Environmental Protection Authority
Te Mana Rauhī Taiao

FORM 3

Permitted activities: Initial environmental assessment and sensitive environments contingency plan

Form 3 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 marine scientific research, prospecting or exploration in accordance with regulation 5 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013 (PA Regulations 2013). This form fulfils the initial environmental assessment and contingency plan requirements of Schedule 2 of the PA Regulations 2013.
Timeframe: You must provide this form to the Environmental Protection Authority (EPA) at least 5 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 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.
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, 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

Operation name:

Name used by operator to reference the activity described in this form: **Deep-ocean Assessment and Reporting of Tsunami (DART) Buoy network**

Activity code: ***NIWPA48***

Code given to you by the EPA after submitting the pre-activity notice:

Details of the person undertaking the permitted activity

Name of company, organisation or person:	National Institute of Water and Atmospheric Research (NIWA)		
Contact person:	[redacted]		
Phone number:	[redacted]		
Mobile number:	[redacted]	**Fax number:**	
Physical address:	[redacted]	**Postcode:**	6021
Postal address *(if different)**:***	[redacted]	***Postcode:***	6241
Email address:	[redacted]		

General description of the permitted activity

Type of activity:

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

Describe methods to be used to undertake the activity:

New Zealand is establishing a tsunami monitoring and detection network to the north and east of New Zealand using Deep-ocean Assessment and Reporting of Tsunami (DART) Buoys as a tsunami generated near New Zealand could lead to significant loss of life in the event of little or no warning. Currently we rely on modelling the likely tsunami threats when significant undersea earthquakes in the Pacific Ocean are detected.

NIWA will be leading the deployment and maintenance of the DART Buoy network, on behalf of a group of government agencies led by the National Emergency Management Agency (NEMA) (previously Ministry of Civil Defence & Emergency Management (MCDEM)). This network is intended to provide timely, accurate detection and warning of tsunamis, for the protection of life and property of New Zealanders and our Pacific Island neighbours. Effective tsunami impact detection and forecasting critically relies on the availability of DART buoy data; without this data, tsunami generation is extremely difficult to confirm, in near real-time, before it reaches our coast. This is particularly critical for earthquakes originating from the Kermadec Trench.

The DART buoy network extends out into the Pacific and includes deployments in both international waters and Exclusive Economic Zones (EEZ). Five buoys lie within the New Zealand EEZ, and a sixth lies on the boundary of the EEZ and could potentially be moved into the NZ EEZ (Figure 1). Hence this application is for six DART buoys to be deployed in the NZ EEZ for an initial 10-year timeframe. The six DART buoys will be deployed in deep water (>1500 m).

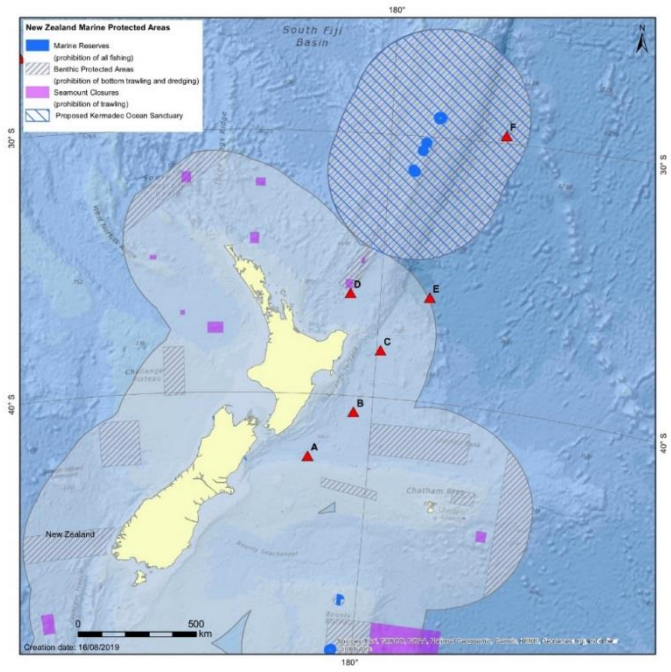

Figure 1: Proposed DART network in the New Zealand EEZ (red triangles).

Each DART buoy comprises a Bottom Pressure Recorder (BPR) and a bottom-moored Surface Buoy. The design of the moorings and associated equipment is considered to allow the maximum information on tsunami generation while minimising the effects of the deployments on the environment.

For each DART buoy a single BPR will be deployed on the seabed at the base of a low-profile vertical mooring (Figure 2). The foot print of each BPR is a steel plate of ~1.1 m^2 (0.9 m x 1.2 m).

At the end of each deployment, when BPR are turned over for servicing, an acoustic release will be activated, and the low-profile mooring will be recovered, leaving only the steel plate on the seabed.

In addition, each DART buoy has a proximal Surface Buoy which is moored separately by 2 anchors (via a slack mooring line) comprising stacked weights (railway wheels) (Figure 2). The foot print of each anchor weight is ~0.52 m^2, for a total of ~1.04 m^2 for each moored buoy.

At the end of each deployment, when Surface Buoy moorings are turned over for servicing, an acoustic release will be activated, and the buoy and mooring line will be recovered, leaving only the anchor weights on the seabed.

In the rare event that an acoustic release fails on the BPR, the BPR and low-profile vertical mooring will not be recovered. If an acoustic release fails on the bottom-moored Surface Buoy, the buoy will still be recovered and a ‘line cutter’ used to remove as much of the mooring line as possible. In either case this should not pose a hazard to navigation or significant threat in the water column or on the seabed.

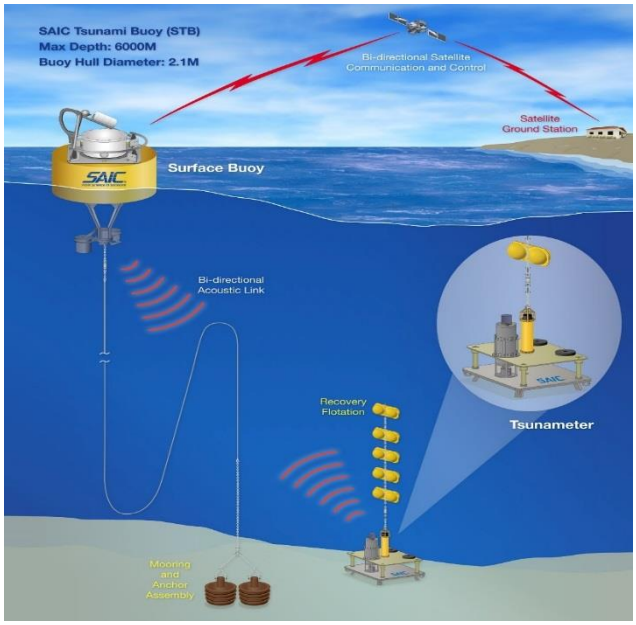

Figure 2. DART long-term monitoring buoy design

	We plan to deploy the DART buoys between December 2019 and May 2020, with each mooring being serviced every 2 years (on average). This means that each DART buoy will be deployed 5 times within the 10-year period.

Location of permitted activity

Co-ordinates of area where activity will be undertaken: The deployments will be conducted offshore East Coast, North Island proximal to the locations below (Figure 3). Specific locations of the proposed DART installations are detailed in Table 1.

Set 1	
Set 2	
Set 3	
Set 4	
☒	**I have attached a shape or KML/KMZ file to a previous form**

Map

(showing position of activity relative to the New Zealand coastline)

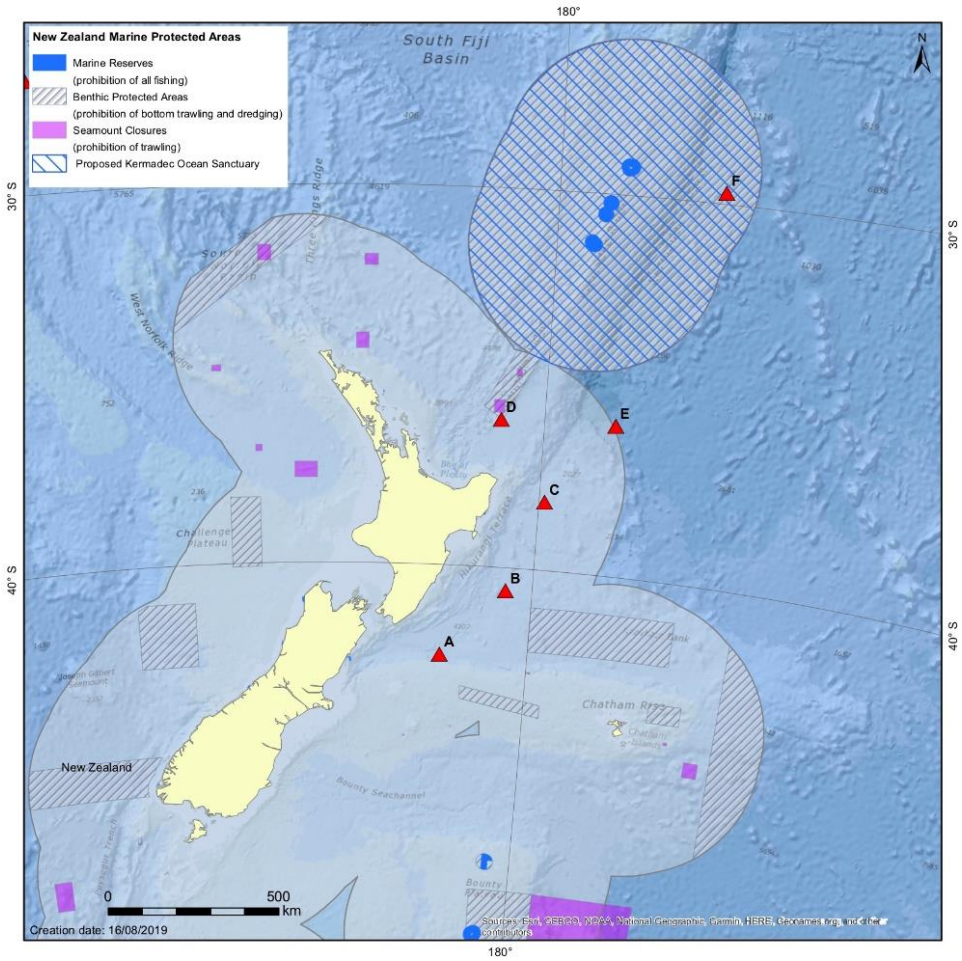

Figure 3: Proposed DART buoy deployment locations (red triangles) in deep (>1500m) water within the NZ EEZ and included within this application.

Table 1: Central point of the proposed sites for DART installations A-F.

DART Buoy Name	Longitude (deg E)			Latitude (deg S)		
	Dec Deg	Deg	Min	Dec Deg	Deg	Min
A	176.91	176	54.6	42.37	42	22
B	179.1	179	6	40.6	40	36
C	180.2	180	12	38.2	38	12
D	178.6	178	36	36.1	36	6
E	182.3	182	18	36.05	36	3
F	185.0	185	0	29.7	29	42

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

The offshore regions of New Zealand have been the focus of a number of mapping surveys, however given the vast nature of the EEZ the mapped areas are only approaching 20% of the region. However, where mapping has occurred NIWA has access to multibeam echosounder data which results in high-resolution bathymetry data (i.e. the depth and nature of the seafloor). The proposed locations of the DART buoy network are all deep-water sites (>1500m) on the seabed of the outer continental slope and abyssal plain. The seabed of these low gradient, flat regions is predominately muddy sand and mud. Bisecting, or outcropping on, these flat regions are channels and seamounts which usually are hard substrates including outcropping rock, discrete boulders, pebbles and biogenic substrates.

If environmental conditions are suitable benthic fauna, of which certain species may occur in densities that are considered 'sensitive environments', are commonly associated with the hard substrates of channels and seamounts. There have been very few biological samples taken from the deep-water outer continental slope and abyssal plain for scientific purposes. Of the few taxonomic records of invertebrates from stations proximal to the proposed locations, records indicate fauna present often comprise Cnidaria, Arthropoda, Echinodermata, Mollusca and Annelida.

Due to the above, as well as the need for the DART network locations to be conducive to longevity and protection of the buoys and appropriate for recording of tsunami generation by the BPR they are proposed to be located as outlined below (also see Figure 4). The deployment sites encompass a 10-nautical mile proximity (radius) from a central point, with the deployment locations within each site determined during each deployment and service retrieval. Additional multibeam echosounder data will collected as required prior to the first deployment at each site.

- Site A is located north of the Hikurangi Channel away from the associated hard substrates and the sediment movement and over bank deposits associated with the channel;
- Site B is located on flat abyssal seafloor offshore Hawke Bay;
- Site C is located on flat abyssal seafloor offshore East Cape;
- Site D is located on flat abyssal seafloor offshore Bay of Plenty;
- Site E is located on flat abyssal seafloor east of the Kermadec Trench (this site is at present outside of the EEZ but may move west to inside the EEZ);
- Site F is located on flat abyssal seafloor, avoiding rugged terrain and seamounts, east of the Kermadec Trench and west of the Louisville Ridge seamount chain.

The DART buoy sites are not located within Marine Reserves, seamount closure areas, or benthic protected areas (Figure 3), aside from Site F. Site F is located within the Kermadec Benthic Protected Area (area protected against dredging and bottom trawling) and the proposed Kermadec Ocean Sanctuary.

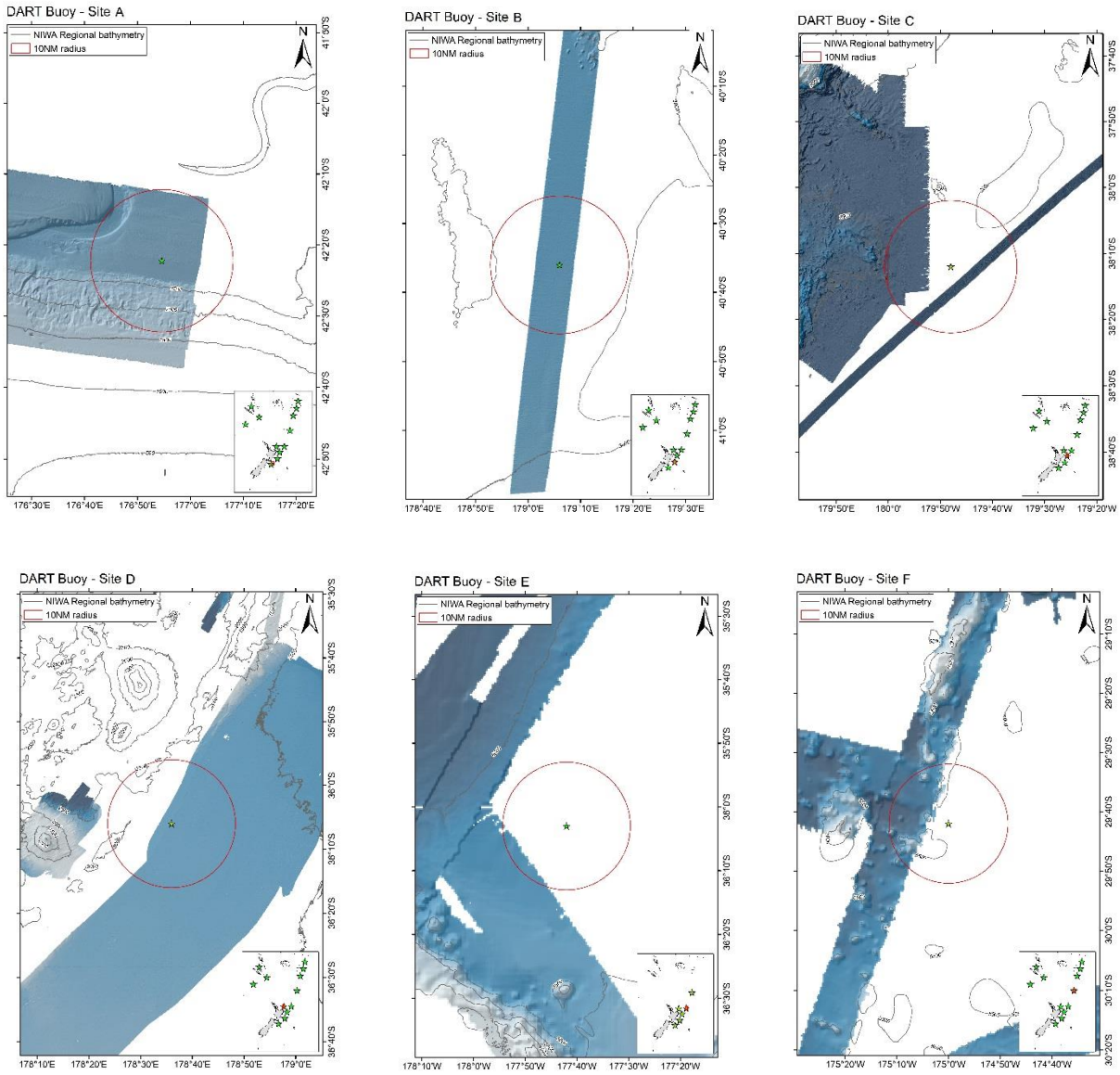

Figure 4: Proposed sites with 10 nautical mile (18.5 km) radius (red circle) for location of DART buoys within NZ EEZ illustrated on available high-resolution bathymetry data (white - shallow, dark blue - deep). The central point of each site is also illustrated (green star).

Describe the likely effects of the activity on the environment:

The only long-term impact will be the mooring weights and steel plates, which remain on the seabed.

The foot print of each set of mooring anchors is ~1.04m^2. The combined footprint on the seabed for six moorings in NZs EEZ is 6.24 m^2. With an anticipated 5 deployments and servicing recoveries over 10 years resulting in a footprint of 31.2 m^2.

The foot print of each BPR plate is ~1.1 m^2. The combined footprint on the seabed for six moorings in NZs EEZ is 6.6 m^2. With an anticipated 5 deployments and servicing recoveries over 10 years resulting in a footprint of 33 m^2.

In summary the combined 10-year effect of the activity is anticipated to be 64.2 m^2. Previous experience has suggested that mooring weights and hard substrate like steel plates may provide settlement habitat for benthic invertebrates.

Identification of sensitive environments

Describe any sensitive environments likely to exist in the area where the activity will be undertaken:

The DART buoy sites are not located within Marine Reserves, seamount closure areas, or benthic protected areas (Figure 3), aside from Site F. Site F is located within the Kermadec Benthic Protected Area (area protected against dredging and bottom trawling) and the proposed Kermadec Ocean Sanctuary.

The proposed locations of the DART buoy network are all deep-water sites (>1500m) on the seabed of the outer continental slope and abyssal plain. If environmental conditions are suitable benthic fauna, of which certain species may occur in densities that are considered 'sensitive environments', are commonly associated with the hard substrates of channels and seamounts. There have been very few biological samples taken from the deep-water outer continental slope and abyssal plain for scientific purposes. The few taxonomic records of invertebrates from stations proximal to the proposed locations, indicate fauna present often comprise Cnidaria, Arthropoda, Echinodermata, Mollusca and Annelida.

The DART network locations need to be conducive to longevity and protection of the buoys and appropriate for recording of tsunami generation by the BPR. They are therefore located on flat seabed of the outer continental slope and abyssal plain and not on the hard substrates of channels and seamounts which, if environmental conditions are suitable, certain species may occur in densities that are considered 'sensitive environments'.

Contingency plan

Specify measures that could be taken to avoid, remedy or mitigate the adverse effects of the activity on sensitive environments:

a) Can the activity be undertaken in another place?	☐Yes ☒No **Explain:** The DART network locations need to be conducive to longevity and protection of the buoys and appropriate for recording of tsunami generation by the BPR.
b) Can the activity be undertaken in a way that reduces the amount of contact with the seabed?	☐Yes ☒No **Explain:** Moorings have been designed such that the only long-term impact will be the mooring weights and steel plates, which remain on the seabed. This includes the use of acoustic releases to recover the low-profile moorings associated with the BPR, as well as recovery of the buoys and mooring lines associated with the Surface Buoy moorings.
c) Can different methods be used in undertaking the activity to lessen its effects on the sensitive environment?	☐Yes ☒ No **Explain:** The DART network buoys need to be appropriate for recording of tsunami generation. The deployment locations within each site will be determined during each deployment and service retrieval. Additional multibeam echosounder data will collected, as required, prior to the first deployment at each site thus ensuring location on flat seafloor, avoiding locations commonly associated with 'sensitive environments'. In addition, moorings have been designed such that the only long-term impact will be the mooring weights and steel plates, which remain on the seabed. This

	includes the use of acoustic releases to recover the low-profile moorings associated with the BPR, as well as recovery of the buoys and mooring lines associated with the Surface Buoy moorings. Previous experience has suggested that mooring weights and hard substrate like steel plates may provide settlement habitat for benthic invertebrates.
d) Can the activity be undertaken in a way that lessens its effects on the sensitive environment?	☐Yes ☒No **Explain:** The DART network buoys need to be appropriate for recording of tsunami generation. The deployment locations within each site will be determined during each deployment and service retrieval. Additional multibeam echosounder data will collected, as required, prior to the first deployment at each site thus ensuring location on flat seafloor, avoiding locations commonly associated with 'sensitive environments'.

Signature of authorised contact person **Date 03/12/2019**

Name: [redacted]

Title: General Manager - Operations

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