Regionally Significant Surf breaks in the Greater Wellington Region

Prepared for:

greater WELLINGTON
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Cover page: Surfers entering the water at Lyall Bay, Wellington's best known and most frequently surfed beach. Photo Michael Gunson

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Glossary of Terms

Surfing breaks can be classified as one of the following types, or a combination of these features. These terms refer to the substrate and morphology of the surf break (Mead, 2000):

Rocky reefs – solid rock or boulder reef substrate, which may or may not extend shoreward to the beach/coast.

Coral reefs – found only in tropical areas of the world; reef surf breaks comprised on coral

Point breaks – surf breaks where the waves break down a headland feature, which may have a sand, gravel or rock seabed.

Rock ledges – very sharp/steep rocky reefs where the waves break along the steep edge of the ledge.

River and estuarine deltas – surf breaks on sand and/or gravel deposits offshore of rivers and estuaries.

Sand beaches – also known as beach breaks, surfing breaks at sandy beaches.

Onshore/offshore winds – the wind direction and strength is a very important factor with respect to surfing wave quality. Winds that blow offshore (i.e. out to sea), or are very light, are preferred for surfing, since the 'clean-up' up the wave or have little effect on it, respectively. Onshore winds (i.e. winds blowing landward) tend to reduce wave quality by adding local wave 'chop' and breaking up wave crests, and so are not preferred for surfing.

Goofy/Regular – these terms refer to which stance the surfer has; regular is left-foot forward, goofy is right-foot forward.

Groundswell – a groundswell refers to a swell that has been generated 100's to 1,000's of kilometres away and so has very straight-crested waves, which are preferred for surfing. This is opposed to a 'sea', where the waves are being generated by strong winds and are very 'messy' and of different heights and periods – as the sea waves propagate away from the generation area, they are sorted into different periods and the crests become straighter.

Peaks – a peak is the highest part of the wave, which breaks first and so is also known as the take-off. Wandering peaks means that there is no defined take-off zone, and the surfer must paddle towards random peaks as they shoal before breaking to take-off in the right spot.

A-frame – an A-frame refers to a very 'peaky' wave that is a wave that has the shape of a large 'A', which breaks as the highest point in the middle and peels in both directions away from the peak.

Peel – surfers require a clean un-broken wave face for performing surfing manoeuvers. In order to ride the wave for as long as possible, the wave must peel, rather than break in a single go (which is terms a 'close-out' by surfers), and so riding the wave close the breaking part of the wave crest as it translates laterally across the face of the wave (peels) provides the best surfing rides.

Lip – the lip is the breaking crest of the wave.

Malibu/Mal – Malibu or Mal, refers to a type of surfboard, also often called a longboard, these

Barrel/tube – the ultimate surfing ride is to get under and inside the breaking lip of the wave as it peels – this is known as the barrel or the tube.

1 Background

This report describes the identification and characterisation of regionally significant surf breaks in the Greater Wellington Regional Council (GWRC) area, the determination of their 'swell corridors', and a first order assessment of the risks to these regionally significant surf breaks. The surf breaks and their associated swell corridors have been compiled into GIS format, which along with this report, provide a planning tool to consider the potential impacts of development to the regions regionally significant surf breaks. Similar to regional scale coastal hazard zoning, this information can be applied as the first order assessment, and a more in depth site-specific assessment should be undertaken for developments proposed at locations of regionally significant surf breaks, in their swell corridor, or in areas that may pose a risk to the surf break (e.g. development inside an estuary where the regionally significant surf breaks is created by the ebb-tidal delta of that estuary).

Surf breaks are unique and valuable components of the coastal environment. They have cultural, spiritual, recreational, and sporting value to in excess of 200,000 people in New Zealand (Sport and Recreation New Zealand, 2008; Graham, 2011). Surf breaks are becoming increasingly recognised in New Zealand coastal policy which is consistent with developments occurring internationally. An increased focus on mechanisms to protect surf breaks has resulted from numerous cases of degradation worldwide and a greater awareness of existing values (Scarfe *et al*., 2009a, 2009b). The argument for protection of surf breaks recognises that a range of benefits are associated with these unique places. These values depend on the integrity of natural processes which influence surf break environments, and on a variety of aspects important to surf break users including accessibility and environmental health (Peryman & Orchard, 2013).

The New Zealand Coastal Policy Statement (NZCPS) provides guidance to local government for the day-to-day management of the coastal environment (Rosier, 2004). The scheduled 10-yearly revision of the NZCPS 1994 included a comprehensive review process and input from stakeholder groups (Young, 2003; Rosier, 2004, 2005). The process attracted considerable input from surfers and surfing organisations, and the resulting submissions provided recommendations for the definition for a "surf break" and provisions for surf break

protection (Board of Inquiry, 2009a). These recommendations were largely adopted within the final NZCPS 2010 as Policy 16 (Department of Conservation, 2010).

Policy 16: Surf breaks of national significance:

Protect the surf breaks of national significance for surfing listed in Schedule 1, by:

(a) ensuring activities in the coastal environment do not adversely affect the surf breaks; and

(b) avoiding adverse effects of other activities on access to, and use and enjoyment of the surf breaks.

Schedule 1 of the NZCPS defines a surf break as:

*A natural feature that is comprised of swell, currents, water levels, seabed morphology, and wind. The hydrodynamic character of the ocean (swell, currents and water levels) combines with the seabed morphology and winds to give rise to a '**surfable wave**'. A surf break includes the '**swell corridor**' through which the swell travels, and the morphology of the seabed of that wave corridor, through to the point where waves created by the swell dissipate and become non-surfable. '**Swell corridor**' means the region offshore of the surf breaks where ocean swell travels and transforms to a '**surfable wave**'. '**Surfable wave**' means a wave that can be caught and ridden by a surfer. Surfable waves have a wave breaking point that peels along the unbroken wave crest so that the surfer is propelled laterally along the wave crest.*

Local authorities are now responsible for implementing NZCPS policies and an essential first step is to understand the features of the surf breaks in their area. To date, the characterisation of New Zealand surf breaks for management purposes has not yet been extensively researched (Skellern *et al.*, 2013). There is an urgent need for a better understanding of the resource in relation to the values derived by the community and consideration of the mechanisms by which degradation can occur. This report provides information on surf breaks, the associated swell corridors and potential risks to the regionally significant surf breaks in the GWRC area and supports its obligations to give effect to Policies 15, 16 and 13 of the NZCPS with regard to the natural features that comprise surf breaks, their protection and their associated natural character, respectively.

The following Section describes the methods used to first identify and characterise the region's surf breaks, then determine their associated swell corridors (out to the 12 nautical mile Territorial Sea limit), and finally consider the potential risks to these breaks due to coastal development. Section 3 presents the results of the identification and characterisation of each of the 57 regionally significant Surf Break Areas (SBA; **Error! Reference source not found.** to Figure 1.11). Section 4 graphically presents the associated swell corridors for the region, with red zones representing the swell corridor for a given SBA, amber zones a buffer, and green areas of the territorial waters[1] being outside swell corridors – these data have been developed as GIS layers for the GWRC database. Section 5 considers the potential risks to the Wellington Regions significant surf breaks. Section 6 discusses the limitations of the methods used in this study, the application of the zoning presented, and recommendations for components to be included in an in depth study for any given surf break.

[1] Previous studies have indicated that it is likely that most developments over 12 nautical miles offshore will have no significant impacts on surf breaks (e.g. Mead, 2013; Black, 2006).

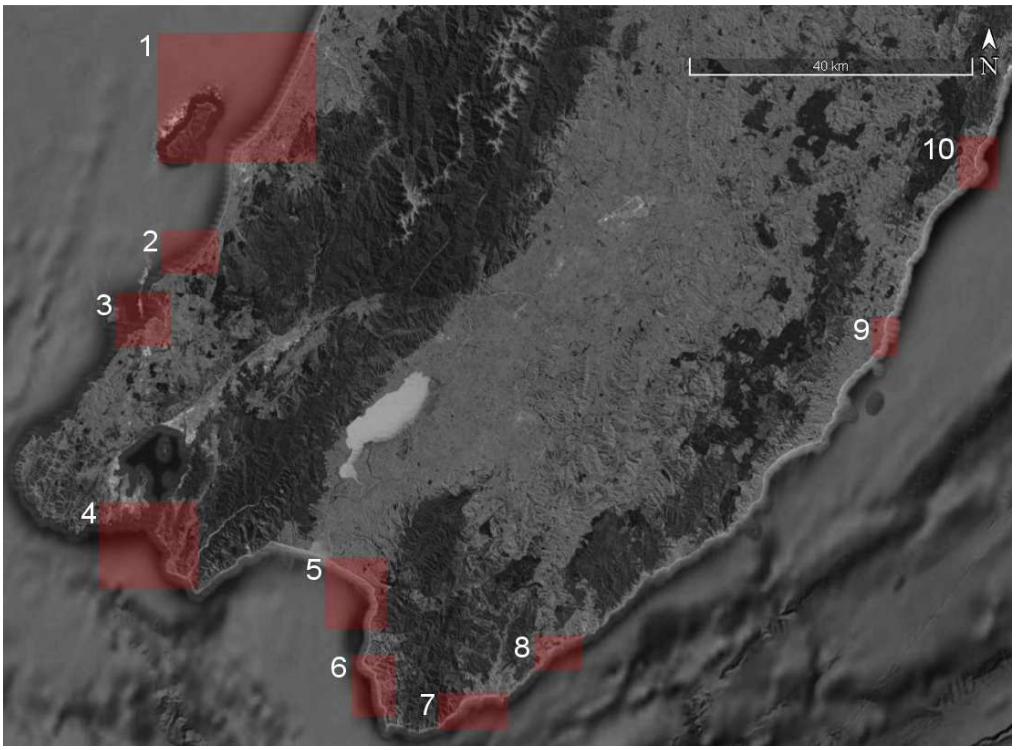


Figure 1.1. Google Earth image overview map of regionally significant surf breaks in the Greater Wellington Region, Figures 1.2 through 1.11 show surf breaks in each of the shaded areas of this Figure.

Figure 1.2. Google Earth image of surf breaks in shaded area 1 of Figure 1.1.

Figure 1.3. Google Earth image of surf breaks in shaded area 2 of Figure 1.1.

Figure 1.4. Google Earth image of surf breaks in shaded area 3 of Figure 1.1.

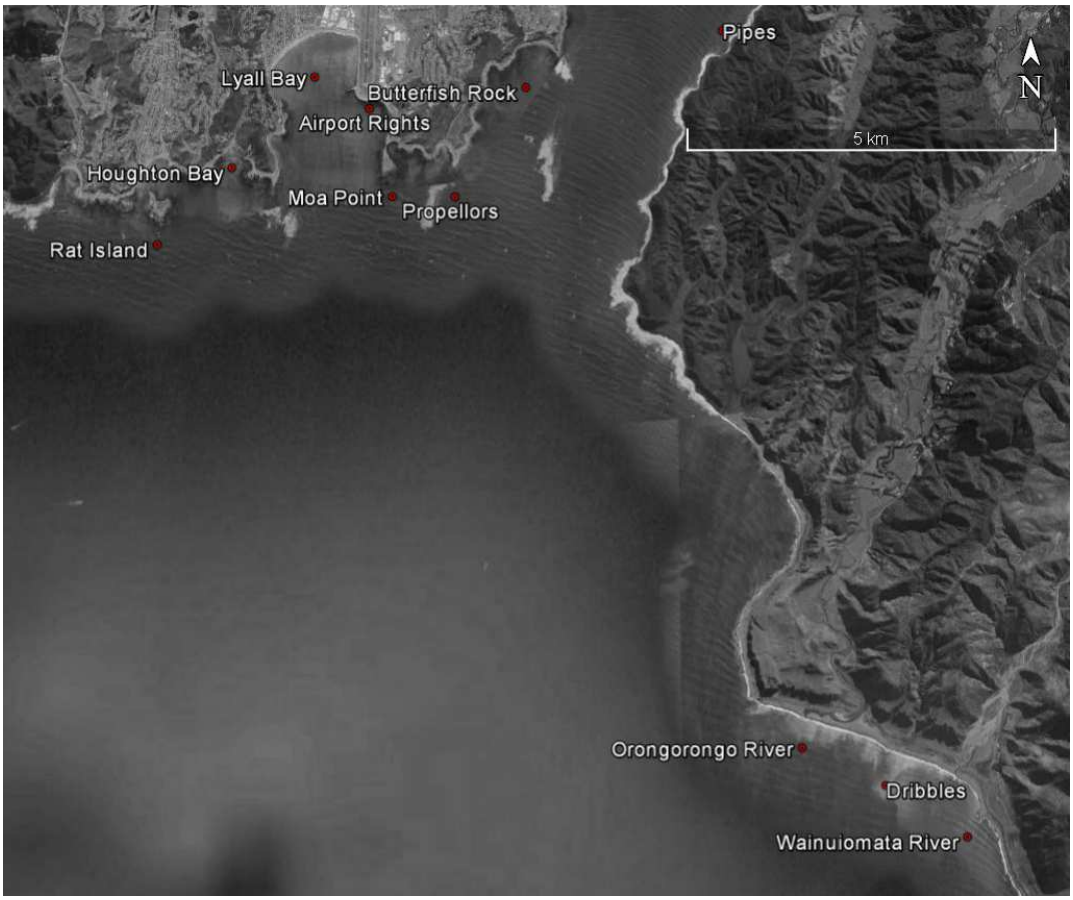


Figure 1.5. Google Earth image of surf breaks in shaded area 4 of Figure 1.1.

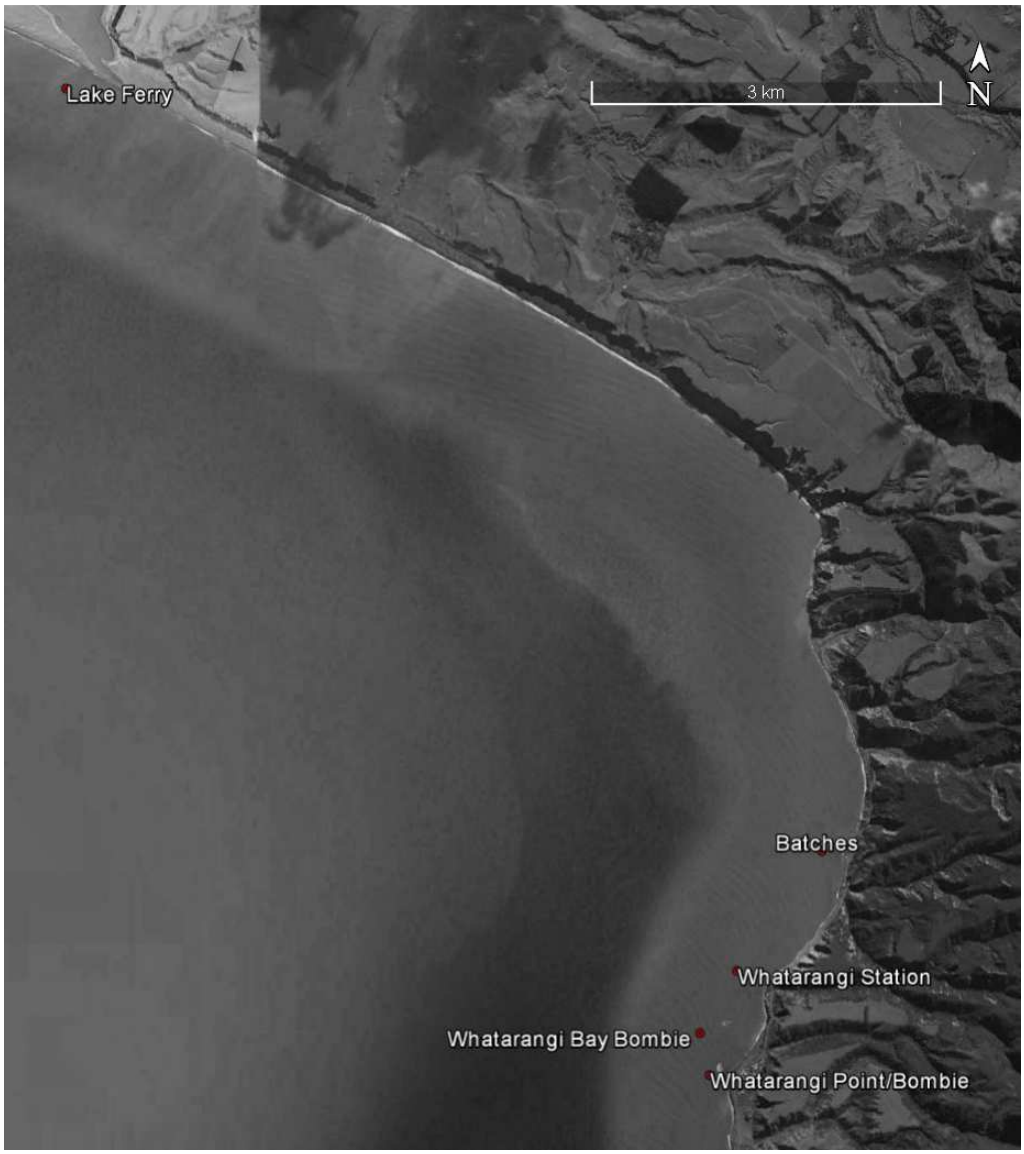


Figure 1.6. Google Earth image of surf breaks in shaded area 5 of Figure 1.1.

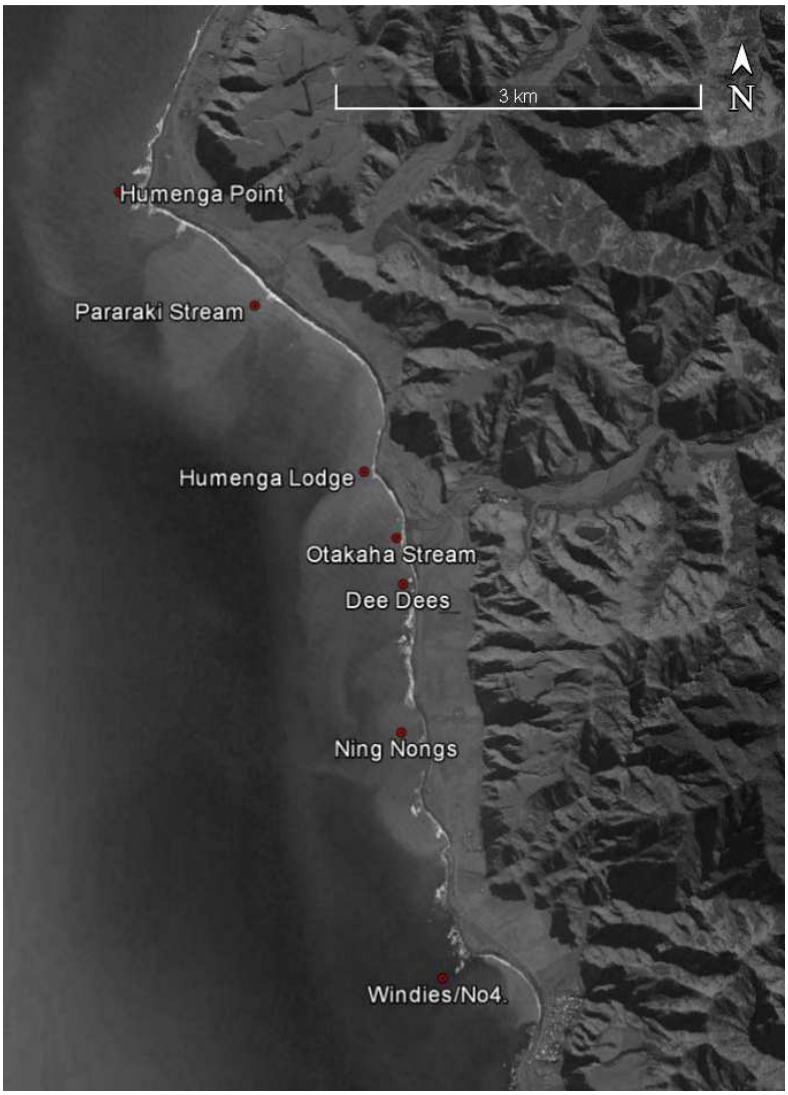


Figure 1.7. Google Earth image of surf breaks in shaded area 6 of Figure 1.1.

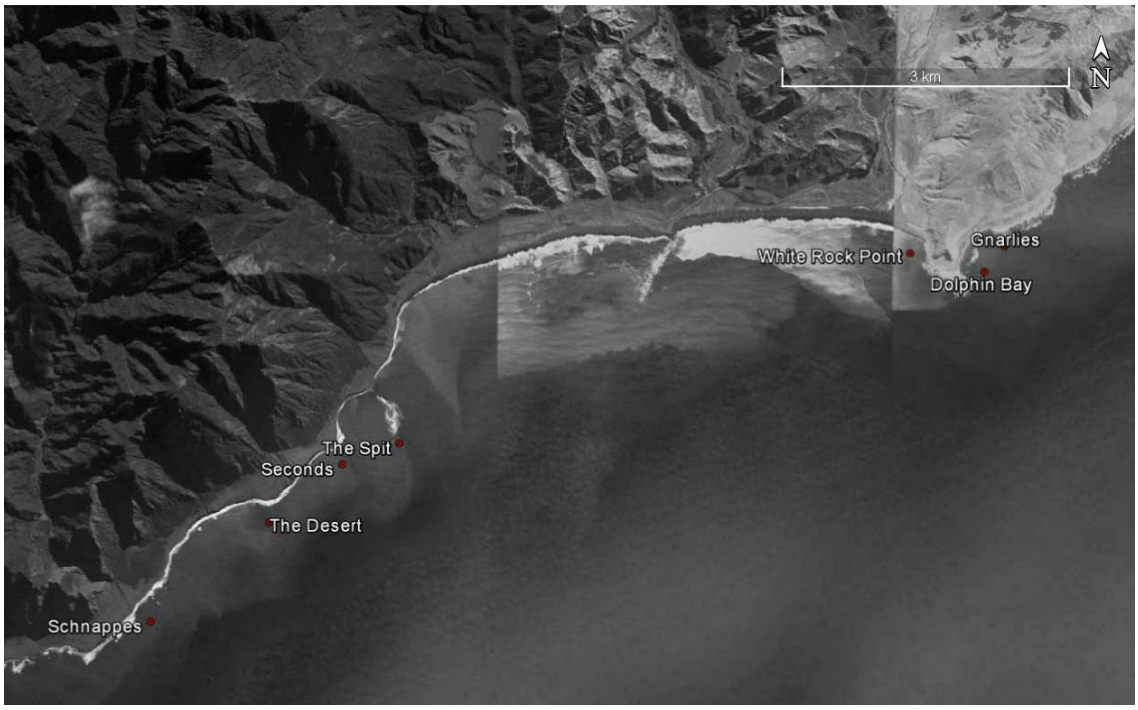


Figure 1.8. Google Earth image of surf breaks in shaded area 7 of Figure 1.1.

Figure 1.9. Google Earth image of surf breaks in shaded area 8 of Figure 1.1.

Figure 1.10. Google Earth image of surf breaks in shaded area 9 of Figure 1.1.

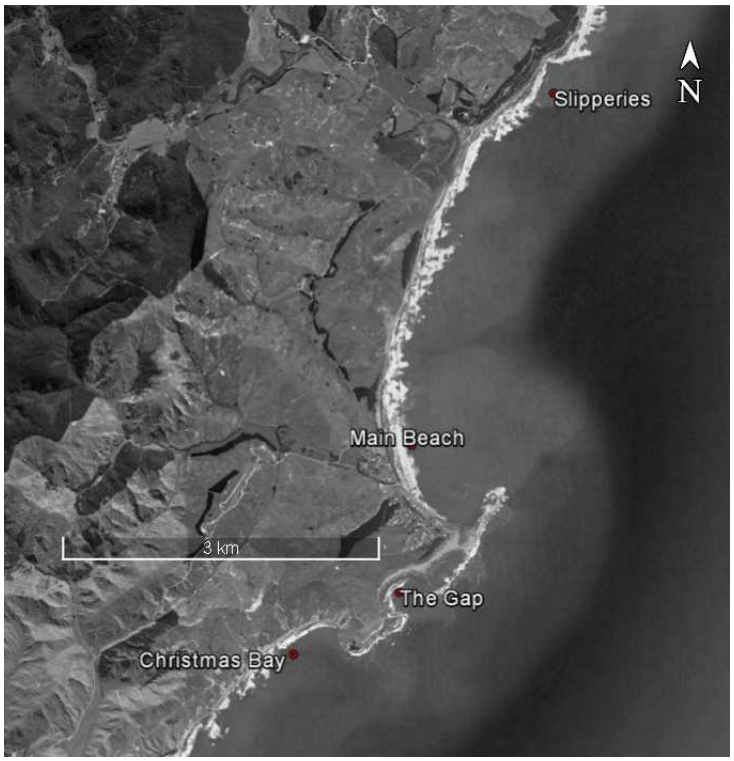


Figure 1.11. Google Earth image of surf breaks in shaded area 10 of Figure 1.1.

2 Methods

2.1 Introduction

There are 3 distinct parts to the project:

1. Identification and characterisation (in terms of type of break, length of ride, best conditions, swell, currents, water level, etc.), for each break in the GWRC area;
2. Numerical modelling of waves to determine swell corridors and their incorporation into GIS suitable for the GWRC's system (e.g. shape files), and;
3. Determination of the potential risks to each break identified.

Different approaches were required for each part, as described in the following sections.

2.2 Characterisation of Regionally Significant Surf breaks in the Wellington Region

2.2.1 Rationale

The basis for the selection of Nationally Significant Surf breaks in the NZCPS (2010) was the NZ Surfing Guide (Greenroom Surf Media Ltd, 2004), with breaks rated 9 or 10 out of 10 being selected as nationally significant. Thus, if surf breaks are listed in the guide, and because this is a similar approach as has been applied in other regions (e.g. Auckland), they are considered regionally significant. It is recognised that there is a measure of subjectivity as to whether a surf breaks is listed in the NZ Surfing Guide (NZSG). However, until an objective methodology has been developed and applied to determine the significance of NZ's surf breaks, and since the guide was used to identify the nationally significant surf breaks, and because these breaks represent a tiny fraction of NZ's coastline, this approach is considered the most reasonable currently available.

It is also noted that a number of surf breaks only receive a mediocre score in the NZSG. This should not be confused with the high amenity value that town breaks like Lyall Bay and Titahi Bay provide; these town breaks are of high importance as noted at the Board of Inquiry to the NZCPS regarding their Nursery surf break status (Board of Inquiry, 2009b).

The NZSG describes more than 60 surf breaks in for the Wellington Region. At many of the locations identified in the NZSG there are multiple surfable waves within a small area (e.g. Lyall Bay), often these breaks require similar or exactly the same met-ocean conditions to become surfable. Where this occurs the multiple breaks have been grouped in to a single Surf Break Area (SBA). A total of 57 SBAs have been evaluated.

2.2.2 Identification – Mapping

The maps in NZSG were used in conjunction with Google Earth and local knowledge to identify at each surf break where surfable waves break and where surfers are riding the waves. From this a Surf Break Area (SBA) was developed

2.2.3 Characterisation

For each SBA a list of characteristics which define the surfable conditions at the particular break are presented. These characteristics are:

2.2.3.1 Wave Type:

Wave type relates to whether it breaks to the Left or to the Right as viewed from the perspective of the surfer (i.e. a surfer catches the wave and turns left to surf a left hander); and, the physical composition of the surf break, whether it is a rocky reef, a point break, a beach break, a rock ledge break, a river/estuary bar/delta or mix of these surfing break definitions (Mead, 2000)[2].

2.2.3.2 Wave Size Min and Max:

The minimum and maximum size of waves that are surfable.

2.2.3.3 Wave Shape:

Refers to the shape of the wave, whether it has a high breaking intensity (Mead and Black, 2001a) or fast peel angle (Hutt *et al.*, 2001), e.g. heavy fast breaking – sometimes a close-out[3]; soft crumbly and slow; solid punchy walls and/or deep hollow barrels[4].

[2] Also see Glossary of Terms

[3] A wave that peels too fast to surf is termed a 'close-out'

2.2.3.4 Optimal Swell Direction:

The direction that the best swell directions are generated from that produce optimal surfing wave conditions for that surf break.

2.2.3.5 Optimal Wind Direction:

The best wind direction for that surf break so that the wind does not degrade the surfing wave quality, and may improve it (generally offshore or very light winds).

2.2.3.6 Tide:

Optimal tidal state (e.g. high, low, mid, dropping, rising, etc.).

2.2.3.7 Skill Level:

A general guide for the competency rating a surfer should have before attempting challenging waves (Hutt *et al.*, 2001). For example, learners should generally not attempt to surf reef breaks and are more suited to sandy beach breaks.

2.2.3.8 Wavetrack Stoke Meter Rating System:

The NZSG rates surf breaks on their wave-quality conditions are optimal. Breaks are not rated on their areas swell consistency. This is to ensure the guide offers an accurate appraisal of each breaks potential when optimum conditions are present.

The stoke meter rating does not relate to factors such as ease of access or high amenity value; e.g. an inner city nursery surf break that has a stoke rating of three may be strategically important to that regions next generation of surfers wishing to learn to surf.

2.2.3.9 Approx. Max Ride Length:

Maximum length a surfable wave can be ridden for.

2.3 Determination of Swell Corridors

The NZCPS (2010), is a national policy statement under the Resources Management Act (RMA, 1991). The Act has jurisdiction out to the Territorial Sea (TS) of New Zealand.

[4] A barrel, or tube-ride, refers to when a surfer is completely enclosed in the peeling vortex of a breaking wave.

Because of this, the definition of swell corridors are considered up to and including the TS that GWRC is responsible for (Figure 2.1).

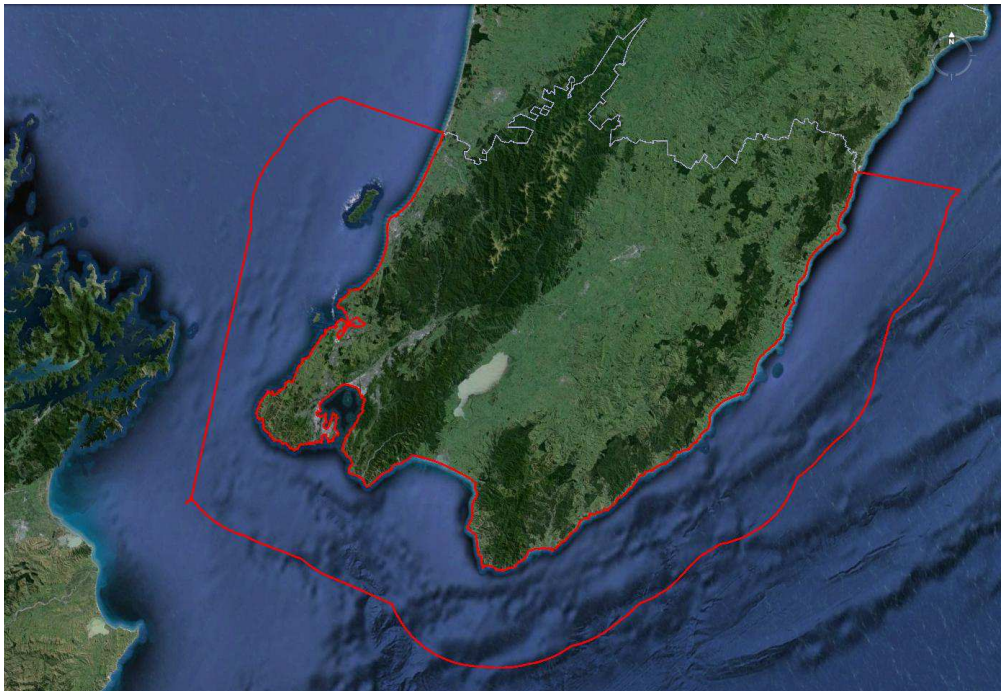


Figure 2.1. Google Earth image with the Territorial Sea that GWRC is responsible for annoted in red.

To determine the swell corridor for each break, the area that encompasses a break must be defined, the Surf Break Area (SBA), as the swell corridor is essentially an offshore extension of the SBA. The SBA is estimated using a combination of historical aerial photographs, existing bathymetric data, published information and anecdotal evidence (as documented in Section 3 of this report). The landward extent of the SBA is constructed from Land Information New Zealand's 1:50,000 coastline topographic polygon.

At some locations there are multiple breaks within close proximity that become active as surf breaks during exposure to similar met-ocean conditions. An example of this is Lyall Bay, where a number of individual breaks have been identified. In this case a SBA has been taken as the whole of Lyall Bay, encompassing the breaks. This method makes for a broader, more conservative management tool.

To establish the region offshore of a surf break where ocean swell travels and transforms to a surfable wave, the numerical model SWAN (Simulating WAves Nearshore) was used to

simulate a range of offshore wave conditions. SWAN is an industry-standard and globally utilised third generation ocean wave propagation model, incorporating current knowledge regarding the generation, propagation and transformation of wave fields in both deep water and nearshore regions. SWAN solves the spectral action density balance equation for frequency-directional spectra. This means that the growth, refraction, and decay of each component of the complete sea state, each with a specific frequency and direction, is solved, giving a complete and realistic description of the wave field as it changes in time and space (Holthuijsen *et al*., 2004).

Wave boundary conditions are run on a New Zealand scale model (Figure 2.2) with a spatial resolution of 0.05° in both latitude and longitude. A nesting scheme was employed to increase spatial resolution of the study site, where by conditions produced in the New Zealand scale model are used to produce boundary conditions for any chosen location. The 2nd level nested grid encompasses the Greater Wellington Region (GWR) and TS for the area, with a spatial resolution of 0.01° (Figure 2.3).

Nested within the GWR model are 7 sub-regional nests with spatial resolutions of 0.002°, which collectively host 57 local nested grids with spatial resolutions ranging from 0.0002° to 0.0004° (Figure 2.4). The resulting model output is a catalogue of wave parameters (e.g. wave height) for each of the original boundary conditions for each nested level. Appendix A contains figures which show the locations of the surf breaks within the local level nests, and a table to layout which local domain and sub-regional domain each surf break lies within.

The range of wave boundary conditions modelled include mean wave directions (D_m) from 10° to 360° in 10° increments, wave period (T_m) of 5 s to 20 s in 1 s increments and significant wave heights (H_s) 0.5 m to 10.5 m in 1 m increments. The extreme end of the idealised wave boundary conditions (H_s of 11 m and T_m of 20 s) were determined by extracting the maximum wave height and period from the Level 1 model domain from the 10 year hind cast of spectral wave data. The maximum wave height value is concurrent with Pickrill and Mitchell (1979) which states wave heights up to 11 m have been recorded off the coast of New Zealand.

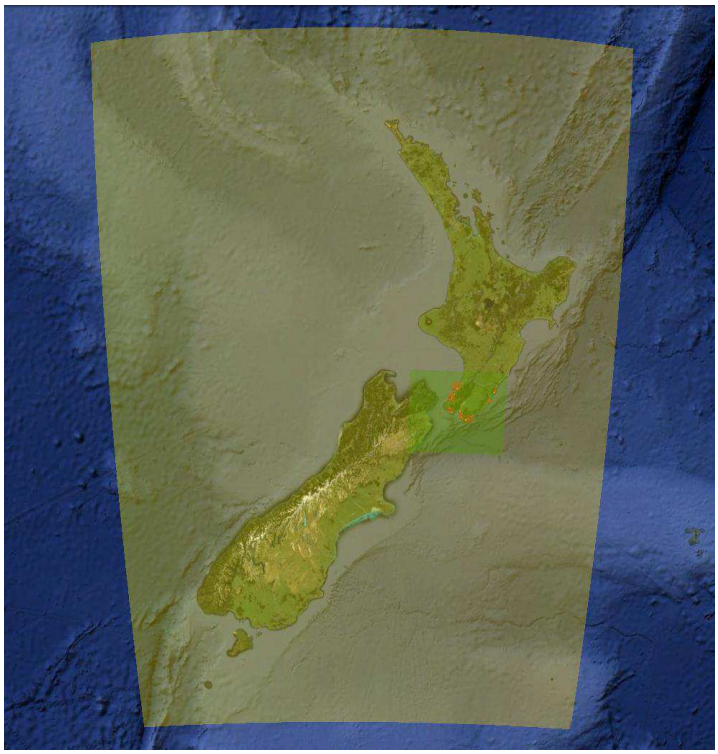


Figure 2.2. Level 1 model grid spatial extent superimposed on Google earth image of New Zealand.

Because the combinations of H_s, T_p and D_m may or may not occur (e.g. an 11 m wave with a period of 20 s from the North is an unlikely event), the Probability of Occurrence (PoB) for these events is determined. To do this, 10 years of hind-casted, 2 dimensional wave spectra is modelled at the New Zealand scale domain and nested in to the Wellington Region domain. At a location central to each of the sub-regional grids a PoB of idealised versus hind casted conditions was undertaken using the output from the Wellington region scale grid. The PoB results were used to determine which idealised conditions are included in the development of the swell corridors.

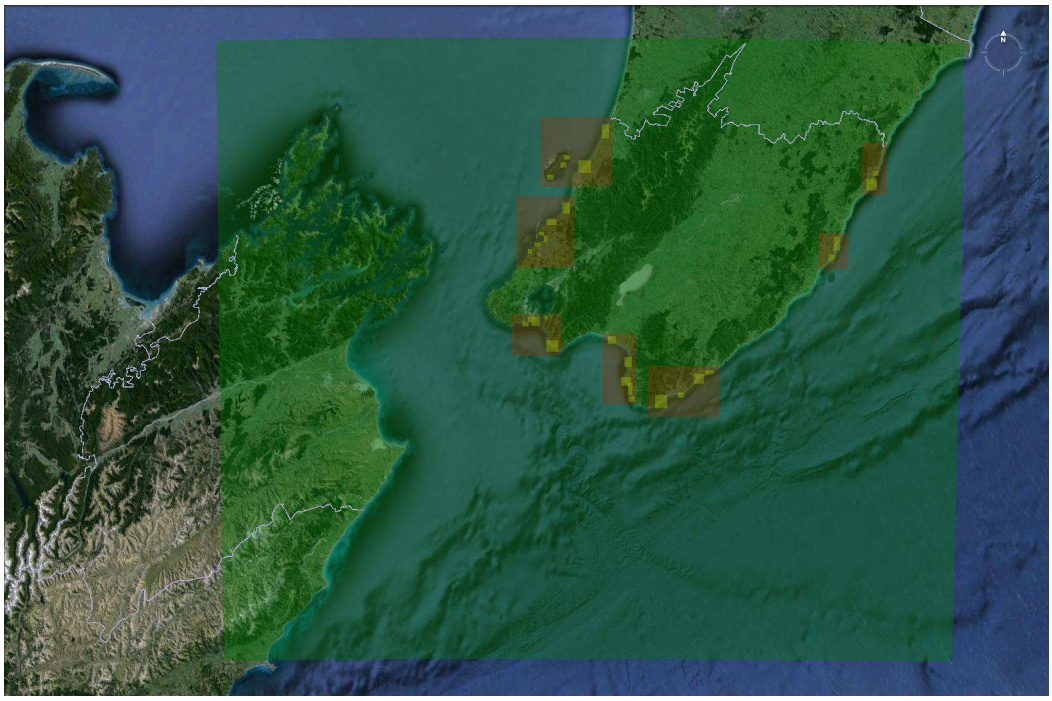


Figure 2.3. Level 2 (GWR; green), Level 3 (sub-regional; red) and Level 4 (Local; yellow) model grid nest extents superimposed on Google Earth imagery.

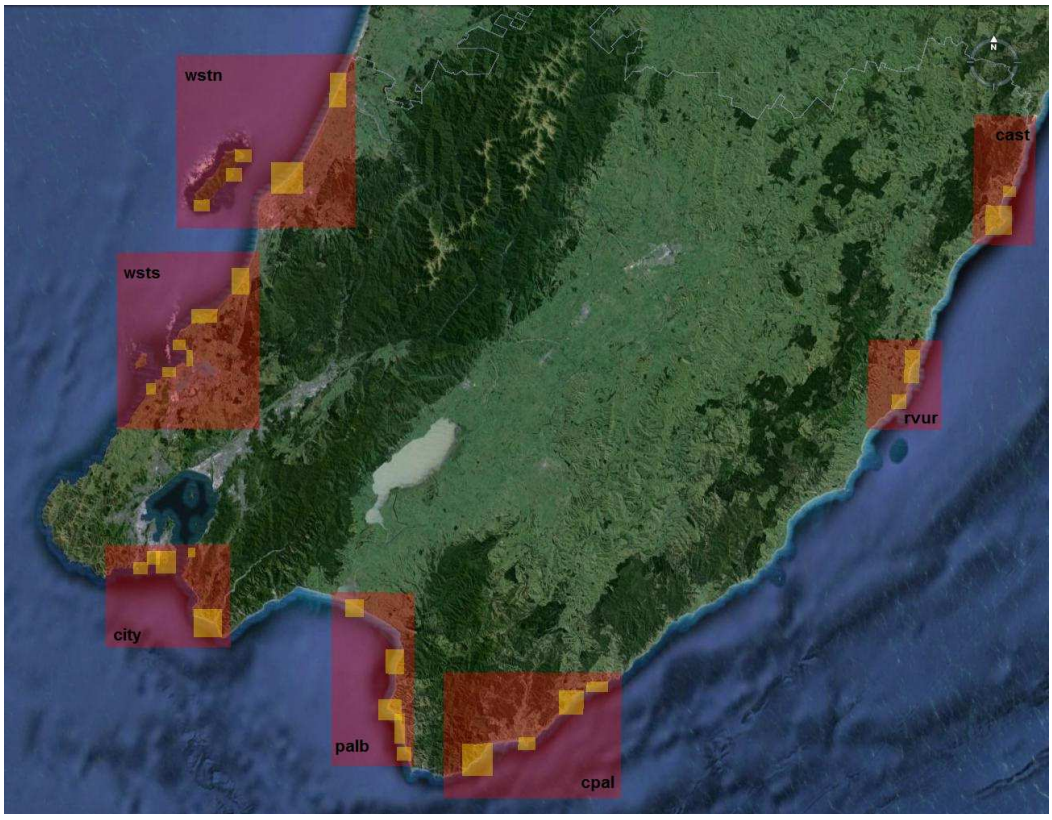


Figure 2.4. Figure 2.3. Level 3 (sub-regional; red) and Level 4 (Local; yellow) model grid nest extents.

Each surf break has been designated a minimum wave breaking height (H_{sf}). This value is evaluated against the modelled inshore conditions, within a surf break's SBA to determine whether the offshore conditions are conducive to surfing at a particular break. For each surf break the catalogue of wave parameters was worked through using the following procedure:

- Check maximum wave height (H_{max}) of Level 4 nest within surf break area;
- If H_{max} >= H_{sf} (if not move on to next condition);
- Create 3 nodal points along the offshore boundary of the SBA;
- Trace the incoming waves back through nest levels 4, 3, 2 and 1.

Once each condition has been cycled through for a surf break, a point cloud of trace marks is created. The point cloud was cropped to those data points that are located within the TS and a marker of the point cloud footprint is created.

A buffer around each swell corridor footprint was created to allow for model short comings based on the grid resolutions. The buffer width is taken as approximately 10% of the cross shore width of the SBA. The areas within the TS and coastline of GWRC, between swell corridors and buffers were also designated. From this a 3 tiered, traffic light system can be adopted, whereby the swell corridors are filled in red, the buffer zone in amber and the areas outside swell corridors are green.

2.4 Risk Assessment

Potential risks to each break in the Wellington Region presented here were considered. While there are the obvious risks to surf breaks through development within a breaks swell corridors (as recognised in the NZCPS), there are a variety of other potential risks that may impact on the breaks themselves. Many surf breaks are there due to natural features and processes which can be impacted on due to marine developments in adjacent areas, as well as due to land developments in the adjacent areas – such developments may also impact on access to, use and enjoyment of surf breaks (which also must be protected as per the NZCPS).

Here, physical impacts on the surf breaks has been considered, which include changes to sediment input and pathways. A surf break's geomorphology fits into one, or in some cases a combination of, the following the following types; coral reefs, rocky reefs, point breaks, rock ledges, river and estuarine deltas, and beaches (Mead, 2000; Mead and Black, 2001b)[5]. All of these types of breaks occur in the Wellington region, except for coral reefs.

In terms of potential risks, we can take bar-breaks as an example. River and estuary deltas are a distinct form of surf break, which can be impacted by changes to sediment inputs and tidal prism. Damming of rivers and/or tributaries, marina developments, reclamation for roading or other land-use, dredging for navigation, dredging for building industry materials, etc., can in turn impact on the morphology of the delta through changed sediment supply, changed current velocities and directions, and changed inner entrance channels. Other breaks may rely on sediment via land based sources such as transverse dune systems – stabilising such dune systems can then in turn lead to negative impacts on surf breaks that rely on them for supply.

Due to the rocky nature of much of the Wellington region's coast, other than obstruction of swell corridors, there are less surf breaks that are at risk from physical impacts than in many other New Zealand regions.

[5] See also Glossary of Terms

3 Wellington Region Surf Break Identification and Characterisation

The order in which the surf breaks are presented begins in the north east of the region and then follows the coast southward and then to the west and northwards (clockwise around the Greater Wellington Region). Each of the following sections represents a Surf Break Area (SBA) that may host a single or multiple surf breaks.

3.1 Slipperies

Wave Type	Left, Reef/Point
Min wave	0.5 m
Max Wave	2.5 m+
Shape	Punchy, Wally
Swell Dir	East
Wind Dir	West
Tide	Mid > High
Ride Length	400 m
Stoke Rating	7

Slipperies is an exposed reef/point break. Consistent surf break that can have surfable waves year-round. The wave works best in offshore winds from the northwest having no shelter from cross shore breezes. Surfing waves are easily degraded by onshore winds. Sources of surfable waves are just as likely to arise from local wind swells as from distant groundswells with the best swell direction being from the southeast. The reef breaks left. Low crowd factor is best and dangerous rips. Suited to intermediate to advanced surfers.

3.2 Castlepoint - Main Beach

Wave Type	Right and Left, Sand beach,
Min wave	0.5 m
Max Wave	2.5 m+
Shape	Soft
Swell Dir	Northeast
Wind Dir	Southwest
Tide	Mid
Ride Length	220 m
Stoke Rating	4

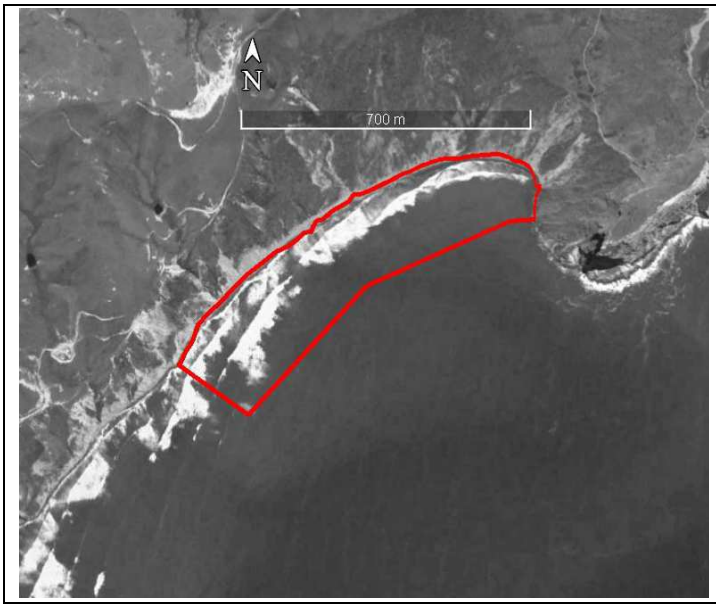
Main Beach has numerous beach break peaks with some sheltered beach/reef breaks at the southern end. Most surfable waves originate from south/southeast groundswells.

3.3 The Gap

Wave Type	Right and Left, Sand beach,
Min wave	0.5 m
Max Wave	2 m
Shape	Wally, Powerful
Swell Dir	Southeast
Wind Dir	Northwest
Tide	All
Ride Length	170 m
Stoke Rating	6

In the entrance of Deliverance Cove is a sheltered beach break that has fairly consistent surf that can work any time of the year. Although best in offshore winds from the west-northwest (with some shelter here from southwest winds), The Gap is able to handle light onshore winds with their associated short period swells, and groundswells in equal measure with the best direction being from the southeast. The beach breaks favour rights with the odd left hand peak working at all stages of the tide. A very popular surf break during summer and school holidays, crowds can almost match that of the corner at Lyall Bay.

3.4 Christmas Bay



Wave Type	Right and Left, Sand beach,
Min wave	0.5 m
Max Wave	2 m
Shape	Punchy
Swell Dir	South
Wind Dir	Northwest
Tide	All
Ride Length	150 m
Stoke Rating	5

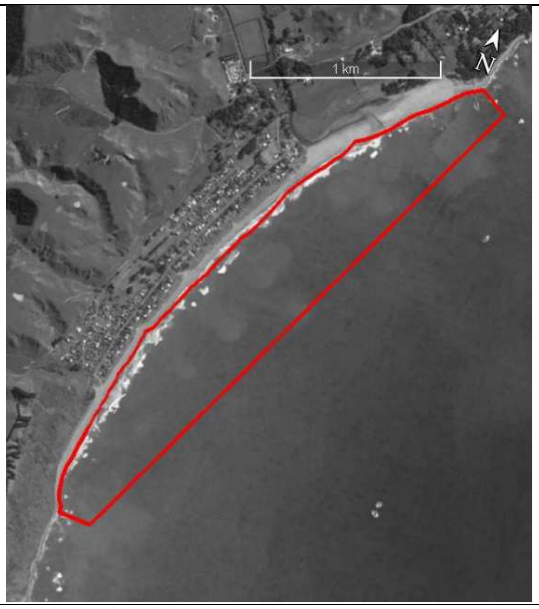
Christmas Bay is an exposed series of beach breaks that have quite consistent surf that can work at any time of the year. Offshore winds blow from the northwest with some shelter from northeast winds. Submerged rocks are a hazard.

3.5 Riversdale - Main Beach

Wave Type	Right and Left, Sand beach,
Min wave	0.5 m
Max Wave	2 m
Shape	Punchy
Swell Dir	Southeast
Wind Dir	Northwest
Tide	All
Ride Length	110 m
Stoke Rating	5

Riversdale has a series of exposed beach breaks that offer quite reliable surf and can work at any time of the year. The best wind direction is from the west-northwest. The main beach tends to receive a mix of groundswells and short period wind swells with the best direction being from the southeast. The peaks here offer lefts and rights for all levels of surfer ability – but learners need to be aware of rips. Best around high tide.

3.6 Uruti Point



Wave Type	Right and Left, Sand beach,
Min wave	0.5 m
Max Wave	~
Shape	Punchy
Swell Dir	Southeast
Wind Dir	Northwest
Tide	All
Ride Length	130 m
Stoke Rating	5

Uruti Point is accessed by taking Waiorongo Rd, off Homewood Rd, off the Riversdale Rd. The set-up encompasses several peaks down the beach, offering both right and left handers. Good, fun, punchy waves, ideal for surfers of all levels. There are surf breaks at the point and further North that are not mentioned in the NZSG.

3.7 Stony Bay

Wave Type	Pebble beach / rocky reef,
Min wave	0.5 m
Max Wave	~
Shape	Punchy
Swell Dir	East
Wind Dir	Northwest
Tide	All
Ride Length	120 m
Stoke Rating	4

Stony Bay is a series of rocky beach breaks and reef outcrops along several internal bays with a number of peaks, located north of the Tora River. Stony Bay picks up good swell and offers both right and left handers. The waves are punchy and fun, good for all levels of surfing ability.

3.8 Tora Pit

Wave Type	Rocky reef,
Min wave	1.5 m
Max Wave	4 m
Shape	Hollow
Swell Dir	East
Wind Dir	Northwest
Tide	Mid to Low
Ride Length	270 m
Stoke Rating	5

Some 550 meters northeast of Tora Stream, a big wave surf break also known as the Bombora. Mainly a left hander, but also provides a hollow right hander. Advanced to expert surfers only.

3.9 Tora Stream

Wave Type	Sand and Rocky reef,
Min wave	0.5 m
Max Wave	1.5 m
Shape	~
Swell Dir	East
Wind Dir	Northwest
Tide	All
Ride Length	130 m
Stoke Rating	6

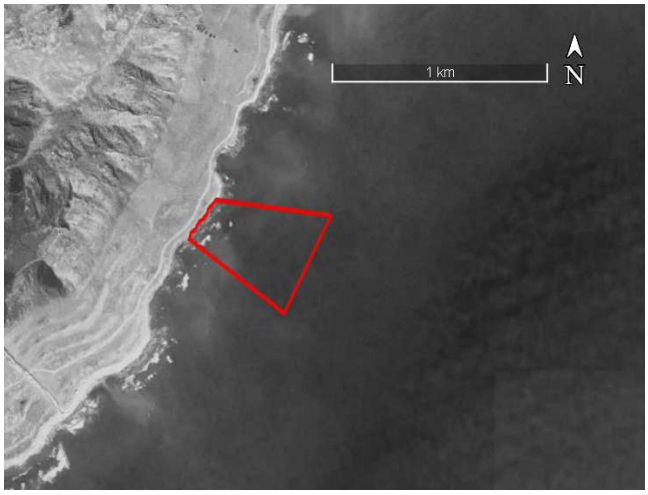
Also known as Awheaiti Stream, is an A-frame surf break with a left and right hander of good quality under 1.5 meters.

3.10 Tora Tora

Wave Type	Rocky point/reef
Min wave	0.5 m
Max Wave	4 m
Shape	Wally, hollow
Swell Dir	East
Wind Dir	Northwest
Tide	All
Ride Length	320 m
Stoke Rating	8

Tora Tora SBA contains two breaks. A right hand inner reef break (known to an older generation as the slaughter house) that works up to 1.5 meter swells – good for surfers of intermediate ability. When the swell increases, the right hand Tora point, some 300 offshore becomes surfable. Experienced riders when big. Tora Point is an extension of the inner break.

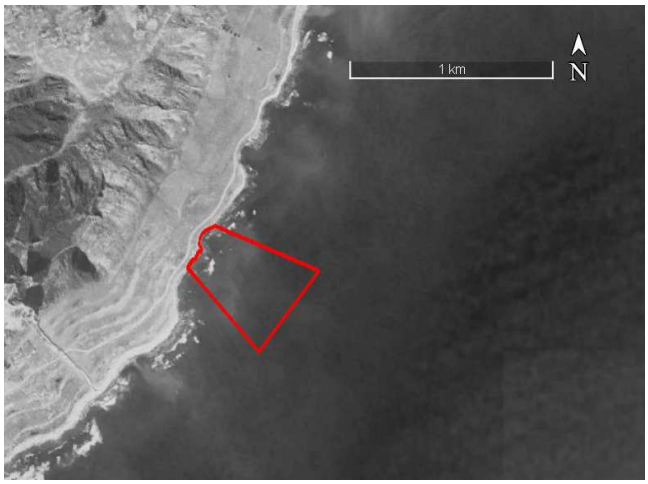
3.11 Toilet Bowls



Wave Type	Left and Right rocky reef
Min wave	0.5 m
Max Wave	2 m
Shape	Wally, hollow
Swell Dir	East
Wind Dir	West
Tide	Mid to High
Ride Length	120 m
Stoke Rating	6

Two distinct reef peaks providing left and right handers. Good for intermediate to expert surfers.

3.12 Shipwrecks



Wave Type	Right rocky reef
Min wave	0.5 m
Max Wave	2 m
Shape	Wally, hollow
Swell Dir	East
Wind Dir	West
Tide	All
Ride Length	120 m
Stoke Rating	6

A good quality right hand reef, breaking directly in front of the Opua shipwreck. Works well in swells under 2 meters.

3.13 God Squad

Wave Type	Left and right rocky reef
Min wave	0.5 m
Max Wave	2 m
Shape	peals, wally
Swell Dir	East
Wind Dir	West
Tide	All
Ride Length	100 m
Stoke Rating	5

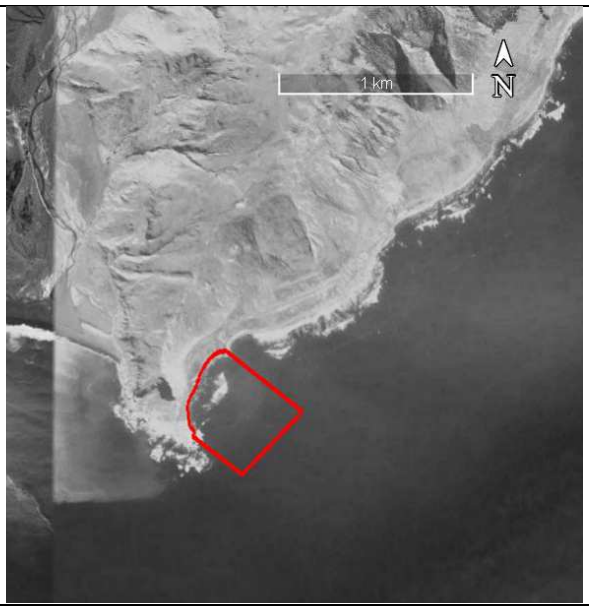
The southernmost surf break at Tora listed in the NZSG. User friendly waves on mid-size swells with fun peaks and workable walls.

3.14 Gnarlies

Wave Type	Left wedge rocky reef
Min wave	1 m
Max Wave	3 m
Shape	peaks, wally
Swell Dir	East
Wind Dir	Northwest
Tide	Mid to High
Ride Length	180 m
Stoke Rating	5

Gnarlies is a left reef/wedge on the rocky point, located on the northern point of the small bay beside Dolphin Bay. Gnarlies is steep and hollow. Best for expert surfers.

3.15 Dolphin Bay



Wave Type	Left and Right beach/reef
Min wave	0.5 m
Max Wave	3 m
Shape	peaks, punchy
Swell Dir	East
Wind Dir	Northwest
Tide	All
Ride Length	170 m
Stoke Rating	5

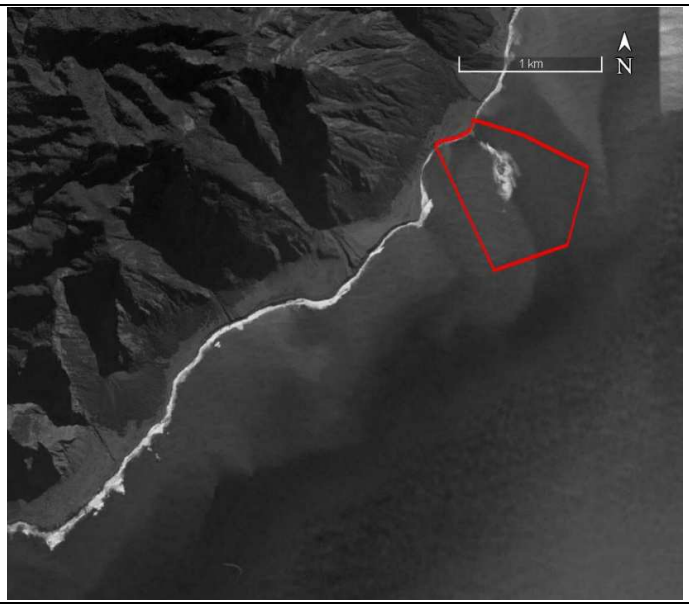
Dolphin bay is a beach break on a stony/rocky beach, located on the east side of Te Kaukau Point. Dolphin Bay picks up plenty of swell and has several peaks with both right and left handers. A punchy and fun wave, best for advanced to expert surfers.

3.16 White Rock Point

Wave Type	Left reef point
Min wave	1 m
Max Wave	2 m
Shape	hollow
Swell Dir	Southeast
Wind Dir	Northwest
Tide	Mid to Low
Ride Length	150 m
Stoke Rating	5

White Rock Point is a left hand reef point break off the western side of Te Kaukau Point. The break is fairly inconsistent but can offer some good waves when it's on. The wave has a steep drop in, with a hollow, powerful wall. Best for advanced to expert riders.

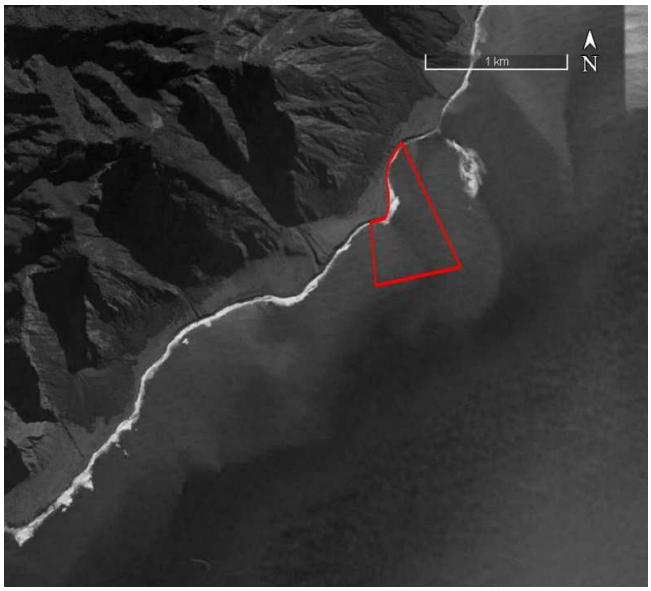
3.17 The Spit



Wave Type	Left and Right reef point
Min wave	0.5 m
Max Wave	4 m
Shape	Hollow, steep
Swell Dir	Southeast
Wind Dir	Southwest
Tide	Low to Mid
Ride Length	350 m
Stoke Rating	10

The Spit at Te Rakauwhakamataku Point is a long, narrow rocky outcrop, with long left and right points that break down either side. The Spit is rated as a world class wave by Wannasurf.com[6] with several sections. The wave is fast, with a steep take off, with steep sections and barrels. Suitable for intermediate to expert surfers, the bigger the swell, only the more advanced level of surfer should be in the water. The Spit is given a NZSG rating of 10, it was recommended to the NZCPS board of inquiry in 2008 as a nationally significant surf break, a fact that was lost in translation with the final NZCPS, as released in December 2010.

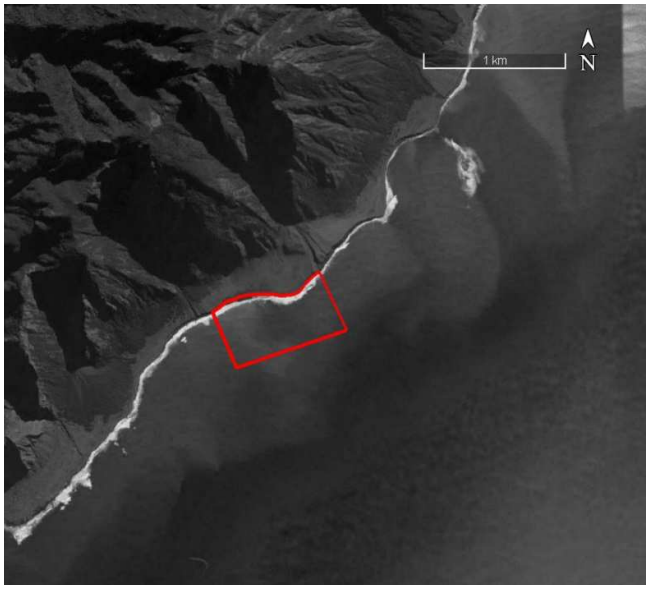
3.18 Seconds



Wave Type	Right boulder point
Min wave	0.5 m
Max Wave	3.5 m
Shape	Steep
Swell Dir	Southeast
Wind Dir	Northwest
Tide	Low to Mid
Ride Length	300 m
Stoke Rating	8

Seconds is a quality right hand point break over large round boulders, onto a rocky/stony beach. It's a quality wave with a fast drop in, powerful wall and barrel sections that peel along providing long rides. The wave handles big swell and can be a serious proposition when big – experts only.

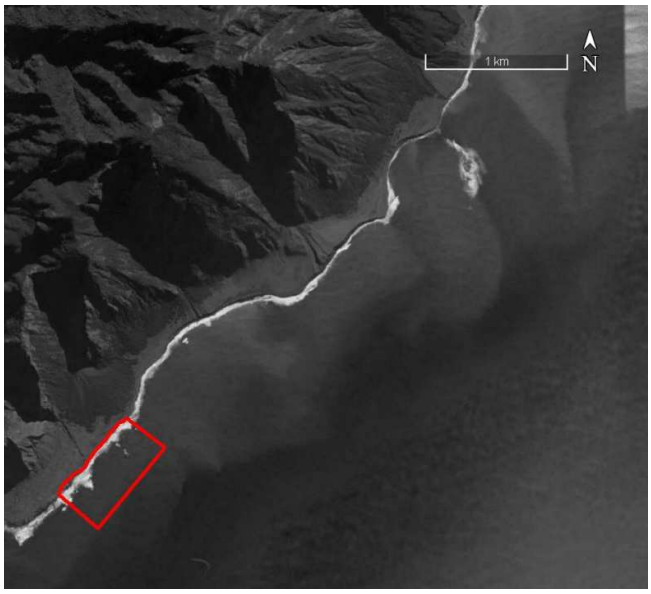
3.19 The Desert



Wave Type	Left rocky reef
Min wave	1 m
Max Wave	2.5 m
Shape	Steep, heavy
Swell Dir	Northeast
Wind Dir	Northwest
Tide	Low to Mid
Ride Length	150 m
Stoke Rating	5

The Desert is a left hand point break. It's a solid wave with a hazardous take off, and powerful wall or barrel. Handles big swell. This is a serious wave – experts only.

3.20 Schnappes



Wave Type	Left rocky reef
Min wave	1 m
Max Wave	2 m
Shape	Hollow
Swell Dir	Southeast
Wind Dir	Northwest
Tide	Low to Mid
Ride Length	80 m
Stoke Rating	6

Schnappes is a left hand reef break off the side of a large rock, onto a rocky beach. It's a solid wave with a critical take off, and powerful wall and barrel. This is a serious wave – experts only.

3.21 Windies/No.4

Wave Type	Right point
Min wave	1 m
Max Wave	2 m
Shape	Steep, wally
Swell Dir	South
Wind Dir	Northeast
Tide	Mid to High
Ride Length	120 m
Stoke Rating	Not Rated

Windies/No. 4, is a set of two right hand point breaks near the Ngawi Golf Course, out at the end of Cape Palliser. User-friendly wave with several sections. Good for surfers of all levels.

3.22 Ning Nongs

Wave Type	Left point rocky
Min wave	0.5 m
Max Wave	3 m
Shape	Steep, hollow
Swell Dir	South
Wind Dir	Northeast
Tide	All
Ride Length	860 m
Stoke Rating	9

The Ning Nongs SBA contains four take off areas that are essentially all interconnected by being part of the same point/reef system. The take-off areas include:

- Big Ning Nong - left hand point break that is surfable to Dee Dees (860 meters) when the swell is three meters plus, encompassing the the whole reef system.
- Craps – inside part of the reef system, offers a good quality left hander and some right handers. Craps left can be ridden in excess of 470 meters
- Little Ning Nong and/or Raspberries – inside and north of Craps, another left hand section of the point.

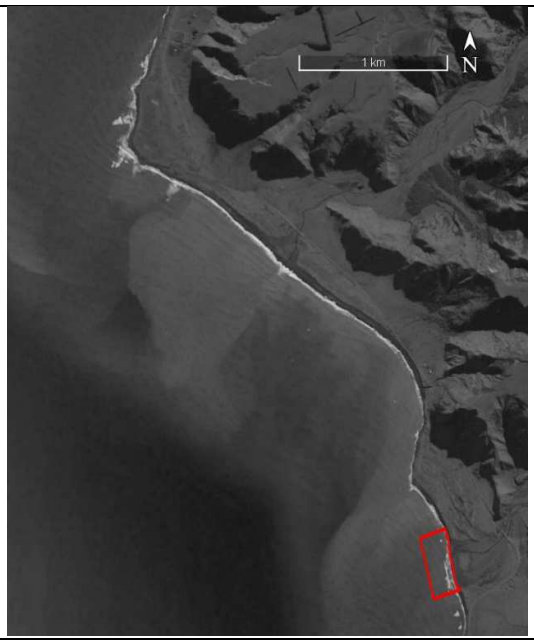
The Ning Nong reef system is revered by surfers nationally, the NZSG gives it a stoke meter rating of 9 yet many of the regions surfers would call it their most favourite surf break. Good for surfers of intermediate ability and upwards when the swell range is up to 2 meters. Bigger than 2.5 – 3 meters it should be left to surfers of expert ability. Ning Nong is one of the Wellington Region's premier surf breaks.

3.23 Dee Dees

Wave Type	Left and Right rocky reef
Min wave	0.5 m
Max Wave	3 m
Shape	Steep, hollow
Swell Dir	South
Wind Dir	Northeast
Tide	Mid to High
Ride Length	375 m
Stoke Rating	6

Dee Dees is a reef break on a rocky beach, just in front of the Kawakawa Station, Ngawi. Dee Dees features both right and left handers, the former being the favoured ride. High performance wave, that is powerful and gets hollow with steep take-offs. Good for all levels of surfer. The NZSG states that the best tide is mid to high in swells two meters and up, and in smaller conditions it really does benefit from tides in the low range.

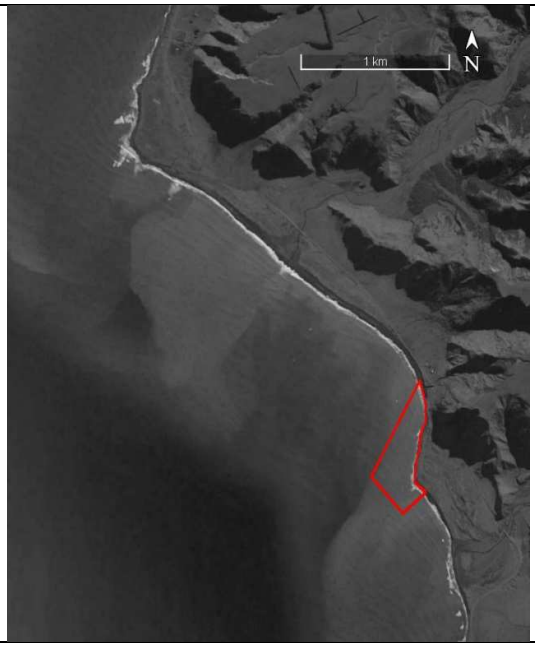
3.24 Otakaha Stream



Wave Type	Left and Right rocky/sand mix
Min wave	1 m
Max Wave	1.5 m
Shape	Steep, punchy
Swell Dir	South
Wind Dir	Northeast
Tide	All
Ride Length	120 m
Stoke Rating	4

A wandering stream mouth that dictates the position of the peak which breaks over rocks and sand. Surfable range is between 1 to 1.5 meters.

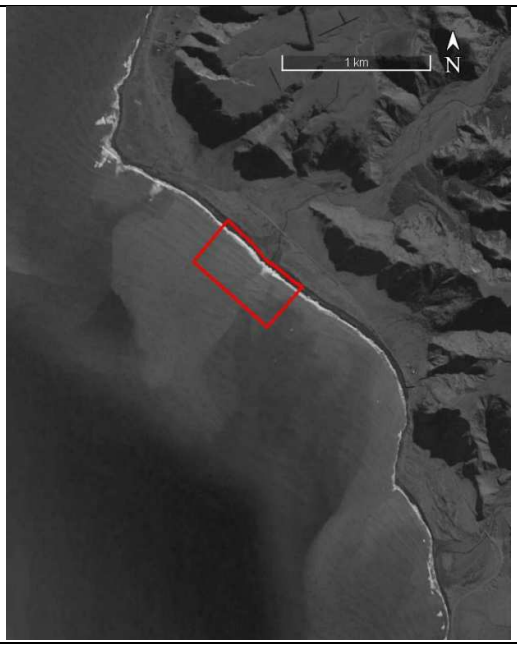
3.25 Humenga Lodge



Wave Type	Left point rocky reef
Min wave	1 m
Max Wave	4 m
Shape	Steep, punchy
Swell Dir	South
Wind Dir	Northeast
Tide	Mid to High
Ride Length	130 m
Stoke Rating	6

A left hand reef point break located south of the lodge which needs a good size swell (over 1.5 meters) to start working properly. Hazardous access with respect to rocky shoreline.

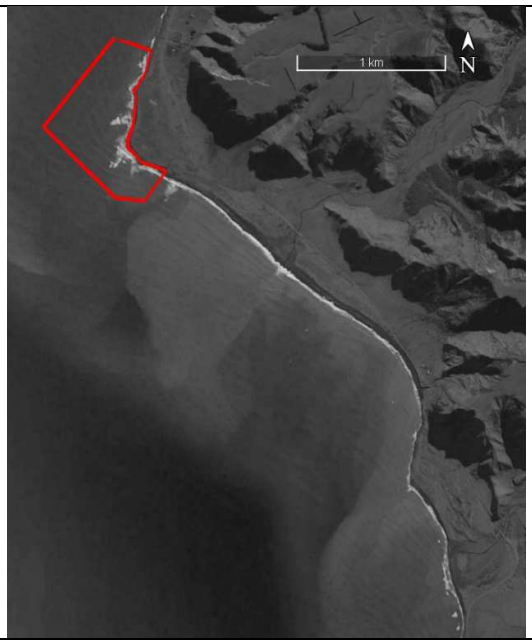
3.26 Pararaki Stream



Wave Type	Left and Right rocky/sand mix
Min wave	0.5 m
Max Wave	1 m
Shape	Fast, wally, peaky
Swell Dir	South
Wind Dir	Northeast
Tide	Mid
Ride Length	120 m
Stoke Rating	No Rating

User-friendly left and right river mouth surf breaks over rocks and black sand which have shifting banks due to the river flow. Best around mid-tide, these surf breaks do not have a NZSG stoke meter listing.

3.27 Humenga Point



Wave Type	Left rocky point
Min wave	0.5 m
Max Wave	3 m
Shape	Fast, wally, peaky
Swell Dir	South
Wind Dir	Northeast
Tide	Mid
Ride Length	150 m
Stoke Rating	7

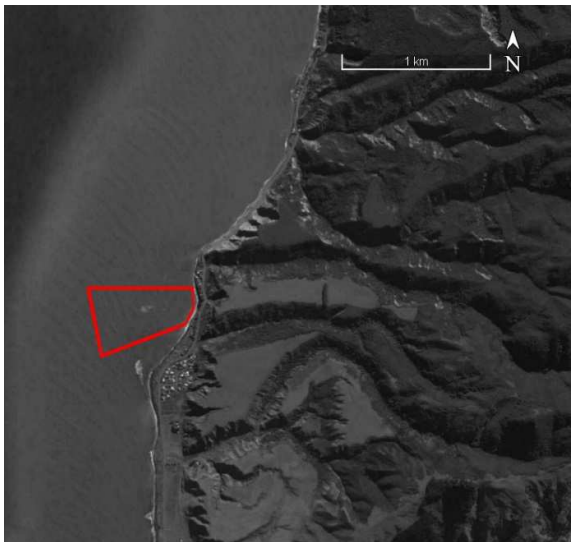
Also known as Rubbish Tips or Dumps, Humenga Point is a left hand rocky point break with several sections and barrels. The point can offer long rides on groundswells over 1.5 meters. The inner point break offers fun peaks on smaller swells, good for all levels of surfer.

3.28 Whatarangi Point/Bombie

Wave Type	Left rocky point
Min wave	2 m
Max Wave	4 m
Shape	Wally
Swell Dir	South
Wind Dir	Northeast
Tide	Mid to High
Ride Length	260 m
Stoke Rating	5

This point/bombie is listed in the NZSG as being situated at the most southern end of the white cliffs where the road takes a sharp right. When swell size exceeds 2.5 meters, both the point and bombie start to work, and hold up to 4 meters plus. The point is a peeling left hander while the A-frame bombie is a few hundred meters to the north and further out to sea. Experts only.

3.29 Whatarangi Bay Bombie



Wave Type	Left rocky point
Min wave	1.8 m
Max Wave	4 m
Shape	Fat, rolling
Swell Dir	South
Wind Dir	Northeast
Tide	All
Ride Length	260 m
Stoke Rating	Not rated

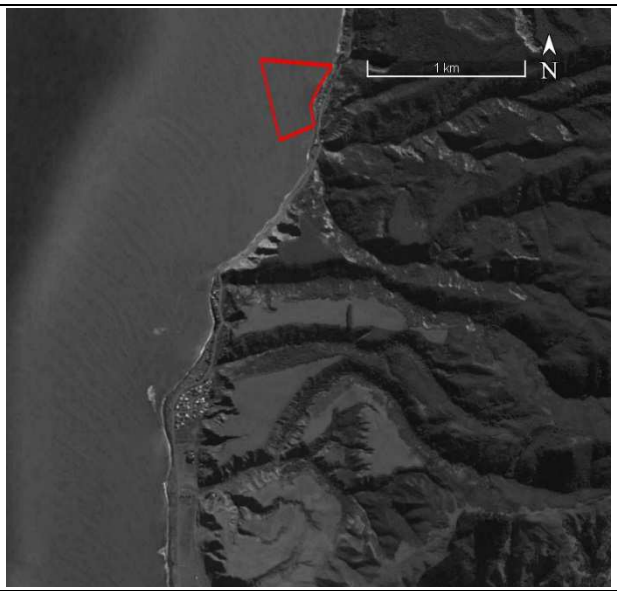
This break is not listed in the NZSG, but is often confuse with the Whatarangi Point Bombie. It is more popular as it is able to be ridden by competent surfers upwards (as opposed to experts). The wave is an A-frame with right and left handers of with a low breaking intensity.

3.30 Whatarangi Station

Wave Type	Left rocky point
Min wave	1 m
Max Wave	3 m
Shape	Fast, wally
Swell Dir	South
Wind Dir	Northeast
Tide	All
Ride Length	180 m
Stoke Rating	6

An exposed left hand point break that is very fast, with impassable sections unless the swell angle is just right. Station can be ridden on small swells (low tide) - optimum size is 2 meters plus. A smaller beach break runs down the inside point by the beachside homestead.

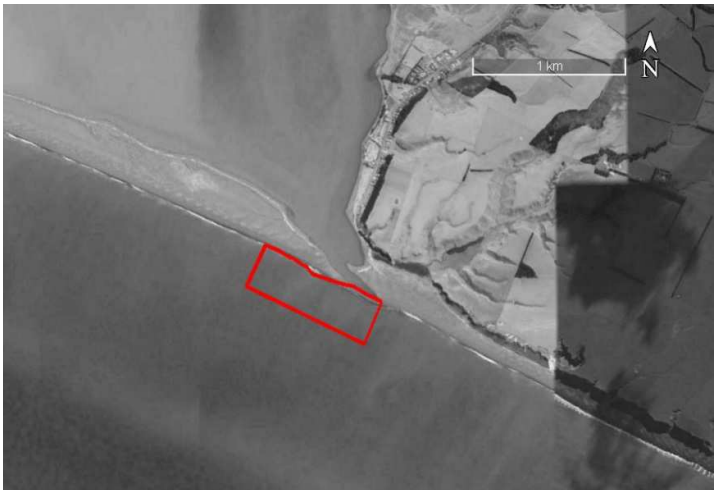
3.31 Batches



Wave Type	Left and right, rock/sand mix
Min wave	0.5 m
Max Wave	2+ m
Shape	Fast, wally
Swell Dir	South
Wind Dir	Northeast
Tide	Mid to High
Ride Length	150 m
Stoke Rating	4

South of the Pinnacles Reserve and on the other side of the active slip. The northern peak handles bigger swells while the southern peak has a fun bowl feature to it good for surfers of all levels.

3.32 Lake Ferry



Wave Type	Pebble beach break
Min wave	0.5 m
Max Wave	2 m
Shape	Fast, hollow
Swell Dir	South
Wind Dir	Northwest
Tide	High
Ride Length	300 m
Stoke Rating	9

Varying river flow and changing phases of the tide lead to very sudden and rapid changes in rips. The wave is a beach break with a heavy lip and changing peaks. Multiple peaks can occur however the surf break is usually located on the eastern side. Usually a right hander suited to experienced riders.

3.33 Wainuiomata River

Wave Type	Left reef
Min wave	1 m
Max Wave	3 m
Shape	Fast, steep
Swell Dir	South
Wind Dir	North
Tide	Mid to High
Ride Length	260 m
Stoke Rating	6

3.34 Dribbles

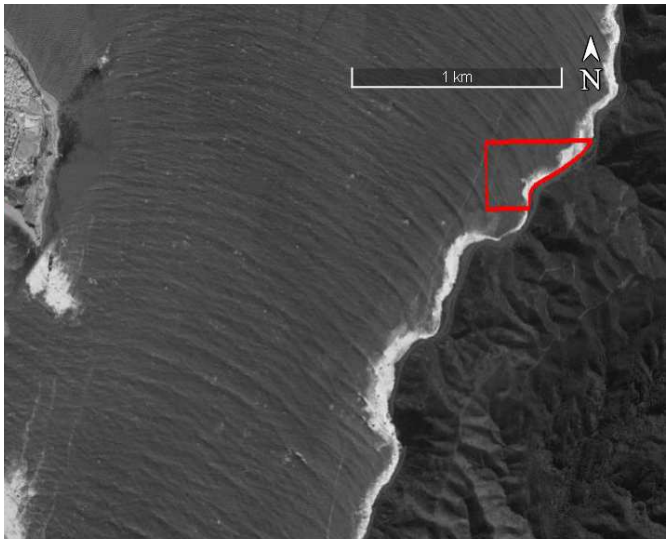
Wave Type	Right and left reef
Min wave	0.5 m
Max Wave	2 m
Shape	Fast, hollow
Swell Dir	South
Wind Dir	North
Tide	Mid to High
Ride Length	250 m
Stoke Rating	6

3.35 Orongorongo River

Wave Type	Left point reef
Min wave	1 m
Max Wave	3 m
Shape	Fast, hollow
Swell Dir	South
Wind Dir	North
Tide	Mid to High
Ride Length	280 m
Stoke Rating	6

The stretch of coast from Wainuiomata River to Orongorongo River is generically referred to as Wainui or Wainui Coast by surfers. The waves at each of the 3 breaks are 'heavy' and are surfable during large swells. Surfers need to mindful of strong currents.

3.36 Pipes



Wave Type	Left point and beach
Min wave	0.5 m
Max Wave	2 m
Shape	Soft
Swell Dir	South
Wind Dir	East
Tide	Low to Mid
Ride Length	200 m
Stoke Rating	5

The NZWG notes that there are numerous left hand point breaks along the Eastbourne coast. The surf break that is best known, most consistent, and most popular – some 20 to 30 minute walk out from Burdens Gate – is Pipes.

Pipes like most of the points can be surfed in a stiff south/south-easterly wind, this makes the pipes the best prospect in the Wellington and Lower Hutt cities during a large southerly storm with big swell. Further down the coast, Burdens Gate – Lion Rock also has a small Mal left hand wave but Lion Rock has filled in with gravel over the last couple of decades. In huge southerly swells the inner Eastbourne township points host left hand shore break points of around a meter in size. The NZSG states that these breaks work on all tides, but the most popular break, The Pipes, is best on a low to mid-tide. The higher the tide, the bigger the swell needed.

3.37 Butterfish Rock

Wave Type	Right reef
Min wave	0.5 m
Max Wave	3 m
Shape	Hollow, fast
Swell Dir	South
Wind Dir	Northwest
Tide	All
Ride Length	150 m
Stoke Rating	8

Butterfish rock is located about 150 meters southeast of the car park at the bottom of the Pass of Branda at Seatoun. Focusing of the swell begins with sunken rock (which claimed the police boat Lady Elizabeth in a large swell in 1986), on giant swell waves can break right through to Butterfish Rock. As the swell wraps around Butterfish rock it will either break right through (in swells over 2.8 meters) or sharpen its focus to a well-defined peak just

inside of the rock. Always a right hander, but on occasion a short left hander can be found. Experienced surfers.

The wave has a solid lip and is rated as one of the 'heavyweights' of the South Coast. Surfers need to observe it carefully before paddling out for the first time, there have been many injuries on the reef. Reinforcement of the car park to date has been good and that has not protruded into MHWS. This end of Breaker Bay is very popular in the holidays and if expansion of the car park facilities in the future is needed, special care must be observed to avoid adverse effects on this surf break.

3.38 Propellors

Wave Type	Right reef
Min wave	1 m
Max Wave	2+ m
Shape	Hollow, fast
Swell Dir	South
Wind Dir	Northwest
Tide	Low to Mid
Ride Length	180 m
Stoke Rating	8

Propellers is a right hand reef break on the eastern side of Palmer Head. Paddle out from the Wahine memorial Park. When conditions are right it produces a long fast wall with barrels. Another surf break that deserves respect.

3.39 Moa Point

Wave Type	Right reef/point
Min wave	2 m
Max Wave	4+ m
Shape	Wall
Swell Dir	South
Wind Dir	North
Tide	All
Ride Length	260 m
Stoke Rating	Not Rated

Moa Point is a right hand reef point break that can hold up to 4 meter plus swells. The NZSG refers to it as a fickle break. Moa Point is in fact a large wave venue so it takes at least 2.5 meters of swell before it starts producing surfable waves. Best left for the experts, Moa Point has the stigma of historically been Wellington City's raw sewerage outfall.

3.40 Airport Rights

Wave Type	Right reef
Min wave	0.5 m
Max Wave	2 m
Shape	Peaky, hollow
Swell Dir	South
Wind Dir	North
Tide	Low
Ride Length	125 m
Stoke Rating	5

Breaks off a part of the original reef that the breakwater and airport is built over. It is a right hand reef break that best works in swells over 1.5 meters. Hazardous due to construction rubble with iron reinforcing rods poking out of the water at low tide, Advanced to expert only.

3.41 Lyall Bay

Wave Type	Left and Right Beach
Min wave	0.5 m
Max Wave	2.5 m
Shape	Walls, hollow
Swell Dir	South
Wind Dir	North
Tide	Low
Ride Length	350 m
Stoke Rating	6

Lyall Bay is host to numerous breaks of varying type and quality. Lyall bay nationally culturally significant, foremost as it was surfed by Duke Kahanamoko, the Father of modern surfing, in February 1915, nearly 100 years ago. The Duke was a swimming and surfing superstar of his time, and his visit to Australia and New Zealand generated a popular wave of interest in the sport of surfing. Lyall Bay was one of the three places that the Duke publically exhibited the Hawaiian Sport of Kings in New Zealand to the General Public. Therefore Lyall Bay is culturally significant (and regionally significant) to the sport of surfing in Aotearoa.

Lyall Bay – Wellington, along with Fitzroy Beach – New Plymouth, Mount Maunganui – main beach and coast, Wainui and Waikanae Beach – Gisborne, and St Clair Beach – Dunedin, were accepted as examples by the board of inquiry to the 2010 NZCPS as nationally significant nursery surf breaks.

As far as amenity value goes, Lyall Bay is Wellington City's most utilised surfing venue. It is Wellington City's premier surfing beach. At its widest point (Sutherland Road to the corner car park), Lyall Bay is a little over 1100 meters, and there are at least ten distinguishable surfable waves breaking left or right, though not all will break well at once:

- The waves near Dorrie Leslie Park only breaks well in swell exceeding 3 meters when it breaks right, across towards the Lyall Bay club rooms. There is an inner right hander in from this peak that works in lesser swell that is quite soft and crumbly, the angle of approach makes it hard to keep up with the lip.
- An A-frame peak opposite the Lyall Bay surf clubrooms is predominately a long right hander. A sucky fast left hander can often be produced off the A-frame that breaks into the patrolled flagged swimming area towards the Maranui clubrooms. In the past the Lyall Bay surf lifesaving club put the eastern swimming flag directly out front of the clubrooms. This particular right hander is the most predominant surfing wave in a south easterly swell, a pattern which prevails during the latter summer months. It is one of the two Lyall Bay peaks named in the NZSG.
- The Bend breaks out front of the Real Surf Shop, right towards a midpoint between Tirangi Rd and Cochrane St. It can break left to a point close to the eastern end of the playground at the bottom of Onepu Rd. Sometimes the peak is non-existent and just a large closeout. On rare occasions this peak can break near to the entrance of Lyall Bay producing rides up to 400 meters long.
- The Toilet Bowl is in front of Cochrane St. Predominantly a left hander, though it does produce a short wedged right hander.
- The Corner left hand peak also known as the Wall, breaks along the airport /Lyall Bay wall from a point south of the orange and white steel frame communication tower. The Corner break is very popular and gets crowded. It produces barrelling waves. Wave quality has been adversely affected by the construction of the corner car park, and in the early eighties from the placement of boulders along what was then a vertical steel plate wall. A surf break of very high amenity value, good for surfers of all levels depending on wave size.

- At the end of the airport breakwater is a pre-existing reef surf break with the southern airport and breakwater built over the top of a reef that extended out in to Lyall Bay from the north-western base of Moa Point hill. The Breakwater is a short left hander off the rock that can hold size of around 3 meters.
- Off the eastern side of Te Raekaihau Point the Outer Bombora reef breaks left and right during mega swells, starting at 3 meters to 13 meters plus. Some 15 to 20 years ago a promoter was offering a prize of $10,000 for the largest wave ride at this location, the prize is yet to be claimed. The outer Bombora is a large wave surfing venue. Located east of Arthurs Nose the Inner Bombora peak starts working on a low tide in swells of 2 meters (low tide) up to 3 meters. Bigger than this it is generally either a re-form off the Outer Bombora or breaking right through.

3.42 Houghton Bay

Wave Type	Left and Right reef and beach
Min wave	0.5 m
Max Wave	3 m
Shape	Hollow
Swell Dir	South
Wind Dir	North
Tide	Low
Ride Length	160 m
Stoke Rating	5

Wellington City's second most popular surf beach, the sandy beach has a steep incline and shore break undertow. The bay has reef points with left and right reef breaks and a sand bar in the middle of the bay that can hold up to 3 meter waves in the right conditions. The optimum swell height is up to 2 meters. In a large swell you can paddle out from Princess Bay and ride the extreme south A-frame peak, which provides a ride of some 100 to 140 meters before closing out the bay. The outside peak is an extension of the bay's central sand bar. Houghton Bay was the venue for the 1968 New Zealand Surf Nationals.

3.43 Taputeranga Island (Rat Island)

Wave Type	Left and Right rocky reef
Min wave	1 m
Max Wave	3.5 m
Shape	Hollow, fast
Swell Dir	South
Wind Dir	Northwest
Tide	High
Ride Length	210 m
Stoke Rating	6

Also known as the Island or Rat Island, Taputeranga Island is a small island off Wellingtons Island Bay. Taputeranga Island features a right hand reef break off the east side of the island and a left hand reef break off the south west side of the island. Both sides produce solid, hollow, fast waves and can be quite a long paddle to get out. Best for advanced to expert surfers.

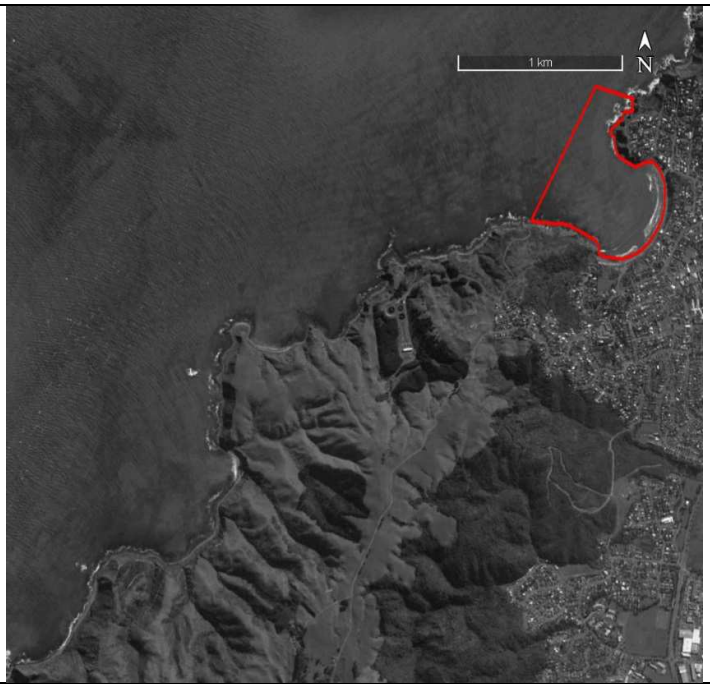
3.44 Stevo's

Wave Type	Left point / rocky reef
Min wave	1.2 m
Max Wave	3 m
Shape	Hollow, fast
Swell Dir	South
Wind Dir	Southeast
Tide	High
Ride Length	200 m
Stoke Rating	4

Stevo's is a left rock ledge located south of Little Titahi Beach (Open Bay). Look south from the beach, it's the point. The wave is powerful with a steep drop-in section into a hollow barrel. It's safest on full tide with tide going out. It only works on a large south/southeast swell which wraps past Makara. Leave this one to the experts and with a lot of local knowledge.

Within the coastal area of Stevos and Titahi Bay are a number of other breaks not listed in the NZSG. Little Titahi (Open Bay) is a safe small beach break. Beginners and Malibu's relish this area. Normally breaks on large northwest onshore swell, when Titahi Bay beach is out of control, this protected beach has small very clean waves. It faces due southwest. Windy (Tirau Bay) is located east of Kaumanga Point. The bay faces northwest.

3.45 Titahi Bay

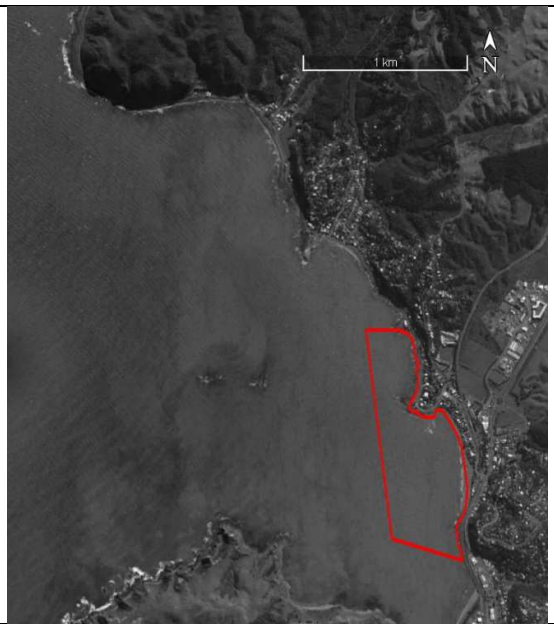


Wave Type	Reef, point and beach
Min wave	0.5 m
Max Wave	3 m
Shape	Hollow, wally
Swell Dir	Northwest
Wind Dir	Southeast
Tide	All
Ride Length	280 m
Stoke Rating	3

Regionally, Titahi Bay rates alongside Lyall Bay, Castlepoint, and Houghton Bay as inner city/town beaches that provide high amenity value, with ease of access close to population centres. Titahi Bay is a significant recreational asset for surfers of all levels. This beach is a surfing nursery break as highlighted to NZCPS board of inquiry in 2008. Titahi Bay consists of north and south rocky reef points and sand bars breaking centrally inside the bay:

- Fisherman's is a right hander on the outer reef on the bay's north point, it only really works when it's big and generates good long sections that can get hollow. In such conditions there is a lot of water moving around. Best left to competent/advanced surfers.
- Slipperies is further on the inside of the north point. It is a beach break point which offers up a right hand wave for intermediate level and up surfers.
- Main beach is series of beach breaks offering left and right handers that are good for beginners providing fun Mal waves for all levels. There are plenty of swimmers, body surfers and boogie boarders who utilise the main beach.
- Pete's Rock is located on the southern point, it is a gnarly left hander that sucks off the reef. Best left to advanced or expert surfers.

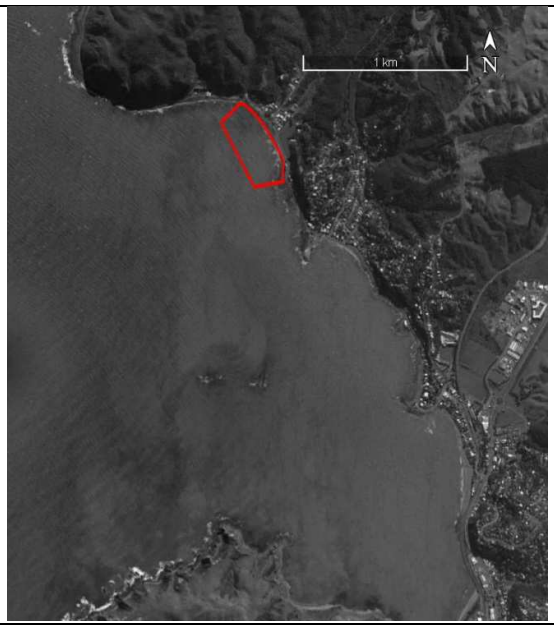
3.46 Plimmerton



Wave Type	Left and Right beach/reef
Min wave	0.5 m
Max Wave	1 m
Shape	Soft, peaky
Swell Dir	Northwest
Wind Dir	Northeast
Tide	All
Ride Length	60 m
Stoke Rating	3

The main surf spot at Plimmerton is the beach break accessed from the town centre via Queen Ave or Bath St. The main beach is sandy, producing soft fat waves suitable for learners and longboard riders. Around the northern headland is a series of rocky coves holding waves up to ~1 meter, not suitable for learners.

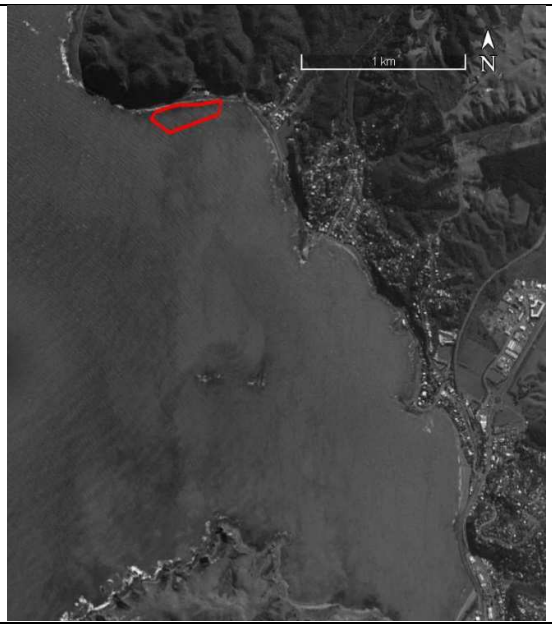
3.47 Hongoeka Bay



Wave Type	Left and Right beach
Min wave	0.5 m
Max Wave	1.5 m
Shape	Punchy
Swell Dir	~
Wind Dir	Northeast
Tide	Mid to High
Ride Length	160 m
Stoke Rating	4

Hongoeka Bay has several beach breaks along the bay near the Marae. The wave is punchy and fun, with both rights and lefts. Ok for all levels of surfer. It is polite to ask permission at the Marae to surf here and at the point.

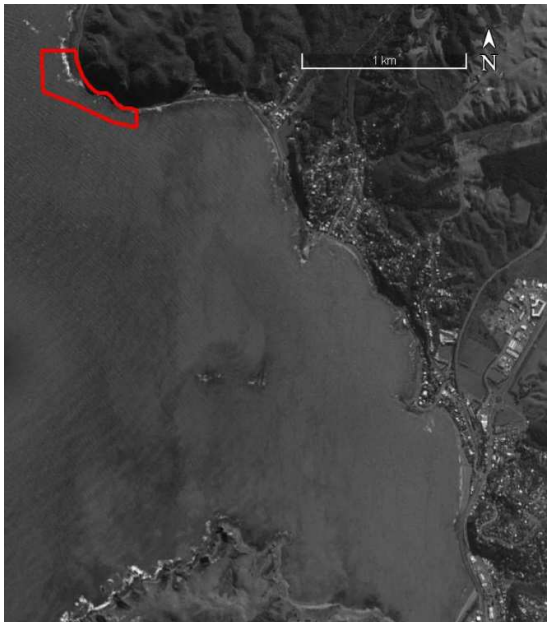
3.48 Pa Point



Wave Type	Right point
Min wave	1 m
Max Wave	2 m
Shape	Hollow, powerful
Swell Dir	Northwest
Wind Dir	East
Tide	Mid to High
Ride Length	330 m
Stoke Rating	4

Pā Point is a right hand pointbreak on a rocky headland. The wave is powerful with a hollow barrel. Best for advanced to expert surfers. Pa Point is one of the most favoured surf breaks on Wellington's west coast.

3.49 Titches



Wave Type	Right point
Min wave	1 m
Max Wave	2 m
Shape	Hollow/powerful
Swell Dir	Northwest
Wind Dir	East
Tide	Mid to High
Ride Length	140 m
Stoke Rating	4

Titches is a right hand point break on the rocky headland located further around the headland from Plimmerton and Pa Point. The wave is powerful and hollow. Best for expert surfers.

3.50 Wairaka Reef

Wave Type	Left reef
Min wave	1 m
Max Wave	2.5 m
Shape	Hollow/powerful
Swell Dir	Northwest
Wind Dir	Southeast
Tide	High
Ride Length	280 m
Stoke Rating	6

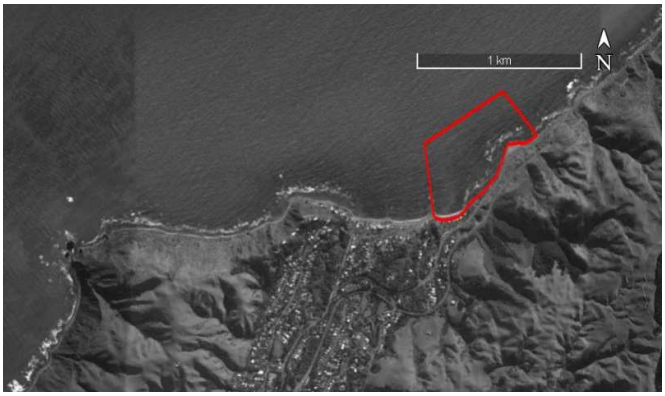
This spot is the south-western most break and is a left hander that breaks over a reef. The wave type is very powerful barrels. It should be left to the experts. Foot access only.

3.51 Wairaka Point

Wave Type	Left reef/point
Min wave	0.8 m
Max Wave	2.5 m
Shape	Wally, powerful
Swell Dir	Northwest
Wind Dir	Southeast
Tide	High
Ride Length	130 m
Stoke Rating	6

A quality left hand point/reef with a sucky take-off and punchy sections. Optimum wave size range of 1 to 2.2 meters. Expert surfers.

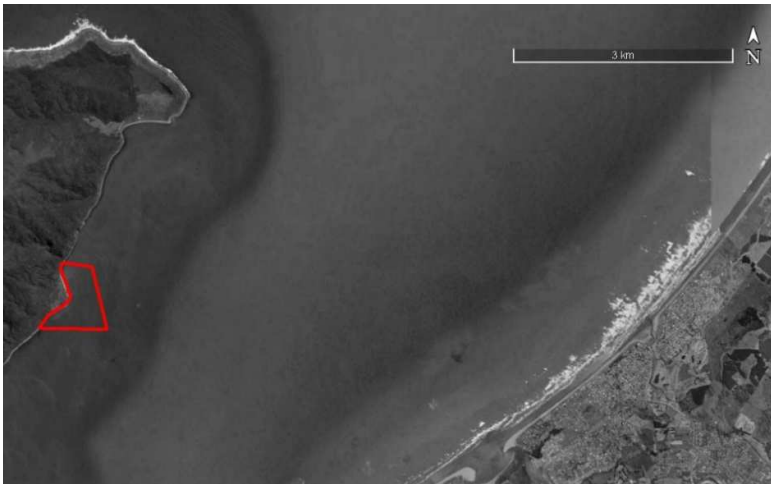
3.52 Brenden's



Wave Type	Right reef
Min wave	0.8 m
Max Wave	1.5 m
Shape	Soft/Wally
Swell Dir	Northwest
Wind Dir	Southeast
Tide	High
Ride Length	100 m
Stoke Rating	6

At the bottom of the hill on Pukerua Beach Rd, walk north along the beach in front of the private houses. Brenden's offers a right hand reef break with a fat shoulder that works best in the 0.5 to 1.5 meter swell range.

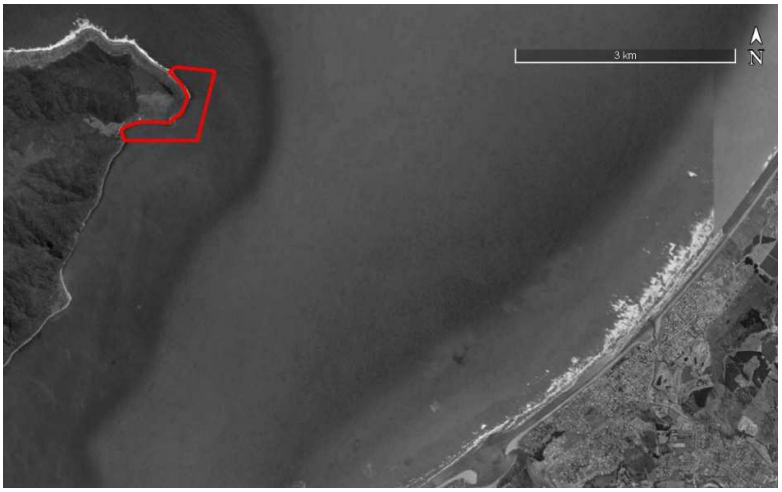
3.53 Mid Point



Wave Type	Left reef/point
Min wave	1 m
Max Wave	2.5 m
Shape	Wally, hollow
Swell Dir	Northwest
Wind Dir	South
Tide	All
Ride Length	280 m
Stoke Rating	7

Kāpiti Island is only accessible by boat. Mid Point is a left hand point break mid-way down the east coast of Kāpiti Island. Mid Point has hollower waves than its northern counterpart (see below).

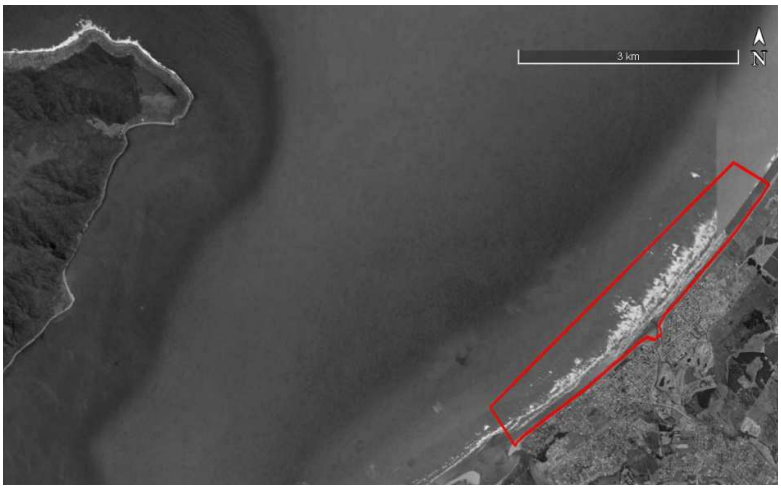
3.54 North Point



Wave Type	Left reef/point
Min wave	1 m
Max Wave	2 m
Shape	Wally
Swell Dir	Northwest
Wind Dir	South
Tide	All
Ride Length	300 m
Stoke Rating	8

North Point is a long left hand point break off the north east point of the island, breaking over rock.

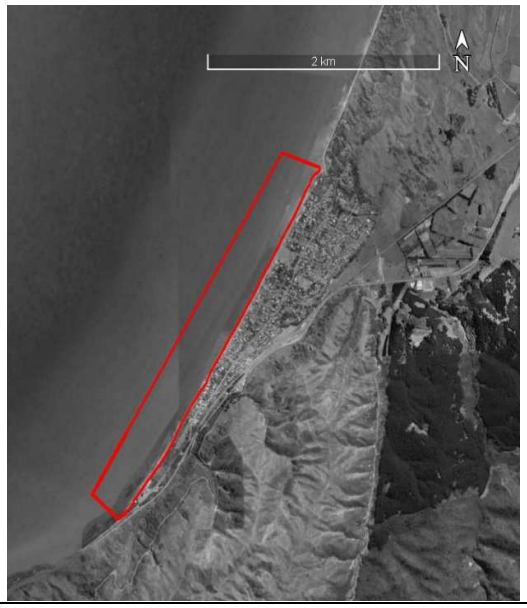
3.55 Waikanae



Wave Type	Left and right beach
Min wave	0.5 m
Max Wave	1 m
Shape	Soft
Swell Dir	West
Wind Dir	Southeast
Tide	All
Ride Length	70 m
Stoke Rating	2

A series of left and right beach breaks along the sandy beach, Waikanae has several peaks along the beach to choose from with both right and left handers. The wave is generally mellow - small and soft, great for beginners.

3.56 Paekākāriki



Wave Type	Left and right beach
Min wave	0.5 m
Max Wave	1.5 m
Shape	Soft
Swell Dir	~
Wind Dir	Southeast
Tide	All
Ride Length	70 m
Stoke Rating	2

Paekākāriki is a beach break on a sandy beach with both right and left handers. The wave is generally small and soft – great for beginners but also good for surfers of all levels.

3.57 Ōtaki

Wave Type	Left and right beach
Min wave	0.5 m
Max Wave	1.5 m
Shape	Soft, peaky
Swell Dir	Northwest
Wind Dir	Southeast
Tide	All
Ride Length	70 m
Stoke Rating	3

A beach break on a sandy beach, Ōtaki has several peaks along the beach to choose from with both right and left handers. While the wave is small, soft and generally good for beginners, longshore currents can be a challenge. On occasion the river mouth can produce banks that are good for surfing.

4 Swell Corridors of the Wellington Region

Figure 4.1 shows an overview of the established swell corridors, buffer zones and green zones for the Greater Wellington region. Figure 4.2 is an example of swell corridors around the Wellington City area. The swell corridor, buffer zone and green zone polygons have been made it to shapefiles and kml files for use in a wide range of GIS interfaces. While a GIS interface is the best way to view the outputs of the swell corridor delineation, close-up figures are provided below (Figure 4.3 to Figure 4.6).

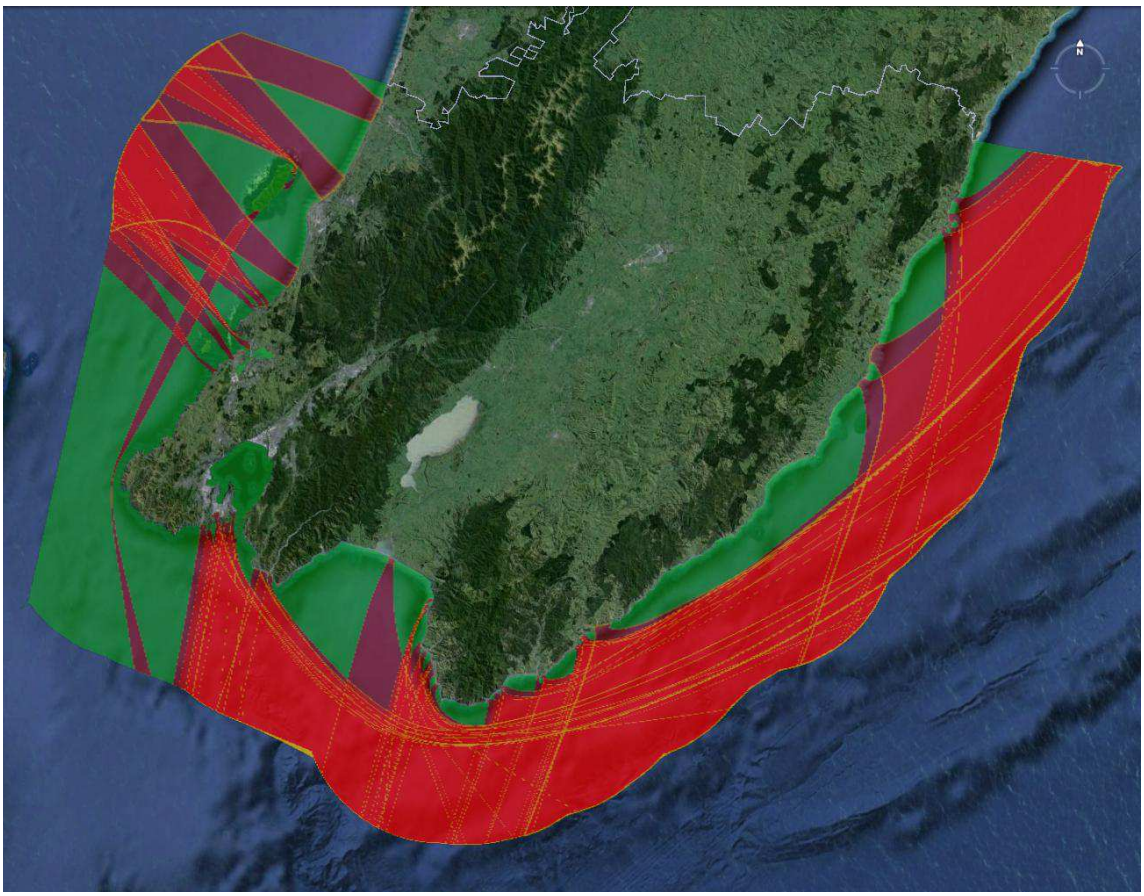


Figure 4.1. Overview of swell corridors and buffer zones for all 68 surf breaks, and GWC green zones.

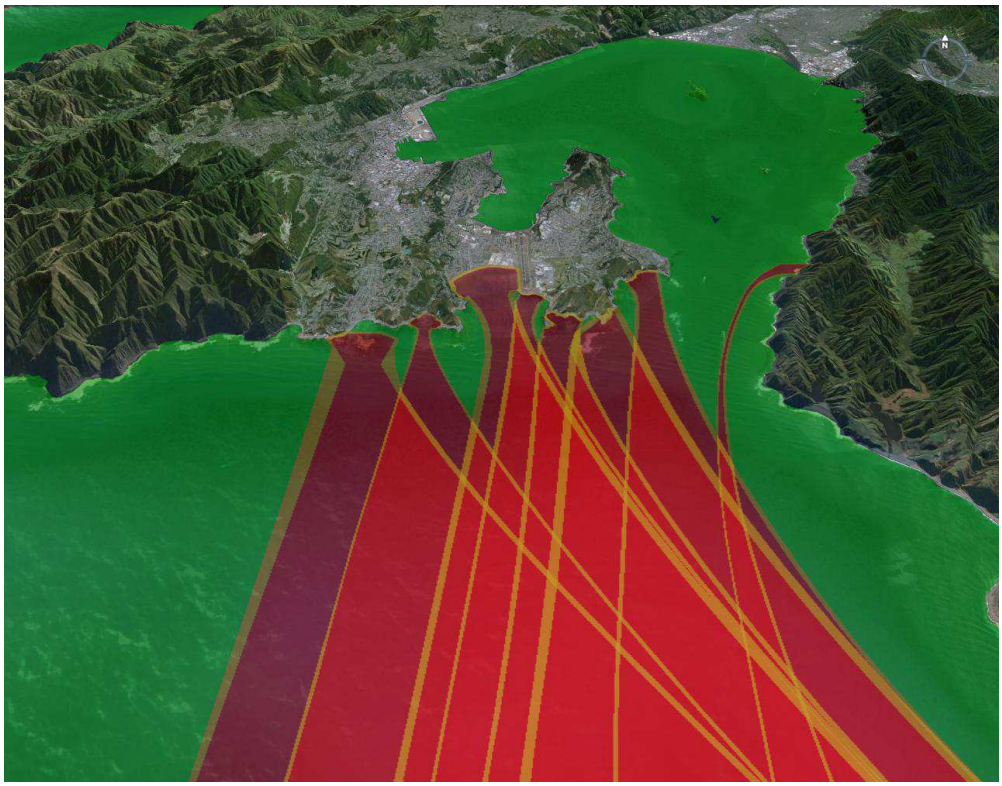


Figure 4.2. Local view of swell corridors, buffer zones and the green zone around Wellington City.

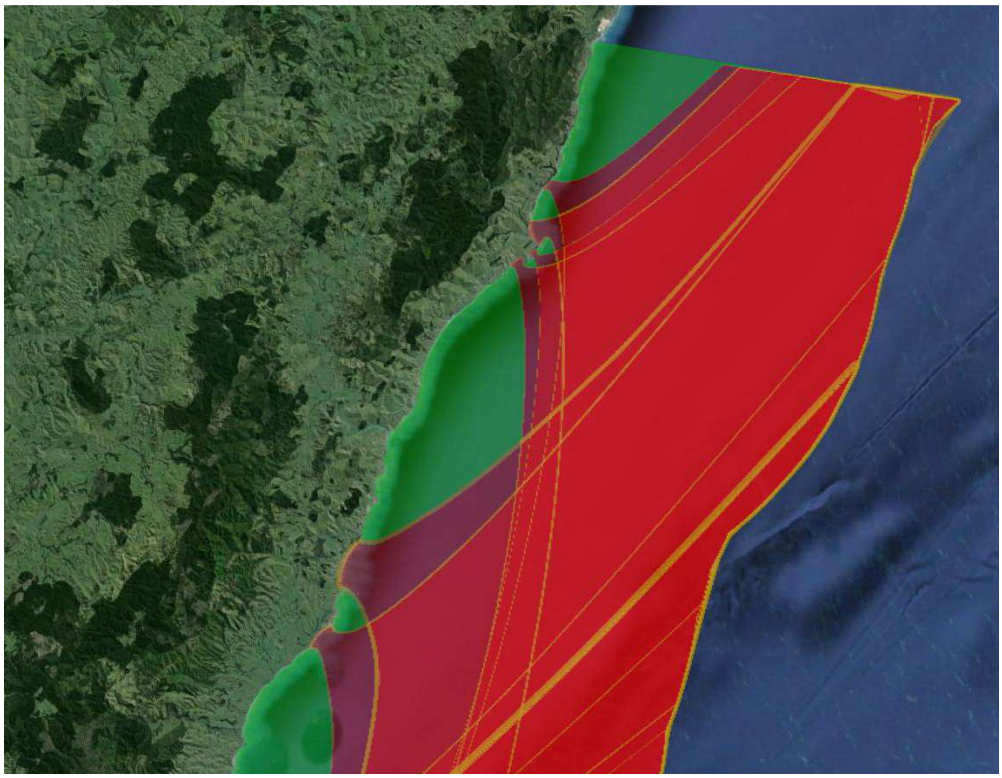


Figure 4.3. Swell corridors from Castle Point to Uruti Point.

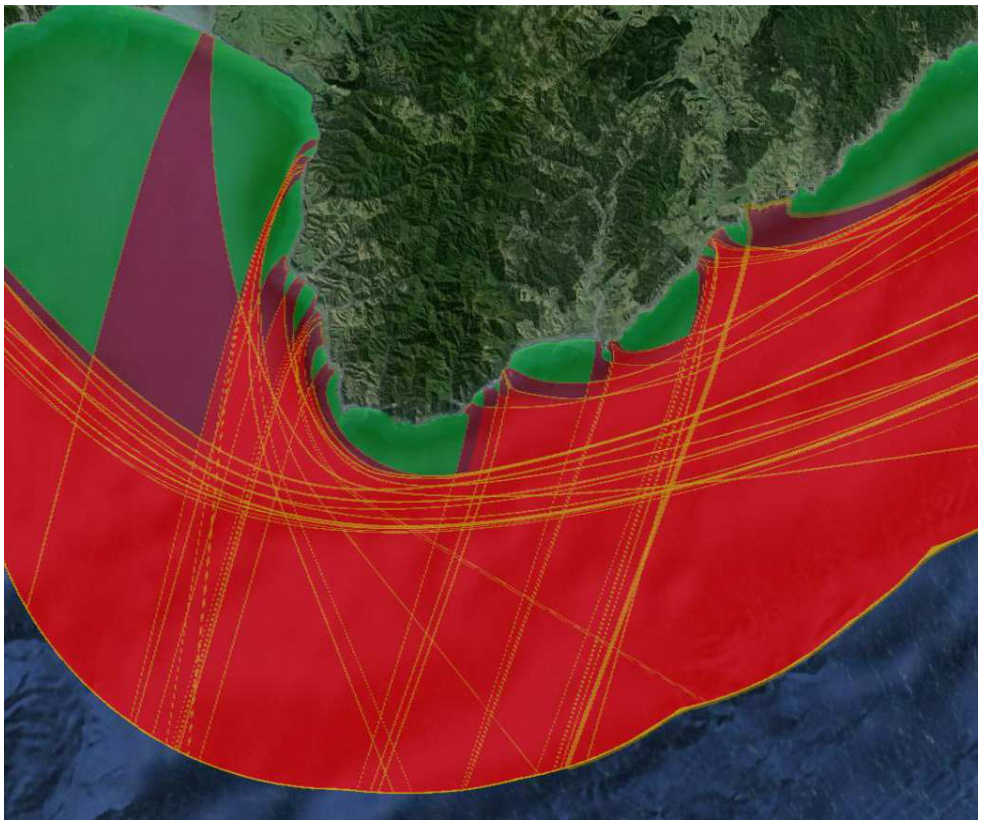


Figure 4.4. Swell corridors from Stoney Bay to Lake Ferry.

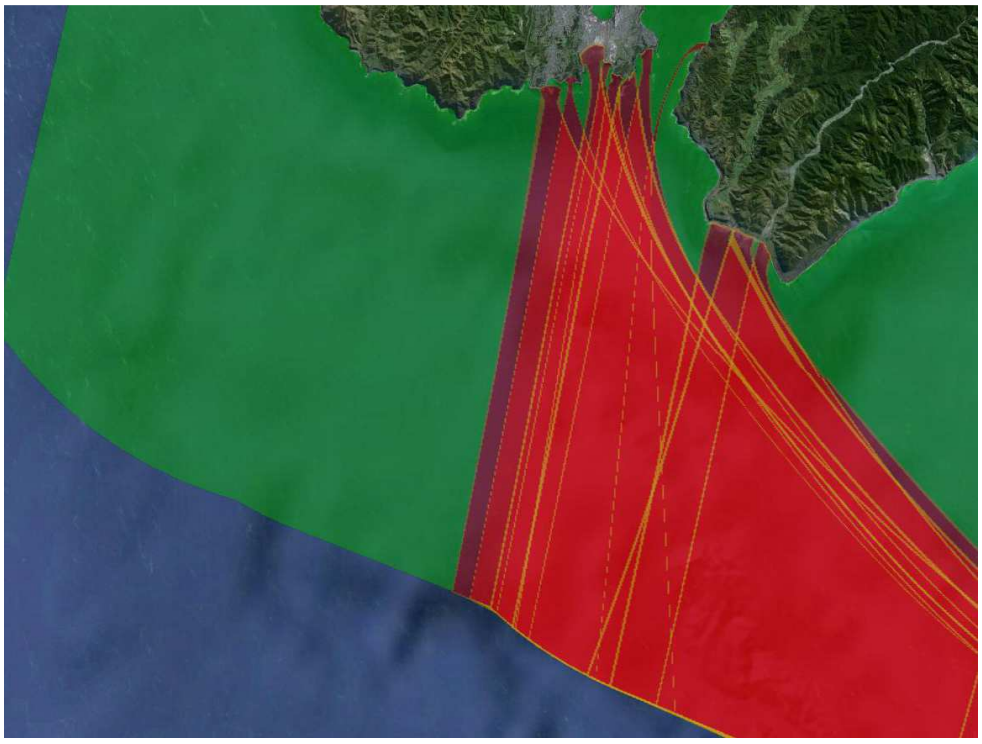


Figure 4.5. Swell corridors from Orongorongo River to Island Bay Lefts.

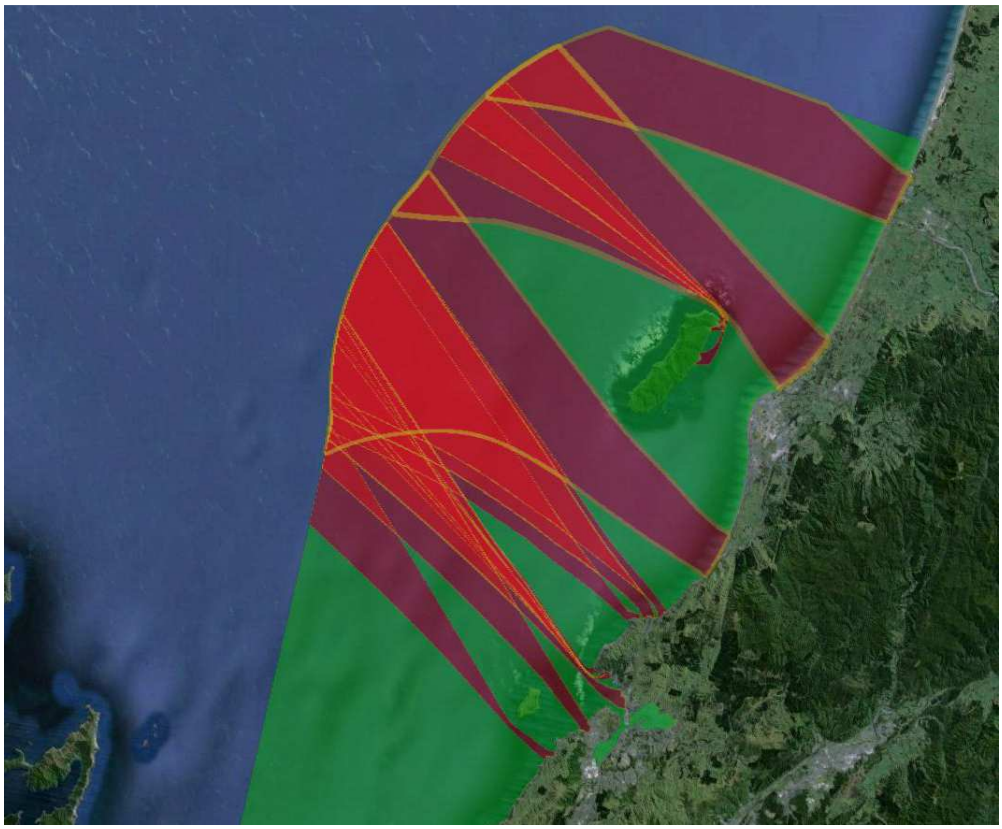


Figure 4.6. Swell corridors from Stevo's to Otaki Beach.

5 Risk Assessment

The 68 surf breaks identified as regionally significant were each considered for potential risks from development/coastal change which could potentially impact on the surf break's wave quality. As stated in Section 2, due to the rocky nature of much of the Wellington region's coast, other than obstruction of swell corridors, there are less surf breaks that are at risk from physical impacts than in many other New Zealand regions[7].

5.1 Water Quality and Access

The focus of this investigation is on the physical impacts to the Wellington regionally significant surf breaks. However, water quality and access to each of these breaks should also be considered as part of Policy 16 of the NZCPS in order to protect them by "*avoiding adverse effects of other activities on access to, and use and enjoyment of the surf breaks".*

5.2 Swell Corridors

All surf breaks in the Wellington region can potentially be impacted by development within their swell corridors, which are presented in Section 4 and provided as GIS layers.

The swell corridors for Wellington's regionally significant surf breaks have been determined and mapped out to the 12 nautical mile limit of the Territorial Sea (TS), since that is the boundary of the GWRC's jurisdiction. However, it is noted that developments beyond the TS limit and within the TS limit although outside the GWRC's boundaries also have potential to impact on surf breaks in the Wellington Region. Even so, based on current potential offshore developments (e.g. seabed mining and associated changes to the seabed, wind-farms, wave-farms and large scale aquaculture), recent studies have indicated that developments that are a long way offshore (e.g. beyond the 12 nautical mile TS limit) have no measureable impact on waves at the coast (Black, 2006; Mead, 2013).

[7] A future risk to rocky reef breaks is sea level rise (SLR), since unlike sandy breaks which can respond to changes in sea level, rocky reefs cannot. Actual impacts of SLR on surf breaks have not been studied in detail, and there is potential for new surf breaks to form as others are lost due to increased water depth. Impacts of SLR have not been considered here, since these impacts are not due to particular site-specific developments and are uncontrollable through the resource consent process.

Impacts in the swell corridors are associated with disruption and/or reduction in the waves propagating through the swell corridors to the surf breaks. There are 2 main ways that waves can be disrupted or reduced due to developments in the swell corridor. Firstly by direct interference with the wave-trains due to structures on the surface and/or through the water column (e.g. breakwaters or other offshore structures, wave-farms, wind-farms and large-scale aquaculture). And secondly by changes to the seabed morphology (e.g. seabed mining and associated tailing disposal). Structures on the surface and/or through the water column may disrupt and reduce waves due to forming a barrier, as well as refraction/diffraction around the structure. Modification of the seabed can impact on swells through the processes of refraction/diffraction, which in simple terms means that because waves travel slower the shallower the water depth, wave height gradients and wave directions are changed as waves propagate across a modified seabed (Mead *et al*., 2003, 2011).

The amount of disruption and attenuation to waves is dependent on the configuration of the development and the wave period, height and direction, as well as the spectral width, which is the 'cleanliness' of the swell[8]. In some cases long period, 'clean' swells are affected more than mixed seas, which is due to the processes of refraction and diffraction changing wave heights and directions (Black, 2006; Mead *et al*., 2003, 2011; Mead, 2013). For example, structures that are present throughout the whole water column (e.g. wind-turbine foundations) and changes to the seabed (e.g. large scale seabed mining) have relatively greater impacts on longer period waves during 'clean' swell conditions. Longer wave periods have greater potential for refraction and disruptions caused by offshore structures or seabed modification can take 10's of kilometres before refraction and diffraction reduce the disturbance (Mead *et al.*, 2003, 2011).

[8] A 'clean' swell is when there is a single dominant wave direction and period from a distant generation source – in most cases these are the best conditions for surfing and occur in conjunction with light or offshore winds (i.e. there are no onshore winds creating additional swell components). Mixed swells occur when there are several wave direction and period components occurring at the same time – this is often due to local onshore wind conditions, and/or local conditions mixing with distant conditions. Clean swell has a narrow spectral width, while mixed seas have wide spectral width.

With respect to structures on the surface of or in the water column that do not form a complete barrier to waves (e.g. large-scale aquaculture, wind turbines, wave-power generation devices), impacts to waves propagating through these developments is largely dependent on wave period. For example, shellfish aquaculture on long-times dissipate and dampen short period wave energy, but long period waves can travel through these developments with little impact on the wave (Stevens *et al*., 2008). A good example of concerns about the impacts of an offshore shellfish farm is Pegasus Bay off of Christchurch. Since the Christchurch beach breaks work best during the summer with short period swell from the northeast, the large offshore farm has the potential to impact on surfing wave quality at the coast. The venture has not yet gone ahead, and a baseline wave monitoring programme was developed to determine the impacts of the venture should it be implemented.

In both cases, the potential scale of the impact on the surf break(s) swell corridor in which development occurs depends on the size, morphology and distance offshore of the development – the larger, the more shore-parallel orientated and the closer to coast, the bigger the potential impact.

5.3 Castle Point to Uruti Point

Of the 6 regionally significant surf breaks in this area (**Error! Reference source not found.**), Slipperies and Uruti Point are reef breaks of significant scale and so have little risk from development, other than within their swell corridors. The other breaks in the area are beach breaks, and so changes in sediment supply could impact on them. However, it is noted that much of the river catchments in this area have already been developed and that cliff erosion is a significant sediment input. Of note is the effect of the offshore focus in the lee of lighthouse rock – this seabed feature produces the surfable waves on the main beach.

5.4 Stoney Bay to Schnappes

There are 14 regionally significant surf breaks in this area (**Error! Reference source not found.**), all of which area reef breaks (and so not affected by changes to sediment supply), with the exception of Tora Stream. A fan of sand and shingle are the basis of the Tora Stream surf break, which are pushed offshore during intermittent breaches of the stream

entrance during heavy rainfall (i.e. the stream entrance is usually closed with sand/shingle). Thus, changes to the Tora Stream catchment could impact on this surf break.

5.5 Windies-No. 4 to Lake Ferry

Of the 15 regionally significant surf breaks in this area (**Error! Reference source not found.**), 3 are sand/shingle bar breaks; the others are all reef breaks and so not affected by changes to sediment supply. Pararaki Stream, Otakaha Stream and the Lake Ferry entrance are all formed by the deltas of significant rivers/catchments, and so potential changes in the catchments/rivers could impact on the surf breaks. In the case of Lake Ferry, this break is the delta of very large and significantly modified catchment and river course.

5.6 Orongorongo River to Island Bay Lefts

The 16 regionally significant surf breaks in this area include rocky reefs, gravel beaches, sand beaches and combinations of reef, gravel and sand. The breaks along the Wainuiomata coast are reef breaks which also depend on gravel input from the 2 rivers that discharge along this relatively short stretch of coast. While the Wainuiomata catchment has been extensively developed, the Orongorongo catchment is still an undeveloped bush catchment.

Eastbourne Pipes, Breaker Bay, Propellers, Moa Point and Airport Rights are all reef breaks, with their swell corridors being the main considerations. However, Airport Rights is located at the end of the Wellington Airport runway, and future plans to extend the runway could impact on this break.

Lyall Bay is arguably the most important surfing area in the Wellington Region. It is a sandy pocket beach that receives sand in low quantities from the Cook Strait. The beach management through planting spinifex and pingao has greatly reduced the loss of wind-blown sand over the past 2 decades. The eastern side of the bay is the revetment protecting the airport runway and the location of ‘the Corner’, a left hand break that can provide long rides during the right conditions. Potential risks to the surf breaks in Lyall Bay include modification of the back-beach and carpark (which have historically impacted on surfing quality of the Corner) and further reclamation/construction associated with the airport, as well as water-quality issues associated with storm water and wastewater over-flows during heavy rainfall events.

Houghton Bay is also a well frequented city surf break. While the sand in the bay interacts with the fringing reefs to form the various breaks in this bay, it is a pocket bay with extensive fringing reefs extending into deep water and has very little terrestrial sediment input (there is a storm water outlet at the head of the bay, and the potential for contaminants entering the bay from the old landfill). Similarly, the surf breaks of the Island and Island Bay are reef breaks, and so the swell corridors are the main consideration.

5.7 Stevo's to Ōtaki Beach

There are 17 regionally significant surf breaks on the Wellington region's west coast. The breaks in the Stevo's area, Pukerua Bay and Kāpiti Reef are all reef breaks, with impacts in the swell corridor being the main concern. Titahi Bay is of similar significance to the Wellington region as Lyall Bay and Houghton Bay due to its popularity. Most of the breaks are associated with reef, it is a pocket beach and much of the Titahi Bay nearshore seabed is relic fossilized forest. In addition to developments in the swell corridor and storm water discharge have the most potential to impact on the breaks.

The breaks at Plimmerton are a mix of reef and beach breaks. They are not bar breaks formed by Porirua Harbour, and so the potential risks to the breaks are developments within the swell corridor, or local small scale coastal development.

The Kāpiti Island surf breaks are deep-water reef breaks, with developments in the swell corridors the main potential risk to them.

Paekākāriki, Waikanae Beach and Otaki Beach are all large open beach breaks. Paekākāriki and Waikanae Beach are susceptible to natural changes due to the response of this large salient feature in the lee of Kāpiti Island to subtle changes in the offshore wave climate. Impacts on sediment supply, including the Ōtaki River entrance, should be considered with future coastal developments, along with the swell corridors.

6 Summary

1. This report describes the identification and characterisation of significant surf breaks in the Greater Wellington Regional Council (GWRC) area, the determination of their 'swell corridors', and a first order assessment of the risks to these regionally significant surf breaks.
2. The first step was the identification and characterisation (in terms of type of break, length of ride, best conditions, swell, currents, water level, etc.), for each break in the GWRC area. The basis for the selection of regionally significant surf breaks was the New Zealand Surfing Guide, since this was used for the selection of nationally significant surf breaks in the NZCPS (2010). A total of 57 regionally significant surf beaks were identified.
3. Numerical modelling of waves around the Wellington coastline was then undertaken to determine swell corridors. Wave transformation was undertaken in a New Zealand-wide domain using schematized and long-term offshore wave climate, and then nested down with increasingly higher resolution grids to encompass each surf break using the model SWAN. A cloud-tracing algorithm was developed to create the swell corridors (i.e. the areas of sea through which waves propagate to the surf breaks), and a red-amber-green mapping system was used to indicate the swell corridor, buffer zone, or outside the corridor, respectively. These outputs were incorporation into GIS suitable for the GWRC's system (e.g. shape files) out to the 12 nautical mile territorial limit (TS), which is the offshore boundary of the Council's jurisdiction.
4. Finally, the potential risks to each of the regionally significant surf breaks was considered. These are mostly restricted to beach and river/estuary entrance breaks, since much of the Wellington region's coast has a rocky nature, and so other than obstruction of swell corridors, there are less surf breaks that are at risk from physical impacts than in many other New Zealand regions.
5. The information developed in this project can be applied to planning and first order assessments to consider potential impacts on Wellington's regionally significant surf breaks

7 References

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Appendix A

Figure A1. Levels 3 (red) and 4 (yellow) model nest grid extents for the Castlepoint (cast) area

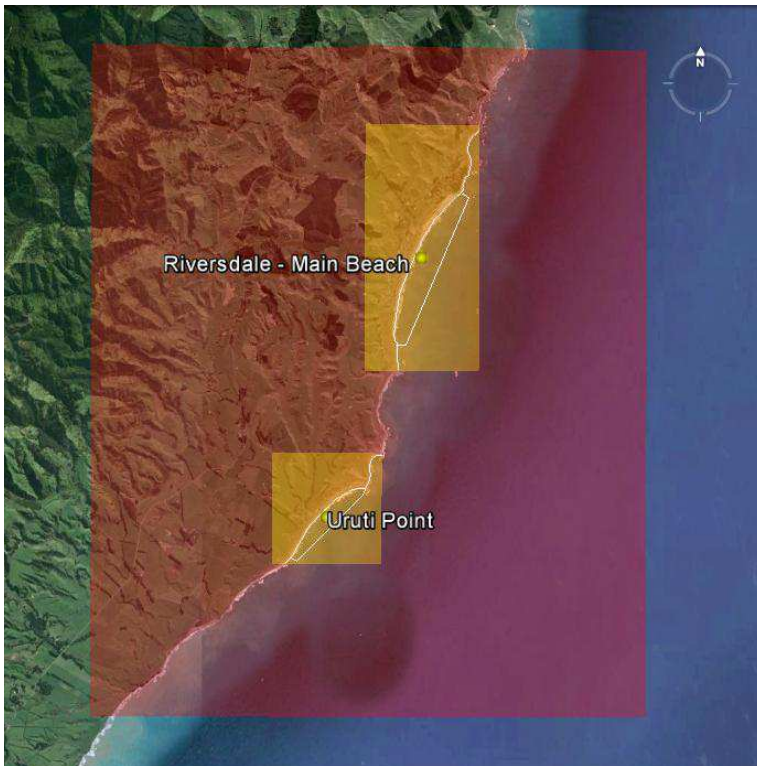

Figure A2. Levels 3 (red) and 4 (yellow) model nest grid extents for the Riversdale/Uruti Pt (rvur) area

Figure A3. Levels 3 (red) and 4 (yellow) model nest grid extents for the Cape Palliser (cpal) area

Figure A4. Levels 3 (red) and 4 (yellow) model nest grid extents for the Palliser Bay (palb) area

Figure A5. Levels 3 (red) and 4 (yellow) model nest grid extents for the Wellington City (city) area

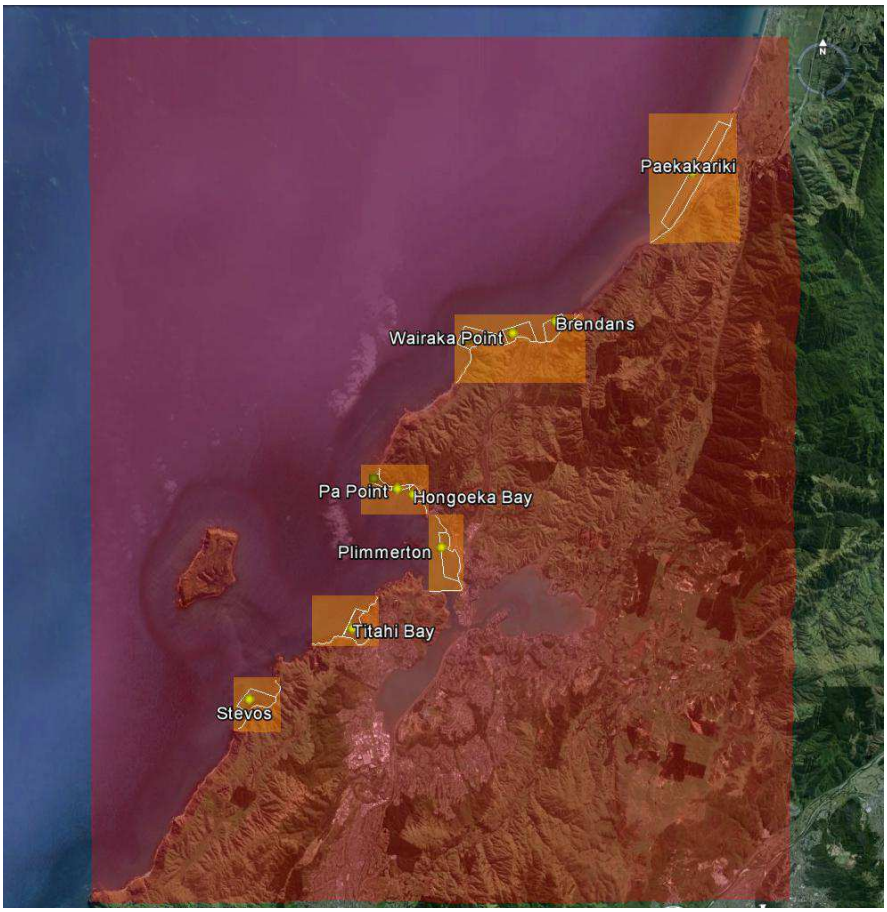

Figure A6. Levels 3 (red) and 4 (yellow) model nest grid extents for the West Coast - South (wsts) area

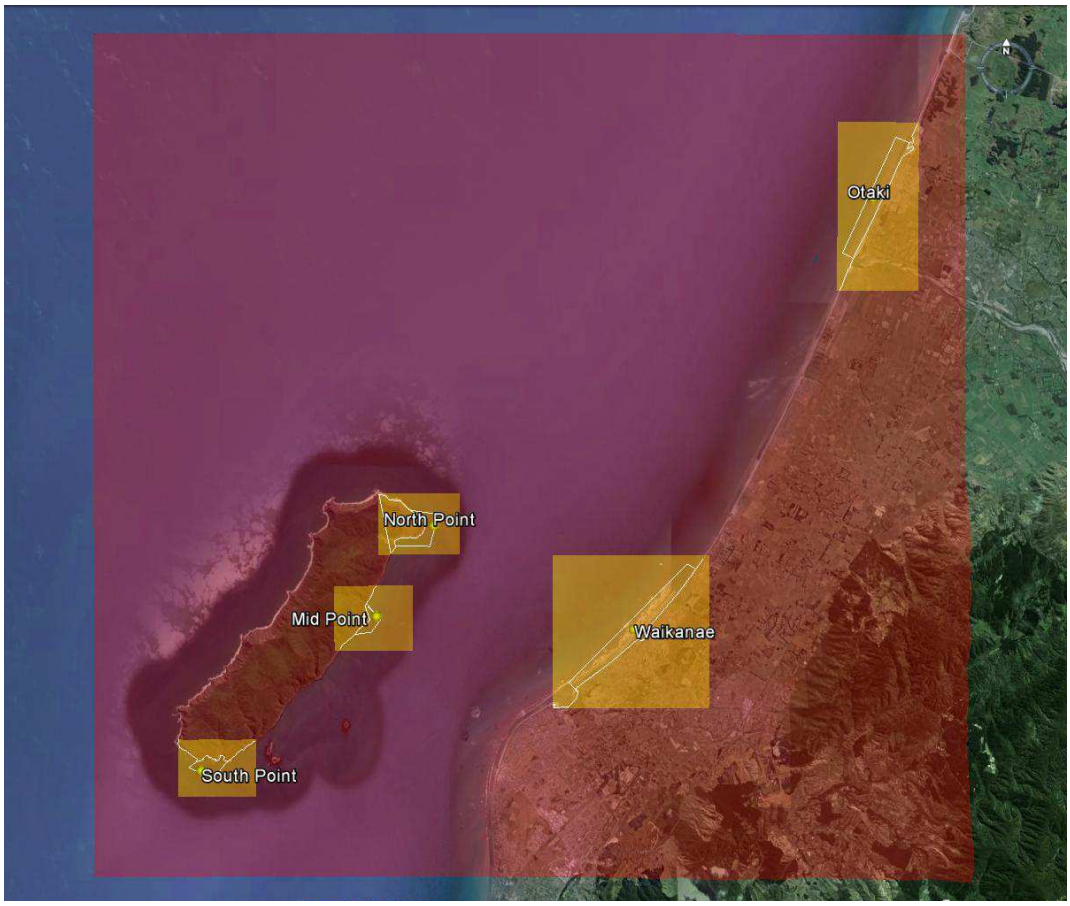

Figure A7. Levels 3 (red) and 4 (yellow) model nest grid extents for the West Coast – North (wstn) area.

Table A1. Model nest framework

Level 1	Level 2	Level 3	Level 4	SBA	Surf breaks
New Zealand	Greater Wellington Region	cpal	slip	Slipperies	Castlepoint - Slipperies
			capt	Main Beach	Castlepoint - Main Beach
				The Gap	Castlepoint – The Gap
				Christmas Bay	Castlepoint – Christmas Bay
			rvur	Riversdale	Riversdale Beach
				Uruti Point	Uruti Point
			stny	Stony Bay	Tora – Stony Bay
			tora	Tora Pit	Tora Pit
				Tora Stream	Tora Stream
				Tora tora	Tora tora
				Toilet Bowls	Toilet Bowls
				Shipwrecks	Shipwrecks
				God Squad	God Squad
			wrpt	Gnarlies	Gnarlies
				Dolphin Bay	Dolphin Bay
				White Rock Point	White Rock Point
			wrwe	The Spit	White Rock – The Spit
				Seconds	white Rock - Seconds
				The Desert	The Desert
				Schnappes	Schnappes
		palb	wind	Windies	Windies and No 4
			ning	Ning Nongs	Supertubes
					Big Ning Nong
					Craps
					Little Ning Nong - raspberries

				Dee Dees	Dee Dees
				Otakaha Stream	Otakaha Stream
				Humenga Lodge	Humenga Lodge
			humg	Pararaki Stream	Pararaki Stream
				Humenga Point	Humenga Point
			what	Whatarangi Station	Whatarangi Station
				Whata Point	Whata Point
				Whata bombie	Whata bombie
				Batches	Batches
			lake	Lake Ferry	Lake Ferry
		city	wain	Orongorongo River	Orongorongo River
				Dribbles	Dribbles
				Wainuiomata River	Wainuiomata River
			pipe	The Pipes	The Pipes - Eastbourne
			butt	Butterfish Rock	Breaker Bay - Butterfish Rock
				Propellers	Breaker Bay - Propellers
				Moa Point	Moa Point
			airp	Airport Rights	Airport Rights
				Lyall Bay	Lyall Bay - The Corner
					Lyall Bay Clubrooms
					Lyall Bay inner Bombora
					Lyall Bay Outer Bombora
			rati	Houghton Bay	Houghton Bay Lefts
					Houghton Bay Lefts
				Rat Island	Island Bay Rights

					Island Bay Lefts
		wsts	stev	Stevo's	Stevo's
			tita	Titiha Bay	Titahi Bay – Petes Rock
					Titahi Bay – Main Beach
					Titahi Bay - Slipperies
					Titahi Bay - Fishermans
			plim	Plimmerton	Plimmerton Beach
			hong	Hongoeka	Hongoeka Beach
				Pa Point	Pa Point
				Titches	Titches
			puke	Wairaka reef	Wairaka reef
				Wairaka Point	Wairaka Point
				Brendan's	Brendan's
			paek	Paekakriki Beach	Paekakriki Beach
		wstn			
			kap2	Mid Point	Kapiti Island - Mid Point
			kap3	North Point	Kapiti Island - North Point
			waik	Waikanae	Waikanae Beach
			otak	Otaki	Otaki Beach