

# **Marine Mammal Management Sub-Plan**

**for**

**‘Design & Construction of Port Botany  
Expansion’**

**Sydney Ports Corporation**

*Document No: PLAN-EN-012[1]*

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## 1 GOALS, OUTCOMES, KEY ISSUES

<b>Goals</b>	To minimise the risk of harm to marine mammals in Botany Bay during construction activities.
<b>Outcomes</b>	Measures in place to protect marine mammals from harm from construction activities.
<b>Key issues</b>	<p><i>Background Issues:</i></p> <ul style="list-style-type: none"> <li>Key cetacean species known to visit Botany Bay include: <ul style="list-style-type: none"> <li>Regular Visitors: Southern Right Whale and the Humpback Whale.</li> <li>Occasional Visitors: Bottlenose Dolphin, Common Dolphin, Risso's Dolphin, Pygmy Sperm Whale, Killer Whale, Australian Fur Seal, Leopard Seal, Southern Elephant Seal, Crab Eater Seal and Dugong.</li> </ul> </li> <li>Between the months of June and July as many as 150-200 whales migrate north past the NSW coastline in a single day, returning in a southern migration in the warmer months of October and November.</li> <li>It is not uncommon for migrating whales to enter ports and harbours along the coast, including Sydney Harbour and Botany Bay.</li> <li>Humpback Whales regularly (i.e. weekly) visit Botany Bay, however do not usually penetrate very far into the Bay. The furthest recorded penetration into the Bay of a Humpback whale was the revetment wall near Molineaux Point.</li> <li>Southern Right Whales venture deeper into the Bay (two whales were recently recorded up the Georges River) and visitations are usually between the Cooks River, Sydney Airport Parallel Runway, Port Botany and Molineaux Point.</li> <li>Southern Right Whales present a higher risk to port construction and operations as they often 'Bay Hop' especially on their southern migration, and once within Botany Bay may stay for a period of days to weeks (the longest recorded stay was a single whale in 2003 for 10-12 days). In addition, Southern Right Whales are difficult to spot, especially in poor weather conditions.</li> <li>Occasional visitors are of lower risk of harm due to their higher mobility.</li> </ul> <p><i>Construction Issues:</i></p> <ul style="list-style-type: none"> <li>Elevated levels of turbidity during dredging and construction activities have the potential to disorientate marine mammals.</li> <li>Possible injury from excavation equipment on dredge vessels, however the silt curtains should keep most marine mammals away from the dredge vessels.</li> <li>Risk of potential entanglement in dredge silt curtain.</li> <li>Dredging navigational channel areas D and E, outside the silt curtains, will take one week in early September 2009. This is prior to whale migration south in October and November, but requires careful monitoring.</li> <li>Emission of high energy low frequency noise: <ul style="list-style-type: none"> <li>High energy, low frequency noise has the potential to cause physiological (such as temporary or permanent hearing loss) and behavioural effects (such as masking, aversion or attraction) in some marine mammals.</li> <li>Dominant underwater noise sources from construction activities will include pile driving, dredging and construction of rock embankments.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>- The greatest potential impact from underwater noise is likely to be from piling, due to its impulsive noise characteristics.</li> <li>• Fuel and Oil Spills can have a lethal effect on marine mammals through contamination of skin and mucous membranes, blocking of digestive tracts and orifices, poisoning through inhalation and ingestion of toxic compounds in the food web, and through damage to habitats.</li> <li>• Striking with construction vessels: <ul style="list-style-type: none"> <li>- Larger vessels will pose a significant risk to large whales, whereas smaller more mobile vessels will pose a risk to dolphins and smaller whales.</li> <li>- Larger whales may not be able to manoeuvre in time to avoid impact.</li> <li>- Impacts could be fatal, either from the direct hit, or as a result of infected injuries.</li> </ul> </li> </ul>
<b>Statutory Requirements</b>	<p><i>National Parks and Wildlife Act 1974 (NSW)</i></p> <ul style="list-style-type: none"> <li>• All marine mammals are protected in NSW.</li> <li>• Unauthorised people are prohibited from: <ul style="list-style-type: none"> <li>- harming a marine animal;</li> <li>- approaching mammals closer than distances prescribed in regulations (100-400m dependant on craft and presence of calves) - see also p7-8 of Appendix 3; and</li> <li>- interfering with a marine mammal, including harassing, chasing, herding, tagging, marking or branding.</li> </ul> </li> </ul> <p><i>National Parks and Wildlife Regulation 2002 (NSW)</i></p> <ul style="list-style-type: none"> <li>• To prevent harm or injury to whales and dolphins with NSW waters, there are legal distances for approaching whales and dolphins. These are outlined in: <ul style="list-style-type: none"> <li>- Clause 57B Prescribed approach distances to marine mammals;</li> <li>- Clause 57C Operation of prohibited vessels;</li> <li>- Clause 57D Operation of vessels that are not prohibited vessels; and</li> <li>- Section 112G Approaching a marine mammal.</li> </ul> </li> </ul> <p><i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i></p> <ul style="list-style-type: none"> <li>• Regulates actions that have, or are likely to have a significant impact on matters of national environmental significance, including listed threatened species and migratory species (Blue, Fin and Sei whales, Southern Right Whale and the Humpback Whales, the Dugong, the Fur Seal are the main threatened species in NSW).</li> </ul> <p><i>International Agreements (Commonwealth)</i></p> <ul style="list-style-type: none"> <li>• Bonn Convention provides a framework for enhancing conservation status of rare and threatened migratory species.</li> </ul>
<b>Environmental Aspects &amp; Impacts</b>	Refer to CFEMP Appendix 5.
<b>Licence &amp; Permit Requirements</b>	There are no current licence or permit requirements.

## 2 MCOA REQUIREMENTS

No.	Original Ref.	Relevant Requirement	Reference
1.		none	-

## 3 EIS REQUIREMENTS

No.	Original Ref.	Relevant Requirement	Reference
2.	Ch 19.7.1 Paragraph 8	A Marine Mammal Management Plan would be developed in consultation with NPWS to respond to the presence of any whales in the Bay during construction.	A Marine Mammal Management Plan was prepared by SPC as part of the PEHEP, which was prepared in consultation with DECC.
3.	Ch 37.2 Tab 37.1 no 29	Develop a Marine Mammal Management Plan to manage vessel movements during operation and construction activities if marine mammals, particularly Southern Right Whales and Humpback whales, are present in the Bay.	This Management Sub-Plan

## 4 DEED AND PSTR REQUIREMENTS

No.	Original Ref.	Relevant Requirement	Reference
4.	Appendix 8 Section 8.10	<p>a. For the duration of the Contractor's Work the Contractor must comply with the requirements of relevant Authorities with respect to marine mammal management within and in the vicinity of the Project Site. The Contractor must liaise with the DECC Cape Solander Whale Migration Study Team and the Harbour Master and must monitor Marine Channels VHF-17 and VHF13 for sightings of a marine mammal(s) within Botany Bay.</p> <p>b. Should the Contractor sight a marine mammal within Botany Bay at any time, the Contractor must immediately contact the Harbour Master and report the time and location of the sighting.</p> <p>c. The Contractor must prepare a Marine Mammal Management Plan in accordance with the requirements of SPC Specification G36 in Appendix 6 and this Appendix 8. The Marine Mammal Management Plan must address protocols and procedures for dealing with marine mammals.</p> <p>d. The Contractor must contact the DECC Cape Solander Whale Migration Study Team at the beginning of June each year and provide its contact details and communication protocols.</p> <p>e. Should a whale enter Area 2 shown in Figure 8.2, which is contained in Annexure B of this Appendix 8, the Contractor must be on standby to stop all water-based construction activities.</p>	<p>Section 6</p> <p>Section 6 and Section 10</p> <p>This Management Sub-Plan</p> <p>Section 6</p> <p>Section 10</p>

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## 5 MITIGATION MEASURES

<i>Mitigation measures</i>	<i>Design</i>	<i>Site establishment</i>	<i>Construction</i>	<i>Relevant Location</i>	<i>Relevant Approval conditions</i>	<i>Accountability</i>	<i>Timing</i>
MM1. <b>Start up</b> water based noise generating activities gradually.			■	Dredging and reclamation area	Appendix 8 Section 8.10	Environmental Manager	Throughout construction
MM2. <b>Inspect</b> the surface level of the silt curtains twice daily, to ensure marine mammals have not become entangled. If a marine mammal is located entangled in the silt curtain, the procedures outlined in section 10 should be followed.			■	Silt curtain locations	Appendix 8, Section 8.10	Environmental Manager	Throughout construction
MM3. <b>Remove</b> any marine debris when observed within the construction site that may pose a risk to marine mammals.		■	■	Entire project	Appendix 8, Section 8.10	Environmental Manager	Throughout construction
MM4. <b>Induct</b> construction staff on potential marine mammal concerns including <b>IND</b> : <ul style="list-style-type: none"> <li>Outline of key risks to marine mammals as a result of construction activities.</li> <li>Communication of marine mammal procedures.</li> <li>Communication of <i>Guide notes for Whale and Dolphin Sighting</i> (Appendix 3)</li> <li>Environmental response procedures and contact arrangements (in case of oil/chemical spill)</li> </ul>		■		Entire project	Appendix 8, Section 8.10	Environmental Manager	Throughout construction
MM5. Put in place <b>emergency procedures</b> to be implemented if harm to marine mammals were to occur. These emergency procedures are detailed in Section 10 of this document.		■	■	Entire project	PEHEP Appendix C	Environmental Manager	Throughout construction

## 6 MONITORING

<b>Monitoring</b>				
<i>Item</i>	<i>Frequency</i>	<i>Applicable standards</i>	<i>Responsibility</i>	<i>Reporting</i>
<ul style="list-style-type: none"> <li>Liaise with the DECC Cape Solander Whale Migration Study Team.               <ul style="list-style-type: none"> <li>A research team has been organised by DECC to monitor the presence of whales from a lookout at Cape Solander during the whale migration season.</li> </ul> </li> </ul>	Beginning of migration season.  Northbound migration begins in June, and Southbound in October	PSTR Appendix 8 Section 8.10	Environmental Manager	Communicate any sightings or reports of sightings immediately.
<ul style="list-style-type: none"> <li>Monitoring of Marine Channel VHF-17               <ul style="list-style-type: none"> <li>Permits interagency communication between the DECC, NSW Maritime, Water Police and commercial vessels</li> <li>Continuously monitored by Sydney Ports Harbour Control (Harbour Control).</li> </ul> </li> </ul>	Throughout Project	PSTR Appendix 8 Section 8.10	Sydney Ports Environmental Manager Environmental Officers	Communicate any sightings or reports of sightings immediately.
<ul style="list-style-type: none"> <li>Monitoring of Marine Channel VHF-13               <ul style="list-style-type: none"> <li>A dedicated working marine channel for communications between Harbour Control and commercial vessels</li> <li>Harbour Control provides hourly reports to all vessels on this channel.</li> </ul> </li> </ul>	Throughout Project	PSTR Appendix 8 Section 8.10	Sydney Ports Environmental Manager Environmental Officers	Communicate any sightings or reports of sightings immediately.
<ul style="list-style-type: none"> <li>Sydney Ports presence               <ul style="list-style-type: none"> <li>Operational presence in Botany Bay, with tug boats, pilot boats emergency response vessels and security surveillance will help identify any marine mammals in the areas 1, 2 and 3 (see Section 10 and Appendix 1 of this plan).</li> </ul> </li> </ul>	Throughout Project	PEHEP Appendix C	Sydney Ports	Communicate any sightings or reports of sightings immediately.
<ul style="list-style-type: none"> <li>Surface level inspections for marine mammals entangled in the silt curtains (Appendix 2).</li> </ul> <p>If a marine mammal is located entangled in the silt curtain, the procedures outlined in section 10 should be followed.</p>	Twice daily throughout Project	PSTR Appendix 8 Section 8.10	Environmental Manager	Communicate any sightings or reports of sightings, note location of entangled mammals and initiate relevant procedures immediately.
<ul style="list-style-type: none"> <li>Surface level monitoring within areas 1, 2 and 3               <ul style="list-style-type: none"> <li>Report all sightings to Harbour Master Immediately</li> </ul> </li> </ul>	Throughout Project	PSTR Appendix 8 Section 8.10	All Personnel	Communicate any sightings or reports of sightings immediately to the Harbour Master, noting time and location of sightings.



## 7 TRAINING AND RESOURCES

### ***Training***

Zone induction training to address:

- Identifying key marine mammals likely to be most affected by the expansion works;
- Identifying distress behaviour in marine mammals;
- Stop work procedures;
- Environmental response procedures;
- Matters identified by the term '**IND**' ('induction') in the mitigation measures section.

Environmental Manager to provide specific briefing/instruction to:

- Dredging and marine works foremen – importance of, and procedures for, the communication of marine mammal sightings.

Toolbox talks to be conducted on:

- Identifying key marine mammal species and classic distress behaviours.

### ***Resources***

- Environment Officers, Environmental Manager.
- DECC Cape Solander Whale Migration Study Team.
- Harbour Master.
- Dredge Team.

## 8 CONSULTATION AND CONTACTS

<b>Consultation</b>	
<i>Agencies / Stakeholder</i>	<i>Details / Outcomes</i>
Sydney Ports Corporation (SPC)	Approval of sub plan required. Comments on draft to be incorporated in final version.

<i>Position / Role</i>	<i>Organisation</i>	<i>Name</i>
Project Director	BHJDN	Vince Newton
Environmental Manager	BHJDN	Quentin Pitts
Construction Manager – Dredging & Reclamation	BHJDN	Hans Hoornaert
Construction Manager – Civil Works	BHJDN	John Taylor
Project Manager - Marine Works	BHJDN	Martin Hitchcock
Harbour Control	Sydney Ports	Duty Officer
Harbour Master	Sydney Ports	Robin Heath
DECC Duty Officer	DECC	Duty Officer
Cape Solander Whale Migration Study Team	DECC	Wayne Reynolds

## 9 REFERENCES AND REVISIONS

### ***Related Documents***

Map of Marine Mammal Protection Areas and Alert Levels (Appendix 1)

Map of Silt Curtain Locations (Appendix 2)

Guide notes for Whale and Dolphin Sighting (Appendix 3)

Photographic examples of key marine mammal species (Appendix 4)

### ***References***

Sydney Ports – Penrhyn Estuary Habitat Management Plan – Appendix C.

### ***Revision, Control & Amendment***

Revisions to this sub-plan will be made as required and in accordance with PSP-DC-004 'Project Documentation'. The Environmental Manager will review outstanding issues and comments provided by the Verifier and SPC's Representative and address these either:

- in time to be endorsed by the Verifier and reviewed by SPC's Representative prior to commencement of any related activities or work; or
- at the next Management Review of the plan as outlined in the Project Management Plan.

## 10 INCIDENT PLANNING AND RESPONSE

### Area Boundaries

Three distinct areas have been established (see map of area boundaries in Appendix 1) in Botany Bay to facilitate effective communication of protocol if marine mammals (particularly whales, as these are the most sensitive mammal) are identified within the Bay.

- Area 1 – **Low** risk of harm and/or injury to whales.
- Area 2 – **Moderate** risk of harm and/or injury to whales.
- Area 3 – **High** risk of harm and/or injury to whales

### Incident Planning & Response

Response to emergency situations will be undertaken in accordance with the Project *Emergency Response & Incident Management Plan* and environmental procedures. An emergency situation is an event that could present significant risk to the environment, personnel or the community, as determined by the Environment Manager or the Environmental Representative.

Environmental incidents will be reported immediately to a Supervisor who will contact either the Environment Manager, or Environmental Officer if the Environment Manager is unavailable. All incidents will be investigated and the appropriate course of action will be taken to address the issues. Environmental incidents that harm or are likely to harm the environment will be reported to DECC (131 555) in accordance with the *Protection of the Environment Operations Act 1997* – Duty to Notify.

The Environmental Representative has the authority and independence to require reasonable actions to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such actions, to instruct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

Potential incidents that could arise during the works include the following:

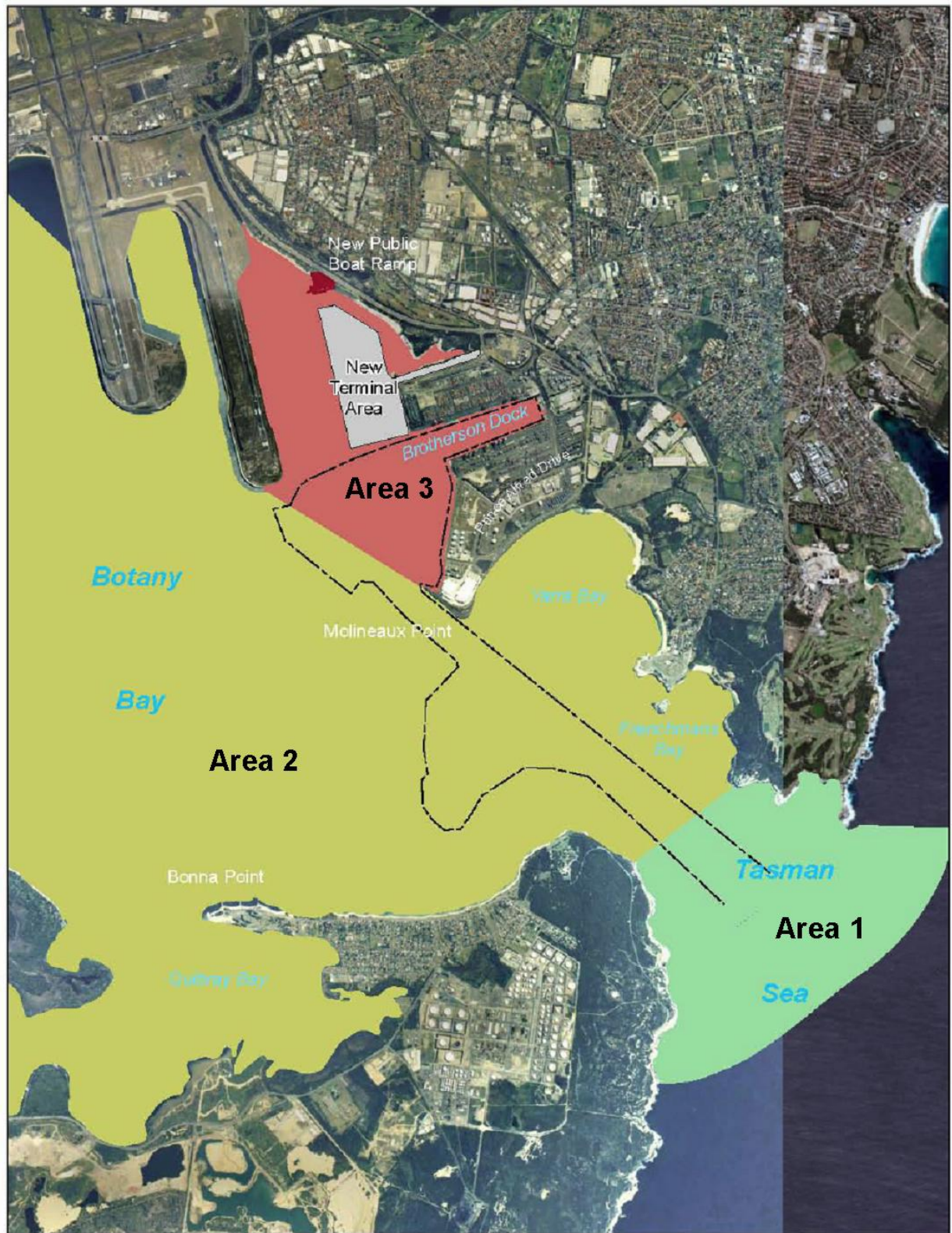
Incident no	Incident (Trigger)	Response (Action)	Responsibility
1	Start of Migration Season	Contact DECC Cape Solander Whale Migration Study Team. Provide contact number and agree that Cape Solander is to report any marine mammal sightings and locations	Environment Manager Dredging and Reclamation Manager Dredge Vessel Crew
2	Marine Mammal(s) enter area 2	Standby alert to stop all water based construction activities (including piling, dredging and construction of rock revetment) should marine mammal(s) enter area 3.	Environment Manager Dredging and Reclamation Manager Dredge Vessel Crew
3	Marine Mammal(s) enter area 3	Immediate stop of all water based construction activities (including piling, dredging and construction of rock revetment).	Environment Manager

		<p>Contact DECC Duty Officer and Harbour Master immediately. Compliance with directions from DECC is required.</p> <p>Water based construction activities will not commence until 30 minutes after marine mammal(s) have left area 3.</p>	<p>Dredging and Reclamation Manager</p> <p>Dredge Vessel Crew</p>
4	<p>Oil Spill in Water</p> <p>(All Areas)</p>	<p>Contact Harbour Master immediately.</p> <p>The Port Botany environmental response procedures will be initiated immediately.</p>	<p>Environment Manager</p> <p>Dredging and Reclamation Manager</p> <p>Dredge Vessel Crew</p>
5	<p>Collision with a marine mammal (of any kind) by a contractor vessel</p> <p>(All Areas)</p>	<p>Immediate stop of all water based construction activities (including piling, dredging and construction of rock revetment).</p> <p>Contact DECC Duty Officer and Harbour Master immediately. Compliance with directions from DECC is required.</p> <p>Activates are not to restart until DECC has provided clearance to do so.</p>	<p>Environment Manager</p> <p>Dredging and Reclamation Manager</p> <p>Dredge Vessel Crew</p>
6	<p>Entanglement of marine mammal in silt curtain.</p> <p>(Areas 2 and 3)</p>	<p>Immediate stop of all water based construction activities (including piling, dredging and construction of rock revetment).</p> <p>Contact DECC Duty Officer and Harbour Master immediately. Compliance with directions from DECC is required.</p> <p>Water based construction activities will not commence until 30 minutes after marine mammal(s) have left area 3.</p>	<p>Environment Manager</p> <p>Environment Officers</p>
7	<p>Whales and/or other marine mammals showing obvious signs of distress<sup>1</sup> and disorientation.</p> <p>(All Areas)</p>	<p>Immediate stop of all water based construction activities (including piling, dredging and construction of rock revetment) if animal is within area 3.</p> <p>Contact DECC Duty Officer and Harbour Master immediately. Compliance with directions from DECC is required.</p> <p>Water based construction activities will not commence until 30 minutes after marine mammal(s) have left area 3.</p>	<p>Environment Manager</p> <p>Dredging and Reclamation Manager</p> <p>Dredge Vessel Crew</p>

<sup>1</sup> Signs of Distress and Disorientation include regular changes in direction or speed of swimming, hasty dives, changes in breathing patterns, changes in acoustic behaviour or aggressive behaviour such as tail slashing and trumpet blows.

## Appendix 1: Marine Mammal Protection Area and Alert Level Map





- Existing Navigational Channel
- Area 1 (Alert Level 1)
- Area 2 (Alert Level 2)
- Area 3 (Alert Level 3)



**PENRHYN ESTUARY HABITAT ENHANCEMENT  
MARINE MAMMAL MANAGEMENT PLAN  
FIGURE 3: WHALE PROTECTION BUFFER  
AREAS AND ALERT LEVELS**

## Appendix 2: Silt Curtain Locations





## Appendix 3: Guide Notes for Whale and Dolphin Sighting



# ORRCA's Guide Notes

Organisation for the Rescue and Research of Cetaceans in Australia

## for Whale and Dolphin Sighting Log

### Contents

*Introduction - Page 1*

*Instructions - Page 1*

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*Legal Distances for Approach - Page 7*

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### Introduction

Sighting whales and dolphins in the wild is difficult because they spend so little time at the surface. Unless they are resting, feeding or breaching there will be only fleeting glimpses of the animals when they come up to breathe. Therefore those few sighting moments must be used wisely.

We recommend that you concentrate on answering the following questions about the key features of the animal you see: *How long is it? What is its head shape? Does it have a dorsal fin? What is the length of the pectoral fin? Are there any distinctive markings? What is the shape of the blow?*

If there is more than one animal in view, it is usually best to concentrate on recording the features of the largest one.

For the novice, the first few attempts at observing and recording whales and dolphins may be frustrating. But that frustration will disappear with practice. There are times when even the most experienced observer cannot record the key features because the animal is too far away, visibility is poor, or the light conditions mask the colours and patterns.

Thank you for participating in ORRCA's research. Your sighting log report will help us to determine the number of whales and dolphins living near, or migrating along, our shores.

### Instructions for Completing the Whale and Dolphin Sighting Log

We ask for your *name, address and phone number* in case we need to check any details, or to pass on to you further information about your sightings.

For your *sighting location*, please print the name of the headland, bay or boat where you were watching for the animals. If you are in a boat offshore, it would be useful to know the latitude and longitude, water depth and temperature.

The *date, start time and finish time* are important whether or not you see any animals. For example, knowing that no whales or dolphins were observed from your location may mean that the animals were traveling further offshore than when they were observed at different locations on that day. So even 'no sighting' reports may help us to establish that the animals avoided particular parts of the coast, possibly due natural events (e.g. currents, water temperature, rough inshore waters) or man-made disturbances (e.g. boats, jet skis, swimmers).

At the bottom of the form there is room for you to include your *comments* about what else you observed. For example, were the animals close to shore, near the horizon, or somewhere in between? Did you notice any wildlife such as sea birds, schools of fish, seals, sharks, rays?

Were there boats, jet skis, surf boards, swimmers in the area? Would you describe the sea as calm or rough? Was it a clear day with good visibility to the horizon?

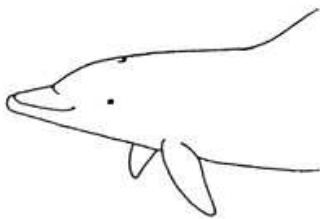
## Length

Estimating the length of a moving animal can be difficult but we would like to know whether you consider the animal is small (up to about 4 metres), medium (between 4 and 10 metres) and large (more than 10 metres). On page 7 you will find the lengths of some of the whale and dolphin species recorded in NSW.

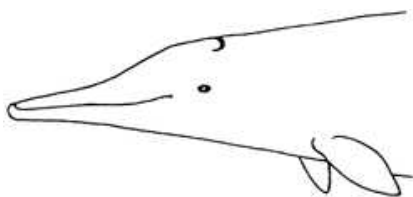
## Head Shape

Which of the following illustrations most closely resembles the shape of the front of the head of the animal you sighted?

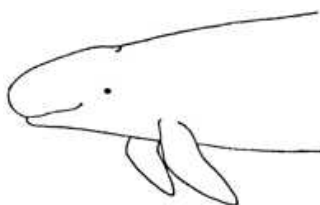
### 1. Short, stubby beak



### 2. Long, narrow beak



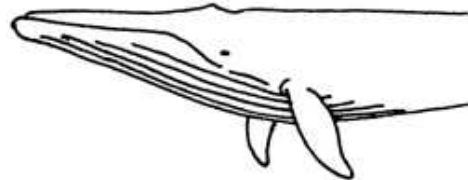
### 3. Rounded at front



### 4. Bulbous, pot shape



### 5. Large head, flat on top



### 6. Large head with small bumps



### 7. Large, dark head with light colour patches (callosities)



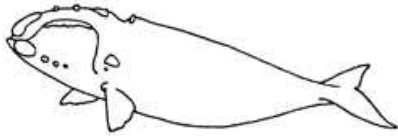
### 8. Blunt, squarish



### **Dorsal Fin**

Which of the following illustrations most closely resembles the back and dorsal fin of the animal you sighted?

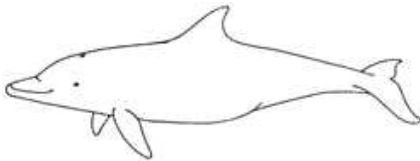
#### **1. No dorsal fin**



#### **2. Bumps or ridges behind small dorsal fin**



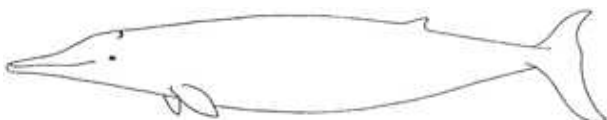
#### **3. Dorsal fin in the middle of the back**



#### **4. Dorsal fin closer to the head than the flukes**



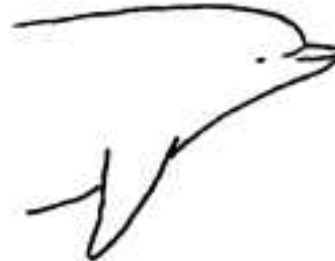
#### **5. Dorsal fin more than halfway along the back**



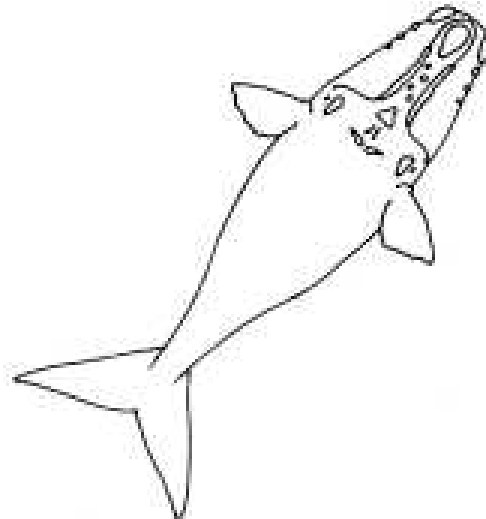
### **Pectoral Fins or Flippers**

Which of the following illustrations most closely resembles the pectoral fin of the animal you sighted?

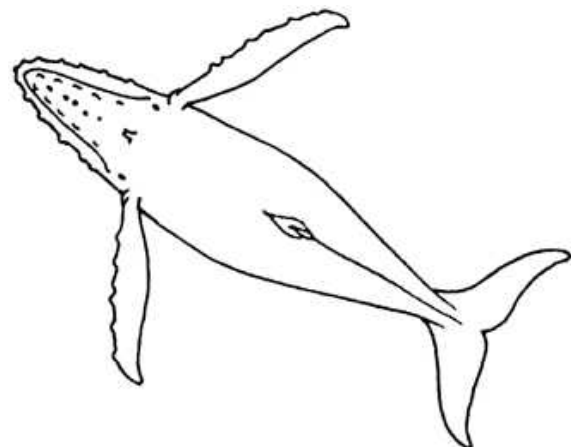
#### **1. Tapered**



#### **2. Short, broad, spatulate**



#### **3. Long, scalloped on leading (front) edge**



## Markings and Patterns

Which of the following descriptions best describes the animal you sighted? 1. Grey all over 2. Grey on the dorsal surface (the back) but lighter colour on the flanks (the sides) and belly 3. Dark grey on body, large light color patches on the head 4. Dark grey on body, white patches on pectoral fins and flukes 5. Criss-cross or hourglass pattern on the flanks

## Blow

In calm conditions, the large whales have distinct blows. Which of the following illustrations most closely resembles the blow of the animal you sighted?

### 1. Upright, V-shaped



### 2. Upright, broad and bushy



### 3. Upright, tall column



### 4. Forward pointing

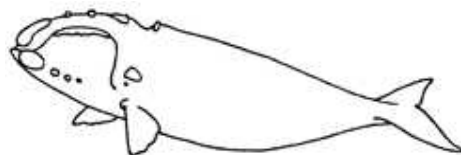


## Species Illustrations

Here are drawings of a few of the whales and dolphins commonly seen in our waters. Does any illustration resemble the animal you sighted?

### 1. Southern Right Whale.

Key features: Large head. No dorsal fin. Light colour patches on head. Paddle-shaped pectoral fins. Calf up to 6m. Adult up to 18m.



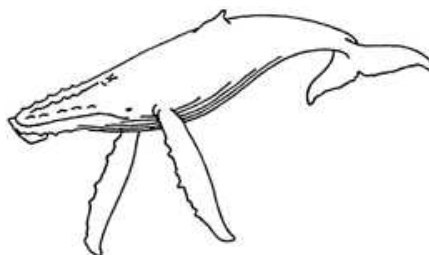
### 2. Rorqual Whales (Blue, Fin, Sei, Tropical, Minke, or Humpback Whale)

Key features: Ventral pleats (extending from under the lower jaw to behind the pectoral fins), dorsal fin in rear third of the back.



### 3. Humpback Whale

Key features: Very long pectoral fins. Small bumps (tubercles) on head. Ventral pleats. Calf up to 5m. Adult up to 15m.



### 4. Sperm Whale

Key features: Blunt, squarish head. Series of bumps along back. Single blowhole at front on left hand side.

Calf up to 4.5m. Adult up to 18m.





### 5. Pilot Whale

Key features: Bulbous head. Dorsal fin closer to head than flukes. Fairly long pectoral fins. Very dark grey colour. Calf up to 1.9m. Adult up to 6.5m.



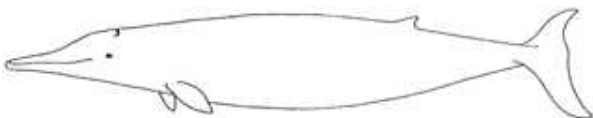
### 6. False Killer Whale

Key features: Rounded head. Prominent dorsal fin in center of back. Dark grey colour. Calf up to 1.9m. Adult up to 6m.



### 7. Beaked Whale Family (there are 20 members) Key

Features: Dorsal fin in rear third, beak, small pectoral fins.



### 8. Bottlenose dolphin

Key Features: Short beak. Prominent dorsal fin in middle of back. Medium grey colour. Calf up to 1.3m. Adult up to 3.9m.



### Surface Behaviors

When you sight a whale or dolphin you may see a variety of behaviors including flukes or pectoral fins in the air, or the head held high above the surface. To help you record the whale and dolphin behaviors, the following descriptions explain some of their common surface activities.

**Blow.** This word refers to the cloud of condensed water vapour produced when the whale or dolphin exhales. The blow forms when the warm air and oil secretions expelled from the lungs comes into contact with the cold sea air. (The same thing happens to our exhalation on a cold winter day when our breath appears as steam.) On a clear, windless day the blow of the large whales may be visible for a few seconds. The blow of the smaller whales and dolphins is usually very low and indistinct and therefore is difficult to see. The height and shape of the blow of the large whales helps to identify each species. For example, the Southern Right Whale has a V-shaped blow up to 5m high, and the Humpback Whale has a bushy blow up to 3m high. The frequency of the blow relates to the whale's activities. For example a migrating humpback whale typically breathes up to five times, about twenty seconds apart, then dives for about five to ten minutes.

**Breaching.** There are a few types of breaching but each one starts with the whale exploding through the surface, and ends with a loud splash. When in midair, the whale twists, and then lands on its back, or on its side, or even belly flops. In most breaches the flukes remain submerged but in a true breach the whale leaps clear of the water. Sometimes the whale will breach over and over again. One humpback whale was observed breaching 130 times in 75 minutes. Though breaching occurs at any time, it seems to be more frequent when there is a change in weather conditions such as rising winds or approaching storms.

**Breathing.** Whales and dolphins breathe differently to us: they cannot breathe through the mouth, they are voluntary breathers (we are reflex breathers), and they breathe less frequently than we do. When they exhale their breath (blow) is often visible.

**Diving.** The depth and duration of the dive varies between species, and reflects their food preferences. Some species are quite shallow divers because their food is near the surface. However the sperm whale may dive several thousand metres to find the large squid on which it feeds. When a whale makes a long deep dive it is called the terminal dive, or sounding. Prior to sounding, the whale makes a series of short dives; it then arches its back and lifts the flukes clear of the surface. The whales and dolphins also dive to avoid predators.

**Feeding.** There is great variation in the feeding behavior of whales and dolphins. The Odontocetes (whales and dolphins with teeth) feed mainly on fish and squid. The Mysticetes (whales with fibrous plates called baleen hanging from the upper jaw) prefer small crustaceans and fish. Toothed whales and dolphins use echolocation (reflected sounds) to detect food. It is unlikely that you will see humpback whales feeding in our waters; their main feeding ground is in Antarctic waters where they spend the summer months constantly eating krill. However, you may see some of the smaller whales and dolphins feeding in our waters.

**Flipper Slapping.** These words describe when the whale lies on its back or side and raises the pectoral fin high above the surface. It then slaps the fin on the surface making a distinct cracking sound which on calm days can be heard a kilometer or more away. The animal may flipper slap for several minutes. Humpback whales often lie on their backs and use both pectoral fins to slap the surface. This behavior is also called finning or flippering.

**Footprints.** This refers to the smooth, 'oily', roughly circular patches of water which follow in the wake of a submerged whale. When the whale swims beneath the surface, it moves its flukes up and down, and these movements create upwellings about a metre wide. If the seas are calm it is possible to track a submerged whale by its footprints.

**Porpoising.** This word relates mainly to the

smaller whales and dolphins, and refers to the way they leap clear of the water when traveling quite quickly. Often a group of dolphins will porpoise along together, making long, low leaps every few seconds.

**Resting.** Because whales and dolphins are voluntary breathers, they have to remain conscious so that they 'remember to breathe'; otherwise they would suffocate. They cannot sleep as we do. Instead they take short rests at, or near, the surface. During the rest, the animal turns off one side of its brain while the other side remains alert to control breathing and to watch out for predators. When the animal is resting, it will be barely moving and its blows will be slow and rhythmical. This resting behavior is sometimes called 'logging' because the animal looks like a log floating in the water.

**Spy Hopping.** This is when the whale or dolphin lifts its head high above the surface, and takes a look around. The purpose of spy hopping may be to get a bearing from natural objects (sun, stars, headlands etc.) but the animals regularly spy hop when vessels are near by, or when there are loud noises or disturbances.

**Swimming.** Whales and dolphins have powerful muscles in the rear third of the body. These muscles move the flukes up and down, and propel the animal forwards. There is a great variation in the swimming speeds of the whales and dolphins. Some of the larger animals swim around 4-5 knots but they can reach a cruising speed of about 10 knots. When alarmed, they go into sprint mode of about 15 knots. However they cannot sprint for long periods. Killer whales have been timed sprinting at 20 knots, dolphins at 23 knots and pilot whales at 26 knots.

**Tail Slapping.** In this activity the whale or dolphin does a headstand and raises its flukes above the surface. It then slaps the flukes down so strongly that on a calm day, a loud smacking sound can be heard two or three kilometers away. Tail slapping is thought to be a way for the animal to communicate with other members



of the group; it is also a sign that the whale or dolphin is uncomfortable about an intruding vessel or swimmer. This behaviour is also called lobtailing.

## Whale and Dolphin Species Recorded in New South Wales

There are 83 known species of whales, dolphins and porpoises in the world. Only about 35 of these species have been recorded along the NSW coast. The following is a list of those we've most frequently observed. The scientific name of each species is in brackets. Beside each species are two lengths; the first is the length of the calf, the second of the adult.

### Mysticetes

These are also known as baleen whales; they have two blowholes.

**Southern Right Whale** (*Eubalaena australis*)

6.0m, 18.0m

**Fin Whale** (*Balaenoptera physalus*) 6.5m, 22.0m

**Blue Whale** (*Balaenoptera musculus*) 7.0m, 27.0m

**Minke Whale** (*Balaenoptera acutorostrata*) 2.8m, 10.0m

**Sei Whale** (*Balaenoptera borealis*) 4.8m, 16.0m

**Tropical (or Bryde's) Whale** (*Balaenoptera edeni*) 4.0m, 14.5m

**Humpback Whale** (*Megaptera novaeangliae*) 4.5m, 15.0m

### Odontocetes

This group of whales and dolphins have teeth and only one blowhole.

**Southern Bottlenose Whale** (*Hyperoodon planifrons*) 3.5m, 7.5m

**Scamperdown Beaked Whale** (*Mesoplodon grayi*) 2.4m, 5.6m

**Ginkgo-toothed Beaked Whale** (*Mesoplodon ginkgodens*) 2.1m, 5.2m

**Straptooth Beaked Whale** (*Mesoplodon layardii*) 3.0m, 6.2m

**Densebeak Whale** (*Mesoplodon densirostris*) 2.6m, 6.0m

**Sperm Whale** (*Physeter macrocephalus*) 4.5m, 18.0m

**Pygmy Sperm Whale** (*Kogia breviceps*) 1.2m, 3.4m

**Dwarf Sperm Whale** (*Kogia simus*) 1.0m, 2.7m

**Shortfin Pilot Whale** (*Globicephala macrorhynchus*) 1.9m, 6.5m

**False Killer Whale** (*Pseudorca crassidens*) 1.9m, 6.0m

**Melonheaded Whale** (*Peponocephala electra*) 1.0m, 2.7m

**Killer Whale** (*Orcinus orca*) 2.5m, 9.8m

**Pygmy Killer Whale** (*Feresa attenuata*) 80cm, 2.6m

**Risso's Dolphin** (*Grampus griseus*) 1.7m, 3.8m

**Bottlenose Dolphin** (*Tursiops truncatus*) 1.3m, 3.9m

**Pantropical Spotted Dolphin** (*Stenella attenuata*) 90cm, 2.4m

**Striped Dolphin** (*Stenella coeruleoalba*) 1m, 2.5m

**Common Dolphin** (*Delphinus delphis*) 90cm, 2.4m

## Legal Distances for Approaching Whales and Dolphins

In New South Wales, whales and dolphins are under the protection of the National Parks and Wildlife Act, and the Fauna Protection Regulations.

To ensure that whale and dolphins are not harmed or disturbed while in our waters, the following are the minimum distances which must be observed by everyone. Any breach of those distances can incur a fine of up to \$100,000 and/or two years' goal.

**Vessels** (other than jet skis): whether powered or unpowered (sailboats and board riders), all vessels must not approach closer than 100m if the animal is an adult. If the animal is a calf, or if there is a calf in the vicinity, do not approach

closer than 300m. When approaching the animal, speed must be reduced to 'no wake', i.e. 4 knots. At all times, the vessel must not move at a speed which is faster than the animal; if there are several animals in the area the vessel must not move faster than the slowest animal. When stopping to watch the animals, place engine in neutral, and allow it to idle without turning off. Avoid sudden or repeated changes in direction. Do not put your vessel in the path of the animal. If more than one vessel is near the animal, do not 'box' in the animal. The animals may show distress or alarm by fluke or pectoral fin slapping; if so, move away slowly at a 'no wake' speed.

**Jetskis, parasails and hovercraft:** must not approach closer than 300m. When 400m from the animal, the craft must reduce speed to 'no wake', i.e 4 knots.

**Swimmers, snorkellers and divers:** must be at least 30 m from the animals.

**Helicopters:** are restricted to at least 500m when in the vicinity of the animal.

**Aircraft, including ultralights and hang gliders:** must be at least 300m above the animal.

If at any time you observe a situation where you consider the whale or dolphin is being disturbed or harassed, please phone our 24-hour Hotline

**(02) 9415 3333.**

## About ORRCA

ORRCA is an all-volunteer organization established in 1986 to assist the National Parks and Wildlife Service (NPWS) with stranded whales and dolphins. Since that time our responsibilities have increased: we provide care and protection for seal visitors, and have a major role in marine mammal research and community education.

## Administration

The organization is administered by a committee of ten members who are elected at our annual general meeting. Our funding is membership and workshop fees and donations (which are tax deductible). We do not have any

paid staff, or an office; all our income is devoted entirely to the rescue and care of the animals.

## Rescue

Our major expense is the maintenance of the 24- hour Rescue Hotline. This is the lifeline not only for stranded animals but for the seals which haul out along our coast. When the Hotline is notified of an animal in distress we promptly send trained rescuers to the site to investigate the situation, assess and assist the animal.

## Research

In June each year ORRCA undertakes a survey of the whales and dolphins in NSW waters. This research provides a reliable data base and is frequently called upon by other organizations. Another form of our research relates to whale and dolphin carcasses. Our post mortem team is licensed by NPWS to examine, measure and photograph carcasses, collect specimen tissue and prepare skeletal material for display.

## Workshops

Since 1986 we have conducted over eighty work- shops on marine mammal rescue. The majority of these workshops are for our members but each year we hold two or three workshops for more specialized groups such as NPWS.

## Education

Throughout the year ORRCA receives many requests for presentations to schools, community groups and other wildlife organizations. One aim of these presentations is to increase public awareness of the need for the prompt reporting of sightings of whales, dolphins and seals to the 24-hour Hotline.

**Further information.** If you would like more information about ORRCA, please visit our web site [www.orrca.org.au](http://www.orrca.org.au) or write to The Secretary, ORRCA, GPO Box 362, Sydney NSW 2001 or email [orrca@orrca.org.au](mailto:orrca@orrca.org.au) .

## Appendix 4:      Photographic examples of key                              marine mammal species

### Humpback Whale



Pictures supplied by Orrca ([www.orrca.org.au](http://www.orrca.org.au))

### Southern Right Whale



Pictures supplied by Orrca ([www.orrca.org.au](http://www.orrca.org.au))

### Dolphin



Pictures supplied by Orrca ([www.orrca.org.au](http://www.orrca.org.au))

### Seal



Pictures supplied by Orrca ([www.orrca.org.au](http://www.orrca.org.au))