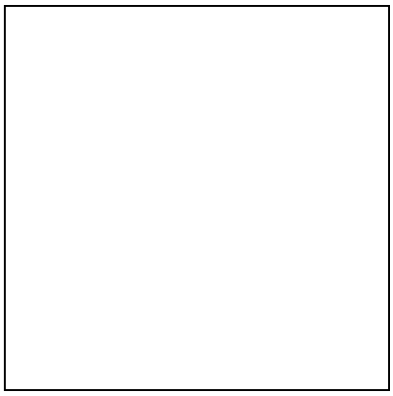
# T/41P – 2D Seismic Acquisition Survey Environment Plan

Revision 0

Issue date: 20/03/2008

# 3D Oil Limited HSE Policy



## Revision history

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# Distribution list

| Copy number | Recipient |
|---|---|
| 1 | 3D Oil Exploration Manager |
| 2 | Party Chief – CGG Veritas |
| 3 | Vessel Master – Pacific Titan |
| 4 | Tasmanian MRT |
| 5 | |
| 6 | |
| 7 | |

# Approvals

This Environment Plan has been prepared by 3D Oil Ltd and is approved for the T/41P 2D Seismic Program by the *Pacific Titan* in 2008.

| NAME | Signature | Date |
|---|---|---|
| **Noel Newell**<br>Managing Director – 3D Oil | | |
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# 1 Introduction

## 1.1 Activity Background

3D Oil Ltd is proposing to undertake a 2-dimensional (2D) seismic acquisition survey in Commonwealth Waters of the Bass Basin in Bass Strait. This is immediately off shore from Tasmania in exploration permit T/41P.

The objectives of this Environment Plan (EP) are to demonstrate:

- compliance with all applicable legislation;
- the operator has a good understanding of how the proposed operations will interact with the environment;
- the environmental effects and risks are as low as reasonably practicable;
- appropriate performance objectives, standards and measurement criteria are in place to measure environmental performance; and
- systematic management to minimise the environmental effects associated with the activity.

## 1.2 Environmental Plan Scope

This EP covers activities associated with the 3D Oil 2D seismic acquisition activities in T/41P and includes the following:

- Section 2 provides a description of the location and the equipment to be used during the seismic survey;
- Section 3 provides a summary of the existing environment in the survey area;
- Section 4 provides a summary of the legislative framework and relevant legislation applicable to the seismic survey;
- Section 5 identifies activities with the potential for environmental impact and details the environmental management strategies to control the risk;
- Section 6 provides details of the environmental performance objectives, standards and measurement criteria for the survey; and
- Section 7 details the implementation strategies to be followed including environmental management systems, roles and responsibilities, consultation, training and management/implementation activities (including emergency response).

## 1.3 Review and Update of Environment Plan

In the event of an alteration to seismic activities, new activities are planned or if a new significant environmental effect is identified, this plan will be revised and resubmitted to the regulator for approval in accordance with the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*.

# 2 Seismic Program Description

## 2.1 Proponent Details

3D Oil Limited is the 100% titleholder and operator of Exploration Permit T/41P in the commonwealth waters of the Bass Basin in Bass Strait.

The registered office for the proponent is:

***3D Oil Limited (ABN 40 105 597 279)***

Level 5, 164 Flinders Lane, Melbourne, Vic, 3000

| | |
|---|---|
| Telephone Number: | +61 3 9650 9866 |
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| Email: | jkeall@3Doil.com.au |
| Contact Person: | Jon Keall |
| | Exploration Manager |

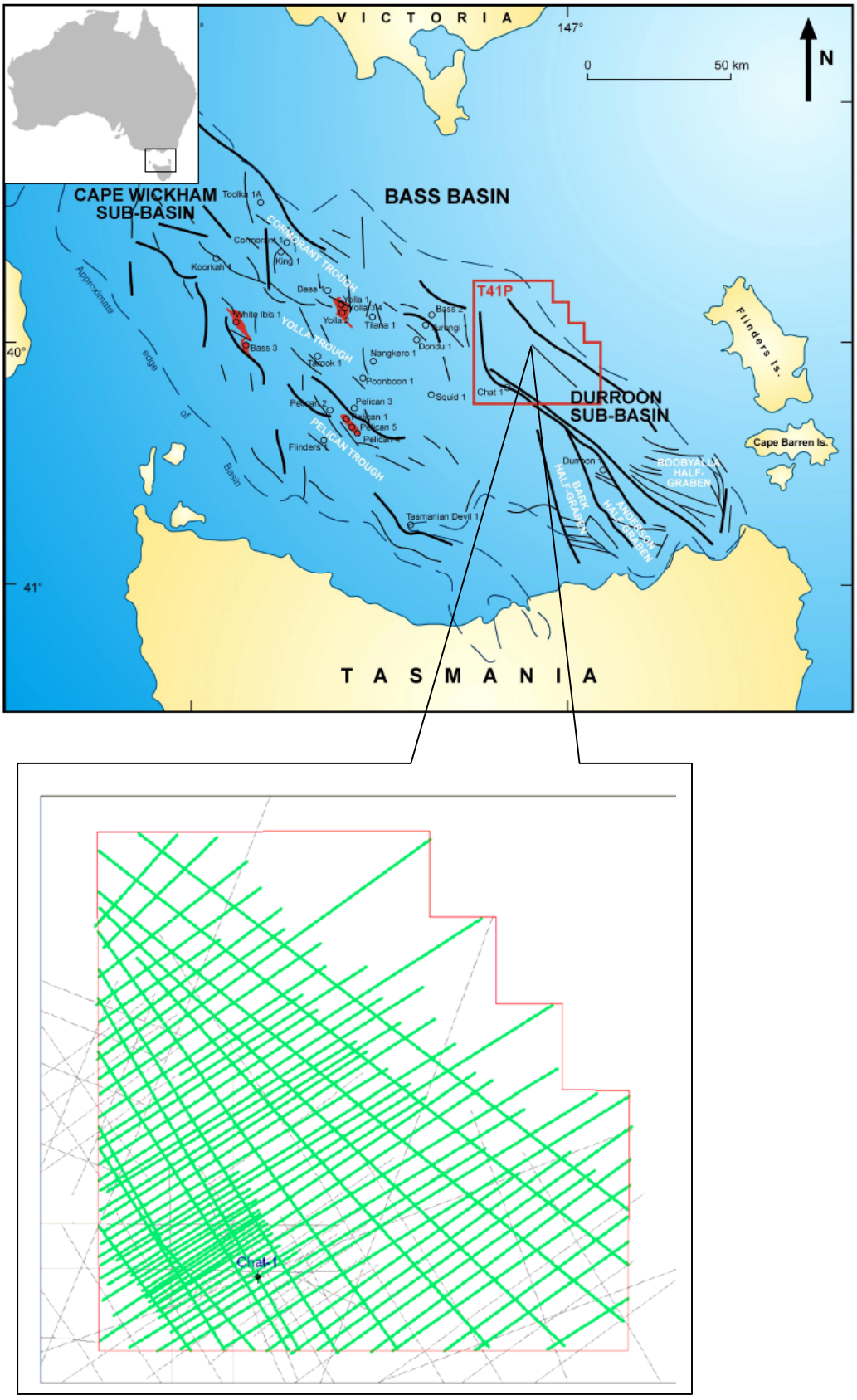

## 2.2 Project Location

The location of the survey lies within the Bass Basin Region of Bass Strait (Refer **Figure 1.1**). The area to be surveyed covers an area of approximately 2805 km$^2$ and lies within the coordinates provided in Table 2.1. The survey will traverse approximately 2201km and shot-lines are shown in Figure 2.1.

Table 2-1 : T/P41 Permit Location (AGD66)

| **Latitudes** | **Longitudes** |
|---|---|
| 39° 45′ 00″ S | 146 ° 30′ 00″ E |
| 39 ° 45′ 00″ S | 146 ° 56′ 00″ E |
| 39 ° 50′ 00″ S | 146 ° 56′ 00″ E |
| 39 ° 50′ 00″ S | 147 ° 00′ 00″ E |
| 39 ° 55′ 00″ S | 147 ° 00′ 00″ E |
| 39 ° 55′ 00″ S | 147 ° 06′ 00″ E |
| 40 ° 00′ 00″ S | 147 ° 06′ 00″ E |
| 40 ° 00′ 00″ S | 147 ° 10′ 00″ E |
| 40 ° 15′ 00″ S | 147 ° 10′ 00″ E |
| 40 ° 15′ 00″ S | 146 ° 30′ 00″ E |

Figure 2-1: 2D Seismic Program (T/41P)



## 2.3 Seismic Program Scope

The seismic acquisition program will be based on a 2D marine seismic survey technique used to determine the subsurface geology of an area. This allows a high resolution, 3D picture of the deep geological structures to be compiled.

Marine seismic surveys emit high energy, low frequency sound sources towed behind a vessel. The 2D seismic survey will be conducted using a purpose built seismic survey vessel, the CGG *Pacific Titan* (refer Figure 2-2). Table 2-2 details the parameters for the seismic survey.

The seismic survey is typical of other 2D seismic surveys conducted in Australian marine waters (method/procedures). No unique or unusual equipment or operations are proposed for this survey.

Table 2-2: Seismic Program Parameters

| Aspect | Details |
|---|---|
| Vessel | CGG Pacific Titan |
| Earliest Seismic Commencement Date | May 2008 |
| Duration of Survey (approx max) | 20 - 34 Days |
| Vessel Physical Dimensions<br>• Overall Length<br>• Draft | <br>64.5m<br>5.18m |
| Total Area of Survey | 2805 $km^2$ |
| Total Length of Survey | 2201km |
| Lead in/out Distance | 1.5km |
| Total Volume of the Airgun array | 3040 $in^3$ (single source) |
| Airgun operating pressure | 2000 psi |
| Streamer Type | Sercel Solid Seal |
| Length of Streamer | 6.0km |
| Source Interval | 25m (release 10-12secs) |
| POB (total Complement) | 56 |
| Hours of Operation | 24hrs |
| Method of Crew Change | Port Call |
| Method of Refuelling | Port Call |
| Communications | VSAT C Band (Primary)<br>InMarSat B with HSD enabled (Secondary) |
| Port | Burnie |
| Support Vessel | No |
| Diesel Storage (onboard): | Diesel 900$m^3$ (approx)<br>Ballast Water 478$m^3$ |

The *Pacific Titan* will tow one streamer measuring approximately 6000m in length with hydrophone intervals located at 12.5m intervals at a depth of 8m below sea level (bsl). The vessel will acquire seismic data at an average speed of between 4-8knots. The hydrophone streamer will be gel filled (solid). One single source tuned airgun array will be towed astern of the vessel at a depth of 6mbsl offset at 150m. The array will consist of 3040 $in^3$ bolt guns operating at 2000psi which will release acoustic pulses into the water column on average every 10-12 seconds. The reflected acoustic signals are recorded by hydrophones towed behind the vessel located in the streamer. Data collected by the hydrophones is stored in onboard computers for processing and analysis allowing the underlying geological strata to be determined.

The *Pacific Titan* will traverse the survey area along defined transects (or seismic lines) in water depths ranging from 50m to 70m (refer Figure 2-1).

The *Pacific Titan* operates under a Shipboard Oil Prevention Emergency Plan (SOPEP) which details actions to be taken in the event of a shipboard emergency or oil spill.

Crew changes during the survey will coincide with port activities (Burnie) and no fulltime support vessel will be available for the campaign. A smaller vessel used to scout for hazards, and maintain towed seismic equipment is available and will be launched from the *Pacific Titan* as required. Refuelling of the *Pacific Titan* is planned to occur whilst in port only.

Subject to obtaining the required approvals, acquisition is scheduled to occur over a 20-34 day period commencing in May 2008. The precise commencement and completion dates will be dependent on vessel availability and weather conditions.

Seismic activities are planned to occur on a 24hr operational basis and in sea-states of <4.5m. Streamer/gun deployment and retrieval are limited in sea-states greater than 4.5m

Figure 2-2: CGG Pacific Titan

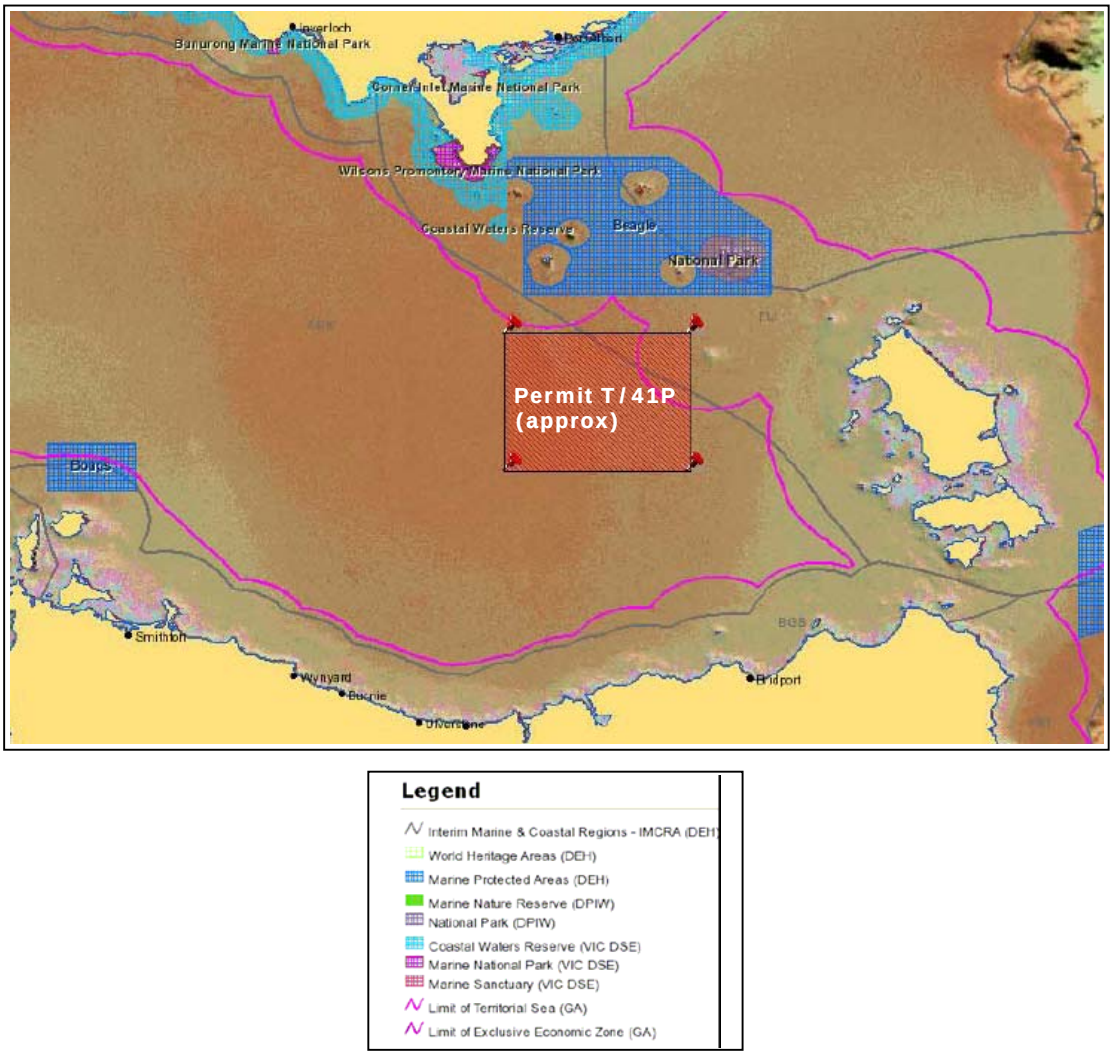
# 3 Summary of Existing Environment

## 3.1 Regional Environmentally Sensitive Locations

The survey will be undertaken in Commonwealth Waters within the Bass Basin in central Bass Strait. Permit Area T/41P is located approximately 90km* north of Georgetown (Tas), 50km* west of Flinders Island and 65km south of Wilsons Promontory (Vic).

The nearest sensitive marine/landfall areas to T/41P are provided in Figure 3-1. The Kent Group National Park (Tas) is located approximately 23km NE of the permit, the Boags Marine Protected Area (Com) is located approximately 15km north of the permit and the Wilsons Promontory Marine National Park (Vic) is located approximately 60km north of the permit.

Figure 3-1: Marine Protected Areas in Proximity to T/41P (GA, 2008)

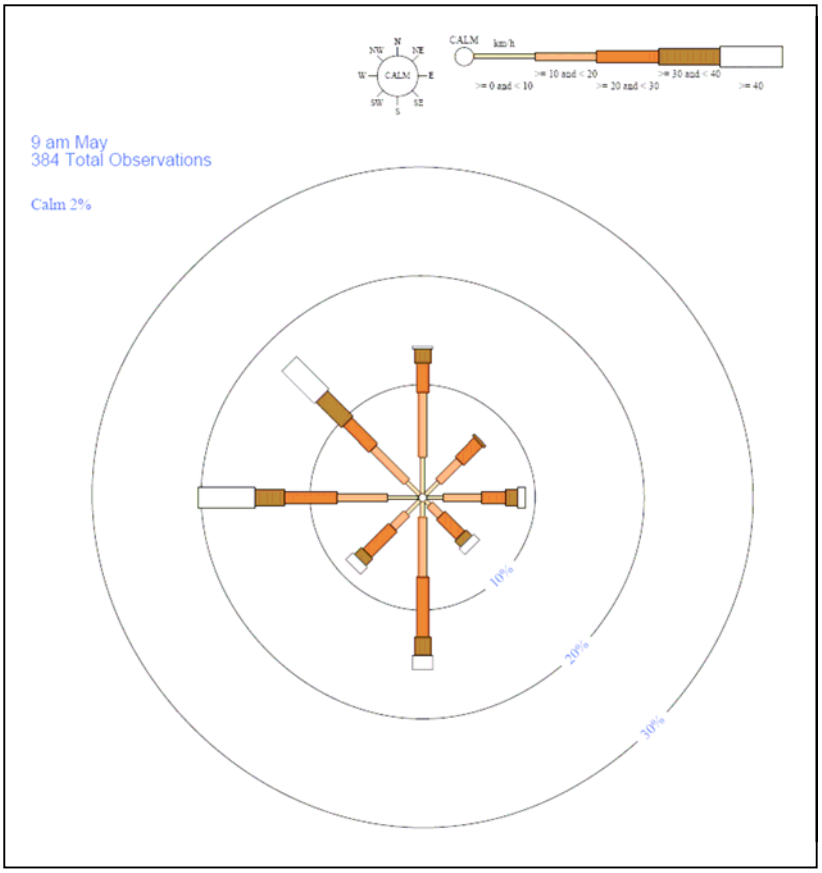



* From nearest permit boundary

## 3.2 Climate

Climate data has been obtained from Deal Island located approximately 30km from the permit area. Data from this site indicates that the mean temperature range for May lies between 15.6°C and 11.4°C with an actual measured range of 23.2°C (max) to 0.4°C (min) (BOM, 2008). Rainfall occurs in all months with approximately 75mm mean rainfall and 14.9 days of rain expected in May. Figure 3-2 provides the 9am wind rose for Deal Island. The wind direction is predominantly from the west/NW during May with wind gusts greater than 40km/hr.

Figure 3-2: May Wind Rose (9am Deal Island) (BOM, 2008)



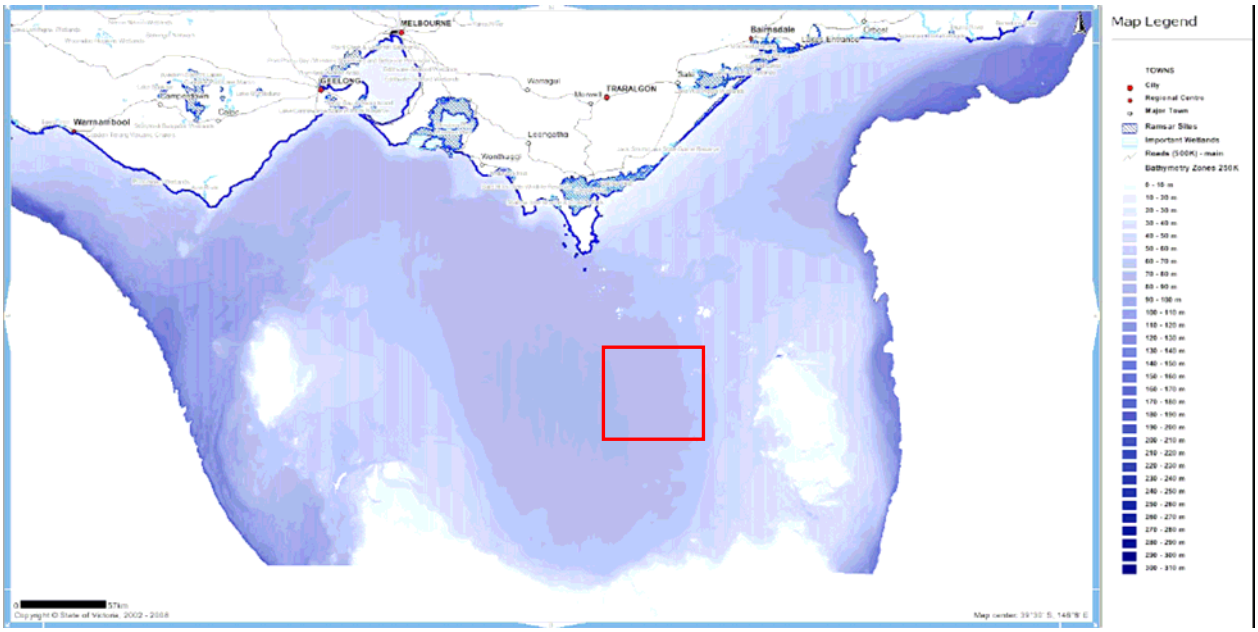

## 3.3 Hydrography

### 3.3.1 Bathymetry & Seabed Features

The topography of Bass Strait could be considered as a perched valley, with the eastern and western margins slightly raised granite ridges. King Island in the west and Flinders Island in the east are visible parts of these ridges. Both margins have submarine dune systems associated with them, probably because of the strong tidal currents on the rim of the Strait (NOO, 2002). The centre of the 250 km-wide Strait forms the shallow Bass Basin depression, which is shaped like an irregular saucer with water depth varying from about 80m (centre) to 50m (margins) (IMCRA, 1998). Refer to Figure 3-3 for bathymetry details.

The proposed survey area ranges from approximately 50 to 70m (water depth) and is flat to undulating.

Figure 3-3: Bass Basin Bathymetry (GA, 2008)




### 3.3.2 Seabed Sediments

Bass Strait sediments consist of a concentric pattern of grain sizes with the finest sizes located in the centre of the Strait and the coarsest on the high energy margins (NOO, 2002). This is primarily due to the effect of high tidal currents through the entrances to Bass Strait winnowing fine material from the sediments, whereas the lower currents in central Bass Strait allow fine material to settle out and deposit (Black, 1992). Accordingly the seabed substrate in the permit area is expected to be sandy/muddy carbonate in the west of the permit area to more gravel-type carbonate in the east of the permit area (IMRCA, 1998). Mean sediment size is expected to vary from 0.06-0.5mm (IMRCA, 1998).

### 3.3.3 Currents, Waves and Tides

Tidal currents dominate the water flow within central Bass Strait although wind driven currents and ocean circulation patterns also make a contribution. Tidal velocities vary from <0.05m/s in the centre of Bass Strait to as high as 0.5m/s at the margins (Flinders Is, King Is., Wilsons Promontory) (IMCRA, 1998).

The water mass characteristics are complex and vary seasonally representing the mixing of different water masses to the east and west of the permit area (IMCRA, 1998). A slow net eastward current moves water through the shelf area of Bass Strait becoming stronger in the winter with the strengthening Zeehan current (NOO, 2002).

Waves have components which are locally generated as well as generated from easterly swells propagating from the Tasman Sea. The region is protected from westerly and south-westerly swells by King Island and Tasmania. Extreme conditions in northern Bass Strait produced by easterly and south-easterly storms can produce significant wave heights ranging from 4.5-5.5m. Significant wave heights of 6.8-7.5m can be expected for the 5 and 100 year return period storms respectively, with lesser wave heights found further south into central Bass Strait (Lawson & Treloar, 2000).

# 3.4 Marine Resources

## 3.4.1 Benthic Communities

In general the biomass of benthic organisms in Bass Strait is dominated by sponges and bryozoans, with micro-crustaceans and polychaete worms the most prevalent in terms of number of species and individuals (Colman et al, 1991).

Parry et al (1990) made the observation that the Bass Strait region appears to be one of the most diverse areas of temperate continental shelf studied. While only 90-95% of benthic species only occur in south-eastern Australia (Wilson & Allen, 1987), most of these species are widely distributed throughout the region (Philips et al 1984).

## 3.4.2 Marine Mammals

Marine mammals listed under the EPBC Act which may occur in proximity to T/41P are provided in Table 3-1. Further actual whale stranding data which has occurred in Tasmania (to 2003) are provided in Table 3-2.

Table 3-1 : Marine Mammals (DEWHA, 2008b)

**Status:**
C: Cetacean
E: Endangered
V: Vulnerable
M: Migratory
L: Listed

**Likelihood of Occurrence:**
LO: Species or species habitat likely to occur in area
MO: Species or species habitat may occur within area
FMO: Foraging may occur within area
FKO: Foraging known to occur in area
KO: Species of species habitat known to occur in area

| Scientific Name | Common Name | EPBC Status | Likelihood of Occurrence |
|---|---|---|---|
| **Cetaceans** | | | |
| *Balaenoptera acutorostrata* | Minke Whale | C | MO |
| *Balaenoptera musculus* | Blue Whale | E, M | LO |
| *Balaenoptera edeni* | Bryde's Whale | M | MO |
| *Caperea marginata* | Pygmy Right Whale | M | MO |
| *Delphinus delphis* | Common Dolphin | C | MO |
| *Lagenorhynchus obscurus* | Dusky Dolphin | M | MO |
| *Eubalaena australis* | Southern Right Whale | E, M | KO |
| *Globicephala macrorhynchus* | Short-finned Pilot whale | C | MO |
| *Grampus griseus* | Risso's Dolphin | C | MO |
| *Orchinus orca* | Killer Whale, Orca | M | MO |
| *Megaptera novaeangliae* | Humpback Whale | V, M | LO |
| *Tursiops truncatus* | Bottlenose Dolphin | C | MO |
| **Pinnapeds** | | | |
| *Arctocephalus forsteri* | New Zealand Fur Seal | L | MO |
| *Arctocephalus pussillus* | Australian Fur-seal | L | LO |

Table 3-2: Marine Mammals (PWS, 2003)

| Species | Strandings |
|---|---|
| **Toothed Whales** | |
| Long-finned pilot whale | 2848 |
| False Killer Whale | 535 |
| Common Dolphin | 426 |
| Sperm Whale | 269 |
| Bottle-nose Dolphin | 140 |
| Strap-toothed whales | 20 |
| Gray's beaked whale | 18 |
| Culviers beaked whale | 14 |
| Killer whale or orca | 17 |
| Hectors beaked whale | 7 |
| Spectacled porpoise | 5 |
| Pygmy sperm whale | 5 |
| Dusky Dolphin | 4 |
| Southern Right Whale dolphin | 2 |
| Dense beaked whale | 2 |
| Andrew's beaked whale | 2 |
| Short-finned pilot whale | 1 |
| Arnouxs beaked whale | 1 |
| Southern bottle-nose whale | 1 |
| True's beaked whale | 1 |
| **Baleen Whales** | |
| Pygmy right whale | 65 |
| Minke Whale | 16 |
| Humpback Whale | 9 |
| Southern Right Whale | 4 |
| Blue Whale | 3 |
| Fin Whale | 3 |
| Sei Whale | 2 |
| Brydes Whale | 1 |

#### 3.4.2.1 Cetaceans

*Blue whale* species have been observed in western Victorian waters during the summer months (November to April) particularly at the Bonney upwelling (DEH, 2005a). The migratory period for Blue whales into Bass Strait is documented as November-December (EA, 2001a). The Blue Whale has widespread migration pathways and does not follow coastlines or oceanographic faults (Bannister et al, 1996). While the T/41P permit area is not a known feeding or aggregation area for this mammal, feeding areas do occur at locations where nutrient enriched waters (upwellings) and krill (*Euphausia superba)* occur. Regular upwellings occur in waters west of Cape Otway (NOO, 2002) and irregular upwellings are also known to occur at Eden (NSW). Upwellings are not known to occur in the vicinity of the proposed seismic acquisition area. Migratory pathways and recognised aggregation areas for this species is provided in Figure 3-4.

The Southern Right Whale (*Eubalaena Australis*) is also known to be present in southern Australian waters between mid-May and November (EA, 2001a). Southern Right Whales migrate from the subantarctic to southern Australian coastal waters to calve. Pregnant females generally arrive between May and June, depart with calves in October to November and may be found anywhere along the coast from Gabo Island in the east to Cape Bridgewater in the west. The nearest calving areas are located at Warrnambool with less regular calving occurring at Port Fairy, Portland and Eden (NSW). No known feeding or calving grounds are in proximity to the seismic survey area (DEH, 2005c) (refer Figure 3-4).

The migratory period for *Humpback Whales* in the Bass Strait region is generally from June-August (northward) and September-November (southward) (EA, 2001a), however early arrivals can occur in May. The exact timing of migration can change from year-to-year influenced by the water temperature, extent of shelf ice, predation risk, prey abundance and location of feeding grounds (DEH, 2005b). There are no known calving, resting or feeding grounds in proximity to the seismic survey area, the closest resting area documented at Twofold Bay (NSW) and Warrnambool (DEH, 2005b). The migration route of the species appears to pass along the continental shelf to the east of Bass Strait and could pass through the seismic survey area (DEH, 2005b) (refer Figure 3-4).

Other listed migratory species listed under the EPBC Database for the permit area includes:

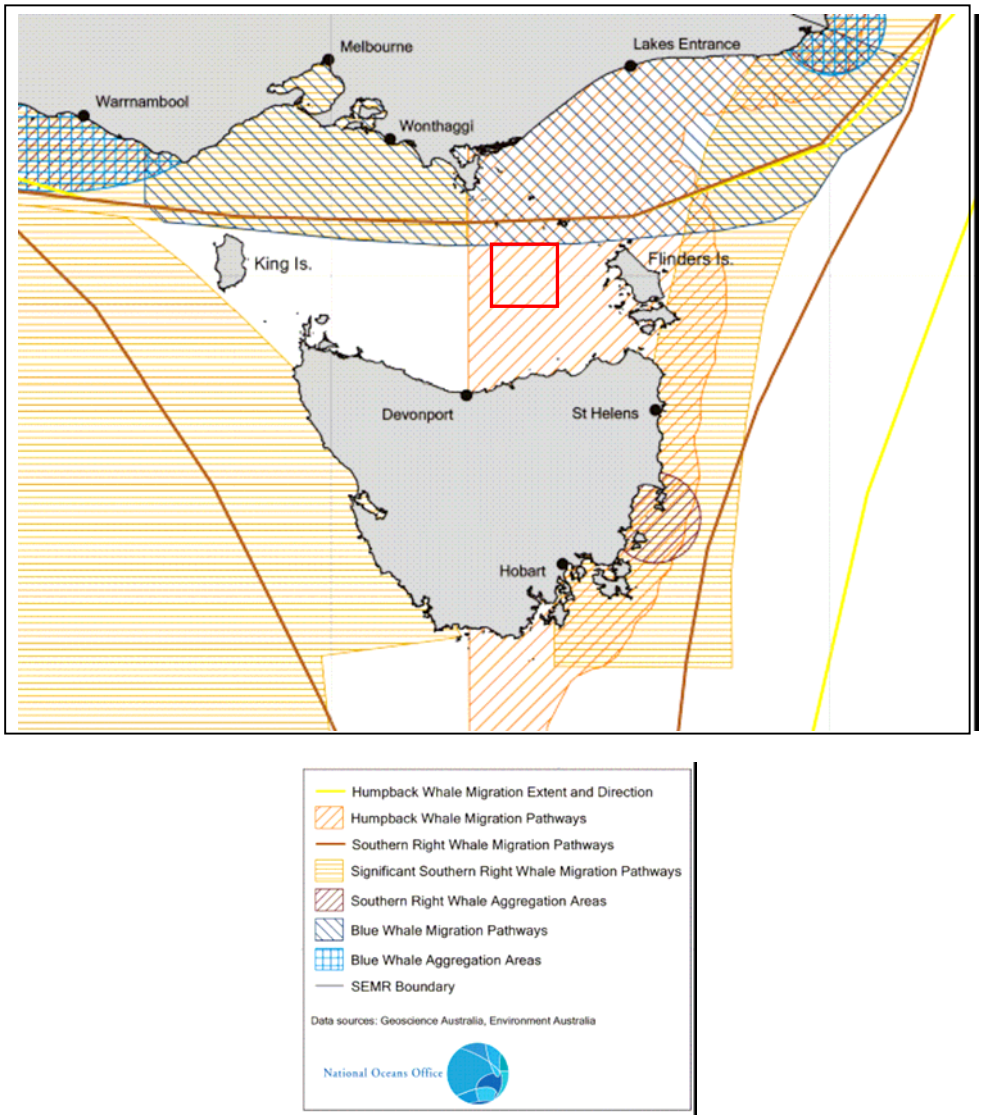
- The *Pygmy right whale* is found in temperate and subantarctic waters in oceanic, pelagic and inshore location habitats. The distribution of this species is found in southern Australian waters close to habitats which are rich in marine life including Bass Strait (Bannister et al, 1996).

- The *Killer whale* has a distribution from polar to equatorial regions and has been recorded in all states except Northern Territory with frequent sightings in South Australia, Tasmania and Victoria. The species is oceanic, pelagic and neritic in both warm and cold waters, and thought to be more common in cold, deep waters. In Australia, this species is often seen along the continental slope and shelf particularly near seal colonies. Literature indicates that this species is not known to be migratory but rather moves seasonally to areas of food supply (Bannister et al, 1996).

- *Brydes' Whale* is restricted to temperate/tropical waters from the equator to approximately 40°S (or 20°C isotherm) in both oceanic and inshore locations. Species inhabiting inshore locations are quite sedentary, with mating occurring in the autumn/winter timeframe. Oceanic species exhibit seasonal movement and mate throughout the year. This species is likely to be found on the west or east coast of Australia, less often on southern coasts (Bannister et al, 1996).

- The *Dusky Dolphin* occurs in the southern hemisphere between latitudes 26-55°S. The species inhabits temperate and subantarctic zones primarily in inshore locations, but is pelagic at times. The species is anticipated to be resident inshore for much of the year and seek out colder water as inshore temperatures rise in summer (Bannister et al, 1996).

Figure 3-4: Cetacean Activity in Bass Strait (NOO, 2002)



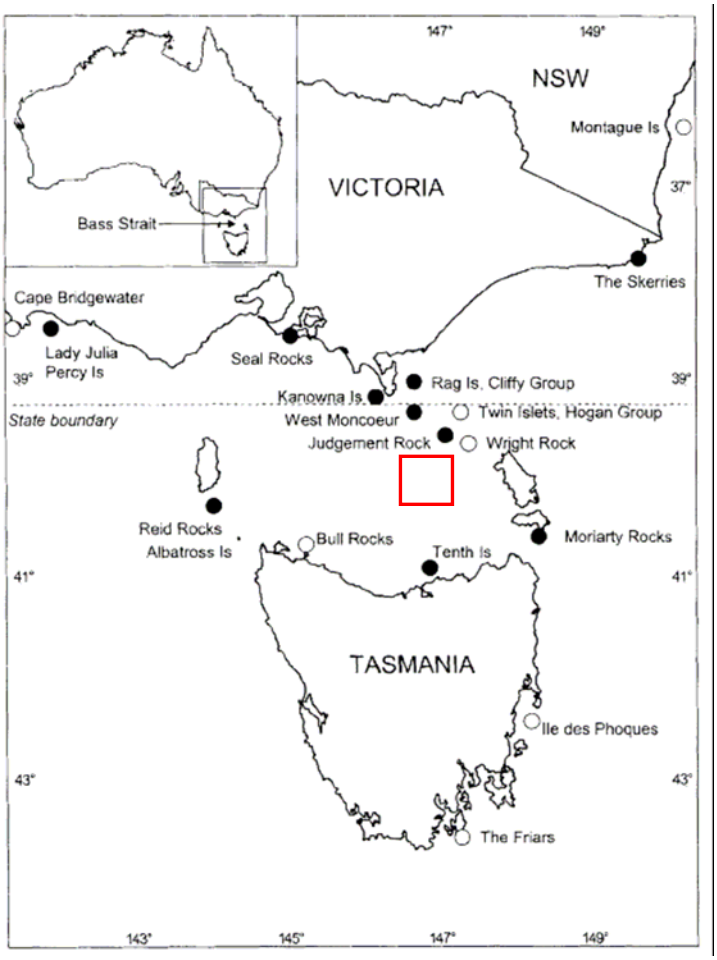

### 3.4.2.2 *Pinniped (Seals)*

In Victoria there are several marine protected areas relevant to Australian fur-seals. There are two contiguous areas at Wilsons Promontory Marine Park and Wilsons Promontory Marine Reserve. They extend from Shallow Inlet in the west to Entrance Point, at the entrance to Corner Inlet, in the east. Fur-seals occur on Kanowna Island and adjacent Anderson Islets in the Anser Group, within the Marine Reserve. The reserve boundaries extend to 300 m around the islands (Shaughnessy, 1999).

In Tasmania a marine protected area surrounds Deal Island in Bass Strait that includes the colony of Australian fur-seals at Judgement Rock (Shaughnessy, 1999).

Breeding colonies are restricted to island habitats in Bass Strait with four in Victoria and five in Tasmania. These locations are provided in Figure 3-5.

Figure 3-5: Bass Strait Seal Colonies & Breeding Areas (Kirkwood et all, 2005)




## 3.4.3 Avifauna

EPBC-listed bird species which may occur in proximity to the Permit area T/41P are provided in Table 3-3. Additional data associated with seabirds which are known to breed in Bass Strait are provided in Table 3-4.

Bird species listed as threatened includes 13 species of albatross and 3 species of petrel. An additional species of albatross is also listed as migratory. Albatross and giant-petrels are among the most oceanic of all seabirds, and seldom come to land unless they are breeding. Most species typically breed on remote islands in the middle of vast oceans (EA, 2001b). Many species, such as Grey-headed Albatrosses, are extremely dispersive, spending most of their time over the pelagic waters of the High Seas while others like adult Shy Albatrosses, tend to remain sedentary, regularly foraging over coastal waters throughout their adult lives (EA, 2001b).

These threatened/migratory bird species may overfly and forage within the permit area, however given there are no islands or rocky outcrops within or in close proximity to the permit area, the probability of any significant interaction is considered to be low.

Table 3-3: Bird Species of Permit T/41P (DEWHA, 2008b)

**Status:**
C: Cetacean
E: Endangered
V: Vulnerable
M: Migratory
L: Listed

**Likelihood of Occurrence:**
LO: Species or species habitat likely to occur in area
MO: Species or species habitat may occur within area
FMO: Foraging may occur within area
FKO: Foraging known to occur in area
KO: Species of species habitat known to occur in area

| Scientific Name | Common Name | Status | Likelihood of Occurrence |
|---|---|---|---|
| **Marine Birds** | | | |
| *Catharacta skua* | Great Skua | L | MO |
| *Diomedea amsterdamensis* | Amsterdam Albatross | E, M | MO |
| *Diomedea antipodensis* | Antipodean Albatross | V. M | MO |
| *Diomedea dabbenena* | Tristan Albatross | E, M | FMO |
| *Diomedea epomorphora* | Southern Royal Albatross | V, M | MO |
| *Diomedea exulans* | Wandering Albatross | V, M | MO |
| *Diomedea gibsoni* | Gibson's Albatross | V, M | MO |
| *Diomedea sandfordi* | Northern Royal Albatross | E, M | MO |
| *Halobaena caerulea* | Blue Petrel | V | MO |
| *Macronectes giganteus* | Southern Giant Petrel | E, M | MO |
| *Macronectes halli* | Northern Giant Petrel | V, M | MO |
| *Pelecanoides urinatrix* | Common Diving Petrel | L | BKO |
| *Thalassarche chlororhynchos* | Yellow-nosed Albatross | M | MO |
| *Thalassarche bulleri* | Buller's Albatross | V, M | MO |
| *Thalassarche cauta* | Shy Albatross | V, M | MO |
| *Thalassarche chrysostoma* | Grey-headed Albatross | V, M | MO |
| *Thalassarche impavida* | Campbell Albatross | V, M | MO |
| *Thalassarche melanophris* | Black-browed Albatross | V, M | MO |
| *Thalassarche salvini* | Salvin's Albatross | V, M | MO |
| *Thinomis rubricollis rubricollis* | Hooded Plover (eastern) | L | MO |

Table 3-4: Australian Seabird Breeding Pairs In Bass Strait (DEST, 1995)

| Species / Region | Bass Strait Breeding Numbers Estimate | CAMBA / JAMBA |
|---|---|---|
| Little Penguin [C] | 85.6-151.8e3 | |
| Shy Albatross [C] | 2700-3300 | |
| Fairy Prion [C] | 71.8-118.7e3 | |
| Short-tailed Shearwater [C] | 7.8-10.1e6 | JAMBA |
| White-faced Storm-petrel [C] | 160600 | |
| Common Diving-petrel [C] | 83.2-116.0e3 | |
| Australasian Pelican [I] | 47 | |
| Australasian Gannet [C] | 1000-1500 | |
| Black-faced Cormorant [C] | 2700 | |
| Black-faced Cormorant [C] | 2700 | |
| Silver Gull [I] | 4200 | |
| Pacific Gull [C] | 1100 | |
| Caspian Tern [I] | 41 | CAMBA |
| White-fronted Tern [C] | 44 | |
| Little Tern [T] | 10 | JAMBA/CAMBA |
| Fairy Tern [I] | 109 | |
| Crested Tern [I] | 6900 | JAMBA |

**Legend:**
C – Southern Ocean Species T – Tropical SpeciesI – Derived from Tropical Species
E3 – 1000 e4 – 10,000 e6 – 1,000,000

### 3.4.4 Fish

There are numerous species of fish in Bass Strait, including a number of important pelagic commercial species such as pilchards, anchovies, Australian salmon, Blue Sprat and southern calamari (Parry et al, 1990). Among the demersal species, school whiting and flathead are significant commercial species. Lesser commercial species such as Gummy shark, school shark, jackass morwong, jack mackerel and snapper are also present. Figure 3-6 provides details of the 'all fisheries catch' for the permit area. This data reflects a very low catch yield in the permit area.

Colman et al (1991) indicates that 200 species of telecosts (bony fish) and about 50 species of elasmobranches (sharks and rays) can be found in Bass Strait. Poore et al (1985) observed that most species are widespread with only a few species confined to the waters of Tasmania, Victoria and south-eastern NSW.

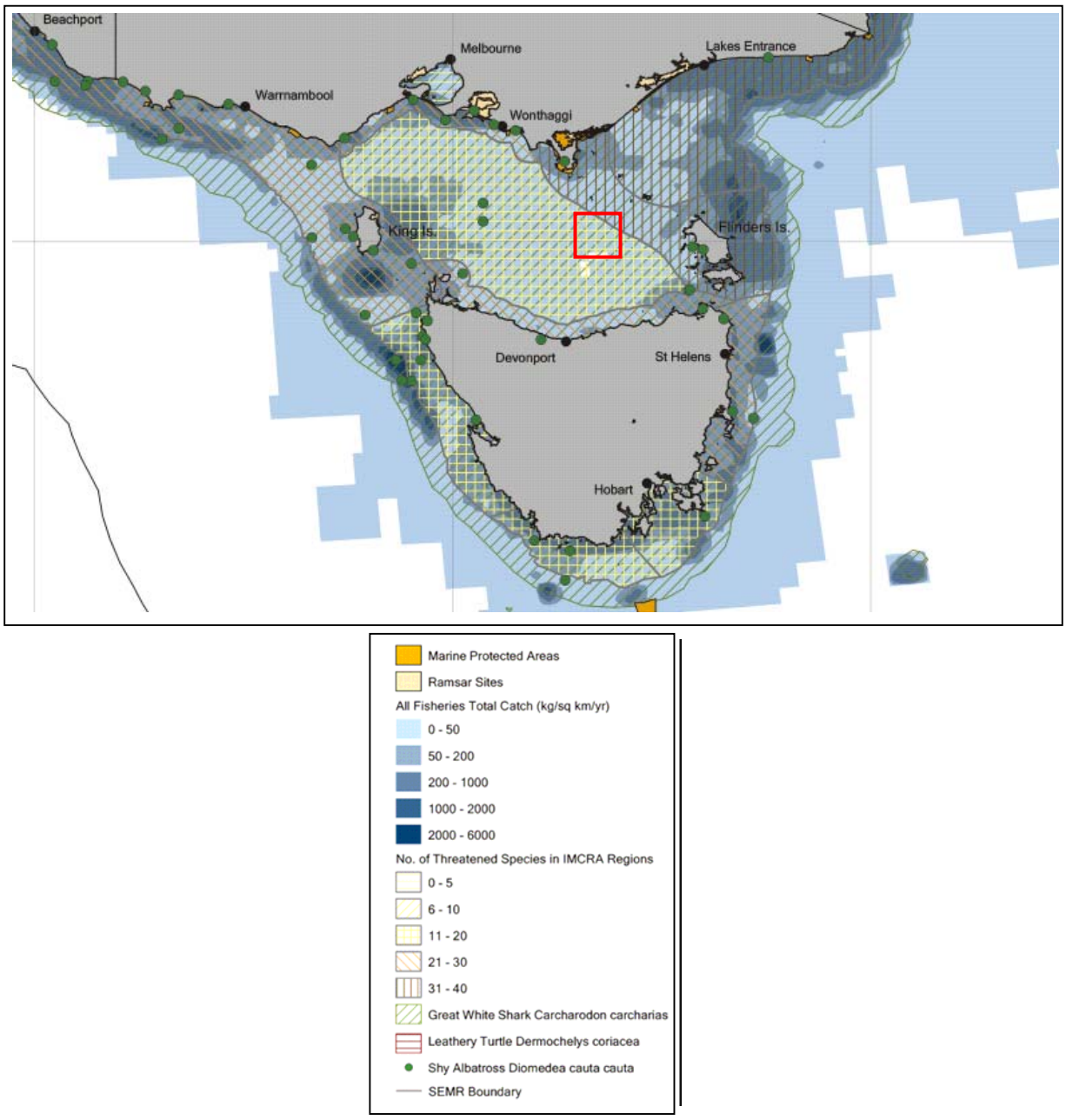
The White Shark, *Caraharodon carcharias*, threatened under the EPBC Act and listed as vulnerable/migratory is known to be present in the waters of Bass Strait (refer Figure 3-6). The species is found primarily in the coastal and offshore areas off the continental shelf and offshore continental islands, and in waters in and around seal and sea lion colonies usually when juveniles are present (EA, 2002). Seal breeding season is nominated as October-December for Bass Strait waters (Shaughnessy, 1999). Seal colonies are known to occur at Wilsons Promontory (Victoria) and around Deal Island (Bass Strait, Tasmania) (EA, 1999) (refer Figure 3-5).

### 3.4.5 Exotic Species

Introduced marine pests within Tasmanian coastal waters are one of the most significant natural resource management issues facing the State. Tasmania has a significant marine pest problem with species such as the Northern Pacific seastar (*Asterias amurensis*), the Japanese kelp (*Undaria pinnatifida*), and the toxic dinoflagellate (*Gymnodinium catentatum*) listed within the 58 invaders in the State. There are 10 introduced species that are recognised pests on the Australian ballast water target species list (RPCD, 2003), however these species tend to live in inter-tidal/sub-tidal zones in depths less than 30m (Hewitt et al, 2002) and are not expected to be an issue within the permit area T/41P.

Abalone *Viral Ganglioneuritis* is affecting the Victorian abalone industry. As a precaution Tasmania has declared an abalone closure on the northern Bass Strait Islands (north of Curtis & Kent Groups) to all recreational and commercial abalone fishing to prevent the disease spreading to Tasmania's abalone stocks (DPIW, 2008).

Figure 3-6: Fishing Catch Density & 'Threatened' Species Presence in Bass Strait (NOO, 2002)



## 3.5 Socioeconomic Environment

The proposed seismic activities will be undertaken in an area which is of interest to both petroleum exploration and production (Yolla platform lies approximately 30km west of the permit area) and commercial fisheries.

### 3.5.1 Commercial & Recreational Fishing

Commercial fisheries operating in the general vicinity of the permit area include the following Commonwealth Fisheries (AFMA, 2008):

- Bass Strait Central Scallop Fishery;
- Southern Square Jig Fishery;
- Small Pelagics Fishery;
- Commonwealth Trawl Fishery (Southern and Eastern Scale-fish and Shark Fishery); and
- Gillnet hook and trap fishery.

Tasmanian fisheries which may operate in the area include the Rock Lobster Fishery (DPIW, 2008b).

All fishery total catch figures for the permit area indicate that commercial fishing is of low intensity (NOO, 2002) (refer Figure 3-6). Consultation with the fishing industry will be undertaken before any activities commence.

### 3.5.2 Heritage

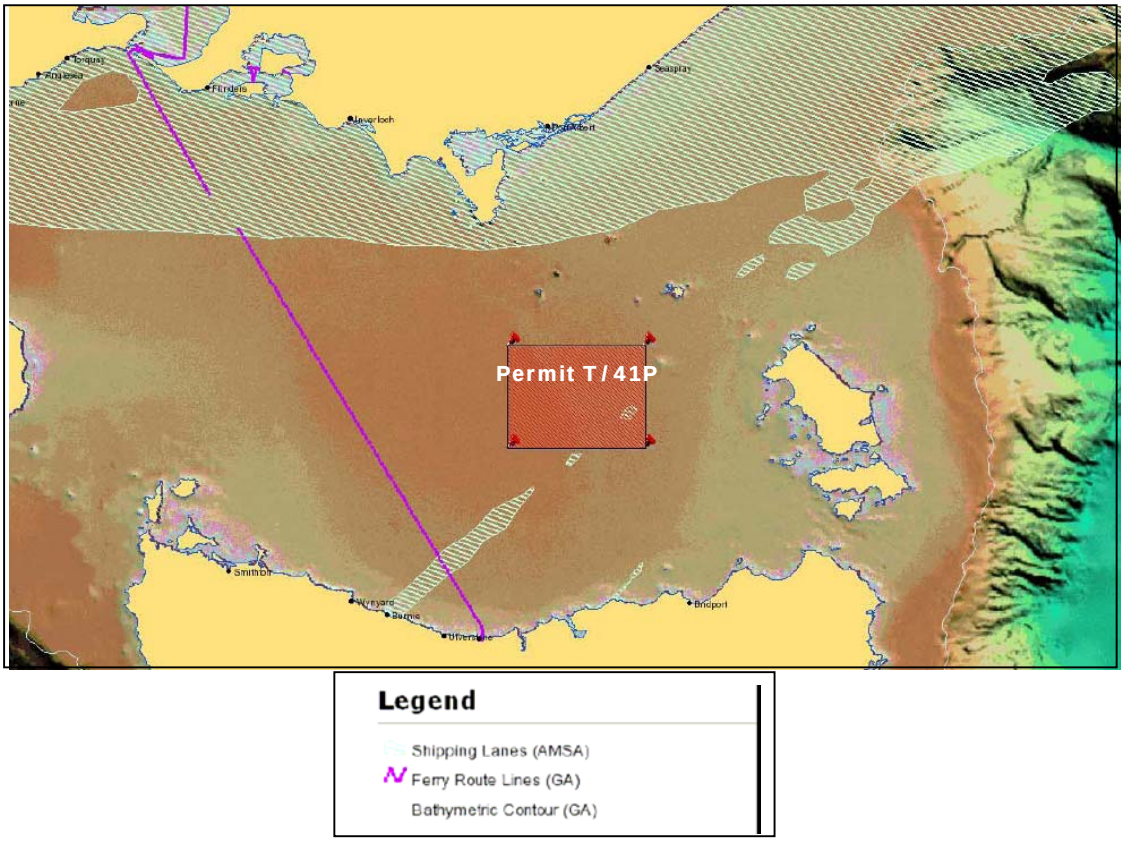
Shipwrecks of historic interest in the area and all shipwrecks older than 75 years are designated for protection under the Commonwealth *Historic Shipwrecks Act 1976*. Shipwrecks recorded which may be in proximity of the permit area include the *Orion* (1908) and *Paringa* (1935) (DEWHA, 2008a). Seismic activities will not impact upon these heritage items.

### 3.5.3 Commercial Shipping

Figure 3-7 (NOO, 2002) provides details of major commercial shipping lanes and ferry routes lying in proximity to T/41P and indicates the following:

- The Melbourne-Devonport Spirit of Tasmania service lies to the west of the permit area; &
- Vessels sailing to northern Australian ports (Sydney, etc) from Burnie and Devonport traverse the permit area.

Figure 3-7: Commercial Shipping (GA, 2008)



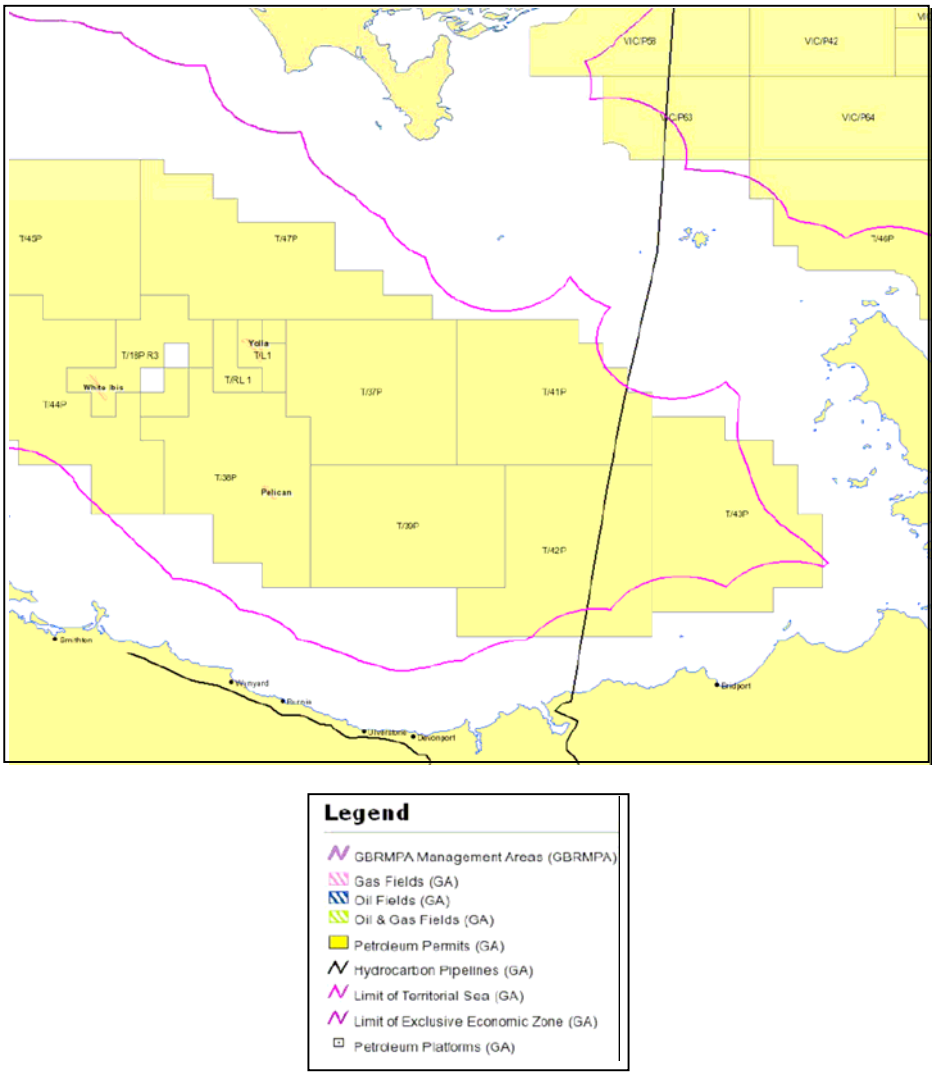

## 3.5.4 Oil & Gas Infrastructure

Proposed seismic activities will be undertaken in an area which is of interest to both petroleum exploration and production. Current hydrocarbon infrastructure lying in proximity to the permit area includes (refer Figure 3-8):

- Yolla platform approximately 30km west of the permit area; and
- The Tasmanian Gas Pipeline (Lfd-Bell Bay) traverses the permit area.

The 3D seismic survey in Permit area T/P41 forms part of a program of work being undertaken by the Pacific Titan in the Otway, Bass and Gippsland Basins during 2008.

Figure 3-8: Existing Petroleum Infrastructure in Bass Basin (GA, 2008)



# 4 Applicable Environmental Legislation

## 4.1 Regulatory Framework

This section provides a brief summary of the legal framework applicable to the 3D Oil Seismic Survey in Exploration Permit T/41P, together with a register of relevant environmental legislation for the seismic activity.

The proposed survey area is situated approximately 50km from the nearest shoreline and falls under commonwealth legislation (3 to 200 nautical miles from territorial baseline). The supply base will be located at the Port of Burnie and as such Tasmanian legislation will apply to activities at the supply base.

The proposed seismic activity is primarily governed by the Petroleum Submerged Lands Act 1997 and its associated legislation; however other legislation is also applicable. Exploration Permit T/41P has been awarded to 3D Oil under the Commonwealth *Petroleum (Submerged Lands) Act 1969* (PSLA). The Commonwealth PSLA is administered by a Joint Authority which consists of Mineral Resources Tasmania (MRT) in the Department of Infrastructure, Energy & Resources (DIER) and the Commonwealth Department of Resources, Energy & Tourism (DRET). The MRT is the designated authority for the day-to-day decisions and approvals process.

As required under the PSLA regulations, an Environment Plan (EP) has been prepared for the seismic survey being conducted in Permit T/41P *(this document*) for submission and approval by MRT.

On 2nd March 2008, 3D Oil submitted an EPBC Referral to the Department of Environment, Water, Heritage & the Arts (DEWHA) seeking determination as to whether the activity is a 'controlled action'. 3D oil considers, with the implementation of the nominated management measures identified in the EPBC referral, that the action is 'not controlled' as there are no significant impacts to items of national environmental significance.

Relevant commonwealth and state legislation as it applies to the 3D Oil Seismic Survey in Permit T/41P is provided in **Table 4.1** and **Table 4.2** respectively.

## 4.2 APPEA Code of Environmental Practice

The Australian Petroleum Production and Exploration Association (APPEA) have developed general industry guidelines as to seismic practices which are considered to represent good industry practice in the petroleum industry. These guidelines have no legislative force and are intended to provide industry guidance.

Table 4-1 Key Commonwealth Legislation

| Legislation | Coverage | International Convention Enacted | Administering Authority |
|---|---|---|---|
| *Petroleum (Submerged Lands) Act 1967* & *P(SL) (Management of Environment) Regulations 1999* | The *PSLA* addresses all licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and development operations extending beyond the 3 nautical mile limit. The PSLA (Management of Environment) regulations is to ensure that petroleum activities are undertaken in an ecologically sustainable manner and in accordance with an environmental plan which has appropriate environmental performance objectives, standards and criteria. | - | Department of Resources, Energy & Tourism (DRET) |
| Environment Protection & Biodiversity Act 1999 | This Act focuses on environmental matters of National Significance, streamlines the Commonwealth environmental assessment and approval process and provides an integrated system for biodiversity conservation and management of protected areas. Matters of national environmental significance are world heritage properties; RAMSAR wetlands; listed threatened species and communities; migratory species under international agreements; nuclear actions and the commonwealth marine environment. | • 1992 Convention on Biological Diversity & Agenda 21<br>• Convention on International Trade in Endangered Species of Wildlife and Flora 1973 (CITES)<br>• Japan/Australia Migratory Birds Agreement 1974 (JAMBA)<br>• China/Australia Migratory Birds Agreement 1974 (CAMBA)<br>• USSR-Australia Migratory Bird Agreement<br>• Convention on Wetlands of International Importance especially waterfowl habitat 1971 (RAMSAR)<br>• International Convention on Whaling 1946<br>• Convention on the Migratory Species of Wild Animals (Bonn Convention) 1979 | Department of Environment, Water, Heritage and Art (DEWHA) |
| Environment Protection (Sea Dumping) Act 1981 | Act prevents the deliberate disposal of wastes (loading, dumping, and incineration) at sea from vessels, aircraft, and platforms. | Convention on the Prevention of Marine Pollution by dumping of waste & other materials 1972 (London Convention) MARPOL | Department of Environment, Water, Heritage and Art (DEWHA) |

| Legislation | Coverage | International Convention Enacted | Administering Authority |
|---|---|---|---|
| Historic Shipwrecks Act 1976 | Protects the heritage values of shipwrecks and relics | • Convention on Conservation of Nature in the South Pacific (APIA Convention) 1976<br>• Aust-Netherlands Agreement concerning old Dutch Shipwrecks 1972<br>• Convention on Protection of Underwater Cultural Heritage 2001 | Department of Environment, Water, Heritage and Art (DEWHA) |
| Hazardous Waste (Regulation of Exports and Imports) Act 1989 | Act control the import and export of hazardous waste. | Basil Convention on the Control of Transboundary Movement of Hazardous Waste and Disposal 1989 | Department of Environment, Water, Heritage and Art (DEWHA) |
| Ozone Protection & Synthetic Greenhouse Gas Management Act 1989 | Regulates the manufacture, importation and use of ozone depleting substances. | • MONTREAL Protocol<br>• UN Framework Convention on Climate Change 1992 | Department of Environment, Water, Heritage and Art (DEWHA) |
| Protection of the Sea (Prevention of Pollution from Ships) Act 1983 | Regulates ship-related operational activities and invokes certain requirements of the MARPOL convention relating to discharge of noxious liquid substances, sewage, garbage, air pollution etc. | International Convention for the Prevention of Pollution from Ships [MARPOL 73/78] provisions and unified interpretations of the articles, protocols and Annexes of MARPOL 73/78, including the incorporation of all of the amendments that have been adopted by the MEPC and have entered into force, up to and including the 2000 amendments (as adopted by resolution MEPC.89(45)) | Australian Maritime Safety Authority (AMSA) |
| Quarantine Act 1908 | The Act empowers authorities to quarantine goods, vessels and people to prevent the introduction, establishment or spread of diseases or pests affecting human beings, animals, or plants. | International Convention for the Control and Management of Ships Ballast Water & Sediments 2004 | Australian Quarantine Inspection Service (AQIS) |
| Navigation Act 1912 | Regulates ship-related activities and invokes certain requirements of the MARPOL convention relating to equipment and construction of ships | International Convention for the Prevention of Pollution from Ships [MARPOL 73/78] (certain sections) | AMSA |
| Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 | Regulates the use of harmful anti-fouling systems employed on boats and their effects on the marine environment. | International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001 | AMSA |

Table 4-2 Relevant Tasmanian Legislation

| Legislation | Coverage |
|---|---|
| Environmental Management & Pollution Control Act 1994 | This Act is the key Tasmanian Legislation regulating emissions to the environment within Tasmania (relevant for waste disposal and transfer, national pollutant inventory reporting). Administered by the Tasmanian Department of Tourism, Arts & the Environment. |
| Pollution of Waters by Oil and Noxious Substances Act 1987 | Tasmanian state legislation to protect Tasmanian state waters from oil/noxious substance pollution giving effect to the requirements of MARPOL 73/78 within state waters. |
| Dangerous Goods Act 1985 | Tasmanian legislation regulating the storage and handling of chemicals with immediate physical impacts. |

# 5 Assessment of Environmental Effects & Risks

## 5.1 Potential Environmental Effects Identification

This section identifies and assesses the activities with potential environmental effects on the environment, identifies mitigation measures to address and minimise these impacts and assesses the residual environmental risk with these measures implemented.

The potential sources of environmental impact from the 3D Oil T/41P seismic survey are:

- Routine Operations:
    - Acoustic disturbance to cetaceans/marine species;
    - Physical presence of seismic vessel to shipping & other marine users (interaction potential) & seabed impacts (possible anchoring);
    - Seismic vessel transfer of exotic species (i.e. ballast water discharges or abalone virus transfer);
    - Other vessel emissions (sewage, putrescible waste, oily water discharges, & hazardous wastes) with the potential to impact on marine water quality and fauna;
    - Combustion emissions (engines, waste incineration) with the potential to impact on local air quality; and
    - Vessel lighting which may attract marine species.
- Non-Routine (Unintentional) Operations:
    - Oil/chemical spill impacts to the marine environment.

These activities have the potential to result in adverse effects on the physical, socio-economic and biological environment of the Bass Basin. A comprehensive description and assessment of the environmental effects associated with seismic activities is presented in Section 5.2. The risk assessment methodology utilised to assess environmental risk is provided in Appendix A.

## 5.2 Environmental Impact & Management

### 5.2.1 Acoustic Disturbance

#### *5.2.1.1 Activity*

Marine seismic surveys involve the discharge of compressed air to create noise pulses that are reflected back from differing geological structures and recorded by receivers towed behind the seismic vessel. High intensity noise discharges from seismic surveys are considered to be the most likely activity to impact marine ecosystems (NOO, 2001). Impacts to marine fauna will vary with seismic discharge intensity, distance from source and species type.

Seismic survey sounds are of high energy and low frequency (APPEA 2006) typically, for arrays, frequencies are concentrated in the 10-200Hz range with maximum sound intensities 230-255dBA re 1µPa@1m from the source (APPEA, 2006), with lower levels in the 200-1000Hz range. The intensity of sound drops rapidly with increasing distances. Depending on local conditions, seismic noise can be reduced to background intensity within a few tens of kilometres (APPEA, 2006).

The sounds produced during a seismic survey are not at an unusual level relative to other sounds experienced in the marine environment. Table 5-1 (APPEA, 2004) provides a comparison of some sound impacts in the marine environment.

Table 5-1: Sound Intensity and Pressure (dB re 1uPa) @ 1m from source

| Source | Sound Intensity (dB) | Frequency (Hz) |
|---|---|---|
| Undersea Earthquake | 272 | 50 |
| Seafloor Volcanic Eruption | 255+ | Varied |
| Lightning Strike (sea surface) | 250 | Varied |
| Seismic Acoustic Source | 230-255 | <200 |
| Sperm Whale Clicks | Up to 235 | 100-30,000 |
| Bottlenose Dolphin click | Up to 229 | Up to 20,000 |
| Ship sound (close to hull) | 200 | 10-100 |
| Breaching whale | 200 | 20 |
| Blue Whale Vocalisation | 190 | 12-400 |
| Ambient Sea sound | 80-120 | Varied |

When considering long-range transmission of sound underwater it is the near horizontal energy output from the sound source which is the most critical. The devices towed by a seismic vessel are arranged in precise groups called arrays which are specifically oriented such that the sound waves are directed towards the seafloor. Thus energy is not directed, nor does it travel, very far horizontally.

Seismic sound also increases in sound wavelength with distance from the sources as a result of the rapid loss of the higher frequencies. The initial seismic pulse lasts a few milliseconds but after travelling a few kilometres from the source, its wavelength increases (Swan et al, 1994).

#### *5.2.1.2 Environmental Assessment*

Cetaceans

Baleen whales (Blue, Southern Right & Humpback) are considered the most sensitive of the marine mammals to seismic arrays due to their use of low-frequency signals (12Hz-8kHz) for communication (McCauley, 1994). Their low frequency hearing capability is believed to overlap the energy output of the seismic and the potential for disturbance in this species is considered higher than for toothed whales (DOIR, 1997). Behavioural responses of these species to seismic include changes in respiration rate and avoidance of

the seismic vessel. Initiation of the seismic source can elicit a startled response even at distance (3km) however this is not observed with the continual firing of the source (DOIR, 1997). While the planned seismic program is not located in key feeding and aggregation areas for these threatened cetacean species, the possibility of migrating Humpback or Southern-Right Whales in proximity to the seismic activity exists and appropriate measures to limit impacts and control interaction will be adopted.

Toothed cetaceans (sperm whale, beaked whales, and dolphins) produce echo clicks that have the highest source levels of any recorded marine mammal sound ranging from 220-230dBA at 1µPa-m. Most toothed whale social sounds are well above the low frequency range where marine seismic is concentrated (NOO, 2001). Little information is available regarding toothed cetacean reaction to seismic noise. Smaller toothed cetaceans have poor hearing in the low frequency range of airgun noise (<200Hz) and so may be able to approach seismic vessels closely without adverse behavioural or pathological effects (McCauley, 1994).

For cetaceans, specific auditory damage is believed to occur at approximately 230-240 dBA within 1-2m of the energy source (Gausland, 2000). However, as a result of cetacean's ability to avoid seismic noise, it is highly unlikely, with the adopted interaction controls that cetaceans will be exposed to levels likely to cause pathological damage (McCauley, 1994).

Pinniped (Seals)

There is a possibility of the presence of pinnipeds, particularly the Australian Fur Seal (*otariid* species), within the area of the seismic activity given the presence of breeding locations approximately 30km from the nearest permit boundary. Typical air guns produce peak sound emissions of low frequency (typically in range 6-100 Hz). Underwater audiograms for some *otariid* seals indicate that their greatest sound sensitivity lies in the range 2-32 kHz. The low frequency sounds of seismic air-gun arrays fall below the greatest hearing sensitivity of seals. McCauley (1994) indicates though, that this interpretation should be treated with caution as audiograms differ between pinnipeds and none exist for Australian species (Shaughnessy, 1999).

Fish & Crustaceans

Seismic survey noise may lead to behavioural responses in fish with the nature and extent of the response varying depending on a range of parameters including the species involved, propagation and aspect of the array.

Fish are considered to have good low frequency hearing and so are likely to be able to hear seismic shots for up to several kilometres from the source, however disturbance to fish is believed to cease below 180 dB re 1µPa (DoIR, 2007). McCauley (1994) reports on a number of studies into the behavioural response of fish to seismic which could include:

- Startled responses expected in fish within 315m of the array;
- Alarm responses expected up to 2000m; and
- Flight responses expected for several kilometers.

Available evidence suggests that behavioural change for some fish species may be no more than a nuisance factor. The behavioural changes are localized and temporary with displacement of pelagic or migratory fish populations having insignificant repercussions at a population level (McCauley, 1994). Trials of effects of nearby airgun operations on captive fish, undertaken by McCauley et al (2000) showed a generic fish alarm response of swimming faster, swimming to the bottom, tightening school structure, or all three at an estimated 2-5km from the seismic source. Gausland (2000) confirms that the seismic noise results in temporary startle responses of fish or tightening of shoals.

Habituation was a noted occurrence (McCauley, 1994). In addition, the regular damage that occurs to streamer cables caused by pelagic fish indicates that some species show no long distance avoidance reaction.

Sharks are less likely to be affected by airgun discharges than other fishes as they lack a swim-bladder (Turnpenny, 1994).

No lethal effects have been observed for crustaceans or shellfish exposed to seismic arrays (McCauley, 1994).

On this basis, given the short duration of seismic activities, the impact of seismic noise on fish stocks is considered as localised and transitory with the displacement of fish insignificant at a population level (NOO, 2001).

#### *5.2.1.3 Management Measures*

Cetaceans

Management measures as detailed in the *DEWHA Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales (2007)* will be adopted to minimise the risk to marine mammals and fauna.

These mitigation and management measures include:

- Visual observation 30minutes prior to soft start procedures;
- Soft start/ramp-up procedures to commence if no cetaceans have been spotted within 3km of the vessel with continuous visual observation[1];
- Initiate start-up delay procedures should a cetacean be observed within 3km during the soft-start procedure with power/shutdown on the acoustic source if the cetacean enters the low power/shutdown zone;
- Seismic crew will undertake regular observations during recording operations as part of their general duties;
- Seismic operations to initiate stop work procedures if a cetacean enters the low-power/shutdown zone; and
- An appropriately trained and experienced Marine Mammal Observer (MMO) will be on-board the vessel to assist the crew with cetacean observation.

[1] At night-time start-up will commence providing there have not been 3 or more whale instigated shut-downs during the previous 24hr period.

As seismic operations are planned on a 24hr basis, the following measures will be adopted for conditions of low visibility (fog, periods of high winds and including night-time operations) (DEWR, 2007) to allow for seismic start-up:

- Provided there have not been 3 or more whale instigated power-down or shut-down situations during the preceding 24hr period; or
- If operations were not previously underway during the preceding 24hrs, the vessel has been in the vicinity (approx 10km) of the proposed start-up position for at least 2 hours (under good visibility conditions) and no whales have been sighted.

Recognising that beaked whales are often mistaken for dolphins (not offered protection from the shutdown requirements detailed in the EPBC Industry Guidelines for Seismic), all sightings of suspected beaked whales or dolphins will be treated as beaked whales unless it is confirmed by the MMO that they are dolphins.

All cetacean sightings will be reported to the DEWHA.

The Pacific Titan crew are fully trained in the above management measures, cetacean observation, distance estimation and reporting. These requirements will be reinforced through an environmental induction prior to mobilisation.

Pinniped (Seals)

It is also recognised that Australian Fur-Seals may be present in the permit area during the survey activities (but outside breeding periods). While the low frequency nature of seismic is expected to fall outside of the Australian Fur-Seal's hearing sensitivity range and may be able to approach seismic vessels at close range although extensive studies have not been undertaken (McCauley, 1994). Harris et al (2001) observed that seals in the Beaufort Sea during seismic activities did not move much beyond 250m for a full array seismic survey. It is expected that soft-start procedures and the gradual vessel approach will allow seals to avoid the vessel reducing their potential risk. The MMO's will record any seals being present during the daylight hours of the seismic and note their behaviour.

Adoption of these management measures will reduce the environmental risk to marine mammals/fauna to as low as reasonably practicable (assessed as medium risk).

## 5.2.2 Vessel Physical Presence

### *5.2.2.1 Activity*

The presence of the seismic vessel, *Pacific Titan*, may create collision hazards to fishing/commercial shipping and disrupt fishing activities. The vessel will travel more than 2200km over a period of 20-34 days acquiring seismic. The survey area may be utilised by fishing vessels (predominantly net fishermen), however the fishing effort is expected to be low.

Artificial lighting (navigation and work area lighting) is used during night-time operations in accordance with marine safety requirements to ensure that the vessel can be clearly identified at night and does not present a collision hazard to other marine users and allows for safe movement of personnel during hours of darkness.

Anchoring activities by the vessel may disturb benthic communities through anchor scouring.

#### 5.2.2.2 Environmental Assessment

The seismic vessel will not be anchoring whilst performing the seismic survey (except in emergency situations) and therefore will not impact on the surrounding seabed environment and benthic communities.

While shipping density in the permit area is assessed as low, the presence of the seismic vessel has the potential to present a shipping collision hazard. Seismic operations will be undertaken in accordance with all marine navigation and vessel safety aids/requirements and operating practices required by Marine Orders declared under the *Navigation Act 1912* and the *Protection of the Sea (Prevention of Pollution by Ships) Act 1983* including the issuing of a Notice to Mariners for the duration of the activities. Implementation of these measures will minimise the collision hazard risk.

While fishing intensity in the Bass Basin is also low, fishing activity may be temporarily disrupted due to the presence of the vessel and the seismic activity undertaken for the duration of the activity (30 days). Close liaison, planning, and regular communication with affected fishing groups will ensure the impact on fishing activities is minimized.

Artificial lighting used in night operations is in accordance with maritime safety requirements. High levels of light-spill may result in changes in behaviour of marine fauna. Marine species may be attracted or avoid the well-lit areas. It is understood that bird strikes (e.g. Short-tailed Shearwater) have been recorded in the Southern Ocean where powerful ice lights are used. While fishing activities are undertaken on open decks with significant light sources attracting birds, seismic operations are not open deck activities. It is likely that any behavioural effects associated with vessel lighting will be insignificant as only the minimum amount of lighting used for safe navigation will be adopted for the survey.

The environmental risk associated with collision hazard is assessed as medium risk and impact to fisheries due to the presence of the vessel is assessed as low given the low intensity fishing levels of the area.

#### 5.2.2.3 Management Measures

Ongoing management measures to maintain low risk levels include:

- Issue of Notice to Mariners; and
- Continued consultation with the fisheries groups.

### 5.2.3 Exotic Species Introduction

#### 5.2.3.1 Activity

Ballast water drawn from shallow seas or harbours which is subsequently discharged into similar environments in different locations can cause a range of environmental consequences. If foreign organisms are introduced they can undergo rapid population increases in the absence of natural competitors. This may lead to biological contamination, changes to water quality and modification to ecological processes.

The *Pacific Titan* will initially mobilise for the larger Otway, Bass and Gippsland Basin Seismic Survey campaign from Singapore. The vessel, prior to its engagement in these basins will undertake ballast exchange on their international voyage in accordance with the following:

- Mandatory ballast exchange in deep water (at least 200m) where sediment is not visible outside the Australian 12 nautical mile limit utilising an approved method of exchange;
- Documentation of all ballast exchange activities; and
- AQIS clearance.

These requirements conform to the Australian Ballast Water Management Requirements (AQIS). Local ballasting will be required for trim adjustments and stability during the seismic survey in T/41P.

The *Pacific Titan* will mobilise to Permit T/41P either from Otway Basin exploration permits or from adjacent Bass Basin permits. Currently the abalone virus *Viral Ganglioneuritis* is affecting the Victorian abalone industry along the western Victoria coast (VADA, 2008). Recognising the potential threat of the virus, Tasmanian authorities have declared an abalone fishing closure (recreational and commercial) on the northern Bass Strait Islands (north of Curtis & Kent Groups) to prevent the disease spreading to Tasmanian stocks (DPIW, 2008). For the T/41P survey, the vessel will:

- If mobilising from Otway Basin permits, undertake a full cleaning and disinfection process on the trailing equipment;
- During the survey, the vessel's supply base will be Burnie alleviating concerns associated with transfer of the virus between Victorian/Tasmanian waters.

#### 5.2.3.2 Environmental Assessment

Protection measures adopted to minimise the possible transfer of exotic species in Ballast water into Tasmanian waters (AQIS requirements) ensures that the risk of exotic species introduction is low for the seismic activities.

Seismic activities in exploration permit T/41P will be undertaken in water depths of 50-70m over a sandy/muddy substrate. Abalone harvesting occurs in waters <40m (DPIW, 2008a) and inhabits rocky substrates, hence the presence of abalone in the permit area is considered low. Additional measures associated with cleaning/disinfection of trailing equipment (if mobilising from Western Victoria) and utilisation of Burnie as a supply base will further reduce the possibility of transfer of the virus. The environmental risk posed by seismic activities in contributing to the transfer of the abalone virus is considered low.

#### 5.2.3.3 Management Measures

No special management actions are required in addition to the measures detailed above.

## 5.2.4 Routine Discharges to the Marine Environment

### *5.2.4.1 Activity*

Offshore seismic activities produce the following waste discharge streams in small quantities:

- Sewage discharges (including grey water) are treated onboard in a biological treatment system sized for 78 persons, macerated to a small particle size and treated to neutralise bacteria prior to discharge overboard in accordance with MARPOL requirements;
- Putrescible waste discharges (food-scraps) are macerated onboard to a size less than 25mm prior to marine discharge overboard;
- Oily water is treated onboard through an oil-water separator to allow for discharge overboard at oil-in-water concentrations less than 15ppm (MARPOL 73/78 Annex 1 requirements). Waste oils are held in a dedicated tank and transferred to shore for disposal by a reputable contractor in accordance with state requirements. All shipboard operations associated with oil transfer/movement are recorded in the Oil Record Book (legislated requirement);
- Solid non-biodegradable waste disposal is undertaken in accordance with MARPOL 73/78 Annex V and implemented via a vessel Garbage Management Plan. Treatment methods adopted on the vessel include:
- Combustion products released through the incineration of paper, plastics and wood in the onboard incinerator (Kvaerner-Golar) and diesel combustion in onboard engines; and
- Special wastes (used oils, chemical and metallic wastes) are compacted where possible, segregated and stored onboard and either disposed onshore in accordance with state disposal regulations, or where possible, returned to suppliers/recyclers. A garbage compactor is available onboard the vessel to minimise waste volumes held;

Solid waste records are maintained in the Garbage Discharge Record book and housekeeping of storage areas is routinely inspected.

### *5.2.4.2 Environmental Assessment*

Discharge of wastes to sea (sewage, putrescible wastes, oily water) will result in localised increases in nutrient/organic levels immediately surrounding the vessel. These wastes as they enter the marine environment will be in accordance with MARPOL requirements and at distances of more than 50km from the nearest landfall. Given the temporary nature of the operation and scale of the workforce; the level of treatment and equipment present on these waste streams and the highly dispersive Bass Strait marine environment, the risk associated with the waste discharge is considered low and not environmentally significant.

Atmospheric emissions associated with engine exhausts and other onboard sources are minor. Equipment is routinely maintained and fuel consumption is monitored.

Given the highly dispersive environment and the vessel's remoteness from any sensitive receptors (population centres), impacts are insignificant and the risk is considered low.

#### 5.2.4.3 Management Measures

All personnel are inducted into the seismic contractor's/3D Oil HSE Policy requirements on environmental protection including the waste management requirements onboard the Pacific Titan. Part of this policy requirement is to reduce waste at source by giving priority to method and tool selection which reduces the amount of waste produced.

## 5.2.5 Non-routine Discharges to the Marine Environment

#### 5.2.5.1 Activity

The predominant hydrocarbons onboard the Pacific Titan is marine diesel used for vessel propulsion. Diesel is stored in internal tank/bunkers onboard the vessel. Refuelling and replenishment of diesel is not planned during the survey given the short duration and capacity of the vessel. However, should this activity eventuate, refuelling will be undertaken in accordance with documented procedures for fuel transfer operations.

Note the Pacific Titan will uses solid streamers on this seismic campaign as opposed to the streamers filled with kerosene to maintain streamer buoyancy. Use of solid streamers eliminates the risk of hydrocarbon spills/leaks from this source.

Chemicals used onboard during seismic operations are limited to small quantities of cleaning products, solvents, paints and primers. All are present in small quantities and are supported by Material Safety Data Sheets detailing spill response equipment and response actions. Additional measures include:

- Chemicals are packaged and labelled in accordance with legislated requirements;
- Crew members are advised of the chemical properties through HSE induction and job training then through regular HSE meetings, tool-box meetings and refresher training;
- All areas are appropriately signed with instruction and warnings;
- All available preventative measures to handle chemicals (including spills) are supplied to crew members; and
- Chemical storage areas are routinely inspected.

#### 5.2.5.2 Assessment

Collision/Grounding Spill Events: Diesel spills associated with collision events are unlikely to occur given that the survey area is located in deep water, the vessel will be operated in accordance with all maritime standards, and navigation equipment will monitor for potential collision threats. The likelihood of vessel collision is assessed as low.

Refuelling Spill Events: The most common source of hydrocarbon spill in seismic operations occurs with refuelling activities with spill volumes typically less than $1m^3$. Refuelling is not planned during the survey and on this basis the risk is eliminated. However, should refuelling activities be required, the activity will be in accordance with documented procedures by trained personnel. The risk posed by this activity is considered to be low.

Packaged Chemical Spills: Any spills which occur from packaged chemicals or oils onboard will be cleaned-up immediately using appropriate on-board spill cleanup equipment with the generated waste material properly disposed onshore. As the volumes used/stored are small and given the onboard training provided in chemical handling, the risk posed to the environment by chemical spills is considered low.

#### *5.2.5.3 Management Measures*

In the unlikely event of a spill, the Pacific Titan operates under a Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL 73/78 Annex I Regulation 26. The SOPEP includes:

- The personnel responsibilities for the deployment and the maintenance of response equipment;
- The emergency plan in case of pollution;
- The communications and contacts required;
- The measures to control and limit the discharge; and
- The required forms to be completed and transmitted.

The vessel's emergency preparedness is maintained and testes through regular drills and simulation exercises. Spillage control drills take place monthly and all drills logged, debriefings held and action/learning points documented and followed-up.

## 5.3 Environmental Risk Assessment Summary

The results of the environmental risk evaluation for the 3D Oil seismic survey activities is summarised in Table 5-2 for both routine and non-routine operations. This Table provides a summary of relevant environmental aspects associated with the survey, the potential environmental impacts, risk control measures and residual risk exposures.

As can be seen from Table 5-2 there have been no aspects or impacts assessed as having a high residual risk (refer to key in Appendix A).

Table 5-2: Environmental Risk Assessment Summary

| Aspects | Impacts | Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Seismic Survey Acquisition | | | | | |
| Acoustic Noise – Survey | Damage to marine mammals and marine life<br><br>Behavioural changes to Cetaceans<br><br>Behavioural changes to fish/planktonic species | No known feeding/breeding or aggregation grounds in proximity to T/41P<br><br>Implement & comply with requirements of the DEWHA Industry Guidelines *Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales (2007) (includes soft-start, power-down, shut-down procedures)*<br><br>Cetacean sightings during survey forwarded to DEWHA<br><br>All sightings of dolphins will be treated as whale sightings until it is confirmed by the MMO. All relevant control measures (power-down, shutdown) will be observed.<br><br>Marine Crew fully trained in cetacean observation, distance estimation and reporting<br><br>Experienced MMO onboard to assist with cetacean observation<br><br>MMO to record seal behaviour during daylight hours within proximity to the vessel and the behaviour noted.<br><br>During night-time/low visibility conditions start-up will only occur if there have not been 3 or more whale instigated power/shut-downs in the preceding 24hr period or if operations were not underway in preceding 24hrs the vessel has been in the vicinity of the proposed start-up position for at least 2hrs (under good visibility conditions) and no whales have been sighted.<br><br>MMO to record the presence of seals and note behaviour to seismic activities during daylight hours<br><br>Behavioural responses to fish likely to be localised and short-term with soft-start procedures minimising impacts | 2 | 3 | 5 |

| Aspects | Impacts | Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Presence of Vessel | | | | | |
| Seismic Vessel | Interference with shipping and fishing vessels increasing the risk of collision | Low density of fishing/commercial vessels in permit area<br>Seismic activities short duration (20-34days) with no permanent infrastructure left on seabed<br>Information on the location and timing of seismic program to be communicated to vessels via AMSA through a Notice to Mariners issued for activity duration<br>Navigation lighting on Pacific Titan<br>Vessel equipped with navigation aids (radio, radar & visual watches) & crew vigilant for fishing /commercial vessel during survey<br>Crew competency with required maritime training standards<br>Consultation with fishing industry groups undertaken and to continue<br>In accordance to MARPOL, the vessels will operate under Shipboard Oil Pollution Emergency Plan (SOPEP). Crew is trained in preparedness and routine drills undertaken | 3 | 2 | 5 |
| | Light-spill interfering with marine fauna and birds | Light emissions are in accordance with navigation safety and workplace safety requirements<br>Extent of light-spill limited<br>Permit area located at distance from nearest land | 1 | 2 | 3 |
| | Anchoring activity creating disturbance to seabed benthos | Seabed substrate consists of mud/sands allowing for rapid recolonisation<br>No anchoring on location except in emergency | 1 | 2 | 3 |

| Aspects | Impacts | Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Introduction of Exotic Species | | | | | |
| Ballast Water | Introduction of exotic species which colonise and create competition for local resources | Initial mobilisation from Singapore will observe AQIS Australian Ballast Water Management Requirements<br>Local ballasting during seismic within permit area | 3 | 1 | 4 |
| Mobilisation of Vessel from Western Victorian Waters | Transfer of the Abalone *Viral Ganglioneuritis* into Tasmanian waters affecting commercial abalone fisheries as a result of seismic equipment and vessel fouling | Vessel to undertake deep water re-ballasting prior to mobilisation to Tasmanian waters<br>Full cleaning and disinfecting process will have been conducted on the trailing equipment in accordance with recognized decontamination procedure<br>Tasmanian Supply Base (Burnie) minimises potential for transfer | 3 | 1 | 4 |
| Discharges to the Marine Environment | | | | | |
| Grey water/sewage disposal | Increased nutrients in surrounding marine waters on discharge<br>Visual amenity impacts | Sewage is treated in accordance with MARPOL 73/78 requirements (i.e. approved biological treatment). Macerated to particle size less than 25mm and disinfected prior to discharge<br>Grey & black water directed to system (low volume)<br>High dispersal/dilution in Bass Strait environment<br>Permit area not in proximity to landmass | 1 | 3 | 4 |
| Oily water discharges from equipment spaces | Toxicity impacts to marine flora & fauna<br>Reduction of water quality | Oily water passes through an oil/water separator and treated to an oil-in-water content <15ppm (MARPOL 73/78 Annex 1)<br>Oily water discharged via an IMO approved Oil-in-water (OIW) meter as per MARPOL 73/78 Annex 1 with alarm on excursion<br>Separated oil store in dedicated tank for onshore disposal (refer *Special wastes*)<br>Activity recorded in the Oil Record Log (onboard)<br>Low volumes discharged and rapid dilution/dispersion in marine waters | 1 | 2 | 3 |
| Putrescible waste (food-scraps) | Increased nutrients in surrounding marine waters on discharge<br>Visual amenity impacts | Waste macerated to less than 25mm particle size in accordance with MARPOL 73/78 and discharged below water line<br>Low volumes discharged and rapid dilution/dispersion in marine waters | 1 | 3 | 4 |

| Aspects | Impacts | Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Special waste disposal (onshore) | Toxicity impacts to marine flora & fauna<br>Reduced water quality<br>Visual amenity impacts | Identification of waste reduction measures (at source) to prevent waste generation<br>Clear waste identification, segregation, containment (in skips or sealed drums) and labelling;<br>Waste storage areas are routinely inspected;<br>Special waste disposed or recycles onshore<br>Training and reinforcement to all crew (& other) personnel of waste management requirements;<br>Documented Disposal Records. | 1 | 3 | 4 |
| Incineration of solid Non-Biodegradable wastes (paper, plastic & wood) & Equipment Combustion | Reduction in air quality<br>Aesthetic impacts of smoke | Segregation/disposal requirements detailed in Vessel Garbage Management Plan<br>Low volumes generated and rapid dilution/dispersion in atmosphere<br>Regular equipment monitoring and maintenance undertaken to ensure maximum efficiencies<br>All emissions from marine utilities are in accordance with the guidelines in MARPOL Annex VI Prevention of Air Pollution from Ships | 1 | 2 | 3 |
| Accidental Releases (Non-Routine) | | | | | |
| Fuel transfer spill | Impacts on water quality and marine life | No 'at sea' refuelling planned for seismic campaign<br>In unlikely event of requiring a fuel transfer at sea, activity will be undertaken in accordance with approved Bunkering Procedures with all associated equipment routinely maintained and inspected;<br>Suitable absorbent material is held on the vessel to cleanup small diesel spills;<br>Availability of implemented and tested SOPEP | 1 | 2 | 3 |

| Aspects | Impacts | Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Diesel spill due to vessel collision/grounding | Impacts on water quality and marine life<br>Shoreline Pollution (very low probability)<br>Disruption to fishing activities | Navigational aids on the *Pacific Titan* including navigation lighting, radars, radio and visual surveillance to avoid collisions.<br>Vessel operated by experienced and competent crew with access to bathymetric and marine charts<br>Grounding risk low due to distance from nearest landmass (60km) and lack of emergent landforms in the permit area.<br>Issue of a Notice to Mariners via AMSA<br>Availability of implemented and tested SOPEP | 2 | 3 | 5 |
| Chemicals spills | Impact on water quality and marine life | Small quantities of chemical are stored onboard<br>Chemicals are packaged & labelled in accordance with legislation<br>Crew members trained in the handling and PPE requirements of specific chemicals<br>All chemical storage areas are appropriately signed and labelled with instructions and warnings;<br>Chemical storage areas routinely inspected;<br>MSDSs are to be made available for all chemicals;<br>Spill kits to be provided in appropriate locations;<br>Availability of implemented and tested SOPEP. | 1 | 3 | 4 |

Note: C = Consequence
L = Likelihood

# 6 Environmental Objectives, Standards and Criteria

## 6.1 General

Section 5 has identified the possible environmental impacts associated with drilling activities. The level of environmental risk associated with each aspect (i.e. activity) has been classified according to the methodology outlined in Appendix A.

This section details the environmental performance objectives for aspects associated with drilling activities assessed in Section 5. Also detailed are relevant standards of operation and performance criteria to determine if an activity is meeting its environmental objectives. The following definitions are used in this section:

- **Performance objectives** are defined as 'overall goals for environmental performance as they relate to individual aspects'.
- **Standards** are described as 'detailed performance requirements necessary to achieve the performance objectives'.
- **Criteria** are defined as 'factors that provide a measure, either direct or indirect, relating to the performance standards'.

## 6.2 Performance Objectives, Standard and Criteria

3D Oil's overall environmental objectives for the seismic survey is to conduct the operations with no or as low as practicable effects on the environment. 3D Oil also aims to minimise the risk of accidental incidents (i.e. non-routine activities) and limit the environmental impact from such incidents should they occur.

The seismic program will be conducted in accordance with this Environment Plan, the 3D Oil HSE Policy[2], all legislative and regulatory requirements (refer Section 4), and the APPEA Code of Environmental Practice (1996).

Table 6-1 provides details of the specific environmental performance objectives, standards and criteria for the T/41P seismic activities.

[2] Includes Seismic Contractors' HSE Policy Statement, Contract Project Safety Plan & Crew HSE Plan for the Program.

Table 6-1 Summary of Performance objective, standards and Criteria

| No. | Objectives | Standard | Criteria |
|---|---|---|---|
| 1 | Minimise disruption to marine life | • 2005 Australia National Guideline for Whale and Dolphin Watching<br>• APPEA Code of Environmental Practice | • DEWHA Guideline adherence to minimise cetacean impact<br>• Cetacean observation records maintained<br>• Induction of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP. |
| 2 | Minimise interference with commercial & fishing vessels | • P(SL)A 1967, Section 124<br>• APPEA Code of Environmental Practice<br>• Navigation Act 1912 (Marine Orders) | • Adequate and timely consultation with local fishermen, fishing industry groups and management agencies in advance of actions that potentially affect these users<br>• No complaints from fishing organisations received during seismic<br>• Notice to Mariners issued<br>• Radar/radio/visual monitoring undertaken during survey<br>• Functional navigational lighting in place and in use<br>• Induction of all personnel on environmental sensitivities, management procedures and commitments detailed in the EP |
| 3 | Minimise impact of routine discharge on marine environment. | • MARPOL 73/78 Annex I (Oil), Annex II (Noxious Liquid Substance), Annex IV (Sewage)<br>• APPEA Codes of Environmental Practice<br>• Garbage Management Plan | • Sewage treatment system, incinerator & putrescible waste treatment system (i.e. macerator) is fully operational and operating within specification.<br>• Oily water treatment system (including oil detection monitor and alarm) operational. Oily water discharge maintained at or below 15ppm (oil-in-water). Oil Record Book maintained<br>• Solid (excluding paper, plastics and wood) and hazardous wastes segregated, labelled and retained for disposal in accordance with Garbage Management Plan. Documented Garbage Discharge Record book<br>• Procedures for deck spill clean up in place and prompt clean up of any spills<br>• Seismic crew inductions and training procedures undertaken and followed |
| 4 | Minimise impacts of atmospheric emissions | • MARPOL 73/78 – Annex VI (Air Emissions) | • Equipment (incinerator & engine) maintenance records in accordance with manufacturer requirements<br>• Diesel consumption records maintained and routinely reviewed |
| 5 | Avoidance of foreign marine organisms to Tasmanian Waters | • Quarantine Act 1908<br>• Australian Ballast Water Management Requirements (AQIS)<br>• *Abalone Viral Ganglioneuritis* Disinfection Procedures (as needed/required) | • Water Ballasting Records & AQIS Clearances.<br>• Records of equipment disinfection in accordance with approved procedures prior to mobilisation to the T/41P Permit area (as appropriate). |

| No. | Objectives | Standard | Criteria |
|---|---|---|---|
| 6 | Minimise occurrence and effects of spills | Navigation Act 1912 (Marine Orders)<br>Shipboard Oil Pollution Emergency Plan (SOPEP) consistent with MARPOL Annex I (Oil) & Annex II(Noxious Substances)<br>APPEA Code of Environmental Practice (1996)<br>Fuel Bunkering Procedures | No planned 'at sea' refuelling, however approved refuelling procedures are in place (as contingency), all crew members are trained in use and equipment is appropriately maintained.<br>All spill incident (& near miss) reporting and recording of spills to marine environment (oil and chemicals) to 3D Oil.<br>All spills >80litres reported to MRT and all spills from vessel to marine environment reported to AMSA.<br>Approved SOPEP in place and tested.<br>MSDSs are available for all oils/chemicals onboard with appropriate spill cleanup material maintained.<br>Chemicals are packaged and labelled in accordance with legislation & storage areas appropriately signed.<br>Rig crew induction and training undertaken and spill response procedures followed. |

# 7 Environment Plan Implementation

## 7.1 Organisation Structure

3D Oil is responsible for assuring that the proposed seismic survey is managed in accordance with this Environment Plan. The seismic contractor will undertake the operations on 3Ds behalf and under contractual arrangements with 3D Oil, the Seismic Contractor is required to implement and comply with all environmental procedures.

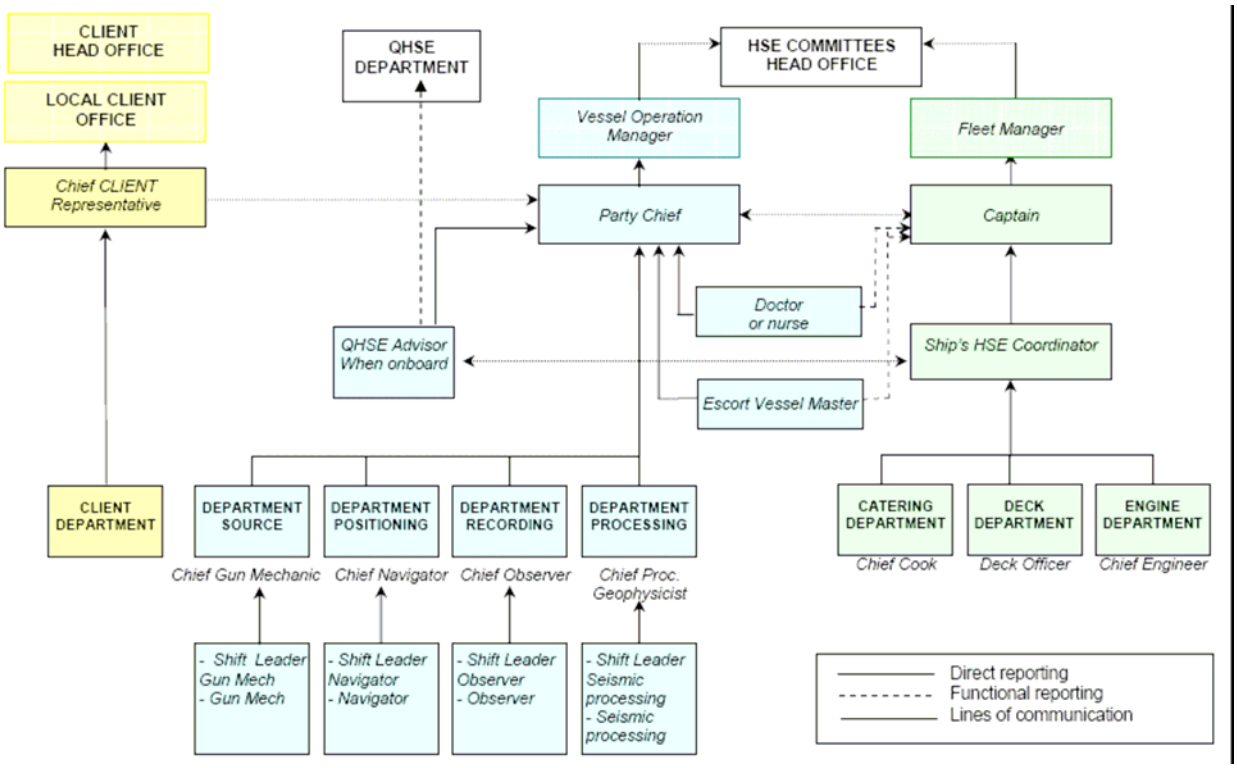
The environmental procedures and practices to be implemented during the seismic survey are documented within this EP. The Seismic Contractor will implement a range of its own procedures and project specific plans including but not limited to the following:

- CGG Offshore – Health Safety & Environment Management System Manual;
- Crew HSE Plan;
- Contract Project Safety Plan; and
- Emergency Response Plan.

These procedures and plans are compatible with the requirements of this Environment Plan and address regulated standards such as DEWHA Industry Guidelines *Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales (2007)*.

The organisation structure for the program is provided in Figure 7-1.

Figure 7-1: Organisation Structure



## 7.2 Roles & Responsibilities

### 7.2.1 3D Oil

The 3D Oil QA Advisor will be located on the vessel and is responsible for the day-to-day conduct of the program to 3D Oil's satisfaction and for the management of 3D Oil personnel on the vessel. The 3D Oil QA Advisor must ensure that during the survey, the seismic contractor(s) undertake operations in a manner consistent with the performance objectives and environmental management procedures detailed in this EP. This position ensures that:

- All project personnel are given a full briefing on the environmental sensitivities of the permit area and the environmental management/commitments made in this EP;
- The 3D Oil Exploration Manager (onshore) is immediately alerted to any changes in operations which could impact negatively on environmental performance;
- All incidents are reported to the Exploration Manager; and
- An environmental review is conducted at the completion of the survey.

The 3D Oil Exploration Manager is the interface between personnel and activities undertaken on the seismic vessel, 3D Oil and regulators. The Exploration Manager will promptly notify DIER (MRT) of any reportable incidents.

The 3D Oil Exploration Manager is also the seismic survey Contract Manager who oversees the routine operation of the vessel, including the operations of the contractors. The Contract Manager has overall responsibility for, and authority with regard to, safety of the vessel and all aboard and is responsible for ensuring that all policies/procedures are implemented and the scope of the seismic survey completed.

### 7.2.2 CGG Veritas & Pacific Offshore

The Survey Vessel Master (Pacific Offshore) has the following responsibilities:

- Ultimate responsibility for the safe execution of all vessel operations including:
- Identification of hazards;
- Prevention of injury or damage to assets or the environment;
- Ensuring the emergency/contingency plan is operable and tested and all personnel are competent to perform their assigned duties;
- Ensuring safe working codes and practices are implemented for all operations in accordance with recognised standards and policies;
- Ensuring that personnel have received the appropriate induction and training and observe such requirements as the work situation warrants;
- Ensuring HSE meetings are held;
- Writing specific Vessel instructions in conjunction with the Party Chief (PC).

The Party Chief (CGG Veritas) is responsible to the Vessel Master for strict observance of existing HSE documentation and supports the Master in the following aspects of the operation:

- Permanent seaworthiness of the seismic area including pollution aspects, securing of equipment, storage and segregation of all chemicals together with relevant MSDSs;
- Writing, in conjunction with the Master, procedures and instructions to be applied to the seismic operations (needing both PC & Master approval);
- Providing information related to back-deck operation to crew and crew changes;

- Safe execution of the agreed Scope of Work in accordance with the Seismic Contract;
- Ensures that all working codes and practices are implemented for all survey operations in accordance with recognised standards
- Ensures that prompt action is taken in order to rectify any deficiencies in working practices or conditions;
- Ensures active participation in HSE meetings by survey crew;
- Communicating all deficiencies of operation with 3D Oil; and
- Investigating all incidents along with the onboard HSE representative, Master and 3D Oil representative.

The Onboard HSE Advisor (CGG Veritas):

- Promotes reporting of accidents and incidents;
- Ensures that various HSE regulations, standards and rules are implemented and compatible with 3D Oil requirements;
- Assists in training of crew on non-conformances, definitions, problem-solving methodology, etc;
- Assists crew in hazard identification and Hazard Register update;
- Records HSE performance;
- Conducts internal inspections and training sessions.

## 7.3 Implementation Strategy

Specific requirements contained in the EP are captured in the 3D Oil T/41P Seismic Program Environmental Commitments Register, which forms the basis of an implementation checklist to ensure appropriate implementation of environmental management. This register captures the:

- Specific environmental requirement or constraint;
- Timing and frequency of the commitment during the drilling campaign;
- Management position responsible for fulfilling the commitment;
- Measurement, monitoring and reporting activities to be undertaken; and
- Verification records necessary to fulfil commitment requirements.

A copy of the register is provided in Appendix D.

## 7.4 Training & Awareness

The Seismic Contractor is highly experienced with regard to the proposed seismic activity and their suitability to undertake the proposed works is evaluated as part of the project planning phase.

### 7.4.1 Induction

All personnel, including contractors, will be made aware of relevant environmental matters to achieve the required environmental objectives during induction/kick-off prior to the commencement of the survey. Induction material will include:

- Importance of conforming with the Environment Plan and associated regulatory requirements;
- Potential environmental hazards and consequences associated with seismic activities in the permit area;
- Environmental objectives, management measures and requirements contained within this EP;
- Personnel roles and responsibilities; and
- An understanding of the emergency response system.

A record of induction will be maintained with endorsement of personnel who attended. These records shall be made available to 3D Oil as soon as possible after induction activities.

### 7.4.2 Competency & Ongoing Awareness

CGG Veritas & Offshore Pacific ensure that offshore personnel are trained and competent to undertake their respective activities onboard the Pacific Titan. Additional training and competency assessment is undertaken for identified HSE sensitive positions in accordance with the respective training systems/matrices.

The following ongoing activities serve to reinforce environmental awareness during the seismic program:

- *Onboard HSE Committee Meetings* attended by all onboard management positions and held fortnightly. These meetings review all HSE issues against plan requirements, review the Action Point list arising from incidents and inspections and prepare, in close liaison with all relevant parties, an environmental action plan to facilitate continuous improvement in environmental performance.
- *Onboard Departmental Meetings* attended by all respective departmental representatives and held on a fortnightly basis. These meetings review all HSE issues on a departmental basis.
- *Intervention Toolbox Meetings* attended by all personnel involved in a specific non-routine operation on an 'as-needs' basis. This meeting reviews the activity and reinforces appropriate measures to be adopted to prevent environmental impacts.
- *Handover Toolbox Meeting* which occurs each shift between team members and their counterparts. In these meetings they analyse all information available, tasks and jobs to be undertaken.

Records are produced for each of these meetings.

# 7.5 Communication and Consultation

## 7.5.1 Employee Communication and Participation

The Party Chief/Vessel Master will be responsible for keeping its workforce informed about environmental issues, acting as a focal point for personnel to raise environmental issues, and consulting and involving all personnel in the following:

- Issues associated with the implementation of the Environment Plan;
- Any proposed changes to equipment, systems, or methods of operation, where these may have environmental implications;
- Any proposals for the continuous improvement of environmental protection, including the setting of environmental objectives and training schemes.

Regular HSE meetings will be held on the *Pacific Titan*. The issues discussed and actions taken will be recorded. The minutes of each meeting, including action items from the meetings, will be made available to all personnel.

Other forms of internal communication include toolbox meetings which are undertaken before every critical or unfamiliar job. This meeting includes all personnel involved in the task and will include aspects such as spill prevention requirements, etc.

## 7.5.2 Stakeholders Consultation

As part of the preparation of this Plan, 3D Oil has consulted with the following Stakeholders:

- Tasmanian Mineral Resources Tasmania (MRT) (Designated Authority);
- Australian Fisheries Management Authority (AFMA);
- Victorian Department of Primary Industries (Fisheries & Aquaculture);
- Tasmanian Department of Primary Industries & Water (Wild Fisheries Section) (DPIW);
- Lakes Entrance Fishing Cooperative Ltd (LEFCOL);
- Twofold Bay Fishing Cooperative;
- San Remo Fishing Cooperative;
- South-east Trawl Fishing Industry Association (SETFIA);
- South East Fishing Association (SEFA);
- Seafood Industry Victoria (SIV);
- Tasmanian Fishing Industry Council (TFIC);
- Tasmanian Abalone Council;
- TASfish; and
- VR Fish.

Appendix B provides a summary of the consultation undertaken. Issues which have been identified among these stakeholders are as follows

- General displacement of fishing activities in the area for the period of seismic activities (20-34 days) (LEFCOL); and

- General concerns associated with seismic impacts to fishery stocks and the food-chain in general (LEFCOL).

3D Oil will provide a written response to LEFCOL on these issues based upon current available literature for fishery impacts.

In addition to the above consultation, 3D Oil will consult with the adjoining permit holders and the Seismic Contractor will consult with fishing operators in the permit area during the survey as necessary. The Seismic Contractor will contact AMSA regarding the location of the survey and potential shipping movements.

## 7.6 Emergency Response and Preparedness

The T/41P Seismic Program operates under a Shipboard Oil Pollution Emergency Plan (SOPEP) to ensure timely response and effective management of any oil spills. General emergencies are handled under the Pacific Titan Emergency Response Procedures. To ensure readiness, emergency exercises and drills are conducted regularly onboard the *Pacific Titan.*

## 7.7 Monitoring

The following environmental monitoring program has been identified for the 3D Oil seismic program to verify environmental performance objectives. Site specific monitoring details are provided in Table 7-1.

Table 7-1 Proposed Monitoring Program

| Aspect | Reporting Parameter | Frequency |
|---|---|---|
| ***Atmospheric Emissions*** | | |
| Machinery exhaust | • Quantity of Marine diesel used by the vessel | Continuous |
| **Discharges to Sea** | | |
| Oily water discharge | • The volume of oily water discharge.<br>• The oil and water concentration | Continuous |
| **Disposal of Wastes** | | |
| Hazardous wastes | • Volume of hazardous wastes transferred onshore | On transfer |
| Incinerated waste | • Volume incinerated | By event |
| Non-hazardous wastes | • Volume of non-hazardous wastes transferred onshore | On transfer |
| **Spills to Sea** | | |
| Chemical/oil spill | • Volume | By event |
| **Marine User Interaction** | | |
| Cetacean/seal sighting | Sightings of cetacean & seal behaviour observation | Opportunistic observation |
| Vessel Interaction/Complaints | • Communications with other vessels | Per interaction |

## 7.8 Audit and Review

### 7.8.1 Inspections

Inspections will be made by the Onboard HSE Advisor (CGG Veritas) and 3D Oil QA Advisor to ensure that vessel standards and seismic operations reflect the requirements of this Environment Plan. Any departures from standard will be documented with follow-up actions documented and closed-out.

### 7.8.2 Audit & Review

A formal company (3D Oil) audit will not be undertaken due to the short time-frame of the survey. However, both CGG Veritas and Pacific Offshore conduct (independent) planned HSE audits on the Pacific Titan. The list of corrective actions generated from each audit is followed-up and reviewed for closure at HSE Meetings. These audit reports will be made available to 3D Oil and will be used to determine if environmental performance standards have been achieved.

A review of environmental records (Refer Section 8.3) will be undertaken to determine the compliance to the environmental performance objectives of the survey at the completion of activities.

# 8 Reporting Requirements

## 8.1 Internal Reports

### 8.1.1 Daily Survey Reports & Key Performance Indicators

The Daily Seismic Survey Report is distributed to 3D Oil by CGG Veritas.

All HSE performance statistics will be regularly collected and monitored throughout the seismic program.

### 8.1.2 Incident Reporting

All environmental incidents (including any spill of chemical or petroleum and near misses) onboard the Pacific Titan are reported and investigated in accordance with the CGG Veritas Incident/accident Notification and Reporting Procedure (WZ-HSE-GP-005). All corrective actions arising from incidents, audits and inspections are recorded on the Action Listing and monitored from closure at HSE Meetings. Corrective and preventative actions taken to eliminate the cause of potential incidents will be commensurate with the magnitude of the environmental risks.

## 8.2 External Reports

### 8.2.1 Recordable Incidents

In accordance with Regulation 26 of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999, CGGVeritas (on behalf of 3D Oil) will record and report all incidents which breach the performance objective or standards for the particular activity as detailed in Table 6-1 as recordable incidents. A monthly report shall include recordable incident 'data' including:

- Circumstances and material facts concerning the incident;
- Actions taken to avoid or mitigate any adverse environmental impacts; and
- Corrective action taken to prevent recurrence.

### 8.2.2 Reportable Incidents

#### *8.2.2.1 DIER (MRT) Reporting*

3D Oil will report all activities that have caused or have the potential to result in moderate to catastrophic environmental consequences to the Tasmanian MRT as soon as possible but within two (2) hours. 3D Oil shall submit a written report to MRT within 3 days of the incident or as agreed with the MRT.

#### *8.2.2.2 AMSA Reporting*

In accordance with the Navigation Act 1912, the Australian Maritime Safety Authority (AMSA) will be notified by the Vessel Master if any of the following incidents occur:

- An oil pollution incident has occurred in commonwealth waters (Marine Notice 1/1996);
- The seismic vessel has sustained or caused an accident occasioning loss of life or serious injury;
- The vessel has received damage or is defective affecting its seaworthiness; or
- There is a serious danger to navigation (e.g. a sizable piece of equipment likely to float has been lost in a storm).

### 8.2.3 Seismic Survey Close-Out Reporting (MRT)

An end-of survey closeout report will be prepared to DIER (MRT) detailing the performance of the seismic activity against the environmental performance objectives and standards set within 2 months of the survey completion. The 3D Oil Exploration Manager is accountable for the production of this report.

Contained within that report will be the following:

- Reportable Incidents, relevant incident investigation details, the corrective actions determined and actioned;
- Recordable incidents (i.e. those incidents which breach the performance standards) including the following data:
- Circumstances and material facts concerning the incident;
- Actions taken to avoid or mitigate adverse environmental impacts; and
- Corrective action taken to prevent recurrence.
- Monitoring Records (Refer Section 7.7); and
- Inspection/Audit outcomes.

### 8.2.4 Compliance & Sighting Reports (DEWHA)

In accordance with the DEWHA Industry Guidelines DEWHA *Industry Guidelines Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales (2007)*, the interaction of seismic activities on whales in the area will be monitored via visual sighting records. The sighting will be recorded on DEWHA sighting form. CGG Veritas will collate the sighting report and 3D oil shall submit to DEWHA.

A report on the conduct of the survey and whale interactions will be provided to DEWHA within two months of completion in accordance with the above Industry Guidelines.

## 8.3 Record Management

The following list summarises the record retention requirements for the proposed seismic program:

- Environmental Induction Register (refer Section 7.4);
- Measurement and recording of criteria that form the Environmental Performance Objectives (Refer Table 6-1);
- Cetacean Surveillance and Sighting Forms and Seismic Activity Log[3];
- Cetacean Interaction Procedures;
- Garbage Management Register;
- Oil Record Book;
- Ballast Water Records;
- Marine User Consultation Logs (pre-mobilisation and during survey);
- Incident Register (including Marine User Complaints), incident investigation reports and corrective actions register;
- Marine Notices;
- Qualifications and experience of MMOs;
- Emergency Response Records; and
- External Reporting Records.

CGG Veritas shall forward copies of all environmental reports and records to 3D Oil, who will store and maintain these records for a period of 5 years. These records shall be made available to regulatory authorities on request.

[3] Requirements are detailed in the EPBC Industry Guideline 2.1 (DEWR, 2007) and includes:

- The location, times and reasons where observations were hampered by poor visibility or high winds
- The location and time of any start-up delays, power-down or stop work procedures instigated as a result of whale sightings;
- The location, time and distance of any whale sightings including species where possible;
- The date and time of survey commencement and completion.

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# Abbreviations

| | |
|---|---|
| 2D | 2 Dimensional |
| µPa | Micro-pascal |
| AFMA | Australian Fisheries Management Authority |
| AGD | Australian Geodetic Datum |
| AMSA | Australian Maritime Safety Authority |
| AQIS | Australia Quarantine Inspection Service |
| APPEA | Australian Petroleum Production & Exploration Association |
| AQIS | Australian Quarantine Inspection Service |
| AS | Australian Standard |
| BOM | Bureau of Meteorology |
| $^{o}C$ | Degrees Celcius |
| CAMBA | China/Australia Migratory Birds Agreement |
| CITES | Convention in International Trade in Endangered Species of Wildlife and Flora |
| Com | Commonwealth |
| dB | Decibels |
| DEWHA | Commonwealth Department of Environment, Water, Heritage and the Arts (Formerly Department of Environment and Water Resources) |
| DIER | Tasmanian Department of Infrastructure, Energy & Resources |
| DPIW | Tasmanian Department of Primary Industries and Water |
| DRET | Commonwealth Department of Resources, Energy & Tourism |
| E | East |
| EP | Environment Plan |
| EPBC | Environment Protection Biodiversity Conservation |
| HB | Handbook |
| Hr | hour |
| HSE | Health, Safety, Environment |
| H | Hertz |
| IMO | International Maritime Organisation |
| $in^3$ | Cubic inches |
| ISO | International Standards Organisation |
| JAMBA | Japan/Australia Migratory Birds Agreement |
| km | Kilometre |
| km/hr | Kilometres per hour |
| $km^2$ | Square kilometres |

| | |
|---|---|
| LEFCOL | Lakes Entrance Fishing Cooperative |
| m | Metres |
| mm | millimetres |
| $m^3$ | Cubic metres |
| m/s | Metres per second |
| MMO | Marine Mammal Observer |
| MoE | Management of Environment |
| MRT | Mineral Resources Tasmania |
| MSDS | Material Safety Data Sheet |
| NW | North-west |
| OIW | Oil in Water |
| PC | Party Chief |
| ppm | Parts per million |
| psi | Pounds per square inch |
| P(SL)A | Petroleum Submerged Lands Act |
| SEFA | South East Fishing Association |
| SETFIA | South-east Trawl Fishing Industry Association |
| SIV | Seafood Industry Victoria |
| SOPEP | Shipboard Oil Pollution Emergency Plan |
| S | South |
| Tas | Tasmania |
| TFIC | Tasmanian Fishing Industry Council |
| UN | United Nations |
| Vic | Victoria |

# Appendix A. Risk Assessment Methodology

The risk assessment approach used within this Environmental Plan is consistent with the approach outlined in ISO14001, AS4360:2004 Risk Management and HB203 Environmental Risk Management Guidelines (2006). Qualitative environmental risk is assessed as follows for identified environmental aspects (activities) which could result in an environmental impact.

**Risk = Likelihood of Occurrence (as it applies to the end-point environmental impact and not the incident) x Environmental Consequence Severity**

The environmental risk assessment methodology adopts the severity of consequence and likelihood of occurrence defined in the risk assessment matrix overleaf. The environmental risk rating presented in Section 5 represents residual risk levels, i.e. the likelihood of occurrence of the end-point environmental impact/consequence taking into account risk management controls implemented as a result of the design, personnel skill training and competency assessments, procedures and emergency response plans.

### 3D Oil Qualitative Risk Assessment Matrix

| ASSET RISK MATRIX | | | | | | Likelihood | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Consequence | | | | | | 1 | 2 | 3 | 4 | 5 |
| Category | | People (H&S) | Environment /Compliance | Financial | Reputation Community/Media | *Rare:* Occurs in exceptional circumstances | *Unlikely :* Could occur at some time | *Possible:* Might occur at some time | Likely: Probably occur in most circumstances | *Almost certain:* Expected to occur in most circumstances |
| 1 | *Negligible* | Minimal Impacts | Localized Impacts. No statutory reporting | Low-to-no Cost Impact. Range: 0-$1M | No public or regulator interest | 2 | 3 | 4 | 5 | 6 |
| 2 | *Minor* | First Aid Injury (minor injury) | Minor local impact. No significant impact to others. Regulatory notification required. | Low Cost Impact: Range: $1M-$5M | No public interest beyond local users. Minor impact on business reputation | 3 | 4 | 5 | 6 | 7 |
| 3 | *Moderate* | Medical Treatment injury or single shift LTI | Significant local impact with potential for regulatory intervention. Possible administrative fine level | Moderate Cost Impact Range: $5M-$10M | Local regulator interest. Local user concern. Moderate to small impact on business reputation | 4 | 5 | 6 | 7 | 8 |
| 4 | *Major* | Extensive Injury or hospitalization Protracted LTI | Significant environmental harm. Material breach or licence, permit or act. | Major Cost Impact. Range: $10M - $25M | Negative local/state media interest Local community complaint Significant impact on business reputation | 5 | 6 | 7 | 8 | 9 |
| 5 | *Critical* | Permanent Disabling Injury, Single or multiple fatalities | Catastrophic harm to the environment. Ongoing/ serious breach of licence, permit or act with potential for revocation of Licence. | Large Financial Impact. In excess of $25M | Negative state/national media interest. Public outrage to curtail operations Critical impact on business reputation. | 6 | 7 | 8 | 9 | 10 |

# Appendix B. Consultation Log

## 3D Oil - Fisheries Consultation Record Summary

| Name | Department | Position | Fishing Relationship | Area Coverage | Fishing Equipment | Date Consulted | Suggested Method | Key Points | Response/Issues |
|---|---|---|---|---|---|---|---|---|---|
| Bronwen Jones | Australian Fisheries Management Authority Phone: (02) 6225 5475 email:bronwen.jones@afma.gov.au | Environment Officer | Fisheries Manager (Gov't) | Commonwealth Fisheries | | 06-Mar-08 | via Email | Refer Email | Primary fishery groups to be contacted include - CFA, TFIC, SIV, LEFCOL, SEFA & SETFIA |
| Graeme Hanel | Department of Primary Industries (Victoria) - Fisheries Victoria Phone: (03) 5561 9959 Email: graeme.hanel@dpi.vic.gov.au | DPI Fisheries | Fisheries Manager (Gov't) | Victorian Fisheries | | 13-Mar-08 | Via Phone | Refer Email | No issues identified to date |
| Christopher Collins | VR Fishing (Peak Body for Recreational Fishing) Phone: (03) 9696 7077 Email: info@vrfish.com.au | Executive Officer | Industry Association (Recreational) | Recreational Fishing in Victoria | Long- lines | 13-Mar-08 | Via Phone Conversation | Described seismic program in Tasmanian Waters | Does not need the information. Information should be directed to TARfish |
| Dale Sumner & Jeff North | Lakes Entrance Fishermans Co-op Phone: 03 5155 1688 Email: jnorth@lefcol.com.au & dsumner@lefcol.com.au | Chairman & Operations Manager | Fishing Coop - Processing of Fishing Stock delivered from Fishing Boats | VIC/Commonwealth Fisheries | Danish Seine (17 boats)<br>Deep Water Board Trawlers (5)<br>Shark Fishing Fleet (6)<br>Scallop & Squid Fleet (30)<br>Rock Lobster Boats (3)<br>Prawn Fishing Vessels (5)<br>Bait Fishing Boats (9) | 13-Mar-08 | Via Phone & email | Refer email | Explained that the primary impact was possibly to shark fishermen given the predominance of netting activity. Primary issues related to the amount of time the fishermen would be excluded from the area, and the impacts of seismic on fisheries with respect to displacement of fish and impacts to krill/foodchain. Written response will be provided back to LEFCOL with all available publically available information on the effects of fishing from seismic. |
| Christian Lloyd | San Remo Fisherman's Co-op Phone: 03 5678 5206 Email: fishcoop1@bigpond.com | Coop Manager | Fishing Coop - Processing of Fishing Stock delivered from Fishing Boats | VIC/Commonwealth Fisheries | Shark Fishing Boats (8) (gillnets)<br>Long-line Boat (1)<br>Rock Lobster Boats (7)<br>Live-Fish Hooking Boats (2) (Eels)<br>Net Boats (2)<br>Fishing Charter Boats (3) | 13-Mar-08 | Via Phone & Email | Refer Email | Cannot provide initial feedback from Coop members but will pass the information on and request response. No response to date. |
| Charlie Farquhar | South East Fishery Association PH: 03 6248 1949 Email: cfarq@bigpond.net.au | Executive Officer - SEFA (Gillnet Hook & Trap Sectors) | Fishing Industry Association | Commonwealth Fisheries | Gillnets<br>Fish Traps<br>Longlines | 13-Mar-08 | Via Phone & Email | Refer Email | Provided fedeback that he through the fishery most impacted would be the shark fishery. He indicated that he would put the email out to association members for feedback. No response received to date. |
| Dr Ian Knuckey (Reports to Gail Richie - EO SETFIA) | SETFIA Phone: 03 5258 4399 Email: fishwell@datafast.net.au | Industry Representative - SEFIA | Fishing Industry Association | VIC/Commonwealth Trawl Fisheries | Otter Trawl<br>Danish Seine<br>Midwater Trawl | 13-Mar-08 | Via Phone & Email | Refer Email | Ian indicated he would put the email to trawl and non-trawl memebrs and provide feedback. No response to date. |
| Ross McGowen | Seafood Industries Victoria Phone: (03) 9329 5660 Email: rossm@siv.com.au | Executive Officer | Seafood Industry Association | VIC Fisheries | Squid Jigging<br>Scallop Dredges<br>Live Fish Hooking Boats<br>Lobster Pots | 13-Mar-08 | Via email | Refer Email | No issues/response identified to date |
| Fritz Orenkhahn | SETFIA Phone: 02 6496 2003 Email: Fritzd@aapt.net.au | Two Bay Fishing Coop Chairman & SETFIA President | Fishing Industry Association | Commonwealth Fisheries | Trawl Boats<br>Net Boats<br>Line Boats | 13-Mar-08 | Via phone & email | Refer Email | Indicated that the seimic area was out-of-bounds to trawl fishermen (except the NW corner of the permit). Did not expect any impacts. |
| Neil Stump | Tasmanian Fishing Industry Council (03) 6224 2332 | CEO | Seafood Industry Association | Tas Fisheries | | 13/03/2008 | Via phone & email | Refer Email | Indicated that the area may impact on the Rock Lobster fishery and has forwarded information to the relevant industry association. No response to date. |

## 3D Oil - Fisheries Consultation Record Summary

| Name | Department | Position | Fishing Relationship | Area Coverage | Fishing Equipment | Date Consulted | Suggested Method | Key Points | Responce/Issues |
|---|---|---|---|---|---|---|---|---|---|
| Grant Pullen | Department of Primary Industries and Water (03) 6233 3157 | Manager (Wild Fisheries Management Branch) | Fisheries Manager (Gov't) | Tasmanian Waters | | 13/03/2008 | Via Phone | Discussed the program, water depths and time of year | Initial feedback indicated that Tasmanian Fisheries (to 3nm) are not likely to be impacted. Tasmanian Fisheries with commonwealth arrangements (Lobster & abalone) are not likely to be impacted given the sandy/muddy substrate (rock lobster) & depths greater than 40m (abalone). Suggest that the impacts may be with the commonwealth fisheries (particularly shark fishery (schooling gummy)*May be some sensitivity to sharks given the development of their sensory organs.* |
| Peter Franklin | Commonwealth Fisheries Association (02) 6162 1283 | CEO | Peak Commonwealth Fisheries Association | Commonwealth Fisheries | | 13/03/2008 | Via Phone | No answer - redirected to SETFIA contact | |
| Mark Nikolai | TASfish (03) 6239 9856 Email: mark.nikolai@tasfish.org | CEO | Tasmanian Recreational Fisheries | Recreational Fishing in Tasmania | | 13/03/2008 | Email & Phone | Refer Email | Indicated that the predominance of game fisheries were off the east Tasmanian coast given that pelagic species tend to migrate around Tasmania. Not thought to be any impacts given the distance from shore (80km) to recreational fishermen or game fishermen. Indicated that there was some shark fishing off the north coast of Tasmania.*Is a committee meeting next Wednesday - will provide feedback.No response to date* |
| Dean Lisson | Tasmanian Abalone Council (03) 6231 1955 0419699954 | President | Tasmanian Abalone | Tasmanian Waters | | 13/03/2008 | Via phone | Refer email | Would like to be kept in the loop regarding mobilisation and disinfection protocols. Abalone virus is transported on mucus strands which attache to current and vessel. Would be appropriate to adopt similar protocol to Santos. Party disinfecting the boat should contact Kevin Ellard (Chief Vet Office - Hobart 6233 6828) and Andrew Sharman (DPIW Abalone Fisheries Manager 6233 3612) to confirm protocol. No other impacts expected to Abalone from seismic given the depth of water and muddy substrate of permit area. |

# Appendix C. Whale and Dolphin Sighting Forms

Australian Government
Department of the Environment and Heritage

*Approvals and Wildlife Division*

## Whale and Dolphin Sighting Report

National Cetacean Sighting Program

**Please return to:**
Wildlife Impact and Protection Section
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2601 AUSTRALIA

DO NOT approach whales/dolphins closer than 100 metres

| Date | Time (local) | Sighting from | Location | Latitude | | Longitude | |
|---|---|---|---|---|---|---|---|
| | | Land/vessel<br>Air / oil platform | | ° | ' S | | E |

**SPECIES DETAILS**

**Species** (as close as possible eg long-finned pilot whale/pilot whale/toothed whale/whale

How sure are you? (please circle)
very sure – sure – not sure

Animals/length
Biggest/smallest

How did you
estimate length?

Your distance (min/max)
from animal

Please draw shape and features you observed (e.g flipper, tail, back and head. Mark in the colour/s and draw colour patters and any unusual markings injuries, scars etc.)

Where there any photographs taken? Y or N

Total number of
whales/dolphins

Behaviour of whales/dolphins (eg swimming-north, breaching, resting)

Number of calves

**WEATHER/SEA CONDITIONS**

Beaufort Sea State (please circle)

0---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 6 ---------- 7+
mirror calm — moderate white caps — very rough

Waether (eg sunny, clear, light, rain)

Cloud cover /8

Wind direction

Wind speed

Sea temperature (°C)

Other animals present (including fish, birds, etc…)

Other notes / sketches
(e.g what did you use to identify the whale/dolphin

**Your Name and Address**

# Appendix D. Environmental Commitment Register

| ID | Issues | Task / Mitigation Measures | Responsibility | Implementation Mechanism | Evidence |
|---|---|---|---|---|---|
| 1 | Approval | Obtain approval for Environment Plan prior to the start of Seismic Survey. | Exploration Mgr | Project Approval | Written approval of EP |
| 2 | | Ensure the *Pacific Titan* (Vessel Mater/Party Chief) has access to approved documents | Exploration Mgr | Project Approval | Transmittal |
| 3 | Environmental Training and awareness | Ensure all personnel receive appropriate training on the operation of equipment and procedures relevant to environmental performance. | Party Chief/Vessel Master | Training procedure and matrix | Training records |
| 4 | | Ensure induction includes relevant environmental aspects and specific control measures to minimise impact to marine habitats prior to the undertaking any seismic activities. | Exploration Mgr | Project/Crew HSE Plan | Induction materials & induction attendance record |
| 5 | Reporting | Report as soon as practicable within the regulatory timeframe to MRT all activities that have caused or has the potential to result in moderate to catastrophic environmental consequences. | Exploration Mgr | Incident Reporting Procedure | Incident Log |
| 6 | | Ensure any recordable incidents are reported to MRT on a monthly basis, not later than the 15$^{th}$ day after the end of the calendar month. | Exploration Mgr | Incident Reporting Procedure | Incident Log & Monthly report |
| 7 | | Report to AMSA relevant incidents ASAP | Vessel Master | Incident Reporting Procedure | Incident Log |
| 8 | | Provide monitoring/record checklist to acquire all relevant data for close-out reporting requirements | Exploration Mgr | Environment Plan | Monitoring/Records |
| 9 | Physical Presence of Vessel | Undertake initial consultation with fishery groups to determine possible impacts | Exploration Mgr | Environment Plan | Consultation Log |
| 10 | | Conduct ongoing consultation with relevant fishing groups. | Party Chief | Project/Crew HSE Plan | Consultation/ Incident Log |
| 11 | | Issue Notice to Mariners for Survey Duration | Vessel Master | Project/Crew HSE Plan | Daily Broadcasts |
| 12 | | Vessel to have functioning navigation lights, radar and radio communications. Crew to be vigilant to possibility of fishing or commercial vessels | Vessel Master | Project/Crew HSE Plan | Inspection Records |
| 13 | | Appropriately qualified and experienced MMO engaged for the survey | Party Chief | Project/Crew HSE Plan | Sighting Records |
| 14 | | Adhere to EPBC Act Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales | Party Chief | Operating procedure & Project HSE Plan | Sighting reports, Seismic activity logging |

| ID | Issues | Task / Mitigation Measures | Responsibility | Implementation Mechanism | Evidence |
|---|---|---|---|---|---|
| 15 | Acoustic Discharges | Adhere to EPBC Act Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales subsumed into vessel operating procedures. Include observations on pinniped activity during daylight hours. | Party Chief | Operating procedure & Project HSE Plan | Sighting reports, Seismic activity logging |
| 16 | | Appropriately qualified and experienced MMO engaged for the survey | Party Chief | Project/Crew HSE Plan | Sighting Records |
| 17 | Discharge of Ballast Water | All vessels to comply with the requirements of the AQIS Ballast Water Management Guidelines. | Vessel Master | Australian Ballast Water Requirements | Ballast water log and records, AQIS clearance certificates |
| 18 | Vessel equipment cleaning if mobilised from Western Victorian Waters | Undertake equipment decontamination in accordance with approved decontamination procedures prior to mobilisation to T/41P | Exoil/Party Chief | Approved Decontamination Procedures | Records of Decontamination |
| 19 | Discharge of Oily Water | Ensure areas where activities involve the handling or storing oils/chemicals, are directed to the oily water separator system. | Vessel Master | Vessel design and operating procedure | Inspection Records |
| 20 | | Ensure the oil-in-water meter is routinely calibrated and the oil/water settling tank is routinely monitored | Vessel Master | Maintenance procedure | Calibration and maintenance record |
| 21 | | Ensure oily water discharge is within the legal limit. | Vessel Master | Vessel design and operating procedure | Oil Discharge Records |
| 22 | | Ensure housekeeping standards are maintained. | Vessel Master | Housekeeping procedure | Inspection Records |
| 23 | Discharge of sewage and food scraps | Ensure sewage are treated prior to discharge (i.e. macerated to <25mm before disposal) | Vessel Master | Equipment availability & use<br>Waste Management Procedure | Inspection Records |
| 24 | | Ensure macerating equipment is inspected and maintained on regular basis. | Vessel Master | Preventative Maintenance Procedure | Maintenance records |
| 25 | | Maximum POB of 56 in accordance to the capacity of the Sewage Treatment Plant; | Vessel Master | | POB record |
| 26 | | Maintenance records of sewage discharge treatment, maceration and disinfection in accordance with Manufacturers specifications | Vessel Master | Maintenance procedure | Maintenance record |
| 27 | Disposal of general and hazardous wastes | Ensure that waste management comply with waste management plan requirements, including segregation, recycling and onshore disposal. | Vessel Master | Waste Management Procedure | Garbage Records |
| 28 | | Maintain waste records. | Vessel Master | Waste Management Procedure | Waste log and records |

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|---|---|---|---|---|---|
| 29 | Atmospheric emission from combustion equipments | Monitor fuel consumption. | Vessel Master | Operating procedure | Fuel consumption record |
| 30 | | Ensure condition monitoring of combustion equipment (incinerator and engines) is routinely undertaken to optimise equipment utilisation/efficiencies. | Vessel Master | Preventative Maintenance Procedure | Maintenance record |
| 31 | Oil spill response | Ensure approved SOPEP is available. | Vessel Master | Project Approval | SOPEP |
| 32 | | Ensure SOPEP is tested in accordance with drill schedule | Vessel Master | Emergency Exercise Procedure/ Project HSE Plan | Exercise record |
| 33 | | Ensure personnel in response operations are appropriately trained. | Vessel Master | Training procedure and matrix | Training record |
| 34 | | Monitor and maintain record for spill. | Vessel Master | Incident Reporting Procedure | Spill records |
| 35 | Fuel Spill prevention and mitigation (as applicable) | Ensure all fuel transfers are conducted in accordance with the refuelling procedures including continuous visual monitoring (*not expected on this seismic program*). | Vessel Master | Bunkering Procedure | Permit for bunkering |
| 36 | | Ensure transfer equipment is inspected and maintained on regular basis (*not expected on this seismic program*). | Vessel Master | Preventative Maintenance Procedure | Maintenance records |
| 37 | | Ensure automatic shut off valve are used. | Vessel Master | Bunkering Procedure | Practice verify during audit |
| 38 | | All transfer activities between supply vessels and the *Pacific Titan* shall be in compliance with the AMSA OSV Code (*not expected on this seismic program*) | Vessel Master | AMSA OSV Code | Completed OSV checklist |
| 39 | | Trained personnel competent in operating the facility without spillage. | Party Chief/Vessel Master | Training and Employee Selection | Training record |
| 40 | | Marine warning and navigation system to avoid collisions. | Vessel Master | Inspection and maintenance procedure | Verify during audit |
| 41 | Chemical Spill | Ensure chemical containers conform with the IMDG Code for structure and labelling | Vessel Master | Handling of hazardous substance procedure | - |
| 42 | | Ensure personnel handling chemicals are appropriately trained. | Party Chief/Vessel Master | Training procedure | Training record |
| 43 | | Ensure MSDS for all chemicals handled onboard are available. | Party Chief/Vessel Master | Handling of hazardous substance procedure | - |

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|---|---|---|---|---|---|
| 44 | | Ensure spill kits are provided in appropriate locations. | Party Chief/Vessel Master | Inspection procedure | Inspection Records |