

BightSPAN 2D Marine Seismic Survey Bight Basin, South Australia and Western Australia

Environment Plan: Public Summary

This document is a summary of the Environment Plan (EP) in support of GX Technology/ION Geophysical Corp. (GXT) BightSPAN 2D Marine Seismic Survey covering small sections of several proposed Permit Areas and adjacent open acreage off South Australia (SA) and Western Australia (WA). The EP was submitted to the department of Primary Industries and Resources South Australia (PIRSA), as required by Regulations 11(7) and 11(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999* (P[SL]MoE Regulations).

Introduction

GXT proposes to conduct a two dimensional (2D) marine seismic survey in the Bight Basin. The proposed survey area spans across Commonwealth waters in South Australia and Western Australia, overlapping proposed Permit Areas EPP028, EPP029, EPP030, EPP031, EPP032 and small areas of open acreage. The survey will be conducted in water depths ranging from 100 to 6,000 m (chart datum).

Coordinates of the Proposed Activity

The proposed survey area is bounded by the coordinates listed in Table 1. Seismic data will be acquired over an area totaling 231,799 km², which includes a 20 km buffer zone required for vessel turning in which little or no data acquisition will occur.

Table 1 Coordinates of the Proposed Survey Area (GDA 94)

Point	Latitude	Longitude
1	-33.4644	128.4217
2	-33.1230	128.7859
3	-32.6696	129.8725
4	-32.1347	130.8535
5	-32.9481	132.0802
6	-33.3367	133.0347
7	-34.1043	133.5697
8	-34.6369	134.2292
9	-35.5695	135.3662
10	-35.9249	134.5571
11	-36.5478	133.9065
12	-36.9713	132.2303
13	-36.8416	131.1975
14	-36.5218	130.2549
15	-36.4748	129.2595
16	-36.5385	128.6959
17	-35.2580	128.0990
18	-34.7556	127.6739
19	-34.0386	128.4181

Description of the Proposed Activity

The seismic survey will map sub-surface geology via the acquisition of 2D seismic data to ascertain potential sub-surface oil and gas deposits of the survey area.

The survey will be undertaken by Bergen Oilfield Services (BOS) on behalf of GXT and will involve a specialised seismic survey vessel, the *M/V BOS Atlantic*, towing seismic equipment in a predetermined pattern within the survey area. The survey will be conducted 24 hours per day.

The seismic energy source will be provided by a single airgun array towed astern of the seismic survey vessel at a depth of approximately 8.5 m, which will be discharged at intervals of approximately 21 seconds. Seismic reflections from subsurface layers will be detected by hydrophones inside a 9,000 m long streamer, towed behind the seismic survey vessel at a depth of 9.5 m.

The survey intends to acquire seismic data from a total of approximately 6,378 line kilometers within the proposed survey area. The seismic survey will overlap with the Great Australian Bight (GAB) Marine Park in which 662 line kilometres will be acquired.

The survey is scheduled to commence in late March 2009 and is expected to take approximately 70 days to complete, all survey work will be completed by June 2009.

Description of the Receiving Environment

Physical Environment

The proposed survey area extends across the Bight Basin in water depths between 100m and 6,000m, overlapping three distinct bioregions: the Great Australian Bight Transition to the north, the Spencer Gulf Shelf Province to the north-east and the Southern Province to the south.

The Great Australian Bight Transition and Spencer Gulf Shelf Province are characterised by cool-water carbonate environments, composed of carbonate sediment, invertebrate skeletons and shells. The Southern Province is characterised by a long continental slope featuring deep canyons and mid-slope terraces (the Eyre and the Ceduna Terraces), extending further offshore is the Australian Abyssal Plain which is characterised by shallower depths and smoother benthic topography. There are no islands, shoals or charted reefs in the proposed survey area.

The region's climate is described as Mediterranean, with mild wet winters and hot dry summers. In summer the climate is influenced by high pressure systems moving from west to east generating northerly to north-westerly winds, while in winter, low pressure systems generate southerly to south-easterly winds and bring rainfall to the region.

Southern Australian waters experience a tidal cycle varying from normal semi-diurnal tidal variations at springs to almost no tidal movement at neaps. The swells are predominantly from the south-west, creating a high wave energy regime along the eastern coastline of the region.

Biological Environment

Some marine migratory species with broad distributions such as fish, sharks, marine turtles, seabirds and cetaceans may traverse the survey area, at least on occasion. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) lists 27 Migratory and 24 Threatened species that could occur in the area. The Threatened and Migratory species include:

- 17 species of bird, including several albatross and petrel species

- Great white shark
- Blue, sei, fin, southern right, humpback, Antarctic minke, Bryde's, killer, sperm and pygmy right whales, and dusky dolphin.
- Australian sea-lion
- Orange roughy

The Threatened and Migratory species listed above are considered to be wide spread throughout the region. The survey area and schedule also overlaps with an annual feeding ground for blue, fin and sei whales to the west of Kangaroo Island in which low to moderate numbers of these species may be encountered. There is also aggregating and breeding areas for southern right whales approximately 80 and 100 km north of the survey area respectively. However, the southern right whale is unlikely to be present at these locations during the survey period.

It is likely that several species of cetacean will be encountered during the seismic survey. The large cetaceans are likely to be concentrated in low to moderate numbers in the feeding area, whilst others may be found in low numbers spread widely across the survey area.

Benthic Assemblages

The benthic communities found within the survey area are described as rich and diverse, consisting of species typically found throughout the continental shelf of south-eastern Australia. Some warmer species such as echinoderms and hydroids also occur as a result of the influence of the Leeuwin Current. Benthic invertebrate communities on the continental shelf have been identified as some of the most diverse soft sediment ecosystems, comprising mainly sponges, ascidians and bryozoans. Generally species abundance has been recorded to decrease with distance from the coast.

Within the survey area, two ecologically sensitive areas have been identified: the Head of Bight, where some of the highest biomass and species richness of the region has been recorded, and, the upwelling zones to the south-west of Kangaroo Island, thought to be used as important spawning grounds for several commercial fish species.

There is limited information regarding the deeper environment of the continental slope and abyssal plain; however it has been recorded that species diversity and habitat diversity decreases with depth and distance from shore.

Socio-Economic Environment

The petroleum and production industry is a significant stakeholder in the region. Oil exploration activities in the Bight Basin commenced in the 1960's, with a number of wells drilled throughout the region. It is known that one other seismic survey is planned to be undertaken within the region, to investigate the potential for oil and gas resources in the Bight Basin.

The proposed survey area may be targeted for offshore mineral exploration. Several license applications have been lodged to mine, however, to date, no licenses are active.

The survey area overlaps with a number of fishing zones for both Commonwealth and State managed fisheries. The fisheries identified as have been active within the proposed seismic survey area in 2006 and 2007 are:

- Southern Bluefin Tuna Fishery,
- Southern and Eastern Scalefish and Shark Fishery,
- Skipjack Fishery, and
- Small Pelagic Fishery.

A Southern Bluefin Tuna Aerial Survey (SBT Aerial Survey) and the GAB Trawl Survey are conducted every year in this area and both surveys overlap with the seismic survey area.

Negotiations with the coordinators of these two surveys resulted in a delay to the start of seismic survey to avoid the period in which the SBT Aerial Survey is conducted and provision of a 100 km exclusion zone around the GAB Trawl Survey.

There is potential for recreational fishing vessels targeting tunas, striped marlin, snapper, Australian salmon and trevally to be found in the proposed area. Given the distance between survey lines from shore and main ports, the numbers encountered are expected to be very low.

Shipping occurs in the region, and shipping traffic between Albany and Port Lincoln and South Australian ports and Cape Leeuwin are likely to traverse the proposed survey area. However the traffic volume is assessed by Australian Marine Safety Authority (AMSA) to be light.

No features of cultural heritage importance were identified during the desktop study for the survey area or any area that may be affected by the seismic survey.

The survey area overlaps with part of the Great Australian Bight Marine Park (GAB Marine Park). The GAB Marine Park is made up of Commonwealth protected areas, consisting of a Marine Mammal Protection Zone (MMZ) and a Benthic Protection Zone (BPZ). These areas are designed to protect features of conservation significance occurring within the Park. A section of the GAB Marine Park is also located in State waters and combines a whale sanctuary and a marine national park.

An application to the Governor General was lodged on 28 January 2009 to request access to the GAB Marine Park to conduct seismic surveying activities. No seismic survey will be conducted within the GAB Marine Park until approval has been granted.

Major Environmental Hazards and Controls

All aspects of the survey have been subjected to risk analysis, which has been used to evaluate the potential environmental risks and effects, and characterize risk likelihood and severity. Table 2 summarises the risk analysis for the key aspects of the survey.

The risk analysis indicates that the risk of significant adverse environmental impact for the proposed survey is low and likely effects are limited to:

- Temporary and localized increase in ambient underwater noise levels as a result of acoustic discharge.
- Temporary and localized changes in water quality from routine discharges of grey water, sewage and putrescible wastes during the survey.
- Collision or entanglement with marine mammals.
- Interaction with fisheries surveys.
- Temporal displacement of commercial fisheries operations.

These sources of potential impact to the marine environment are however limited in duration, scale and intensity. Furthermore, the Standard Management Procedures from the EPBC Act Policy Statement 2.1 (DEWHA, 2008) and a Marine Fauna Observer (MFO) will be employed throughout the survey. In consultation with the coordinators of the SBT Aerial Survey and GAB Trawl Survey, avoidance measures were agreed to ensure there would be little or no effect on the two fisheries surveys. The ecological, social and economical consequences are therefore expected to be insignificant at both local and regional perspectives.

Management Approach

The environmental management approaches relevant to key aspects of the seismic acquisition program are summarised in Table 2. GXT's BightSPAN marine seismic survey will be conducted in accordance with all legislative and regulatory requirements, to the satisfaction of PIRSA. GXT's overall environmental objective for the program is to avoid or minimise environmental risks to as low as reasonably practicable (ALARP).

Table 2. Summary of Potential Major Environmental Risks and Management Approach

Hazard/ Incident	Potential Hazard Consequence	Risk and Management Approach
Acoustic impulse from airguns during seismic operations.	Physiological damage or disruption to behaviour patterns of sensitive marine fauna.	Low risk. Soft start would encourage animals to move away from the airgun array. Implementation of Standard Management Procedures and employment of MFO as set out in <i>Guidelines for Interactions Between Offshore Seismic Exploration and Whales</i> (DEWHA, 2008).
Collision with a cetacean	Injury or death	Low risk. Soft start and option of continued low power during turns. Sensitive animals are likely to avoid operating seismic vessel.
Grey water/ sewage disposal Waste disposal Solid wastes disposal	Adverse effects on marine life due to reduction of water quality (e.g., nutrient enrichment).	Low risk. Low volumes/high dispersion-dilution factor. Grey water / treated sewage only. Offshore discharge (>12 nautical miles from land) only. Biodegradable detergents only. No disposal within 25 km of the GAB Marine Park
Displacement of other users of marine environment	Potential disruption of commercial fishing/ shipping activity.	Low risk. Low levels of vessel and fishing activity and outside major navigation channels or fishing areas. Liaise with AMSA, AFMA fishermen and other commercial mariners to minimise conflict.
Interaction with fisheries surveys	Potential interference with fisheries surveys, through fish displacement or disturbance	Low risk. Start seismic survey after SBT Aerial Survey has been completed and adoption of 100 km exclusion zone from GAB Trawl Survey area.

Consultations

Consultation regarding the proposed seismic survey has been undertaken with relevant stakeholders, including:

- TunaWest
- South East Fishery Association
- South East Trawling Fishing Industry Council
- RecFish Australia
- Western Australia Department of Fisheries
- Wildcatch Fisheries SA
- Great Australian Bight Industry Association (GABIA)
- Australian Fisheries Management Authority (AFMA)
- Tuna Boat Owners Association/Australian Southern Bluefin Tuna Industry Association Ltd (ASBTIA)
- Australian Maritime Safety Authority (AMSA)
- Western Australia Fishing Industry Council (WAFIC)
- Commonwealth Fisheries Association (CFA)
- PIRSA Fisheries Division

- PIRSA Fisheries Council
- Raptis and Sons
- South Australian Fishing Industry Council (SAFIC)

These consultations have indicated that shipping traffic between South Australian ports and Cape Leeuwin passes through the survey area. However, the traffic volume is assessed by AMSA to be light, and therefore not considered a significant risk to seismic activities.

The area over which the survey is proposed is one within which there is existing petroleum activity. In the event that planned seismic lines overlap with existing petroleum related exclusion zones, GXT and BOS will operate according to its industry-compliant Close Pass procedures.

PIRSA requested that no discharges will occur from any vessel associated with the seismic survey within 25 km of the GAB Marine Park. This will include sewage, galley waste or bilge discharges. No vessel-to-vessel refueling, resupply or personnel changes will take place within 25 km of the Marine Park unless needed in an emergency.

Through consultation with AFMA, and GABIA GXT has agreed to observe a 100 km exclusion zone around the GAB Trawl Survey area while this fishery survey is being conducted. GXT has also agreed that the seismic survey should not commence before the end of March to avoid any conflict with the SBT Aerial Survey.

Further Details

For further information about the BightSPAN 2D marine seismic survey please, contact:

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