site Network (now renamed the Partnership for the East Asian-Australasian Flyway) in 2003 as part of the management's commitment to protect the waterbirds which use the site. This year's counts show that the site continues to fulfil the criteria required for inclusion in this network (for more information, see <http://www.eaaflyway.net/document.php>).

5.0 CONCERNS AND POSSIBILITIES FOR THE FUTURE

5.1 Continuing viability of Kapar Power Station ash ponds as a waterbird roost site

The ash ponds at Kapar Power Station have offered a secure roosting site for waterbirds since at least 1988. This report shows that the long-term trend has been of increasing usage of the site by waterbirds over the past 18 years. The importance of the power station for migratory waterbirds has increased in part due to coastal reclamation and development projects elsewhere in the state.

The increased dependence by waterbirds on the power station can be seen as a point of vulnerability. Should the conditions at Kapar Power Station change, the birds could face threats to their long term survival. One scenario and possible options are discussed below.

Reduction of power output and ash into ash ponds

The economic downturn which occurred in early 2009 has resulted in a reduction of power output at the power station, leading to a reduction in the flow of fresh ash and water into the Phase 2 Ash Pond. This has caused the ash pond to dry up, and the birds have had to change their roosting habits in consequence, though they still use the site. If the ash pond were to remain dry over a long period, eventually vegetation would colonize the open area, making it completely unsuitable as a roost site. This has already happened at the now disused Phase 1 Ash Pond. Phase 1 Ash Pond was the main focus of the 1992 survey, as the majority of birds roosted there (Sebastian *et al.* 1993). The site is now heavily vegetated and is no longer used by waterbirds.

Whether or not the power station is in full production, Phase 2 Ash Pond will eventually reach its capacity. Its useful lifespan was initially estimated at ten years (1993 – 2003) (Sebastian *et al* 1993) so it has already exceeded that estimate by over 50%. Once its use by the power station is discontinued, it is likely that the habitat will follow a similar progression to that in the Phase 1 Ash Pond, and that the waterbirds will be forced to seek an alternative roost area, unless there are mitigation measures.

There are several avenues for possible mitigation which would benefit the waterbirds and the conservation of waterbird populations.

- a) ***Kapar Power Station management (Kapar Energy Venture) to set aside a section of existing ashponds*** and allow them to be managed specifically to benefit the waterbirds. As members of the EAAF Partnership, and with the aid of the MNS-BCC Waterbirds Group and the wider membership of MNS, Kapar Power Station has access to a considerable body of expertise and resources for training, education and management of the site. This opens up an excellent opportunity to demonstrate further commitment on the part of a corporate body to its Corporate Social Responsibility (CSR) values; a long-term partnership for the conservation of waterbirds globally.
- b) ***Redesigning the main lake of Kuala Selangor Nature Park*** to fulfil their original stated objective as a roost site for waterbirds (MNS unpublished). The main lake at KSNP is currently too deep to function as a roost site, but there is great potential for this to change if water levels are managed proactively for waterbirds. Regardless of the future scenario at Kapar Power Station, providing an additional roost site on the North-central Selangor coast would increase the security of the waterbird population using the area.

5.2 Status and conservation of the North-central Selangor coast, including the Klang Islands

As mentioned in Section 1.1.3, the value of Kapar Power Station for waterbirds is bound up with the health of the rest of the North-central Selangor IBA. In particular, previous studies have shown that the birds which roost at Kapar are particularly reliant upon the Klang Islands as feeding areas.

The Selangor State Government recently gazetted six of the Klang islands as Forest Reserves on 4th June 2009, under the National Forestry Act 1984 (Gazette Number G.N. 1790-1795). This is a positive step toward securing the waterbirds feeding areas. However, surveys are needed to determine more precisely where the birds feed and what threats they may face there, in order that conservation measures can be taken.

6.0 CONCLUSION

Systematic counts of waders, gulls and terns were carried out for nine months of 2008 at Kapar Power Station ash ponds. These counts not only confirm the power station's status as the prime waterbird site in Malaysia during the migration and non-breeding seasons, but also reveal for the first time its importance as a sanctuary for young birds which do not return to the breeding grounds during the northern summer. As such, the site fulfils several of the criteria of the Ramsar Convention for a wetland of international importance.

Kapar Power Station's importance as a site for migratory waterbirds must be seen in the context of the entire coastal ecosystem of the North-central Selangor coast IBA, which continues to suffer damage as a result of coastal development for industry, agriculture and aquaculture. The mudflats and mangrove forests of the coastline provide feeding grounds for waterbirds, as well as nursery grounds for inshore and offshore fish stocks, prawns and other aquatic vertebrates, livelihoods for coastal fishing communities, and unique opportunities for responsible nature-related tourism.

Sustainable development of the nation's coastal areas requires that initiatives to modernize infrastructure are balanced with the identification and protection of the most valuable areas for biodiversity. The ash ponds at Kapar Power Station represent part of one such area, and the management regime employed by KEV and TNB, which allows the waterbirds to utilize the site, and their usage of it to be regularly monitored, is a prime example of the way in which development can go hand in hand with environmental conservation.

It is hoped that this report, and future annual reports like it, will play a role in furthering efforts to monitor and protect waterbird populations at this unique site.

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Ramsar Convention (http://www.ramsar.org/key_criteria.htm)

APPENDICES

Appendix 1. Waders counted at Kapar Power Station in 2008.

Month	Jan	Mar	Apr				May	June		July		Aug		Sep	Dec	
Date	13	29	7	8	19	25	24	20	21	20	26	17	23	15	28	29
Observer	YC	ATH	DB	DB	DB	ATH	ATH	DB	ATH	DB	ATH	DB	ATH	DB	DB	DB
Pacific Golden Plover					15			3		1		5		80	3	2
Grey Plover	318	10		80	35	30	4	50	2	15	23	50	110	320	200	200
Little Ringed Plover															20	3
Kentish Plover															2	2
"White-faced" Plover															13	
Lesser Sand-Plover	3350	10	50	30	35		400	300	300	400		2500		3800	4000	2500
Greater Sand-Plover	2500	90	350	200	30		2	180	5	30		1000		400	2000	500
Asian Dowitcher			3	3									2			
Black-tailed Godwit	174	7	12	15			10			4	10	47		26	116	150
Bar-tailed Godwit	614	120	30	140	40	17	900	400	250	200	600	50		1220	10	15
Whimbrel	1081	500	5	300	500	1500	1000	900	1000	300	1100	500		1500		100
Eurasian Curlew	2850	30	400	200	350	70	900	650	120	2300	2900	4500		3800	1000	4900
Common Redshank	3214	4	300	30	350	10	70	450	80	500	250	1500	1400	3500	600	2470
Marsh Sandpiper	163	4	40	20	70									30	150	100
Common Greenshank	169	5	100	60	100	7	14	36	10	40	10	350		600	200	350
Spotted Greenshank	17	1	9	11	12	14									4	35
Terek Sandpiper	300			1	500		5	50	20	40	7	50		110	100	100
Common Sandpiper	2	2	1		1							1	2	2	1	1
Ruddy Turnstone			2		1		15	42	8	1	3	7	7	12	5	7
Great Knot	553	60		170	100	70	120	200	50	150	390	500		1280	300	300
Red Knot			1	60	25	7		15			1	1		6	1	
Sanderling			1	2	2		2	1			1	1		1		
Little Stint			1	1	1											
Red-necked Stint	490	20	600	100	50	10	270	100	350	40		200	600	200	400	2500
Dunlin			2		1	1	1									
Sharp-tailed Sandpiper														1		
Curlew Sandpiper		4	500	500	150	120	30	160	100	40	55	200		500	300	400
Spoon-billed Sandpiper			1												1	
Broad-billed Sandpiper	3		50	40	4		10	1	1					20	15	25
TOTAL	15798	867	2458	1963	2372	1856	3753	3538	2296	4061	5350	11462	2121	17408	9441	14660

Appendix 2. Gulls and terns counted at Kapar Power Station in 2008.

Month	Jan	Mar	Apr					May	June		July		Aug		Sep	Dec	
Date	13	29	7	8	19	25	26	24	20	21	20	26	17	23	15	28	29
Observer	YC	ATH	DB	DB	DB	ATH	ATH	ATH	DB	ATH	DB	ATH	DB	ATH	DB	DB	DB
Lesser Adjutant					1		2				1				1	1	
Striated Heron	2												1		4	2	1
Javan Pond-Heron							1										
Pond-Heron sp																1	
Cattle Egret															7		
Grey Heron	39			2					25		10		38		10	2	2
Purple Heron									2		1						
Great Egret	9			2					1		1					2	2
Intermediate Egret																	
Little Egret	4								75		10		20		47		60
TOTAL	54			4	1		3		103		23		59		69	8	65

Appendix 3. Herons, egrets and storks counted at Kapar Power Station in 2008.

Month	Jan	Mar	Apr					May	June		July		Aug		Sep	Dec	
Date	13	29	7	8	19	25	24	20	21	20	26	17	23	15	28	29	
Observer	YC	ATH	DB	DB	DB	ATH	ATH	DB	ATH	DB	ATH	DB	ATH	DB	DB	DB	DB
Black-headed Gull	1																
Gull-billed Tern	520	10	500	300	300		120	15	80	6	70	70	80	250	450	736	
Caspian Tern	26	12	4	5	6		2				1	1	1	1	4	24	
Common Tern												4					
Little Tern	170						1	8		1	30	55	90			5	
White-winged Tern	95			60	50		4								150		
TOTAL	812	22	504	365	356	0	127	23	80	7	101	130	171	251	604	765	



Nordmann's Greenshank (centre right), one of the world's rarest and globally threatened sandpipers, is a regular visitor to Kapar Power Station. (David Bakewell/MNS)