Charles Darwin UNIVERSITY Australia

EPBC2010/5304

MIGRATORY BIRDS MANAGEMENT PLAN

DRAFT

22 MARCH 2013

PROPOSAL TO THE NORTHERN TERRITORY GOVERNMENT

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Garnett, S.T. 2012. Migratory Birds Management Plan.

For Submission

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Report to the Department of Business, Northern Territory Government

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 East Arm Wharf Expansion

The East Arm Wharf and surrounding infrastructure is designated the 'East Arm Port Development Zone' (Zone DV in the East Arm Control Plan 1998, Northern Territory Planning Act 2008). The purpose of zone DV is to provide for development of major strategic industries including gas based, road, rail or ports industries, and to provide land for major industrial development that is of strategic importance to the future economic development of the Northern Territory.

To address increased demands on the wharf for export of bulk minerals, storage, as well as increased requirements of offshore industry, the Northern Territory Government (NTG) is expanding facilities at the East Arm Wharf (EAW), which is located approximately 4.5 km south of Darwin City. The East Arm Expansion Works include a marine supply base (MSB)), a barge ramp to service Defence and private sector needs, including berthing for barges and facilities for loading and unloading; and moorings to accommodate tug boats, customs boats and other smaller vessels.

The MSB is to service the existing and future oil and gas developments in the Timor Sea, Browse Basin and adjacent areas. In September 2011, the NTG awarded the works to develop the MSB, to ShoreASCO (now ASCO Australia Limited (ASCO)), who will be the operator of the MSB facility once constructed. ASCO has engaged McMahon as the build-contractor (the Contractor), to design and construct the MSB. SKM is the lead design consultant for the Contractor. The MSB is of international standard and capable of supporting the Offshore Industry in the region surrounding Darwin, in locations ranging from the Browse Basin to Papua New Guinea.

1.1.2 Other Developments in Darwin Harbour

In addition to the EAW Expansion there will be continued expansion of the industrial base in Darwin Harbour, as well as commercial and residential development.

Darwin LNG currently has one liquefied natural gas (LNG) processing train at Wickham Point on Middle Arm Peninsula in Darwin Harbour and is considering the construction of another subject to securing a gas supply. In addition two LNG processing trains are being constructed by the Ichthys Joint Venture at Blaydin Point on Middle Arm Peninsula to process gas from the Ichthys gas field. It is reasonable to assume that further developments will also occur on the basis of this industrial infrastructure.

As well as these major developments there is approximately 300 Hectares of industrial land in the East Arm Logistics Precinct available for development, with further industrial land available at sites such as the Wishart.

Commercial and residential developments are also proceeding.

1.1.3 Environmental Assessment Background

Environmental assessment for the EAW Expansion Works were undertaken in accordance with the requirements of the Northern Territory Environmental Assessment Act 1982 (EA Act).

The proposal was also declared a controlled action under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) as it was considered likely to have impacts on the following Matters of National Environmental Significance:

1. Listed threatened species and communities (EPBC Act sections 18 and 18A); and

2. Listed migratory species (EPBC Act sections 20 and 20A).

The proposal has been assessed under the Bilateral Agreement for Environmental Impact Assessment between the NT and Australian Governments (Bilateral Agreement), to satisfy requirements of both the EA Act and the EPBC Act.

Pursuant to the Bilateral Agreement, the NTG required an Environmental Impact Statement (EIS) under the EA Act. The draft EIS was lodged on 18 June 2011 and was made available for public comment for a period of six weeks.

After considering submissions made in response to the EIS and the supplementary information provided, the Northern Territory Minister for Natural Resources, Environment, the Arts and Sports issued Assessment Report 67 on 23 December 2011.

The Commonwealth Minister for Sustainability, Environment, Water, Population and Communities issued EPBC Act Approval 2010/5304 on 5 March 2012.

1.1.4 EPBC Approval 2010/5304

Environmental Protection and Biodiversity Conservation Act (Cth) (EPBC Act) Approval 2010/5304 condition 36 requires the Person taking the action to submit a Migratory Bird Management Plan to the Minister. The purpose of this condition is to provide appropriate (and commensurate) offsets for the residual and consequential impact of the East Arm Wharf Expansion Works upon migratory shore birds. Broadly the condition provides for

- the protection and maintenance of Pond "D" as identified in Annexure 1 of the approval as a suitable high tide roost habitat;
- capture of data to enhance the understanding of migratory shorebirds and their use of this location; and
- use of adaptive management to optimise outcomes

1.1.5 Potential Impacts on Species of National Environmental Significance

1.1.5.1 Matters of National Environmental Significance

Under EPBC Act policy statement 3.21 (DEWHA, 2009(a)) a site is nationally important habitat if it:

- is identified as internationally important under Ramsar;[1]
- supports at least 0.1% of the flyway population of a single migratory shorebird species;
- sustains 2000 or more migratory shorebirds; or
- sustains 15 or more shorebird species.

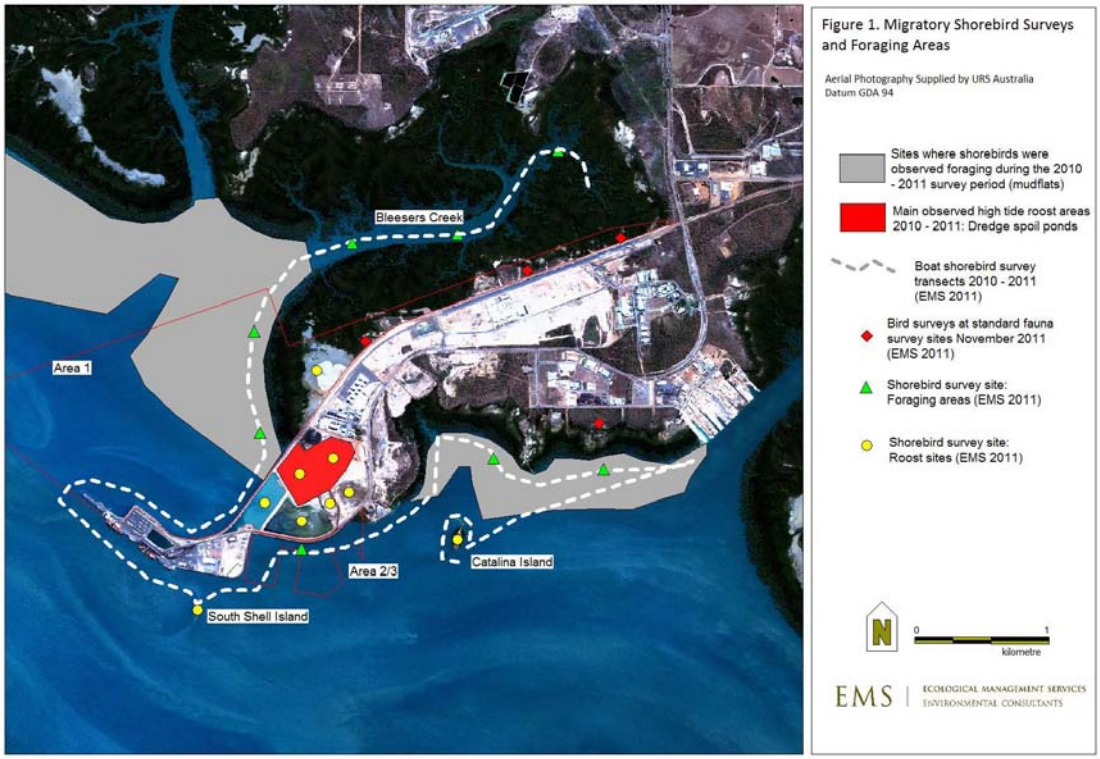
The largest number of the migratory shorebird observations during the EMS surveys were at Pond D (between 922 and 993 sightings out of 1918 sightings at 14 sites in total; Ecological Management Services 2011). During the EMS surveys numbers at Pond D met the criteria for supporting nationally important migratory shorebird habitat in that:

Three migratory shorebird species (Lesser Sand Plover, Greater Sand Plover, and Far Eastern Curlew) were recorded at numbers greater than 0.1% of the flyway population, each on a single occasion. An independent set of 30 counts carried out on behalf of the Darwin Port Corporation (DPC) recorded Far Eastern Curlew at numbers greater than 0.1% of the flyway population on two occasions. In addition 17 species have been recorded on Pond D.

Counts for Pond D are presented in Appendix 1.

The numbers at Pond D vary with height of the high tide and with time of year (Figure 2) with numbers being lowest when the ponds beside which they are roosting, are either full of water or are completely dry. It is not known if birds are present in the harbour at that time or, if so, where they roost. Figure 2 is based solely on counts commissioned by the DPC as the data in Ecological Management Services (2011) can only be calculated to a range for any one date.

[1] Ramsar Convention – or the Convention on Wetlands (Ramsar Iran 1971) is an intergovernmental Treaty that commits its member states to maintain the character of their wetlands of international importance and plan for the sustainable use of wetlands in their territory.



However, to place these numbers in context, Chatto (2003) found relatively few birds in Darwin Harbour itself, though major roosting concentrations exist to the east of Lee Point and in Fog Bay to the west.

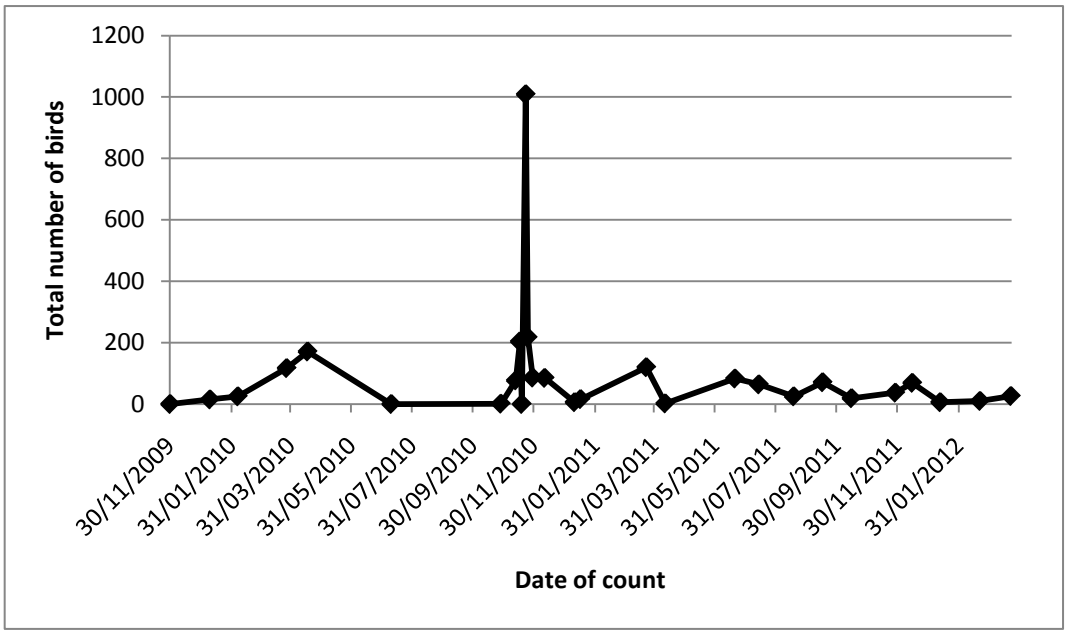


Figure 2. Total numbers of shorebirds counted at Pond D, East Arm Wharf, based on counts commissioned by Darwin Port Corporation.

1.1.5.2 Proposal description

As part of the EAW expansion project, approximately 685,000m^3 of material is to be dredged for the MSB. Dredging commenced early in October 2012. Dredging is planned to occur in two campaigns in 2012 and 2013. Dredge spoil from this dredge programme is being pumped from the dredge through a floating pipeline to the south western corner of Pond K and potentially in the south of Pond E as shown in Figure 3.

The Dredge and Dredge Spoil Management Plan (DDSPMP) approved October 2012 proposed the use of Ponds "K", "D" and "E" for the management of dredge spoil and tail water. Material placed in Pond "K" would drain naturally with the tail water (and a proportion of fines) moving via pipes through Pond "D" and then "E". From "E" tail water would either be pumped into the work site where a proportion would be recycled by the dredge)) or would filter through the designed permeable section of the rail bund. The quality of this tail water is regulated under the terms of a waste discharge licence under the Northern Territory *Water Act* and the conditions attached to EPBC Approval 2010/5304. Pond D was isolated from the system shortly after the commencement of dredging. It is proposed that Pond D may be used to manage tailwater (and associated fines) when dredging recommences in 2013. During the wet season Pond D will continue to have a role in the management of storm water discharge.

Full details of the dredging activity, including environmental impact mitigation measures are set out in the Contractors Construction Environmental Management Plan: Darwin Marine Supply Base and the Darwin Marine Supply Base Dredge and Dredge Spoil Placement Management Plan.

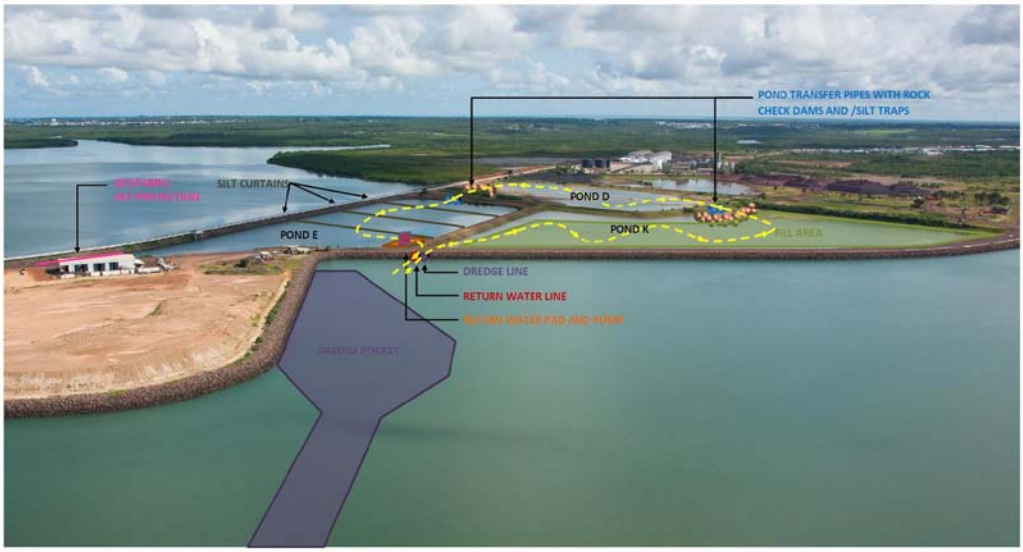


Figure 3. Pond System and Decant Water Flow as originally envisaged in the DDSPMP **(approved 2 October 2012**

1.1.5.3 Potential Impacts on Migratory Birds

The principal activities that are likely to impact upon migratory shorebirds is dredge spoil placement and its management in the pond system adjacent to the East Arm Wharf. These ponds already contain spoil from the Darwin Waterfront Redevelopment project and the East Arm Wharf development.

The approved Biodiversity Impact Mitigation and Offset strategy (BIMOS) outlines that there will be temporary disturbance across the dredge spoil pond system in terms of noise and vibration during dredging operations. In addition there will be a permanent change to the characteristics of Pond K which will be filled to capacity as a result of the placement of dredge spoil material, and of Pond E which will be partially filled.

EPBC Approval 2010/5304, as reflected in the BIMOS, requires that Pond D will be managed with particular emphasis on maintaining it as a high tide roosting habitat for migratory birds in line with the approval requirements. This is the subject of this Migratory Birds Management Plan (Northern Territory Government 2013).

1.1.5.4 Pond D Site Characterisation

Pond D is part of Section 4444, Hundred of Bagot. The site is currently zoned DV (Development)) under the Northern Territory Planning Scheme. It is an artificial site bounded on all sides by a series of bund walls. The material contained within the bund walls is fine weakly consolidated dredge material. The outer bund wall has a minimum height of 6.5m AHD. The pond has an approximate surface area of 12.9Ha. The top of the sediment is at an average of 4mAHD. The area is subject to periods of inundation typically filling to capacity during the peak of the wet season, and dries out in Dry Season.

Pond D is an active part of the East Arm Wharf storm water management system and has received storm water flows on a regular basis since the pond's creation.

It is noted that the material in the pond is gradually settling and compacting under its own weight.

1.1.6 Migratory Birds Management Plan requirements

The Migratory Birds Management Plan (MBMP) as described in EPBC Approval 2010/5304 and reflected in the approved BIMOS is to be submitted to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities for approval, and to be implemented by the NTG once approved. The purpose of the MBMP is to address the consequential and residual impacts upon EPBC listed migratory bird species associated with the expansion of the East Arm Wharf.

Under the EPBC 2010/5304 condition 36 the MBMP will:

a) provide for the protection and maintenance of the existing pond D as a suitable high-tide roosting habitat for migratory birds in perpetuity, including:

   i. Restriction of access to public and animals (dogs);

   ii. Management and control of feral animals and other invasive species within the area to be protected;

b) undertake at least two summer surveys each year compliant with the current *Significant Impact Guidelines for 36 Migratory Shorebird Species* policy statement of the Commonwealth Department of Sustainability, Environment, Populations and Communities (SEWPaC) in the existing pond system, including Pond D, until 5 years after completion of the placement of dredge spoil at pond D.

c) consider the capture, banding and marking of migratory shorebirds that currently use East Arm Wharf Dredge Spoil Ponds, to track their response to the expansion works and to monitor the effectiveness of the management measures; and

d) undertake adaptive management measures for the management of pond D taking into account the surveys conducted under (b) and (c) where appropriate.

2. MIGRATORY BIRDS MANAGEMENT PLAN

2.1 OVERVIEW

The MBMP is divided into two components. The first is focussed on monitoring and management of Pond D at EAW to ensure it retains the values identified during the Environmental Impact Assessment of the EAW Marine Supply Base. The second aims to determine the significance of Pond D within Darwin Harbour as a whole. The object of the second part of the MBMP is also to provide a context against which further developments around the harbour can be assessed.

2.2 EAST ARM WHARF

2.2.1 Monitoring

To comply with Condition 36(b) of EPBC Approval 2010/5304 of the BIMOS not less than two summer surveys of the pond system, particularly Pond D, will be undertaken each year until 5 years after completion of the placement of dredge spoil into Pond D. Concurrent with the bird counts, records shall be kept in regard to water depth, presence/absence of feral animals and vegetation cover.

Table 1 summarises the monitoring and triggers in this report.

Each month Pond D will be subject to a visual inspection to identify whether there have been any deaths of migratory birds. Where a deceased bird has been identified the carcass is to be recovered and examined to determine whether the death is prima facie from natural causes or associated with predation by feral animals or other causes.

To facilitate the development of knowledge regarding the use of Darwin Harbour by migratory shorebirds an annual monitoring report will be published upon the project web site by 30 March for the preceding calendar year ending 31 December.

Table 1

MBMP Monitoring and Triggers

Parameter	Method	Frequency	Trigger
Bird Numbers /species	In accord with *Significant Impact Guidelines for 36 Migratory Shorebird Species* policy	Minimum of two during summer in accordance with condition 36 of approval	• 60% decline of total number from baseline[1] • 60% decline in any of the migratory shorebird species recorded on Pond D whose counts have exceeded 0.1% of flyway • 60% decline in the number of migratory shorebird species recorded.
Water depth	Photograph marker(s) located in pond	Concurrent with bird count	Refer bird count
Vegetation Cover	Photographs of ponds from marked locations - photos to be from same localities using camera lens of same focal length	Concurrent with bird count	Refer bird count
Pipe Inspection	Visual inspection	Annually – prior to the wet season	
Bird deaths	Visual inspection	Concurrent with bird surveys	Discovery of dead migratory shorebird

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2.2.1.1 Methodology

The two summer surveys will comply with the current *Significant Impact Guidelines for 36 Migratory Shorebird Species* policy statement of the Commonwealth Department of Sustainability, Environment, Populations and Communities (SEWPaC) in the pond.

Birds will be counted within two hours of the spring high tide during the wet season (during those months that correlate to the southern hemisphere summer), starting with the first month following the first rains to ensure that there is at least some water in Pond D to attract roosting migratory shorebirds. Counting will be undertaken by personnel with at least sufficient experience with the identification and counting of migratory shorebirds to be competent to participate in the annual shorebird counts coordinated under the Shorebird 2020 program of Bird Life Australia.

The bird counts are to commence in Summer of 2012/2013 and continue until February 2019. The MSB dredge program will cease in the 3rd quarter of 2013.

2.2.1.2 Triggers

Triggers for further action to be adopted once dredging has ceased are as follows:

- the maximum number of shorebirds counted during any season fall below 60% of maximum baseline[2] numbers in total for that season;
- numbers of either of the two species which have been recorded at Pond D in nationally significant numbers fall below 60% of baseline numbers in total for that season
- there are fewer than 60% of the number of species recorded during baseline surveys

The figure of 60% is adopted as being a threshold that allows for the high levels of daily and seasonal variation expected and the megatidal environment of Darwin Harbour, while still demonstrating that the site retains its value to migratory shorebirds.

Season is adopted rather than month because the total number of baseline surveys for each month varies between zero and five (see Appendix 2) so that an average for the month has a high probability of being skewed by outliers. When monthly surveys are aggregated into seasons, the number of baseline surveys varies between 6 and 9. The seasonal aggregation of months would be Summer (Dec-Feb; non-breeding shorebirds most likely to be resident); Autumn (Mar-May; shorebirds likely to be highly mobile on northward passage migration); Winter (June-August; shorebirds largely resident, though some migrants possibly returning in August); Spring (Sept-Nov; shorebirds likely to be highly mobile on southward passage migration). Baseline data for Pond D is presented in Table 2.

Table 2. Baseline data for Pond D at East Arm Wharf derived from 30 counts undertaken from November 2009 to December 2012

	Summer	Autumn	Winter	Spring
Eastern curlew	2	17	0	1
Lesser Sand Plover	2	0	0	1
Greater sand plover	4	0	0	4
Total	18	46	26	30
No. species	7	7	5	7

Where the trigger is exceeded a notice of exceedance will be sent within 14 days of the exceedance being identified by the Territory. The Notice will be provided to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and the Territory Department of Land Planning and Environment.

[2] Baseline – The baseline has been derived by averaging the 28 sets of count data that the Darwin Port Corporation has collected from November 2009 to December 2012. A part of the time series was cited in the East Arm Wharf Expansion as Estbergs 2011. This time series is regarded as more representative of the natural variation of Migratory Bird Species than the counts completed by EMS for which it is only possible to calculate a range of possible numbers for Pond D for each species and each date (see Appendix 3).

2.2.1.3 Responses to trigger exceedances

If any of the triggers described in Section 2.2.1.2 are exceeded, the NTG will investigate to determine whether changes detected are attributable to the condition within the ponds or the management of the ponds (e.g. excessive disturbance) or whether changes are more likely to be caused by extrinsic factors (e.g. condition of the tide, on-migration, local rainfall). The changes will be compared to any counts under the auspices of the Australian Wader Studies Group at other sites in the Darwin region and elsewhere in Australia to determine if they are part of a larger trend. A review of the conditions at the site will also be undertaken to determine if any local habitat variables have altered, particularly whether water has been available, whether the potential roost sites have become excessively vegetated or any other matters that might have discouraged birds from roosting at the site. Where the variation is considered by the NTG to be site specific, a more detailed investigation will be undertaken. If the cause can be identified as relating to pond management, the NTG will arrange for required corrective actions.

The Territory will ensure that analysis and consideration of relevant contributing factors is undertaken within a period of 30 business days of its receipt of initial trigger exceedance data. The management measures that need to be implemented to reduce any adverse impacts upon migratory birds will then be determined on the basis of the NTG analysis of the situation. Corrective action will vary with the identified cause e.g.

i. Increased cover – The Territory will ensure that reduction in vegetation is undertaken. The objective is at least to ensure that vegetation cover is returned to the level that existed at December 2012. Reduction to be undertaken in such a way as to minimise impact upon roosting migratory birds e.g. avoid undertaking activity in the wet season where feasible, or else ensure that, if reduction is required during the wet season, this activity occurs in the 2 hours either side of low tide;

ii. Change in hydrology – determine the contributing factors and identify a cost effective method to address. Changes in hydrology may include:

    a. Changes in pond depth – This may arise from the material in the pond compacting; or from drains between ponds becoming obstructed preventing water from moving from Pond D to other ponds in the network increasing the height of water within the pond. Dependent upon the cause required action may include clear drain pipes and ensure that site management includes ongoing inspection and maintenance of pipes connecting the ponds.

    b. Change in fill regime – the pond currently fills and dries annually. Since inception it has formed part of the area's storm water management. Changes in when the site fills from storm water is attributable to the arrival, and duration of, the wet season and reflects natural variability.

Where a bird death is determined to be the result of predation by feral animals an inspection of the boundary fence will be undertaken to determine whether there are any breaches in the fence. In addition appropriate traps will be set to capture the predatory animal(s).

The Exceedance Attribution Report will also outline what sampling/analysis will be undertaken to assess the success of the proposed mitigation strategy.

Following completion of the Exceedance Attribution Report, SEWPaC will be provided with a copy of the report containing proposed remedial actions and follow up monitoring to measure the success of the proposed remedial action.

2.2.2 Management

To comply with EPBC Approval 2010/5304 Condition 36(a), and in accord with sections (c) and (d) of the BIMOS the NTG, as owner of the land constituting pond D as identified in Annexure 1, will not permit use of Pond D in any manner or for any purpose inconsistent with maintenance of the pond as a high tide roosting habitat for migratory birds.

Similarly the DPC, through the Port Environmental Protection Plan (PEPP), has undertaken not to utilise pond D in a way inconsistent with the NTG's obligation to maintain the pond as a suitable high-tide roosting habitat for migratory birds.

To do so, the following actions will continue or be undertaken:

i. Public access and access by animals (especially dogs) will be restricted at all times. DPC controls public access to the whole of the operational port area, which includes the existing pond D. The general public are not permitted access to the operational port.

ii. The Port area is fenced to exclude unauthorised entry. The Port Environmental Protection Plan (PEPP) ensures this fencing is maintained. The fence restricts public and feral animal access to Pond D.

iii. Install signage at relevant perimeter points of pond D indicating that the Pond is protected as a migratory bird habitat,

The principle risk at East Arm Wharf is from habitat degradation and disturbance. The NTG will manage the site to minimise degradation. Possible sources of degradation include:

- **Increased vegetation**

Appropriate roost sites need to be sufficiently open for birds to detect and avoid predation. Consequently the establishment of new vegetation degrades the site as a suitable high tide roost site.

It is noted that Pond D is subject to seasonal inundation that restricts the establishment of vegetation. Vegetation cover on Pond D will be monitored at the same time as the bird counts are undertaken. This includes taking photographs of the site. This will allow changes in cover to be monitored over time and identify when vegetation cover is likely to affect use of the site by roosting shorebirds.

- **Change in Hydrology**

Water depth and duration over which the site is filled has the potential to affect the use of the site as a roost location. During the initial two years, records will be kept regarding when the site starts to fill, when the pond becomes full and the duration of fill to correlate with bird usage and migration. This is the existing cycle and needs to be understood. Should a trigger occur and assessment

determines that it is attributable to the change in the hydrology; the NTG will also determine what management action is appropriate as outlined previously.

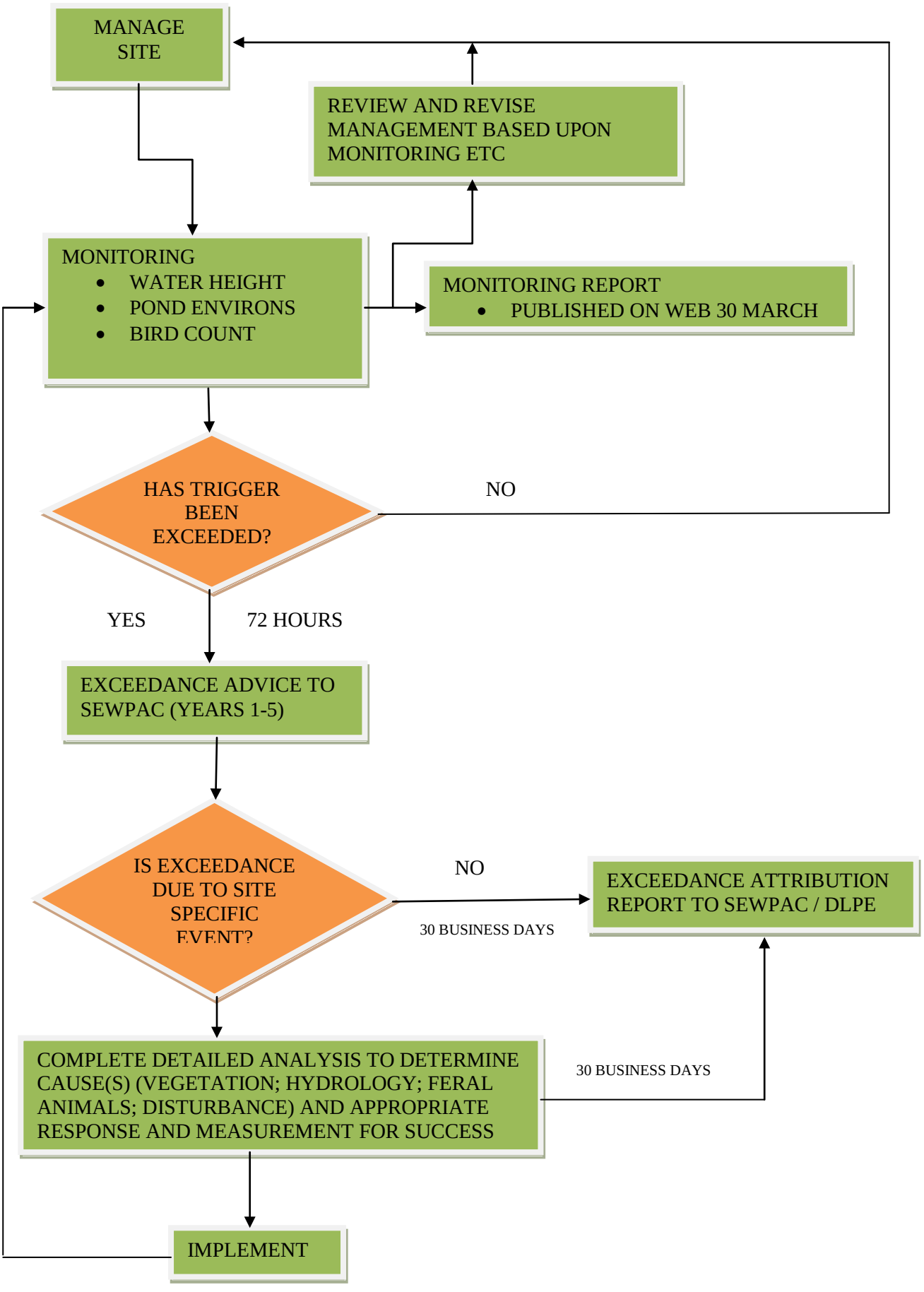
As Part of the EMP for the site, the NTG will ensure that the pipe that allows water to drain from Pond D shall be inspected at least annually prior to the expected onset of the annual wet season. Appropriate action shall be taken to keep the pipe clear of obstruction to ensure that the Pond will drain as designed.

- **Other**

Site degradation can arise from either noise or light from the surrounding environment. Pond D is within the boundary of an active Port that moves a range of products including bulk minerals. The presence of birds within the pond system clearly demonstrates that they have adapted to the light and noise associated with an active port. This is be expected of species that feed by both night and day, breed at latitudes where there is light 24 hours a day and, during migration, transit along some of the busiest coastlines in the world. Given this habituation, it is not proposed to place any restrictions on activities external to Pond D.

Should a trigger occur the Territory will review what changes have occurred in surrounding activity. Should there be a causative relationship established with light and/or noise, the NTG will implement arrangements to manage the identified causes to reverse impacts.

Migratory Bird Adaptive Management



2.3 DARWIN HARBOUR

EPBC Approval 2010/5304 Condition 36 outlines the matters that should be considered as a minimum within the Migratory Bird Management Plan. In addition the Northern NTG is examining options for the completion of an additional study to better understand the movements and roosting sites of migratory birds within the broader setting of Darwin Harbour.

The proposed additional component of this MBMP is a doctoral research project to include:

- Habitat use research; and
- A survey to determine use of the broader Darwin Harbour by migratory shorebirds for roosting and feeding.

This research project will be undertaken through collaboration with Charles Darwin University.

Data and supporting information from this work, will be provided in the annual monitoring report. In a 2011 report (Environmental Management Services 2011), it was recommended that monitoring be continued and expanded to include the saline flats/tidal mudflats and a dry season survey conducted. It was also recommended that monitoring should be continued to determine whether the migratory birds can and do use other nearby areas. This recommendation forms part of the survey to be undertaken as part of this plan. The aim of the surveys would be to:

- determine the relative significance of Pond D at EAW as a roost site for migratory shorebirds in the Darwin region; and
- Test the assumption presented in the Environmental Impact Statement for the EAW expansion that migratory and shorebirds will utilise alternative habitat types within Darwin Harbour.

The identification of roosting and feeding habitat for migratory shorebirds around Darwin Harbour will also be useful for whole of harbour planning in the context of planned developments and subsequent developments.

Roost sites will be determined by two means. Initially the direction of flight of migratory shorebirds will be noted from a boat situated offshore from EAW and at other points around Darwin Harbour as the tide rises and the birds move towards roost sites. This will be combined with spatial analysis of potential roosting habitat – usually unvegetated sites adjacent to water at high tide, usually beside the sea or, as is the case with Pond D, within a few hundred metres of the water's edge. These sites will then be visited at appropriate tides to identify and count the waders present. Numbers at roosts will then be compared with numbers seen feeding on mudflats during low tide.

If the numbers at roosts are far lower than the numbers seen feeding, thus demonstrating that there are roost sites that have not been located, then arrangements may be made to catch waders using cannon nets and to fit radio-transmitters. This will allow the tracking of daily movements of the birds for

extended periods, providing empirical evidence of the spatial use of both feeding sites and non-feeding sites. Any shorebirds caught will also be fitted with leg flags and possibly satellite transmitters to contribute to the larger understanding of shorebird movements from northern Australia along the East Asia Australasian flyway. This activity will fulfil the obligations under section (b) of the BIMOS but active capture and marking of the birds will only be undertaken if deemed necessary to locate roosts and to track the use of habitat by individual birds.

The work outlines above will be undertaken by a PhD project managed through a partnership between NTG and Charles Darwin University. The PhD project aims to:

1. Understand the distribution and population size of shorebirds in Darwin Harbour;

2. quantify resource availability for shorebirds on Darwin Harbour mudflats;

3. model how, and to what extent, shorebirds optimise resource use;

4. contribute to long-term planning of Darwin Harbour.

The Northern NTG Government will protect pond D in perpetuity through land owner commitments to manage the site in accord with the requirements of the EPBC Approval. The success of the land owner commitments will be monitored through the outcome of the summer surveys. Should triggers be exceeded and a determination be reached that this is due to management practices, the NTG will examine and implement options (as described earlier i this Plan) to mitigate any impacts.

2.4 REVIEW OF THE MIGRATORY BIRD MANAGEMENT PLAN

The Plan will be reviewed and submitted to the Minister for approval within 30 Business Days from the receipt of an Exceedance Attribution Report that identified management practices on Pond D as a cause for the trigger.

Should there be no triggers the plan will be reviewed at a minimum of once each five years.

3. REPORTING

3.1 ANNUAL REPORT

By 30 March of each year the NTG will produce and publish an annual compliance report, on www.eastarmwharf-eis.nt.gov.au. This report shall address compliance with the conditions of approval including the implementation of any management plans. This is in accord with EPBC Approval 2010/5304 Condition 3.

By 30 March of each year the NTG will publish on the web site an Annual Monitoring Report. The report will be for the year ending 31 December and include all monitoring data.

3.2 EXCEEDANCE NOTIFICATION AND REPORTING

Should a trigger be exceeded an Exceedance Notification (refer Section 2.2.1.2)) shall be provided to the Department of Sustainability Environment Water Population and Communities within 72 hours of the exceedance being identified. A similar notice will be provided to the Northern Territory Department of Lands Planning and Environment.

An Exceedance Report will be completed within 30 Business Days (Section 2.2.1.3)). This report will summarise the nature of the exceedance, comparison data (other counts taken locally nationally that may demonstrate whether this is a local event or broader trend); weather/climate information; pond condition including degree of pond filling; vegetation cover; changes in offsite activity; proposed action and how success of action will be measured.

3.3 ROUTINE REPORTING

Two summer surveys are to be undertaken from December 2012 to February 2019. The results from these surveys (section 2.2.1) will be provided to SEWPaC within one week of receipt by the Territory of the final report from the persons responsible for completion of the survey.

REFERENCES

Chatto, M. 2003. The distribution and status of shorebirds around the coast and coastal wetlands of the Northern Territory. PWCNT, Technical Report 73.

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Ecological Management Services 2011. East Arm Wharf Expansion Project Terrestrial Flora and Fauna Assessment. Final report to URS Australia/Northern Territory Department of Lands and Planning

McMahon 2012. Construction Environmental Management Plan Darwin Marine Supply Base. McMahon, Darwin

Northern Territory Government 2012. Biodiversity Impact Mitigation and Offsets Strategy – East Arm Wharf Expansion Works – Darwin Marine Supply Base. Department of Business, Darwin.

Appendix 1. Monthly count data from Pond D, East Arm Wharf.

Species	30/11/2009	9/1/2010	6/2/2010	27/3/2010	17/4/2010	10/7/2010	28/10/2010	29/11/2010	11/12/2010	10/1/2011	23/3/2011	11/4/2011	20/6/2011	14/7/2011	18/8/2011	16/9/2011	15/10/2011	28/11/2011	15/12/2011	12/1/2012	21/2/2012	23/3/2012	23/4/2012	20/7/2012	17/8/2012	14/9/2012	15/11/2012	15/11/2012	No. of times observed*	Meets Flyway Threshold
Black-tailed godwit	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Bar-tailed godwit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whimbrel	0	0	0	0	0	0	0	8	0	1	15	0	0	0	0	0	0	0	0	0	0	0	0	37	0	0	0	0	4	0
Eastern curlew	0	1	5	101	1	0	0	9	0	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	2
Marsh sandpiper	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	3	18	0	1	0	0	0	0	0	1	0	9	0
Common greenshank	0	6	8	11	3	0	0	2	15	0	8	0	0	0	12	0	16	28	0	6	9	24	3	47	0	0	54	0	16	0
Wood sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common sandpiper	0	0	0	0	1	0	0	0	0	2	2	0	0	0	1	0	0	0	1	0	0	2	0	0	0	0	0	0	6	0
Grey-tailed tattler	0	0	0	0	0	0	0	2	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Great knot	0	0	0	0	0	0	0	0	0	0	0	0	50	20	0	0	0	0	0	0	0	0	20	0	0	0	0	0	3	1
Red knot	0	1	0	0	150	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Sanderling	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
Red-necked stint	0	6	0	4	4	0	0	0	0	0	0	0	12	20	12	6	0	0	35	0	0	0	0	0	0	4	3	0	10	0
Sharp-tailed sandpiper	0	0	9	1	5	0	0	10	0	3	6	0	4	0	0	6	2	0	14	0	0	0	0	0	0	0	8	0	11	0
Curlew sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	6	1	0	0	0	0	0	0	0	14	0	5	0
Golden plover	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Grey plover	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Lesser sand plover	0	0	0	0	0	0	0	3	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Greater sand plover	0	0	1	0	0	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Oriental plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unidentified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total No. birds	0	15	25	117	171	0	1	84	85	6	120	2	71	44	25	71	19	37	69	6	10	26	23	84	0	4	82	0		
No. of Species counted	0	5	6	4	7	0	1	7	3	3	7	1	5	4	3	4	3	3	5	1	2	2	2	2	1	1	7	0		

** 'Observed' relates to the above 28 surveys*

Appendix 2. Monthly baseline figures for migratory shorebirds at Pond D, East Arm Wharf, based on data collected November 2009 – December 2012.

		Season average					Month											
Species	0.1% Threshold	Summer	Autumn	Winter	Spring		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black-tailed godwit	160	0	1	0	0		0	0	0	2	0	0	0	0	0	0	0	0
Bar-tailed godwit	325	0	0	0	4		0	0	0	0	0	0	0	0	0	0	7	0
Whimbrel	100	0	3	6	1		0	0	5	0	0	0	12	0	0	0	2	0
Eastern curlew	38	1	29	0	1		1	3	58	0	0	0	0	0	0	0	2	0
Common redshank	75	0	0	0	1		0	0	0	0	0	0	0	0	3	0	0	0
Marsh sandpiper	100 - 1,000	3	1	0	1		0	1	0	1	0	2	0	0	0	0	2	9
Common greenshank	60	6	8	10	15		4	9	14	2	0	0	16	6	0	8	23	8
Wood sandpiper	100,000 – 1,000,000	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
Terek sandpiper	60	0	0	5	0		0	0	0	0	0	12	7	0	0	0	0	0
Common sandpiper	25	0	1	0	0		0	0	1	0	0	0	0	1	0	0	0	1
Grey-tailed tattler	50	0	0	1	0		1	0	0	0	0	3	0	0	0	0	0	0
Great knot	375	0	3	12	0		0	0	0	7	0	50	7	0	0	0	0	0
Red knot	220	0	25	0	6		0	0	0	50	0	0	0	0	27	0	0	0
Sanderling	22	0	0	0	0		0	1	0	0	0	0	0	0	0	0	0	0
Red-necked stint	325	6	1	7	8		2	0	1	1	0	12	7	6	5	0	12	18
Sharp-tailed sandpiper	160	3	2	1	6		0	5	2	2	0	4	0	0	3	1	10	7
Curlew sandpiper	180	1	0	0	4		1	0	0	0	0	0	0	0	3	1	5	1
Golden plover	100	0	3	0	0		0	0	5	0	0	0	0	0	0	0	0	0
Grey plover	125	0	0	1	0		0	0	0	0	0	0	1	0	0	1	0	0
Lesser sand plover	140	3	0	0	1		0	0	0	0	0	0	0	0	0	0	2	10
Greater sand plover	110	7	0	0	6		0	1	0	0	0	0	0	0	0	0	11	25
Total		30	77	43	54		9	20	86	65	0	83	50	13	41	11	76	77
No. species		8	11	8	12		5	6	7	7		6	6	3	5	4	10	8
No. counts		7	6	6	9		3	2	3	3	0	1	3	2	2	2	5	2

Appendix 3. Maximum and minimum counts of migratory shorebirds on Pond D at East Arm Wharf based on counts available in the Environmental Impact Statement (EWS 2011)

	No birds	
Species totals	Min	Max
Black-tailed godwit	23	23
Bar-tailed godwit	21	21
Whimbrel	1	4
Eastern curlew	99	99
Marsh sandpiper	263	263
Common greenshank	14	20
Common sandpiper	1	1
Red-necked stint	31	31
Sharp-tailed sandpiper	1	3
Curlew sandpiper	3	10
Grey plover	3	6
Lesser sand plover	284	302
Greater sand plover	178	210
Date totals		
11/11/2010	0	31
12/11/2010	17	70
16/11/2010	140	196
18/11/2010	10	49
22/11/2010	606	911
24/11/2010	98	208
16/01/2011	0	23