Permuted activities: Pre-activity notice

Form 1 of Schedule 5 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013

How to use this form: This form must be completed by organisations planning to carry out a permitted activity (except seismic surveying) in accordance with:

- regulation 5, 6 or 8 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013 (PA Regulations 2013); or
- regulation 7, 8 or 9 of the Exclusive Economic Zone and Continental Shelf (EnvironmentalEffects – Discharge and Dumping) Regulations 2015 (D&D Regulations 2015).

This form fulfills the pre-activity reporting requirements under regulation 11(a) of the PA Regulations 2013 and regulation 12(2) of the D&D Regulations 2015.

Timeframe: You must provide this form to the Environmental Protection Authority (EPA) no less than 40 working days before starting the activity.

Note: Items marked in italics are not compulsory; however, including this information will help the EPA process the form.

This completed form, once received and processed by the EPA, will be posted on the EPA website.

Submitting in hard copy: If you wish to provide the completed form in hard copy, post it to Environmental Protection Authority, Private Bag 63002, Wellington 6140 or fax it to +64 4 914 0433.

Submitting electronically: If you wish to provide the completed form electronically, email it to permitted.compliance@epa.govt.nz.

Any form submitted electronically should be attached to an email that sets out:
- the details of the person undertaking the permitted activity (the operator)
- the name of the person supplying the completed form
- a statement that the person is authorised to supply the form on behalf of the operator.

Note: The EPA has an 8 MB limit on electronic files submitted by email.

You can find and download all forms prescribed by the PA Regulations 2013 and the D&D Regulations 2015, as well as suggested templates for providing other information, on our website at www.epa.govt.nz or request them from us by contacting:

Environmental Protection Authority,
Private Bag 63002, Wellington 6140
Email permitted.compliance@epa.govt.nz
Phone +64 4 916 2426
Fax +64 4 914 0433

New Zealand Government

www.epa.govt.nz
**Operation name:** Sedimentation Effects

*Name used by operator to reference the activity described in this form:* Effects of sedimentation on benthic communities

**Details of person undertaking permitted activity**

<table>
<thead>
<tr>
<th>Name of company, organisation or person:</th>
<th>National Institute of Water and Atmospheric Research (NIWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person:</td>
<td></td>
</tr>
<tr>
<td>Phone number:</td>
<td></td>
</tr>
<tr>
<td><strong>Mobile number:</strong></td>
<td><strong>Fax number:</strong></td>
</tr>
<tr>
<td>Physical address:</td>
<td>Postcode:</td>
</tr>
<tr>
<td><strong>Postal address (if different):</strong></td>
<td>Postcode:</td>
</tr>
<tr>
<td>Email address:</td>
<td></td>
</tr>
</tbody>
</table>

**General description of permitted activity**

**Type of activity:**

- Marine scientific research
  - ☑ Alteration, extension or removal of a permitted marine structure
  - ☐ Discharge of sediments from iron sand prospecting and exploration
- Prospecting
  - ☐ Incidental discharge of sediments from phosphate nodule or placer gold prospecting and exploration
- Exploration
  - ☐ Discharge of sediments from seafloor massive sulphide prospecting and exploration
- Placement or removal of submarine cables
  - ☐ Discharge of sediments from iron sand prospecting and exploration

**Description of methods to be used to undertake the activity:**

The research survey is part of a 5-year research programme approved in late 2016 by the Ministry of Business, Innovation and Employment. The research is 100% government funded. The key objective is to determine impacts on, and recovery of, benthic communities from sedimentation caused by human activities in the deep sea. The primary focus of the study is on potential effects of seabed mining, but results will also have relevance for trawl fisheries.

This is the first of a series of surveys in a seabed disturbance experiment. A dredging-type operation over an area of up to 0.5 km² will generate a sediment plume 5-10m high, at seabed depths of 300-500m on the Chatham Rise. Benthic communities will be surveyed before disturbance, immediately afterwards, and then again 1 and 2 years later to monitor recovery and resilience of the seabed communities.

The equipment to be used on the survey comprises:

**“Benthic Disturber”**

The physical disturbance will be done with a specially designed "Benthic Disturber" (BD) which first fluidises the sediment, then...
pumps it through an exhaust outlet to create a plume in the water column. Below is an image of the equipment being refurbished for the survey in the USA prior to shipping to NZ. The gear was used in similar experiments in the 1990s by US, UK, Japanese and Indian research programmes investigating effects on manganese nodule communities on the abyssal plains in the central Pacific Ocean.

The BD is approximately 4.5m long, 2.4 m wide, and 3 m overall height (with a collapsible stability wing). It weighs about 2.5 t in air.

A pump at the front fluidises the sediment by injecting water, and the resulting slurry is pumped up and out of the central chimney. As the BD is towed slowly along the seafloor at about 1 knot, it creates a plume about 5-10m high, and the disturbance will penetrate about 10-15 cm into the seabed substrate. Coarse material is screened out and diverted away from the chimney intake.

There will be a trial of the BD at depth on the Chatham Rise during transit. This will be a very short deployment (around 1 hour) to test everything works.

Once at the experimental site, the BD will be deployed for a period up to 2-3 days at a time. We plan a single disturbance event, but this will depend upon the actual operation of the BD, and the characteristics of the plume it creates. If the currents are more variable than predicted by our models, it might be necessary to repeat the disturbance event a second time with a re-alignment of the instrumentation to measure the plume. The total area and volume of seafloor likely to be disturbed during a maximum of three deployments will be less than or equal to 0.6 km² and a maximum of 90,000 m³.

**Benthic Landers**

These are metal frames that carry scientific instruments to the seabed. They are not connected to the ship and are deployed on the seabed for periods of hours to weeks before being recovered. Each lander carries a ballast weight (30 cm diameter, total 100 kg weight in air) which is released via...
acoustic triggers at the end of the deployment, allowing the frame to float back to the surface for recovery. The ballast weights remain on the seabed. The landers are currently being built, but will be similar to the one in the image below. Their size is 1.5 m by 1.5 m, but each leg is separate, and not joined as in the image. Hence their frame footprint is small (~0.1m²).

We will deploy three Benthic Landers with a variety of instrumentation to measure currents, sedimentation rates, and characteristics of particles in the water. Instruments include an acoustic doppler current profiler, turbidity sensors, a camera and light, and a sediment trap to measure deposition.

The landers will be deployed over an area to cover the sediment plume gradient and measure the size, density and biochemical composition of the particles. They could be released on more than one occasion depending on the direction and rate of plume dispersal. We plan two deployment sequences, but also allow for a third in case of instrument failure or weather causing an additional recovery-deployment.

The possible three deployments of three benthic landers will result in a total frame footprint of 0.9 m². The ballast weight footprint will be ~0.7 m² with a total weight of 900 kg.

Multi-corer, or backup box-corer / gravity corer:

The multi-corer consists of a metal frame with a number of short 10 cm diameter core barrels and a coring weight assembly. The weights are triggered when the frame contacts the seabed, pressing the barrels down into the sediment. A single deployment of the multi-corer results in up to 8 sediment samples each of which can penetrate up to 40 cm into the seabed. These samples will be used to measure changes in sediment composition, and infaunal communities. The multi-corer will be deployed up to 50 times resulting in a total footprint and sediment volume of 3.2 m² and 1.3 m³.
A box-corer will be taken as back-up to the multicorer. If the substrate is too coarse for the finer tubes of the multicorer to penetrate the surface, the heavier box corer may perform better. The box is 0.5 by 0.5 m. The box corer is more difficult to deploy than the multicorer, and it is likely that fewer deployments would occur. However, as a maximum for any coring operation, assuming 50 box cores sampling at 0.5 m depth results in a total footprint of 12.50 m² and a volume of 6.25 m³.

Seamount sled or backup beam trawl
This is small epibenthic sled that is designed to be towed along the seafloor to sample benthic invertebrates. It is 1.5 m long, by 1.0 m wide, and has a vertical opening of 0.5 m. It is fitted with a positioning beacon, meaning we can target fauna of interest that we see in DTIS transects to collect live specimens. It is towed at 1-1.5 knots. It is designed to run over the seabed surface, and not dig in.
The sled will primarily be used to sample fauna to be kept in tanks onboard for transfer to aquaria facilities back at NIWA - in preparation for experimental work on sediment thresholds in the next year.

There may be up to 8 sled tows. Each will be targeted and sample about 150 m\(^2\) of seabed. In total, about 1,200 m\(^2\) of seafloor will be disturbed.

The beam trawl is a potential back-up to the seamount sled. It consists of a net attached to a 4 m wide beam that is towed slowly at 1.5 knots along about 300 m of seafloor to sample benthic invertebrate fauna and small fish. It would be used to sample fauna to be kept in tanks onboard for transfer to aquaria facilities back at NIWA - in preparation for experimental work on sediment thresholds in the next year. The larger trawl means fewer deployments than the sled. Allowing for up to 6 deployments, the total area covered would be 7,200 m\(^2\). The groundrope has small rubber discs that prevent it digging in to the sediment.

**Seabed moorings**

Three seabed moorings will be deployed to record up-stream currents and particles that will provide unimpacted reference for comparison with the benthic lander and other gear data. Three short moorings are necessary to carry the instrumentation which includes: sediment trap, nutrient sampler, turbidity, and acoustic doppler current profiler (ADCP). The moorings would be deployed at the start of the survey, and picked up several days before the end, serviced,
and then re-deployed to monitor sedimentation conditions over the next year, at which point they will be retrieved during the second survey in the project series. At present this is planned to be before July 2019. The moorings will each use ballast weights (railway wheels) of 0.5 m diameter and weighing 240 kg (two of the moorings with just a single weight, the other mooring with two weights) that will remain on the seafloor after the instrumentation has been recovered following acoustic release. The ADCP mooring will be 17 m high (extent above the seabed), the Water Sampler mooring 40 m high, and the Sediment Trap mooring 60 m high.

There will be two deployments of each of the three moorings, in total amounting to 1.2 m² and 1,920 kg of area and weight respectively.

**CTD bottle rosettes (not touching bottom):**

NIWAs CTD bottle rosette will be used to collect standard CTD (conductivity-temperature-depth) profiles (including O₂-concentrations, fluorescence and turbidity) and sample water at predefined depths down to within 10 m of the seafloor. The rosette contains up to 24 bottles, each with a volume of 10 L. This will be used for measuring the particle loads and composition, including ecotoxins, in the plume. CTD gear will not touch the seafloor.

**Glider (no seafloor contact)**

A glider is an autonomous underwater vehicle that does have an engine or propeller. It changes its buoyancy and its wings translate rising and sinking into horizontal motion, which allows continual sampling away from the ship for extended periods. It will measure an array of oceanographic parameters and carry a turbidity sensor to detect plume density. The glider will not touch the seafloor.
**“Acoustic” Towbody (no seafloor contact)**

A small acoustic towbody that is usually used for fisheries acoustics surveys will be fitted with a CTD unit and turbidity sensor. This will be towed at various depths and help track the plume in combination with other ship-board equipment such as the multibeam echosounder and hull-mounted acoustic doppler current profiler. The towbody will not contact the seafloor.

**Towed camera system (no seafloor contact)**

The NIWA “Deep-Towed-Imaging-System” (DTIS) is a deep-sea camera frame that is towed with the vessel at slow speed. It is kept at a height of 2-3 m above the seafloor while video and still camera imagery is collected over distances of up to 2 km. It also has a small CTD attached. This gear will be used to undertake baseline and monitoring surveys of the large animals (>2cm) that live on or just above the seafloor. This gear will not touch the seafloor.
Overall design concept

The above may seem a lot of equipment. The survey design has been developed taking into account some previous disturbance experiments (Jones et al. 2017). In order to help understand how it all fits together, the diagram below shows the main concept and components.

1) The moorings (blue dot) are deployed up-current of the area of disturbance to provide background flow data.

2) A baseline survey with DTIS, CTD and multicorer is carried out.

3) Benthic landers (red dots) are deployed pre-disturbance to then measure the plume deposition during and following disturbance.

4) The seafloor is disturbed over a compact area (blue square), creating a plume of fine sediment, that disperses down-current.

5) The vessel tows the acoustic towbody and its on-board instrumentation to track the plume, in perhaps a zig-zag fashion (blue symbol and line).

6) The glider also is programmed to work through the expected area of the plume to help detect and track it (yellow symbol and line).

7) Camera transects are run (thin rectangles) across the path of the expected plume distribution. Along the transect we carry out multicore deployments (black stars) to measure sediment characteristics and infaunal (burrowing) communities. CTD stations also sample water from various heights in the water column to measure particle density and composition in and around the plume. This sampling is done before disturbance, and up to twice afterwards.
Timing of permitted activity

<table>
<thead>
<tr>
<th>Proposed start date:</th>
<th>12/05/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate duration of activity:</td>
<td>30 days for main activity; Moorings will be picked up by July 2019.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timetable:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activities</strong></td>
<td><strong>Time (days)</strong></td>
</tr>
<tr>
<td>Mobilisation Wellington (8 May 2018)</td>
<td>1.5</td>
</tr>
<tr>
<td>Testing of some equipment operation n harbour or close</td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td>1.5</td>
</tr>
<tr>
<td>Testing of equipment at depth, and multiple gear deployment operation trials</td>
<td></td>
</tr>
<tr>
<td>Preliminary scoping</td>
<td>4</td>
</tr>
<tr>
<td>Establish site suitability</td>
<td></td>
</tr>
<tr>
<td>Complete tests and gear trials as required</td>
<td></td>
</tr>
<tr>
<td>Baseline survey</td>
<td>5</td>
</tr>
<tr>
<td>Deploy moorings, landers, glider</td>
<td></td>
</tr>
<tr>
<td>Baseline biological survey</td>
<td></td>
</tr>
<tr>
<td>Disturbance survey</td>
<td>8</td>
</tr>
<tr>
<td>Benthic Disturber operations</td>
<td></td>
</tr>
<tr>
<td>Mapping and monitoring plume</td>
<td></td>
</tr>
<tr>
<td>Biological survey</td>
<td></td>
</tr>
<tr>
<td>Monitoring survey</td>
<td>8</td>
</tr>
<tr>
<td>Recover mooring and landers</td>
<td></td>
</tr>
<tr>
<td>Second biological monitoring survey</td>
<td></td>
</tr>
<tr>
<td>Redeploy moorings</td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td>1</td>
</tr>
<tr>
<td>Transit to Wellington</td>
<td></td>
</tr>
<tr>
<td>Demobilisation Wellington (6 June 2018)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Location of permitted activity

**Co-ordinates of area where activity will be undertaken:**

(Please four sets of co-ordinates in latitude and longitude or submit a shape file or KML/KMZ file.)

- **Set 1**: 42°40.0’ S, 175°30.0’ E
- **Set 2**: 42°40.0’ S, 178°45.0’ W
- **Set 3**: 44°15.0’ S, 175°30.0’ E
- **Set 4**: 44°15.0’ S, 178°45.0’ W

☐ I have attached a shape or KML/KMZ file
Map:

(Provide a map that shows the location of your activity relative to the New Zealand coastline)

For simplicity the coordinates of the activity encompass both the testing area and survey areas. The larger area includes the region to the west where we envisage testing some equipment during transit (illustrated by the yellow dot). The region also provides latitude for exploring alternative sites if the chosen location proves unsuitable upon more detailed examination.

The yellow smaller box is the main core area we expect to undertake the disturbance experiment. It's size is 30 km by 20 km (600 km²), which should cover the distribution of the plume (based on hydrodynamic modelling). However, tidal flow as well as currents can complicate circulation on the Chatham Rise, and so this might need some flexibility.

The area of the Mid-Chatham Rise and Hikurangi Benthic Protection Areas (hatched lines) are included for reference.

Describe the current state of the area and the surrounding environment, including any known sensitive environments:

The Chatham Rise has been a major area of deep-sea trawl fisheries for several decades, in particular for hoki and orange roughy, but also hake, ling, scampi and a variety of other commercial species. In recent years a line fishery for ling has also developed. Hence the crest and upper slopes have been, or are currently, subject to considerable human activity. The central region of the Rise is also an area of commercial potential for phosphorite nodules, of interest for deep-sea mining. The Rise has been the focus of a large number of seafloor surveys studying variously; geology, biodiversity, minerals, and fish populations. For the area of interest for the present survey, notable amongst these are Ocean Survey 20/20 programme surveys, work carried out by Chatham Rock Phosphate, and a 2017 MPI-funded photographic survey of large areas of the Rise that had not previously been sampled.

The diverse habitats across the Chatham Rise, ranging from shallow banks on the crest to bathyal sediments at the base, open muddy sediments and sands, to rocky reefs, seamounts, and phosphorite nodule fields, support a wide range of benthic faunal assemblages (Nodder et al. 2012). Most of the rise crest at depths down to 500-600m consists of sediment substrates populated by mobile fauna, with conspicuous examples including scampi (Metanephrops challenger), squat lobsters (Munida gracilis), several crab species, quill worms...
(Hyalinoecia longibranchiata), urchins (Parametia peloria and other spatangids), and asteroids. Sediment cover is often thin and where underlying rock or phosphorite nodules are exposed, sponges, stylasterid hydrocorals, stony corals and other sessile suspension-feeding fauna occur. Most sessile fauna on the crest are relatively sparsely distributed and of small size, but large hexactinellid sponges (Hyalascus sp.), and thickets of the stony coral Goniocorella dumosa, are locally common in the centre and toward the western end of the rise.

At least two types of sensitive habitats are known to be present on Chatham Rise in the area and depths of our survey: coral thickets, and sponge ‘gardens’ (and it is also likely that sea pens may reach sensitive habitat densities in some places). Hexactinellid sponges (Hyalascus spp.) can be common, as can thickets of Goniocorella dumosa which may form unique communities in association with phosphorite nodules.

Describe the likely effects of the activity on the environment:

There will be mixed effects on the environment:

Monitoring survey
The CTD, towbody, glider, and camera systems will not touch the seafloor.

Ballast weight from lander and mooring deployments will remain on the seafloor. Ballast is metal (steel railway wagon wheels) and will in time corrode and dissolve in seawater. The chemical constituents of the metal ballast do not occur in quantities that will be toxic to the environment. The ballast for the moorings will be concentrated at one site, although the moorings will be spaced so as not to interfere with one another. Total footprint and weight of ballast weights used for three moorings over two deployments will be ~1.2 m² and 1,920 kg respectively.

Ballast from the landers (weightlifting type) will be more spread out, but retained within the anticipated footprint of the survey area (radius of about 10 km from the disturbance site). Across the three potential deployments (each with three landers), there will be a lander (leg and ballast) footprint of ~ 1.6 m², and a weight of 900 kg.

No gear from multi-corer sampling activities will remain on the seabed. The combined footprint and volume of all seabed sediment collected using the multicorer (50 stations) and allowing for 8 cores per deployment, will be at most 3.2 m² and about 1.3 m³ respectively. In the event that the box-corer is used as a backup, the footprint and volume would be 12.50 m² and 6.25 m³.

The seamount sled tows will each sample about 150 m² of seabed, with 8 tows resulting in ~1200 m². If a beam trawl is used in place of the sled, the footprint would be 7200 m².

The total footprint, weight, and volume of material removed from monitoring survey activities on the seafloor (assuming a maximum from alternative gear types) are ~7,215 m², 2,820 kg and 6.25 m³.

Disturbance operation
The main environmental impacts of this survey come from the operation of the Benthic Disturber. This equipment was developed in the 1990s (Brockett & Richards 1994), and has been used in similar research in the 1990s (Benthic Impact Experiment II (USA, 1993). Japan Deep-Sea Impact Experiment (Japan, 1994), Interoceanmetal Benthic Impact Experiment (international, 1995), Indian Deep-Sea Environmental Experiment (India, 1997)). Although the original set-up has been modified for deployment from RV Tangaroa, and the pump and control systems have been upgraded, the main frame and operational components are the same. Hence the design has proven performance specifications which minimises the risk of unexpected impacts. The BD will fluidise sediment down to about 10 cm depending on the substrate composition. This is then pumped up a 3 m high chimney and ejected as a plume up to a rate of about 7 m³ per minute. Coarse material (cobble, pebbles etc) is separated through an exit plate (like a trap door) and is not ejected through the chimney. Hence, the main physical impact is from the weight of the BD runners dragging along the seafloor, and the sediment fluidisation over the 2 m width of operation.

The final survey disturbance area will depend on the manoeuvrability of the BD-this is unknown as the system has only previously been used at abyssal plain depths, but it is expected to be able to be turned at 400-500 m depths when in operation. The plan at this stage is to retain the disturbance in a square/rectangle
of 0.5 km² or less. This will result in damage to all epifauna and infauna in the box (although tracks will not always overlap and so there will be some unaffected areas). However, we will avoid any areas of sensitive biological habitat or with significant faunal communities—our intention is to disturb areas of sediment physically, not biological communities.

The main impact is the “downstream” settling of the sediment. This will comprise smaller particles, as the heavy material will likely settle out relatively quickly, and be retained within the area of the disturbance box. The distance of dispersal of components of the plume will depend on the characteristics of the sediment at the particular site. Sediment plume modelling for the area (assuming sandy mud on the basis of NIWA sediment data) suggests a dispersal distance of about 10 km for heavier particles (silt) and up to 20 km for finer clay particles at a density of about 1 mg/L. Particle densities of 10 mg/L will settle out much more rapidly (several km), and densities of >10 mg/L are predicted to occur close to the disturbance area. Hence there will be a gradient of sediment thickness and grain size that the survey will measure. The effects of the sediment will range from complete burial of small animals close to the disturbance site, through to a light dusting of fine particles at the edge of the survey area. The resilience of various taxonomic groups to this gradient of sediment deposition is unknown, which is the reason for the survey. We are especially concerned with learning the responses over time with corals and sponges, which have documented behaviours of reducing respiration rates, producing mucus as a response, and closing polyps for an extended period. Hence the time series element of monitoring surveys is important, to measure both epifaunal and infaunal responses over several years.

The disturbance is unlikely to release any ecotoxic substances, although we will be monitoring these in both the sediment pore water and in the water column. We will not be breaking or grinding rocks, nodules or coarse sediment. Nothing is pumped up to the surface, and so the impact is retained close to the seafloor.

There is no bottom trawling activity near the proposed site, although demersal commercial fish species are generally widespread and may occur in the region. However, fish are typically highly mobile, and could move out of the area temporarily. However, because the plume will be short-lived over a confined area except for extremely fine particles, we believe fish are unlikely to be affected. Because the plume will be near the seabed, pelagic fish species and midwater zooplankton and mesopelagic fishes will likely be unaffected. Many commercial species, such as hoki, are bentopelagic feeders, with a wide prey base consisting of zooplankton in the water column as well as near the seabed. They do not typically feed on seafloor animals. Ling are more benthic feeders, but on mobile invertebrates, which like the fish will either tolerate fine sediment, or move away from the higher sedimentation areas for a time. Some fish species my benefit from infaunal animals exposed by the disturbance. The scale of disturbance, and the plume generated, is thought to be much smaller than the spatial scales of biological communities on the Rise.

The impact from the disturbance phase is, we believe, minor to moderate. Although it will be destructive over the area of the operation of the BD, we are not aware of species or faunal communities on the Chatham Rise that are localised in their distribution at the scale of this impact area. The site will be surveyed with photographic equipment and multicore samples before any disturbance. From the camera work we will be able to assess if there are sensitive communities within the area of physical disturbance, and also compare these with similar data taken during a Tangaroa survey in January 2017 (Bowden et al. 2017).

Please note that the research programme has an “End-user Advisory Group” which acts as a communication and engagement forum. Members are from the Department of Conservation, Ministry for Business, Innovation and Employment, Ministry for the Environment, Ministry for Primary Industries, STRATERRA, Chatham Rock Phosphate, and ECO (ENGO). At two meetings held to date, plans for the disturbance experiment were outlined to the Group, which was supportive of the project and the survey. Background information has also been sent to iwi (Moriori, Ngati Mutanga, and Ngai Tahu). Further discussions are planned with these groups, and Deepwater Group, in March-April.

The total disturbance footprint and volume of displaced sediment caused by the disturbance operation will be ~ up to 0.6 km² and 90,000 m³.

References:


**Other information**

<table>
<thead>
<tr>
<th>Name of the ship involved in the activity:</th>
<th>RV Tangaroa</th>
</tr>
</thead>
<tbody>
<tr>
<td>International call sign or vessel number of the ship:</td>
<td>ZMFR</td>
</tr>
<tr>
<td>Associated licence number (under the Continental Shelf Act 1964):</td>
<td>NA</td>
</tr>
<tr>
<td>Associated permit number (under the Crown Minerals Act 1991):</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Signature of authorised contact person**

Name: 
Title: 

**Date 13/03/2018**

**Note:** A signature is not required for electronic (email) forms.