

Baseline monitoring of the birds of the Ōtaki, Waikanae and Hutt Rivers, 2012-2015

September 2015



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September 2015

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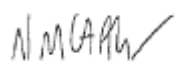


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Executive summary

Greater Wellington Regional Council's Flood Protection department is developing an Environmental Code of Practice and an Environmental Monitoring Plan to guide and monitor how all flood protection and erosion mitigation activities are undertaken across the Wellington region.

This plan includes a commitment to undertake periodic monitoring of the bird populations found in the river corridors subject to flood and erosion mitigation activities. Although all species of birds encountered in the river corridors are recorded during these surveys, there is a particular emphasis on carrying out census counts of several riverbed-nesting shorebird species, as these are the species most likely to be adversely affected by some of these activities.

Between 2012 and 2015, three annual surveys were carried out along 49.7 km of the Ōtaki, Waikanae and Hutt Rivers. The Ōtaki River was found to support the highest diversity and densities of riverbed-nesting shorebirds, with a mean of 3.5 pied stilts, 2.9 banded dotterels and 1.3 black-fronted dotterels counted per km of river. The Ōtaki River populations of both banded and black-fronted dotterels represent 8% of the Wellington region's breeding populations of these two species. In contrast, only pied stilts were recorded on the Hutt River at a mean density of 0.6 birds per km, and no riverbed-nesting shorebirds were found in the bed of the Waikanae River.

Total numbers of species encountered on each river were remarkably similar given major differences in river geomorphology and in the lengths of rivers surveyed, with 48, 45 and 44 bird species recorded respectively on the Ōtaki, Waikanae and Hutt Rivers. Species diversity was fairly uniform along the majority of the lengths of each river, but total species diversity, the ratio of native to exotic species, and the ratio of threatened to non-threatened native species began to increase within ca. 2 km of the coast and reached a maximum at the river estuaries.

Eleven 'sites of value' for indigenous birds were identified on these rivers as a consequence of these surveys. These include shorebird-nesting habitats, shag nesting colonies, colonial roost sites and the three river estuaries.

These results provide a good baseline against which future changes in shorebird population sizes and overall species diversity can be compared. In accordance with the Flood Protection Environmental Monitoring Plan, we recommend that these surveys be repeated again over three consecutive summers between 2020 and 2023. In addition, we provide a number of recommendations for additions or changes to be made to the Environmental Code of Practice and Monitoring Plan as a result of the new information gained from these surveys.

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1. Introduction

Greater Wellington Regional Council (GWRC) has a statutory responsibility for flood and erosion mitigation in the Wellington region under section 30 of the Resource Management Act (1991) and sections 10 and 126 of the Soil Conservation and Rivers Control Act (1941).

To help fulfil this statutory responsibility, GWRC's Flood Protection Department is preparing an Environmental Code of Practice (Code) and an Environmental Monitoring Plan (EMP) to guide and monitor how all flood protection and erosion control activities are undertaken across the Wellington region. The Code is specifically designed to support the vision "that Flood Protection activities restore and enhance the natural and cultural values associated with our rivers" (GWRC 2015).

To ensure that the management of GWRC's flood and erosion mitigation activities remain aligned with this vision over the 35-year term of the resource consents required to undertake many of these activities, an adaptive management approach is being incorporated into the Code and EMP. The aim of this approach is to improve environmental, social and cultural management and outcomes through a continuous "learning by doing" cycle of action, monitoring and evaluation of practice. Together therefore, the Code and EMP provide a process whereby any negative effects of the day to day flood protection and erosion control activities carried out by GWRC are minimised or appropriately mitigated (GWRC 2015).

One of the key ecological values of the rivers that are subject to GWRC's flood and erosion mitigation activities is the relatively high number of bird species that use the river corridors as foraging, roosting or breeding habitat, and the presence of several species of threatened shorebirds that are highly dependent on the open gravel habitats present in the beds of these rivers for breeding (Rebergen 2012; McArthur et al 2013). The importance of these rivers as habitats for threatened shorebirds has been recently recognised by the inclusion of eight riverbed "habitats of significance for indigenous birds" in schedule F2 of the Wellington region's Proposed Natural Resources Plan (GWRC 2015; McArthur et al 2015) and the identification of a large portion of the Ruamahanga River and its tributaries as an "Important Bird Area" by Forest and Bird/Birdlife International (Forest & Bird 2014).

GWRC recognises that there is potential for flood or erosion control activities to have both positive and negative impacts on bird populations present in the river corridors (Cameron 2013; Cameron 2015). In response to this, the EMP includes a commitment by GWRC to undertake periodic monitoring of the bird populations found in the river corridors subject to flood and erosion control activities. The results from this monitoring will in turn be used by the (yet to be formed) Flood Protection Technical Panel to determine whether any changes detected in local bird populations require either a management or monitoring response, which would be driven by making the appropriate changes to the Code or EMP (GWRC 2015).

The bird monitoring programme that GWRC has committed to involves carrying out annual surveys on a three year on, five year off cycle on most of the major rivers affected by flood protection activities. These bird surveys will be carried out on the Ōtaki, Waikanae, Hutt and representative reaches of the Ruamahanga, Waingawa, Waiohine and Tauherenikau Rivers according to the methods described in this report, in blocks of three consecutive years separated by five-year intervals during which no annual surveys will be carried out (McArthur et al 2013; GWRC 2015).

These river bird surveys are specifically designed to provide estimates of the local population sizes of four shorebird species that are known to breed on the open gravels of rivers subject to flood and erosion mitigation activities. Because breeding populations of these four species are largely restricted to these riverine gravel habitats in the Wellington region, they are considered to be at relatively high risk of being adversely impacted by these activities (Cameron, 2013; Cameron 2015). Furthermore, these four species are all of relatively high conservation concern nationally. The banded dotterel (*Charadrius bicinctus*) is ranked as Nationally Vulnerable under the New Zealand Threat Classification System, with a predicted national rate of decline of 30-70% over the next decade. The black-billed gull (*Larus bulleri*) is ranked as Nationally Endangered, with a projected rate of decline of >70% over the same time period. The pied stilt (*Himantopus himantopus*) is ranked as 'At Risk', Declining, with a predicted rate of decline of 10-50% over 10 years (Robertson et al 2013). The final species, the black-fronted dotterel (*Elsayornis melanops*), is a relatively recent addition to the New Zealand avifauna, having self-colonised from Australia in the early 1950s (Heather & Robertson 2015). Although the black-fronted dotterel is not ranked as either Threatened or 'At Risk', the southern North Island is currently the stronghold for this species in New Zealand (Robertson et al 2007), so agencies with the statutory authority for river management in the lower North Island have a disproportionately large responsibility for maintaining populations of this newly-arrived native shorebird in comparison to agencies operating in other parts of the country.

In contrast to the locally-breeding shorebird species that provide the focus for this monitoring, the majority of the remaining bird species recorded in the river corridor are terrestrial species that are common and widespread in the surrounding landscape, and are considered unlikely to be adversely affected by the localised effects of flood protection activities occurring in the bed of the river itself (McArthur et al 2013). A number of additional shorebird and waterfowl species do make use of the lower reaches and estuaries of these rivers during certain stages of their life-cycle however, so in addition to monitoring trends in the population sizes of the four most vulnerable locally-breeding shorebird species, numbers of non-breeding shorebirds, waterfowl and terrestrial bird species are also recorded during these surveys. This will enable broad trends in both the diversity and distribution of these species can be monitored over time.

The first three-year series of annual bird surveys on the Ōtaki, Waikanae and Hutt Rivers (the "western sector" rivers) commenced in late 2012, with three consecutive annual surveys having now been completed in the summers of 2012/13, 2013/14 and 2014/15. This report summarises the results of this first

series of surveys for the “western sector” rivers and provides recommendations for the timing of future surveys and for several changes to be made to both the Code and EMP as a consequence of the new information now available as a result of these surveys.

2. Methodology

2.1 Survey areas

Bird surveys were carried out annually along 49.7 kilometres of the Ōtaki, Waikanae and Hutt Rivers over three consecutive summers between 2012 and 2015. The majority of the lengths of each of these three rivers that are subject to flood protection management activities were surveyed in their entirety each year (Figures 2.1, 2.2 and 2.3).



Figure 2.1: Map of the Ōtaki River, showing the extent of the 2012-2015 bird surveys

2.2 Field methodology

The survey method was adapted from that used by Rebergen (2012) to survey shorebirds on several Wairarapa rivers in 2010 and 2011. Surveys were carried out between the months of October and January each year, on fine and calm days during periods of “normal”, or relatively low river flows.

During each survey, one or two observers walked slowly along the bed of the river recording the identity and numbers of all birds seen or heard in the bed of the river or in the adjacent riparian vegetation. Any birds flying overhead that were obviously associated with the river habitat (eg waterfowl and shorebirds) were also counted when flying in a direction perpendicular or opposite to the direction of travel of the observers. Birds flying in the same direction as the observers were not counted, to minimise the risk of double-counting birds.



Figure 2.2: Map of the Waikanae River, showing the extent of the 2012-2015 bird surveys

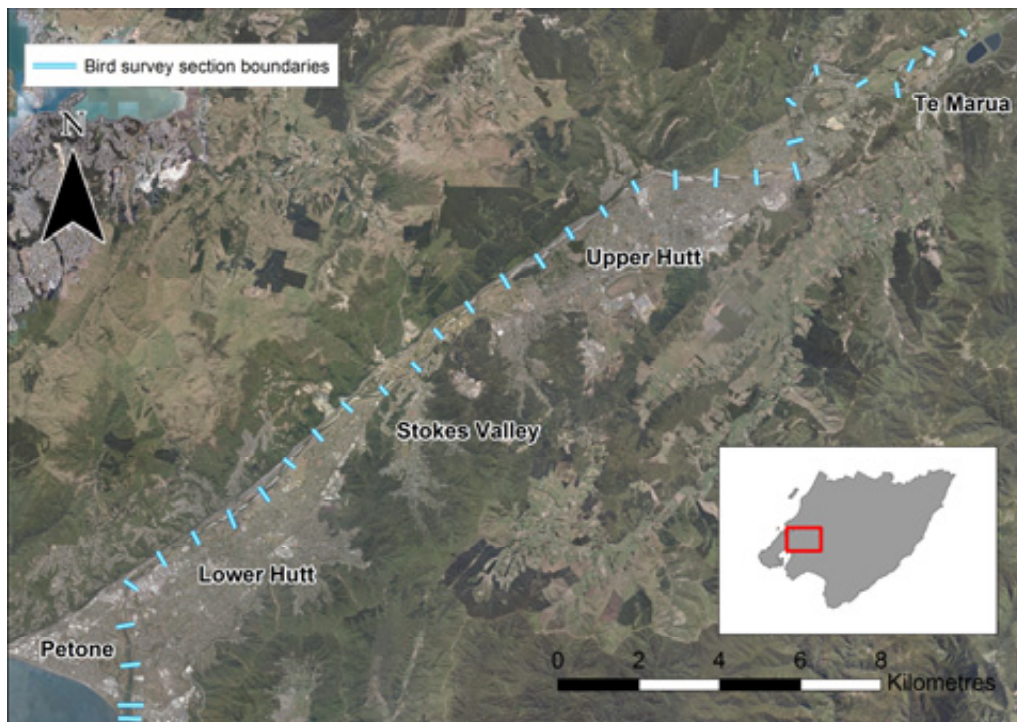


Figure 2.3: Map of the Hutt River, showing the extent of the 2012-2015 bird surveys

Special care was made to systematically scan all areas of un-vegetated gravels and all muddy backwaters to reduce the likelihood of missing territorial pairs of banded and black-fronted dotterels and pied stilts.

The three observers who carried out these surveys (the authors) each spent at least one day surveying a section of riverbed together before completing surveys by themselves. This was done to ensure that each observer was carrying out their surveys in a consistent manner so that direct comparisons of count data collected by different observers could be made.

For this survey, two minor additions were made to the survey method used by Rebergen (2012). Firstly, each river surveyed was broken up into adjacent one kilometre survey sections, and the identity and number of birds detected within each section was recorded separately. This methodology was used in order to create the opportunity to look for spatial patterns in the abundance and diversity of birds within each river and to enable the identification of discrete sites or reaches of river that possessed relatively high habitat values for birds. This approach also creates the opportunity to correlate bird abundance or diversity with physical habitat variables (eg extent of woody weed cover) or the Natural Character Index being developed by Massey University researchers (R. Death pers. comm.). To ensure the repeatability of these surveys, the start and finish points for each of these one km survey sections have been GPSed with a Garmin GPSmap 60CSx hand held GPS unit and these grid references can be found listed in Appendix 1 of this report.

The second addition made to the survey methodology was that the observers recorded the locations of any nests, nesting colonies, dependent chicks or colonial roost sites encountered during the surveys using hand held GPS units. This was completed in order to assist with the identification of any discrete sites or reaches of river that possessed relatively high habitat values for birds.

2.3 Data management and analysis

River bird survey data were entered into Microsoft Excel spreadsheets which were then used to calculate the diversity of species recorded along each river and each 1 km survey section, as well as the relative abundance (mean number of birds/km/year) of several key riverbed-nesting shorebird species.

This survey data was also entered into the New Zealand eBird database (<http://ebird.org/content/newzealand/>), with bird data from each 1 km survey section being entered as a complete checklist using eBird's "travelling count" protocol. This was done to ensure that this data is permanently stored in a discoverable and easily retrievable location, and to amalgamate this dataset with a growing archive of bird observations being made by local bird-watchers and other 'citizen scientists' on the Ōtaki, Waikanae and Hutt Rivers.

Locations of all nests, nesting colonies, dependent chicks, colonial roost sites and sites with relatively high habitat value for indigenous birds were mapped using ArcMap version 10.1.

3. Results

3.1 Ōtaki River

3.1.1 Riverbed nesting shorebirds

Three species of shorebirds were observed using the dry gravel beaches and islands of the Ōtaki River during the 2012-2015 surveys. The pied stilt, a species ranked as ‘At Risk, Declining’ under the New Zealand Threat Classification System was the most common shorebird species, followed by the banded dotterel (ranked as Nationally Vulnerable) and the black-fronted dotterel, a recent coloniser from Australia.

An average of 41 pied stilts was recorded along the 11.6 km of river surveyed each year, or 3.5 birds per km of river (Table 3.1). Territorial pairs of adult pied stilts were found to be fairly evenly distributed along the length of the Ōtaki River, but became uncommon upstream of XS890, and between XS350 and XS260 (from the SH 1 bridge to approximately one km further downstream) (Figure 3.1). Pied stilts were recorded breeding on the riverbed between XS120 and XS700, with both nests and chicks observed during these surveys. During the 2012/2013 survey, a small nesting colony of six breeding pairs, (each pair of birds incubating a clutch of three eggs), was found on the gravel island near XS130 (approximately 1.5 km upstream of the Ōtaki River mouth).

Table 3.1: Numbers of pied stilts, banded dotterels and black-fronted dotterels counted along the Ōtaki River, 2012-2015

Year	Pied stilt		Banded dotterel		Black-fronted dotterel	
	Total number counted	Number of birds per km	Total number counted	Number of birds per km	Total number counted	Number of birds per km
2012/2013	41	3.5	38	3.3	11	0.9
2013/2014	22	1.9	18	1.6	11	0.9
2014/2015	59	5.1	45	3.9	23	2.0
Mean ± SD	41 ± 15	3.5 ± 1.3	34 ± 11	2.9 ± 1.0	15 ± 6	1.3 ± 0.5

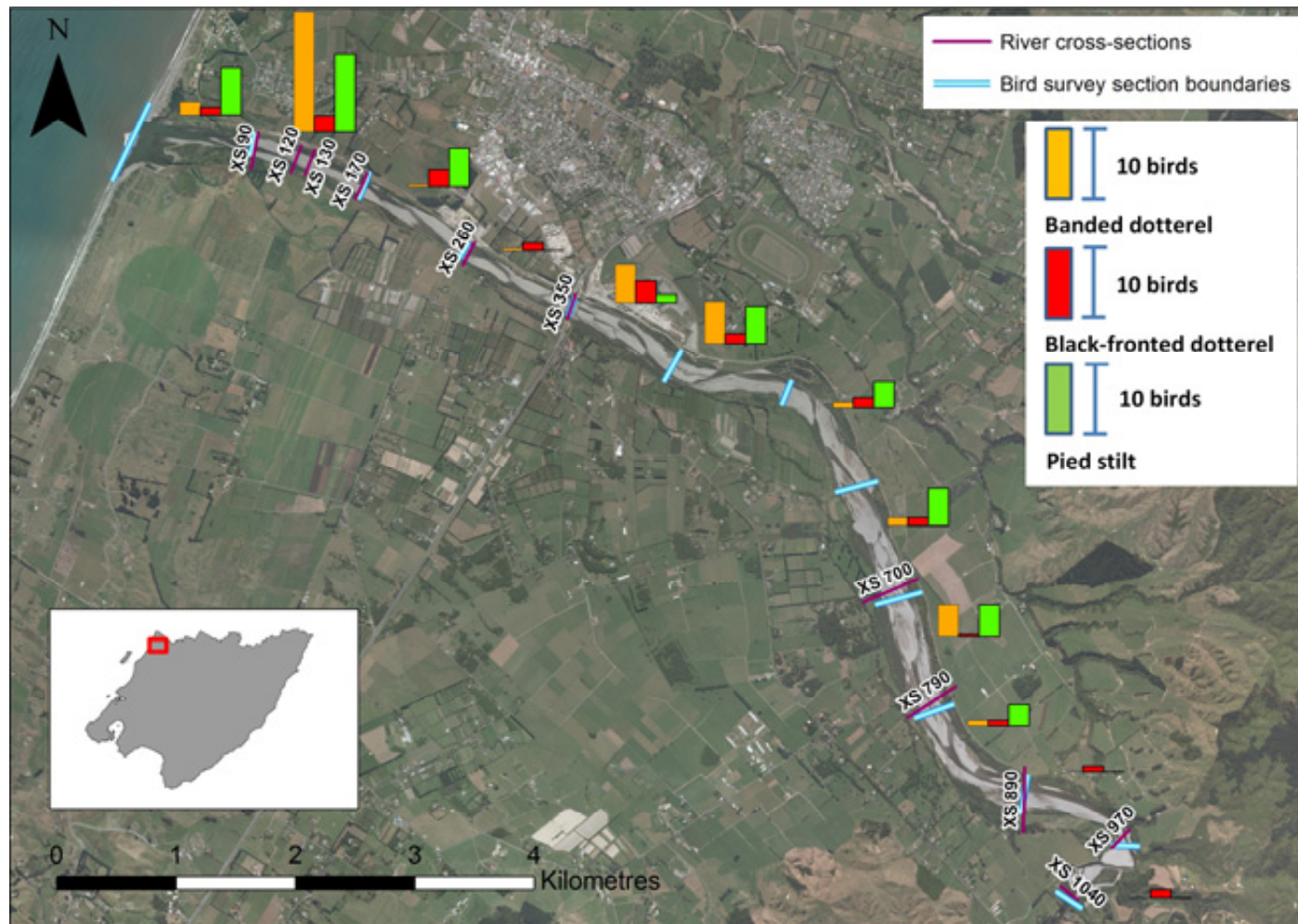


Figure 3.1: Map of the Ōtaki River showing spatial patterns in the relative abundance of riverbed nesting shorebirds. Coloured bars represent the mean number of birds counted along each 1 km survey section during three annual surveys between 2012 and 2015.

An average of 34 banded dotterels was recorded along the Ōtaki River each year, or 2.9 birds per km of river (Table 3.1). Territorial pairs of adult banded dotterels were found to be fairly evenly distributed along the length of the Ōtaki River, but became uncommon upstream of XS890, and between XS350 and XS170 (from the SH 1 bridge to approximately two km downstream) (Figure 3.1). A relatively high number of non-territorial banded dotterels were counted between XS90 and XS170 during the second and third year of surveys. Many of these birds appeared to be part of a small post-breeding flock of both adult and juvenile birds that were using this stretch of river as a roost site during late summer. Banded dotterels were recorded breeding on the riverbed between XS350 (the SH 1 bridge) and XS790, with both nests and chicks observed during these surveys.

No black-fronted dotterel nests or chicks were found during the 2012-2015 surveys, however the presence of territorial adult pairs along the river during the breeding season suggests that breeding is almost certainly occurring. Several pairs were also seen exhibiting various defensive behaviours as fieldworkers traversed their territories, which also indicated that either a nest or chicks were present. An average of 15 black-fronted dotterels was recorded along the Ōtaki River each year, or 1.3 birds per km of river (Table 3.1). Unlike both banded dotterels and pied stilts, black-fronted dotterels continued to be recorded both upstream of XS890 and in the reach immediately downstream of the SH 1 bridge (Figure 3.1).

3.1.2 Spatial patterns in bird species diversity

A total of 48 bird species were recorded on the Ōtaki River during the 2012-2015 bird surveys, including 30 native species and 18 introduced species. Of the native species, nine species are ranked as Nationally Threatened or 'At Risk' under the New Zealand Threat Classification System (Appendix 2; Robertson et al, 2013). In addition to these 48 species recorded during the 2012-2015 surveys, a further 15 species (13 native and two introduced) have been recorded on the Ōtaki River since 1982 (Appendix 3), bringing the total number of birds species so far recorded on the Ōtaki River to 63.

Both the total number of species and the ratio of native to introduced species encountered within each 1 km survey section varied little along the 11.6 km of the Ōtaki River that was covered during these surveys (Figure 3.2). A lower total number of species tended to be recorded upstream of XS890 and between XS350 and XS260 (from the SH 1 bridge to approximately one kilometre further downstream). In contrast, the Ōtaki Estuary supported a much higher total number of species, a higher ratio of native to introduced species and a higher number of Nationally Threatened and 'At Risk' species than any other reach of the Ōtaki River.

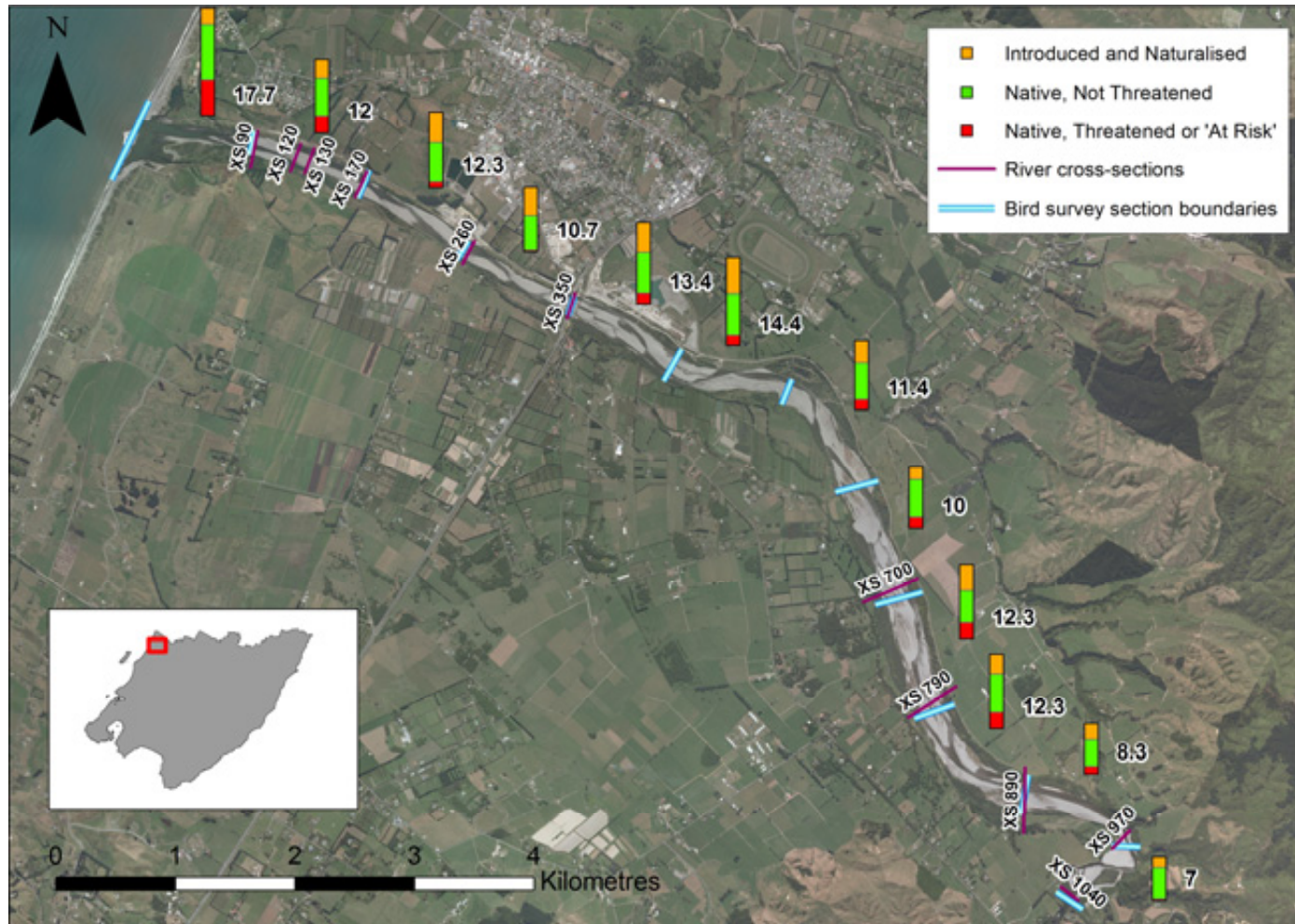


Figure 3.2: Map of the Ōtaki River showing spatial patterns in bird species diversity. Coloured bars and adjacent values represent the mean number of species detected along each 1 km survey section during three annual surveys between 2012 and 2015

3.1.3 Sites of value for indigenous birds on the Ōtaki River

Four sites of value for native birds have been identified on the Ōtaki River based on the data collected during these surveys (Figure 3.3).

Virtually the entire length of the 11.6 km of the Ōtaki River surveyed, between the Ōtaki Estuary and XS1040 provides breeding habitat for regionally-significant populations of both banded and black-fronted dotterels, and for a relatively large local breeding population of pied stilts. Approximately 8% of the Wellington region populations of both banded and black-fronted dotterels breed on the Ōtaki River (McArthur et al, 2015).

A previously un-documented nesting colony of black shags (*Phalacrocorax carbo*; a species ranked as ‘At Risk, Naturally Uncommon’) was discovered on the escarpment on the true right of the Ōtaki River at XS970 during the first year of these surveys, with nesting activity also observed during the second and third years’ surveys. Only two to three occupied nests were observed at the colony each year during these surveys, however peak egg-laying at inland black shag colonies in the Wellington Region occurs between April and October so the colony is likely to support a greater number of pairs than the results of these surveys suggest (Powlesland et al, 2007). Although the colony itself is situated on the escarpment well above the bed of the Ōtaki River, both adult black shags and recently-fledged juveniles from the colony were observed using the adjacent river channel and riverbed for foraging and roosting. This colony is one of only eight black shag nesting colonies known to be active in the Wellington region at the present time (Birds New Zealand, unpublished data).

The lower reach of the Ōtaki River between XS90 and XS170 appears to be utilized by banded dotterels as a post-breeding staging area prior to migration. In late summer (January), a relatively high number of non-territorial adult and juvenile dotterels roost in this downstream reach of the river before departing on migration.

The Ōtaki Estuary supports a relatively high total number of bird species, a relatively high number of Nationally Threatened and ‘At Risk’ species, and a higher ratio of native to introduced bird species than any other reach of the Ōtaki River.

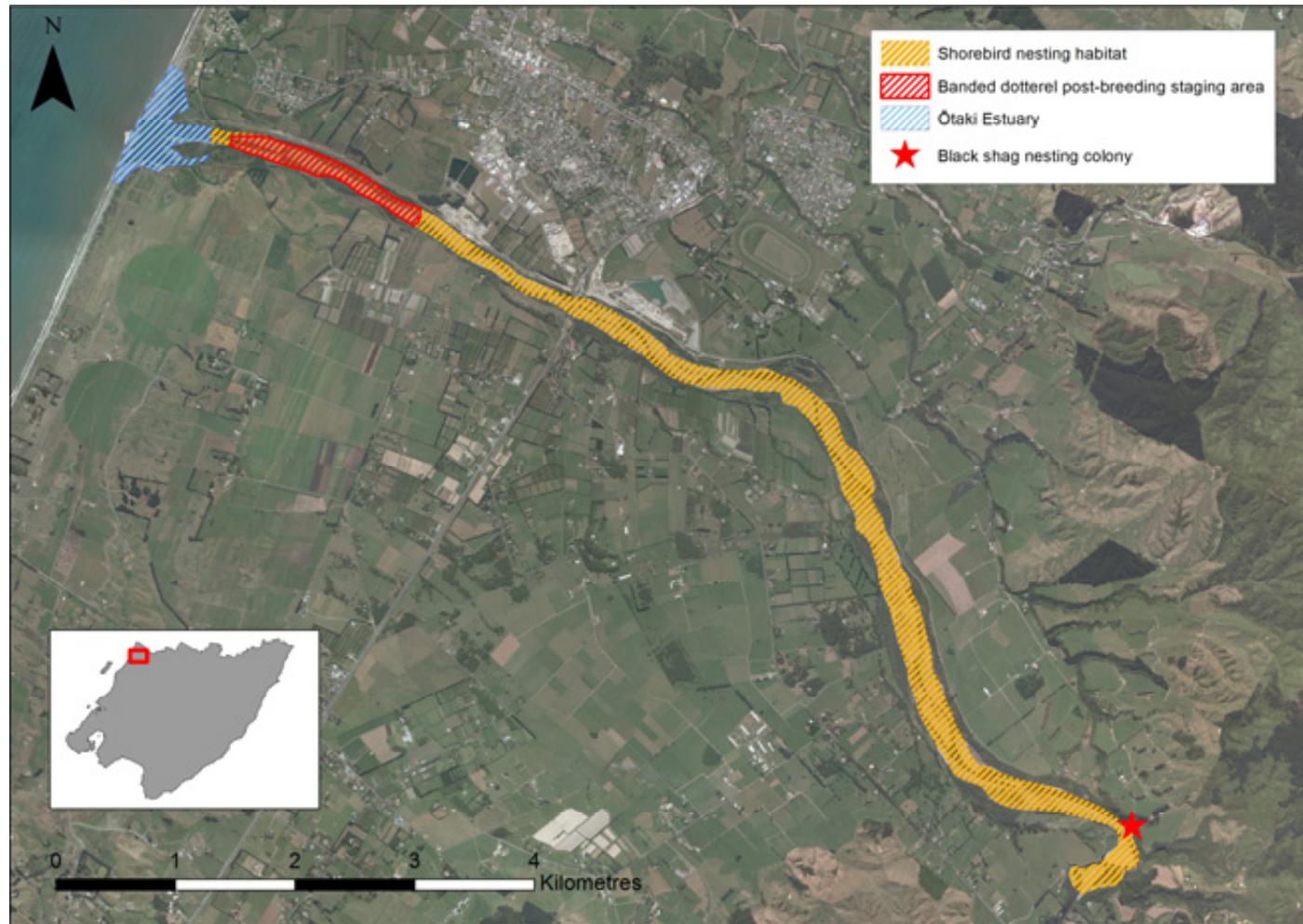


Figure 3.3: Map of the Ōtaki River showing bird sites of value identified as a result of the 2012-2015 bird surveys

3.2 Waikanae River

3.2.1 Riverbed nesting shorebirds

No shorebirds were observed breeding on the dry gravel beaches of the Waikanae River during the 2012-2015 surveys, however a pair of variable oystercatchers (*Haematopus unicolor*) was seen with a downy chick at the Waikanae Estuary during the 2014/2015 survey. Pied stilts and banded dotterels have also been recorded nesting at the Waikanae Estuary in the past (Kirk & Wodzicki 1943; Wodzicki 1946). The morphology of the Waikanae River between the SH 1 bridge and the Waikanae Estuary, particularly the narrow channel width and relatively small areas of open, dry gravel habitat means that there is currently very little (if any) suitable habitat to support riverbed-nesting shorebirds (N. McArthur pers. obs).

3.2.2 Spatial patterns in bird species diversity

A total of 45 bird species were recorded during the 2012-2015 bird surveys, including 27 native species and 18 introduced species. Of the native species, nine species are ranked as Nationally Threatened or 'At Risk' under the New Zealand Threat Classification System (Appendix 4; Robertson et al, 2013). In addition to these 45 species recorded during the 2012-2015 surveys, a further 45 species (42 native and three introduced) have been recorded on the Waikanae River (the majority at the Waikanae Estuary) since 1927 (Appendix 5), bringing the total number of bird species so far recorded on the Waikanae River to 90.

Both the total number of species and the ratio of native to introduced species encountered within each 1 km survey section varied little upstream of XS155. However, the total number of species, the proportion of native species, and the proportion of Nationally Threatened and 'At Risk' species encountered gradually increased downstream from this point, with the highest number of species being detected at the Waikanae River mouth (Figure 3.4).

3.2.3 Sites of value for indigenous birds on the Waikanae River

One site of value for native birds was identified on the Waikanae River based on the data collected during these surveys, and this was the Waikanae Estuary and its associated wetlands and ponds (Figure 3.5).

This site supports a relatively high total number of bird species, a relatively high number of Nationally Threatened and 'At Risk' species, and a higher ratio of native to introduced bird species than any other reach of the Waikanae River. In addition, the wetlands associated with the Waikanae River mouth support one of only two known populations of North Island fernbird (*Bowdleria punctata*) in the Wellington Region, and one of the largest nesting colonies of pied shags (*Phalacrocorax varius*) in the region. As well as supporting a relatively high diversity of resident native bird species, this estuary is also a regionally important stop-over site for several migrant shorebird species including South Island pied oystercatcher (*Haematopus finschi*), bar-tailed godwit (*Limosa lapponica*) and black-fronted tern (*Chlidonias albostratus*).

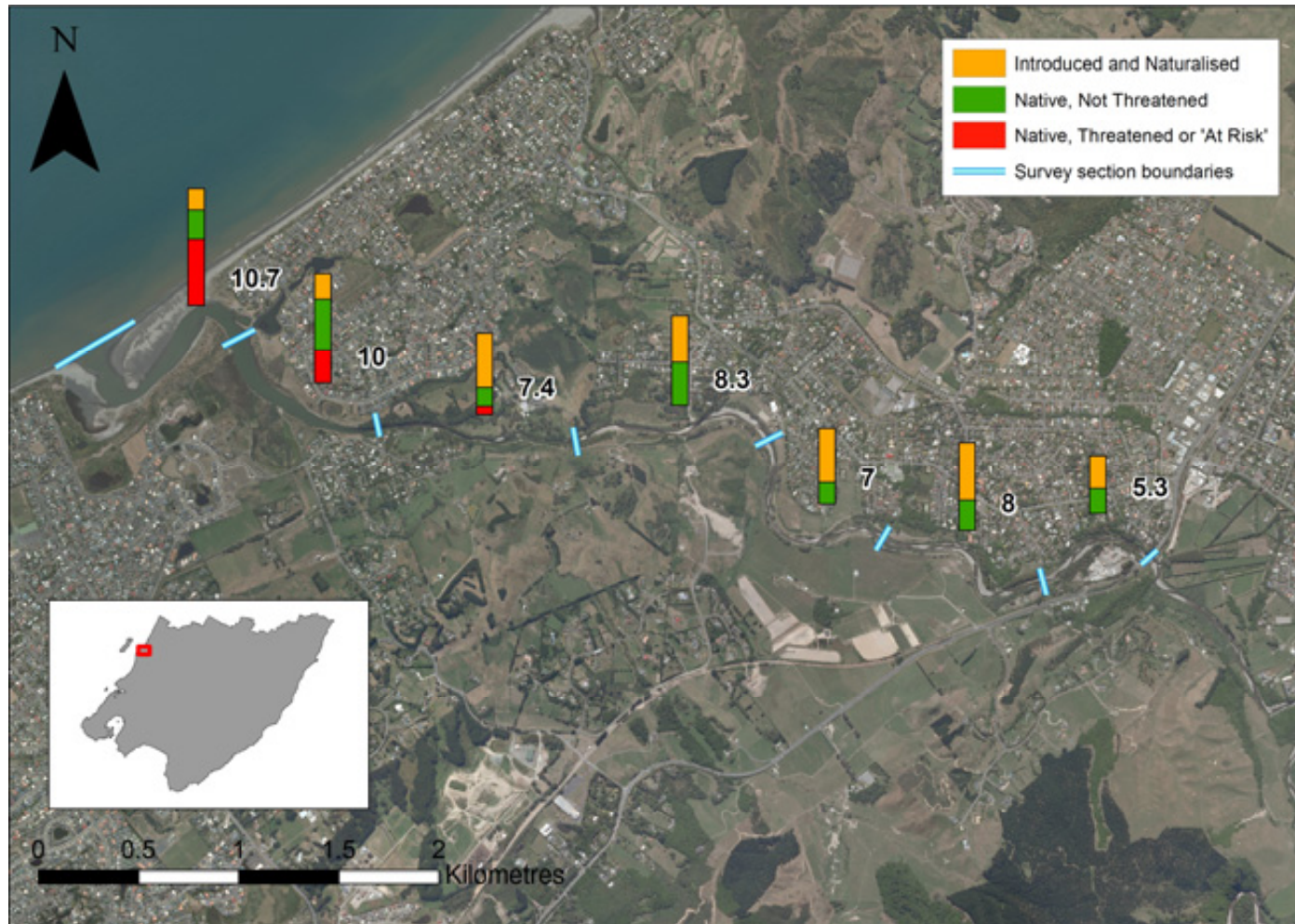


Figure 3.4: Map of the Waikanae River showing spatial patterns in bird species diversity. Coloured bars and adjacent values represent the mean number of species detected along each 1 km survey section during three annual surveys between 2012 and 2015.

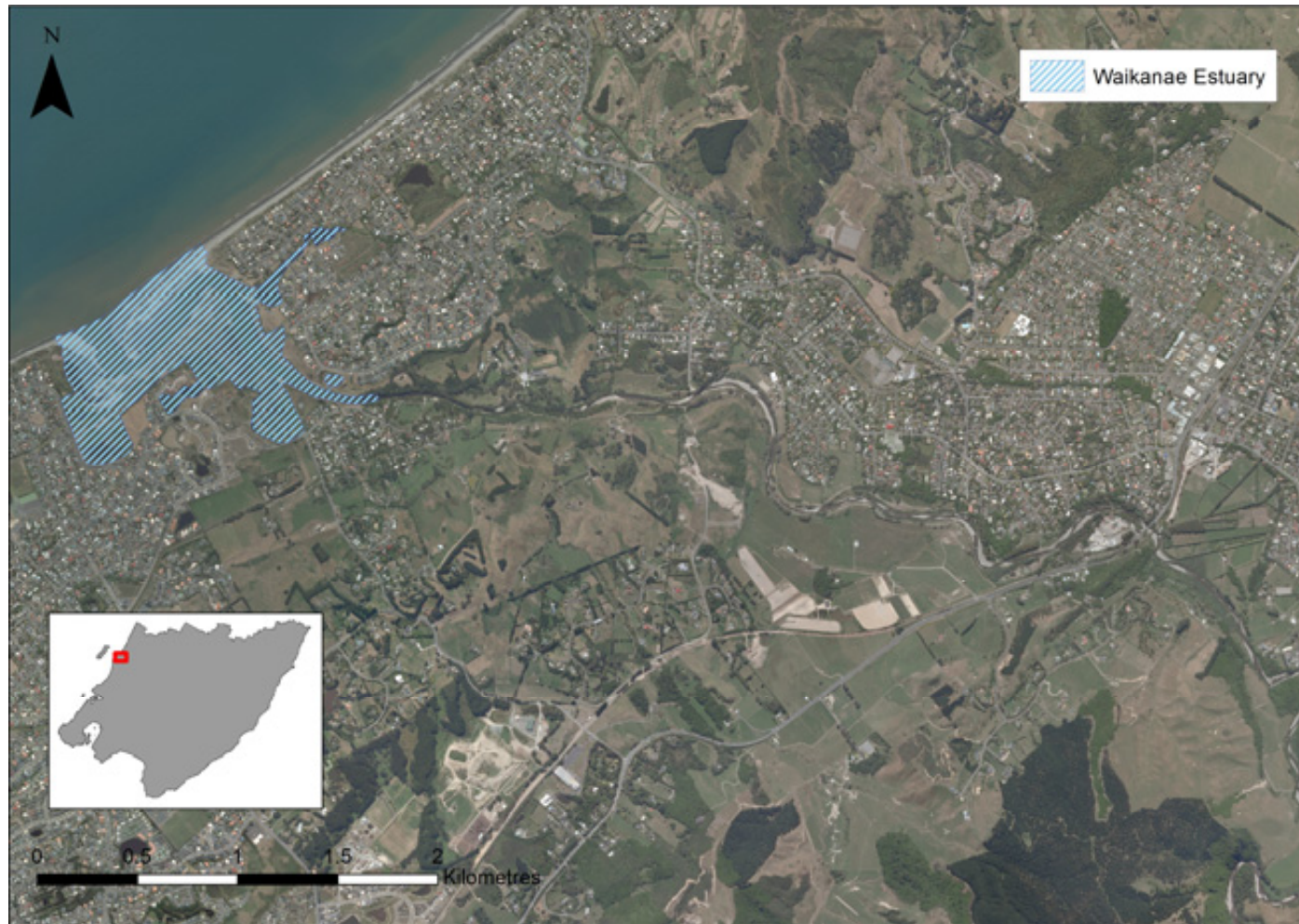


Figure 3.5: Map of the Waikanae River showing the location of the Waikanae Estuary 'bird site of value'

3.3 Hutt River

3.3.1 Riverbed nesting shorebirds

One species of shorebird (pied stilt) was observed using the dry gravel beaches along parts of the Hutt River during the 2012-2015 surveys. Although no nests or chicks were located, the presence of territorial pairs in suitable habitat during this species' breeding season suggests that these birds are likely to be breeding on the Hutt River. Several pied stilt pairs were also seen exhibiting various defensive behaviours as fieldworkers traversed their territories, which also provides circumstantial evidence that either a nest or chicks were present.

An average of 20 pied stilts was recorded along the 31.5 km of river surveyed each year, or 0.6 birds per km of river (Table 3.2). Pied stilts pairs were not evenly distributed along the Hutt River however. Instead, these birds were concentrated in two discrete reaches of the river, between XS1310 and XS2270 (from the Silverstream Weir to the eastern end of Awa Kairangi Park) and between XS2730 and XS2900 (alongside the Te Marua golf course) (Figure 3.6).

Table 3.2: Numbers of pied stilts counted along the Hutt River, 2012-2015

Year	Total number counted	Number of birds per km
2012/2013	11	0.3
2013/2014	20	0.6
2014/2015	28	0.9
Mean ± SD	20 ± 7	0.6 ± 0.2

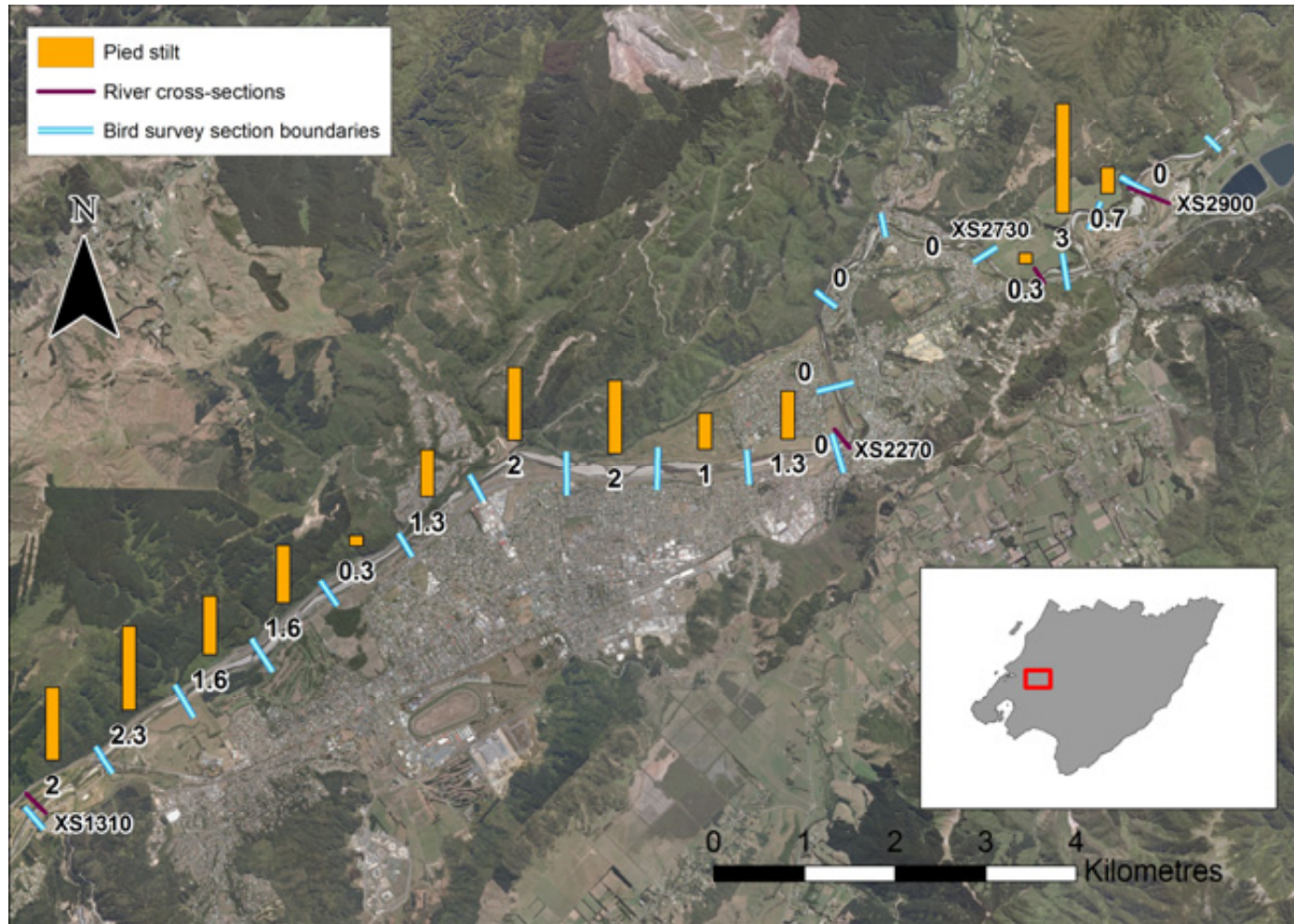


Figure 3.6: Map of the Hutt River showing the spatial pattern in the relative abundance of pied stilts. Coloured bars and adjacent values represent the mean number of birds counted along each 1 km survey section during three annual surveys between 2012 and 2015.

3.3.2 Spatial patterns in bird species diversity

A total of 44 bird species were recorded during the 2012-2015 bird surveys, including 26 native species and 18 introduced species. Of the native species, seven species are ranked as Nationally Threatened or 'At Risk' under the New Zealand Threat Classification System (Appendix 6; Robertson et al, 2013). In addition to these 44 species recorded during the 2012-2015 surveys, a further 18 species (all native) have been recorded on the Hutt River since 1997 (Appendix 7), bringing the total number of bird species so far recorded on the Hutt River to 62.

Both the total number of species and the ratio of native to introduced species encountered within each 1 km survey section varied little along the 31.5 km of the Hutt River that was surveyed (Figure 3.7). A slightly higher proportion of Nationally threatened and 'At Risk' species were recorded between XS1310 and XS2270 (from the Silverstream Weir to the eastern end of Awa Kairangi Park) and between XS2730 and XS2900 (alongside the Te Marua golf course), due largely to the presence of both pied stilts and black shags on the riverbed within these reaches. The total number of species recorded, the ratio of native to introduced species and the proportion of threatened and 'at risk' species all increased with increasing distance downstream of XS540. This change was due to the presence of greater numbers of predominately coastal bird species such as red-billed gulls (*Larus novaehollandiae*), royal spoonbills (*Platalea regia*), pied shags and variable oystercatchers in this lower reach of the Hutt River.

3.3.3 Sites of value for indigenous birds on the Hutt River

Six sites of value for native birds have been identified on the Hutt River based on the data collected during these surveys (Figure 3.8).

The two reaches of the Hutt River, between XS1310 and XS2270 (from the Silverstream Weir to the eastern end of Awa Kairangi Park) and between XS2730 and XS2900 (alongside the Te Marua golf course) are likely to be providing breeding habitat for 10-15 pairs of pied stilts, or 1-2% of the regional population of this "At Risk – Declining" species (McArthur et al, 2015).

Two small nesting colonies of black shags are also present on the Hutt River, one near XS2920 (opposite the Te Marua golf course) and one near XS490 (near the Melling Bridge). The Te Marua colony contained 3-5 occupied nests each year between 2012 and 2015 and the Melling colony contained 2-7 nests. Peak egg-laying at inland black shag colonies in the Wellington region occurs between April and October however, so these colonies likely support a greater number of pairs than the results of these surveys suggest (Powlesland et al, 2007). Although both colonies are situated on escarpments well above the bed of the Hutt River, both adult black shags and recently-fledged juveniles from the colonies were observed using the adjacent river channel and riverbed for foraging and roosting. These colonies are two of only eight black shag nesting colonies known to be active in the Wellington region at the present time (Birds New Zealand, unpublished data). The Melling colony site has been used as a nocturnal roost by black shags since at least 1993, with one prior breeding attempt recorded at the site in June 1994. The Te Marua colony was first

discovered in October 1994, with breeding occurring in 1994 and 1995 (Powlesland et al, 2007).

A large gravel island that is exposed at low tide near XS190 (just downstream of the Ava railway bridge) provides an important roost site for a number of threatened shorebird species, including royal spoonbills, black shags, little black shags (*Phalacrocorax sulcirostris*), pied shags, variable oystercatchers, pied stilts and Caspian terns (*Hydroprogne caspia*) (New Zealand eBird database; accessed 12/06/2015). Gravel beaches either side of the Silverstream road bridge (XS1400) are also used as a roost site by large numbers of black-backed gulls (*Larus dominicanus*), however black-backed gulls lack legal protection and are classified as “Not Threatened” under the New Zealand Threat Classification System (Robertson et al, 2013). This, and the fact that their presence at this location is more likely to be a consequence of the proximity of the Silverstream Landfill, leads us to consider that this latter roost site should not be considered as a “site of value” for native birds.

The Hutt Estuary, upstream to XS150 supports a relatively high number of Nationally Threatened and ‘At Risk’ species, and a higher ratio of native to introduced bird species than any other reach of the Hutt River.

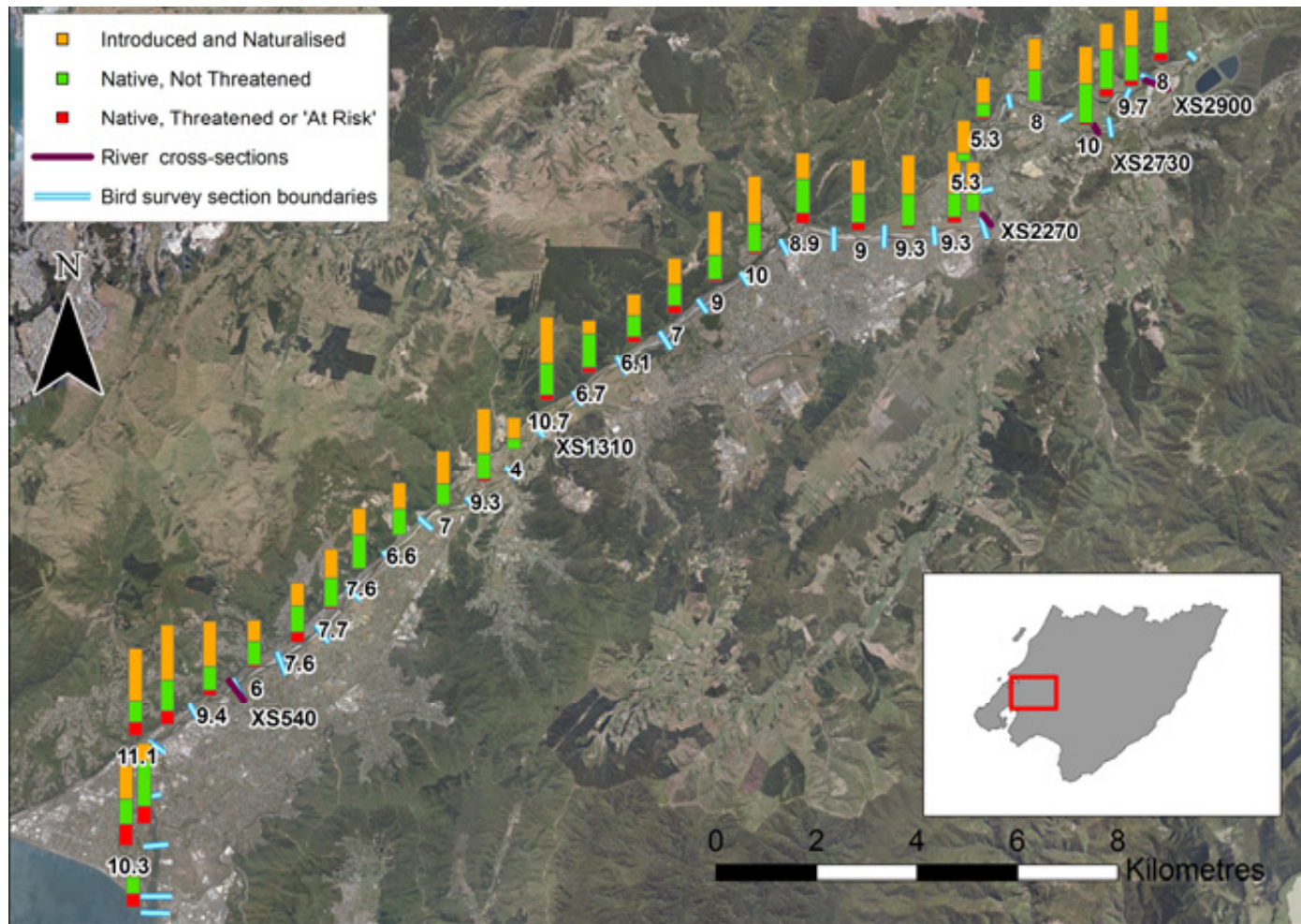


Figure 3.7: Map of the Hutt River showing spatial patterns in bird species diversity. Coloured bars and adjacent values represent the mean number of species detected along each 1 km survey section during three annual surveys between 2012 and 2015.

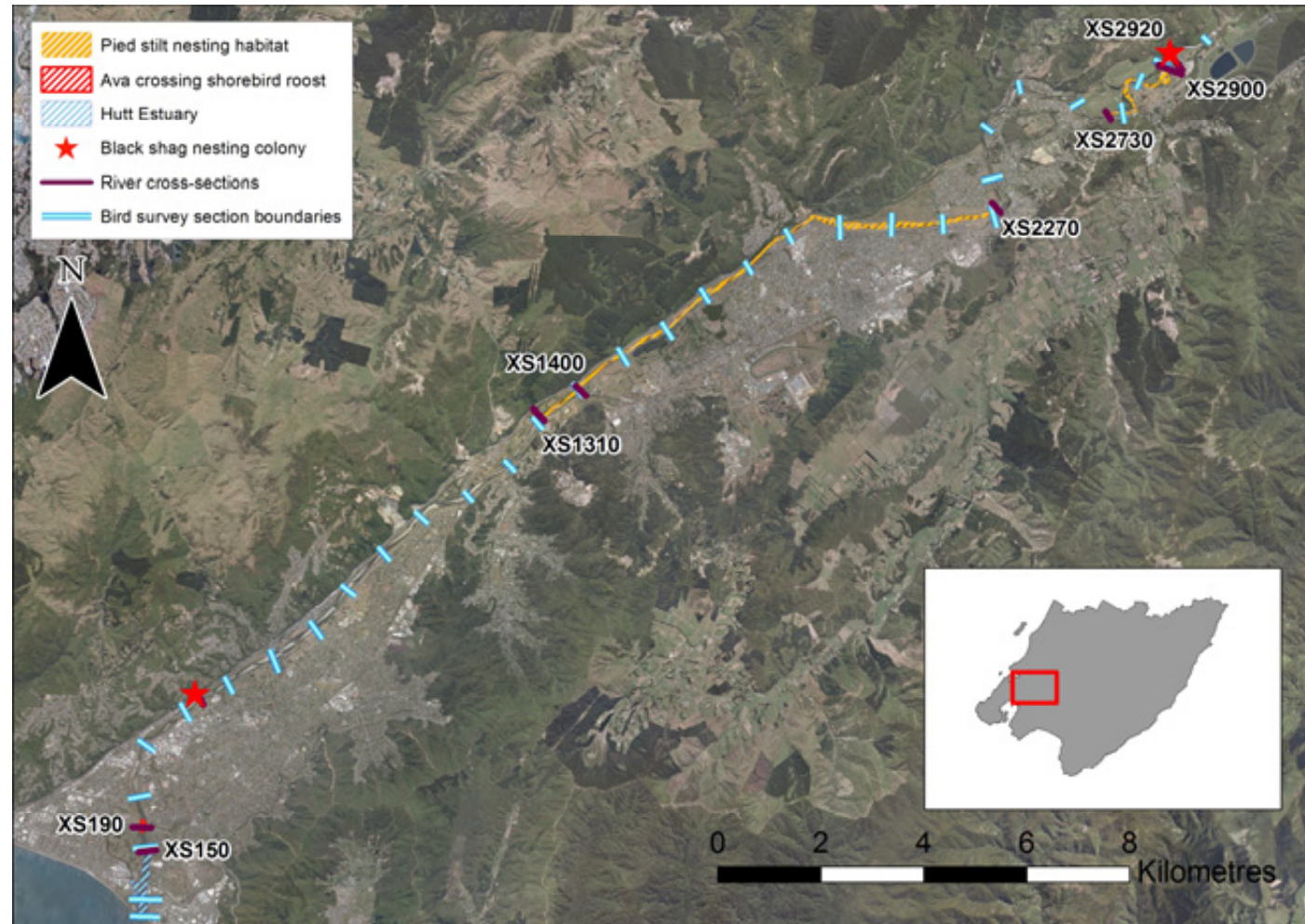


Figure 3.8: Map of the Hutt River showing bird sites of value identified as a result of the 2012-2015 bird surveys

4. Discussion

4.1 Management of riverbed nesting shorebirds

These surveys demonstrate that the Ōtaki River supports the highest diversity and abundance of riverbed nesting shorebirds among the three “western sector” rivers that were surveyed. Around 8% of the Wellington region’s populations of both banded and black-fronted dotterels breed on the Ōtaki River each year, along with 3% of the Wellington region’s population of pied stilts (McArthur et al 2015; GWRC unpublished data). These surveys also show that the Ōtaki River supports the largest populations of both banded and black-fronted dotterels on the west coast of the North Island south of the Manawatu River.

Annual counts of these species varied from year to year. Counts for both banded dotterels and pied stilts were lower than average in year two, which is likely to be because the Ōtaki River was surveyed relatively late in the season that year, and a number of the birds encountered appeared to have finished breeding. It is possible therefore that a proportion of the birds in the local breeding population had already vacated their breeding territories that year so were not included in the count. In year three, numbers of banded and black-fronted dotterels and pied stilts counted were all higher than average, possibly the result of a particularly successful breeding season.

Given this relatively high diversity and abundance of shorebirds and their relatively uniform distribution along the length of the Ōtaki River influenced by flood protection activities, it’s on the Ōtaki River that these activities have the greatest potential to have either beneficial or adverse effects on riverbed-nesting birds.

There is some anecdotal evidence that at the catchment scale, the disturbance regime created by flood protection activities is having a net positive effect on the abundance and breeding success of riverbed nesting shorebirds. Activities such as gravel extraction, beach ripping and contouring help prevent the invasion of open gravel habitats by exotic woody weeds, which in turn may reduce the impacts of introduced mammalian predators on dotterel nesting success (Sim 1997; Rebergen 2011; Rebergen 2012). The authors of this report noted that the Ōtaki River banded dotterels appeared to have experienced relatively high nest success rates during each of the three previous summers, with many of the breeding pairs encountered during these surveys observed with young chicks. In contrast, simultaneous monitoring of two coastal banded dotterel populations at both Pencarrow Head and Baring Head/Ōrua-pouanui showed that these populations were experiencing nest failure rates in excess of 90%, so the majority of pairs at these latter two sites were incubating clutches of eggs at the same time of year (GWRC unpublished data).

Nonetheless, despite these net positive effects possibly occurring at the catchment scale, it’s likely these effects are being limited by the local losses of nests and chicks as a direct consequence of the mechanical disturbance of open gravel habitats during gravel extraction, beach ripping or contouring activities (Figure 4.1). The lowering of gravel beaches during contouring or gravel extraction activities may also lead to nests and chicks being more prone to being washed away by floods (Rebergen 2012).



Figure 4.1: Pied stilt nest (foreground, centre) on the Ōtaki River with gravel beach ripping in progress in the background, November 2012

GWRC's Environmental Code of Practice seeks to minimise these local losses of nests or chicks by stipulating that any activities causing disturbance to dry gravel beaches during the shorebird breeding season (1st Aug to 28th Feb) be preceded by a survey of the affected area to determine whether any shorebird nests or chicks are present (GWRC 2015). Should active nests or broods of chicks be detected, exclusion zones will be maintained where possible around nests and chicks to minimise the risk of accidentally crushing eggs or chicks, or nest abandonment by adults. The extent of these exclusion zones (which vary according to the type or duration of habitat disturbance being imposed) are not currently specified in the Code, but can be found listed in both Cameron (2013) and McArthur et al (2013).

The Environmental Monitoring Plan includes a series of “trigger levels” against which the success or otherwise of the measures included in the Code can be measured. These “trigger levels” represent rates of decline in the Ōtaki

River shorebird populations above which a review of the current management and/or monitoring regime would be triggered (Table 4.1).

Table 4.1: Adaptive management trigger levels for river-bed nesting birds on the Ōtaki River (GWRC, 2015)

Species	Trigger level
Banded dotterel	25% or more decline in the average number of breeding pairs detected between one 3-year set of surveys and the next
Pied stilt	25% or more decline in the average number of breeding pairs detected between one 3-year set of surveys and the next
Black-fronted dotterel	50% or more decline in the average number of breeding pairs detected between one 3-year set of surveys and the next

If the cause of a population decline is obvious, and can be reliably linked to flood protection activities (eg a significant observed increase in the proportion of dry gravel habitat being disturbed during the shorebird breeding season), then a review of the Code would be the most appropriate response. However, a much more likely scenario is that the cause of an observed population decline is not obvious, and in this situation a review of the EMP would be more appropriate. In this latter case, a targeted investigation aimed at identifying the cause of any local decline in shorebirds would likely be required. Such an approach has recently been successfully applied to identify the cause of breeding failure in two populations of coastal-breeding banded dotterels in the Wellington region (Pencarrow Head and Baring Head/Ōrua-pouanui). In this case, digital trail cameras were used to film dotterel nests and it was demonstrated that depredation by hedgehogs was accounting for 60% of nest failures in these two populations. The implementation of hedgehog control in response to this finding led to a 500-700% increase in the nesting success of dotterels at these two sites over the next two subsequent breeding seasons (GWRC unpublished data).

The Hutt River was the only other of the three “western sector” rivers to provide habitat for riverbed-breeding shorebirds. Between 1-2% of the Wellington region’s pied stilt population breeds on two discrete sections of the Hutt River between the Silverstream weir and the Te Marua Water Treatment Plant. These birds are likely to be similarly affected by GWRC’s flood and erosion mitigation activities, so similar management precautions to those used on the Ōtaki River should be adopted for these specific river reaches (see recommendations section below).

4.2 Bird species diversity

Very similar numbers of bird species were recorded along the Ōtaki, Waikanae and Hutt Rivers during these surveys (48, 45 and 44 species respectively), despite large differences in the geomorphology and lengths of each river surveyed. All three rivers showed similar spatial patterns in species diversity, with relatively consistent numbers of species, and a consistent ratio of native to exotic species along most of the surveyed length of each river. Species diversity, the ratio of native to exotic species and the ratio of Nationally

Threatened and ‘At Risk’ to non-threatened species tended to increase within 1-2 km of the mouth of each river, reaching a maximum at each estuary.

In contrast, numbers of additional bird species recorded on each river outside of these annual surveys varied markedly, with 45 additional species recorded on the Waikanae River, 15 species recorded on the Ōtaki River and 18 species on the Hutt River. Most of these additional species recorded on each river were observed at the estuaries, due to a traditional concentration of search effort in these habitats by both recreational birdwatchers and ornithologists. The Waikanae Estuary has a particularly long tradition of being monitored by local birdwatchers, including leading ornithologists such as Sir Charles Fleming, Sir Robert Falla and Dr Kazimierz Wodzicki, so the very high total number of species recorded for this river can partly be explained by a higher level of search effort. However, the Waikanae Estuary is also likely to provide better quality bird habitat than either the Hutt or Ōtaki Estuaries. The Waikanae is several times larger than the Hutt Estuary, and is composed predominantly of soft sediments rather than the stony & cobbly substrates of the Ōtaki Estuary. These differences mean that the Waikanae Estuary probably provides a much greater area of higher-quality foraging habitat for shorebirds than either the Hutt or Ōtaki Estuaries.

The appendices to this report attempt to bring together bird records collected during these surveys with published observations collected by other birdwatchers and ornithologists over the past 90 years. These species lists are not yet likely to be complete, but probably represent the most up-to-date published species lists currently available for each of these rivers.

4.3 Sites of value for indigenous birds

A total of eleven sites of value for indigenous birds have been identified on these western sector rivers from data collected during these surveys. This includes four sites on the Ōtaki River, one site on the Waikanae River and six sites on the Hutt River.

The majority of the bed of the Ōtaki River, and two discrete reaches of the Hutt River have been identified as sites of value due to the presence of one or more species of riverbed-nesting shorebird. The Ōtaki River shorebird-nesting habitat had already previously been identified as a “habitat of significance for indigenous birds” and has been listed in schedule F2 of the Proposed Natural Resources Plan (GWRC 2015; McArthur et al 2015).

A second, smaller reach of the lower Ōtaki River has also been identified as a site of value, due to it regularly being used as a staging area by post-breeding flocks of both adult and juvenile banded dotterels near the end of the summer breeding season. This area falls within the previously mentioned shorebird nesting ‘site of value’ (Figure 3.3).

Three black shag nesting colonies were also identified during the course of these surveys, one near XS970 on the Ōtaki River, and two further colonies on the Hutt River, near Melling Bridge and opposite the Te Marua Golf course. The Ōtaki River colony appears to be previously un-documented, whereas the Hutt River colonies have been known to be present since at least the early

1990s (Powlesland et al 2007). Only eight black shag nesting colonies are known to be active in the Wellington region at the present time (Birds New Zealand, unpublished data).

All three river estuaries have been identified as sites of value for indigenous birds due to the high number of native species, and the relatively high number of threatened and ‘at risk’ species that use these habitats. The Ōtaki Estuary has been designated a “Key Native Ecosystem” by Greater Wellington Regional Council and the Waikanae Estuary site includes the Waikanae Estuary Scientific Reserve. All three estuaries have been previously identified as “sites of significance for indigenous birds” and have been listed in schedule F2 of the Proposed Natural Resources Plan (GWRC 2015; McArthur et al 2015).

Lastly, a small gravel island just downstream of the Ava Rail Bridge on the Hutt River has also been identified as a site of value for indigenous birds. This site provides low-tide roosting habitat for a range of threatened and ‘at risk’ shorebird species. It’s interesting to note that this site was identified solely from bird observations collected by local bird-watchers and submitted to the New Zealand eBird database. Because this island is exposed only at low tide, and the birds that use it for roosting are therefore transitory, these three annual surveys were insufficient to identify this as a site of value. In contrast, birdwatchers have been keeping a regular eye on this site over a number of years, with many useful observations being collected, sometimes by people commuting to and from Wellington on passing trains. Because these observations have been submitted to the New Zealand eBird database, and have been verified by the database’s filters and expert reviewers, we were able to use the data to identify this as a site of value. This example illustrates the potential contribution that appropriately-skilled ‘citizen scientists’ can make towards monitoring trends in the diversity and abundance of birds at key sites, provided their data is stored in a location that enables it to be validated as well as discovered and retrieved.

5. Recommendations

This report provides a baseline description of the diversity, abundance and distribution of birds on the Ōtaki, Waikanae and Hutt Rivers, against which any future changes can be measured. As specified in GWRC's Flood Protection Environmental Monitoring Plan, a second round of annual river bird counts should be scheduled to be carried out between October and December in 2020, 2021 and 2023. This next series of surveys will provide GWRC with the first opportunity to assess trends in the population sizes of riverbed-nesting shorebirds on the Ōtaki River and parts of the Hutt River. These trends can then be compared to the trigger levels described in the Environmental Monitoring Plan, which will determine whether or not a management and/or monitoring response will be required.

We recommend that the Flood Protection department updates its spatial GIS database of river values, adding records describing the 11 bird sites of value for indigenous birds that have been identified in this report and that are mapped in Figures 3.3, 3.5 and 3.8.

We also recommend that the following changes be made to the Code of Practice and Environmental Monitoring Plan:

- The wording of the Code should be modified to specify that flood and erosion mitigation activities causing disturbance to dry gravels on the Ōtaki River and parts of the Hutt River *should be programmed outside of the shorebird nesting season whenever possible. Where this is not possible, these works should be preceded by a survey carried out by an appropriately experienced ornithologist* to identify the presence of shorebird nests or chicks. Adopting these practices should minimise the costs associated with carrying out pre-works shorebirds surveys and the extent to which activities are disrupted by the presence of nests and chicks, while at the same time minimising adverse impacts of these activities on shorebird species that are present.
- The Code should be updated to reflect new information on the presence of a breeding population of pied stilts on the Hutt River between XS1310 and XS2270 and between XS2731 and XS2900. To maintain consistency in the Code, it is appropriate that a restriction period applicable to these two reaches be added to Table 6 of the Code, specifying that works on dry gravels between 1st August and 28th Feb should be avoided where possible. When such work must be carried out during the shorebird nesting season, they should be preceded by a survey for pied stilt nests and chicks, carried out by an appropriately experienced ornithologist.
- In addition, an appropriate trigger level for the Hutt River pied stilt population should be added to the EMP to provide a mechanism by which the Flood Protection department can devise an appropriate response to any potential future decline observed in this population. We recommend that the trigger level specified in Table 5.1 be added to the EMP.

Table 5.1: Recommended trigger level for the Hutt River pied stilt population

Species	Trigger level
Pied stilt	50% or more decline in the average number of breeding pairs detected between one 3-year set of surveys and the next

- The Code should be updated to specify the exclusion zones that should be maintained around shorebird nests or chicks by people or machinery working on dry gravels during the shorebird breeding season. These exclusion zones can be found in listed Cameron (2013) and McArthur et al (2013).

We also recommend that a pilot trial be carried out on the Ōtaki River during an upcoming shorebird nesting season to test the efficacy of these proposed pre-works surveys and the maintenance of exclusion zones around any nests or broods of young chicks found. This will allow GWRC to assess the effectiveness of these methods as a means of minimising the local losses of nests and chicks as a consequence of Flood Protection activities and will provide an opportunity to estimate the costs involved with this work. It would also be useful to test this technique in the field before the Code and EMP are finalised so that the published version of the Code contains a method that is proven to be feasible to implement in the field.

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Appendices

Appendix 1: NZTM grid references for each 1 km survey section on the Ōtaki, Waikanae and Hutt Rivers

Ōtaki River

Section Number	Upstream Boundary	Upstream Boundary	Downstream Boundary	Downstream Boundary
	Easting	Northing	Easting	Northing
1	1785251	5479481	1785661	5479915
2	1785661	5479915	1784825	5480419
3	1784825	5480419	1784140	5481073
4	1784140	5481073	1783723	5481982
5	1783723	5481982	1783386	5482923
6	1783386	5482923	1782843	5483765
7	1782843	5483765	1781852	5483915
8	1781852	5483915	1781047	5484516
9	1781047	5484516	1780116	5484914
10	1780116	5484914	1779296	5485487
11	1779296	5485487	1778359	5485848
12	1778359	5485848	1777383	5485956

Waikanae River

Section Number	Upstream Boundary	Upstream Boundary	Downstream Boundary	Downstream Boundary
	Easting	Northing	Easting	Northing
1	1773790	5472250	1773278	5472120
2	1773278	5472120	1772460	5472338
3	1772460	5472338	1771881	5472842
4	1771881	5472842	1770943	5472819
5	1770943	5472819	1769948	5472931
6	1769948	5472931	1769314	5473387
7	1769314	5473387	1768709	5473396

Hutt River

Section Number	Upstream Boundary	Upstream Boundary	Downstream Boundary	Downstream Boundary
	Easting	Northing	Easting	Northing
1	1779887	5450005	1779028	5449549
2	1779028	5449549	1778590	5449212
3	1778590	5449212	1778257	5448595
4	1778257	5448595	1777385	5448781
5	1777385	5448781	1776258	5449096
6	1776258	5449096	1775623	5448285
7	1775623	5448285	1775759	5447321
8	1775759	5447321	1775748	5446596
9	1775748	5446596	1774765	5446402
10	1774765	5446402	1773766	5446354
11	1773766	5446354	1772762	5446361
12	1772762	5446361	1771776	5446186
13	1771776	5446186	1771003	5445549
14	1771003	5445549	1770159	5445012
15	1770159	5445012	1769416	5444343
16	1769416	5444343	1768557	5443833
17	1768557	5443833	1767755	5443233
18	1767755	5443233	1767676	5443180
19	1767676	5443180	1766896	5442554
20	1766896	5442554	1766353	5441714
21	1766353	5441714	1765543	5441126
22	1765543	5441126	1764630	5440714
23	1764630	5440714	1763907	5440024
24	1763907	5440024	1763213	5439298
25	1763213	5439298	1762597	5438509
26	1762597	5438509	1761778	5437933
27	1761778	5437933	1760897	5437456
28	1760897	5437456	1760073	5436886
29	1760073	5436886	1759276	5436282
30	1759276	5436282	1759162	5435291
31	1759162	5435291	1759351	5434310
32	1759351	5434310	1759316	5433311
33	1759316	5433311	1759320	5432988

Appendix 2: Bird species recorded on the Ōtaki River during the 2012-2015 surveys

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010). Habitat use columns describe which habitats each species was observed using, or is likely to be using for feeding (F), roosting (R) and breeding (B) within the Ōtaki River corridor. Date ranges provided delimit the breeding season for each bird species observed or likely to be breeding in the river corridor, breeding season information was sourced from the [New Zealand Birds Online](http://www.nzbirds.org.nz/) website, accessed 30th July, 2015.

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Phasianus colchicus</i>	common pheasant	Introduced and Naturalised	F, R, B (Jul – Mar)	F, R, B (Jul – Mar)
<i>Cygnus atratus</i>	black swan	Not Threatened	R	Species unlikely to be using this habitat
<i>Anser anser</i>	greylag goose	Introduced and Naturalised	R	Species unlikely to be using this habitat
<i>Tadorna variegata</i>	paradise shelduck	Not Threatened	R, B (Aug – Feb)	B (Aug – Feb)
<i>Anas gracilis</i>	grey teal	Not Threatened	R, B? (Jun – Jan)	B? (Jun – Jan)
<i>A. platyrhynchos</i>	mallard	Introduced and Naturalised	R, B (Jul – Dec)	B (Jul – Dec)
<i>A. rhynchosotis</i>	Australasian shoveler	Not Threatened	R	Species unlikely to be using this habitat
<i>Cairina moschata</i>	Muscovy duck	N/A ¹	R	Species unlikely to be using this habitat
<i>Phalacrocorax melanoleucos</i>	little shag	Not Threatened	R	R
<i>P. carbo</i>	black shag	At Risk, Naturally Uncommon	R	R
<i>P. varius</i>	pied shag	Nationally Vulnerable	R	Species unlikely to be using this habitat
<i>Egretta novaehollandiae</i>	white-faced heron	Not Threatened	R	R, B? (Jun – Apr)

¹ Muscovy duck is not included in the current checklist of the birds of New Zealand (Gill et al, 2010) and therefore has not been given a New Zealand Threat Classification System ranking (Robertson et al, 2013)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Circus approximans</i>	Australasian harrier	Not Threatened	F, R, B (Sep – Apr)	F, R
<i>Porphyrio melanotus</i>	pukeko	Not Threatened	F, R, B (all year around)	F, R, B (all year around)
<i>Arenaria interpres</i>	turnstone	Migrant	R	Species unlikely to be using this habitat
<i>Haematopus unicolor</i>	variable oystercatcher	At Risk, Recovering	R, B (Sep – Mar)	Species unlikely to be using this habitat
<i>Himantopus himantopus</i>	pieb stilt	At Risk, Declining	F, R, B (Jun – Feb)	Species unlikely to be using this habitat
<i>Charadrius bicinctus</i>	banded dotterel	Nationally Vulnerable	F, R, B (Aug – Feb)	Species unlikely to be using this habitat
<i>Elseyornis melanops</i>	black-fronted dotterel	Coloniser	F, R, B (Aug – Mar)	Species unlikely to be using this habitat
<i>Vanellus miles</i>	spur-winged plover	Not Threatened	F, R, B (Apr – Nov)	Species unlikely to be using this habitat
<i>Larus dominicanus</i>	black-backed gull	Not Threatened	F, R	Species unlikely to be using this habitat
<i>L. novaehollandiae</i>	red-billed gull	Nationally Vulnerable	F, R	Species unlikely to be using this habitat
<i>Hydroprogne caspia</i>	Caspian tern	Nationally Vulnerable	R	Species unlikely to be using this habitat
<i>Sterna striata</i>	white-fronted tern	At Risk, Declining	R	Species unlikely to be using this habitat
<i>Columba livia</i>	rock pigeon	Introduced and Naturalised	F, R	Species unlikely to be using this habitat
<i>Hemiphaga novaeseelandiae</i>	New Zealand pigeon (kereru)	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Platycercus eximius</i>	eastern rosella	Introduced and Naturalised	F	F, R, B (Sep – Mar)
<i>Chrysococcyx lucidus</i>	shining cuckoo	Not Threatened	F, R	F, R, B (Oct – Mar)
<i>Todiramphus sanctus</i>	kingfisher	Not Threatened	F, R	F, R, B (Oct – Jan)
<i>Gerygone igata</i>	grey warbler	Not Threatened	F, R	F, R, B (Aug – Feb)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Prosthemadera novaeseelandiae</i>	tui	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Gymnorhina tibicen</i>	Australian magpie	Introduced and Naturalised	F, R	F, R, B (Jul – Jan)
<i>Rhipidura fuliginosa</i>	New Zealand fantail	Not Threatened	F, R	F, R, B (Aug - Mar)
<i>Petroica macrocephala</i>	tomtit	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Alauda arvensis</i>	Eurasian skylark	Introduced and Naturalised	F, R, B (Aug – Jan)	Species unlikely to be using this habitat
<i>Zosterops lateralis</i>	silvereeye	Not Threatened	F, R, B (Aug – Feb)	F, R, B (Aug – Feb)
<i>Hirundo neoxena</i>	welcome swallow	Not Threatened	R	Species unlikely to be using this habitat
<i>Turdus merula</i>	blackbird	Introduced and Naturalised	F, R, B (Aug – Feb)	F, R, B (Aug – Feb)
<i>T. philomelos</i>	song thrush	Introduced and Naturalised	F, R, B (Aug – Feb)	F, R, B (Aug – Feb)
<i>Sturnus vulgaris</i>	starling	Introduced and Naturalised	F, R	F, R, B (Sep – Dec)
<i>Passer domesticus</i>	house sparrow	Introduced and Naturalised	F, R	F, R, B (Sep – Mar)
<i>Anthus novaeseelandiae</i>	New Zealand pipit	At Risk, Declining	F, R, B (Aug – Feb)	Species unlikely to be using this habitat
<i>Prunella modularis</i>	dunnock	Introduced and Naturalised	F, R, B (Sep – Feb)	F, R, B (Sep – Feb)
<i>Fringilla coelebs</i>	chaffinch	Introduced and Naturalised	F, R, B (Sep – Feb)	F, R, B (Sep – Feb)
<i>Carduelis chloris</i>	greenfinch	Introduced and Naturalised	F, R (Oct – Mar)	F, R, B (Oct – Mar)
<i>C. carduelis</i>	goldfinch	Introduced and Naturalised	F, R, B (Oct – Mar)	F, R, B (Oct – Mar)
<i>C. flammea</i>	redpoll	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised	F, R, B (Oct – Mar)	R, B (Oct – Mar)

Appendix 3: Additional bird species recorded on the Ōtaki River since 1982

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010).

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Branta canadensis</i>	Canada goose	Introduced and Naturalised	February 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Anas superciliosa</i>	grey duck	Nationally Critical	Between 1982 and 1991	WRC (1992)
<i>Aythya novaeseelandiae</i>	New Zealand scaup	Not Threatened	November 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Phalacrocorax sulcirostris</i>	little black shag	At Risk, Naturally Uncommon	February 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Stictocarbo punctatus</i>	spotted shag	Not Threatened	Between 1982 and 1991	WRC (1992)
<i>Ardea modesta</i>	white heron	Nationally Critical	November 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Egretta sacra</i>	reef heron	Nationally Endangered	Between 1982 and 1991	WRC (1992)
<i>Platalea regia</i>	royal spoonbill	At Risk, Naturally Uncommon	April 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Numenius madagascariensis</i>	Eastern curlew	Migrant	Between 1982 and 1991	WRC (1992)
<i>Limosa lapponica</i>	bar-tailed godwit	At Risk, Declining	Between 1982 and 1991	WRC (1992)
<i>Haematopus finschi</i>	South Island pied oystercatcher	At Risk, Declining	Between 1982 and 1991	WRC (1992)
<i>Anarhynchus frontalis</i>	wrybill	Nationally Vulnerable	April 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Larus bulleri</i>	black-billed gull	Nationally Critical	Between 1982 and 1991	WRC (1992)
<i>Chlidonias albostrata</i>	black-fronted tern	Nationally Endangered	March 2003	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015
<i>Streptopelia risoria</i>	barbary dove	Introduced and Naturalised	January 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 25/05/2015

Appendix 4: List of bird species recorded on the Waikanae River during the 2012-2015 bird surveys

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010). Habitat use columns describe which habitats each species was observed using, or is likely to be using for feeding (F), roosting (R) and breeding (B) within the Waikanae River corridor. Date ranges provided delimit the breeding season for each bird species observed or likely to be breeding in the river corridor, breeding season information was sourced from the [New Zealand Birds Online](#) website, accessed 30th July, 2015.

Scientific name	Common name	Threat ranking	Habitat use	
			Dry sand and gravels	Riparian vegetation
<i>Phasianus colchicus</i>	common pheasant	Introduced and Naturalised	F, R,	F, R, B (Jul – Mar)
<i>Cygnus atratus</i>	black swan	Not Threatened	R	Species unlikely to be using this habitat
<i>Branta canadensis</i>	Canada goose	Introduced and Naturalised	R	Species unlikely to be using this habitat
<i>Tadorna variegata</i>	paradise shelduck	Not Threatened	R	Species unlikely to be using this habitat
<i>A. platyrhynchos</i>	mallard	Introduced and Naturalised	R	B (Jul – Dec)
<i>A. rhynchotis</i>	Australasian shoveler	Not Threatened	R	Species unlikely to be using this habitat
<i>Cairina moschata</i>	Muscovy duck	N/A ²	R	Species unlikely to be using this habitat
<i>Phalacrocorax melanoleucos</i>	little shag	Not Threatened	R	Species unlikely to be using this habitat
<i>P. carbo</i>	black shag	At Risk, Naturally Uncommon	R	Species unlikely to be using this habitat
<i>P. varius</i>	pied shag	Nationally Vulnerable	R	R, B (all year around)
<i>Egretta novaehollandiae</i>	white-faced heron	Not Threatened	F, R	R
<i>Circus approximans</i>	Australasian harrier	Not Threatened	F, R	F, R
<i>Platalea regia</i>	royal spoonbill	At Risk, Naturally Uncommon	R	Species unlikely to be using this habitat

² Muscovy duck is not included in the current checklist of the birds of New Zealand (Gill et al, 2010) and therefore has not been given a New Zealand Threat Classification System ranking (Robertson et al, 2013)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry sand and gravels	Riparian vegetation
<i>Porphyrio melanotus</i>	pukeko	Not Threatened	F, R	F, R, B (all year around)
<i>Haematopus unicolor</i>	variable oystercatcher	At Risk, Recovering	R, B (Sep – Mar)	Species unlikely to be using this habitat
<i>Himantopus himantopus</i>	pied stilt	At Risk, Declining	F, R	Species unlikely to be using this habitat
<i>Charadrius bicinctus</i>	banded dotterel	Nationally Vulnerable	F, R	Species unlikely to be using this habitat
<i>Vanellus miles</i>	spur-winged plover	Not Threatened	F, R	Species unlikely to be using this habitat
<i>Larus dominicanus</i>	black-backed gull	Not Threatened	F, R	Species unlikely to be using this habitat
<i>L. novaehollandiae</i>	red-billed gull	Nationally Vulnerable	F, R	Species unlikely to be using this habitat
<i>Hydroprogne caspia</i>	Caspian tern	Nationally Vulnerable	R	Species unlikely to be using this habitat
<i>Sterna striata</i>	white-fronted tern	At Risk, Declining	R	Species unlikely to be using this habitat
<i>Columba livia</i>	rock pigeon	Introduced and Naturalised	F, R	Species unlikely to be using this habitat
<i>Hemiphaga novaeseelandiae</i>	New Zealand pigeon (kereru)	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Platycercus eximius</i>	eastern rosella	Introduced and Naturalised	F, R	F, R, B (Sep – Mar)
<i>Chrysococcyx lucidus</i>	shining cuckoo	Not Threatened	Species unlikely to be using this habitat	F, R, B (Oct – Mar)
<i>Todiramphus sanctus</i>	kingfisher	Not Threatened	F, R	F, R, B (Oct – Jan)
<i>Gerygone igata</i>	grey warbler	Not Threatened	Species unlikely to be using this habitat	F, R, B (Aug – Feb)
<i>Anthornis melanura</i>	Bellbird	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Prosthemadera novaeseelandiae</i>	tui	Not Threatened	Species unlikely to be using this habitat	F, R

Scientific name	Common name	Threat ranking	Habitat use	
			Dry sand and gravels	Riparian vegetation
<i>Gymnorhina tibicen</i>	Australian magpie	Introduced and Naturalised	F, R	F, R, B (Jul – Jan)
<i>Rhipidura fuliginosa</i>	New Zealand fantail	Not Threatened	F, R	F, R, B (Aug - Mar)
<i>Alauda arvensis</i>	Eurasian skylark	Introduced and Naturalised	F, R	Species unlikely to be using this habitat
<i>Zosterops lateralis</i>	silvereeye	Not Threatened	F, R	F, R, B (Aug – Feb)
<i>Hirundo neoxena</i>	welcome swallow	Not Threatened	R	Species unlikely to be using this habitat
<i>Turdus merula</i>	blackbird	Introduced and Naturalised	F, R	F, R, B (Aug – Feb)
<i>T. philomelos</i>	song thrush	Introduced and Naturalised	F, R	F, R, B (Aug – Feb)
<i>Sturnus vulgaris</i>	starling	Introduced and Naturalised	F, R	F, R, B (Sep – Dec)
<i>Passer domesticus</i>	house sparrow	Introduced and Naturalised	F, R	F, R, B (Sep – Mar)
<i>Prunella modularis</i>	dunnock	Introduced and Naturalised	F, R	F, R, B (Sep – Feb)
<i>Fringilla coelebs</i>	chaffinch	Introduced and Naturalised	F, R	F, R, B (Sep – Feb)
<i>Carduelis chloris</i>	greenfinch	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)
<i>C. carduelis</i>	goldfinch	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)
<i>C. flammea</i>	redpoll	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised	F, R	R, B (Oct – Mar)

Appendix 5: Additional bird species recorded on the Waikanae River since 1927

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010).

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Callipepla californica</i>	California quail	Introduced and Naturalised	September 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Cereopsis novaehollandiae</i>	Cape Barren goose	Introduced and Naturalised	March 1989	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Anser anser</i>	feral goose	Introduced and Naturalised	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Anas gracilis</i>	grey teal	Not Threatened	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>A. chlorotis</i>	brown teal	At Risk, Recovering	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>A. superciliosa</i>	grey duck	Nationally Critical	September 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Aythya novaeseelandiae</i>	New Zealand scaup	Not Threatened	December 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Poliocephalus rufopectus</i>	New Zealand dabchick	Nationally Vulnerable	March 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Fulmarus glacialis</i>	Antarctic fulmar	Migrant	July 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Phalacrocorax sulcirostris</i>	little black shag	At Risk, Naturally Uncommon	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Stictocarbo punctatus</i>	spotted shag	Not Threatened	September 2011	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Ardea modesta</i>	white heron	Nationally Critical	December 2004	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>A. ibis</i>	cattle egret	Migrant	November 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Egretta garzetta</i>	little egret	Vagrant	September 2007	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>E. sacra</i>	reef heron	Nationally Endangered	April 2011	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Botaurus poiciloptilus</i>	Australasian bittern	Nationally Endangered	October 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Falco novaeseelandiae</i>	New Zealand falcon	Nationally Vulnerable	May 2012	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Porzana tabuensis</i>	spotless crane	At Risk, Relict	August 1997	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>P. pusilla</i>	marsh crane	At Risk, Relict	August 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Fulica atra</i>	Eurasian coot	Colonsier	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Calidris canutus</i>	lesser knot	Nationally Vulnerable	November 2006	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>C. alba</i>	Sanderling	Vagrant	Spring 1930	Wodzicki (1946)
<i>C. ferruginea</i>	curlew sandpiper	Vagrant	November 2002	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>C. ruficollis</i>	Red-necked stint	Migrant	November 2002	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Numenius madagascariensis</i>	Eastern curlew	Migrant	January 2006	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Limosa lapponica</i>	bar-tailed godwit	At Risk, Declining	August 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Tringa hypoleucos</i>	common sandpiper	Vagrant	November 1972	Falconer et al. (1973)
<i>T. cinerea</i>	Terek sandpiper	Vagrant	November 2008	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Arenaria interpres</i>	ruddy turnstone	Migrant	November 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Haematopus finschi</i>	South Island pied oystercatcher	At Risk, Declining	May 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Himantopus novaezelandiae</i>	black stilt	Nationally Critical	August 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Charadrius obscurus</i>	New Zealand dotterel	Nationally Vulnerable	October 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Anarhynchus frontalis</i>	wrybill	Nationally Vulnerable	August 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Euseyornis melanops</i>	Black-fronted dotterel	Coloniser	December 1994	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Thinornis novaeseelandiae</i>	shore plover	Nationally Critical	December 2009	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Coprotheres pomarinus</i>	pomarine skua	Migrant	March 1962	Wodzicki et al. (1978)
<i>Stercorarius parasiticus</i>	Arctic skua	Migrant	February 2009	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Larus bulleri</i>	black-billed gull	Nationally Critical	September 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Sternula albifrons</i>	little tern	Migrant	November 2002	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>S. nereis</i>	fairy tern	Nationally critical	April 1927	Wodzicki (1946)

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Gelochelidon nilotica</i>	gull-billed tern	Vagrant	July 2011	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Chlidonias leucopterus</i>	white-winged black tern	Migrant	January 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>C. albobristata</i>	black-fronted tern	Nationally Endangered	February 2012	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Sterna hirundo</i>	common tern	Vagrant	April 2012	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Bowdleria punctata</i>	fernbird	At Risk, Declining	May 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Anthus novaeseelandiae</i>	New Zealand pipit	At Risk, Declining	February 2012	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015

Appendix 6: List of bird species recorded on the Hutt River during the 2012-2015 bird surveys

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010). Habitat use columns describe which habitats each species was observed using, or is likely to be using for feeding (F), roosting (R) and breeding (B) within the Hutt River corridor. Date ranges provided delimit the breeding season for each bird species observed or likely to be breeding in the river corridor, breeding season information was sourced from the [New Zealand Birds Online](#) website, accessed 30th July, 2015.

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Callipepla californica</i>	California quail	Introduced and Naturalised	F, R, B (Aug – Apr)	F, R, B (Aug – Apr)
<i>Cygnus atratus</i>	black swan	Not Threatened	R	Species unlikely to be using this habitat
<i>Branta canadensis</i>	Canada goose	Introduced and Naturalised	R	Species unlikely to be using this habitat
<i>Tadorna variegata</i>	paradise shelduck	Not Threatened	R, B (Aug – Feb)	B (Aug – Feb)
<i>A. platyrhynchos</i>	mallard	Introduced and Naturalised	R, B (Jul – Dec)	B (Jul – Dec)
<i>Cairina moschata</i>	Muscovy duck	N/A ³	R	Species unlikely to be using this habitat
<i>Phalacrocorax melanoleucos</i>	little shag	Not Threatened	R	R
<i>P. carbo</i>	black shag	At Risk, Naturally Uncommon	R	R
<i>P. varius</i>	pied shag	Nationally Vulnerable	R	Species unlikely to be using this habitat
<i>P. sulcirostris</i>	little black shag	At Risk, Naturally Uncommon	R	Species unlikely to be using this habitat
<i>Egretta novaehollandiae</i>	white-faced heron	Not Threatened	R	R, B? (Jun – Apr)
<i>Platalea regia</i>	royal spoonbill	At Risk, Naturally Uncommon	R	Species unlikely to be using this habitat
<i>Circus approximans</i>	Australasian harrier	Not Threatened	F, R	F, R

³ Muscovy duck is not included in the current checklist of the birds of New Zealand (Gill et al, 2010) and therefore has not been given a New Zealand Threat Classification System ranking (Robertson et al, 2013)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Porphyrio melanotus</i>	pukeko	Not Threatened	F, R	F, R, B (all year around)
<i>Haematopus unicolor</i>	variable oystercatcher	At Risk, Recovering	R	Species unlikely to be using this habitat
<i>Himantopus himantopus</i>	pieb stilt	At Risk, Declining	F, R, B (Jun – Feb)	Species unlikely to be using this habitat
<i>Vanellus miles</i>	spur-winged plover	Not Threatened	F, R, B? (Apr – Nov)	Species unlikely to be using this habitat
<i>Larus dominicanus</i>	black-backed gull	Not Threatened	F, R	Species unlikely to be using this habitat
<i>L. novaehollandiae</i>	red-billed gull	Nationally Vulnerable	F, R	Species unlikely to be using this habitat
<i>Columba livia</i>	rock pigeon	Introduced and Naturalised	F, R	Species unlikely to be using this habitat
<i>Hemiphaga novaeseelandiae</i>	New Zealand pigeon (kereru)	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Platycercus eximius</i>	eastern rosella	Introduced and Naturalised	F, R	F, R, B (Sep – Mar)
<i>Chrysococcyx lucidus</i>	shining cuckoo	Not Threatened	Species unlikely to be using this habitat	F, R, B (Oct – Mar)
<i>Todiramphus sanctus</i>	kingfisher	Not Threatened	F, R	F, R, B (Oct – Jan)
<i>Gerygone igata</i>	grey warbler	Not Threatened	Species unlikely to be using this habitat	F, R, B (Aug – Feb)
<i>Anthornis melanura</i>	bellbird	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Prosthemadera novaeseelandiae</i>	tui	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Mohoua albicilla</i>	whitehead	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Gymnorhina tibicen</i>	Australian magpie	Introduced and Naturalised	F, R	F, R, B (Jul – Jan)
<i>Rhipidura fuliginosa</i>	New Zealand fantail	Not Threatened	F, R	F, R, B (Aug - Mar)
<i>Petroica macrocephala</i>	tomtit	Not Threatened	Species unlikely to be using this habitat	F, R
<i>Alauda arvensis</i>	Eurasian skylark	Introduced and Naturalised	F, R, B? (Aug – Jan)	Species unlikely to be using this habitat
<i>Zosterops lateralis</i>	silvereve	Not Threatened	F, R	F, R, B (Aug – Feb)

Scientific name	Common name	Threat ranking	Habitat use	
			Dry gravels	Riparian vegetation
<i>Hirundo neoxena</i>	welcome swallow	Not Threatened	R	Species unlikely to be using this habitat
<i>Turdus merula</i>	blackbird	Introduced and Naturalised	F, R, B (Aug – Feb)	F, R, B (Aug – Feb)
<i>T. philomelos</i>	song thrush	Introduced and Naturalised	F, R, B (Aug – Feb)	F, R, B (Aug – Feb)
<i>Sturnus vulgaris</i>	starling	Introduced and Naturalised	F, R	F, R, B (Sep – Dec)
<i>Passer domesticus</i>	house sparrow	Introduced and Naturalised	F, R	F, R, B (Sep – Mar)
<i>Prunella modularis</i>	dunnock	Introduced and Naturalised	F, R, B (Sep – Feb)	F, R, B (Sep – Feb)
<i>Fringilla coelebs</i>	chaffinch	Introduced and Naturalised	F, R, B (Sep – Feb)	F, R, B (Sep – Feb)
<i>Carduelis chloris</i>	greenfinch	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)
<i>C. carduelis</i>	goldfinch	Introduced and Naturalised	F, R, B (Oct – Mar)	F, R, B (Oct – Mar)
<i>C. flammea</i>	redpoll	Introduced and Naturalised	F, R	F, R, B (Oct – Mar)
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised	F, R, B (Oct – Mar)	R, B (Oct – Mar)

Appendix 7: Additional bird species recorded on the Hutt River since 1997

Threat rankings are as per Robertson et al (2013). Species names and taxonomic order are as per Gill et al (2010).

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Anas chlorotis</i>	brown teal	At Risk, Recovering	September 2006	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>A. rhynchosotis</i>	Australasian shoveler	Not Threatened	December 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Poliiocephalus rufopectus</i>	New Zealand dabchick	Nationally Vulnerable	January 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Stictocarbo punctatus</i>	spotted shag	Not Threatened	June 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Ardea modesta</i>	white heron	Nationally Critical	June 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Egretta garzetta</i>	little egret	Vagrant	September 2007	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>E. sacra</i>	reef heron	Nationally Endangered	December 2001	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Falco novaeseelandiae</i>	New Zealand falcon	Nationally Vulnerable	February 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Calidris canutus</i>	lesser knot	Nationally Vulnerable	November 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Numenius madagascariensis</i>	Eastern curlew	Migrant	March 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Limosa lapponica</i>	bar-tailed godwit	At Risk, Declining	January 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Arenaria interpres</i>	ruddy turnstone	Migrant	September 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 11/10/2015

Scientific name	Common name	Threat ranking	Date last recorded	Source
<i>Haematopus finschi</i>	South Island pied oystercatcher	At Risk, Declining	January 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Charadrius bicinctus</i>	banded dotterel	Nationally Vulnerable	September 2014	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Thinornis novaeseelandiae</i>	shore plover	Nationally Critical	November 2008	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Larus bulleri</i>	black-billed gull	Nationally Critical	November 2013	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Hydroprogne caspia</i>	Caspian tern	Nationally Vulnerable	March 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015
<i>Cyanoramphus novaezelandiae</i>	Red-crowned parakeet	At Risk, Relict	June 2015	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 22/06/2015
<i>Anthus novaeseelandiae</i>	New Zealand pipit	At Risk, Declining	September 1997	New Zealand eBird database (www.ebird.org/content/newzealand/) Accessed: 26/05/2015

The Greater Wellington Regional Council's purpose is to enrich life in the Wellington Region by building resilient, connected and prosperous communities, protecting and enhancing our natural assets, and inspiring pride in what makes us unique

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