



A baseline survey of the indigenous bird values of the Wellington region coastline

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Cover image: Male New Zealand dotterel (*Charadrius obscurus*) brooding a four-day old chick at the Waikanae Estuary in November 2018. Image courtesy of Roger Smith/New Zealand Birds Online (<http://nzbirdsonline.org.nz/>).

Executive Summary

Greater Wellington Regional Council and Maritime New Zealand both have statutory responsibilities for the sustainable management of the Wellington region coastline. To discharge these responsibilities as efficiently and effectively as possible, both agencies require a detailed and up-to-date understanding of the distribution of indigenous bird values along Wellington's coast. Existing knowledge of patterns in the distribution and abundance of coastal birds in the Wellington region is incomplete however, so a complete region-wide coastal bird survey was carried out in 2017-2018.

A total of 460 km of coastline was traversed either by foot or by boat, and the presence and number of all species of birds and marine mammals encountered was recorded for each separate ~1 km section of coastline surveyed to enable spatial patterns in the relative abundance of key species to be mapped to a ~ 1 km resolution.

A total of 69 bird species and one marine mammal species were detected during this survey. 51 bird species (74%) are native or endemic to New Zealand, and 25 bird species (36%) are ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System. Threatened bird species diversity tended to be highest at estuaries, and along stretches of coastline adjacent to coastal lakes or with comparatively wide stretches of un-vegetated sand or gravel. Five new breeding sites for the Regionally Critical northern New Zealand dotterel were located, extending the known breeding range of this taxon a further 45 km southwards, to a new global southern limit at the Pahaoa River mouth. This survey also detected the first successful breeding attempt by this species on the west coast of the Wellington region in over 120 years.

As a result of this survey, a total of 69 coastal sites have been identified which meet the threshold for being identified as "habitats of significance for indigenous birds" in Wellington's proposed Natural Resources Plan. Thirty-nine of these sites had not been previously identified, and we recommend that these be added to Wellington's proposed Natural Resources Plan to improve Greater Wellington Regional Council's efforts to sustainably manage the Wellington region's coastline, and to protect its natural values from being adversely impacted by human activities.

These survey data and the network of coastal "habitats of significance for indigenous birds" identified in this report together provide an effective prioritisation tool for Greater Wellington Regional Council and Maritime New Zealand to plan an efficient and effective response to a marine oiled wildlife incident in the Wellington region's coastal marine area.

We recommend that this regional coastal bird survey be repeated at five-yearly intervals to maintain an up-to-date picture of coastal wildlife values in the Wellington region, and to begin building an understanding of the regional population trends of key coastal species. We also provide several recommendations for additional changes to the scope and methodology of this survey, to fill remaining knowledge gaps.

Keywords: Coastal bird survey, Greater Wellington Regional Council, Maritime New Zealand, New Zealand Threat Classification System, oiled wildlife response, proposed Natural Resources Plan, Wellington region

1. Introduction

Greater Wellington Regional Council (GWRC) and Maritime New Zealand (MNZ) both have statutory responsibilities relating to the sustainable management of Wellington region's coastline.

Under Sections 283 and 284 of the Maritime Transport Act (1994), MNZ is required to create and update a New Zealand Marine Oil Spill Readiness and Response Strategy, outlining how MNZ and its partners will respond to a marine oil spill incident in New Zealand (MNZ, 2018). As part of this strategy, MNZ has entered into Memoranda of Understanding with local government agencies including GWRC, to build national- and regional-scale capability and infrastructure to respond to marine oil spill incidents. Under this MOU, GWRC has committed to contribute expertise, equipment and other resources to respond to both Tier 2 and Tier 3 oil spills – those spills that occur at a scale or for a duration that is beyond the capability of the individual operator to respond to (MNZ, 2018).

Regional Councils and unitary authorities in New Zealand also have a statutory responsibility under the Resource Management Act (1991) to sustainably manage coastal environments in New Zealand. Under the Resource Management Act, all regional councils are required to prepare a Regional Coastal Plan that gives effect to the New Zealand Coastal Policy Statement (NZCPS) (DOC, 2010). The purpose of these plans is to assist councils in achieving the sustainable management of their coastal environments, by outlining objectives, policies and rules that govern which activities councils will allow, control or prohibit in the coastal environment. As in a number of other regions, Wellington's Regional Coastal Plan isn't a stand-alone document. Rather, it has been incorporated into a proposed Natural Resources Plan for the Wellington region, a single document outlining how all of the Wellington region's natural resources will be managed under the Resource Management Act (GWRC, 2015).

Section 6(c) of the Resource Management Act provides a mechanism that contributes to the sustainable management of coastal sites with high natural values, by directing Wellington's proposed Natural Resources Plan to "identify ecosystems and habitats with significant biodiversity values". Policy 23 of the Wellington Regional Policy Statement contains a set of criteria to be used to identify these significant ecosystems and habitats, which in turn have been translated by McArthur et al., (2015a) to be applied to data describing the indigenous bird values of coastal sites in the Wellington region. Desktop reviews of existing data describing the indigenous bird values of the Wellington coastline carried out in 2013 and 2015 have identified a total of 42 coastal sites that meet these Policy 23 translation criteria, and have therefore been identified as "habitats of significance for indigenous birds" in Wellington's proposed Natural Resources Plan (McArthur & Lawson, 2013; McArthur et al., 2015a; GWRC, 2015).

To continue to discharge these statutory responsibilities as efficiently and effectively as possible, both GWRC and MNZ need to build and maintain a detailed and up-to-date understanding of the indigenous bird values of the Wellington region coastline, and the spatial distribution of those values. The Wellington region coastline supports a high diversity of indigenous bird species, including a significant number of species ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System (Townsend et al., 2008; Robertson et al., 2017). A number of these species are highly reliant on habitats within Wellington region's coastal marine area for foraging, roosting and breeding during all, or part of their annual life-cycles, and are particularly vulnerable to being adversely impacted by any activities that result in the disturbance, degradation or destruction of these habitats (Woodley, 2012; Gartrell et al., *in press*).

Existing knowledge of the distribution of indigenous bird values along the Wellington coastline is patchy, however. Coastal bird survey data collected in the Wellington region to date has tended to focus on describing the bird values of the estuaries of the Wellington region, and of both Wellington and Porirua Harbours (McArthur & Lawson, 2013; Todd et al., 2016), and many of these data are

already very dated (McArthur & Lawson, 2013). Prior to the survey described in this report, three key datasets provided the majority of the information available describing the current indigenous bird values of the Wellington region coastline, namely:

1. The New Zealand eBird database

The [New Zealand eBird](#) database is an online, open-access citizen science database jointly administered by Birds New Zealand and the Cornell Lab of Ornithology. It is the largest and fastest-growing repository of bird observation data collected by citizen scientists in New Zealand, and includes the [New Zealand Bird Atlas](#) Scheme – a five-year project to map the occupancy and abundance of all of New Zealand’s bird species across the entire country. The database currently contains over 210,000 bird observations collected in the Wellington region, including a large number of observations collected from the region’s estuaries, and from Wellington and Porirua Harbours.

2. Birds New Zealand’s Wellington Harbour Bird Survey

This dataset consists of four two-year sets of monthly bird surveys carried out along the coastline of Wellington Harbour between Owhiro Bay and Pencarrow Head. Monthly surveys have been carried out in 1975-1977, 1986-1988, 2008-2010 and 2018-present (Robertson, 1992; Birds New Zealand, unpublished data).

3. Birds New Zealand’s Pauatahanui Inlet Bird Survey

This dataset consists of four two-year sets of monthly bird surveys carried out around the coastline of Pauatahanui Inlet. Monthly surveys have been carried out in 1982-1984, 1992-1994, 2002-2004 and 2012-2014 (Birds New Zealand, unpublished data).

To fill the substantial gaps in our understanding of the spatial distribution of indigenous bird values along the Wellington region coastline, GWRC and MNZ have commissioned this baseline survey of the birds of the Wellington region coast. The aim of this survey was to create the first complete picture of the distribution and abundance of indigenous birds along the entire Wellington region coastline, to help these agencies meet the following statutory responsibilities relating to the sustainable management of the coastal environment:

1. To improve GWRC and MNZ’s readiness to respond to a marine oil spill in the Wellington region, by creating a more detailed understanding of the spatial distribution of indigenous bird values along the Wellington region coastline. This aligns with one of the four principles of MNZ’s Marine Oil Spill Readiness and Response Strategy, namely to “*use information, research and expertise as key enablers*”, and in turn aligns with Objective 2.4 of the Strategy, namely to “*undertake study and research and gather data to improve the environmental and technical knowledge needed to maintain and enhance New Zealand’s readiness and response system*” (MNZ, 2018).
2. To inform the identification of additional candidate coastal habitats of significance for indigenous birds, for inclusion in Schedule F2c of the Wellington’s proposed Natural Resources Plan (GWRC, 2015). This aligns with GWRC’s statutory responsibility to identify such sites

under Section 6(c) of the Resource Management Act, which in turn is given effect by Policy 23 of the Wellington Regional Policy Statement.

Further to these outcomes, GWRC and the Department of Conservation (DOC) have been working together in recent years to develop a system for assigning regional threat classification rankings to all of the Wellington region's bird species, using New Zealand Threat Classification System criteria that have been modified to be applicable at a regional, rather than national scale (Townsend et al., 2008; GWRC/DOC unpublished data). These regional threat classification rankings are now being increasingly used by GWRC to inform regional conservation management priorities in the Wellington region, as they provide a more accurate representation of the regional threat status of a number of species which may be faring better or worse than they are at a national scale. To assign appropriate regional threat rankings to Wellington's bird species, accurate estimates of both regional population sizes and trends are required. One further outcome from this Wellington region coastal bird survey therefore is the creation of baseline regional population size estimates for a number of bird species that are either entirely, or partly, restricted to coastal habitats in the Wellington region, against which future population changes can be measured.

This report provides a summary of the results of this first complete survey of the bird values of the Wellington region coastline and provides a number of recommendations for how the information gained can be used to inform regional oiled wildlife response preparedness, Wellington's proposed Natural Resources Plan and regional threat rankings. This report also includes recommendations for further survey and monitoring work required to continue improving our knowledge of the spatial distribution, population trends and threats facing the Wellington region's coastal bird fauna.

2. Methods

2.1 Survey area

Bird surveys were carried out along a total of 460 km of coastline in the Wellington region in 2017-2018. The mainland coastline was surveyed on foot, from Waikawa Beach on the northern Kāpiti coastline to the Owahanga River mouth on the northern Wairarapa coastline. In addition, the coastlines of Kāpiti, Motungarara, Tahoramaurea, Tokomapuna, Mana, Taputeranga, Mākaro/Ward, Matiu/Somes and Mokopuna Islands were surveyed by boat or by kayak. For logistical reasons, these surveys were split across two summer seasons, with the Wairarapa coast from the Owahanga River mouth to Onoke Spit being surveyed between the 4th and 9th of December 2017, and the west Wellington coastline and inshore islands being surveyed between the 10th of November and 22nd of December 2018 (Figure 2.1).

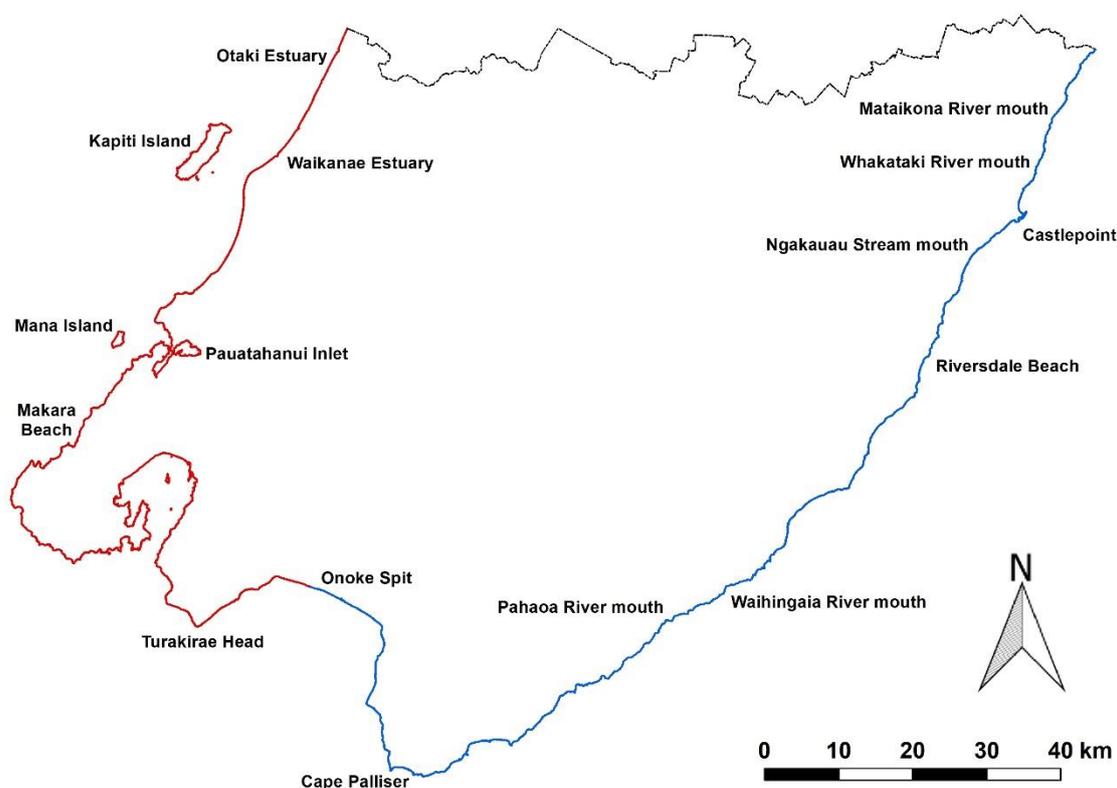


Figure 2.1: Extent of the Wellington region coastline surveyed in December 2017 (blue) and November-December 2018 (red). The northern boundary of the Wellington region is marked in grey.

2.2 Field methods

Surveys were carried out during the shorebird breeding season, at a time of year when the majority of a number of coastal-breeding shorebirds were occupying established breeding territories and were 'anchored' to active nests or broods of chicks. Carrying out these surveys at a time of year during which a number of these species were relatively sedentary therefore minimised the risk of double-counting birds that would be more likely to disperse over larger distances along the coastline in other seasons. All surveys were carried out during fine weather, and in relatively calm sea conditions.

When surveying the mainland coastline, one or two observers walked along the foreshore, usually near the high tide mark, recording the identity and numbers of all birds and marine mammals seen or heard, including any birds or marine mammals encountered on the foreshore as well as any birds detected either offshore or further inland. Any birds seen flying overhead were also counted, provided they were flying in a direction perpendicular or opposite to the direction of travel of the observers. Birds flying in the same direction that the observers were travelling in were not counted, to minimise the risk of double-counting birds. Special care was taken to systematically scan all areas of dry, un-vegetated gravels or sand on the foreshore, and any muddy backwaters, seepages, ponds, lagoons, rock pools, rock platforms, rocky islands and rock outcrops encountered along the coast to minimise the risk of missing key shorebird taxa such as dotterels, oystercatchers, gulls, terns and herons. Separate counts were recorded for each ~1 km section of coastline traversed, so that spatial patterns in the distribution and relative abundance of shorebirds could be mapped to a ~1 km resolution. These ~1 km sections were mapped out in advance of the survey, and were aligned with Maritime New Zealand's Marine Oil Spill Risk Assessment Coast Cells (<http://mosra18.navigatusconsulting.com/map>, accessed 10/07/2019; Maritime New Zealand, unpublished data). In addition to compiling separate species lists for each ~1 km section of shoreline traversed, individual checklists were compiled at a network of pre-defined estuaries and river mouths along the coast.

To survey the coastlines of the inshore islands, two or three observers circumnavigated each island in either a small motor boat or a kayak at a speed of no greater than five knots, recording the identity and numbers of all bird species seen and heard on the island or flying offshore. The survey vessels typically circumnavigated each island at a distance of less than 50 m from the shoreline, however this distance was occasionally extended to up to 200 m, in order to avoid navigational hazards such as submerged rocks. Separate counts were recorded either for each ~1 km section traversed (in the case of Kāpiti Island), or for arbitrarily-defined sections of shoreline between two easily identified landmarks (Mana, Matiu/Somes and Mokopuna Islands). For the remaining, smaller islands (namely Mākaro/Ward, Taputeranga, Motungarara, Tahoramaurea and Tokomapuna Islands), a single count was compiled for the entire island's coastline.

In addition to counting all birds that were detected, the locations of any active nests or nesting colonies, and any dependent chicks encountered along the coastline were also recorded using handheld GPS devices.

2.3 Data analysis

These survey data were entered into a Microsoft Excel™ spreadsheet, and into the [New Zealand eBird](#) database, an open-access bird observation database jointly maintained by [Birds New Zealand](#) and the [Cornell Lab of Ornithology](#). A copy of this dataset was also provided to GWRC's Environmental Science Department. Total counts were calculated using Microsoft Excel™, and species diversity and distribution maps were created using ArcMap version 10.6.12 and QGIS version 2.18.10.

3. Results

3.1 Spatial patterns in species diversity

A total of 69 bird species were detected during this survey of the Wellington region coastline. 51 species (74%) were either native or endemic to New Zealand and the remaining 18 species (26%) were introduced and naturalised species.

Twenty-five of the bird species detected (36%) are ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System, including one species ranked as Nationally Critical (black-billed gull, *Larus bulleri*); one species ranked as Nationally Endangered (reef heron, *Egretta sacra*); two species ranked as Nationally Vulnerable (banded dotterel, *Charadrius bicinctus* and Caspian tern, *Hydroprogne caspia*); six species ranked as At Risk, Recovering; two species ranked as At Risk, Relict; five species ranked as At Risk, Naturally Uncommon and eight species ranked as At Risk, Declining (see Appendix One).

Nineteen of the 25 Nationally Threatened or At Risk bird species detected during this survey are species that are entirely or partially reliant on coastal habitats during all, or part of their life cycles. Many of these species breed along the Wellington region coastline, and all of them use the coastline for foraging and roosting. The local diversity of these species varies considerably along the Wellington coastline, however. The diversity of these species tends to be highest at estuaries and river mouths, or on the coastal foreshore adjacent to coastal lakes such as Lake Onoke and the Parangarahu Lakes. Species diversity also tends to be higher on wide, sandy or gravel beaches such as Waikanae and Ōtaki beaches in the NW; Ocean Beach in Palliser Bay; and Riversdale, Castlepoint and Mataikona beaches in the NE. Other hotspots of high local species diversity also include several of the predator-free offshore islands in the region, including Mākaro/Ward Island, Mana Island and the northern and southern ends of Kāpiti Island. Conversely, stretches of foreshore with relatively narrow intertidal zones supported a lower diversity of these species, including sections of foreshore north and south of Makara Beach, the western end of Whangaimoana Beach and the foreshore to the south of Uruti Point. All of these sections of coast were characterised by the presence of coastal escarpments or cliffs falling steeply to the sea (Figure 3.1).

Eighty-six of the 460 ~1km sections of coastline surveyed were found to support a sufficient number of Nationally Threatened and At Risk bird species to meet the 'Diversity' criterion developed by McArthur et al., (2015a) for the purpose of identifying "coastal habitats of significance for indigenous birds" for inclusion in Schedule F2c of Wellington's proposed Natural Resources Plan (Figure 3.2). A number of these 86 sections of coastline are contained within existing "coastal habitats of significance" already listed in the proposed Natural Resources Plan as a result of previous desktop assessments carried out by McArthur & Lawson, (2013) and McArthur et al., (2015a), but the remainder are new sites that hadn't previously been identified as "habitats of significance" due to a lack of available survey data.

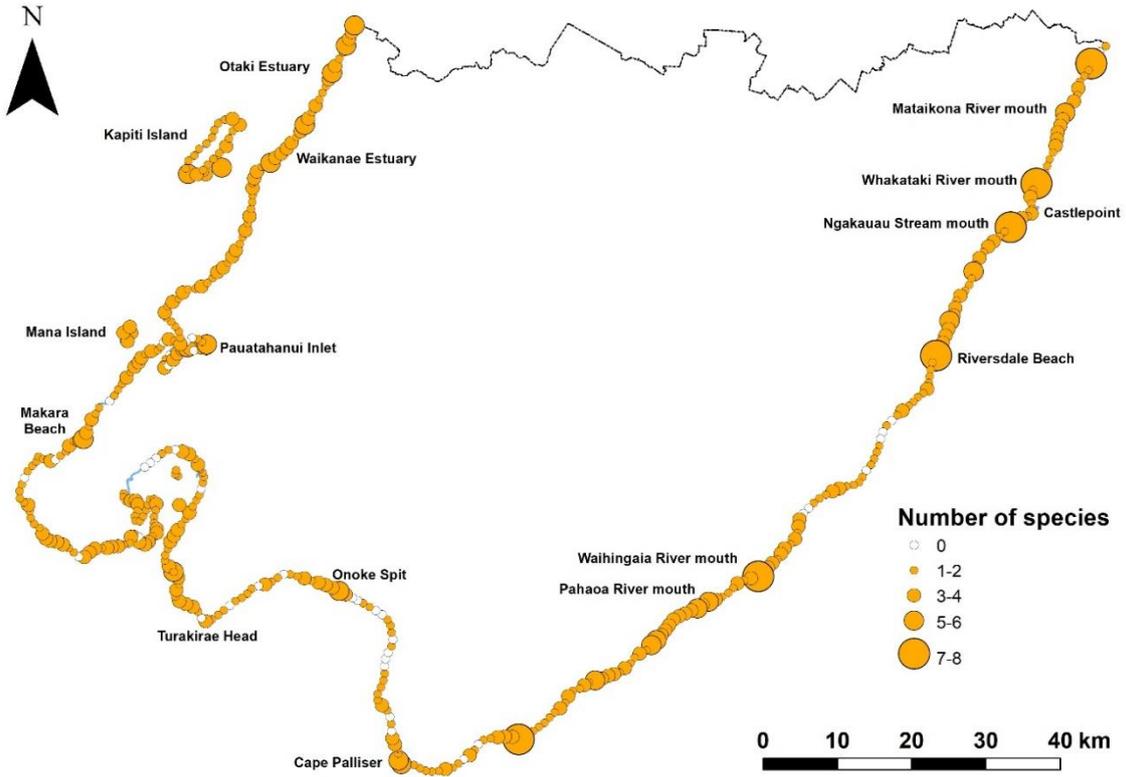


Figure 3.1: Number of Nationally Threatened or At Risk coastal bird species recorded per survey section.

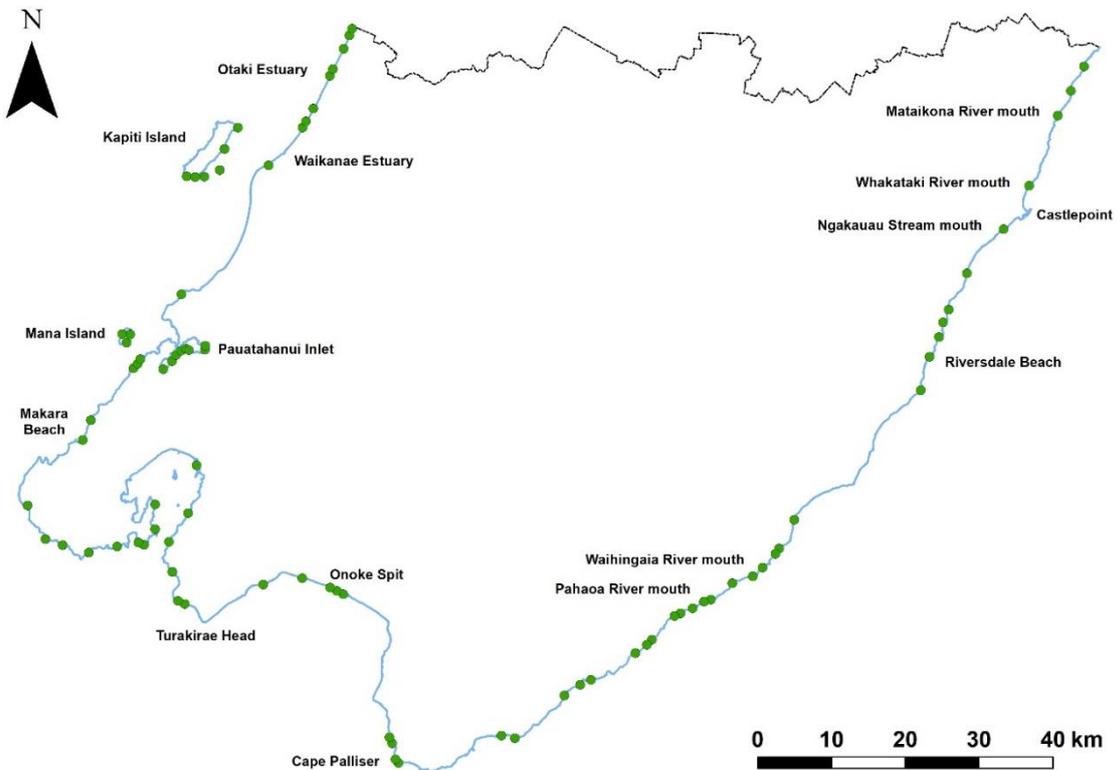


Figure 3.2: Coastal survey sections that meet the 'Diversity' threshold for being identified as a "habitat of significance for indigenous birds".

3.2 Spatial patterns in species abundance

In the following sections of the report, we have mapped spatial patterns in the abundance of ten of the 25 Nationally Threatened or At Risk species that were detected along the Wellington region coastline. These species have been chosen either because they are entirely restricted coastal habitats (e.g. New Zealand dotterel and reef heron), or because these coastal survey data can be combined with other regional-scale datasets to estimate the total regional population size for a particular species (e.g. banded dotterel). Both cases enable us to apply the 'Rarity' criterion developed by McArthur et al., (2015a) to identify "coastal habitats of significance for indigenous birds" for inclusion in Schedule F2c of Wellington's proposed Natural Resources Plan.

3.2.1 Banded dotterel (*Charadrius bicinctus*)



Image courtesy of Rebecca Bowater/NZ Birds Online

National conservation status: Nationally Vulnerable (Robertson et al., 2017)

Regional conservation status: Regionally Vulnerable (GWRC/DOC, unpublished data)

A total of 346 adult banded dotterels were counted during this survey, occupying 58 of the 460 ~1 km sections of coastline surveyed (Figure 3.3). A number of estuaries and river mouths supported local concentrations of banded dotterels, including the Waitohu and Ōtaki Estuaries on the west coast, and the Opouawe and Waihingaia River mouths on the east coast. Local concentrations of birds were also encountered along several stretches of

relatively wide shingle or sandy beach, including the Wellington south coast, Fitzroy Bay, Onoke Spit and Riversdale Beach.

Prior to this survey, the best recent estimate of the number of banded dotterels occupying the Wellington coastline is that provided by Rebergen (2012). During the spring and summer of 2011, Rebergen (2012) surveyed pre-selected sections of the Wairarapa coastline and estimated that 110 banded dotterels occupied the Wairarapa coast. Our estimate of 346 birds occupying the entire Wellington region coastline during the summers of 2017-2018 and 2018-2019 is more than triple this previous estimate.

In recent years, surveys of the number of banded dotterels occupying braided river habitats in the Wairarapa and on the Kāpiti Coast have established that a total of 344 banded dotterels occupy braided river habitats in the Wairarapa (the majority of these birds occurring on the mid-Ruamahanga, lower Waingawa and lower Opouawe Rivers) and a further 38-45 birds occupy the lower Ōtaki River (McArthur et al., 2015b; McArthur & Burgin, 2017). By combining the results of these three surveys, we therefore estimate that the Wellington region currently supports a breeding population of 728 adult banded dotterels.

Assuming a regional breeding population of 728 adult birds, no single ~1 km section of coastline supports sufficient numbers of banded dotterels to meet the 'Rarity' criterion developed by McArthur et al., (2015a) for the purpose of identifying "coastal habitats of significance for indigenous birds" for inclusion in Schedule F2c of Wellington's proposed Natural Resources Plan.

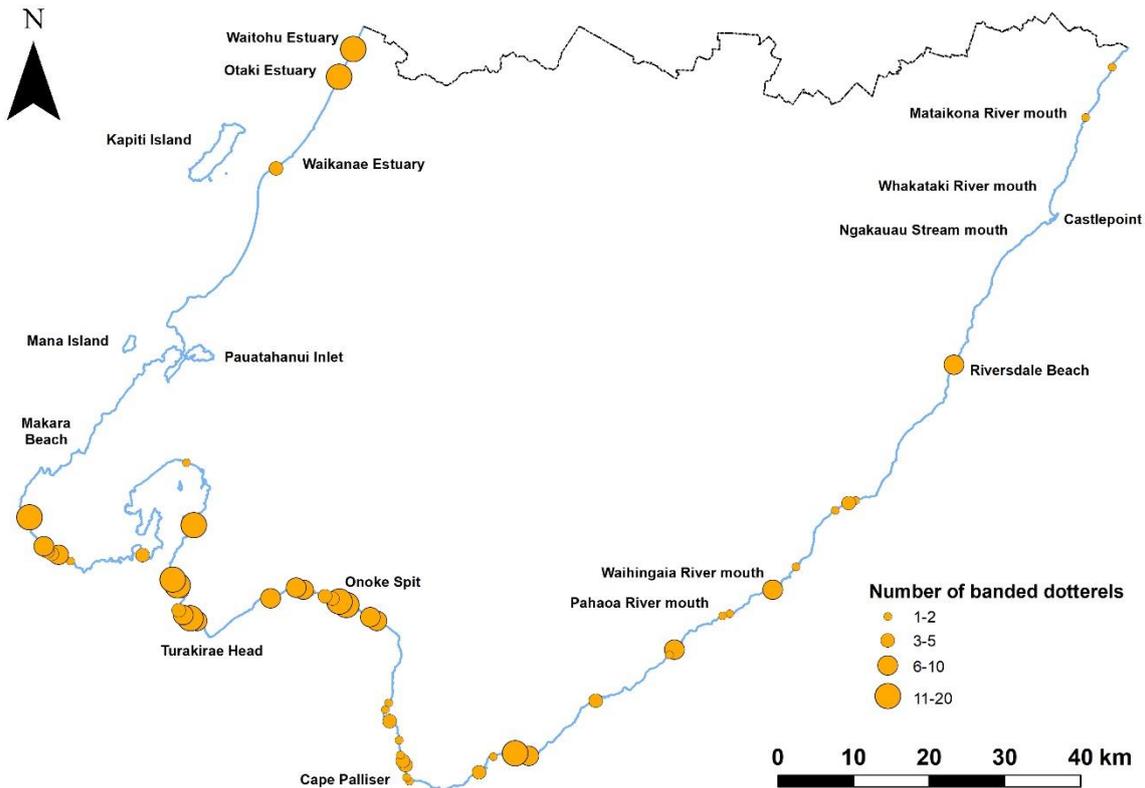


Figure 3.3: Distribution and relative abundance of banded dotterels along the Wellington region coastline.

3.2.2 Black shag (*Phalacrocorax carbo*)



Image courtesy of Ormond Torr/NZ Birds Online

National conservation status: At Risk, Naturally Uncommon (Robertson et al., 2017)

Regional conservation status: Regionally Critical (GWRC/DOC, unpublished data)

A total of 148 black shags were counted during this survey, occupying 78 of the 460 ~1 km sections of coastline surveyed (Figure 3.4). Black shags were very scarce and sparsely distributed along coastline to the west of Cape Palliser, but were considerably more common and widespread along the eastern Wairarapa coastline. Two local ‘hotspots’ of abundance at the Ngakauau and WaiHINGAIA River mouths may suggest the presence of previously-unknown breeding colonies near these two locations. The coastal distribution of black shags and pied shags (Figure 3.10) in the Wellington region appears to be

almost mutually exclusive, suggesting that some form of competitive exclusion may be occurring between these two species, with pied shags being the more dominant of the two. It’s possible therefore that as the distribution of pied shags continues to expand in the Wellington region, black shags may become increasingly scarce along the Wellington region coastline.

“hotspot” of Caspian tern abundance was Onoke Spit, which is the location of the sole breeding colony for this species in the Wellington region (these same birds attempted to breed unsuccessfully at the Wairongomai River delta on the western shoreline of Lake Wairarapa in December 2018, but quickly returned to Onoke Spit following the failure of this colony (Joanna McVeagh, *personal communication*)).

Caspian terns have been breeding on Onoke Spit since at least 1936. The colony experienced a slow increase in size from around 30 breeding pairs in the late 1930s to a maximum count of 60 breeding pairs in 1972. Around 1975 the number of breeding pairs in the colony dropped sharply to around 30 pairs, and continued to fluctuate between 26 and 38 breeding pairs between 1976 and 1996 (Challies & Scadden, 2010). In more recent years, the number of breeding pairs has dropped even further, with only 17 breeding pairs present during the 2018-2019 breeding season (eBird, 2019). Furthermore, the colony appears to have experienced poor productivity in recent years, likely due to the combined impacts of human disturbance, and depredation by cats (*Felis catus*) and black-backed gulls (*Larus dominicanus*) (Joanna McVeagh, *personal communication*).

Assuming a regional breeding population of 34 adult birds, seven sections of coastline support sufficient numbers of Caspian terns to meet the ‘Rarity’ criterion developed by McArthur et al., (2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan. Five of these sections (two on Onoke Spit, as well as the Mataikona and Opouawe River mouths and Riversdale Beach have already been identified as “coastal habitats of significance”, and are listed in the proposed Natural Resources Plan as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). Two further sections of coastline (the Whakataki River mouth and Uruti Point) hadn’t previously been identified as “habitats of significance” however, due to a lack of available survey data.

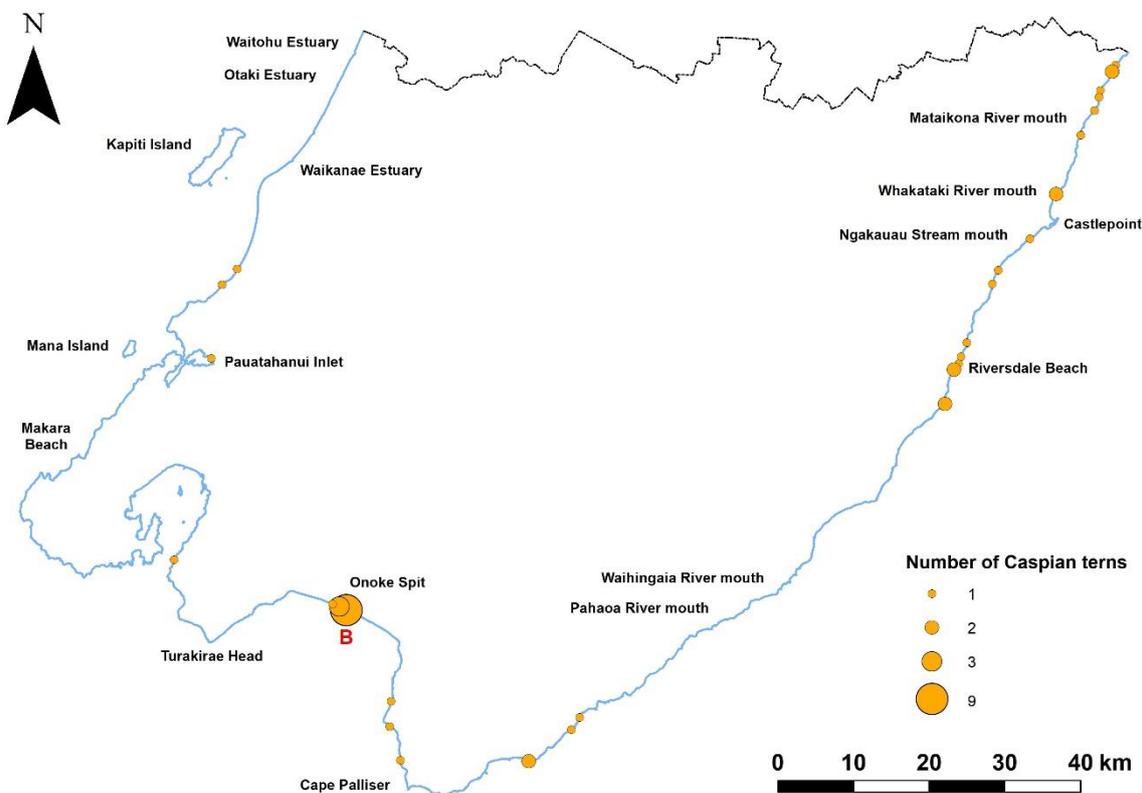


Figure 3.5: Distribution and relative abundance of Caspian terns along the Wellington region coastline. “B” denotes the location of the region’s only coastal breeding colony for this species.

3.2.4 Northern New Zealand dotterel (*Charadrius obscurus aquilonius*)



Image courtesy of Bruce Buckman/NZ Birds Online

National conservation status: At Risk, Recovering (Robertson et al., 2017)

Regional conservation status: Regionally Critical (GWRC/DOC, unpublished data)

A total of 17 adult New Zealand dotterels were counted during this survey, distributed across seven sites along the Wellington region coastline (Figure 3.6). Prior to this survey, New Zealand dotterels were known to regularly occur at only two sites in the region. Several birds have been present at Riversdale Beach in the Wairarapa since at least 2009, and have bred annually at this site since at least 2012 (Dowding, *in press*). On the west coast, a pair of dotterels attempted to breed (unsuccessfully) at the Waikanae Estuary during the summer of 2017-2018 (DOC, unpublished data).

As a result of this survey, New Zealand dotterels are now known to occur at five additional sites along the eastern Wairarapa coastline, distributed between the Mataikona and Pahaoa River mouths. Active nests or young chicks were located at four of these five new sites, confirming that this species is now breeding at the Mataikona, Whakataki, Ngakauau and Pahaoa

River mouths, in addition to the existing breeding site at Riversdale Beach. These results extend the known range of the northern New Zealand dotterel subspecies on the east coast of the North Island a further 45km southwards, to a new global southern limit at the Pahaoa River mouth.

On the 19th November 2018, one of the co-authors of this report, Samantha Ray, located an active New Zealand dotterel nest containing three eggs at the Waikanae Estuary (Figure 3.7), being closely guarded by an adult male bird (Figure 3.8). Warning signage and temporary fencing was installed around the nest soon afterwards by local volunteers, and two chicks subsequently hatched from this nest and successfully fledged (Tony Fluerty, *personal communication*). This represents only the second time that New Zealand dotterels are known to have attempted to breed at the Waikanae Estuary, and the only recorded instance of New Zealand dotterel chicks successfully fledging at this site. Until their re-colonisation of Riversdale beach from 2009, and apart from the occasional vagrant bird, New Zealand dotterels have been absent from the Wellington region since at least the late 19th Century (Woodley, 2012). This being the case, the two chicks that fledged at the Waikanae Estuary during the summer of 2018/2019 are likely to be the first to have fledged on the west coast of the Wellington region in at least 120 years.

All seven of the sites at which New Zealand dotterels were encountered support a sufficient number of these birds to meet the ‘Rarity’ criterion developed by McArthur et al., (2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan. The Waikanae Estuary, Mataikona River mouth, Riversdale Beach and Pahaoa River mouth have already been identified as “coastal habitats of significance” and are listed in the proposed Natural Resources Plan as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). The Whakataki, Ngakauau and Waihingia River mouths hadn’t previously been identified as “habitats of significance” however, due to a lack of available survey data.

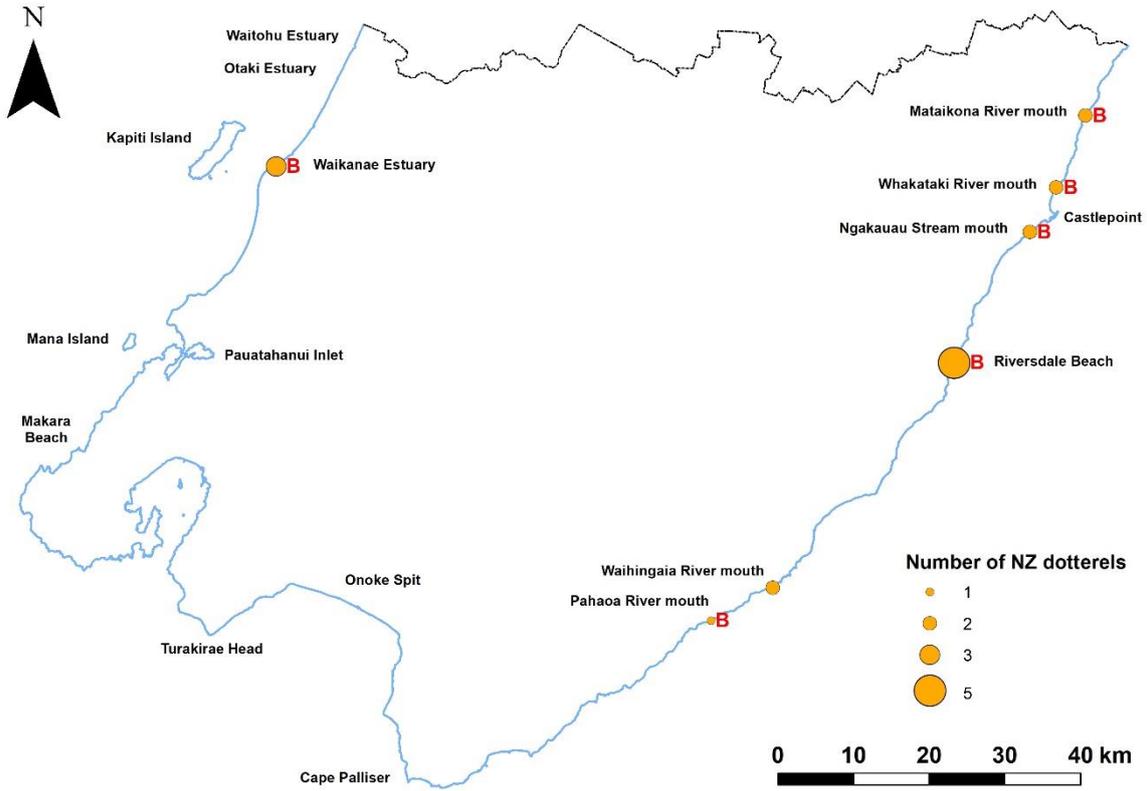


Figure 3.6: Distribution and relative abundance of New Zealand dotterels along the Wellington region coastline. “B” denotes locations at which breeding was confirmed.



Figure 3.7: New Zealand dotterel nest at the Waikanae Estuary, November 2018 (image courtesy of Samantha Ray).



Figure 3.8: Male New Zealand dotterel at the Waikanae Estuary, November 2018 (image courtesy of Samantha Ray).

3.2.5 New Zealand pipit (*Anthus novaeseelandiae*)



Image courtesy of Duncan Watson/NZ Birds Online

National conservation status: At Risk, Declining (Robertson et al., 2017)

Regional conservation status: Regionally Vulnerable (GWRC/DOC, unpublished data)

A total of 80 New Zealand pipits were counted during this survey, occupying 52 of the 460 ~1 km sections of coastline surveyed (Figure 3.9). Pipits were particularly abundant and widespread along the south-west Wellington coastline, between Titahi Bay and Sinclair Head, and in Fitzroy Bay. Otherwise, pipits tended to be fairly scarce and scattered along

the Wairarapa coastline east of Turakirae Head, and appeared to be absent from the coastline of Wellington Harbour and the Kāpiti Coast.

New Zealand pipits not only occur along the Wellington region coastline, but also occupy a range of inland habitats including gravel riverbeds, farmland and alpine areas. For this reason, no accurate estimate exists for the size of the Wellington region's New Zealand pipit population. Based on an extrapolation of count data from this coastal survey and recent river surveys, together with pipit distribution data from the *Atlas of Bird Distribution in New Zealand* (Robertson et al., 2007), our best estimate is that there are between 1,000 and 5,000 adult New Zealand pipits in the Wellington region (GWRC/DOC unpublished data). Assuming a regional breeding population of 5,000 adult birds, no

single section of coastline supports sufficient numbers of New Zealand pipits to meet the ‘Rarity’ criterion developed by McArthur et al., (2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan.

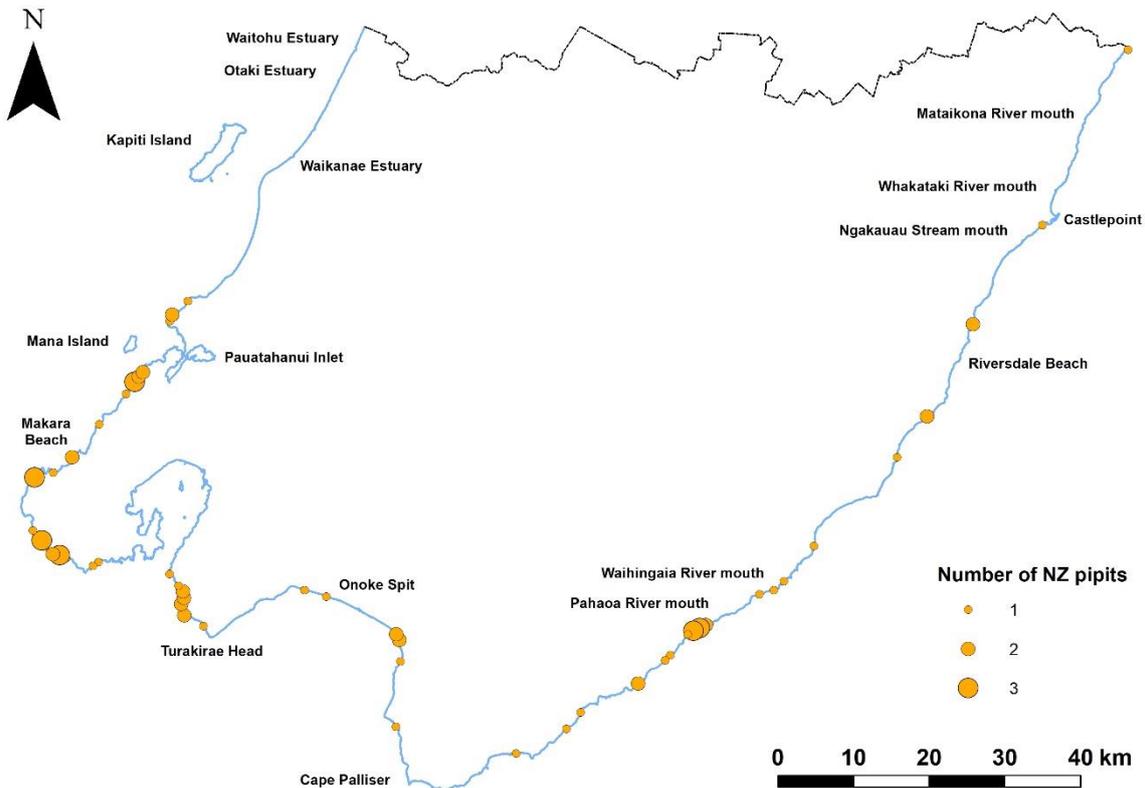


Figure 3.9: Distribution and relative abundance of New Zealand pipits along the Wellington region coastline.

3.2.6 Pied shag (*Phalacrocorax varius*)



Image courtesy of Peter Reese/NZ Birds Online

National conservation status: At Risk, Recovering (Robertson et al., 2017)

Regional conservation status: Regionally Vulnerable (GWRC/DOC, unpublished data)

A total of 474 pied shags were counted during this survey, occupying 125 of the 460 ~1 km sections of coastline surveyed (Figure 3.10). Pied shags were relatively common and widespread along the Kāpiti and south-west Wellington coastlines, but were almost absent from coastline to the east of Onoke Spit. A total of six coastal breeding colonies of pied shags were observed during this survey, at Waimanu Lagoon (Waikanae Estuary), Pukerua Bay,

Moorehouse Point (Pauatahanui Inlet), Mana Island, Makara Estuary and Lake Kohangapiripiri. A total of 66 occupied nests were counted across these six colonies.

Pied shags have a disjunct distribution in New Zealand, with a southern breeding population in the southern South Island/Stewart Island, a central breeding population in the northern South Island and Wellington, and a northern breeding population in Northland, Auckland, Bay of Plenty and East Cape (Robertson et al., 2007; Bell, 2013). The 'central' breeding population has expanded considerably since the 1950s, with birds colonising the Wellington region in 1996 with the establishment of the breeding colony at the Makara Estuary (Powlesland et al., 2008; Bell, 2013). Since 2008, at least another nine breeding colonies have become established in the Wellington region. In addition to the six coastal colonies found during this survey (including the Makara Estuary colony), additional inland colonies are also present on Zealandia's lower reservoir, at Pharyzyn Reserve (Waikanae) and at Lake Nganoke (Palliser Bay), and one further coastal colony has become established at the Ōtaki Estuary (eBird, 2019). The coastal distribution of pied shags and black shags (Figure 3.4) in the Wellington region appears to be almost mutually exclusive at the present time, suggesting that some form of competitive exclusion may be occurring between these two species, with pied shags being the more dominant of the two species. It's possible therefore that as the distribution of pied shags continues to expand in the Wellington region, black shags may become increasingly scarce along the Wellington region coastline.

To estimate the size of the Wellington region's pied shag population, we can combine our count of 66 occupied nests at the six colonies located during this survey with recent maximum counts of the number of occupied nests at the four other colonies not visited during this survey, by sourcing these additional count data from the New Zealand eBird database (eBird, 2019). In recent years, counts of the maximum number of occupied nests present at the Zealandia, Pharyzyn Reserve, Lake Nganoke and Ōtaki Estuary colonies during summer have totalled 56 occupied nests (eBird, 2019). Combining these two estimates together, the Wellington region supports a minimum breeding population of 244 adult pied shags. It should be noted, however, that pied shags breed year-round with between 32% and 53% of adult birds nesting in any given month of the year (Millener, 1972; Powlesland et al., 2008; Bell, 2013). During November and December, the proportion of adult birds present at established breeding colonies is typically around 50%, suggesting that our estimate of 244 breeding adults in the Wellington region is almost certainly an underestimate, and that the true number of breeding adults in the region could be as high as 488 birds (Bell, 2013). The 474 pied shags counted during the course of this survey, including birds encountered both at breeding colonies and away from breeding colonies, further suggests that the true breeding population size is significantly higher than our minimum population estimate of 244 birds.

Assuming a regional breeding population of 244 pied shags however, seven sections of coastline support a sufficient number of pied shags to meet the 'Rarity' criterion developed by McArthur et al., (2015a) for the purpose of identifying "coastal habitats of significance for indigenous birds" for inclusion in Schedule F2c of Wellington's proposed Natural Resources Plan. Five of these sections of coastline have already been identified as "coastal habitats of significance" and are listed in the proposed Natural Resources Plan, as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). Two further sections of coastline, namely the Parangarahu Lakes foreshore and the Tokomapuna Island foreshore, hadn't previously been identified as a "habitat of significance" however, due to a lack of available survey data.

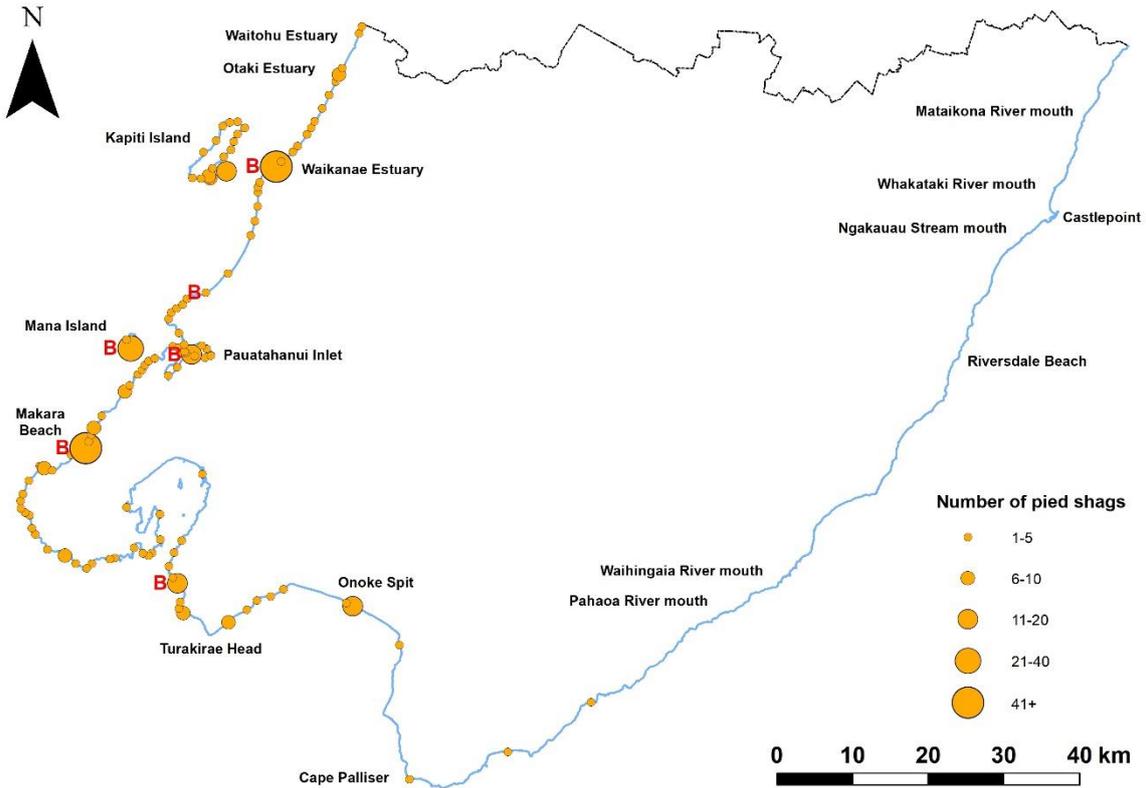


Figure 3.10: Distribution and relative abundance of pied shags along the Wellington region coastline. “B” denotes the location of coastal breeding colonies for this species in the Wellington region.

3.2.7 Red-billed gull (*Larus novaehollandiae*)



Image courtesy of Alan Tennyson/NZ Birds Online

National conservation status: At Risk, Declining (Robertson et al., 2017)

Regional conservation status: Regionally Vulnerable (GWRC/DOC, unpublished data)

A total of 5,255 red-billed gulls were counted during this survey, occupying 273 of the 460 ~1 km sections of coastline surveyed (Figure 3.11). Red-billed gulls were not uniformly distributed along the Wellington coastline, instead appearing to be clustered along stretches of coastline adjacent, or in proximity to breeding colonies. A total of eight breeding colonies were located during the survey, on Kāpiti and Mana Islands, at Point Dorset (Miramar Peninsula), at Cape Palliser, Te Awaiti, the Pahaoa River mouth and at Castlepoint. Between these eight colonies, a total of 1,239 occupied nests were counted, providing a regional breeding population estimate of 2,478 birds.

Assuming a regional breeding population of 2,478 red-billed gulls, seven sections of coastline support a

sufficient number of red-billed gulls to meet the ‘Rarity’ criterion developed by McArthur et al., (2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan. Six of these sections of coastline have already been identified as “coastal habitats of significance” and are listed in the proposed Natural Resources Plan, as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). One further section of coastline, at Cape Palliser, hadn’t previously been identified as a “habitat of significance” however, due to a lack of available survey data.

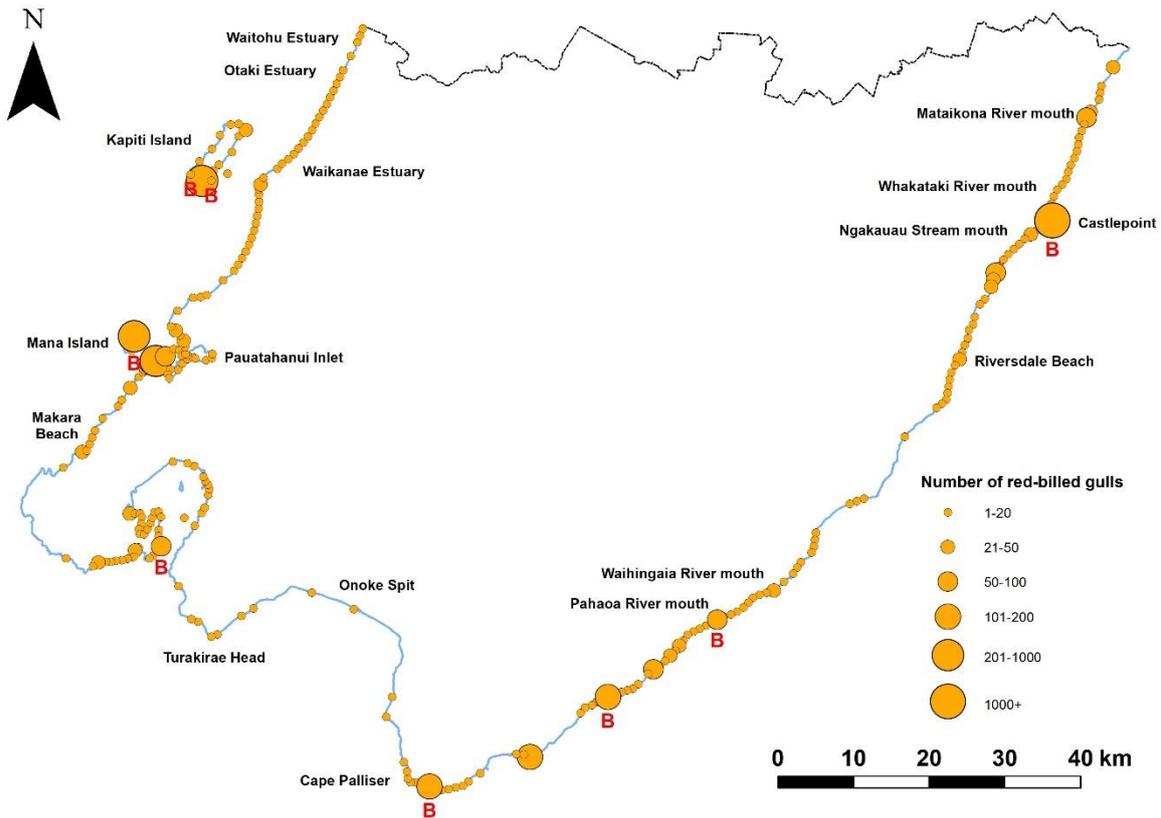


Figure 3.11: Distribution and relative abundance of red-billed gulls along the Wellington region coastline. “B” denotes the location of breeding colonies for this species in the Wellington region.

3.2.8 Reef heron (*Egretta sacra*)



Image courtesy of Duncan Watson/NZ Birds Online

National conservation status: Nationally Endangered (Robertson et al., 2017)

Regional conservation status: Regionally Critical (GWRC/DOC, unpublished data)

A total of 15 adult reef herons were counted during this survey, and were very sparsely but widely distributed around the Wellington region coastline (Figure 3.12). This result confirms that the reef heron is now one of the Wellington region’s rarest breeding bird species. Reef herons were apparently formerly more common

in the Wellington region, but appear to have undergone a substantial decline from around the 1950s onwards. For example, Edgar (1978) reports that eight reef heron nests were located at Castlepoint in 1959, but a re-survey of the same location in 1975 found none. Similarly, four breeding pairs were reported to be present on Kāpiti Island in 1941 (Edgar, 1978), whereas only a single bird was observed on the island during this survey. Numbers of reef herons in Wellington Harbour have apparently been relatively low since the mid-1970s, during which time an estimated six breeding pairs were present (Edgar, 1978). Recent Wellington Harbour bird surveys carried out by Birds New Zealand, together with the results of this survey, suggest that the current breeding population of reef herons in the harbour is now less than half of this 1975 estimate.

During this survey we confirmed that reef herons had bred successfully on Taputeranga Island during the summer of 2018/2019 (Figure 3.13), as they have in previous years at this site (Bell, 2017). In addition, a probable breeding attempt was detected on Mana Island during this survey, when an adult bird was flushed from beneath dense taupata (*Coprosma repens*) on the western coastline of the island as our survey boat traversed that section of the shoreline. In addition to these two records, breeding attempts have also occurred on both Matiu/Somes and Mākaro/Ward Islands in Wellington Harbour in recent years (Birds New Zealand, unpublished data).

All fourteen of the sites at which reef herons were encountered supported a sufficient number of these birds to meet the 'Rarity' criterion developed by McArthur et al., (2015a) for the purpose of identifying "coastal habitats of significance for indigenous birds" for inclusion in Schedule F2c of Wellington's proposed Natural Resources Plan. Six of these sites (the foreshores of Kāpiti, Mana, Matiu/Somes and Taputeranga Islands and sections of coastline near Pukerua Bay and Sinclair Head) have already been identified as "coastal habitats of significance" and are listed in the proposed Natural Resources Plan as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). The remaining eight sites, including two sections of coastline between Titahi Bay and Makara Beach and six sites distributed along the eastern Wairarapa coastline between the Pahaoa and Owahanga River mouths hadn't previously been identified as "habitats of significance" however, due to a lack of available survey data.

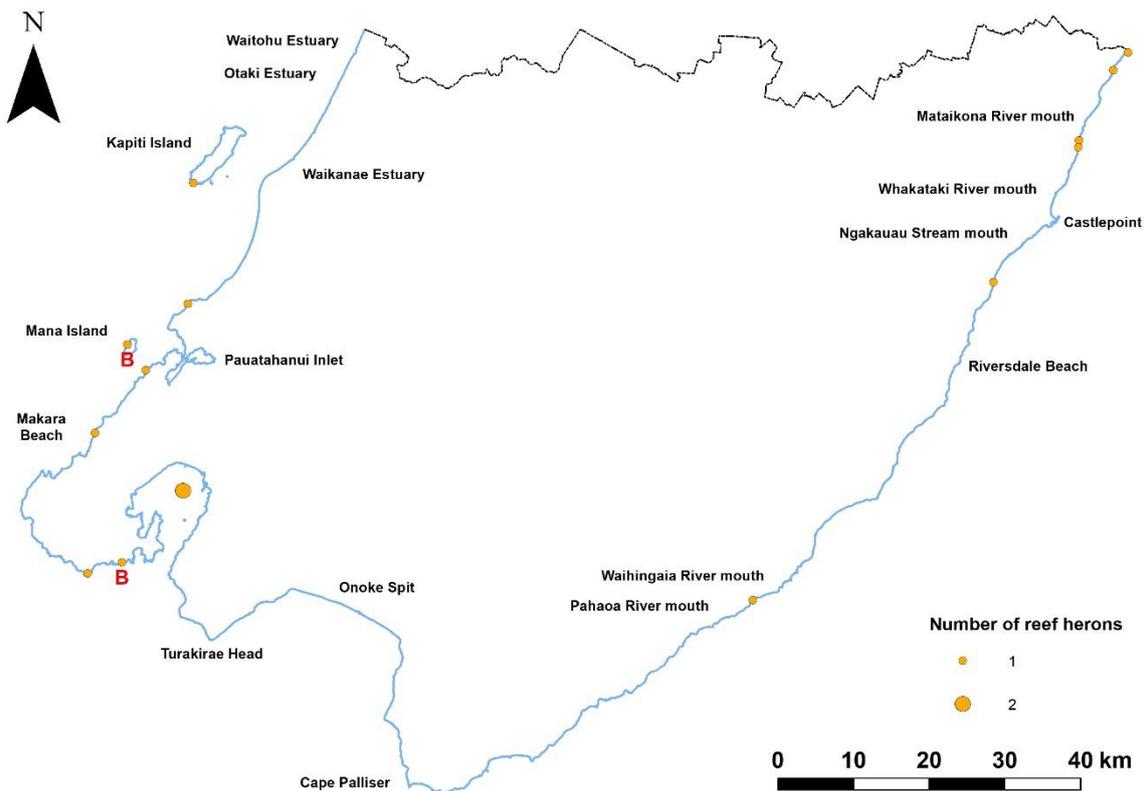


Figure 3.12: Distribution and relative abundance of reef herons along the Wellington region coastline. “B” denotes locations at which breeding was suspected or confirmed.



Figure 3.13: Juvenile reef heron (left hand bird) with two adults observed on Taputeranga Island, Island Bay on the 15th December, 2018. The juvenile can be distinguished by its pale grey bill and legs, in comparison to the pale yellow bill and legs of the adults (image courtesy of Jonathan Walter).

3.2.9 Variable oystercatcher (*Haematopus unicolor*)



Image courtesy of Tony Crocker/NZ Birds Online

National conservation status: At Risk, Recovering (Robertson et al., 2017)

Regional conservation status: Regionally Vulnerable (GWRC/DOC, unpublished data)

A total of 712 adult variable oystercatchers were counted during this survey, occupying 236 of the 460 ~1 km sections of coastline surveyed (Figure 3.14). Particularly high densities of birds were encountered on lengthy sections of sandy beach, including Ōtaki, Paraparaumu, Waikanae, Petone and Riversdale Beaches. High local concentrations of birds were also encountered on Mana, Matiu/Somes and Mākaro/Ward Islands. Variable oystercatchers are noticeably more abundant on the Kāpiti Coast and in

Wellington Harbour than along the eastern Wairarapa coastline. This is possibly due to the proximity of Kāpiti, Mana, Matiu/Somes and Mākaro/Ward Islands, which are likely to be supporting highly productive ‘source populations’ of variable oystercatchers that are experiencing high productivity rates in the absence of mammalian predators and with low rates of human disturbance (Hugh Robertson, *personal communication*).

Variable oystercatchers are almost entirely restricted to coastal habitats in the Wellington region, with the exception of a small number of pairs that breed along the eastern shoreline of Lake Wairarapa (Robertson & Heather, 1999; GWRC, unpublished data). The 712 variable oystercatchers counted during this survey, together with the 16 and 18 birds counted along the eastern shoreline of Lake Wairarapa during November 2017 and 2018 (GWRC, unpublished data) can therefore be combined to provide an estimate that the Wellington region currently supports a breeding population of at least 728 variable oystercatchers. This is the first such population estimate generated for this species in the Wellington region. Rebergen (2012) has previously estimated that the Wairarapa coastline supported between 70 and 100 variable oystercatchers, based on an extrapolation of survey results from pre-selected sections of coastline carried out during the summer of 2011. During this survey however, we counted 261 variable oystercatchers on the Wairarapa coast, over 2.5 times the number estimated by Rebergen (2012).

Assuming a regional breeding population of 728 adult birds, no single section of coastline surveyed supports a sufficient number of variable oystercatchers to meet the ‘Rarity’ criterion developed by McArthur et al., (2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan.

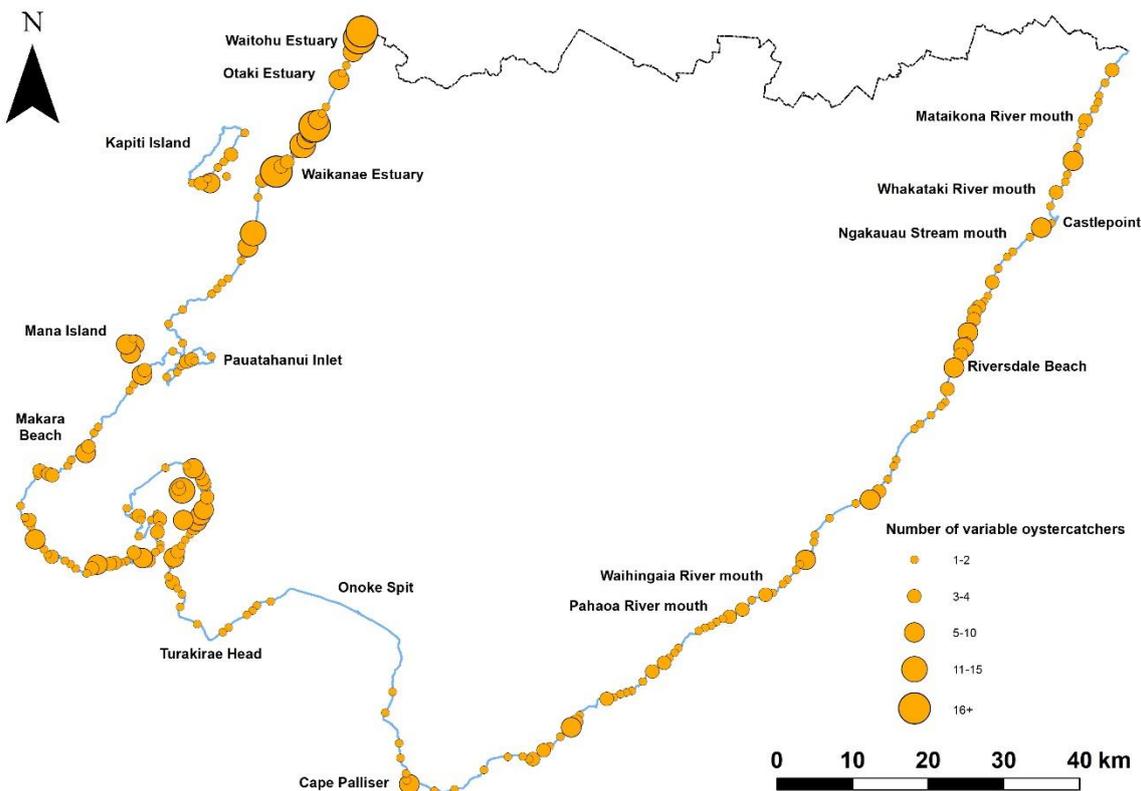


Figure 3.14: Distribution and relative abundance of variable oystercatchers along the Wellington region coastline.

3.2.10 White-fronted tern (*Sterna striata*)



Image courtesy of Rebecca Bowater/NZ Birds Online

National conservation status: At Risk, Declining (Robertson et al., 2017)

Regional conservation status: Regionally Endangered (GWRC/DOC, unpublished data)

A total of 1,088 white-fronted terns were counted during this survey, occupying 98 of the 460 ~1 km sections of coastline surveyed (Figure 3.15). A total of six breeding colonies were located during the survey, on Kāpiti, Mana and Mākaro/Ward Islands, as well as at Point Dorset (Miramar Peninsula), Te Awaiti and Honeycomb Rock (eastern Wairarapa). Between these six colonies, a total of 149 apparently occupied nests were counted, providing a regional breeding population estimate of 298 birds. White-fronted terns appear to be substantially more abundant and

widespread west of Onoke Spit, which is unsurprising given that four of the six breeding colonies encountered, and 87% of the apparently occupied nests, were situated on the west Wellington coastline and its inshore islands.

Assuming a regional breeding population of 298 white-fronted terns, 15 sections of coastline support a sufficient number of white-fronted terns to meet the ‘Rarity’ criterion developed by McArthur et al.,

(2015a) for the purpose of identifying “coastal habitats of significance for indigenous birds” for inclusion in Schedule F2c of Wellington’s proposed Natural Resources Plan (Figure 3.16). Thirteen of these sections of coastline have already been identified as “coastal habitats of significance” and are listed in the proposed Natural Resources Plan, as a result of previous desktop assessments carried out by McArthur & Lawson (2013) and McArthur et al., (2015a). Two further sections of coastline, between Plimmerton and Pukerua Bay, and at Honeycomb Rock in the Wairarapa, hadn’t previously been identified as a “habitat of significance” however, due to a lack of available survey data.

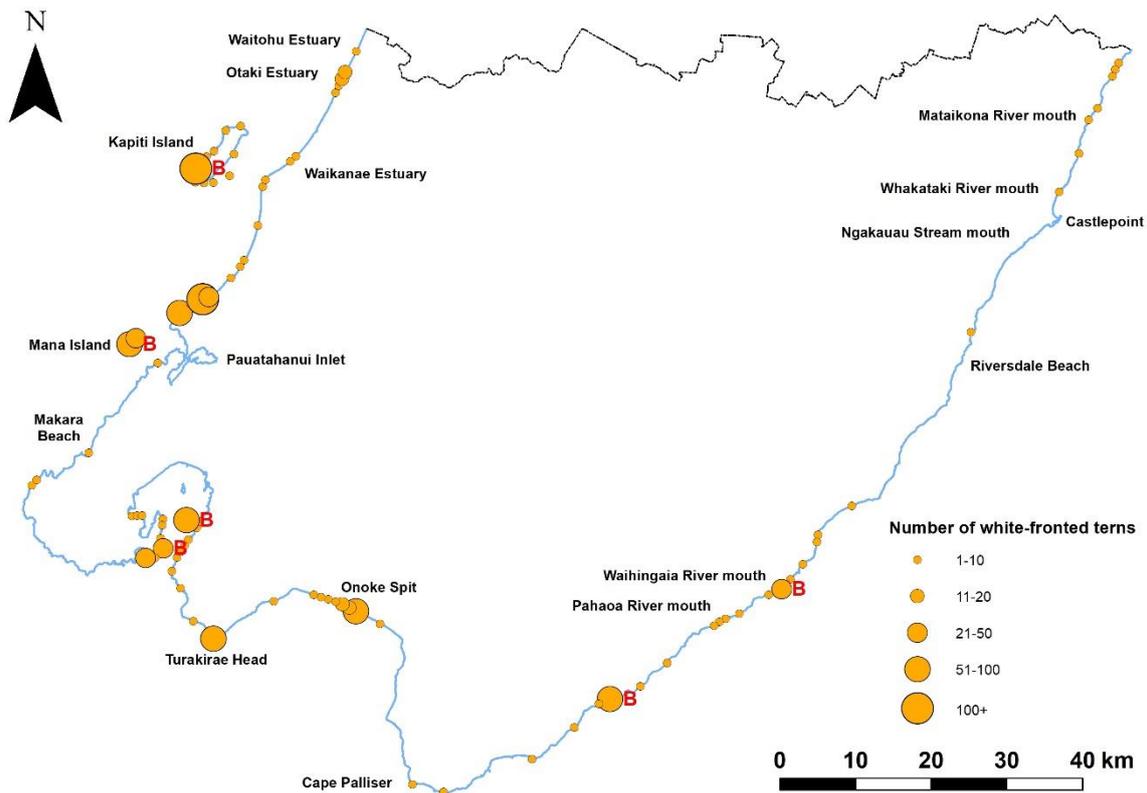


Figure 3.15: Distribution and relative abundance of white-fronted terns along the Wellington region coastline. “B” denotes the location of breeding colonies for this species in the Wellington region.

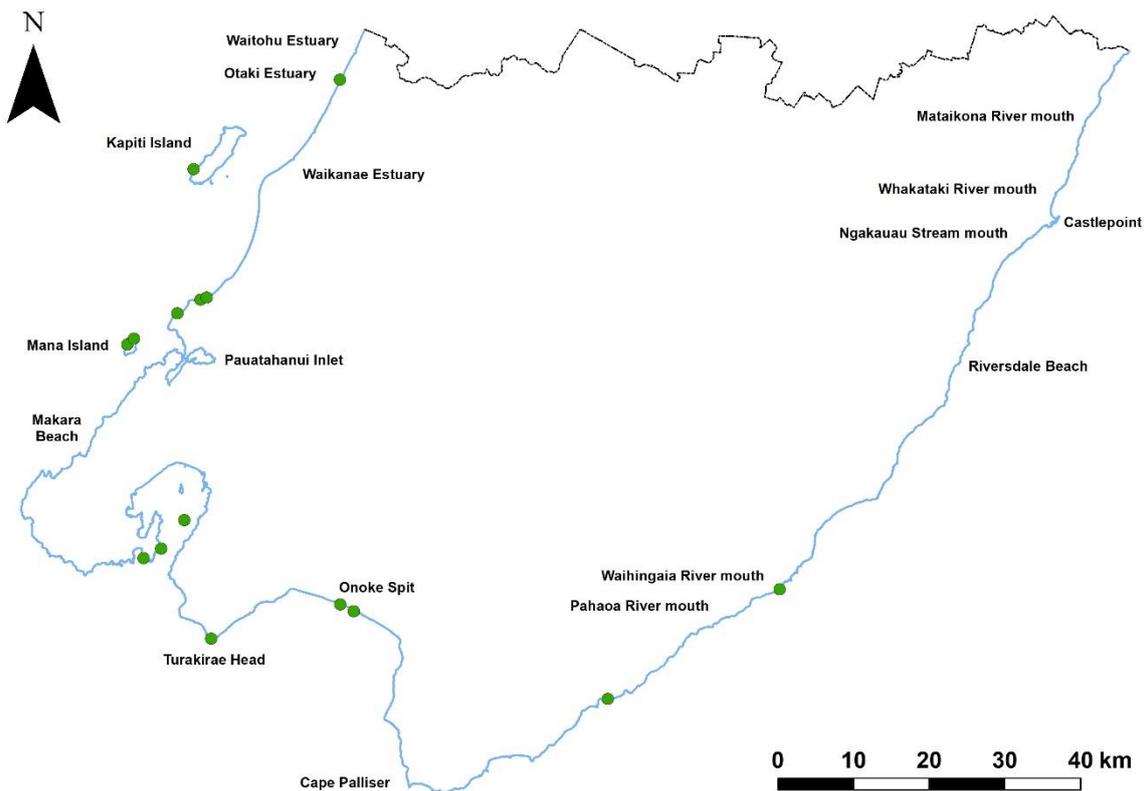


Figure 3.16: Coastal survey sections for which the local abundance of white-fronted terns meets the 'Rarity' threshold for being identified as a "habitat of significance for indigenous birds".

4. Discussion

4.1 Coastal sites of significance for indigenous birds

By applying the Policy 23 translation criteria developed by McArthur et al., (2015a) to the bird abundance and distribution data collected during this survey, we have identified 69 sites along the Wellington region coastline that meet the test for being identified as “habitats of significance for indigenous birds” in Wellington’s proposed Natural Resources Plan (Figure 4.1; Appendix Two).

Thirty of these 69 sites have previously been identified as “habitats of significance” by McArthur & Lawson (2013) and McArthur et al., (2015a), and are already listed in Schedule F2c of Wellington’s proposed Natural Resources Plan. The remaining 39 sites had not been previously identified as “habitats of significance” due to a lack of available data prior to this survey being carried out.

Appendix Two of this report contains a list of all 69 sites identified as a result of this survey, including details of the locations, bird values and “critical periods” for each site, as well as a summary of the Policy 23 translation criteria scores for each site, and the source of any datasets used to assess each site. We recommend that Schedule F2c of Wellington’s proposed Natural Resources Plan be updated with the information contained in Appendix Two of this report. Specifically, we recommend that the 39 sites that have not previously been identified as “habitats of significance” be added to Schedule F2c, and that the bird values descriptions and critical periods for the additional 30 sites already listed in Schedule F2c be updated with the new information provided in Appendix Two of this report.

The inclusion of all 69 of these “habitats of significance” in Schedule F2c of Wellington’s proposed Natural Resources plan will represent a major step forward in Greater Wellington Regional Council’s efforts to sustainably manage the Wellington region coastline, and to protect its natural values from being adversely impacted by human activities. This network of sites includes all, or the majority of the breeding habitat of several Regionally Critical species, including Caspian tern, reef heron and northern New Zealand dotterel, and protects the majority of the nesting colonies of colonially-breeding coastal bird species such as white-fronted tern (Regionally Endangered) and red-billed gull (Regionally Vulnerable). This network also includes all coastal sites that support a relatively high diversity of Nationally Threatened or At Risk coastal bird species, such as the Waikanae Estuary, Onoke Spit and Riversdale Beach.

The Wellington region’s coastal habitats are relatively dynamic, and are under ever-increasing pressure from intensifying land use and other human activities. Furthermore, the distribution and abundance of several bird species that are largely restricted to the coastline, including pied shag and northern New Zealand dotterel, have changed relatively quickly in recent years, and will likely continue to do so. All of these phenomena will act to change the Policy 23 translation scores for those coastal sites that are listed in Schedule F2c of Wellington’s proposed Natural Resources Plan and/or Appendix Two of this report. For this reason, we recommend that this regional coastal bird survey be repeated at five-yearly intervals, to provide GWRC with the ability to regularly update Schedule F2c of the proposed Natural Resources Plan in responses to future changes to the natural values of the Wellington region coastline. We recommend that the next regional coastal bird survey be scheduled to commence during the summer of 2022/2023.

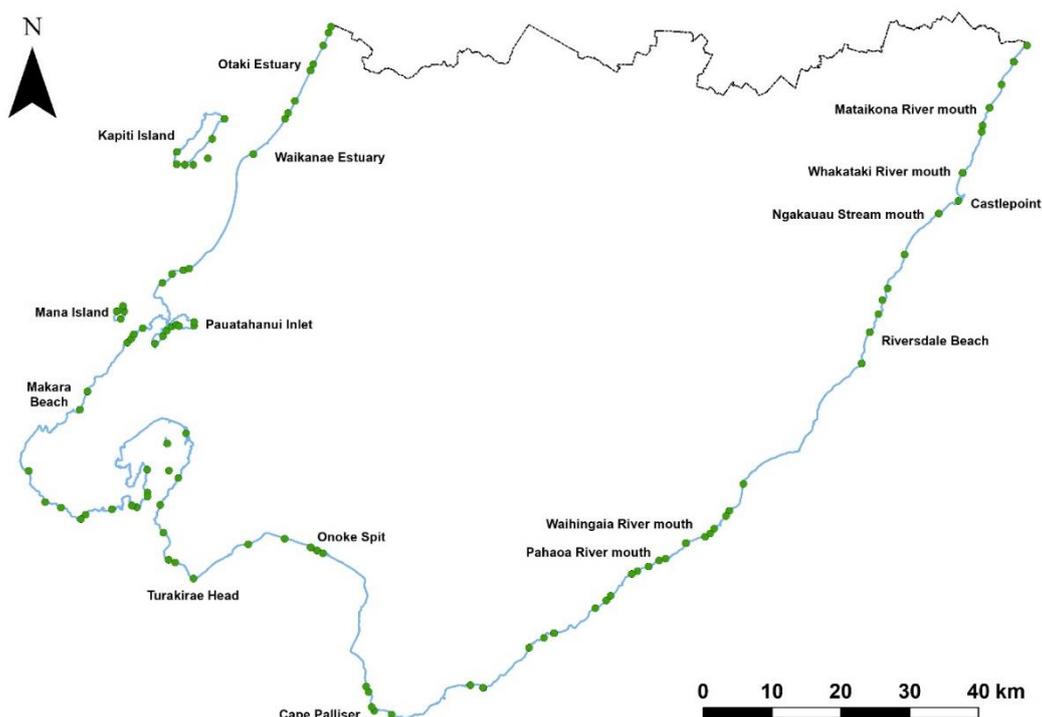


Figure 4.1: Coastal habitats of significance for indigenous birds in the Wellington region, identified by applying the Policy 23 criteria outlined in McArthur et al., (2015a) to the data collected during this survey. Note, sites marked on this map that fall within existing habitats of significance already listed in Wellington’s proposed Natural Resources Plan have been merged with these pre-existing sites in Appendix Two of this report.

4.2 Regional threat rankings

The data collected during this survey makes it possible to review and update regional population size and trend estimates for a number of bird species that are restricted in distribution to the Wellington region coastline and/or inland braided river habitats. Applying New Zealand Threat Classification System criteria to these revised population estimates further allows us to update the regional threat rankings for a number of these species (Townsend et al., 2008). In Table 4.1 below, we present regional population estimates for nine coastal and/or riverbed-nesting bird species in the Wellington region, along with updated regional threat rankings for these species. Based on these updated population estimates, we recommend that Caspian tern, northern New Zealand dotterel and reef heron continue to be ranked as Regionally Critical in the Wellington region, that white-fronted tern continues to be ranked as Regionally Endangered, and that red-billed gull and variable oystercatcher continues to be ranked as Regionally Vulnerable. We further recommend that pied shag be downgraded from Regionally Critical to Regionally Vulnerable, and that banded dotterel be downgraded from Regionally Endangered to Regionally Vulnerable. We also recommend that black-fronted dotterel be upgraded from Regional Coloniser to Regionally Vulnerable (Table 4.1).

The data collected during this coastal survey has enabled us to create relatively accurate and precise regional population size estimates for a number of the coastal bird species present in the Wellington region for the very first time. However, estimates of regional population trends for many of these species are still reliant on extrapolating population trends from smaller, more geographically-confined datasets such as Birds New Zealand’s Wellington Harbour Bird Survey. To improve our ability to monitor the regional population trends of a number of these species, we recommend that this

Wellington region coastal bird survey be repeated at five-yearly intervals, with the next survey scheduled to commence during the summer of 2022/2023.

Table 4.1: Regional population size and trend estimates, proposed regional threat rankings, threat criteria and data sources for nine coastal and/or riverbed-nesting bird species in the Wellington region.

Species	Regional population size ¹	Regional population trend ²	Proposed regional threat ranking	Threat criterion	Data source(s)
Banded dotterel	728 (quantified)	>10% increase (quantified)	Regionally Vulnerable	A(1/1)	This survey, McArthur et al., (2015b); McArthur & Burgin (2017); GWRC/DOC unpublished data
Black-fronted dotterel	588 (quantified)	>10% increase (quantified)	Regionally Vulnerable	A(1/1)	This survey, Dennison & Robertson (1999); McArthur et al., (2015b); McArthur & Burgin (2017)
Caspian tern	34 (quantified)	50-70% decline (quantified)	Regionally Critical	A(1)	This survey; Challies & Scadden (2010)
Northern New Zealand dotterel	17 (quantified)	>10% increase (quantified)	Regionally Critical	A(1)	This survey; Rebergen (2012)
Pied shag	474 (quantified)	>10% increase (quantified)	Regionally Vulnerable	A(1/1)	This survey; Bell (2013)
Red-billed gull	2,478 ³ (quantified)	10-50% decline (estimated)	Regionally Vulnerable	C(1/1)	This survey; Frost & Taylor (2018)
Reef heron	15 (quantified)	10-50% decline (estimated)	Regionally Critical	A(1)	This survey; Birds New Zealand, unpublished data
Variable oystercatcher	728 (quantified)	>10% increase (quantified)	Regionally Vulnerable	A(1/1)	This survey; Birds New Zealand, unpublished data
White-fronted tern	298 ³ (quantified)	10-50% decline (estimated)	Regionally Endangered	A(1/1)	This survey

¹ Number of mature individuals counted or estimated to be present in the Wellington region (Townsend et al., 2008).

² Predicted or ongoing population trend over ten years or three generations, whichever is longer (Townsend et al., 2008).

³ Number of mature individuals observed to be breeding during this survey

4.3 Oiled wildlife incident responsiveness

The data collected during this regional coastal bird survey provide the most detailed and complete picture of the indigenous bird values of the Wellington region coastline ever assembled. In addition to collecting these bird data, our field surveyors also mapped spatial patterns in the abundance of the New Zealand fur seal (*Arctocephalus forsteri*), the only marine mammal species that we detected on land along the Wellington region coastline. These data have been provided to both Greater Wellington Regional Council and to Maritime New Zealand, to improve these agencies' readiness and responsiveness to both Tier 2 and Tier 3 oil spills in the future.

This survey has demonstrated that the diversity of Nationally Threatened or At Risk bird species tends to be highest at estuaries and river mouths, along sections of coastline adjacent to coastal lakes, and on stretches of relatively wide sandy or gravel beaches. The coastlines of the Wellington region's predator-free islands, including Kāpiti, Mana, Matiu/Somes and Mākaro/Ward islands also support a relatively high diversity of species. This survey has also identified a small network of coastal sites that support relatively large proportions of the breeding populations of a number of Nationally Threatened or At Risk species. These include Onoke Spit (which supports the Wellington region's only breeding colony of Caspian terns), and the six sites in the region at which northern New Zealand dotterels are known to breed (Figure 3.6).

All of these relatively high-value sites have been identified as "coastal habitats of significance for indigenous birds" using the Policy 23 translation criteria outlined in McArthur et al., (2015a). Some of these sites have already been listed in Schedule F2c of Wellington's proposed Natural Resources Plan, while the remaining sites have been listed in Appendix 2 of this report, with the recommendation that they be added to Schedule F2c during the next plan change. This being the case, we recommend that these "habitats of significance" also be considered as high priority sites at which efforts to control, contain or manage the impacts of an oil spill should be deployed. By using these "habitats of significance" as a means of prioritising an oiled wildlife response, resources will quickly be targeted towards avoiding, minimising or mitigating the adverse impacts of an oil spill on populations of the Wellington region's most highly threatened coastal bird species, and at sites that support relatively high coastal bird values.

By measuring spatial patterns in the abundance of coastal bird species along the Wellington coastline, this survey also serves as a comprehensive baseline survey against which future changes in local or regional indigenous bird values can be measured. As a result, as well as creating the opportunity to optimise the deployment of resources during an oiled wildlife incident response, this dataset creates the opportunity to measure the adverse impacts of future oil spills that occur in the Wellington region's coastal marine area, and the success or otherwise of any efforts to control, contain or manage the impacts of these incidents. For this reason, we recommend that this Wellington region coastal bird survey be repeated at five-yearly intervals, to improve GWRC and MNZ's ability to differentiate other temporal changes in the Wellington region's coastal bird populations from the impacts of oil spill incidents and subsequent oiled wildlife response efforts.

This regional coastal bird survey fills some substantial gaps in our prior knowledge of spatial patterns in the distribution and abundance of coastal bird species in the Wellington region, particularly those Nationally Threatened or At Risk species that are for the most part restricted to coastal habitats. As a result, the completion of this survey represents a major step forward in our understanding of coastal bird distribution abundance in the Wellington region, creating the opportunity for relevant statutory agencies to make better evidence-based decisions regarding the sustainable management of the Wellington region's coastline. That said, at least three minor gaps in our understanding of the wildlife values of the Wellington coastline remain.

Firstly, because this regional coastal bird survey was conducted during daylight hours, the survey was not designed to capture data describing the distribution and abundance of little penguins (*Eudyptula minor*), due to their nocturnal habits on land (Marchant & Higgins, 1990). Little penguins are ranked as At Risk, Declining on a national scale however, and Regionally Vulnerable in the Wellington region (Robertson et al., 2017; GWRC/DOC unpublished data). Furthermore, little penguins are both highly vulnerable to being adversely impacted by oil spills in the coastal marine area, and respond extremely well to rehabilitation after becoming oiled (Gartrell et al., *in press*). For these reasons, containing, controlling and managing the impacts of an oil spill on local little penguin populations should be considered a high priority by GWRC and MNZ during an oil spill incident, and a detailed knowledge of current spatial patterns in the abundance of breeding little penguins along the Wellington region coastline would greatly assist in these agencies' readiness to avoid, minimise or mitigate any adverse impacts on this species. For this reason, we recommend that GWRC and MNZ carry out a dedicated little penguin survey along the entire Wellington region coastline. We recommend that one or more certified little penguin detector dog be used, and that the survey should be carried out between the months of August and December, during peak laying (Marchant & Higgins, 1990), so that the survey targets a time of year during which the burrow occupancy rate is likely to be relatively high. Should it not be feasible to carry out a detector dog survey along all of the Wellington region coastline, sections of coastline with relatively high little penguin occupancy probabilities could be mapped using pre-existing data sources and these sections of coastline could be targeted as a matter of priority.

Secondly, this regional coastal bird survey has done a relatively poor job at quantifying the true abundance of breeding spotted shags (*Stictocarbo punctatus*) in the Wellington region, due to this species' prolonged and "extremely irregular" breeding season (Turbott, 1956; Waugh et al., 2013). Spotted shags are ranked as Not Threatened on a national scale, but are ranked as Regionally Endangered in the Wellington region and are known to breed at only four sites in the region (Matiu/Somes and Mokopuna Islands, Mākaro/Ward Island, Point Dorset (Miramar Peninsula) and Kāpiti Island (Waugh et al., 2013)). For these reasons, we recommend that counts of the number of adult spotted shags and the number of occupied nests be carried out at least once per season at all four spotted shag breeding sites in the Wellington region, in the same years in which the (summer) regional coastal bird survey is carried out. We recommend that surveys of the Matiu/Somes, Mokopuna, Mākaro/Ward and Kāpiti Island spotted shag breeding colonies be carried out by boat as recommended by Waugh et al., (2013), while the Point Dorset colony can be adequately surveyed from land. Given that we recommend that the next regional coastal bird survey be carried out during the summer of 2022/2023, we recommend that surveys of Wellington spotted shag colonies be scheduled to be carried out in February, May, August and November 2022.

Thirdly, this regional coastal survey has done a relatively good job at mapping the distribution and quantifying spatial patterns in the abundance of NZ fur seals breeding around the Wellington region coastline (Figure 4.2), given that this survey was done at a time of year when occupancy rates at local rookeries would have been relatively high (Bradshaw et al., 1999). Counts carried out at seal rookeries are known to provide the best data for consistent estimates of population size, however because adult occupancy rates at rookeries can vary substantially from day to day, counts of the number of pups present at rookeries provide the best measure of population size, trend and population productivity (Shaughnessy et al., 1994). During the survey reported here, our fieldworkers recorded only total counts of seals encountered per ~1 km of coastline, and didn't record separate counts of the number of fur seal pups encountered. During future surveys therefore, we recommend that a separate count of the number of fur seal pups be kept, to provide the most consistent measures of fur seal population size and productivity along the Wellington region coastline. Further to this, non-breeding and post-breeding seals are also known to congregate at non-breeding sites ('haul-outs'), which can be situated at different location along the coastline, and peak occupancy at these haul-outs occurs in July-August (Crawley & Wilson, 1976). To adequately map the spatial distribution in fur seal abundance during the non-breeding season, we recommend that a regional winter survey of NZ fur seal distribution and abundance be carried out, during the same years that the (summer) regional coastal bird survey is

carried out. Given that we recommend that the next regional coastal bird survey be carried out during the summer of 2022/2023, we recommend that a regional winter survey of NZ fur seal distribution and abundance be scheduled to be carried out in July-August 2022. Should it not be feasible to carry out a winter NZ fur seal survey along all of the Wellington region coastline, sections of coastline with relatively high fur seal winter occupancy probabilities could be mapped using pre-existing data sources and these sections of coastline could be targeted as a matter of priority.

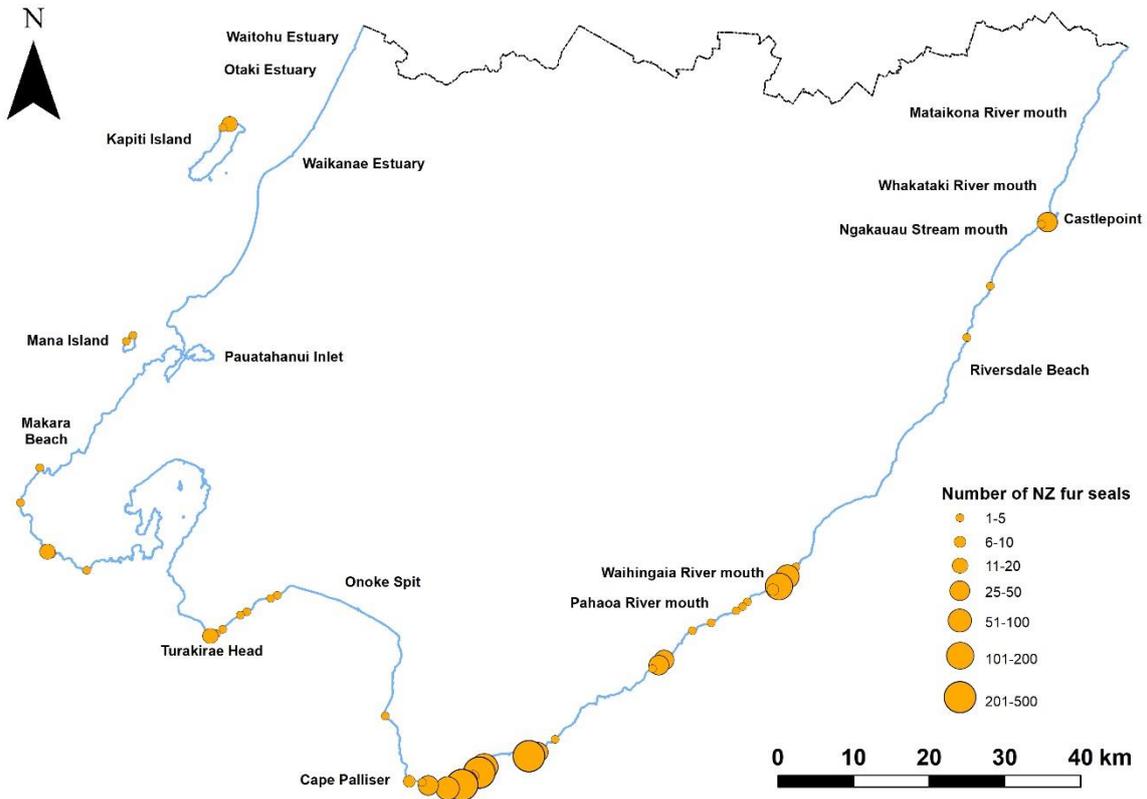


Figure 4.2: Distribution and relative abundance of New Zealand fur seals along the Wellington region coastline.

5. Recommendations

Based on the results described in this report, we suggest that Greater Wellington Regional Council considers adopting the following recommendations:

Wellington's proposed Natural Resources Plan

- That the 39 previously unidentified "coastal habitats of significance for indigenous birds" listed in Appendix Two of this report be added to Schedule F2c of Wellington's proposed Natural Resources Plan, during the next scheduled plan change.
- That the bird values descriptions and critical periods for the additional 30, previously-identified "habitats of significance" detailed in Schedule F2c of Wellington's proposed Natural Resources Plan be updated using the information provided in Appendix Two of this report, during the next scheduled plan change.

Regional Threat Rankings

- That GWRC updates the GWRC/DOC database of regional threat rankings for Wellington's birds, using the information presented in Table 4.1 in this report.

Oiled wildlife incident responsiveness

- That GWRC and MNZ utilize the lists of "coastal habitats of significance to indigenous birds" contained within Schedule F2c of Wellington's proposed Natural Resources Plan and Appendix Two of this report, to improve their readiness and responsiveness to oiled wildlife incidents in the Wellington region.

Future surveys

- That this regional coastal bird survey be repeated at five-yearly intervals, with the next survey scheduled to commence during the summer of 2022/2023. This will allow GWRC, DOC and Maritime NZ to maintain an up-to-date picture of spatial patterns in the diversity and abundance of bird species along the Wellington region coastline, and to accurately monitor the regional population trends of all Nationally Threatened or At Risk bird species that are largely restricted to coastal habitats in the Wellington region.
- During future regional coastal bird surveys, we recommend that separate counts of adult NZ fur seals and pups be made within each ~1 km section of coastline surveyed, to provide the most consistent measure of NZ fur seal population size and productivity.
- That GWRC and MNZ carry out a regional survey of the distribution and abundance of little penguins breeding in the Wellington region between the months of August and November, using a certified penguin detector dog.
- That GWRC and MNZ carry out seasonal surveys of spotted shag breeding colonies in the Wellington region, during the same years in which (summer) regional coastal bird surveys are carried out. Given that we recommend that the next regional coastal bird survey be carried out during the summer of 2022/2023, we recommend surveys of Wellington spotted shag colonies be carried out in February, May, August and November 2022.

- That GWRC and MNZ carry out a regional winter survey for NZ fur seals along the Wellington region coastline, during the same years in which (summer) regional coastal bird surveys are carried out. Given that we recommend that the next regional coastal bird survey be carried out during the summer of 2022/2023, we recommend the first regional winter NZ fur seal survey to be carried out in July-August 2022.

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APPENDIX ONE

This appendix contains a list of all of the bird species encountered during this Wellington regional coastal bird survey. Species names and taxonomic order are those listed in Gill et al., (2010), national threat rankings are those listed in Robertson et al., (2017) and regional threat rankings are from GWRC/DOC, unpublished data. The date ranges delimiting the breeding season for each bird species observed have been sourced from [New Zealand Birds Online](#), accessed 24th June, 2019.

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
California quail	<i>Callipepla californica</i>	Introduced and Naturalised	Introduced and Naturalised	August - April	5 (1.1%)
common pheasant	<i>Phasianus colchicus</i>	Introduced and Naturalised	Introduced and Naturalised	July – March	4 (0.9%)
black swan	<i>Cygnus atratus</i>	Not Threatened	Not Threatened	July - March	17 (3.7%)
greylag goose	<i>Anser anser</i>	Introduced and Naturalised	Introduced and Naturalised	August - December	3 (0.7%)
Canada goose	<i>Branta canadensis</i>	Introduced and Naturalised	Introduced and Naturalised	September - January	20 (4.3%)
paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	Not Threatened	August - February	38 (8.2%)
grey teal	<i>Anas gracilis</i>	Not Threatened	At Risk, Recovering	June - January	3 (0.7%)
mallard	<i>A. platyrhynchos</i>	Introduced and Naturalised	Introduced and Naturalised	July - December	44 (9.6%)
Australasian shoveler	<i>A. rhynchotis</i>	Not Threatened	Not Threatened	October - February	2 (0.4%)

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
New Zealand scaup	<i>Aythya novaeseelandiae</i>	Not Threatened	Regionally Vulnerable	October - March	1 (0.2%)
little penguin	<i>Eudyptula minor</i>	At Risk, Declining	Regionally Vulnerable	July - February	2 (0.4%)
fluttering shearwater	<i>Puffinus gavia</i>	At Risk, Relict	Regionally Critical	August - January	1 (0.2%)
Australasian gannet	<i>Morus serrator</i>	Not Threatened	Migrant	August - March	90 (19.6%)
little shag	<i>Phalacrocorax melanoleucos</i>	Not Threatened	Regionally Vulnerable	August - March	85 (18.5%)
black shag	<i>P. carbo</i>	At Risk, Naturally Uncommon	Regionally Critical	Year round	78 (17.0%)
pied shag	<i>P. varius</i>	At Risk, Recovering	Regionally Vulnerable	Year round	125 (27.2%)
little black shag	<i>P. sulcirostris</i>	At Risk, Naturally Uncommon	Regionally Vulnerable	October - December	8 (1.7%)
spotted shag	<i>Stictocarbo punctatus</i>	Not Threatened	Regionally Endangered	Year round	17 (3.7%)
white-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	Not Threatened	June - April	121 (26.3%)
reef heron	<i>E. sacra</i>	Nationally Endangered	Regionally Critical	September - December	14 (3.0%)
royal spoonbill	<i>Platalea regia</i>	At Risk, Naturally Uncommon	Coloniser	October - March	11 (2.4%)
swamp harrier	<i>Circus approximans</i>	Not Threatened	Not Threatened	September - April	18 (3.9%)
New Zealand falcon	<i>Falco novaeseelandiae</i>	At Risk, Recovering	Regionally Critical	August - May	1 (0.2%)

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
pukeko	<i>Porphyrio melanotus</i>	Not Threatened	Not Threatened	Year round	1 (0.2%)
bar-tailed godwit	<i>Limosa lapponica</i>	At Risk, Declining	Regionally Critical	Not applicable	3 (0.7%)
ruddy turnstone	<i>Arenaria interpres</i>	Migrant	Regional Vagrant	Not applicable	1 (0.2%)
variable oystercatcher	<i>Haematopus unicolor</i>	At Risk, Recovering	Regionally Vulnerable	September - March	236 (51.3%)
South Island pied oystercatcher	<i>H. finschi</i>	At Risk, Declining	Migrant	Not applicable	9 (2.0%)
pied stilt	<i>Himantopus himantopus</i>	Not Threatened	Regionally Vulnerable	June - February	33 (7.2%)
New Zealand dotterel	<i>Charadrius obscurus</i>	At Risk, Recovering	Regionally Critical	August - February	7 (1.5%)
banded dotterel	<i>C. bicolinctus</i>	Nationally Vulnerable	Regionally Vulnerable	July – January	58 (12.6%)
black-fronted dotterel	<i>Euseyornis melanops</i>	At Risk, Naturally Uncommon	Regionally Vulnerable	August - March	4 (0.9%)
spur-winged plover	<i>Vanellus miles</i>	Not Threatened	Not Threatened	April - November	114 (24.8%)
Arctic skua	<i>Stercorarius parasiticus</i>	Migrant	Migrant	Not applicable	1 (0.2%)
southern black-backed gull	<i>Larus dominicanus</i>	Not Threatened	Not Threatened	September - March	427 (92.8%)
red-billed gull	<i>L. novaehollandiae</i>	At Risk, Declining	Regionally Vulnerable	September - January	273 (59.3%)
black-billed gull	<i>L. bulleri</i>	Nationally Critical	Regionally Critical	August - March	9 (2.0%)

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
Caspian tern	<i>Hydroprogne caspia</i>	Nationally Vulnerable	Regionally Critical	September - January	30 (6.5%)
white-fronted tern	<i>Sterna striata</i>	At Risk, Declining	Regionally Endangered	October - January	98 (21.3%)
rock pigeon	<i>Columba livia</i>	Introduced and Naturalised	Introduced and Naturalised	Year round	22 (4.8%)
New Zealand pigeon (kererū)	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	At Risk, Recovering	Year round	3 (0.7%)
kākā	<i>Nestor meridionalis</i>	At Risk, Recovering	At Risk, Recovering	October - July	3 (0.7%)
red-crowned parakeet	<i>Cyanoramphus novaeseelandiae</i>	At Risk, Relict	At Risk, Recovering	November - March	2 (0.4%)
yellow-crowned parakeet	<i>C. auriceps</i>	Not Threatened	Regionally Endangered	Year round	2 (0.4%)
shining cuckoo	<i>Chrysococcyx lucidus</i>	Not Threatened	Not Threatened	October - March	3 (0.7%)
long-tailed cuckoo	<i>Eudynamys taitensis</i>	At Risk, Naturally Uncommon	At Risk, Naturally Uncommon	October - March	1 (0.2%)
New Zealand kingfisher	<i>Todiramphus sanctus</i>	Not Threatened	Not Threatened	October - January	10 (2.2%)
North Island saddleback	<i>Philesturnus rufusater</i>	At Risk, Recovering	Regionally Vulnerable	August - May	5 (1.1%)
grey warbler	<i>Gerygone igata</i>	Not Threatened	Not Threatened	August - February	30 (6.5%)
bellbird	<i>Anthornis melanura</i>	Not Threatened	Not Threatened	September - February	10 (2.2%)

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
tūī	<i>Prosthemadera novaeseelandiae</i>	Not Threatened	Not Threatened	September - February	71 (15.4%)
whitehead	<i>Mohoua albicilla</i>	At Risk, Declining	Not Threatened	September - January	9 (2.0%)
Australian magpie	<i>Gymnorhina tibicen</i>	Introduced and Naturalised	Introduced and Naturalised	July - January	49 (10.7%)
New Zealand fantail	<i>Rhipidura fuliginosa</i>	Not Threatened	Not Threatened	August - March	13 (2.8%)
North Island robin	<i>Petroica longipes</i>	At Risk, Declining	Not Threatened	September - March	1 (0.2%)
skylark	<i>Alauda arvensis</i>	Introduced and Naturalised	Introduced and Naturalised	August - January	197 (42.8%)
silvereve	<i>Zosterops lateralis</i>	Not Threatened	Not Threatened	August - February	39 (8.5%)
welcome swallow	<i>Hirundo neoxena</i>	Not Threatened	Not Threatened	August - March	79 (17.2%)
Eurasian blackbird	<i>Turdus merula</i>	Introduced and Naturalised	Introduced and Naturalised	August - February	118 (25.7%)
song thrush	<i>T. philomelos</i>	Introduced and Naturalised	Introduced and Naturalised	August - February	11 (2.4%)
common starling	<i>Sturnus vulgaris</i>	Introduced and Naturalised	Introduced and Naturalised	September - December	195 (42.4%)
house sparrow	<i>Passer domesticus</i>	Introduced and Naturalised	Introduced and Naturalised	September - March	125 (27.2%)

Common name	Scientific name	National threat ranking	Regional threat ranking	Breeding season	Number (and percentage) of survey sections in which species was observed
New Zealand pipit	<i>Anthus novaeseelandiae</i>	At Risk, Declining	Regionally Vulnerable	August - February	52 (11.3%)
dunnock	<i>Prunella modularis</i>	Introduced and Naturalised	Introduced and Naturalised	September - February	93 (20.2%)
chaffinch	<i>Fringilla coelebs</i>	Introduced and Naturalised	Introduced and Naturalised	September - February	97 (21.1%)
greenfinch	<i>Carduelis chloris</i>	Introduced and Naturalised	Introduced and Naturalised	October - March	56 (12.2%)
goldfinch	<i>C. carduelis</i>	Introduced and Naturalised	Introduced and Naturalised	October - March	58 (12.6%)
common redpoll	<i>C. flammea</i>	Introduced and Naturalised	Introduced and Naturalised	October - March	6 (1.3%)
yellowhammer	<i>Emberiza citrinella</i>	Introduced and Naturalised	Introduced and Naturalised	October - March	119 (25.9%)

APPENDIX TWO:

This appendix contains a list of all of the Wellington region’s “coastal habitats of significance for indigenous birds” identified by applying the Policy 23 translation criteria developed by McArthur et al., (2015a) to the bird abundance and distribution data collected during this region-wide coastal bird survey.

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington’s pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Baring Head/Ōrua-pouanui coastline, including the Wainuiomata River mouth	E1756737 N5414476	This site is one of only several sites on the Wellington south coast that supports a breeding population of banded dotterels. Nine Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, Caspian tern, NZ pipit, pied shag, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.	3	1	3	1 August to 1 February (Banded dotterel breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Cape Palliser	E1789090 N5391198	This site provides breeding, roosting and foraging habitat for ≥5% of the regional breeding population of red-billed gulls.	2	3	3	1 August to 1 March (Red-billed gull breeding season)	No	This survey

⁴ Coordinates describe the centroid of each of the habitats of significance listed in this table. The boundaries of these sites are yet to be delimited, but for the 39 sites not already listed in Schedule F2c of Wellington’s proposed Natural Resources Plan, they conform to the 1 km coastal bird survey section boundaries that occur on either side of the centroids listed in this table.

⁵ The criteria applied to this dataset are those outlined in table 3.1 of McArthur et al., (2015a).

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Castlepoint Reef and adjacent foreshore	E1871684 N5466743	<p>This site supports the largest nesting colony of red-billed gulls in the Wellington region, supporting ≥25% of the regional breeding population.</p> <p>This site supports one of the largest nesting colonies of white-fronted terns in the Wellington region, supporting ≥25% of the regional breeding population.</p> <p>Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, NZ pipit, red-billed gull, variable oystercatcher and white-fronted tern.</p>	1	2	3	<p>1 August to 1 March (Red-billed gull breeding season)</p> <p>1 October to 1 February (White-fronted tern breeding season)</p>	Yes	<p>This survey McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Glenburn coastline	E1838132 N5421039	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, red-billed gull, variable oystercatcher and white-fronted tern.</p>	3	2	3	None	No	This survey
Glenburn coastline south	E1837647 N5420284	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, pied stilt, red-billed gull and variable oystercatcher.</p>	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Glendhu foreshore	E1831828 N5416294	This site supports ≥5% of the regional breeding population of reef heron. Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, red-billed gull, reef heron and variable oystercatcher.	2	2	3	None	No	This survey
Green Point	E1751585 N5446913	This site supports ≥5% of the regional breeding population of reef heron. Six Nationally Threatened or At Risk species are known to occur at this site: Caspian tern, pied shag, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.	2	2	3	None	No	This survey McArthur & Lawson (2013)

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Honeycomb Rock and the Waihingia River mouth	E1834604 N5417245	<p>This site supports 12% of the regional breeding population of New Zealand dotterels.</p> <p>This site provides nesting habitat for 12% of the regional breeding population of white-fronted terns.</p> <p>Eight Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, NZ dotterel, NZ pipit, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	1	3	<p>1 August to 1 March (New Zealand dotterel breeding season)</p> <p>1 October to 1 February (White-fronted tern breeding season)</p>	No	This survey
Honeycomb Rock north	E1835921 N5418432	<p>Four Nationally Threatened or At Risk species are known to occur at this site: NZ pipit, red-billed gull, variable oystercatcher and white-fronted tern.</p>	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Kāpiti Island foreshore	E1760365 N5475442	<p>This site provides little penguins with access to one of only eight areas of suitable, predator-free nesting habitat remaining in the Wellington region.</p> <p>This site provides breeding habitat for 21% of the regional breeding population of red-billed gulls.</p> <p>This site provides breeding habitat for 47% of the regional breeding population of white-fronted terns.</p> <p>This site supports ≥5% of the regional breeding population of reef heron.</p> <p>Eight Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, little penguin, pied shag, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.</p>	1	1	3	<p>1 July to 1 March (Little penguin breeding season)</p> <p>1 August to 1 March (Red-billed gull breeding season)</p> <p>1 October to 1 February (White-fronted tern breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Kororiki Stream foreshore	E1859811 N5449890	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, pied stilt, red-billed gull and variable oystercatcher.</p>	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Makara Estuary	E1743726 N5435217	<p>This site supports ≥5% of the regional breeding population of pied shags.</p> <p>Six Nationally Threatened or At Risk species are known to occur at this site: Black shag, pied shag, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	2	3	<p>All year round</p> <p>(Pied shags breed year-round)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Mākaro/Ward Island foreshore	E1756702 N5426904	<p>This site provides breeding habitat for 17% of the regional breeding population of white-fronted terns.</p> <p>This site provides little penguins with access to one of only eight areas of suitable, predator-free nesting habitat remaining in the Wellington region.</p> <p>Four Nationally Threatened or At Risk species are known to occur at this site: Little penguin, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	2	3	<p>1 October to 1 February</p> <p>(White-fronted tern breeding season)</p> <p>1 July to 1 March</p> <p>(Little penguin breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Mana Island foreshore	E1749430 N5450081	<p>This site provides little penguins with access to one of only eight areas of suitable, predator-free nesting habitat remaining in the Wellington region.</p> <p>This site provides breeding habitat for 19% of the regional breeding population of red-billed gulls.</p> <p>This site provides breeding habitat for 23% of the regional breeding population of white-fronted terns.</p> <p>This site supports ≥5% of the regional breeding population of reef heron.</p> <p>Six Nationally Threatened or At Risk species are known to occur at this site: Little penguin, pied shag, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.</p>	2	2	3	<p>1 July to 1 March (Little penguin breeding season)</p> <p>1 August to 1 March (Red-billed gull breeding season)</p> <p>1 October to 1 February (White-fronted tern breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Manurewa Point	E1811209 N5402451	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, red-billed gull and white-fronted tern.</p>	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Mataikona coastline north	E1877684 N5483497	Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey
Mataikona River mouth	E1875783 N5480237	This site supports 12% of the regional breeding population of New Zealand dotterels. Seven Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, NZ dotterel, pied stilt, red-billed gull and variable oystercatcher and white-fronted tern.	2	1	3	1 August to 1 March (New Zealand dotterel breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Matiu/Somes Island foreshore	E1756191 N5430913	<p>This site provides little penguins with access to one of only eight areas of suitable, predator-free nesting habitat remaining in the Wellington region, supporting ≥10% of the regional breeding population of this species.</p> <p>This site provides habitat for ≥5% of the regional breeding population of reef herons.</p> <p>This site provides habitat for the largest breeding colony of spotted shags in the Wellington region, supporting ≥67% of the regional breeding population of this species.</p> <p>Six Nationally Threatened or At Risk species are known to occur at this site: Black shag, little penguin, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.</p>	2	2	1	<p>1 July to 1 March (Little penguin breeding season)</p> <p>1 September to 1 February (Reef heron breeding season)</p> <p>All year round (Spotted shag breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Mukamuka Stream mouth	E1768232 N5416121	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, pied shag, variable oystercatcher and white-fronted tern.</p>	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Ngakauau Stream mouth	E1868559 N5464624	This site supports 12% of the regional breeding population of New Zealand dotterels. Seven Nationally Threatened and At Risk species are known to occur at this site: Black shag, Caspian tern, NZ dotterel, pied stilt, red-billed gull, royal spoonbill and variable oystercatcher.	2	1	3	1 August to 1 March (New Zealand dotterel breeding season)	No	This survey
Ngawi foreshore north	E1785355 N5395281	Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, Caspian tern and variable oystercatcher.	3	2	3	None	No	This survey
Ocean Beach	E1773531 N5416961	Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black-fronted dotterel, red-billed gull and white-fronted tern.	3	2	3	None	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Onoke Spit	E1776979 N5415934	<p>This site provides nesting habitat for the entire regional breeding population of Caspian terns in the Wellington region.</p> <p>This site provides nesting habitat for ≥5% of the regional breeding population of banded dotterels in the Wellington region, supporting one the largest coastal breeding populations of this species in the region.</p> <p>This site provides roosting habitat for ≥5% of the regional breeding population of white-fronted terns.</p> <p>This site provides roosting habitat for ≥5% of the regional breeding population of pied shags</p> <p>This site supports one of only three royal spoonbill breeding colonies present in the Wellington region.</p> <p>Eleven Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, black-billed gull, Caspian tern, little black shag, NZ pipit, pied shag, red-billed gull, royal spoonbill, variable oystercatcher and white-fronted tern.</p>	1	1	3	<p>1 September to 1 February (Caspian tern breeding season)</p> <p>1 August to 1 February (Banded dotterel breeding season)</p> <p>1 October to 1 April (Royal spoonbill breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>

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			Rarity	Diversity	Ecological Context			
Open Bay	E1751227 N5446274	Four Nationally Threatened or At Risk species are known to occur at this site: NZ pipit, pied shag, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey
Ōtaki River mouth	E1777633 N5485828	This site provides regular roosting habitat for ≥5% of the regional breeding population of white-fronted terns. Eight Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, pied shag, pied stilt, red-billed gull, royal spoonbill, variable oystercatcher and white-fronted tern.	2	1	3	None	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Oteranga Bay	E1736320 N5426900	This site is one of only several sites along the Wellington south coast that supports a coastal breeding population of banded dotterels. Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, pied shag, pied stilt and variable oystercatcher.	3	2	3	1 August to 1 February (Banded dotterel breeding season)	No	This survey McArthur & Lawson (2013)

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Owahanga coastline south	E1879450 N5486868	<p>This site provides habitat for ≥5% of the regional breeding population of reef herons.</p> <p>This site provides roosting habitat for ≥5% of the regional breeding population of Caspian terns.</p> <p>Eight Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, Caspian tern, pied stilt, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.</p>	2	1	3	None	No	This survey
Pahaoa Estuary and Pahaoa Scientific Reserve	E1827215 N5413278	<p>This site is one of only six sites in the Wellington region to support breeding New Zealand dotterels, comprising 18% of the regional breeding population of this species.</p> <p>This site provides nesting habitat for ≥5% of the regional breeding population of red-billed gulls.</p> <p>Eight Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, NZ dotterel, NZ pipit, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	1	3	<p>1 August to 1 March (New Zealand dotterel breeding season)</p> <p>1 August to 1 March (Red-billed gull breeding season)</p>	Yes	<p>This survey McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>

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			Rarity	Diversity	Ecological Context			
Pekapeka Beach	E1773548 N5478486	Five Nationally Threatened or At Risk species are known to occur at this site: Black-billed gull, pied shag, red-billed gull, SI pied oystercatcher and variable oystercatcher.	3	2	3	None	No	This survey
Pencarrow foreshore	E1755469 N5418424	This site provides habitat for ≥5% of the regional breeding population of pied shags. This site supports the largest breeding population of banded dotterels on the Wellington south coast. Seven Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, NZ pipit, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	2	1	3	All year round (Pied shags breed year-round) 1 August – 1 February (Banded dotterel breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Pipinui Point south	E1744880 N5438536	Four Nationally Threatened or At Risk species are known to occur at this site: Pied shag, red-billed gull, reef heron and variable oystercatcher.	3	2	3	None	No	This survey
Rerewhakaaitu River mouth	E1823966 N5411805	Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, NZ pipit, pied stilt and red-billed gull.	3	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Riversdale Beach and Motuwaireka Stream mouth	E1858571 N5447344	<p>This site is one of only six sites in the Wellington region to support breeding New Zealand dotterels, comprising 29% of the regional breeding population of this species.</p> <p>This site provides roosting habitat for ≥5% of the regional population of Caspian terns.</p> <p>This site supports one of the largest breeding populations of banded dotterels along the eastern Wairarapa coastline.</p> <p>Ten Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, bar-tailed godwit, black-billed gull, black shag, Caspian tern, NZ dotterel, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.</p>	1	1	3	<p>1 August to 1 March (New Zealand dotterel breeding season)</p> <p>1 August to 1 February (Banded dotterel breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Rock Point	E1750666 N5445663	<p>Four Nationally Threatened or At Risk species are known to occur at this site: NZ pipit, pied shag, red-billed gull and variable oystercatcher.</p>	3	2	3	None	No	This survey
Sinclair Head west	E1741051 N5421513	<p>Four Nationally Threatened or At Risk species are known to occur at this site: NZ pipit, pied shag, red-billed gull and variable oystercatcher.</p>	3	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Stony Bay	E1812418 N5403007	<p>This site provides nesting habitat for ≥5% of the regional breeding population of red-billed gulls.</p> <p>This site provides nesting habitat for ≥5% of the regional breeding population of white-fronted terns.</p> <p>Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, red-billed gull, variable oystercatcher and white-fronted tern.</p>	3	2	3	<p>1 August to 1 March (Red-billed gull breeding season)</p> <p>1 October to 1 February (White-fronted tern breeding season)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Tahoramaurea Island foreshore	E1760253 N5471779	Four Nationally Threatened or At Risk species are known to occur at this site: Pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	None	No	This survey
Te Awaiti foreshore; Hapukura Stream north	E1820240 N5407906	Six Nationally Threatened or At Risk species are known to occur at this site: Black-fronted dotterel, NZ pipit, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	None	No	This survey
Te Awaiti foreshore; Okoropunga Stream mouth	E1820907 N5408581	Five Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, NZ pipit, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Te Awarua-o-Porirua Harbour – Onepoto Arm	E1755415 N5446709	<p>This site is one of only several relatively large estuaries in the Wellington region, and is therefore a regionally important stop-over site for several migrant shorebird species including SI pied oystercatcher and bar-tailed godwit.</p> <p>Ten Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, bar-tailed godwit, black shag, Caspian tern, pied shag, pied stilt, red-billed gull, royal spoonbill, SI pied oystercatcher and variable oystercatcher.</p>	3	1	3	<p>All year round</p> <p>(Important summer site for Arctic-breeding shorebirds such as bar-tailed godwit; important winter site for NZ-breeding shorebirds such as SI pied oystercatcher)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>

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			Rarity	Diversity	Ecological Context			
Te Awarua-o-Porirua Harbour – Pauatahanui Arm	E1755415 N5446709	<p>This site is one of only three sites in the Wellington region to support a breeding population of NI fernbird, comprising ≥25% of the regional breeding population of this species.</p> <p>This site provides breeding, foraging and roosting habitat for ≥5% of the regional breeding population of pied shags.</p> <p>This site is one of only several relatively large estuaries in the Wellington region, and is therefore a regionally important stop-over site for several migrant shorebird species including SI pied oystercatcher and bar-tailed godwit.</p> <p>Twelve Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, bar-tailed godwit, black shag, Caspian tern, little black shag, NI fernbird, pied shag, pied stilt, red-billed gull, royal spoonbill, SI pied oystercatcher and variable oystercatcher.</p>	1	1	3	<p>All year round</p> <p>(Important summer site for Arctic-breeding shorebirds such as bar-tailed godwit; important winter site for NZ-breeding shorebirds such as SI pied oystercatcher; year-round habitat for NI fernbird and pied shag)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p> <p>Birds New Zealand, unpublished data</p>
Te Horo Beach south	E1775023 N5481098	<p>Four Nationally Threatened or At Risk species are known to occur at this site: Pied shag, red-billed gull, SI pied oystercatcher and variable oystercatcher.</p>	3	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Te Kawakawa Point	E1786544 N5391742	Five Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	None	No	This survey
Te Kawakawa point north	E1786175 N5392250	Five Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, pied stilt, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey
Tokomapuna Island foreshore		This site provides little penguins with access to one of only eight areas of suitable, predator-free nesting habitat remaining in the Wellington region. Six Nationally Threatened or At Risk species are known to occur at this site: Black shag, little penguin, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	1 July to 1 March (Little penguin breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Tokorakau Reef north	E1824779 N5412205	Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, NZ pipit, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Tongue Point	E1738714 N5422335	This site is one of only several sites along the Wellington south coast that supports a coastal breeding population of banded dotterels. Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, pied shag and variable oystercatcher.	3	2	3	1 August to 1 February (Banded dotterel breeding season)	No	This survey
Tora foreshore	E1806302 N5397956	Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, NZ pipit, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	None	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Turakirae Head	E1760690 N5411733	This site provides regular roosting habitat for ≥5% of the regional breeding population of white-fronted terns. Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, NZ pipit, red-billed gull, variable oystercatcher and white-fronted tern.	2	2	3	None	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)

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			Rarity	Diversity	Ecological Context			
Uruti Point	E1857345 N5442664	Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, red-billed gull and variable oystercatcher.	3	2	3	None	No	This survey
Waikanae Estuary	E1768804 N5473284	<p>This site is one of only three sites in the Wellington region to support a breeding population of NI fernbird, comprising ≥5% of the regional breeding population of this species.</p> <p>This site is one of only six sites in the Wellington region to support breeding New Zealand dotterels, comprising 18% of the regional breeding population of this species.</p> <p>This site provides breeding, foraging and roosting habitat for ≥5% of the regional breeding population of pied shags.</p> <p>This site is one of only several relatively large estuaries in the Wellington region, and is therefore a regionally important stop-over site for several migrant shorebird species including SI pied oystercatcher and bar-tailed godwit.</p> <p>Thirteen Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, bar-tailed godwit, black</p>	1	1	3	<p>All year round</p> <p>(Important summer site for Arctic-breeding shorebirds as well as breeding banded dotterels, NZ dotterels and Variable oystercatchers; important winter site for NZ-breeding shorebirds such as SI pied oystercatcher; year-round habitat for NI fernbird and pied shag.)</p>	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>

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			Rarity	Diversity	Ecological Context			
		shag, Caspian tern, NI fernbird, NZ dabchick, NZ dotterel, pied shag, pied stilt, red-billed gull, SI pied oystercatcher, variable oystercatcher and white-fronted tern.						
Waikawa Beach south	E1780272 N5492021	Five Nationally Threatened or At Risk species are known to occur at this site: Black-billed gull, pied shag, red-billed gull, SI pied oystercatcher and variable oystercatcher.	3	2	3	None	No	This survey
Waitekino Stream mouth	E1840180 N5424971	Four Nationally Threatened or At Risk species are known to occur at this site: Black shag, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	None	No	This survey
Waimimi coastline	E1863591 N5458614	This site supports ≥5% of the regional breeding population of reef heron. Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, red-billed gull, reef heron and variable oystercatcher.	2	2	3	None	No	This survey

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			Rarity	Diversity	Ecological Context			
Wairaka Point	E1757144 N5455745	This site supports ≥5% of the regional breeding population of reef heron. Four Nationally Threatened or At Risk species are known to occur at this site: NZ pipit, pied shag, reef heron and white-fronted tern.	2	2	3	None	No	This survey
Waitohu Beach north	E1779897 N5491094	Four Nationally Threatened or At Risk species are known to occur at this site: Pied shag, red-billed gull, SI pied oystercatcher and variable oystercatcher.	3	2	3	None	No	This survey
Waitohu Stream mouth	E1779143 N5489272	This site is one of only several sites along the Kāpiti Coast that supports a coastal breeding population of banded dotterels. Seven Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black-billed gull, Caspian tern, pied stilt, red-billed gull, variable oystercatcher, white-fronted tern.	3	1	3	1 August to 1 February (Banded dotterel breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)

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			Rarity	Diversity	Ecological Context			
Wellington Harbour (Port Nicholson) foreshore; Burdan's Gate to Pencarrow sewer outfall.	E1756400 N5419043	This site is one of only three sites in Wellington Harbour that supports a coastal breeding population of banded dotterels. Nine Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, Caspian tern, little black shag, NZ pipit, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	3	1	3	1 August to 1 February (Banded dotterel breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Wellington Harbour (Port Nicholson) foreshore; Days Bay to Burdan's Gate	E1758065 N5425856	This site is one of only three sites in Wellington Harbour that supports a coastal breeding population of banded dotterels. Four Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, red-billed gull, variable oystercatcher and white-fronted tern.	3	2	3	1 August to 1 February (Banded dotterel breeding season)	No	This survey

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			Rarity	Diversity	Ecological Context			
Wellington Harbour (Port Nicholson) foreshore; Palmer Head to Lyall Bay	E1750808 N5421979	<p>This site provides regular roosting habitat for ≥5% of the regional breeding population of white-fronted terns.</p> <p>This site is one of only three sites in Wellington Harbour that supports a breeding population of banded dotterels.</p> <p>Six Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, little penguin, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	2	3	1 August to 1 February (Banded dotterel breeding season)	Yes	<p>This survey McArthur & Lawson (2013) McArthur et al., (2015a)</p>
Wellington Harbour (Port Nicholson); Point Halswell to Worsler Bay boat club	E1753421 N5426425	<p>Six Nationally Threatened or At Risk species are known to occur at this site: Little black shag, little penguin, pied shag, red-billed gull, variable oystercatcher and white-fronted tern.</p>	3	2	3	None	Yes	<p>This survey McArthur & Lawson (2013) McArthur et al., (2015a)</p>
Wellington Harbour (Port Nicholson); Point Howard to eastern shore of Te Awa Kairangi/Hutt River mouth	E1759418 N5431764	<p>Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, pied shag, red-billed gull, royal spoonbill and variable oystercatcher.</p>	3	2	3	None	Yes	<p>This survey McArthur & Lawson (2013) McArthur et al., (2015a)</p>

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Wellington Harbour (Port Nicholson) foreshore; Te Raekaihau Point to Ohiro Bay Road end, including Taputeranga Island foreshore	E1748110 N5421200	This site supports ≥5% of the regional breeding population of reef heron. Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.	2	2	3	1 September to 1 January (Reef heron breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
Wellington Harbour (Port Nicholson) foreshore; Worser Bay boat club to Point Dorset	E1753504 N5423790	This site provides breeding habitat for 9% of the regional breeding population of white-fronted terns. This site is the only mainland site in Wellington Harbour to support breeding red-billed gulls and spotted shags. Four Nationally Threatened or At Risk bird species are known to occur at this site: Pied shag, red-billed gull, variable oystercatcher and white-fronted tern.	2	2	3	1 October to 1 February (White-fronted tern breeding season) 1 August to 1 March (Red-billed gull breeding season)	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Wellington south coast (Sinclair Head to Owhiro Bay)	E1748110 N5421200	<p>This site supports $\geq 5\%$ of the regional breeding population of reef heron.</p> <p>Seven Nationally Threatened or At Risk species are known to occur at this site: Black shag, NZ pipit, pied shag, red-billed gull, reef heron, variable oystercatcher and white-fronted tern.</p>	2	2	3	None	Yes	<p>This survey</p> <p>McArthur & Lawson (2013)</p> <p>McArthur et al., (2015a)</p>
Whakataki River mouth	E1872044 N5470568	<p>This site supports 12% of the regional breeding population of New Zealand dotterels.</p> <p>This site provides roosting habitat for $\geq 5\%$ of the regional breeding population of Caspian terns.</p> <p>Seven Nationally Threatened or At Risk species are known to occur at this site: Black shag, Caspian tern, NZ dotterel, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.</p>	2	1	3	1 August to 1 March (New Zealand dotterel breeding season)	No	This survey

Site name	Coordinates (NZTM) ⁴	Description	Policy 23 criteria scores ⁵			Critical periods	Falls within existing habitat of significance listed in Schedule F2c of Wellington's pNRP?	Data source(s)
			Rarity	Diversity	Ecological Context			
Whareama River coastline south	E1860378 N5451900	Five Nationally Threatened or At Risk species are known to occur at this site: Black shag, pied stilt, red-billed gull, variable oystercatcher, white-fronted tern.	3	2	3	None	No	This survey
Whareama River mouth	E1861310 N5454819	Seven Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black shag, New Zealand pipit, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.	3	1	3	None	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)
White Rock to Te Kaukau Point, including White Rock beach and the Opouawe River mouth	E1801190 N5395390	This site provides habitat for ≥5% of the regional population of red-billed gulls. Nine Nationally Threatened or At Risk species are known to occur at this site: Banded dotterel, black-fronted dotterel, black shag, Caspian tern, NZ pipit, pied stilt, red-billed gull, variable oystercatcher and white-fronted tern.	3	1	3	None	Yes	This survey McArthur & Lawson (2013) McArthur et al., (2015a)