

## **ANNEX 4**

### **Sensitive Site and Coastal Information**

In order to give priority to the ecological sites in the region that have values worth particular protection, it is wise to know the potential threats from oil spill risk in the region. This Annex identifies the risk potential and the significant ecological sites for protection both within the Port/city confines and along the region's coastline.

#### **Risk potential**

The Taranaki region is the home of the New Zealand oil and gas industry and has thirteen onshore production facilities and five offshore facilities. The offshore Pohokura field is within the 12 nm limit and has onshore processing facilities. As such the risk of an oil spill from the industry is increased and the industry, Maritime New Zealand and the Council need to work co-operatively towards addressing the risk.

The five offshore facilities are:

- Kupe
- Maari
- Maui (1 and 2)
- Pohokura
- Tui

There is the potential for a spillage of 150 tonnes of oil or oil product within the Port and adjacent area, if a major breakdown of loading equipment occurs and emergency procedures commence. Other sources of spills are:

- Shipping - collision, grounding;
- Discharges from:
  - tank farms to Hongi Hongi or Herekawe streams
  - New Plymouth Power Station to sea;
- Newton King tanker terminal loading failure;
- Port area bunkering failure;
- Onshore pipeline failure;
- Off shore pipeline failure;
- Off shore production facilities;
- Earthquake;
- Tsunami; and
- Terrorism.

The magnitude of the spills from these other sources, with the exception of collision, is likely to be less than 150 tonnes.

Information in the next sections (A, B, C and D) is drawn from the contingency plans of oil and gas companies operating in the coastal environment. It is provided to complement the Council's contingency plan and identifies:

- Production facilities characteristics;
- Spill potential and risks;
- Sources and causes of spills;

- Spill prevention measures;
- Potential hydrocarbon spills;
- Spill consequences and priorities;
- Modelling of off-shore oil spills;
- Weathering of oil on shorelines; and
- Potential consequences of oil spills.

Information is then presented on the threat to sites within the harbour limits of Port Taranaki (Section E).

Finally, information drawn from the Department of Conservation Coastal Inventory showing sensitive coastal sites and preferred oil spill response methods is presented (Section F).

## New Zealand Offshore Oil Production



## Spill potentials and risks

This section of the plan outlines the three key areas of information needed in assessing risk:

- A description of the operations identifies the location of possible spills, types of substance which could be spilt, potential volumes and possible causes.
- The potential sea and weather conditions are summarised with an explanation of how these affect the movement and persistence of spills.
- A brief outline is given of the environment and the species which are potentially vulnerable to spills. Human uses of the areas which may be affected by spills are also described.

## Risk

A good understanding of spill risks is integral to the prevention of spills. In spill plans, risk can be described as the probability of a spill multiplied by the consequences. This approach allows an improbable event with massive consequences to be equated to a common event with minor consequences. This approach is simplistic and a better way to assess the risk is to consider the following components:

- Probability of potential causes of oil spills;
- Probability of exposure to undesirable consequences;
- Probability of factors affecting severity;

This can be summarised as:

Probability of hazard	Probability of factors affecting severity	Probability of exposure
$\text{Risk} = \sum_N \{ \text{Pr}(\text{Event})_i \times (\text{Pr}(\text{Outcome})_i \times \text{Pr}(\text{Exposure}_i)) \}_{ i=1 \text{ to } N}$		

*The spill risk from the Pohokura offshore platform is the sum of all (i=1 to N) hypothetical spill scenarios (size of spill, type of substance, cause of spill, metocean conditions) and their potential effects (pathways, receptors). One of these risk scenarios may be the probability of an event which causes a 200 litre hydraulic oil drum to be dropped from the platform, helicopter or support vessel, times the probability of the sea and weather conditions moving the oil towards the coast and shoreline, times the probability of shore birds being present where the oil impacts the shoreline at the time of impact. The probability of presence of the shore birds may be affected by the time of year, time of day, weather conditions etc.*

## Factors affecting likelihood of a spill

Factors which can increase the probability of a spill occurring, for example:

- Age and condition of installations, pipelines and equipment.
- Frequency of maintenance and inspections.
- Impact of weather conditions, particularly on boat operations. Bad weather may lead to accidents or damage e.g. vessel groundings or collisions, equipment failure, loss of drums overboard.
- Unfamiliarity with safety procedures amongst new or inexperienced personnel.
- Lack of leak monitoring or detection systems.

- High traffic volumes.
- High intensity or complexity of operational activities.

The following are examples of potential spill causes from hydrocarbon Exploration & Production activities.

▪ Loss of well control	▪ Fabrication defect or construction fault
▪ Production incident	▪ Clamp failure
▪ Fire or explosion	▪ Brittle fracture
▪ Overpressure	▪ Weld defect
▪ Accidental loss/dropped container	▪ Thermal expansion
▪ Procedural error during pigging	▪ Flange, joint, valve, gasket or seal failure
▪ Vessel collision or grounding	▪ Maintenance fault or error
▪ Dragged/dropped anchors, trawler nets or boards	▪ Tanker accident or roll over
▪ Mooring failure causes hose rupture during oil transfer (due to wind, swell or ship incident)	▪ Unauthorised discharge (e.g. pumping contaminated bilge water overboard)
▪ Overfilling of tanks	▪ Damage from falling object
▪ Physical or bacterial internal corrosion	▪ Subsidence
▪ External erosion or corrosion	▪ Seismic event
▪ External interference e.g. vandalism, sabotage, theft	▪ Lightning

### Spill prevention measures

Oil companies are committed to safety in all aspects of their operations. Particular attention is paid to spill prevention at the design and build stage, and also in the management and operation of ships, sites, installations, pipelines and other facilities. The best spill contingency planning revolves around PREVENTION – preventing spills from occurring in the first instance through design, storage and handling, product substitution, and training. Key factors in oil companies approach to spill prevention include:

- Compliance with regional regulations and national legislation.
- Adoption of industry best practice to prevent spills during production, transfer, storage and handling of all hydrocarbons and chemicals.
- Provision of safety systems, e.g. permit to work system, and appropriate safety training for all personnel.
- Regular maintenance, audits, inspections and feedback for performance improvement.
- Analysis and follow up on incidents and near misses to improve systems and procedures.
- Safety systems have been designed to prevent and recover from a potential accident such as fire or loss of containment.
- Safety objectives are achieved through the following design characteristics:
- Provision of self acting mechanical devices or systems, e.g. relief valves, block valves.

- Automatic sensing of abnormal operational or equipment condition and provision of audible and visual alarms to the operator and facility personnel.
- Automatic reaction to any abnormal condition by shutting down and/or isolating and, where appropriate depressurising the installation.
- Providing additional manual facilities for shutdown and/or isolation and depressurising the installation.
- Monitoring of potential sources of hazard and elimination of potential sources of ignition.
- Providing systems that can be tested without loss of production.
- Separation of stormwater and hazardous drainage.
- Contained hazardous drainage systems.
- Oily water treatment systems.
- Construction of bunds and walls to ensure containment of tank/vessel volumes in the event of total loss of the oil or chemical.
- Wherever practical, safety equipment is designed to be "fail safe", and where appropriate, systems are duplicated to allow for component failure.

### **Worst case spills**

The term 'worst case' is typically used to describe the worst possible outcome in terms of the volume of oil released as a result of an incident. So for example if a lube oil drum is punctured then the worst-case volume would be 220 litres. 'Worst case' is also used to describe the weather and sea conditions that will result in a spill reaching the coastline in the shortest possible time. This is an important concept for oil spill response planning as it provides a basis for deciding on response strategies, location of response equipment, response time limits etc.

## **Spill Consequences and Priorities**

### **Weathering and movement of spills**

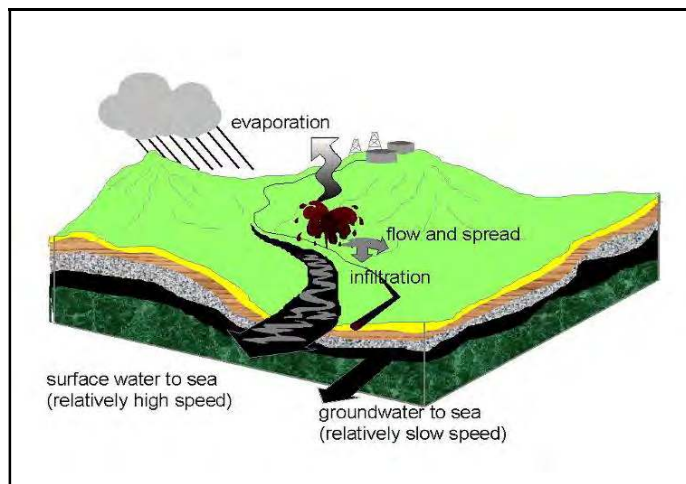
This section focuses on the weathering and movement of hydrocarbon spills. Most chemicals that are non-oil based are soluble in water; therefore this section is not relevant to the non-hydrocarbon based chemicals. Refer to the MSDS for more information on the solubility of the spilled product in water. This solubility factor is one of the reasons chemical spill responses are difficult, or impossible to undertake. If a hazardous substance contaminates a water source a long term programme of remediation or chemical treatment may be required. Properties of oils change after a spill due to weathering, and the effects of weathering directly influence the choice of response methods and equipment.

### **Onshore spills**

The fate of hydrocarbons onshore depends on the weather and the various surfaces and substrates, such as:

- Impermeable surface
  - Evaporation will commence immediately.
  - Oil will flow and spread freely.
- Permeable Surface
  - Oil, particularly low viscosity oils such as condensate and diesel, will rapidly soak into permeable soil. However once the oil is in the soil it will move slowly.
  - Oil infiltrates horizontally and vertically and may eventually reach ground water.
- Surface Water
  - If oil finds its way to surface water it will spread quickly, and once in a stream or river will flow downstream at the same speed as the current.

Fate of hydrocarbons onshore



## Offshore spills

The fate of oil spills in the marine environment depends on a variety of factors, in particular:

- Physical and chemical characteristics of the oil (in particular: viscosity, specific gravity, pour point, wax content, asphaltene content)
- Wind speed
- Water temperature
- Direction and speed of current
- Tides
- Location of the spill
- Whether the release is ongoing or instantaneous

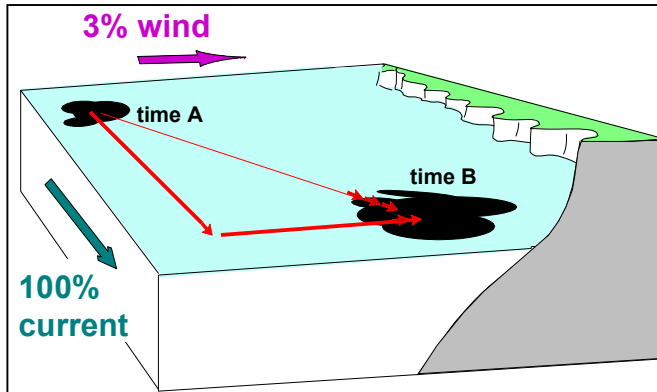
Oils at sea are acted upon by a number of physical and chemical processes. The most important processes for oil spill response are drift, spreading, evaporation, physical dispersion and emulsification.

## Weathering processes on oil - offshore

### Drift

Drifting is lateral transport of the oil due to the driving force of winds and currents, and is the primary concern for response. Oil typically moves at 3% of the wind speed and 100% of the current speed.

Physical movement of surface oil



### Spread

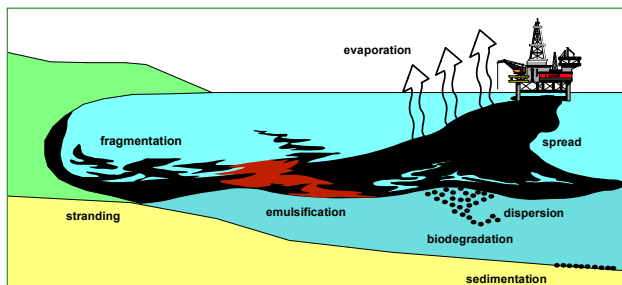
Spreading is the expansion of oil on the sea surface due to positive buoyancy, surface tension and diffusion. Generally the lower the viscosity of the oil the faster the spread. Condensate and diesel will spread rapidly so the slick is no thicker than 0.0003mm within an hour. At this stage it may be visible as a rainbow or silver coloured sheen, but surface water conditions and light conditions may make it almost impossible to spot. Oils with a pour point higher than the ambient water temperature will solidify as their temperature reaches the ambient level.

### Evaporation

Evaporation is a physical-chemical process resulting in mass transfer of hydrocarbons from the sea surface to the atmosphere. The rate of evaporation increases as wind speed increases. Oils with a lower specific gravity and lower viscosity, such as diesel and condensate, evaporate quickly.

### Emulsification/mousse formation

Formation of 'water in oil' emulsions can occur with some oils resulting in increased volume



and viscosity. The resulting emulsion is sometimes called a 'mousse'. Oils with a high asphaltene content are likely to form emulsions, and emulsions will form more quickly as wind speed and waves increase. Results of testing by the Cawthron Institute in April 2004 show no indication of Maui and Pohokura condensate forming water in oil emulsions. Diesel does not form a water in oil emulsion.

### **Entrainment/dispersion**

Dispersion and entrainment occur when oil is transported from the sea surface into the water column due to breaking waves. Light, low viscosity oils such as diesel and condensate will tend to disperse naturally in windy conditions.

### **Submergence/sinking/sedimentation**

Oils increase in viscosity as they weather, and as they move they may come into contact with suspended sediments or organic material. When oil or oily material exceeds the specific gravity of seawater it will submerge and may sink to the sea floor. The submerged oil may sediment, or could form tar balls which may be transported by underwater currents.

### **Shoreline interaction/stranding**

When oils reach the shoreline they will strand and are subject to transformation depending on the shoreline material, wave action and tides.

### **Dissolution**

Dissolution is a physical-chemical process resulting in mass transfer of hydrocarbons from oil slick or oil droplets into the water column. Oils are generally dissoluble and only a very small amount of a spill will be lost through this process.

### **Photo-oxidation/photolysis**

Photo-oxidation of petroleum hydrocarbons occurs through interaction with sunlight. This is a very minor and slow process.

### **Biodegradation**

Biodegradation is a slow biological-chemical process which transforms petroleum hydrocarbons through the action of microbial populations and/or the ingestion or retention by macro-organisms.

### **Weathering of utility oils in the sea**

With an offshore operation there is always the risk of a spill of utility oils. The following information is a summary of potential oil types:

### **Avgas and diesel**

Avgas/Jet (aviation fuel) is extremely volatile oil that will spread and evaporate rapidly. Expect a large spread of sheen. There will be no emulsion and very little natural dispersion.



Diesel is a very low viscosity distillate fuel, which easily evaporates in warm conditions. Evaporation times of less than 4 hours are not uncommon. Diesel will spread rapidly and form a very thin slick.

ADIOS weathering predictions assuming water temperature = 18°C and wind speed = 5 knots are:

- Avgas: rapid sheen, 88% evaporated in 8 hrs
- Diesel: rapid sheen, 65% evaporated in 8 hrs

### **Lubricating oil**

Lubricating oils are medium to heavy oils. Expect limited spread and minimal loss through evaporation and natural dispersion. They vary in viscosity but generally have a high capacity to take up water. Consequently, emulsification of these oils can be very rapid at sea and the resulting emulsions can be highly stable. These oils are persistent and may significantly increase in volume due to the emulsification process, however spills are unlikely to involve significant volumes unless an entire container is damaged and lost to the sea.

### **Hydraulic oil**

Hydraulic oil is relatively viscous and is not easily assimilated by the environment. Expect limited spread and minimal loss through evaporation and natural dispersion. The action of mixing energy is likely to produce a frothy emulsion.

### **Heavy fuel oil**

Heavy fuel oil (HFO), varies in composition but are generally persistent, viscous and may form emulsions at sea. The time and energy required for the formation of emulsions is variable. Due to their high pour points, HFO will be highly viscous even at summer sea temperatures, and this will slow the spread of the oil and also slow the formation of emulsions. Evaporation rates are also expected to be low.

## Consequences and Priorities

### Modelling of offshore oil spills

#### Weathering models

The most widely used tool for evaluating the weathering of different oils under varying weather conditions is called ADIOS. ADIOS software was developed by the Hazardous Material Response Division of NOS (National Ocean Service), which is part of NOAA (National Oceanic and Atmospheric Administration). ADIOS uses mathematical equations and oil property information to predict changes over time in the density, viscosity, and water content of an oil or product, the rates at which it evaporates from the sea surface and disperses into the water, and the rate at which an oil-in-water emulsion may form.

#### Stochastic models

In the planning and preparation stage, before an oil spill occurs, it is possible to use computer software to predict the possible range of movement and weathering of oils based on the typical weather and sea conditions. These are known as 'stochastic' models. Stochastic modelling considers a variety of hypothetical oil spill scenarios and then calculates the weathering and transport of oil spills under typical climate variations in the Maui and Pohokura areas. The output of the stochastic modelling shows the maximum possible extent of oil coverage. This is presented in the form of maps which show the probability of the spill reaching particular areas within specific time periods. The maps consequently indicate the boundaries of spill zones, and are useful for specialists involved in oil spill response planning.

#### Trajectory models

Following the report of a marine oil spill the Response Coordinator can request a computer trajectory model to forecast the movement and weathering of the oil. The same computer software used for trajectory modelling can also be used to 'backtrack' spills. In other words if the location of an oil slick is known but the source is not, it is possible to calculate where the spill may have come from. The output of trajectory modelling varies according to the volume of oil spilt, the oil type, weather conditions, sea temperature, tide and current. Output includes:

- A map showing the predicted movement and location of the oil slick at specified intervals, usually hourly
- The volume of oil predicted to strand on the shoreline
- Percentage evaporation and rate of natural dispersion of the oil over time
- Change in oil viscosity and density over time
- After what time the oil may form a water in oil emulsion, and rate of increase in water content.

## **Weathering of oils on shorelines**

Characteristics of shorelines affecting the degree of weathering and persistence of an oil spill include:

- Degree of exposure to wave energy
- Shape of the beach
- Sediment type

### **Wave energy**

The Taranaki coast is characterised by high energy 'exposed' shorelines. These shorelines recover naturally and more quickly from an oil spill than a sheltered shoreline. If the oil is deposited during a storm it may be covered by a layer of sand. Buried layers of oil or oily sediment will weather slowly and may be remobilised and deposited elsewhere during a later storm.

Low energy 'sheltered' shorelines such as river estuaries and the lee side of islands tend to be slower to recover naturally from an oil spill. Sheltered areas are more likely to have a high diversity and abundance of invertebrates and higher populations of vulnerable organisms and juveniles. Oil is likely to remain on a sheltered shoreline for longer periods than exposed shorelines.

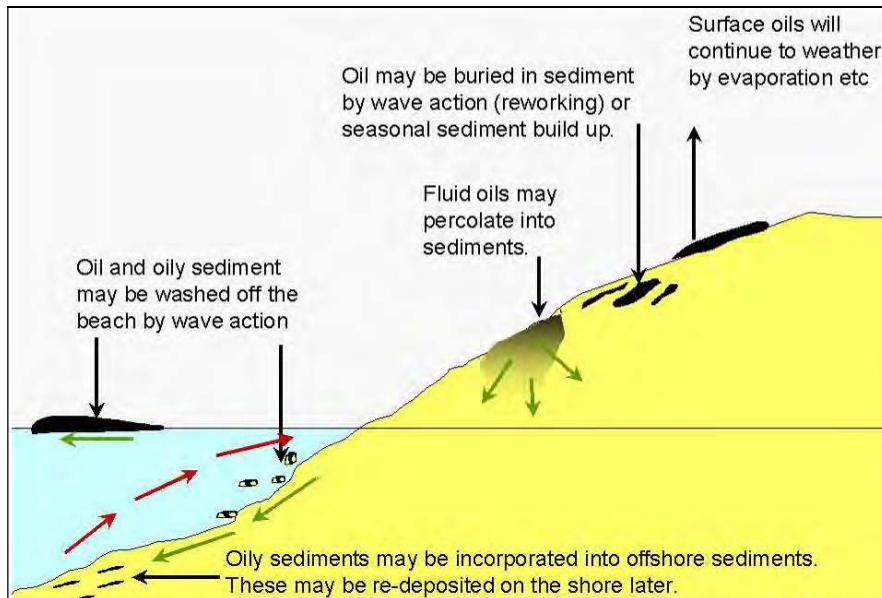
### **Steepness and shape of the beach**

Oil may settle on sediment flats, but get washed off steep beach slopes. However, if oil gets carried up over a high tide berm, it may remain there until it is physically removed.

### **Sediment type**

Oil can penetrate deeper into coarse open sediments, but is less likely to adhere to firm fine sands. Light toxic oils can penetrate deep into coarse sandy sediments and can cause high mortality of invertebrates. Heavier oils such as ship bunker fuel may not penetrate so easily, but if they do become incorporated with sediments they can form thick asphalt pavements with very long residence times.

## Behaviour of oil on shorelines



The shorelines and sediment types vary along the Taranaki shoreline. For specialist assistance in determining the shore and sediment type and determining if they will influence the spill containment, clean-up and recovery efforts, contact the Taranaki Regional Council who have specialists in marine ecology, botany, and habitat restoration. The above figure highlights the behaviour of oil on shorelines, while the figure below is taken from the Regional Coastal Plan showing the designated Coastal Management Areas along the Taranaki Coastline.

## Potential consequences of hydrocarbon spills

The potential consequences of an oil spill vary mainly due to the type and volume of the oil spilt, and its proximity to

- People – particularly if there is any risk of fire or explosion.
- Human activities – for example, water sports, aquaculture, fishing, port operations.
- Vulnerable species and sensitive environments, which typically exist in sheltered areas of shoreline and estuaries.

Measures to ensure safety, to contain the spill, and to prevent oil reaching sensitive areas are therefore key to limiting the potential consequences.

## Oil types

Heavy viscous oils will remain in the environment for a longer time than light oils or condensate. Viscous residues from oil spills may persist for many weeks and are often difficult to clean up and can smother organisms. Lighter oils typically evaporate rapidly and disperse into the environment relatively quickly. However, they often contain a high percentage of toxic components.

## Potential environmental impacts

The main environmental impacts associated with oil spills are:

- Destruction of aquatic/marine species; and/or
- Destabilisation of aquatic/marine communities and ecosystems;
- Degradation of shoreline; and
- Contamination of soil and surface water.

Aquatic/marine communities have variable tolerance to oil spills. For example plankton are known to be relatively tolerant whilst marine mammals are very intolerant. Birds and mammals suffer the most acute impacts from floating oil. Physical contamination and smothering are the primary causes of morbidity in birds and mammals following an oil spill. Further causes of morbidity are reduction in thermal capability, and direct toxicity from fumes and ingestion.

Ecosystems such as estuaries, wetlands and mud flats are known to be extremely sensitive to contamination by oil, and the presence of contamination in these areas is likely to be more persistent than in areas due to sedimentation of oil or adhesion to vegetation which is then released slowly over time resulting in a chronic effect on flora and fauna in the area.

- The long term environmental impacts are difficult to measure but are likely to include:
  - Sub-lethal and chronic ecological impacts.
  - Continued leaching of oil that has penetrated deeply into beach surfaces.
  - Continued presence of weathered remnants of oil.
  - On-going contamination of shell fish beds.
  - Slow recovery of filter feeders such as shrimp and bivalves.

A further potential impact is the entry of contaminants into the food chain. This can be both a short term and a long-term impact. With the slow release of contaminants over time the potential for sub-lethal chronic impacts on the receiving environment are high. This section provides an overview of the consequences/ effects of a hydrocarbon spills on a variety of biological organisms.

### Birds

Along the Taranaki shoreline major concerns following an oil spill would be the potential impacts to sheltered areas such as estuaries and the lee side of the Sugar Loaf Islands, where birdlife may be particularly at risk. Birds are smothered by the oil and die from a combination of factors including loss of buoyancy, poisoning and damage to their thermal regulation. Shore feeding birds could also be affected by the build-up of contaminants in mud flats and in the food chain. A list of species in the Taranaki region is at the back of this annex.

### Seals

Seals will be affected if the oil contaminates their haul out areas. In particular, fur seals and seal pups are vulnerable if oil adheres to fur and affects their thermal regulation.

## **Fish**

Many types of fish move into shallow water coastal habitats to breed and lay their eggs. The juvenile stages of many species often remain in sandy embayments and kelp beds to feed, until they grow into mature fish. Oil spills reaching shallow sheltered areas and estuaries may affect fish populations, as the ability to spawn may be affected and larvae could suffer mortality through direct contamination and poisoning. Depending on the oil's toxicity, food species may be affected, and oil has been shown to adversely affect the immune systems of many species making them more vulnerable to disease.

Adult fish are known to avoid oil, but rock dwelling and river species would find this difficult.

## **Marine invertebrates**

The greatest impact on marine invertebrates is likely to be experienced by bivalve molluscs and echinoderms where the mortality is likely to be high.

The results of a water available fraction (WAF) toxicity test on Pohokura condensate indicate that an accidental underwater discharge from a damaged pipeline has the potential to cause adverse effects on nearby benthic species. Larval and juvenile stages of all marine species are more sensitive than adult life stages due to their greater body surface area per unit body mass and relatively higher metabolic rates. Where toxic components of an oil spill disrupt larval development, this can have potentially serious ecological consequences, both on the population of the species and also on the balance of the ecosystem.

Blue mussels and sand dollars both inhabit the sub-tidal region of the coastal environment, and their life cycle would be particularly susceptible to disruption from an accidental discharge from an underwater pipeline. In addition, the mysids, a common marine crustacean, showed high sensitivity to the WAF of condensate, indicating potential for acute mortality to marine crustaceans. The WAF showed the highest toxicity to blue mussels, followed by sand dollar embryos, and juvenile mysids (EC50 1.7, 2.5 and 4.6% WAF, respectively).

The magnitude of the effects would depend on the available dilution by the receiving water, and if a dilution greater than 250 times was achieved, then the effect from the WAF would be removed. However, close to the site of the discharge, the dilution achieved may be much less than required and significant effects would probably be detected.

## **Potential socio-economic impacts**

The human uses of the marine environment and shoreline include fishing, surfing, windsurfing, diving, sailing, boating, swimming, recreational use of beaches, and coastal tourism. Adverse effects on fisheries may be caused by tainting of fish by oil or a loss of customer confidence in the quality of the fish. There may also be on-going reductions in fish stocks as a result of impacts on fish reproduction and contamination of fish food sources. Potential effects on fish and shellfish are described above (refer to 'Potential Environmental Impacts').

## **Recreational fishing and shellfish gathering**

Recreational fishing and to a lesser extent, shellfish gathering are popular, and in some rural communities, fishing and shellfish gathering are important elements of the coastal lifestyle, and also contribute to family income.

## **Maori customary fishing**

Customary fishing and kaimoana/mataitai harvesting is a common activity along the Taranaki coast. The traditional practice of manākitanga and having fish and shellfish on the table at hui or tangi is hugely significant to our Maori communities.

There is some data available from iwi as to the scale of customary fishing (i.e. Pataka/whata and Customary authorisations) with the potential for more data to be added as the iwi/hapu become more familiar with data collection and the tools available.

Any incident that prevents harvesting or damages an area will be viewed very seriously by iwi and their hapu. Hence their input in any response is essential.

## **Commercial fishing**

Commercial fishing is carried out in the sea off Taranaki. Fishing includes trawling, seine-netting, and long-lining for species such as snapper, trevally and gurnard, and purse-seining for jack mackerel and barracouta (as a by-catch). The Taranaki Bight, together with North Tasman Bay provides 50% of New Zealand's jack mackerel catch.

As paua, mussels and oysters are important commercial and recreational fisheries, STOS commissioned the Cawthron Institute to prepare a report on the potential effects of a surface film of condensate. Paua are particularly sensitive to acute exposure to a condensate film, however a 'no effect' thickness of 0.008 mm was identified given 48 hours exposure.

Condensate will form a thinner layer than 0.008 mm a few hours after a spill, and according to weathering models is unlikely to remain in the environment for more than 12 hours.

Blue mussels and pacific oysters were not adversely affected by the thickest film tested (0.95 mm over 96 hours). The insensitivity of the blue mussels and Pacific oysters may be due to their ability to close their shells in an unfavourable environment.

Whilst bivalves such as mussels and oysters, can isolate themselves physically from exposure to the film for short periods, extended periods of exposure may result in adverse effects on bivalve survival in the vicinity of the discharge.

## **Cultural sensitivities**

The "mountain to the sea" is a phrase that is often heard amongst the people of Taranaki. It highlights the inter-connective views and the values that tangata whenua have when considering areas or sites of significance. For example, the Mohakatino River is significant to Ngāti Tama for a number of reasons and one of note is this is where the waka Tokomaru landed (one of the three main waka that all the eight iwi within Taranaki are descended from). The Waiwhakaiho River marked the boundary between several hapu of Te Atiawa

and also provided abundant resources such raupo, flax, tuna, inanga and the reefs immediately off shore were bountiful with kaimoana.

The Patea River is significant to Ngāti Ruanui because this was where Turi, the captain of the Aotea waka (another of the three main waka), arrived and settled.

Recent Treaty of Waitangi settlements in Taranaki have also provided a means where cultural association and sites of significance, by way of statutory acknowledgements are recognised under the Resource Management Act 1991 and the Heritage New Zealand Pouhere Taonga Act 2014.

Further information regarding sites of significance can be found in the Taranaki Sensitive Sites pages at the back of this annex.

Also further information can be found in the following Schedules in the Proposed Coastal Plan for Taranaki:

- Schedule 2 [Coastal areas of outstanding value]
- Schedule 4 [Significant indigenous biodiversity]
- Schedule 5 [Historic heritage]
- Schedule 6 [Coastal sites with significant amenity values]
- Schedule 7 [Significant surf breaks and Significant Surfing Area]

The Proposed Plan can be accessed via:

<https://www.trc.govt.nz/assets/Documents/Plans-policies/CoastalPlan/Proposed2018/ProposedCoastalPlan-Feb2018-mainbody.pdf>

And the maps portal for the Proposed Plan via:

<https://maps.trc.govt.nz/LocalMapsViewer/?map=14083dae18734b83a3a7a0fc51b34283>

### **Port operations**

A major spill within the Port of Taranaki is likely to result in closure of the port until Maritime New Zealand and the Harbour Master have assessed the situation as safe for shipping. This means that the port could be closed until spill response operations involving boats and booms are completed.

### **Tourism and water sports**

There are significant effects on tourism following most serious spills, and the resulting fall in tourist numbers can have a serious effect on local hospitality and recreational businesses which rely on tourism.

The Taranaki coast is used throughout the year by surfers, and the Sugar Loaf Islands are a Marine Protected Area frequented by recreational divers. Other coastal tourist activities include sailing, tramping, kayaking and recreational fishing, and during the summer the beaches are popular for snorkelling and swimming.

There is an increase in coastal tourism during holiday periods and the highest numbers of visitors to the region occur during the summer.



## **Inland activities**

The effects of an onshore spill from a pipeline or facility is unlikely to have a serious impact, as in most cases spills will be contained. Where a spill flows into a waterway or migrates to groundwater the impacts will depend on what the water is used for.

Potential adverse health effects from exposure to the oil depend on the type of exposure. These risks to human health are generally low. Exposure can occur from skin contact, ingestion, or inhalation. Concern will focus on potential health impacts from skin contamination and accidental ingestion, and on the potential impact on the food chain.

Water takes for stock or irrigation are vulnerable to oil spills, and if there is a spill immediately upstream there may need to be Public Health warnings to ensure that farmers and land owners are advised of the potential hazards.

## **Spill Response Priorities**

Typically the priorities in an oil spill response are:

**People - Environment - Assets - Reputation**

### **People**

The first priority in any spill is to ensure safety of personnel, responders and the public.

### **Environment**

In principle the response should result in the highest possible net environmental benefit, so:

- Attention should focus on sensitive areas and species in the environment (marine mammals, birds, fish, shellfish and sheltered coastal habitats);
- Response strategies should aim for the highest possible level of mitigation of damage and should result in the lowest possible environmental damage or disturbance;
- The response should target areas and resources that have the slowest, or least likely, rate of self-cleanup or recovery from damage;
- The response should be the most efficient use of materials and human resources; and
- The response should result in the minimum possible generation of waste materials.

### **Assets**

Response efforts to protect assets are subsequent to environmental objectives, and should consider the protection of economic assets such as fisheries and water extraction for farm use, as well as the need to protect property and company installations.

## **Section A: OMV**

### **Production: Maui Field**

There are two offshore production platforms in the Maui Field. The Maui A platform is approximately 35 km west south west of the Oaonui onshore production station. The Maui B platform is located 15 km south west of Maui A. Gas and condensate from Maui A is transported in separate pipelines to the Maui production station (MPS) at Oaonui. Gas and condensate from Maui B is piped to Maui A for initial separation and then via the same pipelines to shore. Maui condensate is stabilised at the production station and the light ends can be converted into naphtha. Naphtha and enhanced Maui condensate are transferred in batches via the 48 km Oaonui-Paritutu cross country pipeline to the Omata or Paritutu Tank Farm (PTF). Approximately 500 m<sup>3</sup> of naphtha and 1,500 m<sup>3</sup> of condensate are transferred daily, depending on production.

### **Production: Pohokura Field**

Produced gas and liquids flow from an offshore platform (PPB) through a 12-inch subsea flexible pipeline to the reception facilities at Pohokura Production Station (PPS). PPB stands in 31.5 metres of water and is located at 38 54' 42.9" S, 174 16' 15.3" E, approximately 26 km North of Port Taranaki and 8.5 km from Motunui, the nearest point on the Taranaki coast.

PPS and PPB are Normally Unattended Installations (NUI) with their safety systems controlled automatically or remotely from the control room at OMV Taranaki Limited's (OTL) Head Office in New Plymouth. There are two chemical injection lines (1 x 12 mm line for scale inhibitor and pour point depressant and 1x 25 mm methanol pipeline) from PPS to PPB.

The Pohokura facilities recover and process well fluids into spec sales gas and condensate and deliver them to their respective points of sale, while also handling waste products from the process (produced water and low grade fuel gas). The condensate storage tank capacity is 7,900 m<sup>3</sup>.

The 10-inch EPJV cross country pipeline can be used to export stabilised condensate 34.3km from PPS to the Omata Tank Farm (OTF) at around 65 m<sup>3</sup>per hour with a line pressure of around 25 bar.

### **Transfer: Export Pipelines**

OTL manages two overland condensate export pipelines, from MPS to OTF/PTF, and PPS to OTF. The table below provides an overview of the export pipelines to the tank farm facilities. From the OTF/PTF product is transferred via an underground pipeline to a load-out arm at Port Taranaki.

## Export Pipeline Inventory Information

From – To	Pipeline Length km	Pipeline Inventory (m <sup>3</sup> )	Approximate Transfer Volume m <sup>3</sup> / hour
▪ Maui B to Maui A	16		
▪ Maui A to MPS	35	1720	83
▪ MPS to PTF	47.9	1600	125
▪ Pohokura B to PPS	8.5		
▪ PPS to the OTF	34.3		65
▪ Tank Farm to Port Taranaki	1.6 / 3.2	230 / 470	1800 / 1800

## Storage and Handling

### Tank Farms (Omata, Paritutu & T3500)

The Paritutu Tank Farm (PTF) is at the western end of New Plymouth overlooking Port Taranaki. PTF is wholly owned by Todd Energy, and is operated by OTL.

There are five bunded, floating roof storage tanks at PTF each capable of holding 11,700 m<sup>3</sup>. Generally speaking, one tank contains Kapuni condensate, two are used for Maui condensate, and one for Maui naphtha. OTL also operates T3500; a 35,000 m<sup>3</sup> tank holding Maui or Pohokura condensate that is located near the Omata Tank Farm.

The Omata Tank Farm (OTF) is a separate facility located west of PTF, 3 km from New Plymouth, and is operated by OTL on behalf of Energy Infrastructure Ltd (EIL), a 100% OMV subsidiary. There are three bunded tanks on the EIL facility; one holding up to 20,000 m<sup>3</sup> of Pohokura condensate, one of 10,000 m<sup>3</sup> holding McKee Blend (crude oil) and another of 10,000 m<sup>3</sup> holding the overflow of McKee blend or Pohokura condensate. There is also the potential for EIL to handle Maui Condensate, product from Waihapa, and other crude that is trucked in from multiple operators.

Methanex, Beach and Port Taranaki also own and operate condensate, petrol, diesel and methanol tanks on neighbouring properties to the EIL facility.

All tanks are surrounded by bunds lined in accordance with HSNO regulations, designed to contain 110% of the tanks volume. Valves are locked closed and any discharges from bunded areas are tested for compliance with consent conditions before release into the stormwater system.

### Newton King Tanker Terminal (NKTT)

The Newton King Tanker Terminal at Port Taranaki is where export tankers are loaded via pipelines from the Tankfarms. OTL operate loading equipment in a coordinated operation with Port Taranaki loading 2-4 tankers each month depending on production.

## Sources and Causes of Spill

Any facility or infrastructure that contains hydrocarbons or chemicals represent a potential spill risk. The actual hazard will depend on the event that creates a spill. Within OTL operations potential hydrocarbon spills sources include, leaks or loss of containment from:

- Gas/condensate/oil wells
- Pipelines offshore or onshore
- Production platform
- Supply or support boat
- Export tanker
- Helicopter
- Drilling rig
- Onshore production facility
- Tank farm
- Road tanker
- Utility oil tank or drum
- Chemical storage tank or drum

### Potential Hydrocarbon Spills

Various types of oil could be spilled from OTL facilities or from associated operations. Properties of the main oil types are summarised below. The hydrocarbons commonly associated with OTL operations and where they are typically found are outlined in the table below.

Type of Hydrocarbons and Properties (OTL Operations)

Oil Type	Description	Location	Density (SG)	Pour Point °C	Flash Point °C	Viscosity cSt	Asphaltene %	Wax %	Oil Group
Naphtha	Light distillate	MPS, PTF, NKTT	0.67	-	-30	-	-	-	I
Petrol	Gasoline	Onshore and offshore various locations	0.75	< -18	-30	1 at 38°C	-	-	I
Avgas	Aviation fuel	NP Airport HNZ choppers	< 0.8	< -40	38 to 60	0.5 at 15°C	-	-	I
Diesel L-0.5-62 Grade	Vehicle, generator fuel	Field support vessels, rigs and at all assets onshore	0.843	-14	66	5.063 at 15°C	Negligible	Low	II
Maui Condensate	Gas condensate	MPS, MPA, MPB, OTF, PTF, NKTT	0.751 at 15.5°C	<-36	Flashes at ambient	Kintematic viscosity 0.9 @ 13°C	low	<5%	II
Kapuni Condensate	Gas condensate	PTF, NKTT,	0.766 at 15.5°C	-27	< -15	1.18 at 20°C	-	-	II
Pohokura Condensate	Light crude oil with high wax content	PPB, PPS, OTF, T3500, NKTT,	0.75-0.77	-21	-33.9	0.758	low	10.8%	II/III
McKee Blend	Blend of crude oil from various operators	OTF, NKTT	0.817	15	< -10	?	?	?	III/IV
Hydraulic Oil	Water based oil	PPB well leg conductors		-4°C		2.3cSt at 20°C			

Location key- MPS: Maui Production Station, MPA: Maui Platform Alpha, MPB: Maui Platform Bravo, PPS: Pohokura Production Station, PPB, Pohokura Platform Bravo, NKTT: Newton King Tanker Terminal – Port, OTF: Omata Tankfarm; T3500- T3500 tank behind Omata Tankfarm, PTF: Paritutu Tankfarm.

## Potential Scenarios for Hydrocarbon Spills

In the table below, a selection of hypothetical oil spill scenarios (sources, oil types, causes) are identified as examples. The potential maximum spill volume for each scenario is estimated, with comments on how the volumes were derived. Further examples of spill scenarios can be found in the OTL Site Spill Contingency Plans for each facility. **These plans should be referred to for the most current information.**

### Spill Scenario Examples

Spill Scenario	Estimated Max Spill Size 1 m <sup>3</sup> = 6.29 bbls	Comments
Utility oil drum damaged or lost overboard	Up to 220 litres	Could be minor leak or loss of entire drum
Hose breakage during diesel transfer (support vessel bunkering)	< 10 m <sup>3</sup>	Assuming transfer rate of 75 m <sup>3</sup> /hr, 5 minutes to notice and stop flow plus loss of hose contents.
Small leak in MPS-PTF condensate pipeline close to MPS.	29 m <sup>3</sup>	At 30 bar 1.46 m <sup>3</sup> / hr will spill from a 3 mm hole. Assume six hours until leak is noticed and line is shut down and a further 20 m <sup>3</sup> drains from the line.
PPB-PPS condensate pipeline breach	40 m <sup>3</sup>	Loss immediately detected by pressure or flow alarms and operator manually initiates platform shutdown.
Spill of product from the export line close to the wharf.	477 m <sup>3</sup>	Assuming 40 mm hole (70.1 kg/hr), 5 mins to complete the line shutdown and all oil in the line drains out.
MPA-MPS condensate pipeline breach	Up to 1,720/m <sup>3</sup>	Loss detected by pressure or flow alarms and operator immediately initiates platform shutdown.

## Section B: Beach Energy Ltd

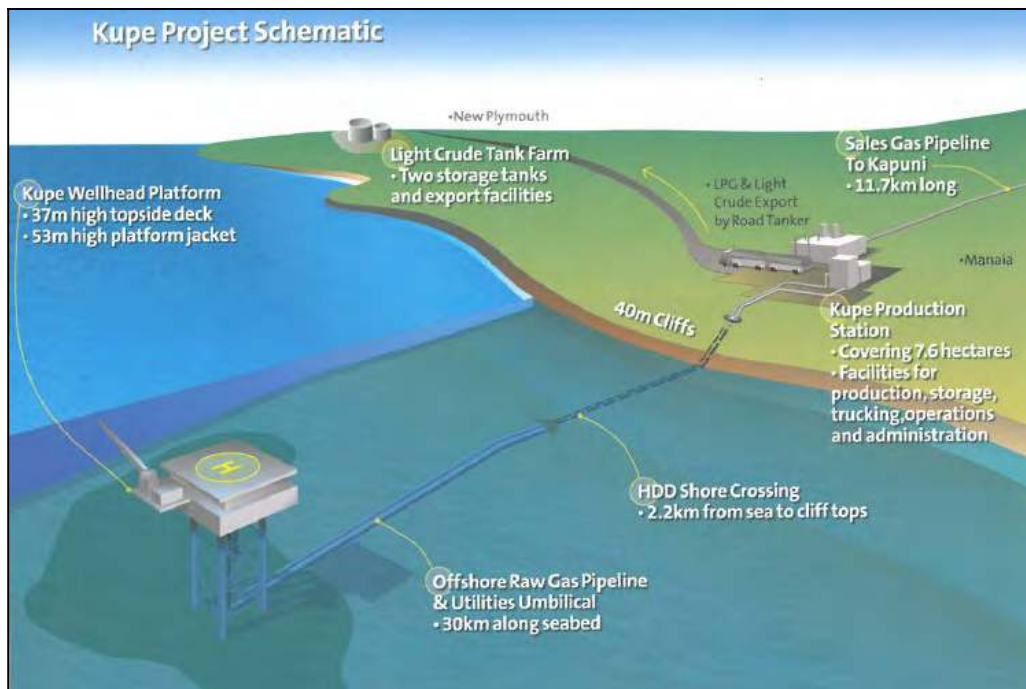
### Production: Kupe Field

The Kupe Gas Field is located in Mining License Area PML38146, situated approximately 30km offshore, southwest of Hawera, in 35 m water depth. The Kupe Wellhead Platform (KWHP) is a small normally unmanned platform with three producing wells situated at Lat: 39 51 03 South; Long: 174 07 12 East (NZGD 2000/WGS 84 (DMS)), or Northing 5 588 191, Easting 1 695 807, (reference datum NZTM 2000).

The KWHP does not contain any gas or liquid processing facilities. All raw product (gas, condensate, and produced water) extracted from the reservoirs is exported directly to the onshore Kupe Production Station (KupePS) via a 12" (324mm) offshore Raw Gas Pipeline.

A utilities umbilical containing fibre optic communications cable and chemical service lines (for transfer of monoethylene glycol, corrosion inhibitor, and diesel) also runs from KupePS to the KWHP.

The KupePS processes well fluids into condensate, sales gas, and LPG.



### Transfer: Trucking and Export Pipelines

Sales gas is exported from the KupePS via an 11.7km long Sales Gas Pipeline to the Kapuni Gas Treatment Plant to tie into the Vector gas transmission pipeline grid for sales gas export.

Condensate is trucked from KupePS to the Kupe Omata Tank Farm for storage and export via a condensate pipeline from the Kupe Omata Tank Farm to Port Taranaki.

LPG is trucked from KupePS direct to consumers.

## Storage and Handling: Tank Farm (Kupe Omata Tank Farm)

The Kupe Omata Tank Farm is located on Centennial Drive just west of New Plymouth alongside other tank farms. KOTF receives condensate via truck from KupePS for storage in two 15,000m<sup>3</sup> tanks prior to export from Port Taranaki.

The tanks are surrounded by bunds lined in accordance with HSNO regulations, designed to contain 110% of the tanks volume. Valves are locked closed and any discharges from bunded areas are tested before release into the stormwater system.

## Storage and Handling: Newton King Tanker Terminal (NKTT)

The Newton King Tanker Terminal at Port Taranaki is where export tankers are loaded via gravity fed pipelines from the Tankfarms. Beach Energy utilise the OMV loading equipment in a coordinated operation with Port Taranaki. Approximately six to eight tankers are loaded per year depending on production.

## Sources and Causes of Spill

The potential for a major spill of hydrocarbons and/or harmful substances from activities associated with Kupe WHP is limited due to the minimal process equipment and inventory on board. In addition, the facilities are designed for the full well shut-in pressure. The volume of oil and/or harmful substances that may potentially be released to the environment during normal operations is minimal, and only small quantities of substances are stored on the platform and used during maintenance.

## Potential Hydrocarbon Spills

Properties of the main types of oil could be spilled from Beach Energy facilities or associated operations are summarised in the table below.

Oil Type	Description	Location	Density (SG)	Pour Point °C	Flash Point °C	Viscosity cSt	Asphaltene %	Wax %	Oil Group
Kupe Condensate	Gas condensate	KWHP, KupePS, KOTF, export	0.7224 @15°C	-60	<20°C	0.6909 @20°C	<0.05	0.04	I
Avgas	Aviation fuel	NP Airport HNZ choppers	< 0.8	< - 40	38 to 60	0.5 at 15°C	-	-	I
Diesel L-0.5-62 Grade	Generator fuel	Offshore generators, field support vessels, trucks	0.843	- 14	66	5.063 at 15°C	Negligible	Low	II

## Potential Scenarios for Hydrocarbon Spills

Potential Scenario	Potential size of spill
Uncontrolled release from wells	Release volume of up to 3030 bbl/day (399,960bbl based on time to drill a relief well)
Loss of containment of hydrocarbons from raw gas pipeline	Estimated volume of raw gas pipeline when plant operating at 77TJ is: <ul style="list-style-type: none"> <li>Gas: 7TJ</li> <li>LPG: 32.8 tonnes</li> <li>Condensate: 890bbbls (141.5m<sup>3</sup>)</li> </ul>

Potential Scenario	Potential size of spill
Loss of containment of harmful substances from umbilical	Total volume of chemical lines in umbilical is 136m <sup>3</sup> (mono-ethylene glycol, corrosion inhibitor, diesel)
Hydrocarbon or harmful substance release during normal operations and maintenance	Volume lost during maintenance activities would be minimal due to manning at the time and alternate isolations utilised to prevent loss of containment
Hydrocarbon or harmful substance release from the drains drum	Maximum loss from drains drum would be 1m <sup>3</sup>
Loss of containment of hydraulic oil from crane	Maximum volume of hydraulic oil 500L
Loss of containment of harmful substances from dangerous goods storage	Only minor harmful substance storage on platform (an Addendum to the OSRP lists maximum volumes stored)
Vessel or helicopter collision with platform	Supply vessel spill of up to 150m <sup>3</sup> of diesel. Helicopter spill of up to 2m <sup>3</sup> of fuel.

### Weathering of Kupe Condensate in the Sea

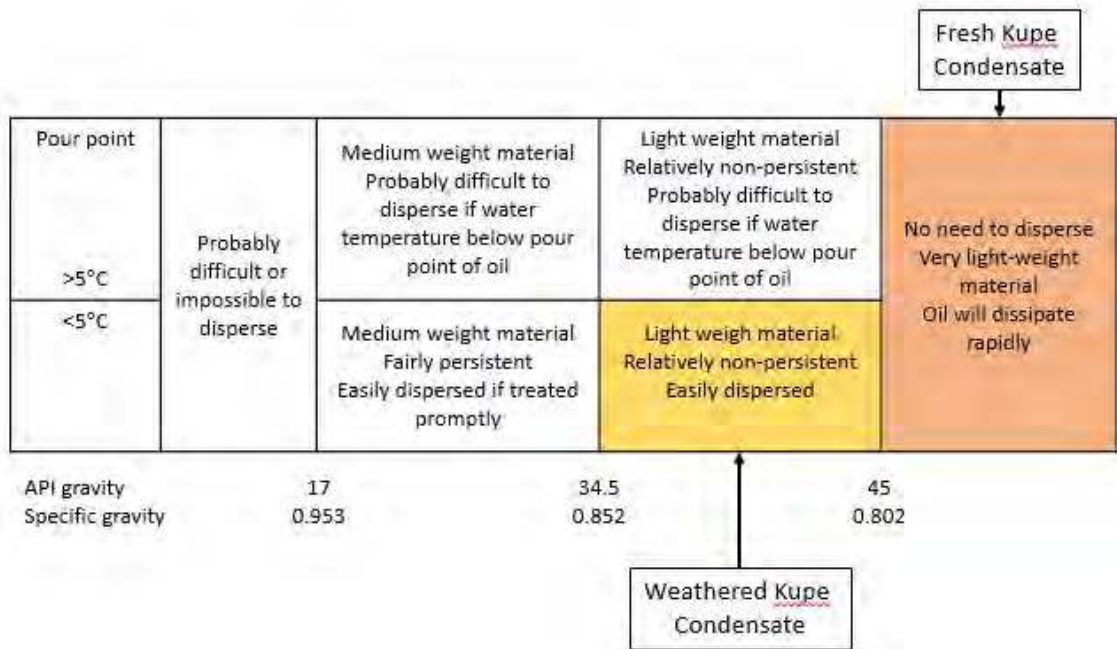
Physical oil weathering testing was conducted in 2018 to assess the effect of summer and winter weathering processes, in open ocean conditions, on Kupe condensate. The weathering testing showed:

- Over 12 hours the sample lost at least 56% by evaporation, with a complete loss up to C5 carbon groups and partial loss from C6 to C8;
- Over the 24 hours the sample lost at least 67% by evaporation with full loss up to C8, and partial loss from C9 to C10;
- Over 48 hours the sample lost at least 85% by evaporation, with complete loss up to C9 and partial loss of C10 to C11;
- Density, pour point, viscosity, water content and wax content all increased as the condensate weathered, with carbon groups in the wax range (C17 to C37) comprising 36% of the remaining product at 48 hours; and
- The weathered samples held more water than the original sample but no stable emulsion was formed.

### Dispersant use

The figure below shows that most recent assay results place unweathered Kupe Condensate within the cell highlighted orange (no need to disperse). Weathered Kupe Condensate is expected to fall within the yellow cell (relatively non-persistent and easy to disperse).





The weathering study conducted on recent Kupe Condensate samples identified that 56% of the spilled condensate would evaporate within 12 hours of release, and 85% would evaporate within 48 hours. The use of chemical dispersants is not recommended as it would transfer condensate components which would otherwise be rapidly lost to evaporation, to the water column instead.

Kupe Condensate would be amenable to chemical dispersion. However, stochastic modelling of a worst feasible case spill from a loss of well control showed that surface slicks would potentially exceed 10 grams per square metre (g/m<sup>2</sup>) (the minimum slick thickness potentially suitable for dispersant application) only within 1 – 2 km of the release point (RPS, 2018).

As a result, it is considered that chemical dispersion of a spill of Kupe Condensate is not a feasible response option and is not justified by environmental risk posed by surface slicks.

## Trajectory Modelling Kupe Condensate in the Sea

In the event of a spill, Beach Energy has a contract with RPS Australia West Pty Ltd to conduct real time trajectory forecasts based on current weather and tidal conditions and the actual spill characteristics.

Stochastic spill modelling was conducted by RPS in 2018 to determine the movement of a marine spill of Kupe condensate and the potential for condensate to contact the shoreline and sensitive resources. Two worst feasible case scenarios were modelled:

1. Scenario 1 - 132-day subsea loss of well control incident releasing 3,030 bbl/day of Kupe condensate; and
2. Scenario 2: 141.5 cubic metres (m<sup>3</sup>) subsea release of Kupe condensate over 7 minutes to represent a pipeline rupture incident 3 nm offshore.

The tables below show minimum time for visible condensate to shore, and maximum potential shoreline loading for the two scenarios.

The Offshore Spill Response Plan – Kupe WHP and Pipeline has detailed information on the stochastic spill modelling results.

**Table 1** Summary of shoreline contact at or above 10 g/m<sup>2</sup>, in the event of a 3,030 bbl/day subsea release of condensate from a loss of well control incident over 132 days at the Kupe Wellhead Platform release site, tracked for 162 days

Shoreline statistics	Summer	Winter
Probability of contact to any shoreline (%)	67	82
Absolute minimum time for visible condensate to shore (hours)	53	38
Maximum volume of hydrocarbons ashore (m <sup>3</sup> )	13	18
Average volume of hydrocarbons ashore (m <sup>3</sup> )	4	6
Maximum length of the shoreline at 10 g/m <sup>2</sup> (km)	23	61
Average shoreline length (km) at 10 g/m <sup>2</sup> (km)	10	18
Maximum length of the shoreline at 100 g/m <sup>2</sup> (km)	11	8
Average length of the shoreline at 100 g/m <sup>2</sup> (km)	4	2
Maximum length of the shoreline at 1000 g/m <sup>2</sup> (km)	0	0
Number of simulations exceeding 1 bbl/km on shore	67	81
Peak length of shore exceeding 1 bbl/km on shore	14	34

**Table 2** Summary of shoreline contact at or above 10 g/m<sup>2</sup>, in the event of a 141.5 m<sup>3</sup> subsea release of condensate from a pipeline rupture incident over 7 minutes at the 3 nm pipeline release site, tracked for 15 days

Shoreline statistics	Summer	Winter
Probability of contact to any shoreline (%)	12	8
Absolute minimum time for visible condensate to shore (hours)	6	10
Maximum volume of hydrocarbons ashore (m <sup>3</sup> )	10	10
Average volume of hydrocarbons ashore (m <sup>3</sup> )	3	3
Maximum length of the shoreline at 10 g/m <sup>2</sup> (km)	7	8
Average shoreline length (km) at 10 g/m <sup>2</sup> (km)	4	5
Maximum length of the shoreline at 100 g/m <sup>2</sup> (km)	7	6
Average shoreline length (km) at 100 g/m <sup>2</sup>	4	4
Maximum length of the shoreline at 1,000 g/m <sup>2</sup>	3	3
Average shoreline length (km) at 1,000 g/m <sup>2</sup> (km)	3	3
Number of simulations exceeding 1 bbl/km on shore	11	8
Peak length of shore exceeding 1 bbl/km on shore	5	4

## Section C: OMV New Zealand Ltd - Maari Field – FPSO *Raroa* and WHP *Tiro Tiro Moana*

### Maari Field

The **Maari Field** production facilities are currently (at the time this plan was approved) under the management of OMV New Zealand Ltd. However soon to be handed over to Jadestone Energy (contacts in Petroleum Industry contacts table in Annex 2).

The **Maari Field** production facilities are located approximately 80 km off the west coast of Taranaki in the Exclusive Economic Zone (EEZ) and outside the 12 nautical mile limit. The Maari Field comprises of the following:

- A Wellhead Platform (WHP) structure (“*Tiro Tiro Moana*”) which supports the wellheads, production equipment and a removable workover unit (WOU) for well interventions and maintenance. The WHP is designed for manned and unmanned operation and is controlled and monitored from the FPSO *Raroa* control room.
- Subsea facilities: pipelines to transfer both production fluids and treated seawater for sub-surface injection, and an umbilical to transport production chemicals, power and communications between the WHP *Tiro Tiro Moana* and FPSO *Raroa*; and
- Processing and storage facilities on FPSO *Raroa*.

### Storage, Handling and Transfer

Produced crude from the Maari Field is stored in the tanks of the FPSO *Raroa* until transfer to an offtake tanker.

All produced crude from the Maari Field is transferred via a floating offtake hose from the FPSO *Raroa* to an offtake tanker. Once the crude transfer has been completed, the crude is exported by sea to international or NZ refineries.

### Sources and Causes of Spill

Any facility or infrastructure that contains hydrocarbons or chemicals represent a potential spill risk. The actual hazard will depend on the event that creates a spill. Within the Maari Field, potential hydrocarbon spills sources include, leaks or loss of containment from:

- Produced crude oil/oil wells;
- Subsea facilities and production pipelines;
- Offshore production facility;
- Offshore support vessel;
- Export tanker;
- Helicopter; and
- Utility oil or chemical storage tank or drum.

### Potential Hydrocarbon Spills

Various types of oil could be spilled from Maari facilities or from associated operations. The properties of the main oil types present in the Maari Field and where they are typically found are summarised in the table below.

**Table 3** Type of Hydrocarbons and Properties (Maari Operations)

Oil Type	Description	Location	Specific Gravity	Pour Point °C	Flash Point °C	Viscosity cSt	Asphaltene % mass	Wax %
Crude oil	Moki Crude	WHP, FPSO	0.8443	+27	<20	2.696 @ 50°C	<0.50	21.1
Crude oil	Manaia-1 Crude	WHP, FPSO	0.8062	+24	<25	2.328 @ 50°C	<0.50	n/a
Crude oil	Maari Mangahewa	WHP, FPSO	0.786	+24	<25	2.328 @ 50°C	<0.50	n/a
Crude oil	Maari Blend	WHP, FPSO	0.8389	+27	<25	2.888 @ 50°C	<0.50	n/a
Crude oil	Maari Blend 2.0	WHP, FPSO	0.8298	+21	<23	2.244 @ 50 °C	0.08	27.8
Avgas	Aviation fuel	NP Airport HNZ choppers	< 0.8	< - 40	38 to 60	0.5 at 15°C	-	-
Diesel L-0.5-62 Grade	Generator fuel	Emergency generators, field support vessels, rigs etc.	0.843	- 14	66	5.063 at 15°C	Negligible	Low

### Potential Scenarios for Hydrocarbon Spills

In the table below, a selection of hypothetical oil spill scenarios (sources, oil types, causes) from the Maari Field Oil Spill Contingency Plan/Emergency Spill Response Plan are identified. The potential maximum spill volume for each scenario is estimated, with comments on how the volumes were derived. Note that most of these scenarios are extremely unlikely.

**Table 4** Spill Scenario Examples

Spill Scenario	Estimated Max Spill Size (1m <sup>3</sup> = 6.29 bbls)	Comments
Produced water discharge oil content >100mg/l	120 litres	Assume failure of the OIW analyser to detect an off specification discharge of 120mg/l oil in water. Discharge for one hour at a rate of 1000 m <sup>3</sup> per hour
Utility oil drum damaged or lost overboard	Up to 200 litres	Could be minor leak or loss of entire tank contents
Helicopter crash at sea. Loss of 50% of full tank capacity of aviation fuel	386 litres	Standard fuel capacity of a Bell 214ST is 772 litres.
Leak of crude oil during pigging of subsea line from FPSO swivel	< 1 m <sup>3</sup>	Spill is contained on FPSO
Crude oil spill on export tanker deck due to procedural error during connection or disconnection of export hose or loose/leaking flanges, or pipe corrosion	< 1 m <sup>3</sup>	
Leak from export tanker cargo tank via a crack or defective seam	< 1 m <sup>3</sup>	Any leak would probably be very small and quickly detected

Spill Scenario	Estimated Max Spill Size (1m <sup>3</sup> = 6.29 bbls)	Comments
Crude oil spills or leaks from WHP or FPSO topsides, e.g. due to failure of joints, valves, fittings or process components	< 1 m <sup>3</sup>	
Process cooling water spill due to pipework failure	< 1 m <sup>3</sup>	Assumes cooling water is contaminated by hydrocarbons and runs overboard via rainwater drainage
Carry over of liquid hydrocarbon to flare	< 1 m <sup>3</sup>	
Leak from export tanker's overboard discharge valve	2 m <sup>3</sup>	Incorrect deck set-up or over filling of tanks. Volume of spill will vary on speed of response
Leak in 16 inch floating hose between tanker and FPSO	4 m <sup>3</sup>	If 2% loss of oil during an export operation at 4,000 m <sup>3</sup> /hr and 3 minutes taken to stop flow
Separation of the crude oil loading hose at the breakaway coupling, due to a surge event or mooring failure.	~ 9 m <sup>3</sup>	Based on 8 seconds for breakaway coupling closure
Transfer hose ruptures during diesel or fuel oil transfer from support vessel	< 15 m <sup>3</sup>	Assume transfer rate of 150 m <sup>3</sup> /hr, 5 minutes to stop flow plus loss of hose contents
Slow leak from 10 inch submarine production flowline or riser for 6 hours. Amount too small to be identified by leak detection system	18 m <sup>3</sup>	Line would be shut down immediately leak observed
Small hole in 16 inch floating hose between tanker's manifold and FPSO. Occurs during the night so 10 hours worst case before leak is identified and oil export stopped	39 m <sup>3</sup>	Based on ~3.9 m <sup>3</sup> /hr via ½ inch hole if off-loading at 4,000 m <sup>3</sup> /hr
Loss of 10% of cargo from supply vessel due to collision or grounding	78 m <sup>3</sup>	Based on typical fuel tank capacity of a field support vessel
Rupture of 16" floating hose due to being run over by passing ship	200 m <sup>3</sup>	Based on loss of contents of hose (265m length) plus 2.5 minutes of flow at 4,000 m <sup>3</sup> /hr until shut down
Damage to 10 inch production flowline or riser and simultaneous failure of the emergency shut-down system and alarm	600 m <sup>3</sup>	Assumes 100 m <sup>3</sup> /hr released for 6 hours before shut down
Heavy fuel oil spill from export tanker's fuel tanks	1000 m <sup>3</sup>	Assumes loss of 50% of typical Aframax HFO tank capacity
Catastrophic accident (e.g. fire, explosion or collision) on FPSO resulting in loss of crude oil	5,000 m <sup>3</sup>	Assuming largest wing tank (No.1 port or starboard) is 50% full
Breach of two largest storage tanks on FPSO or export tanker following collision	19,600 m <sup>3</sup>	Based on collision at the waterline at bulkhead between 2 full tanks
Total loss of well control	~1,500 m <sup>3</sup> per day	Reservoir pressure is expected to drop rapidly so wells will be incapable of natural flow

## Weathering of Maari crude in the Sea

Assuming a water temperature of 18°C and wind speed of 5 knots, independent laboratory analysis and computer modelling predicts:

Estimated % evaporated	Moki Crude	Manaia Crude	Maari Blend
2 hours after spill	34%	67%	32%
24-48 hours after spill	62%	76%	46%

*Note: these losses in volume are likely to be partially offset by an increase in volume as a result of water in oil emulsion formation, with the emulsion formation predicted to increase the volume of oil by a factor of 1.5. Oils from the Maari Field wells are characterised by having a relatively high wax content. Following evaporation of the lighter ends, the vast majority of the residue*

comprises buoyant wax that will remain on the sea surface. Waxy residues are expected to degrade and break up slowly over weeks or months.

### **Dispersant use**

Dispersibility analysis and dispersant testing has indicated that fresh and weathered crude oil from the Maari Field was not dispersed by any of the dispersants tested (during both winter and summer temperatures). Therefore dispersants are not an effective response method and mechanical recovery is a far more efficient and environmentally friendly response mechanism. *Note: any decision to use dispersants would be made in conjunction with MNZ and/or TRC.*

The impact of a spill into the marine environment will be greatly affected by the meteorological conditions. OMV has a contract with Metocean Solutions Ltd (MSL) for the provision of high-resolution metocean forecasting and spill trajectory modelling during an emergency.

## Section D: MBIE - Tui Field

The Tui field is under management of Ministry of Business, Innovation & Employment. The field is not producing and is currently (at the time this plan was approved) in the process of being decommissioned.

The **Tui Field** is located approximately 50 km offshore, west of the Taranaki coastline of New Zealand's North Island and within the Exclusive Economic Zone (EEZ). The field comprises of three oil accumulations Tui, Amokura and Pateke. The field accessed via a subsea installation, utilising five horizontal subsea completions with the wells and subsea infrastructure separated from the main processing facility, the FPSO Umuroa.

### Overview of the FPSO Umuroa

The FPSO "**Umuroa**" is a converted and modified Suezmax oil tanker designed to handle daily production rates of up to 50,000 barrels of oil, 25 mmscfd of gas, and a total of 120,000 barrels of liquid per day. It weighs 67,684 tonnes (GRT), is 241m in length, 46m in breadth and 23m in depth. It contains eight segregated ballast tanks, eleven cargo and two slop tanks. The tank capacity, excluding slop tanks, is 773,245 barrels.

Three-phase well fluids enter the FPSO via subsea flowlines and are separated into oil, gas and produced water.

- Produced crude oil is degassed and routed into oil cargo tanks for storage and subsequent offloading into oil offtake tankers for shipping and distribution;
- Produced gas is treated via a glycol dehydration system then compressed for gaslift supply to the subsea wells to assist the wells to flow back to the FPSO. In addition produced gas is used as a fuel medium to run the boilers / turbine alternators (vessel power supply). Excess gas is sent to flare; and
- Produced water is discharged overboard after oil removal and cooling to meet discharge quality requirements.

The main deck of the FPSO houses the topsides process modules (Modules 1 to 8), accommodation and office block, helideck, two pedestal mounted cranes, boilers, internal turret, and flare tower. Below the main deck are three deck levels housing the oil tanks, water tanks, slops tanks, engines and generators, lift pumps, fire pumps and a mechanical workshop.



## Section E: Threat sites within the harbour limits

Resources at risk from oil spills include amenity areas and recreational activities, flora, fauna, industrial activities, and seawater intakes. The extreme sensitive ecological sites are set out in the following pages of this Annex. These sites have been agreed in conjunction with other interested parties, who have considered the economic and environmental values to the community of each site. The relative priorities for clean-up at these sites may vary from time to time and have been reviewed in conjunction with the Plan review process. It should be noted that the time of the spill will also greatly alter relative priorities.

Sensitive environs within and beyond the harbour limits are:

- Waiwhakaiho River mouth;
- East End Beach;
- New Plymouth Foreshore;
- Kawaroa Park;
- Ngamotu Beach;
- Sugar Loaf Islands Marine Protected Area;
- Tapuae Marine Reserve; and
- Paritutu/Back Beach.

### Potentially oiled wildlife in Taranaki

It has been assessed that the following wildlife is in the Taranaki area and therefore has the potential to be affected in a spill:

- **Marine mammals**
  - NZ Fur Seal
  
- **Sea birds**
  - Little Blue Penguins
  - Petrels: Diving Petrels, Grey Faced Petrels, Fluttering Shearwaters, summer breeding population - 15,000
  - Gannets
  - White Fronted Terns
  - Gull species
  
- **Estuary Birds**
  - Oyster Catchers
  - Branded Dotterels
  - Non-breeding/Seasonal species: Knots, Godwits, Cattle Egrets, Royal Spoonbills, White Herons
  - Shags
  - Water fowl

A list of bird species in the Taranaki region is at the back of this annex.

The location of significant wildlife habitat is discussed below.

## **Section F: Sensitive sites and preferred oil spill response option**

### **Regional sites for special protection**

The charts, site information and response guidelines of this Annex, which show the ecologically sensitive areas of the Taranaki Harbour and coastal waters, have been prepared by the Council in consultation with the Department of Conservation, iwi, hapu, MPI, and interested parties of the Taranaki region.

The coastline of the Taranaki region consists of two basic forms, an open coast exposed to a westerly wave environment, and sheltered estuaries formed by the region's largest rivers. The open coast is a high-energy environment, and the effects of tides, currents and wind are significant.

Near shore currents in the North Taranaki area are determined primarily by the prevailing wind stress and the local coastal orientation and bathymetry. The predominant near shore current direction is down coast and occurs under the influence of northerly, north-easterly winds. Up coast flows are less frequent, generally less persistent and occur under the influence of westerly or south-westerly winds.

The predominant wind directions in North Taranaki are from south-east and west with south-easterlies predominating in autumn and winter and westerlies predominating in spring and summer. Off shore winds occur more often than onshore winds especially during autumn and winter.

Near shore currents in the South Taranaki area are determined primarily by the prevailing winds and the local coastal orientation and bathymetry. The predominant near shore current direction is down coast. The coastal region of South Taranaki is directly exposed to the prevailing westerly air flow and is acknowledged as being one of the windier parts of New Zealand. Wind records taken at Patea show that westerly winds tend to predominate during spring and summer and northerly winds predominate during autumn and winter.

The whole of the coastal environment of Taranaki is of importance to tangata whenua, especially the reef systems which are important for kaimoana, and other wāhi tapu sites.

Ecological sites for special protection have been identified by the Regional Council and Department of Conservation, and are set out below. The location of the sites is shown in 28.

Also, of more general note is an area of snapper and trevally spawning which is recognised as occurring between Motunui and the northern boundary of the Taranaki region. Trawling and seining restrictions are in place to protect this area, and as a consequence, in the event of an oil spill, clean-up measures should be used which prevent or minimise the sinking of oil/by-products to the seabed as far as practicable.

### **Maui's Dolphin**

The Taranaki Region includes the southernmost habitat for Maui's dolphin. Maui's dolphin is the world's smallest dolphin and is found on the west coast of the North Island of New Zealand and nowhere else in the world. It is New Zealand's rarest dolphin. The dolphin is listed internationally as 'critically endangered', which means there is a high risk of it

becoming extinct in the near future. Maui's dolphin are generally found close to shore in groups or pods of several dolphins. They are often seen in water less than 20 metres deep but may also range further offshore.

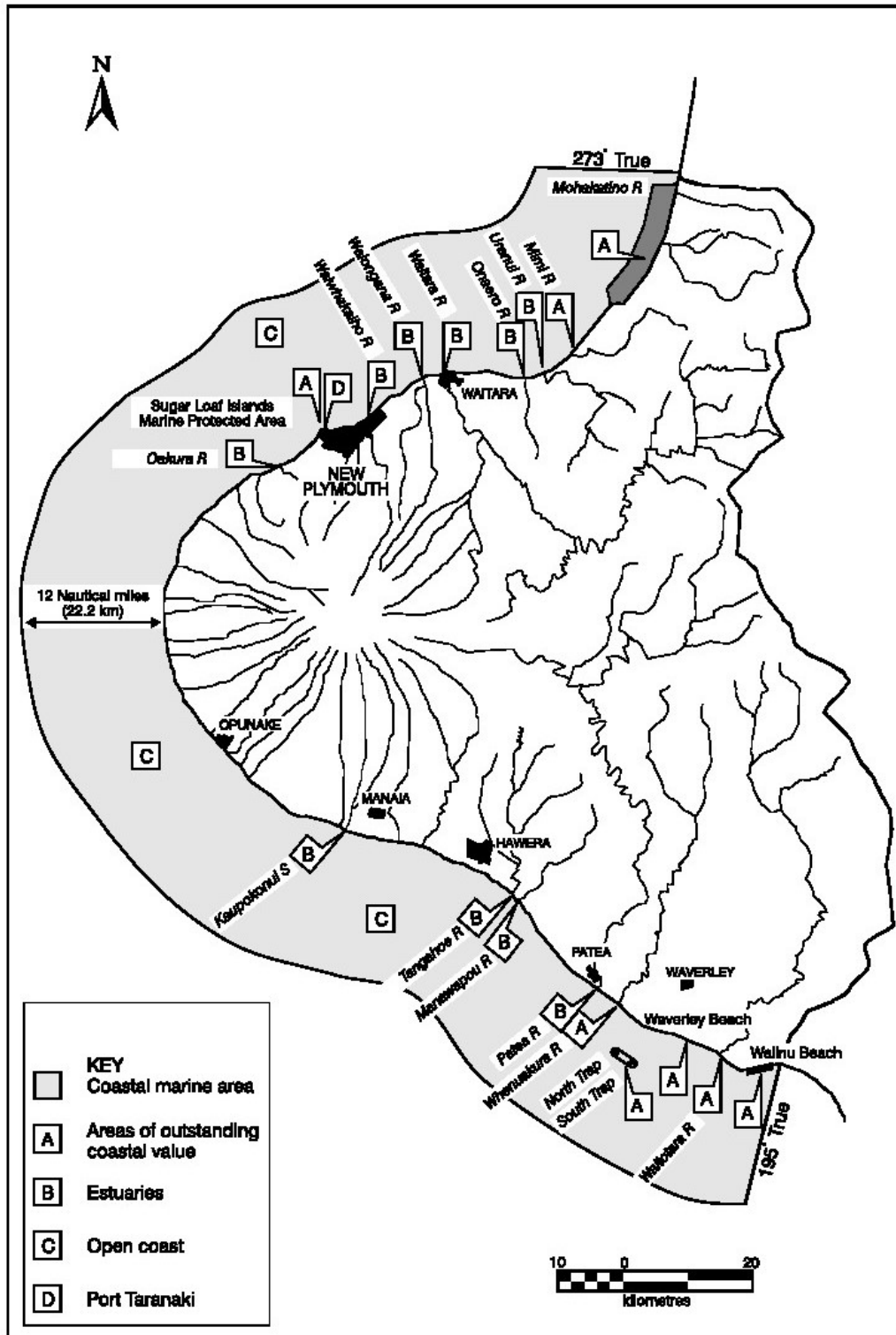
The West Coast North Island marine mammal sanctuary has been established to help protect Maui's Dolphin. The boundaries extend alongshore from Maunganui Bluff in Northland to Oakura Beach, Taranaki, in the south. The sanctuary's offshore boundary extends from mean high water springs to the 12 nm territorial sea limit.



## Oil spills

While cetaceans are presumed to be less vulnerable to oiling than many other marine species such as otters and seabirds, oil may damage the eyes, and inhalation of surface vapours can damage their lungs. Also, oil spills may have long-term impacts on prey populations such as fish and benthic invertebrates (Hines 2011). Understanding of the long-term impact of oil spills on cetaceans has grown following the Exxon Valdez oil spill in 1989 (Matkin et al 2008). Prior to the spill it was not clear whether cetaceans could detect and avoid oil, however, research suggests that while vision can help cetaceans to detect thick oil, they often rely on tactile response in order to avoid the oil, meaning that they will still come in contact with it and run the risk of ingestion or inhalation (Smultea and Wursig 1995). It has been suggested that the lack of an olfactory system for cetaceans may make it more difficult for these species to avoid oil than other species (Matkin et al 2008). Little is known about the effects of oil spills on cetaceans in New Zealand, so information from overseas is vital. A study on the effects of the Exxon Valdez oil spill on Orca/Killer whales found that two groups of whales suffered losses of 33 and 41% in the year following the oil spill and that 16 years after the oil spill one group had still not recovered to pre-spill numbers (Matkin et al 2008). This suggests that while the likelihood of a spill in New Zealand may not be high, the consequence of a spill on a small inshore population of cetaceans with a small home range could be catastrophic.

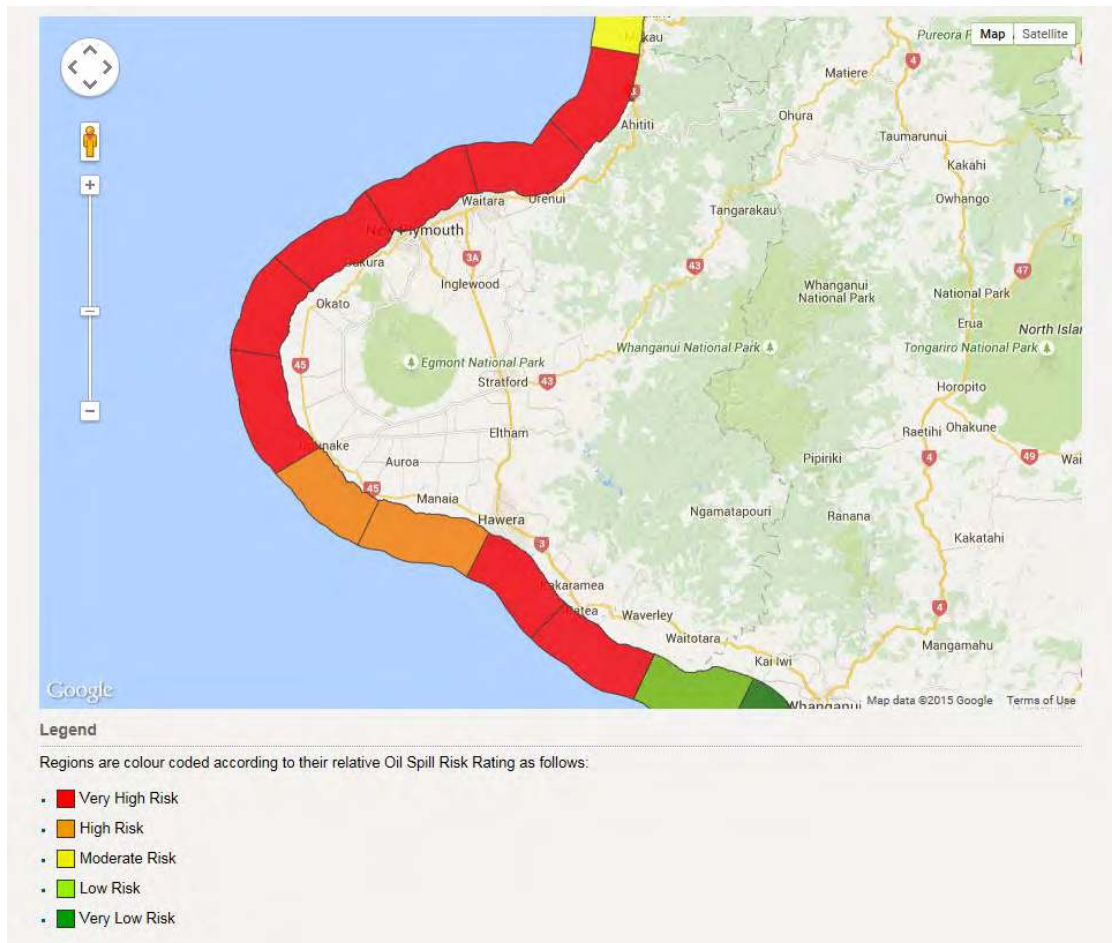
Taranaki Regional – Coastal Management Areas (map from Regional Coastal Plan for Taranaki)



## Sensitive sites along the Taranaki coastline

The following pages show sensitive sites and coastal information, including maps and photographs for the Taranaki region. There are 66 sensitive sites identified.

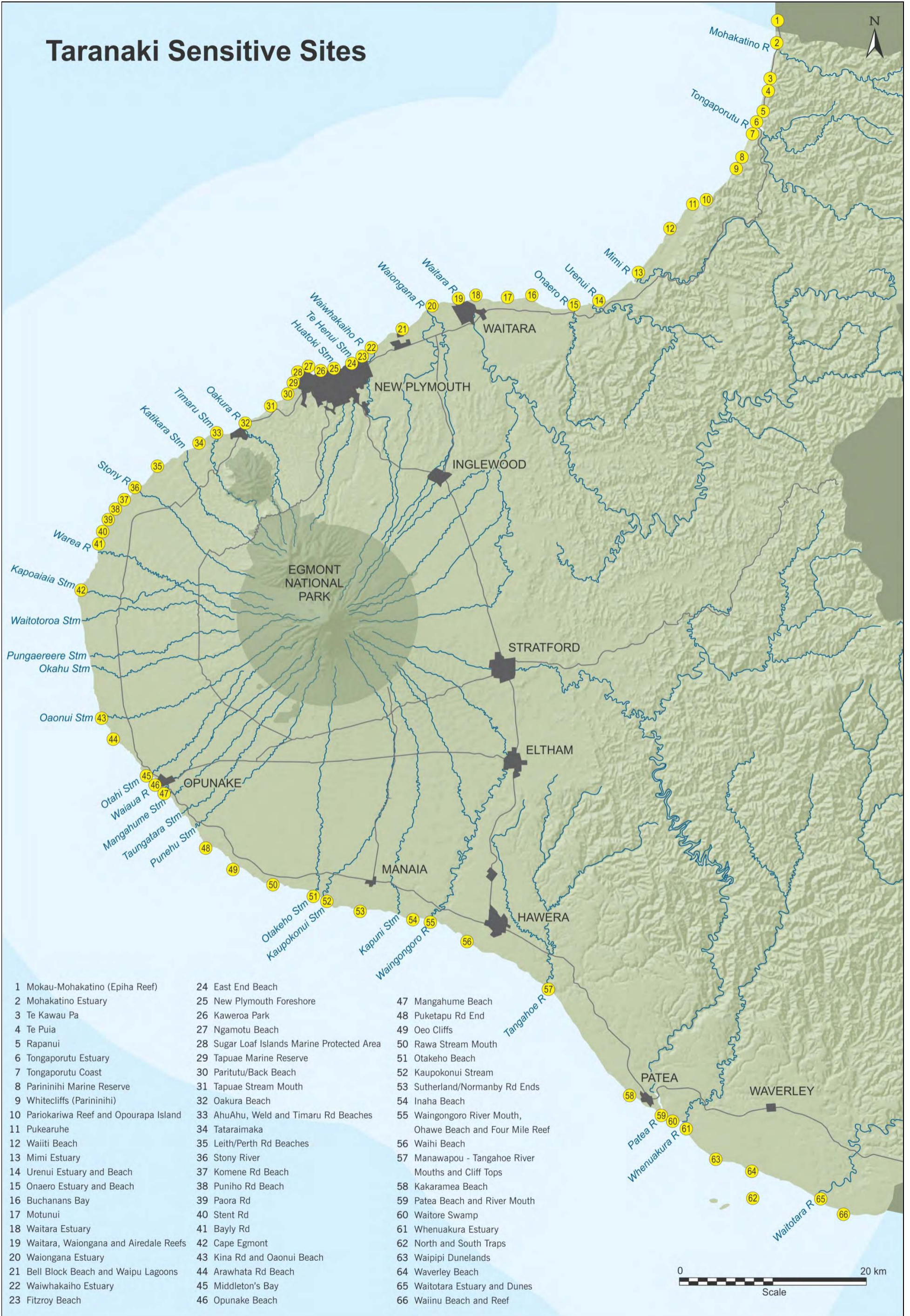
**Risk rating** – rates the site 1-5 (5 - Very high risk, 2 – High risk, 3 – Moderate risk, 4 – Low risk, 5 – Very low risk) to reflect the resulting level of risk (a combination of the calculated likelihood of oil being present and the impact of that oil). This is based on the map (below) from the marine oil spill risk assessment undertaken in 2009, which was based on an assessment of the environmental and social sensitivity to oil spills and the calculated risk associated with current vessel activity and associated movement of oil.



**Sensitivity index/rating** – rates the sites 1 – 3 to show which are deemed to be more sensitive sites, to allow assessment of which sites should be protected or cleaned up first etc.

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# Taranaki Sensitive Sites



- |  |   |  |
|--|---|--|
| 1 Mokau-Mohakatino (Epiha Reef)          | 24 East End Beach                           | 47 Mangahume Beach   |
| 2 Mohakatino Estuary                     | 25 New Plymouth Foreshore                   | 48 Puketapu Rd End   |
| 3 Te Kawau Pa                            | 26 Kaweroa Park                             | 49 Oeo Cliffs  |
| 4 Te Puia                                | 27 Ngamotu Beach                            | 50 Rawa Stream Mouth                                       |
| 5 Rapanui                                | 28 Sugar Loaf Islands Marine Protected Area | 51 Otakeho Beach   |
| 6 Tongaporutu Estuary                    | 29 Tapuae Marine Reserve                    | 52 Kaipokonui Stream                                       |
| 7 Tongaporutu Coast                      | 30 Paritutu/Back Beach                      | 53 Sutherland/Normanby Rd Ends                             |
| 8 Parininihi Marine Reserve              | 31 Tapuae Stream Mouth                      | 54 Inaha Beach   |
| 9 Whitecliffs (Parininihi)               | 32 Oakura Beach                             | 55 Waingongoro River Mouth, Ohawe Beach and Four Mile Reef |
| 10 Pariokariwa Reef and Opourapa Island  | 33 AhuAhu, Weld and Timaru Rd Beaches       | 56 Waihi Beach   |
| 11 Pukearuhe                             | 34 Tataraimaka                              | 57 Manawapou - Tangahoe River Mouths and Cliff Tops        |
| 12 Waiiti Beach                          | 35 Leith/Perth Rd Beaches                   | 58 Kakaramea Beach   |
| 13 Mimi Estuary                          | 36 Stony River                              | 59 Patea Beach and River Mouth                             |
| 14 Urenui Estuary and Beach              | 37 Komene Rd Beach                          | 60 Waitore Swamp   |
| 15 Onaero Estuary and Beach              | 38 Puniho Rd Beach                          | 61 Whenuakura Estuary                                      |
| 16 Buchanans Bay                         | 39 Paora Rd                                 | 62 North and South Traps                                   |
| 17 Motunui                               | 40 Stent Rd                                 | 63 Waipipi Dunelands                                       |
| 18 Waitara Estuary                       | 41 Bayly Rd                                 | 64 Waverley Beach  |
| 19 Waitara, Waiongana and Airedale Reefs | 42 Cape Egmont                              | 65 Waitotara Estuary and Dunes                             |
| 20 Waiongana Estuary                     | 43 Kina Rd and Oaonui Beach                 | 66 Waiinu Beach and Reef                                   |
| 21 Bell Block Beach and Waipu Lagoons    | 44 Arawhata Rd Beach                        |  |
| 22 Waiwhakaiti Estuary                   | 45 Middleton's Bay                          |  |
| 23 Fitzroy Beach                         | 46 Opunake Beach                            |  |







# Mokau-Mohakatino (Epiha Reef)

Number: 1

GPS: 1739811E  
5713173N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High) 1 2 3

## General description

Epiha reef is a large intertidal reef system between Mokau and Mohakatino Rivers, just north of the Waihi Stream. It is the most extensive intertidal reef system in North Taranaki. The coastal cliffs along this section of the coast are of varying height, and have communities of native flax-shrubland and native herbs.

## Location

2 km south of Mokau, between Mokau River and Mohakatino River.

## Land tenure

**Site:** - Crown Land: Seabed (administered by Department of Conservation)

**Site access:** - Crown Land: on the right bank of Mohakatino River; State Highway 3 (administered by Transit New Zealand) and Mohakatino Swamp Conservation Area (administered by Department of Conservation)  
- Private Land: no formal access

## Values

Amenity	High	- within an area of outstanding coastal value <sup>1</sup>
Recreational	Moderate	- access limits recreational use - fishing and shellfish collecting
Cultural/ Historical	High	- important traditional fishery for local hapu - midden and pa site in the area
Ecological/ Scientific	High	- herbfields on cliffs - the reef supports encrusting organisms including mussels, limpets and barnacles - coastal cliffs are a significant natural area

## Public access

Poor - The reef can be accessed via the beach at low tide from the Mohakatino Swamp Conservation Area on the right bank of the Mohakatino River. The reef is located approximately 2 km north of the Mohakatino River. Land in private ownership is located immediately adjacent to the reef and no public access is provided (previously informal access was provided via Mohakatino Station).

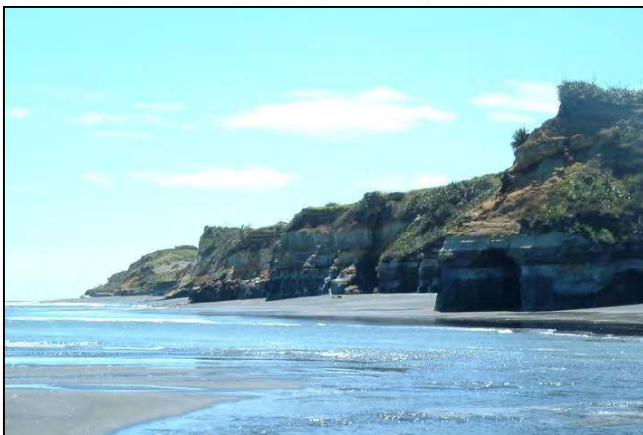
## Preferred response option

Where possible oil should be prevented from reaching sensitive reef areas. Deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection

point. Prevention of oil reaching the reef area and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### MOKAU-MOHAKATINO (EPIHA REEF)



# Mohakatino Estuary

Number: 2

GPS: 1739869E  
5711499N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High)

1 2 3

## General description

Mohakatino Estuary is one of the least modified estuaries in North Taranaki<sup>2</sup>. The estuary has a brackish swamp and extensive mudflats visible at low tide. Directly adjacent to the estuary is the Mohakatino Swamp Conservation Area - a regionally significant protected wetland of approximately 10 ha. Surrounding the area is farmland and 20-30 metre high cliffs.

## Location

3.5 km south of Mokau.

## Land tenure

- Site:**
- Crown Land: Seabed and foreshore of the estuary, and Mohakatino Swamp Conservation Area (administered by the Department of Conservation)
- Site access:**
- Crown Land: on the right bank; State Highway 3 bridge (administered by Transit New Zealand) crosses the estuary, and is directly adjacent to the Mohakatino Swamp Conservation Area (administered by the Department of Conservation)
  - Private land: on the left bank; no formal access

## Values

Amenity	High	<ul style="list-style-type: none"> <li>- within an area of outstanding coastal value</li> <li>- regionally important amenity value</li> <li>- significant coastal area, and a regionally significant landscape</li> <li>- land/seascape in this area is very unusual and dramatic</li> </ul>
Recreational	Moderate	<ul style="list-style-type: none"> <li>- boating and fishing</li> </ul>
Cultural/ Historical	High	<ul style="list-style-type: none"> <li>- pa and midden sites</li> </ul>
Ecological/ Scientific	High	<ul style="list-style-type: none"> <li>- notable fauna (bittern and spotless crane), and possibly petrel burrows. Australian bittern, Caspian tern, and variable oystercatcher roost on sandflats and in wetland adjacent to the estuary</li> <li>- notable flora (raupo and flax), a coastal herbfield and tussock shrubland, and Tainui, a nationally vulnerable tree grows on the edge of the swamp</li> <li>- the river supports whitebait, flounder and shellfish, and native freshwater fish spawning areas are likely to be present</li> <li>- regionally significant wetland</li> <li>- Key native ecosystem</li> </ul>

**Public access**

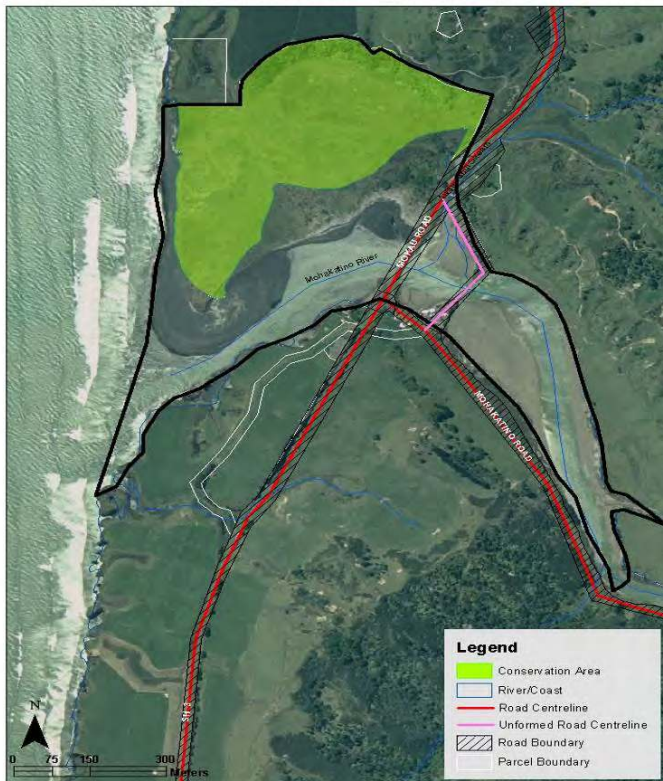
Good - Mohakatino Swamp Conservation Area is directly adjacent to State Highway 3, which enables access to the estuary and beach at low tide. No access is available to the left bank of the estuary.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive areas, deflective booms are unlikely to be effective long the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef area and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

**MOHAKATINO ESTUARY**



# Te Kawau Pa

**Number:** 3

**GPS:** 1739027E  
5707941N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)** 1 2 3

## General description

Te Kawau is a small (1.0244 hectare), flat-topped, steep sided island Pa protected as a historic reserve and archaeological site. The top of the island is 25 metres above sea level, and is covered in thick native shrub. The sea surrounds the eroding sandstone cliffs at high tide. The Pa is an ancient site of the Ngati Tama. The island is an attractive landmark on the North Taranaki coast. A few small off-shore reefs

## Location

7 km south of Mokau and 6 km north of Tongaporutu.

## Land tenure

**Site:** - Crown Land: Te Kawau Pa Historic Reserve (administered by the Department of Conservation)

**Site access:** - Crown Land: State Highway 3 (administered by Transit New Zealand)  
- District Land: Esplanade Reserve (administered by New Plymouth District Council)

## Values

Amenity	High	- within an area of outstanding coastal value - attractive landmark on the North Taranaki coast
Recreational	Low	- accessibility to possible recreational spots is low, surfcasting
Cultural/ Historical	High	- archeological site, protected historical reserve - ancient island Maori pa site, burial site (urupa), and midden - site of great spiritual and historical significance to local iwi - boundary between Taranaki and Waikato tribes All of these are well above high water
Ecological/ Scientific	Moderate	- Northern blue penguin common around the area, and other seabirds nest on the cliffs and offshore stacks - cliffs have high interpretive and scientific values for coastal processes - grey faced petrels - fluttering Shearwaters - Key native ecosystem

## Public access

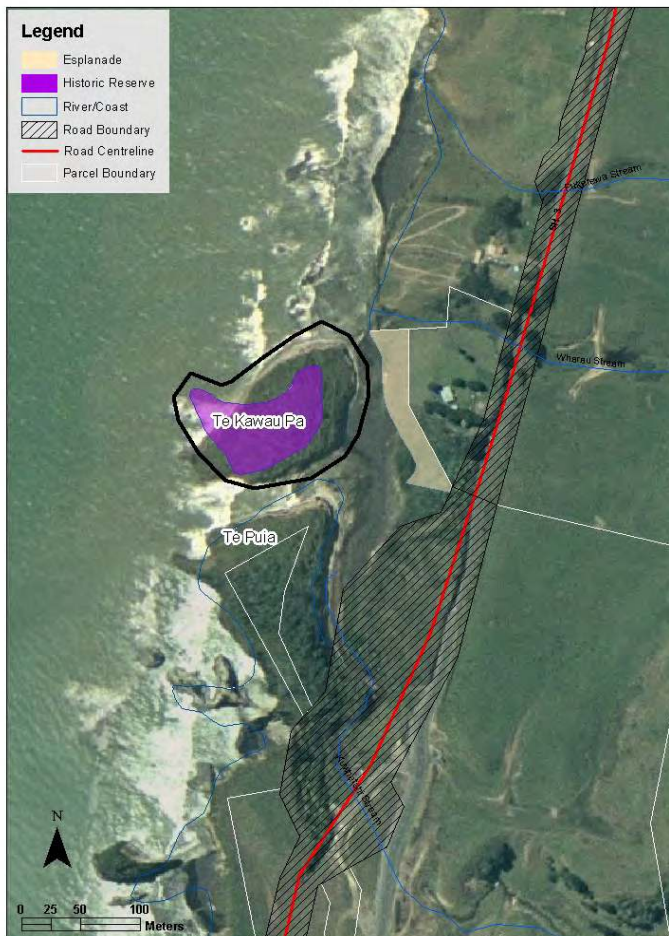
Poor - The historic reserve is signposted off State Highway 3, and a car parking area is available. No access track is available to the beach around the island. A rough track through bush exists onto the nearby headland (Te Puia) to view Te Kawau Pa. Access onto Te Kawau Island is forbidden. No high tide access.

### Preferred response option

Where possible oil should be prevented from reaching sensitive areas, deflective booms are unlikely to be effective long the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

### TE KAWAU PA



# Te Puia

Number: 4

GPS: 1739009E  
5707813N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High)

1 2 3

## General description

A Pa site on the headland adjacent to the mouth of the Kuwhatahi River. The site covers approximately 3 ha and is vegetated with coastal scrub and forest. It is one of the few remaining natural areas on the uplifted marine terrace. The headland is separated from Te Kawau Pa Reserve by a narrow sea channel.

## Location

7 km south of Mokau and 6km north of Tongaporutu.

## Land tenure

Site: - Private Land

Site access: - Crown Land: State Highway 3 (administered by Transit New Zealand)  
- Private Land: No formal access

## Values

Amenity	Moderate	- extensive views along the coast
Recreational	Moderate	- fishing
Cultural/ Historical	High	- pa site
Ecological/ Scientific	High	- vigorously regenerating coastal vegetation, one of few natural remaining on the uplifted Marine Terrace land system, above sea level. Not vulnerable to oiling - significant natural area - Key native ecosystem

## Public access

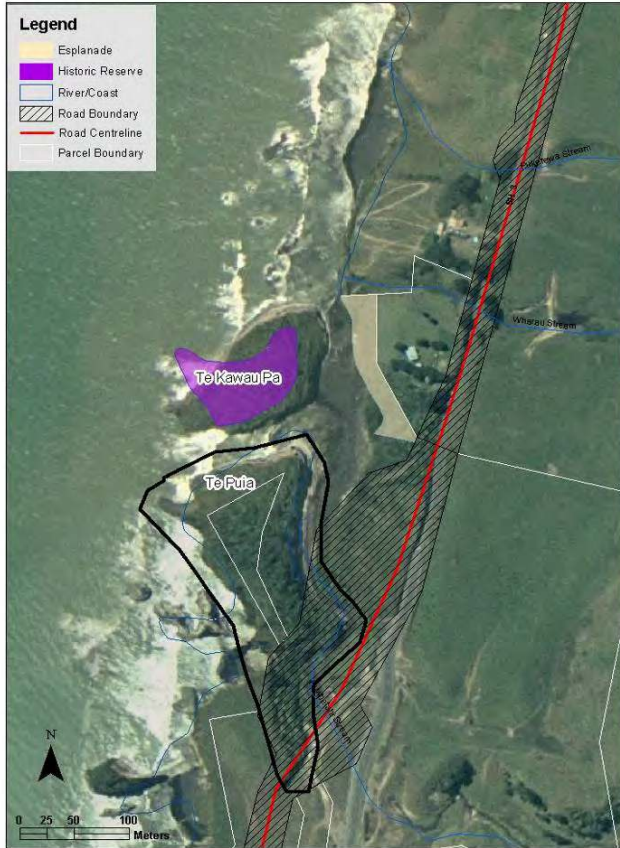
None - Te Puia is on private land, however there is a rough track from a carpark on road reserve off State Highway 3 to the headland from which Te Kawau Pa can be viewed. The Te Kawau Historic Reserve is signposted off State Highway 3.

## Preferred response option

Where possible oil should be prevented from reaching sensitive areas, deflective booms are unlikely to be effective long the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

TE PUIA





# Rapanui

Number: 5

GPS: 1738114E  
5704236N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High) 1 **2** 3

## General description

The area consists of a beach and a significant wetland, not tidally influenced, of less than 5 ha containing indigenous species. The area contains a small patch of raupo.

## Location

2 km north of Tongaporutu, adjacent to Rapanui Stream mouth.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Recreation Reserve (administered by the New Plymouth District Council)
- Site access:**
- Crown Land: on right bank; State Highway 3 (administered by Transit New Zealand)

## Values

Amenity	High	- regionally significant landscape
Recreational	Moderate	- small roadside picnic area, sandy beach, swimming and fishing, whitebaiting
Cultural/ Historical	High	- pa and midden/oven sites
Ecological/ Scientific	High	- Northern blue penguin - threatened flora (raupo and <i>Hypolepis dicksonioides</i> ) - wetland area - not tidal - grey faced petrel and fluttering shearwater also breed in the area - Key native ecosystem

## Public access

Excellent - Car parking area off State Highway 3 with direct access to the recreation reserve and beach on right bank of Rapanui Stream. No access is available via the left bank. Predator proof fenced area on south side of the stream

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach and wetland areas, deflective booms are unlikely to be effective long the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

### RAPANUI BEACH



# Tongaporutu Estuary

Number: 6

GPS: 1737677E  
5702564N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High) 1 2 3

## General description

A large (40 hectare), relatively unmodified and unpolluted, important, estuary containing extensive mudflats. Hardwood forests, bluffs, and offshore stacks surround the estuary. A small settlement, consisting mainly of holiday baches, is located on the left bank of the estuary.

## Location

15 km south of Mokau.

## Land tenure

- Site:**
- Crown Land: Tongaporutu Estuary (administered by the Department of Conservation)
- Site access:**
- Crown Land: on the right bank; State Highway 3 (administered by Transit New Zealand) and Pou Tehia Historic Reserve and Umukaha Point Recreation Reserve (administered by the Department of Conservation)
  - District Land: on the left bank; Tongaporutu Recreation Reserve, esplanade reserve and Clifton Road (administered by the New Plymouth District Council)  
on the right bank; Pilot Road and unformed Seaview Terrace (administered and vested in the New Plymouth District Council)
  - Private land: on left bank; no formal access

## Values

Amenity	High	<ul style="list-style-type: none"> <li>- baches</li> <li>- highly scenic area, with regionally important amenity values</li> <li>- significant coastal area, and a regionally significant landscape</li> </ul>
Recreational	High	<ul style="list-style-type: none"> <li>- various recreational activities, including waterskiing, whitebaiting, floundering, and holiday baches</li> </ul>
Cultural/ Historical	High	<ul style="list-style-type: none"> <li>- Pou Tehia Historic Reserve adjoins the estuary</li> <li>- various pa and midden sites</li> <li>- holiday baches have heritage value</li> </ul>
Ecological/ Scientific	High	<ul style="list-style-type: none"> <li>- contains abundant shellfish, with high species diversity</li> <li>- Variable oystercatcher, Northern blue penguin, Caspian tern, Branded Dotterel, Pied oyster catcher, Black shag, Little black shag, Pied shag, Pied stilt, Reef heron, White fronted tern</li> <li>- inanga and whitebait spawning site, and likely to contain other native freshwater</li> <li>- several small areas of wetland with plant life uncommon in Taranaki, excellent saltmarsh communities</li> <li>- offshore stacks considered regionally important and show turbidite exposures</li> <li>- priority waterbody</li> </ul>

## Public access

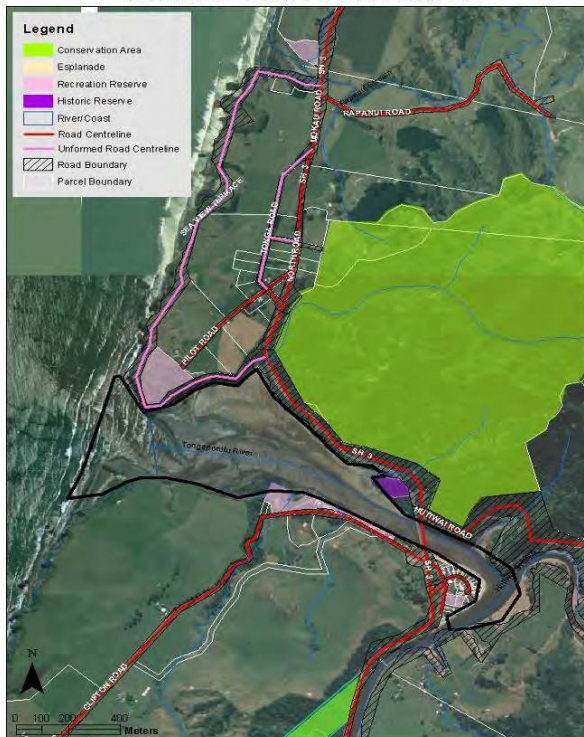
- Excellent - Boat ramp up the river and good staging facilities.
- The recreation reserve off Clifton Road has parking and toilet facilities directly adjacent to the left bank of the estuary. A public concrete boat ramp is located on the seaward side of the State Highway 3 bridge on the left bank. Access is also available from the right bank of the estuary via Pilot Road off State Highway 3, and through Umukaha Point Recreation Reserve (no signpost exists to indicate this is a recreation reserve however there is a stile over the fence and rough track).

## Preferred response option

Where possible oil should be prevented from reaching sensitive estuary, salt marsh and mudflat areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. Could easily boom river/stream as less than 10 metres. The river/stream is too shallow for boats. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

## TONGAPORUTU ESTUARY



# Tongaporutu Coast

**Number:** 7

**GPS:** 1737251E  
5702155N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)** 1 2 3

## General description

A wide sandy beach on either side of the Tongaporutu Estuary, from the Rapanui Stream to the Whitecliffs. Approximately 15 metre high steep cliffs back the beach. The beach is only accessible at low tide. There are extensive caves and offshore stacks along the coastline.

## Location

15 km south of Mokau.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
- Site access:**
- Crown Land: on the right bank; Umukaha Point Recreation Reserve (administered by the Department of Conservation)
  - District Land: on the left bank; Tongaporutu Recreation Reserve, esplanade reserve, and Clifton Road (administered by the New Plymouth District Council).  
on the right bank; Pilot Road and unformed Seaview Terrace (administered and vested in the New Plymouth District Council)
  - Private Land: on left bank; no formal access

## Values

Amenity	High	- outstanding natural features and landscapes, within an area of outstanding coastal value - significant coastal area
Recreational	Moderate	- commonly used for recreation (boating, fishing, walking) - Three Sister walk at low tide
Cultural/ Historical	High	- Māori rock art visible in a cave (one of 18 rock art locations in New Zealand) - pa and midden sites - shipwreck off Umukaha Point
Ecological/ Scientific	High	- caves, cut back into the cliffs to the south of the river mouth, feature strong horizontal strata and frequent waterfalls - nationally important for geology; with fossils of the Miocene Epoch (halostatotypes of the Tongaporutuan stage) present - offshore stacks and cliff edges have breeding colonies of grey-faced petrels, fluttering shearwater and white fronted terns, northern blue penguin have been recorded as nesting in the area. Breed up high but raft on water. - excellent saltmarsh communities and small sand dunes

## Public access

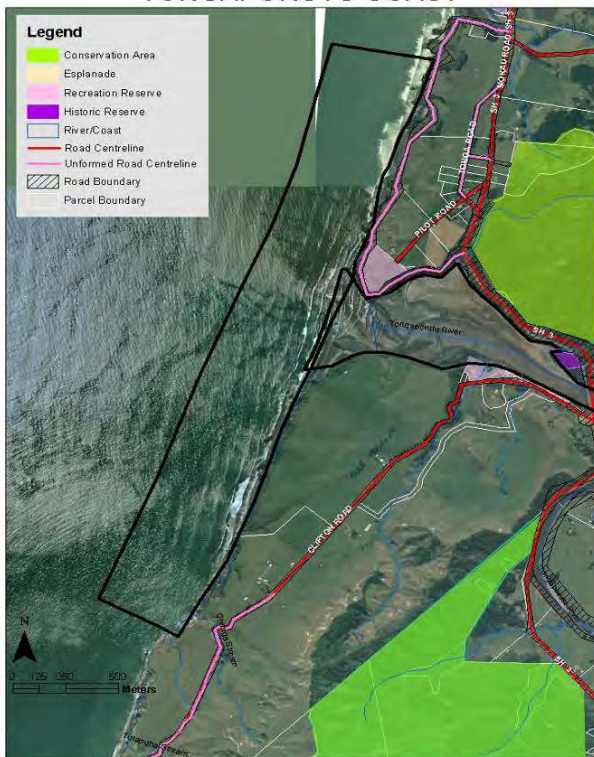
Poor - This stretch of the coast is inescapable at high tide due to the high cliffs. Access to the beach is by wading through the estuary from the recreation reserve off State Highway 3 and Clifton Road at low tide, or by walking along the coast from Rapanui at low tide. Access can also be obtained to the coastline north of the Tongaporutu Estuary from Umukaha Point Recreation Reserve off Pilot Road (no signpost exists to indicate this is a recreation reserve, however there is a stile over the fence and rough track). Foot and four wheel drive access along shoreline during low tides. There is a boat ramp access

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas and is a very wide estuary mouth so would be difficult to boom. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Reserve area. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## TONGAPORUTU COAST



# Parininihi Marine Reserve

Number: 8

GPS: 1732767E  
5696501N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High) 1 2 3

## General description

Parininihi Marine Reserve protects the isolated Pariokariwa reef. There are several different marine habitat types ranging from sand and mud flats to highly complex boulder reef systems. The 245 m high Whitecliffs, or Parininihi, are a significant feature of this stretch of coast and are eroded into short headlands and small bays fronted by beaches of black sand. Harder rocks are embedded in the mudstone and sandstone of the cliffs. Boulders dominate the shore between the Te Horo Stock Tunnel and Waipingau Stream. The intertidal and subtidal zones, extending north-west from the cliffs out to the reef consist of gravel with occasional boulders. This area is punctuated occasionally by boulder reefs and steep eastward facing rock outcropping reef. Sand flats are the dominant habitat type between depths of 20 to 30 m.

## Location

Offshore from the White Cliffs/Parininihi, North Taranaki

## Land tenure

- Site:** - Crown Land: Foreshore and seabed owned by Crown, Parininihi Marine Reserve (administered by the Department of Conservation)
- Site access:** - District Land: Road access via Pukearuhe rd, north of Urenui. Access via Whitecliffs walkway and Te Horo stock tunnel (administered by the Department of Conservation, in conjunction with Ngati Tama) which crosses private land (R. Gibbs - Clifton Road) and Maori land (Ngati Tama).

## Values

Amenity	High	- area of outstanding coastal value, and regionally important amenity values - significant coastal area, regionally significant landscape, and outstanding natural feature (White Cliffs, )
Recreational	High	- swimming, diving, walking, surf-casting (just outside of reserve)
Cultural/ Historical	High	- Katikatiaka Pa, evidence of Maori occupation; traditional customary fishing/kai moana grounds.
Ecological/ Scientific	High	- collection of rare and exotic sponge gardens that carpet the reef, of international significance in terms of diversity - diverse and abundant marine life and underwater habitats - large rock lobster populations Most of ecological value associated with subtidal area (deeper offshore than intertidal)

**Public access**

**Poor** -The main public access to the area is via Pukearuhe Road, north of Urenui (off State Highway 3). It is also possible to access the northern part of the reserve via Clifton Road (also off State Highway 3) using the Whitecliffs Walkway. However, this track is closed from 1 July to 30 September due to lambing (as the walkway crosses private farmland). From the end of Clifton Road, it is a 6 km walk to gain beach access just south of the Katikatiaka Pa. Boats can also access the area from boat ramps at Mokau, Tongaporutu, Pukearuhe, Urenui, Waitara and New Plymouth. Information signs about the Parininihi Marine Reserve are located at the Mokau boat ramp, Tongaporutu – Clifton Rd and at the end of Pukearuhe Rd.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive reef and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant further off-shore/outside the Marine Reserve area, avoid use of dispersants within marine reserve. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High





# Whitecliffs (Parininihi)

**Number:** 9

**GPS:** 1734131E  
5696536N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)** 1 2 3

## General description

Huge white cliffs (reaching up to 200 metres high) along a 7 km stretch of coastline. At high tide the area is inaccessible. During low tide the area is accessible via the beach and inland Whitecliffs Walkway. A small sand dune of national importance is located at the mouth of the Waipingau Stream. The dune is approximately 8 metres high and contains a population of Pingao. Boulders and volcanic sand beach.

## Location

6 km south of Tongaporutu and 2 km north of Pukearuhe.

## Land tenure

- Site:**
- Crown Land: Foreshore and Whitecliffs Conservation Area (state forest – 856 ha with 32 ha in grazing and occupation licences – administrated by the Department of Conservation)
  - District Land: Unformed Clifton Road (vested in the New Plymouth District Council)

- Site access:**
- The Whitecliffs Walkway (9.6 km long) follows a pipeline corridor, unformed road and beach. The walkway is on a combination of land administered by the New Plymouth District Council, Department of Conservation and privately owned.

## Values

Amenity	High	- outstanding natural landscape, and within an area of outstanding coastal value - regionally significant landmark, and landscape
Recreational	Moderate	- recreational fishing, walking, and surfing (at northern end)
Cultural/ Historical	High	- pa sites, and terraces, ovens and pits - 'hand-dug' Te Horo stock tunnel and a well known pre-european pathway - kaimoana gathering
Ecological/ Scientific	High	- geologically important 'B' rating on geopreservation inventory - best remaining examples of primary coastal hardwood and podocarp hardwood forest on the west coast of the North Island - fluttering shearwaters breed on the cliffs and blue penguins burrow near stream mouths - sand dunes at Waipingau Stream are a threatened plant site (Pingao – <i>Ficinia spiralis</i> ) - land adjoining the whitecliffs is a significant natural area - sponge gardens of international significance

**Public access**

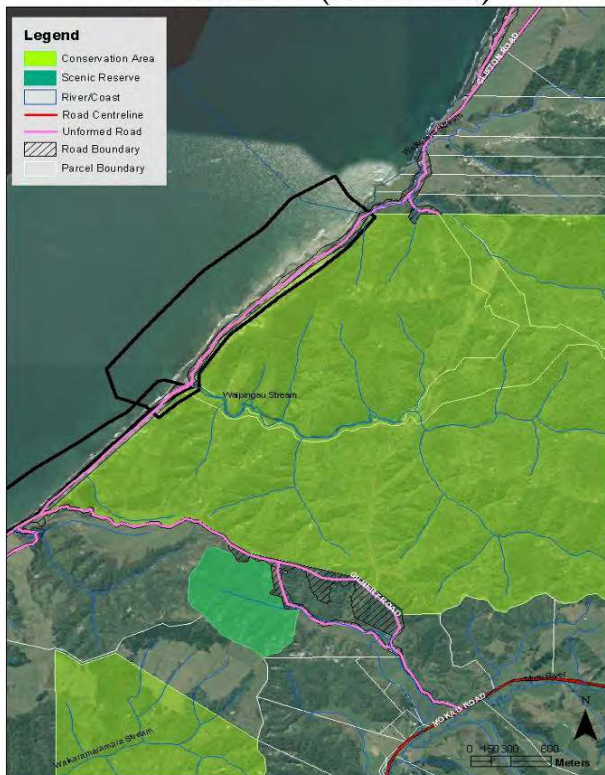
Good - Low tide access only to beach. Access to the walkway via Clifton Road in Tongaporutu to the north, and Pukearuhe Road in the south. The route is signposted with an option to use the inland track or beach. Access via the beach is two hours either side of low tide. The inland route is closed during the lambing season.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Reserve area. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

**WHITECLIFFS (PARININIHI)**



# Pariokariwa Reef and Opourapa Island

**Number:** 10

**GPS:** 1730816E  
5694538N

(Shipwreck 1731913E, 5695075N)

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)**

**1** 2 3

## General description

This section of the coast is dynamic, high energy, and supports diverse marine life. Opourapa Island stood as high as the nearby mainland in the mid-nineteenth century. Connected to the island is a large reef system, approximately 8 km long extending north to Waikiekie Stream. The reef extends between 1.5 km and 900 m offshore, with a small intertidal area known locally as Waikiekie Reef which has approximately 30 m of rocky habitat. The reef is relatively shallow (approximately 8 to 20 m deep). The ship 'H.M. Colonial Transport Alexandra' was wrecked off the coast in 1865, at the time when the military settlement at Pukearuhe was being set up. The H.M. Colonial Transport Alexandra (273 tonnes) was one of the many ships carrying materials and garrison to this area. Many parts have been salvaged, and most of the ironwork is badly corroded. The ships bell hangs in St Peter's by the sea at Mokau.

## Location

16 km north of Urenui.

## Land tenure

**Site:** - Crown Land: Seabed (administered by the Department of Conservation)

**Site access:** - Crown Land: Recreation reserves and Pukearuhe Historic Reserve (administered by the Department of Conservation)  
- District Land: Pukearuhe Road and unformed roads in the Pukearuhe 'township' (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- within area of outstanding coastal value - unusual marine feature
Recreational	Moderate	- popular fishing and kaimoana gathering, and underwater divers
Cultural/ Historical	High	- site of the shipwreck 'Alexandra' in shallow water offshore (archeological site)
Ecological/ Scientific	Moderate	- abundant marine life - diversity of encrusting (attached) marine animals, sponges, shellfish, crustaceans and large variety of fish - fur seal haul-out and a seabird roosting area

**Public access**

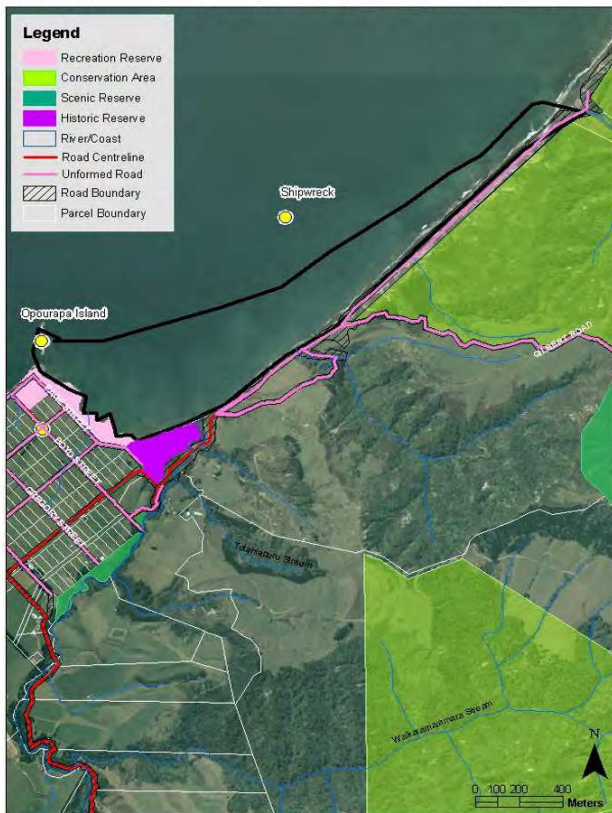
Poor - The island is accessible at low tide from the beach at the end of Pukearuhe Road. There is no visible indication that a recreation reserve or unformed roads exist on the ground. The shipwreck is located offshore approximately half way between Oporapa Island and Waipingau Stream.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Reserve area. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

**PARIOKARIWA REEF AND OPOURAPA ISLAND**



# Pukearuhe

**Number:** 11

**GPS:** 1730800E  
5694018N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)** 1  2  3

## General description

Pukearuhe was the site of one of the great pa of Ngati Tama whom controlled the northern route and movements in and out of Taranaki. The area was established as a military settlement in the 1860's in an attempt to stabilize the political situation in the province following the Taranaki Wars of the period. As a result there are many surveyed unformed roads in Pukearuhe.

## Location

14 km north of Urenui, at the end of Pukearuhe Road (no-exit road).

## Land tenure

**Site:** - Crown Land: Pukearuhe Recreation Reserves and Pukearuhe Historic Reserve (administered by the Department of Conservation)

**Site access:** - District Land: Pukearuhe Road and many unformed roads in the Pukearuhe 'township' (administered and vested in the New Plymouth District Council)

## Values

Amenity	Moderate	- scenic reserve nearby
Recreational	Moderate	- gathering kaimoana, fishing, beach use, picnics, start of whitecliffs walkway
Cultural/ Historical	High	- historic reserve - military redoubts, occupations sites and artifacts found - pa sites, wāhi tapu sites, and ovens
Ecological/ Scientific	Not known	- often fur seals on the point - likely Northern blue penguins at the stream mouth

## Public access

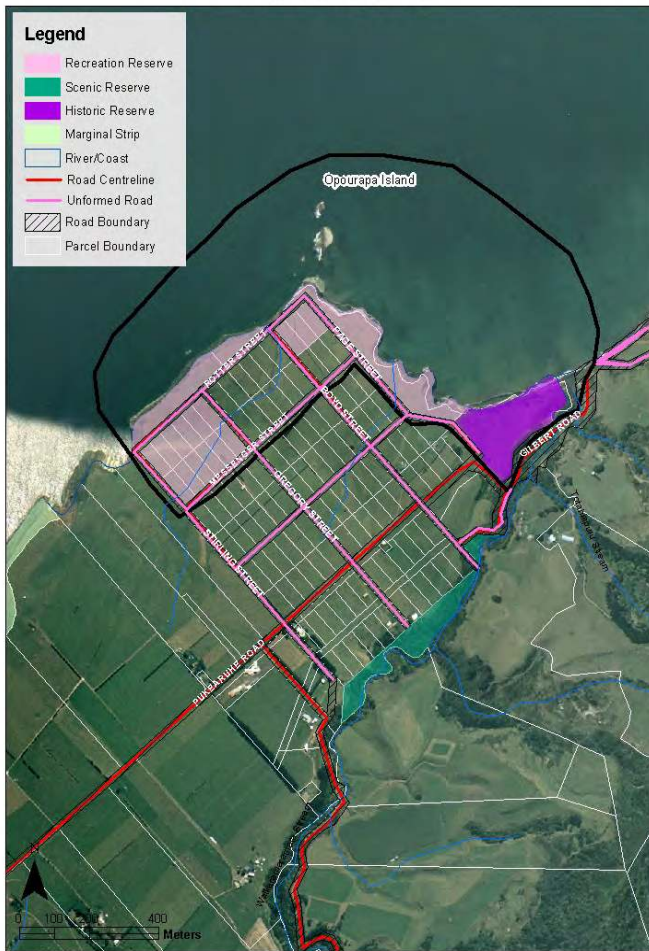
Good - At the end of Pukearuhe Road is a road sign indicating the Historic Reserve, which is a popular picnic spot with tables. The many other recreation reserves in Pukearuhe can not be distinguished from the adjacent farmland. Pukearuhe is also the start of the Whitecliffs Walkway. Boat ramp.

## Preferred response option

Where possible oil should be prevented from reaching sensitive reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Reserve area. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

PUKEARUHE



# Waiiti Beach

**Number:** 12

**GPS:** 1727709E  
5690617N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)** 1 2 3

## General description

Waiiti beach is an iron sand beach with 20-30m high cliffs and papa boulders. The beach has high recreational use by day visitors, and there is a popular campground with baches. Small stream, holiday resort facilities. Rock armouring to protect resort.

## Location

10 km north of Urenui.

## Land tenure

**Site:**

- Crown Land: Marginal Strip from Waiiti to the Mimi River (administered by Department of Conservation)
- District Land: Esplanade Reserve along the beach front (administered by New Plymouth District Council)

**Site access:**

- District Land: Land owned by New Plymouth District Council used for public parking area, and Beach Road (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- area used for swimming, surfing, fishing and walking
Cultural/ Historical	High	- Waiiti Stream is the tribal boundary for Ngati Tama and Ngati Mutunga - wāhi tapu and pa sites in the area - heritage building
Ecological/ Scientific	High	- internationally important shark and whale bone fossils in intertidal zone - previously buried forest is now exposed on the reef - fluttering shearwaters and grey faced petrels on the cliffs and stacks and northern blue penguin abundant (penguin hot spot) in the area - a huge protected kahikitea - stabilised sand dunes, with marram, some tall karo, taupata, and native herbs - mussel reef northern end

## Public access

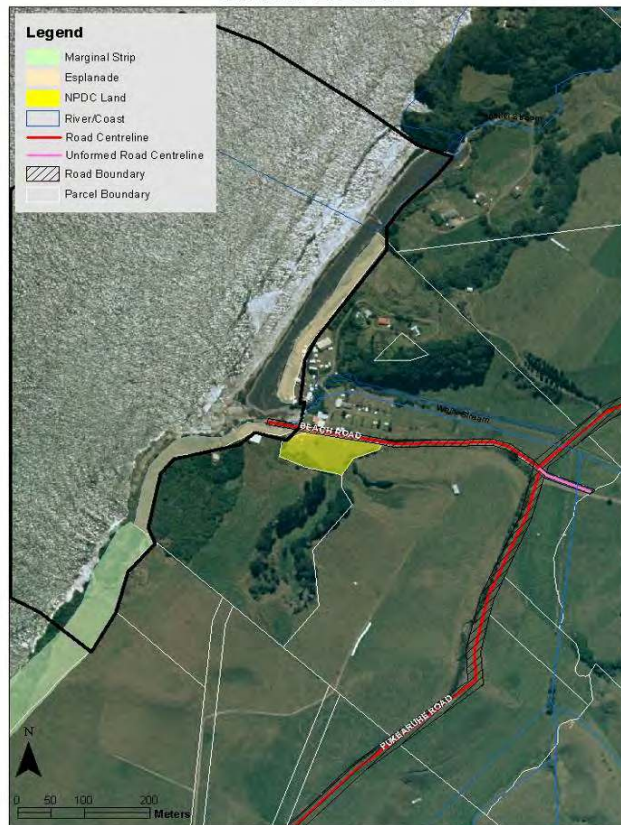
Excellent - Parking area at the end of Beach Road (off Pukearuhe Road) by the campground shop. The adjoining esplanade reserve gives direct access to the beach. Four wheel drive boat ramp. Use beach to access neasts/burrows.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### WAIITI BEACH





# Mimi Estuary

**Number:** 13

**GPS:** 1724593E  
5686292N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)** 1 2 3

## General description

The Mimi Estuary has tidal mudflats and sandflats, saltmarsh and sand dune habitat that are uncommon in North Taranaki. Planting of marram grass has been undertaken to stabilise the dunes. Adjacent is the wide, sandy Waitoetoe Beach.

## Location

5 km north of Urenui.

## Land tenure

- Site:** - Crown Land: Mimi Estuary (administered by the Department of Conservation)
- Site access:** - Crown Land: Recreation reserve and marginal strip from Waiti to the Mimi River (administered by the Department of Conservation)
- District Land: Waitoetoe Road, unformed Carrs Road and unformed Johnson Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- area of outstanding coastal value, significant coastal area, and a regionally significant landscape
Recreational	Moderate	- wide sandy beach adjacent to the estuary, used for various activities such as fishing, surfing, walking, floundering, and picnics, whitebaiting
Cultural/ Historical	High	- many wāhi tapu and pa sites - Maori artefacts have been found
Ecological/ Scientific	High	- dunes/sand spit south side of estuary - important habitat for resident and migratory shore birds, including Northern NZ Dotterel, Variable oyster catcher, Northern blue penguin, Caspian tern, Red billed bull, white fronted tern and Royal spoonbill - whitebait spawning area in upper estuary, feeding ground for snapper and trevally and a nursery area for juvenile marine species and flounder - priority waterbody - Key native ecosystem - Salt marsh ribbonwood, coastal tree daisy

**Public access**

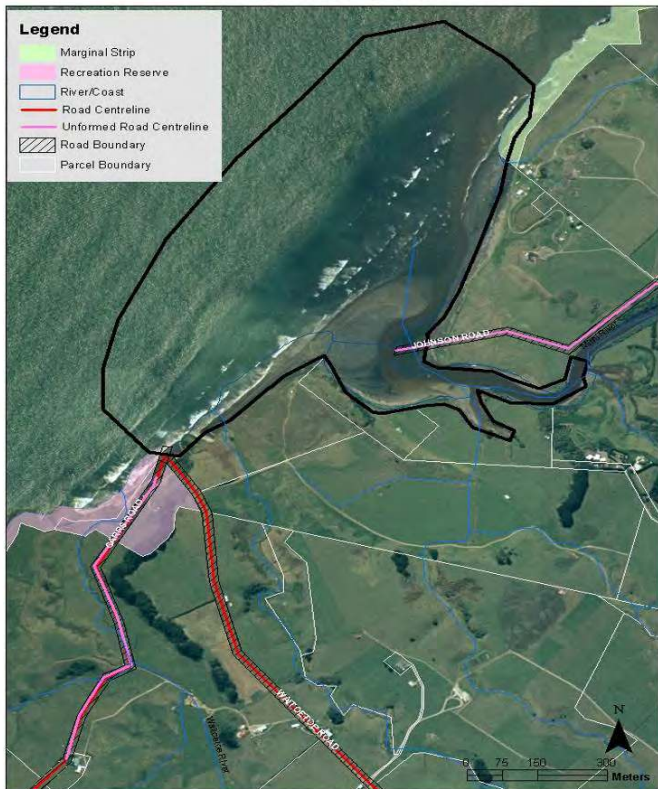
Good - Waitoetoe Road provides direct access to Waitoetoe Beach via the recreation reserve. The estuary is approximately 1 km north along the beach from Waitoetoe Road and can be reached at low tide. Access to the right bank of the Mimi Estuary is via Johnson Road. Johnson Road is formed to approximately 500 metres from the coast with the unformed portion across farmland to the estuary. May be possible to boom. No boat launching evident.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive mudflat and dune areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the mudflat, dune area and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

**MIMI ESTUARY**



# Urenui Estuary and Beach

Number: 14

GPS: 1720317E  
5683266N

Map sheet: NZMS 260 Series Sheet Q19

Risk rating (1= High) 1 2 3

## General description

The Urenui Estuary covers approximately 80 ha and contains tidal mudflats and earth banks. The township is situated on the left bank and on the right bank is a popular camping ground.

## Location

16 km north of Waitara.

## Land tenure

**Site:** - Crown Land: Estuary and foreshore (administered by Department of Conservation)

**Site access:** - District Land: on the right bank; recreation reserve (incorporates the campground and golf course) and Urenui Beach Road (administered by the New Plymouth District Council) on the left bank; recreation reserve and Mokena Street (administered by the New Plymouth District Council).  
- Private Land: on the left bank; no formal access

## Values

Amenity	High	- regionally important amenity values - significant coastal area and regionally significant landscape
Recreational	High	- large campground, golf course, whitebaiting, fishing, amateur boats, and high use by school groups
Cultural/ Historical	High	- Wāhi tapu and pa sites - several important historic sites surround the estuary
Ecological/ Scientific	High	- whitebait spawning in the upper reaches, snapper and trevally spawn offshore and feed in the estuary, also an important flounder fishery - Northern blue penguin are abundant and breed here - Caspian tern, Variable oystercatcher - migratory birds roost and feed here - good coastal kohekohe and karaka trees - remnants of what has now been almost completely cleared from the uplifted marine terrace - two significant natural areas adjoining the estuary - saltmarsh ribbonwood

**Public access**

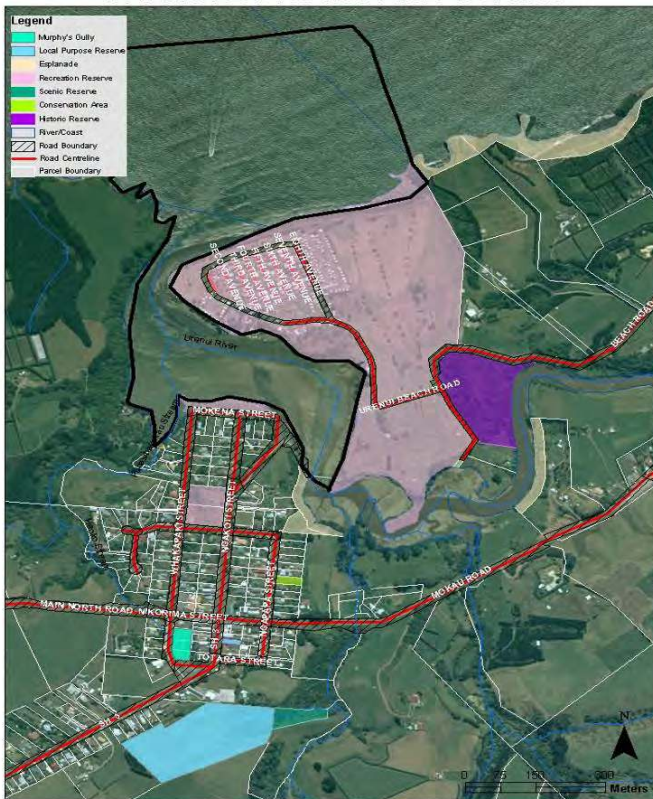
Excellent - Direct access to the estuary via Urenui Beach Road through the campground and recreation reserve. Access on the left bank is through the recreation reserve via the Urenui township. A walking track previously existed along the esplanade reserve north of Urenui Beach to a bay called Honeymoon Bay however the track has eroded and no access to Honeymoon Bay now exists.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive mudflat and earthbank areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the mudflat and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

**URENUI ESTUARY AND BEACH**



# Onaero Estuary and Beach

**Number:** 15

**GPS:** 1717570E  
5683176N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)** 1 2 3

## General description

A rugged coastline with protruding cliffs. The area is popular for recreational activities with many baches, a camping ground and domain. There are several historic sites in the area. Cliff on the true left bank of the river mouth.

## Location

2.5 km south of Urenui and 11 km north of Waitara.

## Land tenure

**Site:**

- Crown Land: Estuary, foreshore and marginal strip (administered by the Department of Conservation)
- District Land: Esplanade reserves (administered by the New Plymouth District Council)

**Site access:**

- Crown Land: Scenic reserve and Pukemiro Historic Reserve (administered by the Department of Conservation) and State Highway 3 (administered by Transit New Zealand)
- District Land: Onaero Domain Recreation Reserve plus additional recreation reserves and Onaero Beach Road (administered by New Plymouth District Council)

## Values

Amenity	High	- scenic reserve, regionally important amenity values, a significant coastal area, and regionally significant landscape
Recreational	High	- popular recreational area especially during summer and whitebait season - surfing at the western end of beach
Cultural/ Historical	High	- historic reserve - Pukemiro pa site (sacred pa) on south bank, and other wāhi tapu sites - ancient Maori pathway from coast to Te Rau o te Huia inland
Ecological/ Scientific	Moderate	- northern blue penguins nest in cliffs, abundant - fossils present in the cliffs, an important area geologically - large historic puriri tree in the Pukemiro Reserve

## Public access

Excellent - A parking area and boat ramp is provided to the beach at the end of Onaero Beach Road. Access to the estuary can be through the domain off State Highway 3. Access to the mouth of the estuary and adjoining beach is through the campground however the current lease agreement restricts vehicular

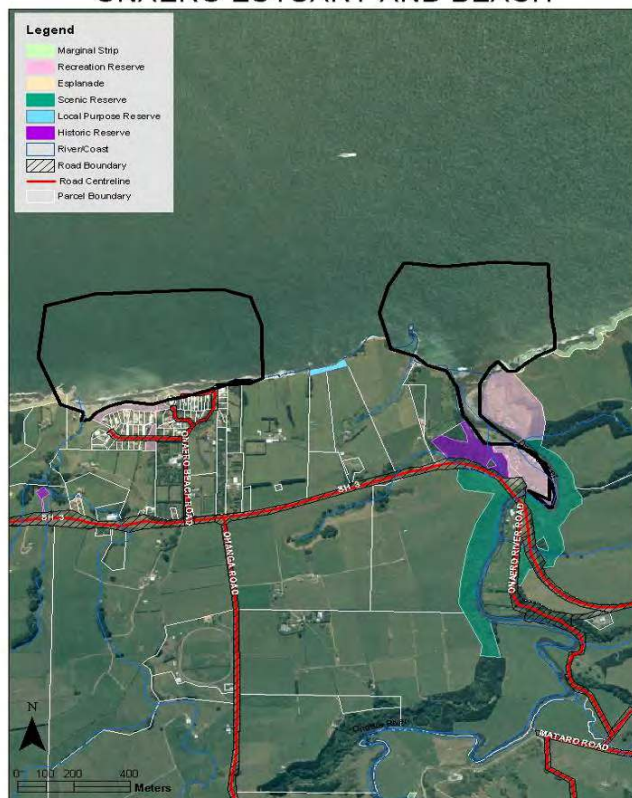
access. Access cannot be gained around the coast from the mouth of the estuary to the beach at the end of Onaero Beach due to rugged cliffs. Lots of debris in river mouth. Four wheel drive access across farm. No place to launch a boat.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Possible to boom (rapid deployment boom) off upper estuary. Prevention of oil reaching the beach and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### ONAERO ESTUARY AND BEACH



# Buchanans Bay

**Number:** 16

**GPS:** 1715114E  
5683325N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)**

**1** 2 3

## General description

An area with a huge tidal reef system, sand/cobble beaches and eroding cliffs. Within this area is the boundary between debris from Pouakai volcanic eruptions and uplifted Tertiary mudstones to the north. There is a spawning ground for snapper and trevally 2-4 nm off shore offshore, and a trawling ban covers the offshore area. Big reef exposed on spring low tides.

## Location

Located between Turangi Road to the south and Waiiau Stream to the north, 9 km north of Waitara.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
- Site access:**
- District Land: Esplanade reserves, land owned by New Plymouth District Council and Turangi Road (administered by the New Plymouth District Council).
  - Private Land: no formal access

## Values

Amenity	Moderate	
Recreational	Moderate	- used extensively for fishing and kaimoana gathering - surfing at the end of Turangi Road
Cultural/ Historical	High	- pa sites, wāhi tapu sites, and a urupa
Ecological/ Scientific	High	- tidal reef system rich in marine life - snapper and trevally spawning ground - 2-4 nm off shore - boundary between debris from Pouakai volcanic eruptions and uplifted Tertiary mudstones to the north - paua and kina - likely Northern blue penguin habitat

## Public access

- Poor
- Turangi Road is the only access point to this section of the coast. Parking and picnic tables are provided at the road end. Buchanans Bay is approximately 2 km east from Turangi Road and may be accessible at low tide.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Could boom off estuary inside mouth. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option as it would need to avoid snapper and trevally spawning ground offshore. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to an offshore oil rig in the area. Lots of large debris along river mouth.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### BUCHANANS BAY





# Motunui Beach

**Number:** 17

**GPS:** 1711159E  
5683921N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)**

**1** 2 3

## General description

An area of coastline with offshore reefs, close shallow sub tidal Ecklonia, sand and cobble beaches, and low vegetation on volcanic cliffs. The Motunui Synfuel plant dominates this section of coastline. Lots of drift wood in supra-tidal zone.

## Location

5 km north of Waitara.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Esplanade reserve, Epiha Road and Otaraoa Road (administered by the New Plymouth District Council)

## Values

Amenity	Moderate	
Recreational	Moderate	- surfing
Cultural/ Historical	High	- ancient canoe launch, locally significant - wooden artifacts discovered in the past - pa sites, urupa, wāhi tapu sites, and oven/pits
Ecological/ Scientific	Not known	- Key native ecosystem

## Public access

Excellent - Access and parking areas are provided at the end of Epiha Road and Otaraoa Road. Access along the esplanade reserve is restricted due to health and safety issues with industry in the area.

## Preferred response option

Where possible oil should be prevented from reaching sensitive reef and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of an offshore oil rig.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## MOTUNUI BEACH



# Waitara Estuary

**Number:** 18

**GPS:** 1706442E  
5683724N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)**

**1** 2 3

## General description

The Waitara River is the largest river in Taranaki and is located in the centre of the Waitara urban area. Small areas of native vegetation remain near the river mouth. A regionally significant protected wetland with salt marsh vegetation (approximately 2.3 ha) is located on the mudflats approximately 500 metres from the river mouth. Extensive tidal reef systems are located offshore (see Waitara, Waiongana and Airedale Reefs information sheet).

## Location

Waitara township.

## Land tenure

**Site:** - Crown Land: Estuary (administered by the Department of Conservation)

**Site access:** - Crown Land: Waitara River Scenic Reserve (administered by the Department of Conservation)  
- District Land - Foreshore reserve, land owned by the New Plymouth District Council which is used as recreation reserve, and includes a campground, Battiscombe Terrace, West Beach Road and East Beach Road (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values, and a significant coastal area
Recreational	Moderate	- boating, fishing
Cultural/ Historical	High	- river, estuary and adjacent coast has important spiritual and historical value to the local Maori people - pa and wāhi tapu sites - fourteen shipwrecks have been recorded on the Waitara bar
Ecological/ Scientific	Moderate	- part of the North Taranaki uplifted marine terraces - was previously an important lamprey fishery, although now badly damaged - wetland area adjacent to estuary - small areas of native vegetation remain near the river mouth and the location of regionally uncommon indigenous plants, including saltmarsh ribbonwood - Important habitat for resident and migratory shore birds including Variable oyster catcher, Northern blue penguin, Black shag, Caspian tern, red billed gull and Royal spoonbill - notable Norfolk Island Pine on road reserve <sup>3</sup> - Key native ecosystem (parts of this area)

**Public access**

Excellent - Access is available along the length of the western foreshore. Both the left and right banks are very accessible from the Waitara township, including from Battisicome Terrace, West Beach Road, East Beach Road, the campground, and golf course.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of an offshore oil rig.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High



# Waitara, Waiongana and Airedale Reefs

**Number:** 19

**GPS:** 1706006E  
5683918N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)**

**1** 2 3

## General description

An extensive reef system that is exposed at low tide. Large areas, volcanic boulders. The beach is sandy and stony with low coastal foredunes.

## Location

Waitara township, adjacent to Waitara golf course and between Waiongana Stream and Waitara River.

## Land tenure

**Site:**

- Crown Land: Seabed (administered by the Department of Conservation)
- District Land: Foreshore reserve (administered by the New Plymouth District Council)

**Site access:**

- Crown Land: Marginal strip (from right bank of Waiongana Stream, continues along coast to New Plymouth District Council owned land in Waitara)
- District Land: Esplanade reserves, New Plymouth District Council owned land (including land used as recreation reserve, campground and land leased by Airedale Golf Club), Battiscombe Terrace, West Beach Road, and East Beach Road (administered by the New Plymouth District Council. Unformed road off Brown Road and Waihi Road (vested in the New Plymouth District Council).

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- significant mussel beds, important for collection of edible shellfish, paua - surfing
Cultural/ Historical	Moderate	- reef used for Kaimoana gathering
Ecological/ Scientific	Moderate	- Airedale reef contains the roots and trunks of a buried forest - Key native ecosystem, Waitara West marginal strip - Significant notable bird area at the Waiongana river mouth

## Public access

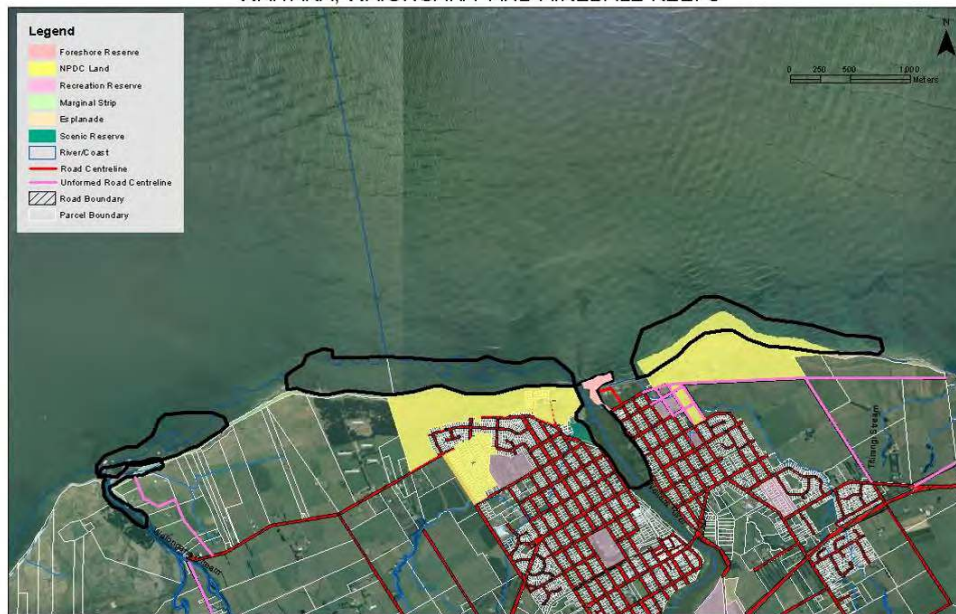
Poor - The reef is offshore, but access is available along the length of the western foreshore in Waitara. Access is via Battiscombe Terrace, West Beach Road and East Beach Road, the campground and golf course. An unformed road exists off Brown Road that could provide access to the Waiongana Reef.

## Preferred response option

Where possible oil should be prevented from reaching sensitive reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef area and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of an offshore oil rig.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

WAITARA, WAIONGANA AND AIREDALE REEFS



# Waiongana Estuary

**Number:** 20

**GPS:** 1702437E

5682968N

**Map sheet:** NZMS 260 Series Sheet Q19

**Risk rating (1= High)**

**1** 2 3

## General description

The Waiongana Estuary is adjacent to flat to rolling land, consisting of horticulture and dairying areas, and a cobble beach with 20-30 metre cliffs on the southern side to north is flat with dunes. The Waiongana Stream is actively accreting and a sand dune system consists of a low coastal foredune and a lagoon, not tidal, about 2ha in size that was formed by river diversion works. The lagoon is a regionally significant wetland and is used by waterbirds.

## Location

3 km south of Waitara and 4 km north of Bell Block.

## Land tenure

**Site:** - Crown Land: Estuary and marginal strip (that extends from the Waiongana Stream to the Waitara River) (administered by the Department of Conservation)

**Site access:** - District Land: on the right bank; Airport (owned by the New Plymouth District Council)  
on the left bank; Brown Road and the unformed road off Brown Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values, a significant coastal area, and a regionally significant landscape
Recreational	Moderate	- access limits recreational use - surfing on coast - floundering and whitebaiting
Cultural/ Historical	High	- Pukatepu pa and other historic and spiritual sites
Ecological/ Scientific	High	- dunes and dune lakes - important for migratory wading birds - breeding location of New Zealand Dotterel and Oystercatcher - offshore reef system adjacent to river mouth - whitebait spawning habitats - cliffs of geological interest, banding and a petrified forest buried by the Pouakai Volcanic Eruptions - priority waterbody - Significant notable bird area at the Waiongana river mouth

## Public access

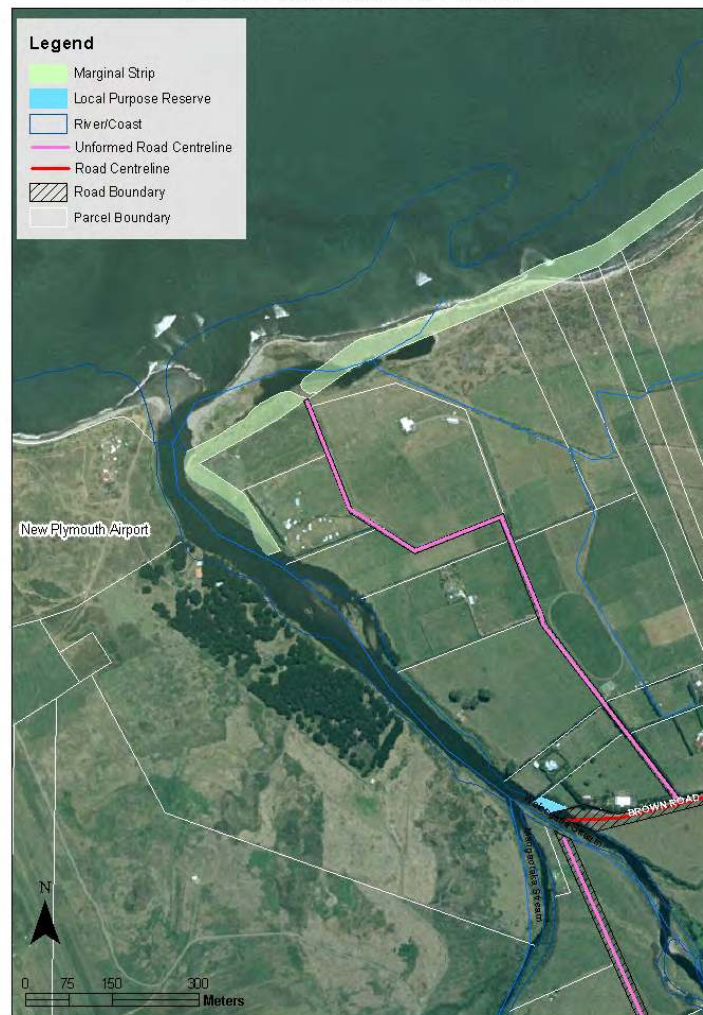
Poor - On the right bank an unformed road off Brown Road could provide access to the coast. Access can be gained along the beach from Waitara township.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach and sand dune areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of an offshore oil rig.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### WAIONGANA ESTUARY





# Bell Block Beach and Waipu Lagoons

Number: 21

GPS: 1698163E  
5680200N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

1 2 3

## General description

A boulder beach backed by 20 m high cliffs and sand dunes that are mostly covered in rough scrub and marram. Construction of seawalls, fencing and planting of dunes has been undertaken in an attempt to combat erosion. Waipu lagoons are two natural coastal lagoons (approximately 4.5 ha) that are a rare dune swamp/lagoon system valued for its wildlife habitat. Offshore is the Mangati Reef (Te Whioa kaimoana reef).

## Location

Just south of Bell Block.

## Land tenure

**Site:**

- Crown Land: Foreshore (administered by the Department of Conservation)
- District Land: Esplanade reserves (administered by the New Plymouth District Council)

**Site access:**

- Crown Land: Recreation reserve (administered by the Department of Conservation)
- District Land: Recreation reserves and Sewerage and Drainage reserves (administered by New Plymouth District Council).

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- popular recreation area <sup>2</sup> with variety of uses including surfing - facilities include a small boat ramp, carpark, and toilets - kaimoana gathering – kina and paua
Cultural/ Historical	High	- pa and midden/pit sites
Ecological/ Scientific	High	- threatened bird species (Australasian bittern), and habitat for other wetland birds - relatively natural state - Key native ecosystem (Waipu Lagoons)

## Public access

Excellent - Direct access to the lagoons from Ellesmere Avenue, and direct access to the beach from Mangati Road in Bell Block. A walkway exists through the recreation reserve areas.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of an offshore oil rig.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## BELL BLOCK AND WAIPU LAGOONS



# Waiwhakaiho Estuary

**Number:** 22

**GPS:** 1695866E  
5678477N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)** 1 2 3

## General description

The Waiwhakaiho Estuary is an important wildlife area and nearby are extensive sand dunes covered in rough scrub and marram. Offshore are the Waiwhakaiho Reef (Rewarewa kaimoana reef) and two shipwrecks. There is an old canoe launch ramp. The surrounding beach is mainly boulder with sand and cobbles. Adjacent to the left bank is Lake Rotomanu - a freshwater wetland/lake.

## Location

On the northern outskirts of New Plymouth city.

## Land tenure

**Site:** - Crown Land: Estuary (administered by the Department of Conservation)  
On the right bank; Crown Land Conservation Area  
(accretion in river mouth) (administered by the Department of Conservation)

**Site access:** - District Land: on the left bank; Recreation reserves and Clemow Road  
(administered by New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values, and a significant coastal area
Recreational	High	- surfing (surf break of national significance, avoid affects), whitebaiting and fishing, and use of Lake Rotomanu
Cultural/ Historical	High	- Rewarewa Pa
Ecological/ Scientific	Moderate	- inanga spawning site, diverse freshwater shrimp habitat - was once an important lamprey fishery - important for wading and migratory birds - Northern blue penguin habitat - Red billed gulls, black backed gulls at river mouth - priority water body - relatively diverse sponge community offshore

## Public access

**Good** - Direct access to the left bank by driving from Clemow Road past Lake Rotomanu. Access can also be gained by walking north along Fitzroy Beach. No access to the right bank.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline and reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline and reef areas may best be achieved by the use of dispersant off-shore, though is not a preferred option (avoid ecologically important reef offshore and surfbreak of national significance). Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## WAIWHAKAIHO ESTUARY



# Fitzroy Beach

**Number:** 23

**GPS:** 1694975E  
5677588N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)** 1 2 3

## General description

Fitzroy Beach is sandy and backed by sand dunes. The beach and adjacent recreation reserve is extensively used for recreation, with a campground, surf life saving club, playground, and walkway in the area. The beach is one of the most popular surfing areas in the region.

## Location

Within New Plymouth city, just south of Waiwhakaiho River Mouth.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Recreation reserve, Beach Road and coastal walkway (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- high recreational use, including: surfing, surf life saving club, campground, playground, walkway
Cultural/ Historical	Not known	
Ecological/ Scientific	Not known	- likely Northern blue penguin habitat and breeding - Red billed gulls

## Public access

Excellent - Direct access to a carpark adjacent to the beach via Beach Road, Fitzroy. The beach is also accessible from the coastal walkway.

## Preferred response option

Where possible oil should be prevented from reaching popular beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## FITZROY BEACH



# East End Beach

**Number:** 24

**GPS:** 1694485E  
5677230N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)** 1 2 3

## General description

East End Beach is sandy and backed by sand dunes. The beach and adjacent reserves are extensively used for recreation, including skating rink/skate park, miniput, bowling club, surf life saving club, and playground. The coastal walkway passes through the area. The Te Henui Stream, with adjacent walkway, is in the vicinity. The beach is a very popular surfing area in the region.

## Location

Within New Plymouth city.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Recreation reserves, esplanade reserve, Buller Street and Nobs Line, coastal walkway (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- high recreational use, including: surfing, surf life saving club, playground, miniput, indoor skating rink, skate park, bowling club, walkways - kaimoana gathering – kina and paua
Cultural/ Historical	High	- pa site
Ecological/ Scientific	Not known	- likely Northern blue penguin habitat and breeding - Red billed gulls

## Public access

Excellent - Direct access from several roads, specifically Buller Street and Nobs Line, with car parking areas. The beach is also accessible from the coastal walkway.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach and shoreline area may best be achieved by the use of dispersant off-shore. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application	✓		High
Shoreline cleanup	✓		High
Natural recovery	✓		High

### EAST END BEACH





# New Plymouth Foreshore

**Number:** 25

**GPS:** 1692768E  
5676465N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)** 1 2 3

## General description

New Plymouth foreshore is a boardwalk and grassy area that makes up part of the coastal walkway that extends for 7 km from Port Taranaki to the Waiwhakaiho River mouth. The Huatoki Stream mouth discharges into the Tasman Sea within the area, with a short walkway adjacent to the Huatoki Stream crossing under St Aubyn Street and connecting with Puke Ariki Landing.

## Location

Within New Plymouth city, adjacent to the central business area.

## Land tenure

**Site:** - District Land: Recreation reserve (administered by the New Plymouth District Council)

**Site access:** - District Land: Recreation reserve plus various streets including St Aubyn Street and coastal walkway (administered by the New Plymouth District Council)

## Values

Amenity	High	- unique feature in the New Plymouth District connecting city with coastal environment - location of 'Wind wand' designed by kinetic sculptor Len Lye
Recreational	High	- high recreational use, including: fishing, playground, walking, running and surfing
Cultural/ Historical	Not known	
Ecological/ Scientific	Not known	- likely Northern blue penguin habitat and breeding - Fur seal haul out area - Red billed gulls

## Public access

Excellent - Various access points from St Aubyn Street, including via carparks, and is part of the coastal walkway.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the

use of dispersant off-shore. Carry out shoreline clean up and wildlife rehabilitation if required where possible.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application	✓		High
Shoreline cleanup	✓		Medium
Natural recovery	✓		High



# Kawaroa Park

Number: 26

GPS: 1691763E  
5676456N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High) 1 2 3

## General description

This is an area of rocky foreshore between Belt Road and Weymouth Street. Within the recreation reserve is a public swimming pool, playground and squash club, and the coastal walkway passes through the area. The remains of a swimming pool built into the rock pools can still be seen. Very good reef system/volcanic boulder.

## Location

Within New Plymouth city.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Recreation reserves, including playground, and swimming pool (administered by the New Plymouth District Council)

- Site access:**
- District Land: Weymouth Street, Belt Road and coastal walkway (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- wide variety of recreational uses - kina and paua collection
Cultural/ Historical	Moderate	- historic value of old swimming pool in rock pools - Kaimoana gathering reef of cultural significance, paua
Ecological/ Scientific	Not known	- likely Northern blue penguin habitat and breeding - Fur seal haul out area - Red billed gulls - Excellent stable reef habitat - Intertidal communities amongst most diverse in Taranaki

## Public access

Excellent - Direct access from a carpark off Weymouth Street and from the coastal walkway to the foreshore and recreation reserves.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, taking care to avoid sensitive offshore reefs, present to around

5km offshore. Carry out shoreline clean up and wildlife rehabilitation if required where possible.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application	✓		High
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

### KAWEROA PARK



# Ngamotu Beach

**Number:** 27

**GPS:** 1689957E  
5675992N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)** 1 2 3

## General description

Ngamotu Beach is a very sheltered and popular beach within the port area.

## Location

Within the Port area, New Plymouth city.

## Land tenure

**Site:** - Private Land: Westgate Transport

**Site access:** - District Land: Bayly Road and coastal walkway (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- very high use, sailing, kayaking, canoeing, swimming, paddle boarding, sheltered area for snorkelling
Cultural/ Historical	High	- pa site - historic and spiritual sites in the port area, and shipwrecks offshore
Ecological/ Scientific	Moderate	- highly modified, but supports an assortment of seabirds, and fur seals, occasionally use the harbour to shelter in bad weather - Northern blue penguin, Reef heron, red billed gulls - gulls, terns and a few oyster catchers - Diverse subtidal communities, different species to more exposed areas of Taranaki coastline (e.g. seahorses)

## Public access

Excellent - Direct access to the beach from a car park off Bayly Road and the coastal walkway passes through the area.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Medium
On water recovery	✓		Medium
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

### NGAMOTU BEACH



# Nga Motu/Sugar Loaf Islands Marine Protected Area

Number: 28

GPS: 1688081E

5676067N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

**1** 2 3

## General description

The area consists of five Islands and two rock groups (volcanic in origin) located offshore from Port Taranaki. The area includes underwater reefs, caves, platforms, boulders and ledges where northern warm currents and southern cold currents mix.

## Location

Off shore from Port Taranaki.

## Land tenure

**Site:** - Crown Land: Sugar Loaf Islands Conservation Park, Sugar Loaf Islands Sanctuary Area, and Sugar Loaf Islands Wildlife Refuge (administered by the Department of Conservation)

**Site access:** - District Land: Paritutu Centennial Park, recreation reserves and Centennial Drive (administered by the New Plymouth District Council)

## Values

Amenity	High	- area of outstanding coastal value, and regionally important amenity values (Sugar Loaf Islands, and Back Beach) - significant coastal area, regionally significant landscape, and outstanding natural feature
Recreational	High	- swimming, diving, fishing
Cultural/ Historical	High	- evidence of Maori occupation; Pa, island refuges, and several archaeological sites in the area
Ecological/ Scientific	High	- oldest volcanic formations in Taranaki - diverse and abundant marine life and underwater habitats - important nesting habitat for many seabirds per year (Grey-faced petrel, Gull spp, white-fronted terns) - Moturoa and Motumahanga islands free of exotic predators <sup>1</sup> - New Zealand fur seal breeding ground (northernmost breeding ground in NZ), important haul out areas for seals, on all islands and rocky outcrops - mineral locality of taranakite (phosphate mineral associated with guano) - some scattered colonies of spinifex - key native ecosystem

## Public access

Poor - Most of the islands are sanctuaries and access onto the islands is by permit only. Information signs for the Sugar Loaf Islands are located at the Lee Breakwater and Paritutu lookout. Access through the port to the Main Breakwater is at the discretion of Westgate. Boat trips and kayak hire are available. A boat ramp is available for boat launch from the Lee Breakwater.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline and island areas. Booms may be useful in guiding oil to a suitable collection points. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Park area and adjacent marine reserve. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Medium
On water recovery	✓		Medium
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High





# Tapuae Marine Reserve

**Number:** 29

**GPS:** 1685727 m E  
5674395 m N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)**

**1** 2 3

## General description

The area consists of three sea stacks (volcanic in origin) to the north of the area as well as a low rocky reef extending south-west towards the Tapuae Stream. The subtidal habitat includes caves, canyons, rock faces with crevices and overhangs, large pinnacles, boulder fields and extensive areas of mud and sand. The reserve adjoins the Sugar Loaf Islands Marine Protected Area and is situated at the convergence of warm northern currents and cooler southern currents.

## Location

South-west of New Plymouth city.

## Land tenure

**Site:** - Crown Land: Foreshore and seabed owned by Crown, Tapuae Marine Reserve (administered by the Department of Conservation)

**Site access:** - District Land: Paritutu Centennial Park, recreation reserves and Centennial Drive (administered by the New Plymouth District Council), Lee breakwater boat ramp (administered by the Port company?).  
Access via Tapuae Country Estate, walkway following Tapuae Stream to the beach (administered by District Council).

## Values

Amenity	High	- area of outstanding coastal value, and regionally important amenity values (Back Beach, Tapuae Beach) - significant coastal area, regionally significant landscape, and outstanding natural feature
Recreational	High	- surfing, swimming, diving
Cultural/ Historical	High	- evidence of Maori occupation; Pa, and several archaeological sites in the area
Ecological/ Scientific	High	- oldest volcanic formations in Taranaki - diverse and abundant marine life and underwater habitats - Northern Blue Penguin common along the coast and nest in burrows around stream mouths - Waikaranga rock important haul out for New Zealand fur seal - Tokatapu and Waikaranga house large crayfish populations - reef heron, Red billed gulls

**Public access**

- Poor - Waikaranga is a wildlife sanctuary and access onto the rocks is by permit only. Information signs for the Tapuae Marine Reserve are located at access points along the coast including:
- the New Plymouth boat ramp on the Lee Breakwater,
  - Paritutu Centennial Car Park (overlooking the Sugar Loaf Islands),
  - the lower car park by the Herekawe stream,
  - the tank farm lower car park (further south along Centennial Drive - not a full drive-in car park) where the track leads to the beach,
  - the southern car park on Beach Road, where the track leads to the beach,
  - the car park at Tapuae Country Estate (by the Tapuae Stream where you park before walking the track down to the beach) and
  - the Oakura River beach access by the Kaitake Rugby Club.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline and island areas. Booms may be useful in guiding oil to a suitable collection points. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Reserve area and adjacent marine area. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Medium
On water recovery	✓		Medium
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High



# Paritutu/Back Beach

Number: 30

GPS: 1688081E

5676067N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

1 2 3

## General description

Paritutu/Back Beach is a popular recreational area located to the west of the Sugar Loaf Islands. Sandy beach, cliffs from mean high water.

## Location

West of Port Taranaki.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Paritutu Centennial Park (administered by the New Plymouth District Council)

- Site access:**
- District Land: Recreation reserves and Centennial Drive (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- popular beach, activities include surfing and walking - whitebaiting in the Herekawe stream
Cultural/ Historical	Not known	
Ecological/ Scientific	Not known	- Herekawe stream, northern reserve, penguins in the area. - Reef heron, red billed gulls

## Public access

Excellent - A road off Centennial Drive provides direct access to a car park adjoining the beach. Additional parking areas are located within Paritutu Centennial Park off Centennial Drive.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline and island areas. Booms may be useful in guiding oil to a suitable collection points. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/outside the Marine Park area and adjacent marine reserve. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

# PARITUTU/BACK BEACH



# Tapuae Stream Mouth

Number: 31

GPS: 1684543E  
5671765N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

**1** 2 3

## General description

A sandy beach at the Tapuae Stream mouth with a dune wetland area, more an estuary than wetland and some scattered colonies of spinifex on dune.

## Location

5 km south of New Plymouth and 2 km north of Oakura.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation). On the left bank; Marginal Strip from Tapuae Stream to the Oakura River (administered by the Department of Conservation)

**Site access:** - Crown Land: State Highway 45 (administered by the Department of Conservation)  
- District Land: On the right bank; Esplanade Strip (private ownership)

## Values

Amenity	High	- regionally significant landscape
Recreational	Moderate	- fishing and whitebaiting, access limits use
Cultural/ Historical	High	- pa sites, redoubt, fort and pits - petroglyphs (rock carvings) - poplular paua, and other kaimoana, gathering to south-west of stream
Ecological/ Scientific	Moderate	- scattered colonies of spinifex on dunes - dune wetland area - vulnerable toaling - likely Northern blue penguins and breeding - red billed gulls

## Public access

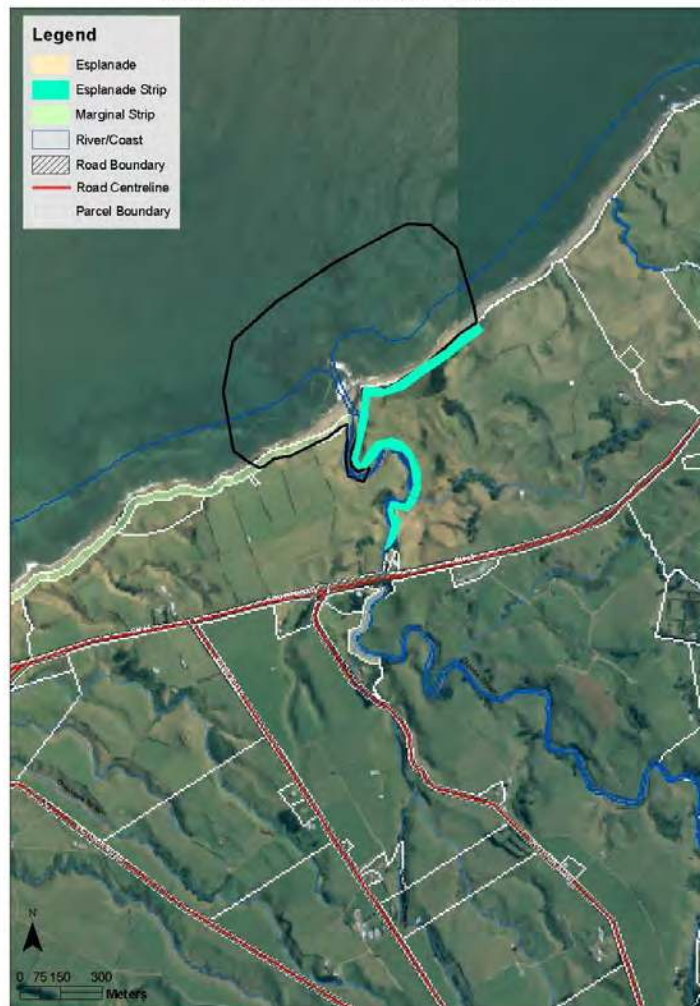
Poor - Access to the coast from State Highway 45 via a 20 m wide esplanade strip down the right bank of the Tapuae Stream. New Plymouth District Council have advised that a recreation reserve will be acquired at the stream mouth beach area. There are no signposts or indications that the public can access the beach via the stream bank. Access to the stream mouth cannot be obtained via the marginal strip along the coast due to physical and topographical constraints.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the marine protected area may best be achieved by the use of dispersant off-shore/ outside the Marine Reserve area and adjacent marine reserve. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

### TAPUAE STREAM MOUTH



# Oakura Beach

**Number:** 32

**GPS:** 1681889E  
5669959N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)**

**1** 2 3

## General description

Oakura Beach is a wide sandy beach backed by small dunes and extends the length of the township. Offshore are cobble and boulder reefs. Small estuarine area.

## Location

8 km south of New Plymouth.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Esplanade reserves (administered by the New Plymouth District Council)

- Site access:**
- District Land: Recreation reserves, Messenger Terrace and Tasman Parade (administered by the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity value of beach, and a significant coastal area - surf club
Recreational	High	- windsurfing, surfing, swimming and camping - whitebaiting
Cultural/ Historical	High	- pa and redoubt sites - marae at Oakura River mouth on true left bank.
Ecological/ Scientific	Moderate	- notable fauna – Australasian bittern and gold-striped gecko (not on beach) - several historic trees, largest pohutukawa in it's southerly range - likely Northern blue penguin habitat and breeding - notable seabird resting area, White fronted tern, Red billed gulls

## Public access

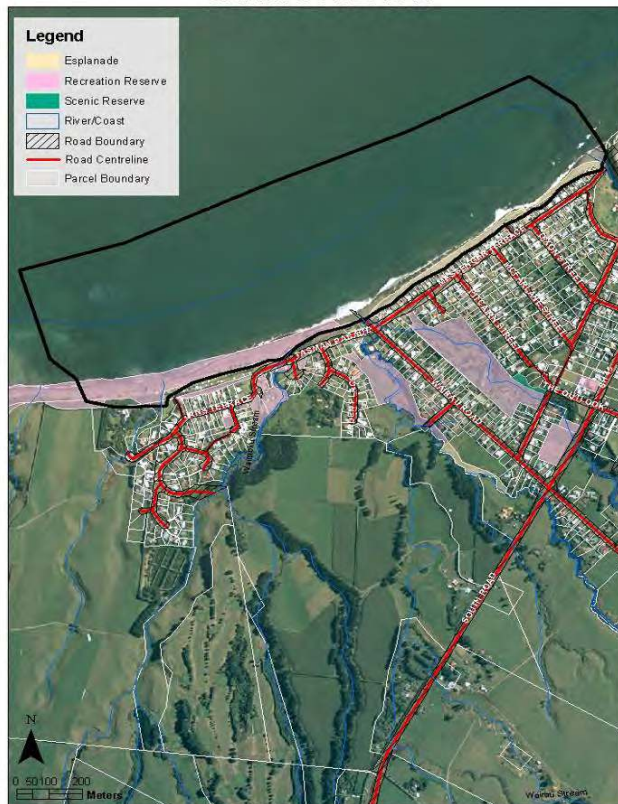
- Excellent - There are many access points along this section of the coast, both from roads and walking around the coast at low tide. Access to right bank of the Oakura River via Corbett Park, to left bank through Oakura township.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef beach and shoreline area may best be achieved by the use of dispersant off-shore. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application	✓		Low
Shoreline cleanup	✓		High
Natural recovery	✓		High

### OAKURA BEACH





# AhuAhu, Weld and Timaru Road Beaches

Number: 33

GPS: 1680079E  
5669612N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

1 2 3

## General description

This area has wide sandy beaches backed by small dunes. The dunes from Greenwood Road to Timaru Stream are degrading due to animal grazing. Offshore are cobble and boulder reefs, intertidal.

## Location

1.5 km south of Oakura.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Recreation reserve (shoreline between Oakura and Timaru Road) (administered by the New Plymouth District Council)

- Site access:**
- District Land: Weld Road, AhuAhu Road, Timaru Road and unformed Timaru Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values of beaches (AhuAhu, Timaru, Weld Road)
Recreational	High	- windsurfing, surfing and swimming - kaimoana gathering on reef - kina and paua
Cultural/ Historical	High	- pa and redoubt sites - several shipwrecks offshore - 'Gairloch' (sank in 1903) still has some wreckage visible (one of most popular for visitors in Taranaki)
Ecological/ Scientific	Moderate	- Several historic trees, largest pohutukawa in it's southerly range - Likely Northern blue penguin habitat - Reef heron, Caspian terns, White fronted terns

## Public access

Excellent - Many access points along this section of the coast from roads and by walking around the coast at low tide. Direct access from AhuAhu Road and Weld Road, with parking and recreational areas at the road ends. The section of Timaru Road to the east of the Timaru Stream is unformed.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas and reef, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### AHUAHU, WELD & TIMARU ROAD BEACHES



# Tataraimaka

Number: 34

GPS: 1676953E  
5668063N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

1 2 3

## General description

Tataraimaka Pa (Crows Nest) is a prominent coastal feature, which is not vulnerable to oiling and was part of a military site. The pa is now covered in pohutukawa. The area has cobble and boulder beaches, backed by low cliffs starting at mean high water. The coast is low lying with coastal forest headlands including patches of wetland.

## Location

5.5 km south of Oakura and 7 km north of Okato.

## Land tenure

**Site:**

- Crown Land: Tataraimaka Pa Scenic Reserve (administered by the Department of Conservation)
- District Land: Esplanade reserve (administered by the New Plymouth District Council)

**Site access:**

- Crown Land: Okato Coast Marginal Strip (administered by the Department of Conservation)
- District Land: Recreation reserves, Greenwood Road, Pitone Road and unformed Coast Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- regionally significant amenity values (Pitone Road Beach)
Recreational	Moderate	- surfing, and launching ramp at Fort St George, camping
Cultural/ Historical	High	- pa sites, St Georges redoubt, flour mill - two tauranga waka (original canoe landing site) are located on the foreshore
Ecological/ Scientific	Moderate	- presence of northern blue penguin, many burrows indicate important breeding area - notable pohutukawa trees - Reef heron

## Public access

Excellent - Pitone and Greenwood Roads form a loop, with a section of the road directly alongside the coast. The land between the road and coast is in esplanade reserves. Information signs are present.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach and shoreline areas may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### TATARAIMAKA



# Leith/Perth Road Beaches

Number: 35

GPS: 1675248E

5667107N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

1 2 3

## General description

A low-lying stretch of coast, with cobble and boulder beaches and volcanic reefs offshore, sub-tidal. The beach is backed by low cliffs starting at mean high water, which are covered in coastal scrub.

## Location

7 km south of Oakura and 5.5 km north of Okato.

## Land tenure

**Site:** - Crown Land: Foreshore and Maitahi Scientific Reserve (administered by the Department of Conservation) – get in touch with DoC before entering

**Site access:** - Crown Land: Okato Coast Marginal Strip (administered by the Department of Conservation)  
- District Land: Local reserves, Perth Road, Leith Road, unformed Coast Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- regionally significant amenity values
Recreational	Moderate	- surfing
Cultural/ Historical	High	- Pa site
Ecological/ Scientific	High	- Maitahi Scientific reserve contains uncommon plants, a good variety of coastal vegetation, including patches of wetland above mean high water - threatened sea birds regularly use the area - blue penguins

## Public access

Good - There is a road sign to the Scientific Reserve off Perth or Leith Roads, with access along the boulder beach.

## Preferred response option

Where possible oil should be prevented from reaching sensitive reef and beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is

higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### LEITH/PERTH ROAD BEACHES



# Stony River

**Number:** 36

**GPS:** 1670783E  
5663821N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)**

**1** 2 3

## General description

The Stony River (Hangatahua) is the most undisturbed river in the region. Large sand deposits from the river form the beach, which changes constantly due to storms. This is a top surfing location with many offshore reefs. Not generally tidal ingress as river mouth is raised.

## Location

4.5 km west of Okato.

## Land tenure

- Site:** - Crown Land: Foreshore (administered by the Department of Conservation)
- Site access:** - Crown Land: Okato Coast Marginal strip (from Tataraimaka Pa to Stony River Mouth) (administered by the Department of Conservation)
- District Land: on the right bank; Kaihihi Road, Brophy Road, unformed Brophy Road and unformed Coast Road (administered and vested in the New Plymouth District Council)

## Values

Amenity	High	- regionally important amenity values, and a regionally significant landscape
Recreational	High	- 'Kumara Patch' - considered one of best surfing spots in Australasia, and other surf breaks - popular for fishing and walking, but access limits use
Cultural/ Historical	High	- cooking site, kainga, and many Pa sites - two shipwrecks offshore, the "Marchioness" (1864) and the "Ottawa" (1877)
Ecological/ Scientific	High	- significant natural area, conservation values, are well above high water - priority water body - gulls and terns feed in rivermouth - dotterel habitat and other notable seabirds present - likely Northern blue penguin habitat - brown trout runs out to sea.

## Public access

- Excellent - The unformed section of Kaihihi Road is fenced off from the adjacent farmland and a vehicular track is provided to approximately 30 m from the coast. New Plymouth District Council have recently purchased the section of land from Kaihihi Road adjoining the coast. Historically 4WD vehicular access was provided to the beach however this has now been prevented. The main

access route was historically via unformed Brophy Road and down a private farm track. This route was widely known and used however no formal agreements were obtained and the route is now closed. Access can be obtained via unformed Brophy Road and along the Stony River. Unformed Coast Road runs parallel to the coast. The Kumera Patch is situated on the northern flank of the Stony River mouth delta.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach and river areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### STONY RIVER





# Komene Road Beach

**Number:** 37

**GPS:** 1671021E  
5662766N

**Map sheet:** NZMS 260 Series Sheet P19

**Risk rating (1= High)**

**1** 2 3

## General description

Large sand deposits from the river form the beach, which changes constantly due to storms. A large area of sand dunes is located to the south of the river mouth, which is almost devoid of vegetation. A regionally significant wetland Komene Lagoon is located at the back of the dunes. The dune lake dries up in the summer months. The area is popular for surfing.

## Location

5 km west of Okato.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Komene Road, unformed Komene Road, and unformed Coast Road (administered and vested in the New Plymouth District Council)

- Private Land: No formal access

## Values

Amenity	High	- regionally important amenity values <sup>1</sup> , and a regionally significant landscape
Recreational	High	- surf breaks along entire length of beach - popular for fishing and walking, but access limits use
Cultural/ Historical	High	- cooking site, kainga, and many Pa sites - two shipwrecks offshore, the 'Marchioness' (1864) and the 'Ottawa' (1877)
Ecological/ Scientific	High	- area important for rare and threatened bird species (such as golden plover, sharp-tailed sand piper and wrybill) - breeding location of New Zealand Dotterel and Banded Dotterel - Northern blue penguin - Variable oystercatcher nest area - sand dunes and a regionally significant wetland - Komene lagoon - significant natural area - priority water body - key native ecosystem

## Public access

**Poor** - Komene Road ends approximately 300 m prior to the coast with the unformed section ends approximately 100 m prior to the coast. Between the end of the unformed road and the foreshore is privately owned land. Access from the end of formed Komene Road is via a walking track roughly following the unformed section of Komene Road to the coast, the land owners approval is required to cross private land.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### KOMENE ROAD BEACH



# Puniho Road Beach

Number: 38

GPS: 1669232E  
5662072N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

**1** 2 3

## General description

This area has reefs and sandy beaches, backed by sand dunes. Driftwood debris in supra-tidal. Off shore sub-tidal reefs deep.

## Location

2.5 km south of the Stony River.

## Land tenure

Site: - Crown Land Foreshore (administered by the Department of Conservation)

Site access: - District Land: Puniho Road and unformed Coast Road (administered by the South Taranaki District Council)  
- Private Land: No formal access

## Values

Amenity	High	- regionally important amenity values
Recreational	Moderate	- used for surfing, windsurfing, and fishing
Cultural/ Historical	Not Known	Kaimoana gathering, paua and crayfish
Ecological/ Scientific	Not Known	Abundant marine life on subtidal reef ash and invertebrates

## Public access

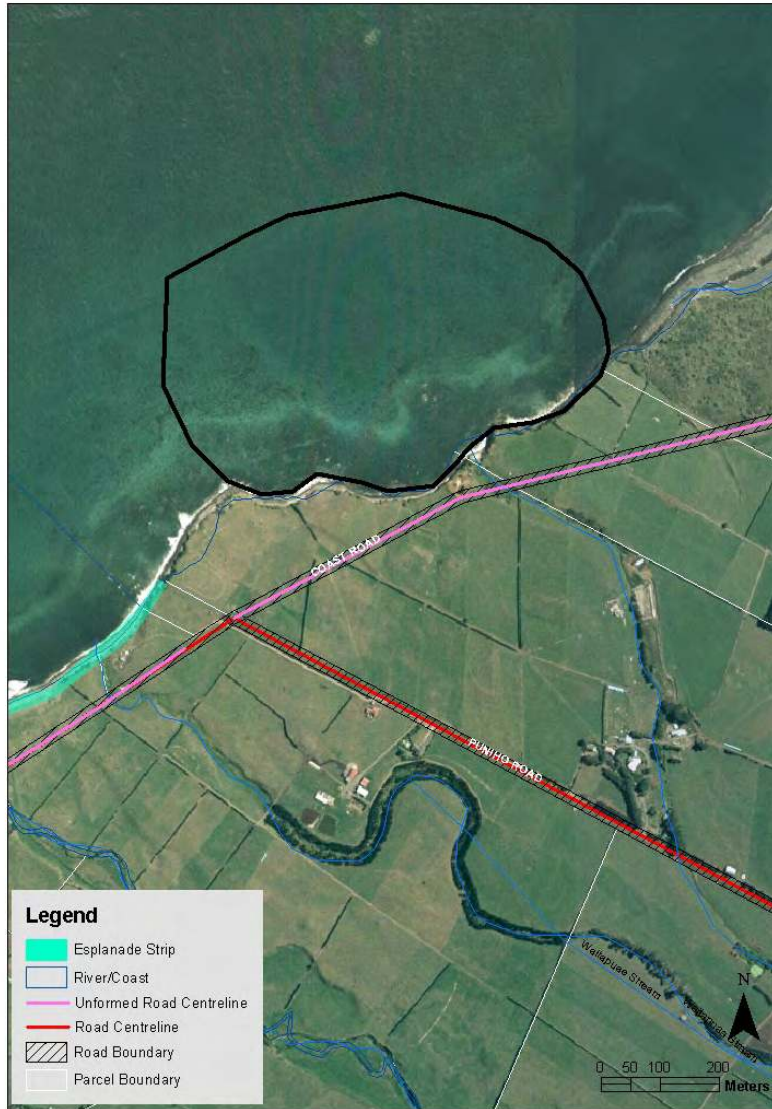
Poor - Land owner's approval to cross private land is required. Access may also be achieved by walking from Paora Road and Komene Road at low tide.  
- NB: surfers access Puniho Reef over farmland (use styles and gate)

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas and reef, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### PUNIHO ROAD BEACH



# Paora Road Coast

Number: 39

GPS: 1668638E  
5661579N

Map sheet: NZMS 260 Series Sheet P19

Risk rating (1= High)

**1** 2 3

## General description

A popular surfing area with many top surfing breaks. Cobble shoreline.

## Location

3.5 km south of the Stony River.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Esplanade reserve (administered by the South Taranaki District Council)

- Site access:**
- District Land: Esplanade Reserve, Paora Road and unformed Coast Road (administered and vested in the South Taranaki District Council).
  - Private Land: Esplanade strip (20m wide)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- numerous top surf breaks between Paora and Stent roads, namely Graveyards, Boat Harbours, Rocky Point, Rocky Rights and Birds Nest
Cultural/ Historical	High	- two sites of spiritual significance
Ecological/ Scientific	Not Known	- Reef heron

## Public access

Excellent - Paora Road continues all the way to the coast, and adjoins an esplanade reserve. A car parking area with facilities is located at the end of the road, with direct access to the coast.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### PAORA ROAD COAST



# Stent Road

Number: 40

GPS: 1667157E  
5658192N

Map sheet: NZMS 260 Series Sheet P20

Risk rating (1= High)

**1** 2 3

## General description

A popular surfing area. Three surf breaks of national significance included in the NZCPS. The area also contains a coastal herbfield (less than 0.5 ha) adjacent to the sea, quite low.

## Location

7.5 km south of Stony River and 7 km north of Pungarehu.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Stent Road and Coast Road (to the north) and unformed Coast Road to the south (administered and vested in the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- area popular for surfing, Stent Road is one of the top New Zealand surf breaks of national significance
Cultural/ Historical	High	- Pa and papakainga
Ecological/ Scientific	High	- herbfield containing <i>Lepidium flexicaule</i> [recently discovered and only known site in Taranaki and only known natural location outside of West Nelson-North Westland area]. Also contains <i>Crassula manaia</i> , which is endemic to the Egmont-Waverley coast, some fenced. Could at risk on a spring tide. - Reef heron

## Public access

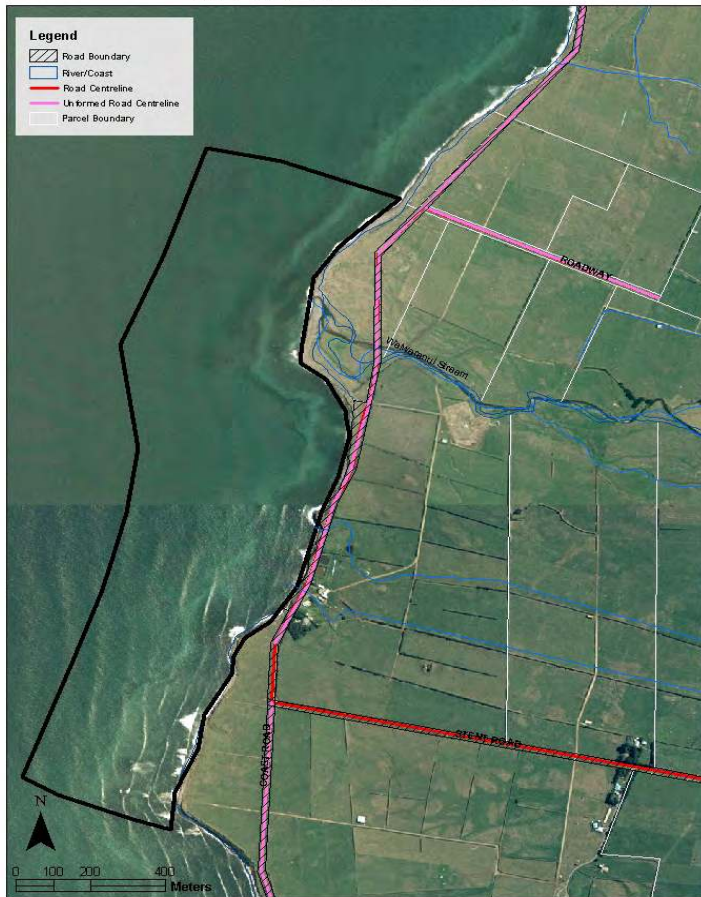
Excellent - Stent Road is formed to the coast and a section of Coast Road to the north has also been formed. A car parking area is provided.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option, consideration should be given to the herbfield area and need to avoid affects on surf breaks. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### STENT ROAD COAST





# Bayly Road

Number: 41

GPS: 1666911E  
5655822N

Map sheet: NZMS 260 Series Sheet P20

Risk rating (1= High)

1 2 3

## General description

The area consists of a large bay which is partially sheltered by an offshore reef and a 3 km length of low-lying coastline, characterised by extensive gently sloping boulder and cobble reefs and beaches. The area contains a small nationally important herbfield, and an internationally significant geomorphic feature. The Cape Egmont Boat Club, and a concrete boat ramp is located in the bay. Stream at boat ramp runs over boulder reef.

## Location

8 km south of Stony River and 6.5 km north of Pungarehu.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Bayly Road and Coast Road (south of Bayly Road) and unformed Coast Road (to the north of Bayly Road).

## Values

Amenity	Moderate	
Recreational	High	- boating, fishing, surfing - whitebaiting and paua collection
Cultural/ Historical	High	- Warea River mouth was location of a large Maori village - Pa sites and a redoubt are still evident
Ecological/ Scientific	High	- threatened plant site on exposed bank 35m long x 3m wide ( <i>Euphorbia glauca</i> ), above mean high water on cliff - herbfield, with <i>Crassula manaia</i> , which is endemic to the Egmont-Waverley coast - most extensive well-preserved geomorphic surface of a volcanic debris avalanche deposit in New Zealand, on shoreline boulder - Reef heron

## Public access

Excellent - Bayly Road is formed to the coast. The concrete boat ramp in the bay provides boat launching facilities. Note that in some places unformed Coast Road to the north of Bayly Road has eroded which may prevent access to the Warea River. Boat ramp at Cape East Boating Club.

### Preferred response option

Where possible oil should be prevented from reaching sensitive reef and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### BAYLY ROAD



# Cape Egmont

**Number:** 42

**GPS:** 1664891E  
5652213N

**Map sheet:** NZMS 260 Series Sheet P20

**Risk rating (1= High)**

**1** 2 3

## General description

Three major ocean currents converge at this location, resulting in a diverse range of marine organisms. A 2-3 m high bank separates the cobble and boulder beaches from farmland. The area is farmed to Mean High Water Springs. Located in the vicinity are lahar debris and offshore andesitic boulder reefs, caused by erosion of coastal lahars, which extend 5-10km offshore. Intertidal reef platforms and boulder reefs along coast.

## Location

5 km from Pungarehu and 10 km north of Rahotu.

## Land tenure

**Site:** - Crown Land: Foreshore and Cape Egmont Marginal Strip (administered by the Department of Conservation)

**Site access:** - Crown Land: Cape Egmont Conservation Area and Cape Egmont Recreation Reserve (in grazing licences) (administered by the Department of Conservation)  
- District Land: River Bank Reserve, Cape Road and unformed Coast Road (administered and vested in the South Taranaki District Council)

## Values

Amenity	Moderate	
Recreational	Moderate	- seafood gathering on reef, fishing, surfing and windsurfing
Cultural/ Historical	High	- New Zealand's oldest lighthouse - Pa site - site of European redoubt built in 1881
Ecological/ Scientific	High	- areas of coastal herbfield from Cape Egmont to Otahi Stream, above high water - geologically important (internationally) mound field, created by volcanic debris avalanche deposits - complex, unique marine environment - Reef heron

## Public access

Excellent - Cape Road continues directly to the coast, there is also a rough track north along unformed Coast Road.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed

and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### CAPE EGMONT



# Kina Road and Oaonui Beach

Number: 43

GPS: 1667981E  
5638342N

Map sheet: NZMS 260 Series Sheet P20

Risk rating (1= High)

1 2 3

## General description

A wide sandy beach and sand dunes. This is one of the few significant areas of coastal dunes that still exists in Taranaki, south of Kina Road. The dunes cover an area of approximately 35 hectares, and are approximately 1.5 km long. The dune is relatively unstable, prone to wind erosion, and eroding inland. Some pingao exists on the dune but mainly marram and spinifex. This area has had several sand stabilisation schemes, with the main area now retired from grazing. The area is a popular windsurfing area.

## Location

8 km north of Opunake.

## Land tenure

Site: - Crown Land: Foreshore (administered by the Department of Conservation)

Site access: - Crown Land: Recreation Reserve (administered by the Department of Conservation)  
- District Land - Esplanade strip (adjacent to Oaoiti Stream), esplanade reserve and Lower Kina Road (administered by the South Taranaki District Council)

## Values

Amenity	High	- significant natural area - high natural and aesthetic values, largely unmodified - regionally important amenity values (Kina Road reef)
Recreational	Moderate	- internationally renowned for windsurfing
Cultural/ Historical	High	- several pa and occupation sites, and a spiritually significant site located at Oaonui - shipwreck 'Northern Monarch' lies offshore
Ecological/ Scientific	High	- regionally significant dunefield - breeding location of New Zealand Dotterel, Banded Dotterel and Variable oystercatcher - other notable bird stopover area - important wildlife habitat: black backed gull colony, and goldstripe gecko (inland) in surrounding scrublands - Key native ecosystem, Sandy Bay

## Public access

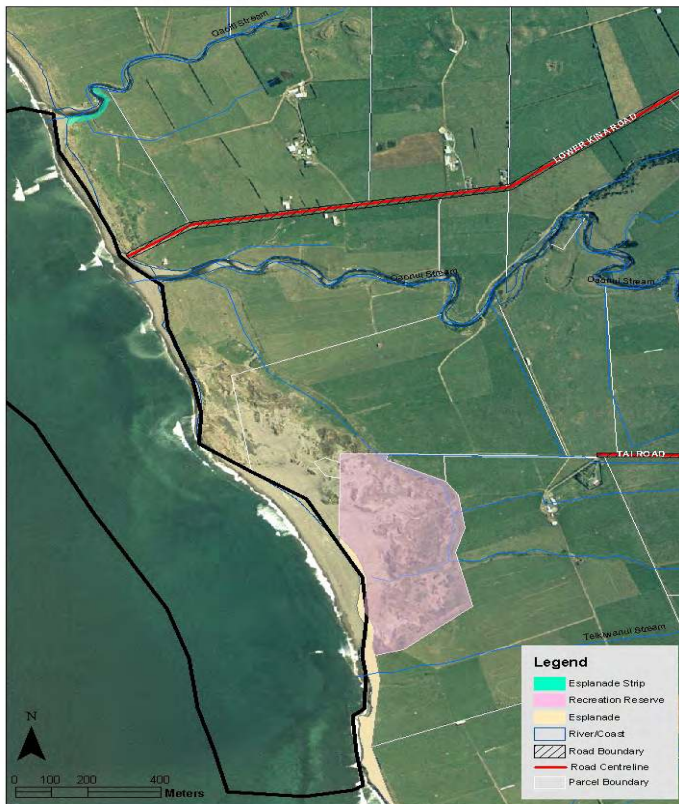
Good - The surfing break is signposted on State Highway 45. Access to the coast is via the beach from Kina Road.

### Preferred response option

Where possible oil should be prevented from reaching sensitive beach and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### KINA ROAD AND OANUI BEACH



# Arawhata Road Beach

Number: 44

GPS: 1669055E  
5636356N

Map sheet: NZMS 260 Series Sheet P20

Risk rating (1= High)

1 2 3

## General description

Arawhata Road is important as the habitat for a nationally rare herb. The area is popular for surfing with reefs present offshore. Tidal boulder reefs.

## Location

6 km north of Opunake.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Esplanade Reserve (administered by the South Taranaki District Council)

- Site access:**
- District Land: Arawhata Road and unformed Arawhata Road (administered and vested in the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity values (Arawhata Road)
Recreational	Moderate	- high use for surfing, low to moderate use for fishing and gathering kaimoana
Cultural/ Historical	Not known	
Ecological/ Scientific	High	- habitat of the herb <i>Crassula manaia</i> , (nationally rare species), and <i>Myosotis pygmaea</i> var <i>pygmaea</i> - location of endemic moth <i>Notoreas</i> sp - Reef heron

## Public access

- Good
- Arawhata Road ends approximately 300 metres from the coast with the unformed section of the road extending through a paddock down to the coast. The unformed road adjoins an esplanade reserve. This area of coast is low-lying.

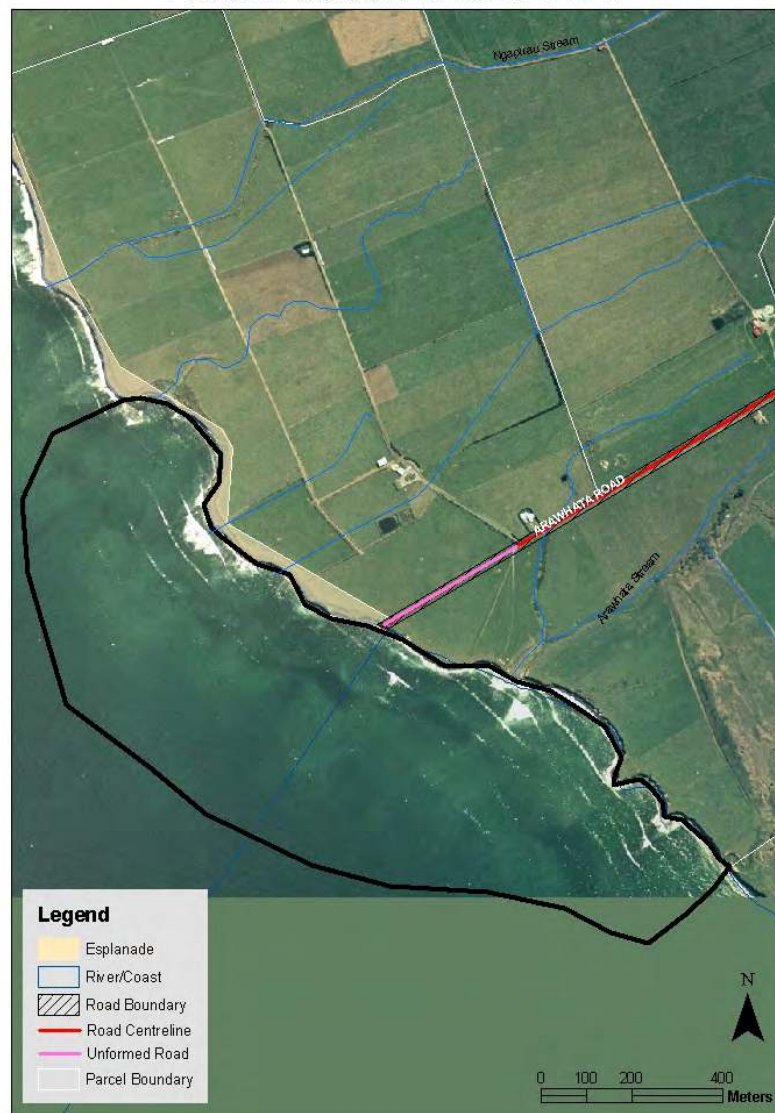
## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher

due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### ARAWHATA ROAD BEACH





# Middleton's Bay

**Number:** 45

**GPS:** 1672983E  
5632538N

**Map sheet:** NZMS 260 Series Sheet P20

**Risk rating (1= High)** 1 2 3

## General description

A sandy beach in the bay, separated from Opunake Beach by 30-40 metre high cliffs. There are steep cliffs at the back of the beach.

## Location

In Opunake township, one bay north from Opunake Beach.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Esplanade Reserve (administered by the South Taranaki District Council)

- Site access:**
- District Land: Halse Place (administered by the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity value
Recreational	Moderate	- boat launching ramp
Cultural/ Historical	High	- nearby pa sites, and cemetery - ten shipwrecks on reefs in the area – remains of 'Lord Worsley' still visited by snorkellers and divers - kaimoana gathering – kina and paua
Ecological/ Scientific	Moderate	- important area geologically – shows complete lahar sequence, and contains buried forest and lignite in bays - important habitat for waterfowl

## Public access

Excellent - Vehicle access to Middleton's Bay via road from Halse Place. Boat ramp at Opunake Beach.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### MIDDLETONS BAY



# Opunake Beach

**Number:** 46

**GPS:** 1673717E  
5632059.N

**Map sheet:** NZMS 260 Series Sheet P20

**Risk rating (1= High)**

**1** 2 3

## General description

Sandy beach between 30-40 m high coastal cliffs. Spillway from Lake Opunake hydroelectric scheme is located at the southern end of the beach.

## Location

In Opunake township.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Recreation Reserve (administered by the South Taranaki District Council)

- Site access:**
- District Land: Beach Road (administered by the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- beach, surf life saving club - popular swimming and surfing area (beach break)
Cultural/ Historical	High	- nearby pa sites, and cemeteries - ten shipwrecks on reefs in the area – remains of 'Lord Worsley' visited by snorkellers and divers
Ecological/ Scientific	High	- important area geologically – shows complete lahar sequence, and contains buried forest and lignite in bays

## Public access

Excellent - A walkway provides direct access to Te Namu Pa, the old wharf, lake, surf club, campground, lookout and an historic cemetery. Vehicle access via Havelock Street in Opunake township.

## Preferred response option

Where possible oil should be prevented from reaching beach reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, , though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### OPUNAKE BEACH



# Mangahume Beach

Number: 47

GPS: 1674540E  
5631112N

Map sheet: NZMS 260 Series Sheet P20

Risk rating (1= High)

**1** 2 3

## General description

A sandy beach just north of the Mangahume River mouth. Intertidal and subtidal reefs present. Popular for surfing (Mangahume and Sky Williams surf break).

## Location

1 km south of Opunake Beach.

## Land tenure

- Site:
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Esplanade Reserve (administered by the South Taranaki District Council)

Site access: - Private Land: No formal access

## Values

Amenity	High	- regionally important amenity values
Recreational	Moderate	- fishing - popular for surfing - Kaimoana gathering, especially paua - Mangahume is one of the most highly rated surf breaks in the region
Cultural/ Historical	Moderate	- Maori reservation land adjacent
Ecological/ Scientific	Not known	- <i>Euphorbia glauca</i> located on back dunes (nationally rare plant) - likely notable bird stopover area

## Public access

Poor - No formal access is provided across the private property to the beach, approval from landowner to cross land is required.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## MANGAHUME BEACH



# Puketapu Road End

Number: 48

GPS: 1678422E  
5625374N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High)

**1** 2 3

## General description

An area with 30-40 m high lahar cliffs, and boulder and gravel beaches. An important botanical site in the Department of Conservation Wanganui Conservancy. The area is an old redoubt site with 1 m x 1 m holes scattered over the rocky outcrop. There is limited access to the coast north of Puketapu Road due to the very high cliffs between Opunake and Kaupokonui. Boulder and volcanic reefs. Very exposed.

## Location

8.5 km south of Opunake.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - Private Land: Maori Reservation

- Site access:**
- District Land: Puketapu Road (ends approximately 700 metres prior to the coast) and unformed Puketapu Road and esplanade reserve (administered and vested in the South Taranaki District Council)

## Values

Amenity	Moderate	
Recreational	Moderate	<ul style="list-style-type: none"> <li>- boatshed and ramp carved out of rock face</li> <li>- popular area for surfcasting and diving</li> <li>- surfing, fishing</li> </ul>
Cultural/ Historical	High	<ul style="list-style-type: none"> <li>- historic pa of Papakaka Te Rangi &amp; Puketapu redoubt</li> <li>- traditional kimoana collection area</li> </ul>
Ecological/ Scientific	High	<ul style="list-style-type: none"> <li>- area of coastal herbfield towards headland, which is habitat for moth <i>Notoreas</i> sp, on top of cliffs</li> <li>- threatened plant site – only site in Taranaki containing <i>Crassula peduncularis</i>, <i>Euphorbia glauca</i></li> <li>- steep south facing cliff, with remnant of taupata scrub, and occasional emergent karaka</li> <li>- paua</li> <li>- NZ fur seal often in this area (up to ten or more)</li> </ul>

## Public access

- Poor
- An unformed road is located in the vicinity. Private land (Maori Reservation) exists between the end of road, and the coast and esplanade strip. No legal access is available to the coastal area south from Puketapu Road.

### Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option, consideration should be given to herbfield. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### PUKETAPU ROAD END





# Oeo Cliffs

**Number:** 49

**GPS:** 1681526E  
5622976N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)**

**1** 2 3

## General description

A rugged coastline with very high cliffs, and areas of coastal herbfields on the cliff tops.  
Inter-tidal reefs

## Location

12 km south of Opunake and 15 km west of Manaia.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

- Private Land

**Site access:** - District Land: Unnamed unformed road off State Highway 45 to the coast.

## Values

Amenity	Moderate	- Local community significance
Recreational	Moderate	- surfcasting, shellfish gathering and traditional fishing site - access limits recreational use
Cultural/ Historical	High	- site of four major shipwrecks, 'Annie Wilson', 'Lizzie Bell', 'Manaia' and the 'Marramarra' - marae and cemetery nearby - boatsheds cut into cliff
Ecological/ Scientific	Moderate	- coastal herbfields

## Public access

Poor - An unformed road exists off State Highway 45 however the location is not apparent on the ground. Access along Oeo Stream.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required where possible. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

# OEO CLIFFS



# Rawa Stream Mouth

Number: 50

GPS: 1684966E  
5621348N

Map sheet: NZMS 260 Series Sheet Q18

Risk rating (1= High)

**1** 2 3

## General description

This coastline has very high cliffs, with areas of coastal herbfield on the cliff tops, not vulnerable to oil. Below cliffs is tidal reefs, no beach.

## Location

16 km south of Opunake and 12 km west of Manaia.

## Land tenure

Site: - Crown Land: Foreshore and marginal strip (administered by the Department of Conservation)

Site access: - District Land: Unformed road off State Highway 45 (administered and vested in the South Taranaki District Council)

- Private Land: Marginal strip

## Values

Amenity	Moderate	
Recreational	Moderate	- surfcasting, shellfish gathering and traditional fishing site - access limits recreational use
Cultural/ Historical	High	- site of four major shipwrecks, 'Annie Wilson', 'Lizzie Bell', 'Manaia' and the 'Marramarra' - marae and cemetery nearby - boatsheds cut into cliff - Ohunuku, Otakeho wahi tapu site - whare waka, tauranga waka - koiwi/burial caves
Ecological/ Scientific	Moderate	- coastal herbfields, not vulnerable to oiling

## Public access

Poor - An unformed road exists off State Highway 45 however the location of the road is unclear.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required where possible. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### RAWA STREAM MOUTH



# Otakeho Beach

**Number:** 51

**GPS:** 1690263E

5620237N

**Map sheet:** NZMS 260 Series Sheet Q18

**Risk rating (1= High)**

**1** 2 3

## General description

Otakeho Beach is a small sandy beach at the bottom of high cliffs. The area is popular for fishing.

## Location

6.5 km west of Manaia.

## Land tenure

**Site:** - Crown Land: Foreshore and marginal strip (administered by the Department of Conservation)

**Site access:** - District Land: Dingle Road and unformed Dingle Road (administered and vested in the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	Moderate	- fishing
Cultural/ Historical	Not known	
Ecological/ Scientific	High	- site of nationally threatened plant <i>Craspedia</i> "Otakeho" (found in only two sites in the North Island, both being in Taranaki, the only other sites being around Nelson) - Key native ecosystem

## Public access

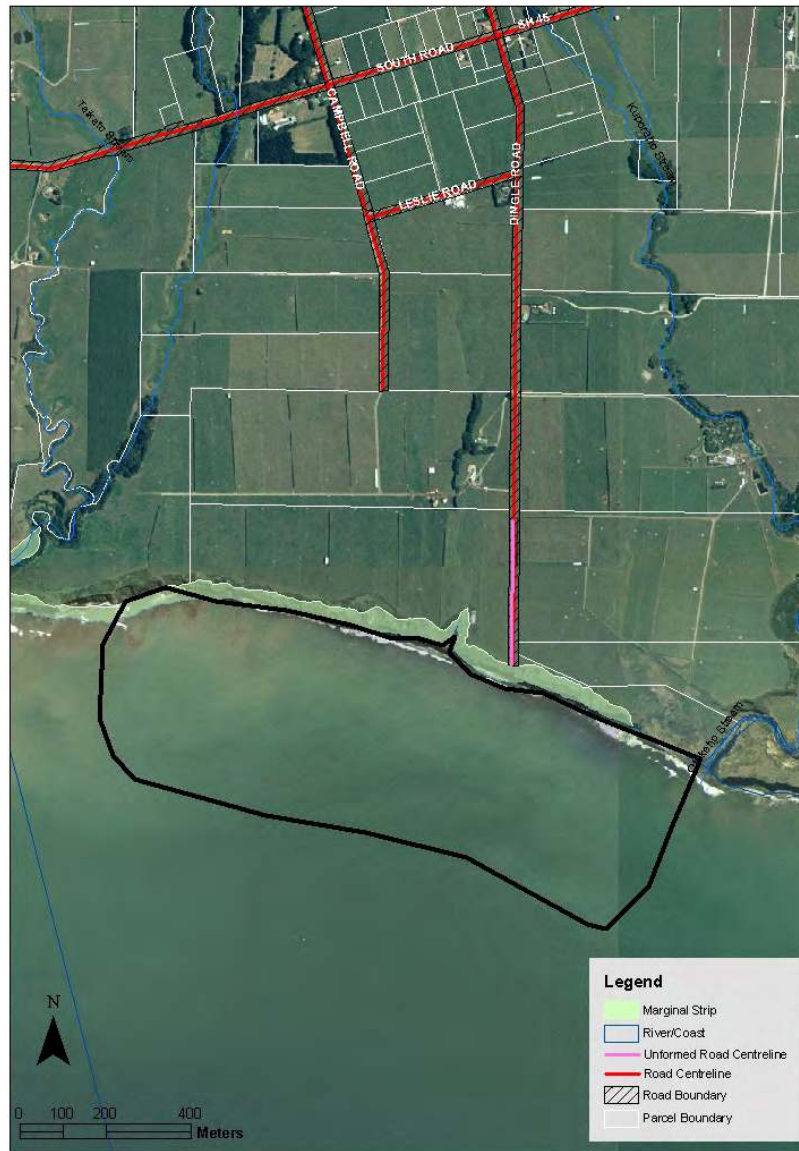
Poor - Access to the cliffs above the beach is via formed Dingle Road (which ends approximately 300 metres from the coast). A paper road continues to the coast and connects with a marginal strip.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### OTAKEHO BEACH



# Kaupokonui Stream

Number: 52

GPS: 1691070E  
5619730N

Map sheet: NZMS 260 Series Sheet P21

Risk rating (1= High)

1 2 3

## General description

The Kaupokonui Stream and beach is a popular area during the summer months with a camp site and facilities located on the left bank. The area is an important 'moa-hunting' archaeological site with nine species of moa and fifty five species of other birds having been found in the area (the remains are estimated to be from 660 – 610 years before present). There is also a 50 ha area of stabilised sand dunes on the right bank of the stream. Very high energy coast.

## Location

5.5 km south west of Manaia.

## Land tenure

**Site:** - Crown Land: Foreshore and estuary (administered by the Department of Conservation)

**Site access:** - Crown Land: To the left of the Stream mouth; marginal strip (administered by the Department of Conservation)  
- District Land: On the left bank; recreation reserve, esplanade reserve and Kaupokonui Heads Road (administered by the South Taranaki District Council).  
On the right bank; Formed Rama Road and unformed Rama Road (administered and vested in the South Taranaki District Council)  
- Private Land: On the right bank; no formal access

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- popular area during summer, especially for camping, swimming, fishing and surfing - whitebaiting
Cultural/ Historical	High	- pa and wāhi tapu site - important 'moa-hunting' archaeological site
Ecological/ Scientific	High	- Inanga spawning site - moa and bird remains (as above) - presence of sand dunes Caspian tern and Variable oystercatcher

## Public access

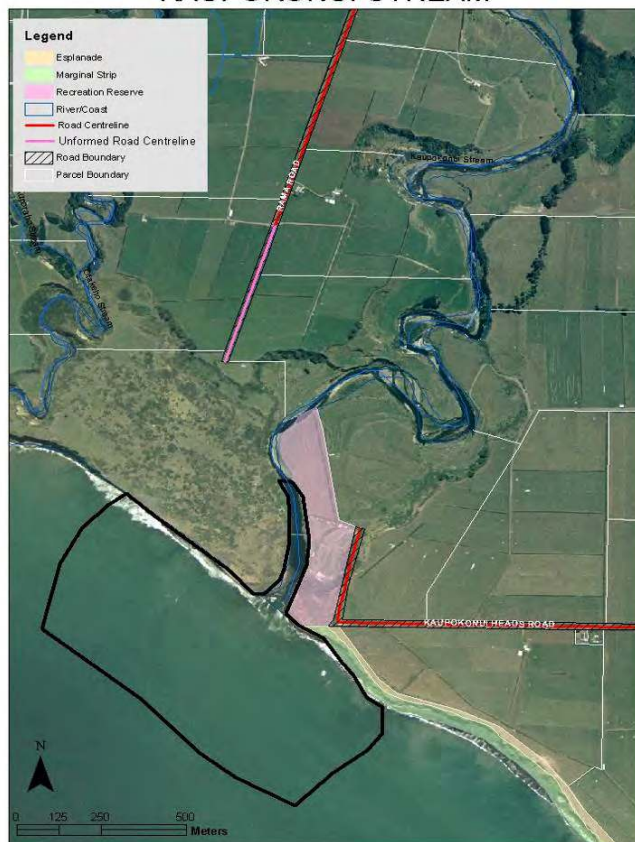
Excellent - Direct access to the Kaupokonui Stream mouth from Kaupokonui Heads Road. A bridge across the Kaupokonui Stream provides walking access to the right bank. No vehicle access is provided to the right bank.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## KAUPOKONUI STREAM





# Sutherland/Normanby Road Ends

Number: 53

GPS: 1694529E  
5618535N

Map sheet: NZMS 260 Series Sheet P21

Risk rating (1= High)

1 2 3

## General description

At the end of Sutherland and Normanby roads are steep mudstone cliffs, overlaying sand and tephra. Native shrubs exist on ledges, and native herbfields on the cliff.

## Location

3.5 km south of Manaia and 15 km east of Hawera.

## Land Tenure

Site: - Crown Land: Marginal Strip (administered by the Department of Conservation)

Site access: - District Land: Normanby Road, Sutherland Road and unformed Sutherland Road (administered and vested in the South Taranaki District Council)

## Values

Amenity	Moderate	
Recreational	Moderate	
Cultural/ Historical	High	- pa sites nearby
Ecological/ Scientific	High	- threatened plant sites, one of the most important botanical sites in the region - Key native ecosystem

## Public access

Poor - The cliffs in the area are steep and access to the beach is difficult although a rough steep track to the beach does exist. From the end of Normanby Road a marginal strip runs adjacent to the coast to Sutherland Road. From the end of Sutherland Road an unformed road provides access to the cliffs however location of the road on the ground is unclear.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### SUTHERLAND/NORMANBY ROAD ENDS



# Inaha Beach

**Number:** 54

**GPS:** 1700804E  
5617631N

**Map sheet:** NZMS 260 Series Sheet Q21

**Risk rating (1= High)**

**1** 2 3

## General description

A sandy beach below high cliffs. The area is used for fishing.

## Location

5 km south east of Manaia and 2.5 km west of Ohawe.

## Land tenure

**Site:** - Crown Land: Foreshore and marginal strip (from Inaha Stream to Waingongoro River) (administered by the Department of Conservation)

**Site access:** - District Land: Inaha Road, unformed Inaha Road, Rainie Road and unformed Rainie Road.

## Values

Amenity	High	- regionally important amenity values
Recreational	Moderate	- fishing, surfing
Cultural/ Historical	Not known	
Ecological/ Scientific	Not known	

## Public access

Poor - Formed Inaha Road and Rainie Road both finish approximately 300 and 500 metres respectfully prior to the coast. The location of the unformed roads to the coast is unclear.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## INAHA BEACH



# Waingongoro River Mouth, Ohawe Beach, and Four Mile Reef

Number: 55

GPS: 1702450E  
5617462N

Map sheet: NZMS 260 Series Sheet Q21

Risk rating (1= High)

1 2 3

## General description

This area consists of a small beach settlement and is a popular recreational area. The Waingongoro River is the southern most stony stream in Taranaki. The high cliffs at the river mouth and coast consist of mudstone, shell beds and sands overlaid with tephra. Offshore is a reef system. Coastal rescue based here.

## Location

The Waingongoro River is located adjacent to the Ohawe settlement, 8 km west of Hawera. Four Mile Reef is approximately 6.5 km offshore from Ohawe Beach.

## Land tenure

**Site:** - Crown Land - River, foreshore and marginal strip (administered by the Department of Conservation).

**Site access:** - Crown Land: Recreation Reserve (administered by the Department of Conservation)  
- District Land: to the right bank; unformed Waingongoro Heads Road to the left bank; Rangatapu Street, and unformed Ohawe Terrace (administered and vested in the South Taranaki District Council)  
- Private Land: no formal access

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- popular for swimming, whitebaiting, surfcasting, surfing and seafood gathering - scuba diving, and boat fishing near the reef
Cultural/ Historical	High	- historic pa and midden sites - military cemetery - Four mile reef is a traditional fishing reef, important to local Iwi - remains of moa and other birds (such as takahe, kakapo, huia and kokako) were found here
Ecological/ Scientific	High	- inanga spawning site - rare example of coastal scrub - distinctive form of native angelica ( <i>Scandia rosifolia</i> ) only known location in Taranaki - moa and bird remains (as above) - abundant and diverse marine life on the reef - patch of nationally rare <i>Euphorbia glauca</i> at river mouth

**Public access**

Excellent - Access to Ohawe Beach is via Rangatapu Street from the Ohawe Beach settlement. Public toilets and a boat ramp are provided. Access to the Waingongoro River Mouth is via the beach from Rangatapu Street.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive beach and shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

WAINGONGORO RIVER, OHAWE BEACH & FOUR MILE REEF



# Waihi Beach

**Number:** 56

**GPS:** 1706556E  
5615236N

**Map sheet:** NZMS 260 Series Sheet Q21

**Risk rating (1= High)**

**1** 2 3

## General description

The coastline is stony, with sandstone and siltstone cliffs. Herbfields that exist on the cliff face are dynamic communities, often disturbed by weather and erosion.

## Location

From Hawera township.

## Land tenure

**Site:** - Crown Land: Marginal strip (from Ohawe to the Hawera Golf Club)  
(administered by the Department of Conservation)

**Site access:** - District Land: Denby Road and Waihi Reserve (administered by the South Taranaki District Council)

## Values

Amenity	Moderate	
Recreational	High	- fishing, surfing and beach walking
Cultural/ Historical	High	- archeological site
Ecological/ Scientific	Moderate	- fossil bivalves and gastropods in the cliffs <sup>4</sup> - herbfield, at top of cliff - site is part of an internationally important sequence of uplifted marine terraces

## Public access

Excellent - There is good access from Denby Road, with a parking area, and a walking track to the beach. Signposted from State Highway 45. Be careful around herbfield when on top of cliff.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

## WAIHI BEACH





# Manawapou-Tangahoe River Mouths and Cliff Tops

Number: 57

GPS: 1715841E

5609467N

Map sheet: NZMS 260 Series Sheet Q21

Risk rating (1= High)

1 2 3

## General description

Areas of turf community extend over the cliffs near the Tangahoe River and Manawapou River mouths. Both of the rivers have small areas of indigenous vegetation on their banks upstream from the coast. Fonterra water take in Tangahoe River.

## Location

9 km south of Hawera.

## Land tenure

Site: - Crown Land: Foreshore and river mouths (administered by the Department of Conservation)

Site access: - District Land: Manawapou Road, Mokoia Road and unformed Manawapou Road and unformed Mokoia Road (administered and vested in the South Taranaki District Council)

- Private Land

## Values

Amenity	High	- unusual landforms of stacks, pinnacles and peninsulas
Recreational	Moderate	- fishing
Cultural/ Historical	High	- Pa sites including Manawapou Pa - Thatckers redoubt, Cameron's redoubt, and Inman's redoubt - traditional food gathering area for local Maori
Ecological/ Scientific	Moderate	- area representative of coastal vegetation, presence of coastal herbs and other halophytes in sand pockets on cliff edges. - whitebait spawning area in upper estuary area

## Public access

Good - Access to Manawapou River mouth along Manawapou Road (accessed via Manutahi), which is a formed metal road across farmland. The track has gates across it, however signs advise that it is a public road and access is provided to the river mouth. Access is also provided from Mokoia Road to both river mouths. There are two signs at the end of formed Mokoia Road, which advise that the public, by the most direct route, may have access to the Manawapou River and Tangahoe River passing through the privately owned land. One of the routes follows a paper road; the other is over private land. No vehicle access to beach.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean

up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

MANAWAPOU-TANGAHOE RIVER MOUTHS & CLIFF TOPS



# Kakaramea Beach

**Number:** 58

**GPS:** 1721556E  
5600974N

**Map sheet:** NZMS 260 Series Sheet Q21

**Risk rating (1= High)**

**1** 2 3

## General description

A coastal area with 25 m high cliffs with a series of 'fingers' that extend out to sea which are approximately 50 m long and 10-15 m across, with bays in between. There are native herbfields found on the cliff faces and in boggy areas on the cliff tops. Also within this area was the site of one of the first hydroelectric power stations established in New Zealand. Water spilt over the cliffs to a powerhouse at the base. The station was destroyed in the early 1920's when the dam at the top of the cliffs gave way.

## Location

20 km south of Hawera and 5 km north of Patea.

## Land tenure

Site:

- Crown Land: Foreshore (administered by the Department of Conservation)
- Private Land

Site access:

- Crown Land: Marginal strip (administered by the Department of Conservation)
- District Land: Powerhouse Road, unformed Powerhouse Road and unformed Manawapou Road (administered and vested in the South Taranaki District Council)
- Private Land: No access provided

## Values

Amenity	Moderate	
Recreational	Moderate	- recreational fishing from the cliff tops
Cultural/ Historical	High	- the site of one of the first hydro-electric stations established in New Zealand
Ecological/ Scientific	Moderate	- herbfield, and Black-backed gull colony - key native ecosystem

## Public access

Poor - A paper road exists from the end of Powerhouse Road which connects to the marginal strip along the coast. Pine trees are growing on the unformed road and the location of the unformed road is unclear. Good foot access to river, however no vehicle access to beach due to cliff bank.

## Preferred response option

Natural recovery preferred. Containment and recovery impossible. Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife

rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### KAKARAMEA BEACH



# Patea Beach and River Mouth

**Number:** 59

**GPS:** 1727183E  
5596641N

**Map sheet:** NZMS 260 Series Sheet Q22

**Risk rating (1= High)**

**1** 2 3

## General description

The Patea River mouth area has been extensively modified due to the construction of wharves when a port operated in the area, groynes and seawalls. The area is popular for recreation and includes a campground. The area is part of the South Taranaki uplifted marine terraces that forms a 20 km wide coastal strip from Hawera to Wanganui, and which represents NZ's most complete sequence of uplifted marine terraces. Sand margins of the tidal river have little native vegetation, but nearby sand dunes have a small patch of pingao. There are unbroken vegetation sequences from estuary to cliff-face, and areas of tidal saltmarsh, backed by steep mudstone cliffs. The area is spiritually valuable for the Nga Rauiri Iwi.

## Location

1 km south of Patea township.

## Land tenure

Site: - Crown Land: Estuary and foreshore (administered by the Department of Conservation)

Site access: - Crown Land: Patea Coast marginal strip (administered by the Department of Conservation)  
- District Land: Harbour Endowment (Golf Club), recreation reserve, District Council owned land (public toilets, and beach pavilion), Taranaki Road and unformed Pilot Station Road (administered and vested by the South Taranaki District Council)

## Values

Amenity	Moderate	- highly modified, but with high landscape values - small scale commercial fishing
Recreational	High	- camping, fishing, surfing, and golf
Cultural/ Historical	High	- two redoubts - many pa including Wai-o-teiri Marae
Ecological/ Scientific	High	- threatened plants - Pingao on dunes and taupata at base of cliffs ( <i>Coprosma repens</i> ) - drowned forest - part of South Taranaki uplifted marine terraces - used by wading and coastal birds - dunes at river mouth

**Public access**

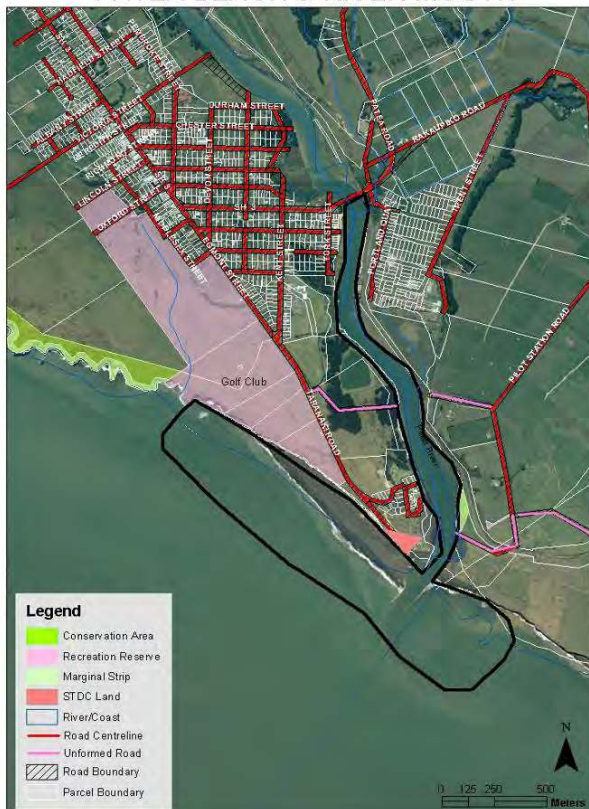
Excellent - The beach is signposted from the main road, with access to the right bank via Taranaki Road, through Patea township. There is a car park, playground, toilets, and a riverside walkway. Access to the right bank can also be via unformed Pilot Station Road. There are boat ramps and good staging areas.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required. The likelihood of an oil spill in this area is higher due to the presence of offshore floating production stations, well heads and increased oil tanker movements.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

PATEA BEACH & RIVER MOUTH



# Waitore Swamp

Number: 60

GPS: 1728758E  
5595777N

Map sheet: NZMS 260 Series Sheet Q22

Risk rating (1= High) 1 2 3

## General description

Waitore Swamp is a small coastal peat swamp in an area of coastal dunes. The swamp is an important archaeological site containing the oldest wooden artifacts known from New Zealand (AD1380-1500).

## Location

1.5 km south of Patea River, north of the Whenuakura River.

## Land tenure

Site: - Private Land

Site access: - District Land: Harbour Endowment Farm (leased) and unformed Pilot Station Road (administered and vested in the South Taranaki District Council)  
- Private Land: No formal access

## Values

Amenity	Moderate	
Recreational	Low	
Cultural/ Historical	High	- archaeological site - many cultural sites of significance
Ecological/ Scientific	Not Known	

## Public access

None - Private land.

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application	✓		Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

# WAITORE SWAMP





# Whenuakura Estuary

**Number:** 61

**GPS:** 1729365E  
5595518N

**Map sheet:** NZMS 260 Series Sheet Q22

**Risk rating (1= High)**

1 2 3

## General description

A small but relatively unmodified estuary with extensive mudflats. The Whenuakura Estuary has tidal lagoons, a sand bar, and an island often forms. To the south west of the estuary the cliffs gradually disappear under eight metre high sand dunes. This is part of the 20 km wide coastal strip of South Taranaki uplifted marine terraces, and is a dynamic coast with many unvegetated and unstable dunes. Much of the area is continually being eroded by wind and wave action. The sand dunes extend either side of the river for approximately 3 km, with high irregular foredunes, and dune ridges extending up to 50 metres inland. The dunes are vegetated with marram, some sand convolvulus and isolated pingao and spinifex. The area is important for seabirds.

## Location

3.5 km south of Patea.

## Land tenure

- Site:**
- Crown Land: Estuary, foreshore and Foreshore Reserve (administered by the Department of Conservation)
- Site access:**
- District Land: On both banks; Harbour Endowment Farm  
On right bank; unformed Pilot Station road  
On left bank; unformed Whenuakura Road
  - Private Land: On left bank; no formal access

## Values

Amenity	Moderate	
Recreational	Moderate	
Cultural/ Historical	High	<ul style="list-style-type: none"> <li>- site of a Maori Kainga (village) on sand dunes on left bank</li> <li>- a pa existed on island in the estuary</li> <li>- many sites of spiritual significance</li> </ul>
Ecological/ Scientific	High	<ul style="list-style-type: none"> <li>- relatively unmodified estuary</li> <li>- habitat of threatened caspian tern and rare variable oyster catcher</li> <li>- nationally important for presence of Royal spoonbill</li> <li>- whitebait spawning on northern bank</li> <li>- on the route for migratory birds</li> <li>- large area of sand dunes, with a loud frog population in the dune swales</li> <li>- Pingao in dunes</li> <li>- oxbow wetland just behind dunes with notable flora and fauna</li> <li>- key native ecosystem</li> </ul>

**Public access**

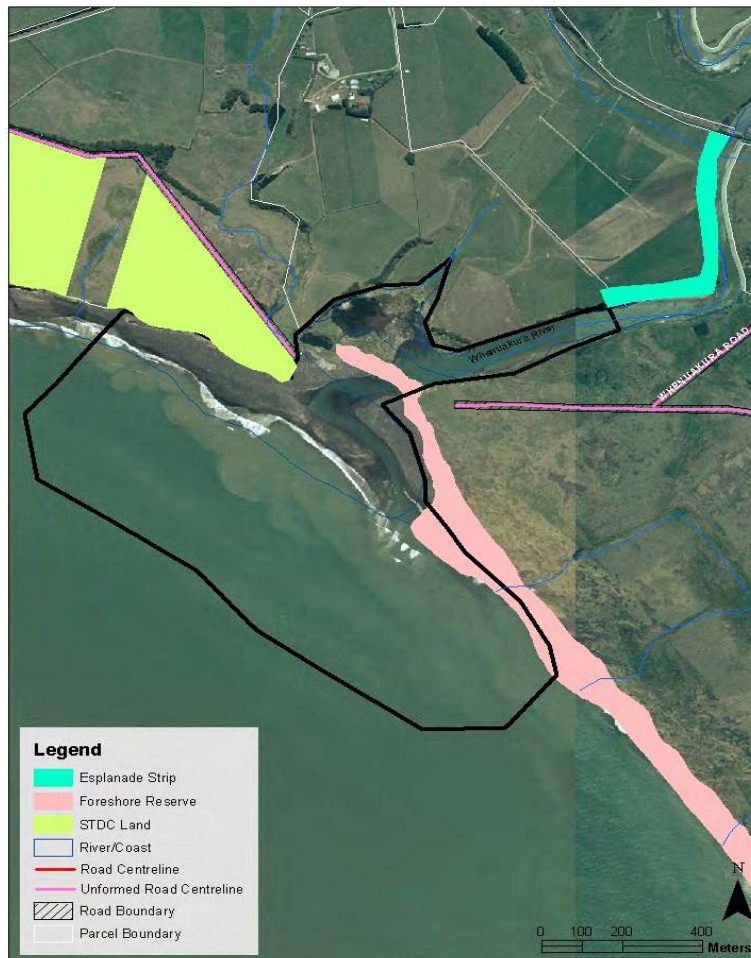
Poor - An unformed road leads to the right bank. On the left bank an unformed road stops approximately 100 m from the river bank. The unformed roads are not discernible on the ground.

**Preferred response option**

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

**WHENUAKURA ESTUARY**



# North and South Traps

Number: 62

GPS: 1730462E  
5585778N

Map sheet: NZMS 260 Series Sheet Q22

Risk rating (1= High) 1 2 3

## General description

Two large adjoining reef systems approximately 6 km offshore from Patea. This is an important marine habitat in a sandy environment.

## Location

6 km offshore from Patea.

## Land tenure

Site: - Crown Land: Seabed (administered by the Department of Conservation)

## Values

Amenity	Moderate	- tall underwater pinnacles, an unusual feature on sandy coast
Recreational	Moderate	- used for recreational diving and fishing
Cultural/ Historical	High	- Te Poho-o-Maru (check spelling with Sam T)
Ecological/ Scientific	High	- large seaweed (Ecklonia) forests - diverse and abundant marine life

## Public access

Poor - Offshore, access via boat.

## Preferred response option

Where possible oil should be prevented from reaching sensitive reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the reef area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Low
Natural recovery	✓		High

# NORTH AND SOUTH TRAPS



# Waipipi Dunelands

Number: 63

GPS: 1733359E  
5591579N

Map sheet: NZMS 260 Series Sheet Q22

Risk rating (1= High)

1 2 3

## General description

A dynamic coast with many unvegetated and unstable dunes, with much of the area continually being eroded by wind and wave action. Waipipi Dunes is a 40 hectares area, consisting of small wet sand flats, low dunes of less than 4 metres, and dunes extending inland to taller (15 metres) more stable relict foredunes. The water meanders across these dunes in a NW to SE direction periodically forming shallow lagoons on the beach and patches of quicksand can occur. It is thought that the unusual drainage is due to earlier ironsand mining in the area which flattened the dunes.

## Location

5.5 km southwest of Waverley.

## Land Tenure

- Site:**
- Crown Land: Foreshore Reserve and Waipipi Marginal Strip (administered by the Department of Conservation)
  - District Land: Foreshore Reserve (administered by the South Taranaki District Council)

- Site access:**
- District Land: Unformed Dryden Road (vested in the South Taranaki District Council)

## Values

Amenity	High	- significant natural area
Recreational	Moderate	- fishing, walking, tramping
Cultural/ Historical	Moderate	- archaeological material found
Ecological/ Scientific	High	- vulnerable flora species - one of best remaining examples of pingao and spinifex sand dune vegetation in South Taranaki - a regionally significant wetland - key native ecosystem, Waipipi dunes

## Public access

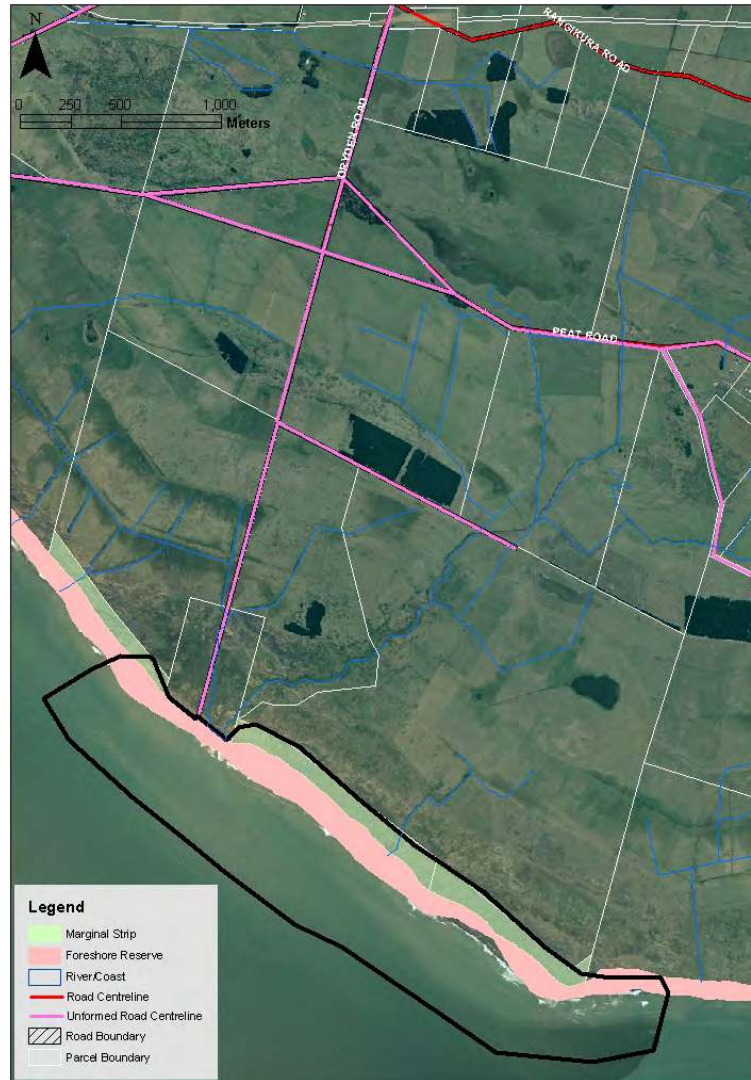
- Poor
- Off Rangikura Road unformed Drydon Road crosses farmland and continues to the coast; however the location of the road on the ground is unclear.

## Preferred response option

Where possible oil should be prevented from reaching sensitive dune and beach areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

### WAIPIPI DUNELANDS



# Waverley Beach

Number: 64

GPS: 1739740E  
5589577N

Map sheet: NZMS 260 Series Sheet Q22

Risk rating (1= High)

1 2 3

## General description

A beach with unique landforms of caverns, ravines, blowholes and eroding stacks carved into the cliffs by wave erosion. Eleven small peninsulas project 5-15 metres out to sea, and one island has been formed. The cliff tops support mats of small native plants. A dynamic coast with many unvegetated and unstable dunes, with much of the area continually being eroded by wind and wave action. Waverley beach is approximately 8 km long with 13 metre high cliffs. The low undulating dunes are on the cliff tops and extend inland. These dunes are stable and the vegetation includes lupin, marram and kikuyu. Also, the nearby Lake Waikare and Lower Waikare are a significant natural area.

## Location

5.5 km south of Waverley.

## Land tenure

- Site:**
- Crown Land: Foreshore (administered by the Department of Conservation)
  - District Land: Wairoa Recreation Reserve and Okahu Maori Reservation (administered by the South Taranaki District Council)

- Site access:**
- District Land: Wairoa Domain Recreation Reserves and Waipipi Road (administered by the South Taranaki District Council)

## Values

Amenity	High	<ul style="list-style-type: none"><li>- regionally important amenity values, outstanding natural landscape</li><li>- eroding stacks, caverns and tunnels produce unique landforms, and blow holes</li></ul>
Recreational	High	<ul style="list-style-type: none"><li>- walking, off-road vehicles, camping, boat ramp, fishing</li></ul>
Cultural/ Historical	Not known	<ul style="list-style-type: none"><li>- site of cultural significance</li></ul>
Ecological/ Scientific	High	<ul style="list-style-type: none"><li>- Ototuku Conservation Area, a remnant sand dune</li><li>- rare plant species (<i>Leptinella dispersa rupestris</i>)</li><li>- part of the South Taranaki uplifted marine terraces (which forms a 20 km wide coastal strip from Hawera to Wanganui, NZ's most complete sequence of uplifted marine terraces)</li><li>- native herbfields on cliff tops</li><li>- key native ecosystem</li></ul>

## Public access

Excellent - Direct access via Waipipi Road from Waverley. There is no beach sign at the main road.

### Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High

WAVERLEY BEACH





# Waitotara Estuary and Dunes

Number: 65

GPS: 1744206E

5587541N

Map sheet: NZMS 260 Series Sheet R22

Risk rating (1= High) 1 2 3

## General description

A relatively unmodified estuary with an area of tidal mud and sand flats. The sub-fossilised totara stumps of a 'drowned forest' give the river its name. A continuous dune system extends north of the Waitotara River mouth, and is approximately 203 hectares in size. The area includes a regionally significant protected wetland comprising of a dune lake, wetland in dune slacks, sand dunes, and river margins of Waiau Stream and Waitotara River. There are also sand dunes south of the river mouth.

## Location

10 km south west of Waverley.

## Land Tenure

**Site:** - Crown Land: Estuary and Hawken's Lagoon Conservation Area (192.76 ha, with grazing license covering 18.7903ha) (administered by the Department of Conservation)

**Site access:** - Crown Land: On right bank; Waitotara River Marginal Strip (administered by the Department of Conservation)

- District Land: On left bank; Recreation Reserve (administered by the South Taranaki District Council)

On right bank; Hawken Road, unformed Hawken Road and unformed Waipipi Road (administered and vested in the South Taranaki District Council)

## Values

Amenity	High	- significant natural area (Hawkens Swamp) , relatively unmodified with high natural values
Recreational	Moderate	- whitebaiting
Cultural/ Historical	High	- ferry punt landing from early European settlement - site of original Waitotara Hotel the 'rising sun', which used a cave in the cliff for the cellar - Waitotara River is major significance to Ngao Rauru Kaitakai
Ecological/ Scientific	High	- unmodified, representative estuary, with dune lake, wetland, sand dunes and damp dune flats adjacent (a regionally significant wetland) - important habitats for bird and insect species - threatened Australian bittern, NZ shoveller, black swan, stopover for migratory wading birds (royal spoonbill, banded dotterel) and international migrant birds (eastern bar-tailed godwit) - notable flora: pingao and <i>Eleocharis neozelandica</i> , large number of different plant communities - sub-fossil totara stumps in estuary (unique artefacts) - two key native ecosystems

## Public Access

Good - Walking access from the end of Hawken's Road, via Hawken's Lagoon Conservation Area. There is a Department of Conservation 'Conservation Area' sign, but the pathway across public land to the river is hard to distinguish from the adjacent private land. There is also access by walking along the coast from Wainu Beach to the left bank of the Waitotara River mouth (6 kms).

## Preferred response option

Where possible oil should be prevented from reaching sensitive shoreline areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		Medium
Natural recovery	✓		High

## WAITOTARA ESTUARY



# Waiinu Beach and Reef

**Number:** 66

**GPS:** 1749358E  
5585589N

**Map sheet:** NZMS 260 Series Sheet R22

**Risk rating (1= High)**

1 2 3

## General description

Waiinu Beach is the southernmost beach in Taranaki. There is a small settlement and camping area. Nearby are steep eroding coastal cliffs, approximately 46 metres high. The beach is long and sandy with extensive sand dunes. Between Waiinu settlement and Waitotara River Mouth is an iron sand beach with defined foredunes between 5 and 500 metres wide. This is a dynamic dune system with large areas of bare sand backed by ephemeral wetland areas. The high dunes back on to an uplifted marine plain. The area was much larger in the 1950's, and now some of the older stabilised dunes are eroding through stock damage<sup>4</sup>. Waiinu reef is offshore, and features limestone outcrops extending from Mean High Water Spring to 3-5 kms offshore. Reefs in the area are made of an extremely hard rock (resistant calcareous conglomerate of Pleistocene origin) containing abundant well-preserved fossils of oysters, toheroas, cockles, paua and barnacles.

## Location

7 km south of Waitotara.

## Land tenure

**Site:** - Crown Land: Foreshore (administered by the Department of Conservation)

**Site access:** - District Land: Nukumar Domain Board, Recreation Reserve, Waiinu Beach Road and unformed unnamed road (administered and vested in the South Taranaki District Council)

## Values

Amenity	High	- regionally important amenity values
Recreational	High	- Snapper rock, local fishing spot, and surfing - large sandy beach
Cultural/ Historical	High	- old Maori fishing village, and site of a Maori fishing canoe (Karewaonui) - the reef is used for gathering kaimoana and has been a major fishing ground
Ecological/ Scientific	High	- extensive sand dunes - ventifacts (rocks shaped by wind and sand erosion) in the area. They occur in very few places around the world - the reef has an abundance of marine invertebrates, plants and fish - the reef is a rock platform of Pleistocene origin containing many well-preserved fossils

## Public access

Excellent - Located at the end of Waiinu Beach Road is a large recreation reserve which stretches from the mouth of the Waitotara River to three km south of Waiinu Beach settlement. A parking area and information sign about the area are provided in the reserve.

## Preferred response option

Where possible oil should be prevented from reaching sensitive beach and reef areas, deflective booms are unlikely to be effective along the coastline close to the shore as the area is exposed and subject to rough seas. They may however be useful in guiding oil to a suitable collection point. Prevention of oil reaching the beach, reef and shoreline area may best be achieved by the use of dispersant off-shore, though this is not a preferred option. Carry out shoreline clean up and wildlife rehabilitation if required.

Preferred Response Options Matrix			
	Preferred	Not preferred	Feasibility
Containment and recovery	✓		Low
On water recovery	✓		Low
Dispersant application		✓	Medium
Shoreline cleanup	✓		High
Natural recovery	✓		High



## Coastal bird species recorded in Taranaki

Priority Category	Species Scientific Name	Species Common Name	NZ threat classification	IUCN category	Status Code	Breeds in Taranaki	Breeding Season	Seasonal Distribution
1C	<i>Anarhynchus frontalis</i>	Wrybill	Nationally vulnerable	VU	E	N		Sp, S, A
5	<i>Anas gracilis</i>	Grey Teal	Not threatened	LC	N	Y	Sept-Jan	year round
6	<i>Anas platyrhynchos</i>	Mallard	Introduced & naturalised	LC	I	Y	Aug-Feb	year round
5	<i>Anas rhynchotis variegata</i>	NZ shoveler	Not threatened	LC	E	N	n/a	year round
1A	<i>Anas superciliosa superciliosa</i>	Grey Duck	Nationally critical	LC	N	Y	Aug-Feb (Peak Oct-Nov)	year round
6	<i>Anser anser</i>	Feral Goose	Introduced & naturalised	LC	I	Y	Sep - Jan	year round
5	<i>Ardea novaehollandiae</i>	White Faced Heron	Not threatened	LC	N	N	n/a	year round
4	<i>Arenaria interpres</i>	Turnstone	Migrant	LC	M	N	n/a	Sp, S, A
5	<i>Aythya novaeseelandiae</i>	NZ Scaup	Not threatened	LC	E	Y	Oct - Apr	year round
1B	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Nationally endangered	EN	N	N	n/a	year round
6	<i>Branta canadensis</i>	Canada Goose	Introduced & naturalised	LC	I	Y	Sep - Jan	year round
4	<i>Bubulcus ibis coromandus</i>	Cattle Egret	Migrant	LC	M	N	n/a	year round
6	<i>Cairina moschata</i>	Muscovy Duck	Not listed	LC	I	N	n/a	year round
4	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Migrant	LC	M	N	n/a	S
4	<i>Calidris canutus rogersi</i>	Lesser Knot (red knot)	Migrant	LC	M	N	n/a	Sp, S
4	<i>Calidris ruficollis</i>	Red-necked Stint	Migrant	LC	M	N	n/a	Sp, S
4	<i>Charadrius melanops</i>	Black Fronted Dotterel	Coloniser	LC	N	N	Sep - Mar	A, W, Sp
1C	<i>Charadrius obscurus aquilonius</i>	Northern NZ Dotterel	Nationally vulnerable	EN	E	Y	Aug-Feb	year round
1C	<i>Charadrius bicinctus bicinctus</i>	Banded Dotterel	Nationally vulnerable	Not listed	E	Y	Jul - Feb	year round
4	<i>Chlidonias leucopterus</i>	White winged black tern	Migrant	LC	S	N	n/a	Sp, S
5	<i>Cygnus atratus</i>	Black Swan	Not threatened	LC	I	Y	variable	year round
6	<i>Cygnus olor</i>	Mute swan	Introduced & naturalised	LC	I	N	n/a	year round
2A	<i>Thalassarche cauta steadi</i>	NZ white capped mollymawk	Declining	NT	N	N	n/a	year round
4	<i>Diomedea exulans</i>	Wandering/Snowy albatross	Migrant	VU	N	N	n/a	A
4	<i>Thalassarche melanophrys</i>	Black browed mollymawk	Coloniser	EN	N	N	n/a	Sp
1A	<i>Ardea modesta</i>	White Heron	Nationally critical	Not listed	N	N	n/a	year round
1C	<i>Egretta sacra sacra</i>	Reef Heron	Nationally endangered	LC	N	Y	Sep - Feb	year round

Priority Category	Species Scientific Name	Species Common Name	NZ threat classification	IUCN category	Status Code	Breeds in Taranaki	Breeding Season	Seasonal Distribution
2A	<i>Eudyptula minor iredalei</i>	Northern Blue Penguin	Declining	LC	N	Y	Jul - Feb	year round
4	<i>Fulica atra</i>	Australian Coot	Coloniser	Not listed	N	Y	Aug - Mar	year round
2A	<i>Haematopus finschi</i>	NZ Pied Oystercatcher	Declining	LC	E	N	n/a	year round
2B	<i>Haematopus unicolor</i>	Variable Oystercatcher	Recovering	LC	E	Y	Sep - Mar	year round
2A	<i>Himantopus himantopus leucocephalus</i>	Pied Stilt	Declining	LC	N	Y	Jul-Jan	year round
1A	<i>Himantopus novaezelandiae</i>	Black Stilt	Nationally critical	CR	E	N		S, A
5	<i>Larus dominicanus dominicanus</i>	Southern Black-backed Gull	Not threatened	LC	N	Y	All Year	year round
1C	<i>Larus novaehollandiae scopulinus</i>	Red Billed Gull	Nationally vulnerable	LC	E	Y	All Year	year round
4	<i>Limosa lapponica baueri</i>	Eastern Bar-tailed Godwit	Migrant	LC	M	N	n/a	Sp, S, A
2D	<i>Macronectes halli</i>	Northern giant petrel	Naturally uncommon	NT	N	N	n/a	year round
4	<i>Macronectes giganteus</i>	Southern giant petrel	Migrant	NT	N	N	n/a	year round
5	<i>Morus serrator</i>	Australasian Gannet	Not threatened	LC	N	N	n/a	year round
4	<i>Numensis phaeopus spp.</i>	Whimbrel - Asiatic, American	Migrant/vagrant	LC	M	N	n/a	Sp, S, A
2D	<i>Phalacrocorax carbo novaehollandiae</i>	Black Shag	Naturally uncommon	LC	N	Y	All Year	year round
2D	<i>Phalacrocorax melanoleucos breirostris</i>	Little Shag	Not threatened	LC	E	Y	Aug - Feb	year round
2D	<i>Phalacrocorax sulcirostris</i>	Little Black Shag	Naturally uncommon	LC	N	N	n/a	year round
1C	<i>Phalacrocorax varius varius</i>	Pied Shag	Nationally vulnerable	LC	N	N	n/a	year round
2D	<i>Platalea regia</i>	Royal Spoonbill	Naturally uncommon	LC	N	N	n/a	year round
4	<i>Pluvialis fulva</i>	Pacific Golden Plover	Migrant	LC	M	N	n/a	year round
1C	<i>Poliiocephalus rufopectus</i>	NZ Dabchick	Nationally vulnerable	VU	E	Y	Sep - Mar	year round
5	<i>Porphyrio melanotus</i>	Pukeko	Not threatened	LC	N	Y	variable	year round
2C	<i>Porzana tabuensis plumbea</i>	Spotless Crane	Relict	LC	N	N		year round
5	<i>Pterodroma macroptera gouldi</i>	Grey-faced petrel	Not threatened	LC	E	Y	Jun - Jan	year round
2D	<i>Puffinus bulleri</i>	Buller's Shearwater	Naturally uncommon	VU	E	N	n/a	Sp, S, A
2A	<i>Puffinus carneipes</i>	Flesh-footed Shearwater	Declining	LC	N	N	n/a	Sp, S, A
2C	<i>Puffinus gavia</i>	Fluttering Shearwater	Relict	LC	E	N	n/a	year round
2A	<i>Puffinus griseus</i>	Sooty Shearwater	Declining	NT	N	N	n/a	Sp, S, A

Priority Category	Species Scientific Name	Species Common Name	NZ threat classification	IUCN category	Status Code	Breeds in Taranaki	Breeding Season	Seasonal Distribution
4	<i>Stercorarius spp.</i>	Skua	Migrant	LC	M	N	n/a	Sp, S, A
4	<i>Sterna albifrons sinensis</i>	Little Tern	Migrant	LC	M	N	n/a	Sp
1B	<i>Chilodrias albostrata</i>	Black-fronted tern	Nationally endangered	EN	E	N	n/a	S,A,W
1C	<i>Hydroprogne caspia</i>	Caspian Tern	Nationally vulnerable	LC	N	N	n/a	year round
2A	<i>Sterna striata striata</i>	White Fronted Tern	Declining	LC	N	Y	Aug-Feb	year round
5	<i>Tadoma variegata</i>	Paradise Shelduck	Not threatened	LC	E	Y	Aug-Jan	year round
1A	<i>Thinomis novaeseelandica</i>	Shore plover	Nationally critical	EN	E	N	n/a	S
4	<i>Tringa brevipes</i>	Siberian Tattler	Vagrant	LC	S	N	n/a	Sp, A
5	<i>Vanelus miles novaehollandiae</i>	Spur Winged Plover	Not threatened	LC	N	Y	June-Jan	year round

### **Key**

#### **Status Code:**

E	Endemic	Breeds only in NZ territories
N	Native	Breeds in NZ territories and elsewhere
M	Migrant	A reasonable number migrate to NZ territories but do not breed
S	Straggler/vagrant	Not a regular migrant or few migrate to NZ territories but do not breed
I	Introduced	Introduced by humans

#### **IUCN Classification scheme:**

CR	Critically Endangered
EN	Endangered
VU	Vulnerable
NT	Near Threatened
LC	Least Concern

(<http://www.iucnredlist.org>)

#### **Seasons:**

Sp	Spring
S	Summer
A	Autumn
W	Winter

***Priority Category:***

Category 1: First priority for deterrence, rescue and/or rehabilitation

Species with a New Zealand Threat Classification of 'Threatened' and/or IUCN Red-list classification ([www.iucnredlist.org](http://www.iucnredlist.org)) of critically endangered (CR), endangered (EN) or vulnerable (VU). These are ranked from 1A to 1D for further prioritization using the New Zealand Threat Classification system.

- 1A Nationally critical
- 1B Nationally endangered
- 1C Nationally vulnerable

Category 2: Second priority for deterrence, rescue and rehabilitation

Species with a New Zealand Threat Classification of 'At Risk' and/or IUCN Red-list classification ([www.iucnredlist.org](http://www.iucnredlist.org)) of critically endangered (CR), endangered (EN) or vulnerable (VU). These are ranked from 2A to 2D for further prioritization using the New Zealand Threat Classification system.

- 2A Declining
- 2B Recovering
- 2C Relict
- 2D Naturally uncommon

Category 3: Third priority for deterrence, rescue and rehabilitation

Species which are endemic to New Zealand and are considered to be 'Not Threatened' under the NZ Threat Classification System, and with an IUCN Red-list classification of lower risk (LR) or not listed.

Category 4: Fourth priority for deterrence, rescue and rehabilitation

Species considered as migrants, vagrants or colonizers under the NZ Threat Classification System, and with an IUCN Red-list classification of lower risk (LR) or not listed.

Category 5: Fifth priority for deterrence, rescue and rehabilitation

Species which are native to New Zealand and are considered to be 'Not Threatened' under the NZ Threat Classification System, and with an IUCN Red-list classification of lower risk (LR) or not listed.

Category 6: Sixth priority for deterrence, rescue and rehabilitation

Species considered to be 'Introduced & Naturalised' under the NZ Threat Classification System, and with an IUCN Red-list classification of lower risk (LR) or not listed.



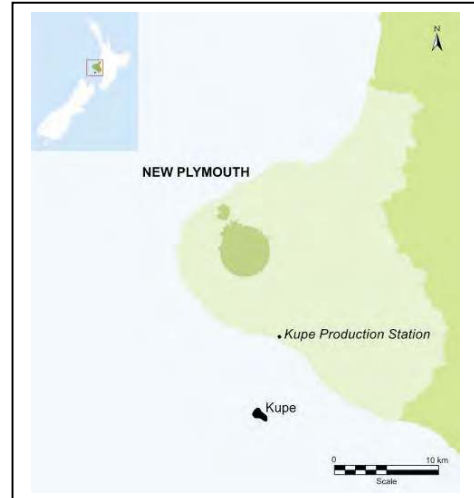
# Kupe

## Introduction

Beach Energy Resources NZ (Kupe) Ltd is the legal entity that operates Kupe on behalf of the Kupe Joint Venture involving Genesis Energy, and New Zealand Oil & Gas Ltd.

The Kupe Gas Project comprises an unmanned non processing facility Wellhead Platform and a sub-sea multiphase raw gas pipeline to bring the unprocessed gas and liquids from the Wellhead Platform (WHP) to the Kupe Production Station (KPS) onshore.

Frodo document # 793252



## Contact information

Kupe WHP  
KPS control room

(06) 2749725/ VHF ch. 16  
(06) 274 9712

Maritime NZ Rescue Coordination Centre  
Taranaki Regional Council (24hrs)

(04) 577 8030  
0800 736 222

## Location information

Well Head Platform  
2000/WGS 84 (DMS)),  
Distance from Shore  
Prevailing Wind  
Prevailing Current  
Median Water Temperature (°C)

Lat: 39 51 03 South; Long: 174 07 12 East (NZGD)  
30km offshore, southwest of Hawera, in 35m water depth  
South East and West  
North West/ South East (NW/ SE)  
15 (Sea water temp. varies between 12 -18.°C)

## Oil characteristics

Common Name	Kupe Condensate
Description	Condensate/ Oil
Pour Point (°C)	-60
Specific Gravity (15°C)	0.7224
API Gravity (15°C)	64.37
Viscosity Temperature (°C)	.6909 @20°C
Flash Point (°C)	<20

Fluids from the Kupe field are a light condensate. Oil spill trajectory results show that there is a **very low probability** that the spilt oil would beach in coastal regions beyond the zone from South Taranaki to Kapiti Island. The minimum travel times for spilled oil to beach from a low of well control incident are 38 hours in Winter (South Taranaki) and 53 hours in Summer (South Taranaki) to 205 hours in summer (Horowhenua) and 743 hours in winter (Kapiti Island Shoreline).

## Use of dispersants

The fresh oil is readily dispersible, but dispersion is likely to be undesirable most of the time because of the high toxicity of the light volatile fractions and the fact that most of this will evaporate if it is not dispersed. The weathered oil residues are likely to be difficult to disperse chemically, but are comparatively non-toxic and best suited to physical recovery if it comes ashore; and the most likely response options are considered to be natural recovery (primarily be removal via evaporation), on-water containment and recovery, or shoreline cleanup.

Dispersant applied at recommended rates is unlikely to cause significant adverse effects, even with multiple applications. Oil dispersed into water greater than 10m in depth will quickly dilute to levels where acute toxic effects are unlikely. Dispersant use is generally not appropriate in shallow, near shore areas, with limited circulation and flushing; near aquaculture facilities, shellfish beds and fish spawning grounds and around seawater intakes.

## Dispersant – Important information

Window of Opportunity	<3 hours
Use of dispersant recommended	No (dispersant could only be applied on freshly spilled crude oil)
Dispersant Types	Type 2: Diluted as 10% solution in seawater Type 3: Undiluted from aircraft/vessel (1:20-25 disp.: oil)
Most effective dispersant	1. Corexit 9527; 2. Gamlen OSD LT; 3. Corexit 9500
Boat Availability	Pacific Chieftain is fitted with 2 x 6 m spray booms with direct suction pump

## Dispersant types

Type 1 Dispersant	Type 2 Dispersant	Type 2/3 Dispersant	Type 3 Dispersant
BP 1100X	<b>BP 1100WD</b>	Atpet 787	BP Enersperse 1037
BP A-B	Castrol Solvex OSD 9 Conc	<b>Corexit 9527</b>	Shell Dispersant HEC
Castrol Atlas OSD	<b>Gamlen OSD LT*</b>	<b>Shell VDC/Slickgone LTSW</b>	<b>Tergo (Rochem) R40*</b>
Gamlen OSR LT	Corexit 9600		
Shell Dispersant ND	Shell Dispersant Conc		
Shell SD LT(X)	Tergo (Rochem) OSR LT		
Tergo (Romchem) OSR WSA			

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

**Note:** Current at 22 Oct 2020, this table will be updated.

## Location of dispersant

Stockpile	Inventory Type	Quantity (litres)
Beck Helicopters (Eltham)	Corexit 9500A	2400
Chemfreight Auckland	Slickgone LTSW	3200
Chemfreight Christchurch	Slickgone LTSW	2000
<b>Chemfreight New Plymouth</b>	<b>Corexit 9500A</b>	<b>8000</b>
MPRS	Slickgone NS	90000
MPRS	Corexit 9500A	16600
MPRS	Slickgone LTSW	61620
Marsden Point	Slickgone LTSW	1600
Total		185420

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

\* Considered appropriate for freshwater use

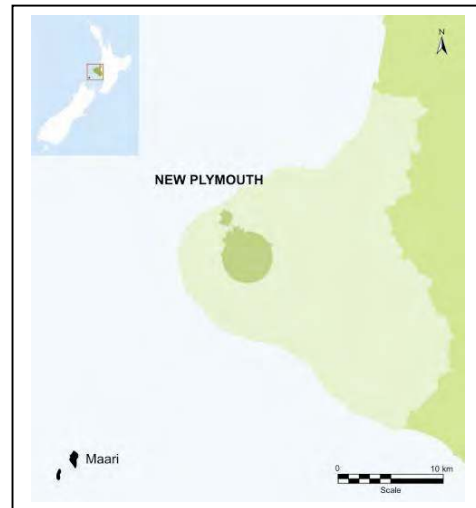
\*\* MSA stock Gamlen OSD LT; Port Taranaki stocks 2090L of Gamlen OST KT, 2090L of Gamlen OSD KT and 4000L of Gamlen OSD LT; TRC Spill trailer stocks Gamlen (product specifications unknown).

## Maari

### Introduction

OMV NZ Ltd operates the Maari field using the Wellhead Platform *Tiro Tiro Moana* with associated subsea flowlines tied back to the Floating Production, Storage and Offloading vessel (FPSO) *Raroa*.

Frodo document # 557210; 557211



### Contact information

OMV NZ Ltd New Plymouth  
 OMV NZ Ltd ERG Lead  
 Maritime NZ Rescue Coordination Centre  
 Taranaki Regional Council (24hrs)

(06) 968 2310  
 027 568 5689  
 (04) 577 8030  
 0800 736 222

### Location information

Well Head Platform	1731751E: 395821S
FPSO	1731737E: 395909S
Distance from Shore	80km west of Taranaki coast 36km south of Maui B 70km NNE of Farewell spit
Prevailing Wind	South East and West
Prevailing Current	North North West/ South South East (NNW/ SSE)
Median Water Temperature (°C)	15 (Sea water temp. varies between 13.2 -18.2°C)

### Oil characteristics

Common Name	Maari Crude
Description	Oil
Pour Point (°C)	+21 - +27
Specific Gravity (15°C)	0.786 - 0.844
API Gravity (15°C)	34.58
Viscosity Temperature (°C)	30
Flash Point (°C)	<20 - 25

Maari Crude is considered to be a Group II Oil (light crudes) as it has a specific gravity of around 0.80-0.85. These oils can lose up to 40% by volume through evaporation but, because of their tendency to form viscous emulsions, there is an initial volume increase as well as a curtailment of natural dispersion.

The highest probability of oil beaching is between Cape Egmont and Kapiti Island with only 27-42% of the oil expected to evaporate/ dispersing before impacting on the coastline.

## Use of dispersants

The use of chemical dispersant is not recommended for spills of Maari Crude due to its high wax content (18%) and a pour point above ambient seawater temperature (27°C). Recent testing of a range of dispersants in 2014 and 2015 has demonstrated that Maari Crude is unlikely to be dispersed by the dispersants available.

Oil dispersed into water greater than 10m in depth will quickly dilute to levels where acute toxic effects are unlikely. Dispersant use is generally not appropriate in shallow, near shore areas, with limited circulation and flushing; near aquaculture facilities, shellfish beds and fish spawning grounds and around seawater intakes.

## Dispersant – Important information

Window of Opportunity	<3 hours
Use of dispersant recommended	No (dispersant should only be applied on freshly spilled crude oil)
Dispersant Types	Type 2: Diluted as 10% solution in seawater Type 3: Undiluted from aircraft/vessel (1:20-25 disp.: oil)
Boat Availability	<i>Pacific Runner – through shared services arrangements with other offshore oil and gas operators.</i>

## Dispersant types

Type 1 Dispersant	Type 2 Dispersant	Type 2/3 Dispersant	Type 3 Dispersant
<b>BP 1100X</b>	<b>BP 1100WD</b>	Atpet 787	BP Enersperse 1037
<b>BP A-B</b>	Castrol Solvex OSD 9 Conc	<b>Corexit 9527</b>	Shell Dispersant HEC
<b>Castrol Atlas OSD</b>	<b>Gamlen OSD LT*</b>	<b>Shell VDC/Slickgone LTSW</b>	<b>Tergo (Rochem) R40*</b>
<b>Gamlen OSR LT</b>	Corexit 9600		
<b>Shell Dispersant ND</b>	Shell Dispersant Conc		
<b>Shell SD LT(X)</b>	Tergo (Rochem) OSR LT		
<b>Tergo (Rochem) OSR WSA</b>			

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

**Note:** Current at 22 Oct 2020, this table will be updated.

## Location of dispersant

Stockpile	Inventory Type	Quantity (litres)
Beck Helicopters (Eltham)	Corexit 9500A	2400
Chemfreight Auckland	Slickgone LTSW	3200
Chemfreight Christchurch	Slickgone LTSW	2000
<b>Chemfreight New Plymouth</b>	<b>Corexit 9500A</b>	<b>8000</b>
MPRS	Slickgone NS	90000
MPRS	Corexit 9500A	16600
MPRS	Slickgone LTSW	61620
Marsden Point	Slickgone LTSW	1600
Total		185420

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

\* Considered appropriate for freshwater use

\*\* MSA stock Gamlen OSD LT; Port Taranaki stocks 2090L of Gamlen OST KT, 2090L of Gamlen OSD KT and 4000L of Gamlen OSD LT; TRC Spill trailer stocks Gamlen (product specifications unknown).

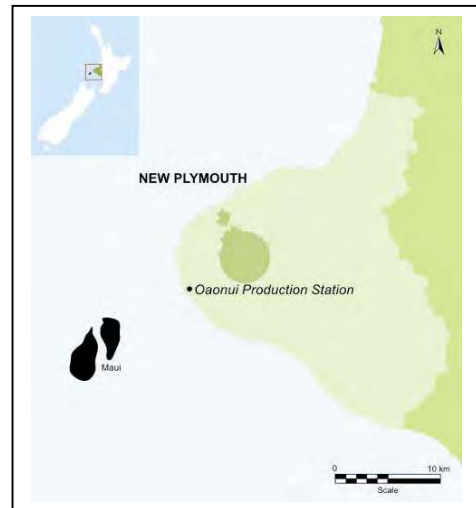
# Maui

## Introduction

The Maui field is operated by OMV Taranaki Limited (OTL). The Maui field comprises two production platforms:

- Maui Platform Alpha (MPA)
- Maui Platform Bravo (MPB) located 15 km south-west of MPA
- Subsea pipelines, between MPA and MPB and between MPA and the Maui production station

Maui Contingency Plan - Frodo document # 777852/777856



## Contact information

OTL Response Coordinator (24hrs)	027 4422 723
OTL New Plymouth Office	06) 758 7609
Maritime NZ Rescue Coordination Centre	04) 577 8030
Taranaki Regional Council (24hrs)	0800 736 222

## Location information

G.P.S Coordinates	Maui A - 1732657E: 393324N Maui B - 1731856E: 393856N
Distance from Shore	Maui A - 39km from shore Maui B - 50km from shore
Prevailing Wind	West West South (WWS)
Prevailing Current	North North West/ South South East (NNW/ SSE)
Median Water Temperature (°C)	15

## Oil characteristics

Common Name	Maui Condensate
Description	Light Oil/Gas
Pour Point (°C)	< -36
Specific Gravity (15°C)	0.7514
API Gravity (15°C)	57.2
Kinematic Viscosity (13°C)	0.9
Flash Point (°C)	Flashes at ambient

Maui Condensate is considered to be a Group I Oil (light distillate) as it has a specific gravity <0.80; is non-persistent; highly toxic to biota; high spread rate; tends to dissipate completely through evaporation within a few hours and does not normally form emulsions.

The light nature of Maui Condensate means the vast majority of the oil is likely to evaporate relatively quickly. Studies have shown that Maui condensate should reduce by around 50% in 24 hours, and nearly 70% in 48 hours, although there may be some emulsification of the product which offsets evaporation. Low levels of asphaltenes and waxes present in the condensate should prevent any emulsions from being stable and persisting at sea. As the condensate weathers the proportion of wax is expected to almost double (from 2.4% up to 4.4%) by 12 hours, increasing to 12.5% at 48 hours.

## Use of dispersants

Dispersant use on Maui Condensate is unlikely to be necessary. Lighter fractions of oil generally contain the most toxic fractions so dispersing Maui condensate into the water column may cause adverse impacts that are otherwise avoidable (through evaporation). On this basis any consideration of chemical dispersant use for Maui Condensate would need to be strongly justified.

However, ecological impacts of oil are generally longer lasting and more persistent than most other impacts. Dispersant applied at recommended rates is unlikely to cause significant adverse effects, even with multiple applications. Oil dispersed into water greater than 10m in depth will quickly dilute to levels where acute toxic effects are unlikely. Dispersant use is generally not appropriate in shallow, near shore areas, with limited circulation and flushing; near aquaculture facilities, shellfish beds and fish spawning grounds and around seawater intakes.

Following testing with Maui Condensate, Gamlen OSD-LT was the most effective, followed by Corexit 9500 and 9527.

## Dispersant types

Type 1 Dispersant	Type 2 Dispersant	Type 2/3 Dispersant	Type 3 Dispersant
BP 1100X	<b>BP 1100WD</b>	Atpet 787	BP Enersperse 1037
BP A-B	Castrol Solvex OSD 9 Conc	<b>Corexit 9527</b>	Shell Dispersant HEC
Castrol Atlas OSD	<b>Gamlen OSD LT*</b>	<b>Shell VDC/Slickgone LTSW</b>	<b>Tergo (Rochem) R40*</b>
Gamlen OSR LT	Corexit 9600		
Shell Dispersant ND	Shell Dispersant Conc		
Shell SD LT(X)	Tergo (Rochem) OSR LT		
<b>Tergo (Romchem) OSR WSA</b>			

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

**Note:** Current at 22 Oct 2020, this table will be updated.

## Location of dispersant

Stockpile	Inventory Type	Quantity (litres)
Beck Helicopters (Eltham)	Corexit 9500A	2400
Chemfreight Auckland	Slickgone LTSW	3200
Chemfreight Christchurch	Slickgone LTSW	2000
<b>Chemfreight New Plymouth</b>	<b>Corexit 9500A</b>	<b>8000</b>
MPRS	Slickgone NS	90000
MPRS	Corexit 9500A	16600
MPRS	Slickgone LTSW	61620
Marsden Point	Slickgone LTSW	1600
Total		185420

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

\* Considered appropriate for freshwater use

\*\* MSA stock Gamlen OSD LT; Port Taranaki stocks 2090L of Gamlen OST KT, 2090L of Gamlen OSD KT and 4000L of Gamlen OSD LT; TRC Spill trailer stocks Gamlen (product specifications unknown).

# Pohokura

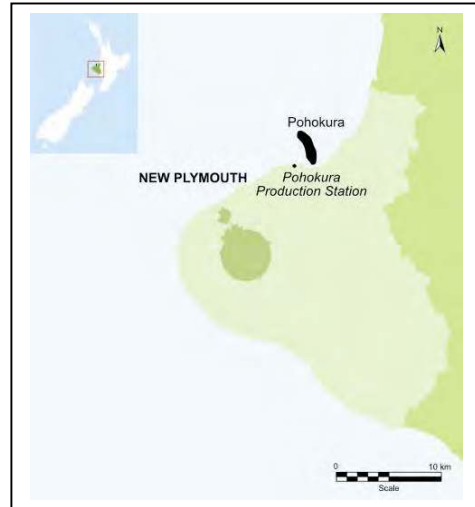
## Introduction

OMV Taranaki Limited (OTL) operates the Pohokura field on behalf of OMV Production NZ Limited (OPL). The offshore installations comprise of one unmanned platform known as PPB.

Pohokura Contingency Plan - Frodo document # 793807

## Contact information

Pohokura Control Room	(06) 757 7126
OTL Response Coordinator (24hrs)	027 4422 723
OTL New Plymouth Office	(06) 758 7609
Maritime NZ Rescue Coordination Centre	(04) 577 8030
Taranaki Regional Council (24hrs)	0800 736 222



## Location information

G.P.S Coordinates	174° 16' 18.28" E 38° 54' 43.79" S
Distance from Shore	8.5km from adjacent coast 26km from New Plymouth
Prevailing Wind	Westerly Winds
Prevailing Current	North North West/ South South East (NNW/ SSE)
Median Water Temperature (°C)	15

## Oil characteristics

Common Name	Pohokura Condensate
Description	Light Oil/Gas
Pour Point (°C)	-21°C
Specific Gravity (15°C)	0.75-0.77
API Gravity (15°C)	56.3
Viscosity Temperature cSt@40°C	0.758
Flash Point (°C)	-33.9

A high proportion of Pohokura condensate liquid is comprised of light hydrocarbon which is highly volatile and will convert to a vapour at the time of a spill. Approximately **40% will evaporate in the first 12 hours** and 63% will have evaporated 48 hours after spill. The remaining oil is likely to be relatively waxy which will have a lower rate of spreading and natural dispersion, and will generally take longer to degrade and break up.

Pohokura Condensate is considered to be a Group I Oil (light distillate) as it has a specific gravity <0.80; is non-persistent; highly toxic to biota; high spread rate; tends to dissipate completely through evaporation within a few hours and does not normally form emulsions. The low asphaltene content of Pohokura condensate indicates that stable oil in water emulsions are unlikely to form.

## Use of dispersants

In general, although likely to be effective, chemical dispersion of unweathered Pohokura condensate is not recommended for the following reasons:

- Dispersant use will inhibit evaporation and therefore the natural removal of a large portion of a spill.
- Because a significant portion of the most toxic components of the fresh oil will preferentially evaporate, the use of chemical dispersants will increase the transfer of these components in to the underlying seawater.

However, there may be circumstances in which dispersant use may be considered. For example, chemical dispersion can greatly reduce the concentration of volatile components following a spill, and dispersant use may be justified if it sufficiently reduces the risk to allow response teams to mitigate any discharge of condensate or to ensure the safety of a spill site. If dispersant use is considered, testing results indicate that any of the dispersants stocked by Maritime New Zealand are likely to be effective on unweathered Pohokura Condensate with Gamlen OSD LT being the most effective, followed by Corexit 9500 and 9527.

### Dispersant – Important information

Window of Opportunity	<4 hours
Use of dispersant recommended	No (dispersant could only be applied on freshly spilled condensate)
Dispersant Types	Type 2: Diluted as 10% solution in seawater Type 3: Undiluted from aircraft/vessel (1:20-25 disp.: oil)
Boat Availability	Pacific Runner can be fitted with 2 x 6 m spray booms with direct suction pump

### Dispersant types

Type 1 Dispersant	Type 2 Dispersant	Type 2/3 Dispersant	Type 3 Dispersant
BP 1100X	BP 1100WD	Atpet 787	BP Enersperse 1037
BP A-B	Castrol Solvex OSD 9 Conc	<b>Corexit 9527</b>	Shell Dispersant HEC
Castrol Atlas OSD	<b>Gamlen OSD LT*</b>	<b>Shell VDC/Slickgone LTSW</b>	<b>Tergo (Rochem) R40*</b>
Gamlen OSR LT	Corexit 9600		
Shell Dispersant ND	Shell Dispersant Conc		
Shell SD LT(X)	Tergo (Rochem) OSR LT		
<b>Tergo (Romchem) OSR WSA</b>			

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

**Note:** Current at 22 Oct 2020, this table will be updated.

### Location of dispersant

Stockpile	Inventory Type	Quantity (litres)
Beck Helicopters (Eltham)	Corexit 9500A	2400
Chemfreight Auckland	Slickgone LTSW	3200
Chemfreight Christchurch	Slickgone LTSW	2000
<b>Chemfreight New Plymouth</b>	<b>Corexit 9500A</b>	<b>8000</b>
MPRS	Slickgone NS	90000
MPRS	Corexit 9500A	16600
MPRS	Slickgone LTSW	61620
Marsden Point	Slickgone LTSW	1600
Total		185420

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

\* Considered appropriate for freshwater use

\*\* MSA stock Gamlen OSD LT; Port Taranaki stocks 2090L of Gamlen OST KT, 2090L of Gamlen OSD KT and 4000L of Gamlen OSD LT; TRC Spill trailer stocks Gamlen (product specifications unknown).



# Tui

## Introduction

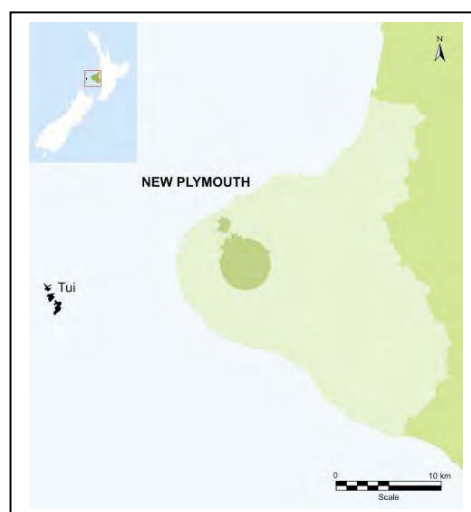
Tamarind Taranaki Limited, is the operator for the Tui field. The FPSO "Umuroa" is a converted oil tanker designed to handle daily production rates of up to 50,000 barrels of oil, 0.7 million standard cubic metres of gas, and a total of 120,000 barrels of liquid per day. It weighs 67,684 tonnes (GRT) and cargo tank capacity, excluding slop tanks, of 773,245 barrels.

Frodo document # 785913

## Contact information

Tamarind On Call Contact  
Tamarind New Plymouth Office  
Maritime NZ Rescue Coordination Centre  
Taranaki Regional Council (24hrs)

021 308 150  
(06) 759 2173  
(04) 577 8030  
0800 736 222



## Location information

The location of the individual wells; associated subsea trees and the UMUROA, which will be moored at a single point within the Tui Area, are summarised below

UMUROA (Turret centre)	173° 14' 12.40"E: 39° 25' 39.80"S
Tui-3H	173° 14' 09.22"E: 39° 26' 40.78"S
Tui 2H	173° 14' 10.51"E: 39° 26' 41.46"S
Amokura-2H	173° 12' 44.11"E: 39° 25' 30.10"S
Pateke-3H	173° 12' 25.06"E: 39° 22' 58.86"S
Pateke-4H	173° 11' 45.19"E: 39° 22' 32.65"S

Distance from Shore	27nm to Oaonui Production Station 46nm to New Plymouth Port
Prevailing Wind	Westerly Winds (WWS)
Prevailing Current	North North West/ South South East (NNW/ SSE)
Median Water Temperature (°C)	15 (Sea water temp. varies between 12 -18.7°C)

## Oil characteristics

Common Name	Tui Crude
Description	Oil
Pour Point (°C)	21
Specific Gravity (15°C)	0.81
API Gravity (15°C)	42.0
Viscosity Temperature (°C)	50
Flash Point (°C)	Unknown

Tui Crude is considered to be a Group II Oil (light crudes) as it has a specific gravity of 0.80-0.85 These oils can lose up to 40% by volume through evaporation but, because of their tendency to form viscous emulsions, there is an initial volume increase as well as a curtailment of natural dispersion.

\* Considered appropriate for freshwater use

\*\* MSA stock Gamlen OSD LT; Port Taranaki stocks 2090L of Gamlen OST KT, 2090L of Gamlen OSD KT and 4000L of Gamlen OSD LT; TRC Spill trailer stocks Gamlen (product specifications unknown).

## Use of dispersants

A dispersibility study on Tui Crude Oil using six dispersants as part of a multi stage study showed Corexit 9527 was the most effective dispersant on Tui Crude Oil at 15°C, but was not effective at 10°C. This dispersant gave a mean efficacy result of 23%. Slickgone LTSW was the second most effective dispersant which gave an efficacy result of 17%. 29% of the oil with have evaporated after 12 hours, 39% after 24 hours, 48% after 48 hours and 52% after 96 hours.

Corexit 9527 is the only dispersant approved by MNZ to be applied.

Dispersant applied at recommended rates is unlikely to cause significant adverse effects, even with multiple applications. Oil dispersed into water greater than 10m in depth will quickly dilute to levels where acute toxic effects are unlikely. Dispersant use is generally not appropriate in shallow, near shore areas, with limited circulation and flushing; near aquaculture facilities, shellfish beds and fish spawning grounds and around seawater intakes.

### Dispersant – Important information

Window of Opportunity	<3 hours
Use of dispersant recommended	Yes but only on freshly spilled crude oil
Dispersant Types	Type 2: Diluted as 10% solution in seawater Type 3: Undiluted from aircraft/vessel (1:20-25 disp.: oil)
Dispersant Brand	Corexit 9524
Boat Availability	Pacific Runner spray application by 2 x 6 m spray booms
Ariel Availability	Beck Helicopters Ariel application by a fixed spray boom

### Dispersant types

Type 1 Dispersant	Type 2 Dispersant	Type 2/3 Dispersant	Type 3 Dispersant
BP 1100X	<b>BP 1100WD</b>	Atpet 787	BP Enersperse 1037
BP A-B	Castrol Solvex OSD 9 Conc	<b>Corexit 9527</b>	Shell Dispersant HEC
Castrol Atlas OSD	<b>Gamlen OSD LT*</b>	<b>Shell VDC/Slickgone LTSW</b>	<b>Tergo (Rochem) R40*</b>
Gamlen OSR LT	Corexit 9600		
Shell Dispersant ND	Shell Dispersant Conc		
Shell SD LT(X)	Tergo (Rochem) OSR LT		
Tergo (Romchem) OSR WSA			

**Note:** Dispersants highlighted in bold are available in the Taranaki region.

**Note:** Current at 22 Oct 2020, this table will be updated.

### Location of dispersant

Stockpile	Inventory Type	Quantity (litres)
Beck Helicopters (Eltham)	Corexit 9500A	2400
Chemfreight Auckland	Slickgone LTSW	3200
Chemfreight Christchurch	Slickgone LTSW	2000
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