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Sites of importance to shorebirds and seabirds in the Waikato region

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Prepared by:
JE Dowding (DM Consultants)

For:
Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
HAMILTON 3240

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Peer reviewed by:

Phil Battley Date March 2021

Approved for release by:

Mike Scarsbrook Date March 2021

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Sites of importance to shorebirds and seabirds in the Waikato Region

Miranda, Firth of Thames

A report prepared for:
Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
HAMILTON 3240

Report prepared by:
JE Dowding
DM Consultants
PO Box 36-274
CHRISTCHURCH 8146

April 2019

Summary

Dowding, J.E. 2019. Sites of importance to shorebirds and seabirds in the Waikato Region. *DM Consultants contract report number 291*. DM Consultants, Christchurch.

A report commissioned by Environment Waikato and published in 2013 identified sites of importance to shorebirds on the east coast of the Waikato Region. The present report replaces the 2013 report; it updates information on the east coast sites, and adds sites of importance to shorebirds on the region's west coast. It also provides an outline of the most important sites for seabirds in the region. Threat rankings of all taxa have been updated.

Site inventories are provided for 51 sites, 11 on the west coast and 40 on the east coast. The inventories summarise the main avian values of each site, note threats to those values, and identify information gaps. Based on threat status and numbers of birds, sites have been assigned to one of three broad priority categories, reflecting each site's importance to shorebirds or seabirds. Threatened and At Risk taxa are common around much of the coast and on offshore islands in the region, and almost all sites qualify as significant habitat of indigenous fauna under Waikato Regional Council guidelines. There are 15 Priority 1 sites on the east coast and four on the west coast.

One important ecological value in the region is not captured by the assessment of individual sites. The entire western coastal strip of the region is part of the country's main north-south migration route (flyway), used by 90,000-100,000 shorebirds annually.

Shorebirds face a wide range of actual and potential threats. The main short-term threats to resident species are predation, disturbance during breeding, and natural factors, such as flooding of nests. In the longer term, loss and degradation of habitat (from both natural and human-induced causes) will affect both resident and migratory species.

Seabirds in the region are largely confined to predator-free offshore islands, mostly off the east coast. The main short-term threat is the potential for incursions by mammalian predators; in the medium-long term, changes in oceanic productivity may affect population sizes.

Basic inventory information (species, numbers, and locations) is lacking or limited for some sites and species. In particular the importance of many sites for cryptic waterbirds (such as bittern, crakes and banded rail) is poorly known, and the numbers of most seabirds are not well known on many islands. There is normally limited information about habitat use and the importance of different areas within each site.

A very high proportion of the bird species in the coastal zone and on offshore islands in New Zealand are classified as Threatened or At Risk, and this results in a large number of sites being classified as important. The fact that important sites are numerous does not lessen their significance.

The importance of sites can change for a variety of reasons. Up-to-date information is important for decision-making, so the information in this report will inevitably need to be supplemented and revised from time to time.

Introduction

A report commissioned by Environment Waikato (EW) and published in 2013 identified sites of importance to shorebirds on the east coast of the Waikato Region (Dowding 2013). The brief for that report was to provide a summary of recent information that identified areas important to shorebirds on the east coast of the Waikato Region. The main requirements were to:

- Document spatial information – which sites are used by which key species, and within those sites, what areas are used for different activities (where known);
- Identify threats to shorebirds (where known);
- Identify information gaps (with suggestions on how to fill them);
- Attempt to identify high-priority sites for shorebirds in the region.

EW now wishes the 2013 report to be revised and extended as follows:

- Identify sites of importance to shorebirds on the west coast of the region;
- Identify sites of importance to seabirds on the west and east coasts of the region, considering the best way to assess significance in the likely absence of accurate population estimates;
- Apply the methodology and report format used in the 2013 report;
- Use the updated threat rankings from Robertson *et al*. (2017) in the new sections of the report and, as necessary, revise the rankings and site priorities shown in the east coast sections of the 2013 report.

The boundaries of the region in the coastal zone extend from Mokau Estuary north to Port Waikato on the west coast, and from Kaiaua in the Firth of Thames to just north of Waihi Beach on the east coast of Coromandel Peninsula. There is a single island site off the west coast, with all other islands and island groups off the east coast.

In general, shorebirds and seabirds use very different habitats, with shorebirds being largely confined to coastal and estuarine areas on the mainland. Seabirds forage at sea, and when breeding are almost entirely confined to offshore islands that have no (or few) mammalian predators. There is therefore very little overlap between the sites of importance for the two groups.

The inclusion of seabirds in the brief raises an additional issue. While population sizes and distribution are reasonably well known for shorebirds, the same is not true for seabirds. In their review of data relating to the nine shearwater taxa breeding around New Zealand, Waugh *et al*.

(2013) commented that the data "*give only a rough indication of the population sizes of most taxa. Most species are poorly studied and most data are more than 20 years old. Only for flesh-footed and Hutton's shearwaters is the information about most primary breeding sites less than 10 years old and quantitative. Total numbers of the other species are little better than educated guesses and there is almost no useful information on their overall population trends*."

Part of the reason for this lack of information is because all the procellariiform seabirds breeding in the region nest in burrows and are therefore difficult to enumerate. Because of the lack of information on seabird population sizes, and in some cases uncertainty about current distribution, assessments of site significance for some of the offshore islands in the region may be less robust than for the mainland sites.

Methods

Extent of the coastal zone

Defining the extent of the coastal zone is not straightforward. In this regard, the New Zealand Coastal Policy Statement (NZCPS 2010) includes the following points that are relevant to a consideration of shorebird habitat:

Policy 1 Extent and characteristics of the coastal environment

(2) Recognise that the coastal environment includes:

(a) the coastal marine area;

(b) islands within the coastal marine area;

(c) areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, coastal wetlands, and the margins of these;

(e) coastal vegetation and the habitat of indigenous coastal species including migratory birds;

(h) inter-related coastal marine and terrestrial systems, including the intertidal zone

Species coverage

Shorebirds

Shorebirds using the region can broadly be classed into those species that are resident (i.e. they breed within the region and do not generally move out of it at any time of year), and those that are migratory (i.e. they breed elsewhere and move into the region to spend their non-breeding season). Migratory species normally occur in flocks at favoured foraging and roosting sites and for this reason their distributions tend to be clustered around the larger estuaries. Resident species are often more widely and thinly spread along the coastline.

Among resident shorebirds, the current distribution and numbers of northern New Zealand dotterels (NNZD) in the region are well known, partly because a national census of the taxon was undertaken in October 2011, and partly because many of the east coast sites are monitored annually as part of the NZ Dotterel Watch programme (Dowding 2006, Miller 2018). The global NNZD population is currently estimated at about 2500 individuals (Dowding 2019), including about 1100 pairs; 1% levels have therefore been revised upwards from those in the 2013 report and are now set at 25 individuals or 11 pairs. The dotterel surveys have also

provided information on numbers and distribution of variable oystercatchers (VOC). Coromandel Peninsula is a notable stronghold for both species, with about 21% of the global NNZD population (Dowding 2019), and probably in the order of 15% of the VOC population.

Among migrant shorebirds visiting the region, two taxa occur in significant numbers. One is the South Island pied oystercatcher, an internal migrant that breeds mainly in the South Island and winters in large numbers in northern North Island harbours (Dowding & Moore 2006). The other common migrant is the eastern bar-tailed godwit, which breeds in Alaska and migrates to New Zealand for the austral summer.

Other predominantly coastal species included in the wider definition of shorebirds are the gulls and terns, and records of these are included occasionally. Red-billed gulls and white-fronted terns are both currently classified as At Risk (Declining) but are still relatively numerous and their presence and numbers are therefore rarely recorded during surveys.

Wetland birds

The inter-tidal mud-flats of estuaries are an important component of coastal habitat for many shorebirds, but the more vegetated upper reaches of some estuaries are also important for a range of wetland birds – Australasian bittern, crakes, banded rail, brown teal, and North Island fernbird. These species are typically secretive, cryptic, and difficult to enumerate, and their distributions and numbers are usually not well known. All are Threatened or At Risk, and a significant proportion of wetland habitat is now coastal, so records of these species have been included where available. In general, these species are residents.

Many shag species are also largely coastal or estuarine, and several species are classified as At Risk. They are also commonly overlooked (or not recorded) during surveys, and all are more widely distributed than the site inventories suggest.

Seabirds

Most of the seabirds listed here are members of the order Procellariiformes (tube-nosed seabirds, such as petrels and shearwaters), but one species of penguin and the Australasian gannet also occur (and breed) in the region.

All these species forage almost exclusively at sea, but obviously require land for breeding; with the exception of the northern blue penguin, which breeds on mainland coasts, their breeding sites in the region are largely confined to predator-free offshore islands. On those islands, they may breed at very high densities, in some cases with thousands of pairs on a relatively small island.

Nomenclature and threat ranking

Native bird species mentioned in the text are listed in Appendix 1, with their common and scientific names (following Checklist Committee 2010) and their 2016 threat rankings (Robertson *et al*. 2017).

Data sources (shorebirds and waterbirds)

In compiling the site inventories for shorebirds, the following data sources were consulted:

- Unpublished results of a national census of northern New Zealand dotterels in 2011 (NNZD census 2011), with recent updates from Miller (2018);
- Unpublished sightings and counts of shorebirds made between 2005 and 2012, and retrieved from Birds New Zealand's shorebird database;
- Two reports on birds in the Firth of Thames (Battley & Brownell 2007, Dowding 2008a);
- Information from the Ornithological Society/Birds New Zealand's publications, including *Notornis*, *Southern Bird*, and regional newsletters;
- Species records from a series of estuarine vegetation surveys undertaken by Meg Graeme and published by Environment Waikato;
- Records from the Department of Conservation's bittern and waterbird databases;
- A report by Bouma (2007), listing biological values of ASCVs in the region. In Tables 1 and 2 and Appendix 2 of the present report, ASCVs are numbered as in Bouma (2007);
- The Directory of Wetlands in New Zealand (Cromarty & Scott 1996);
- Data from reports by the author, particularly Dowding (2006a) and Dowding & Moore (2006);
- Information recorded at a number of websites, including NZ Birds Online, Birding-NZ.net, eBird New Zealand, and iNaturalist NZ.
- Personal communications from individuals;
- Unpublished counts and observations by the author.

Most of the records in these sources give a count and a general location only. Counts and surveys of shorebirds are typically undertaken at or near high water to maximise numbers recorded, and information on distribution and habitat use at other stages of the tidal cycle is sparse. In compiling species lists for each site, priority was given to locating records of Threatened and At Risk taxa. All sites will have a range of common native and introduced species, but these have been routinely omitted as they will not affect significance level.

Data sources (seabirds)

In compiling the site inventories for seabirds, the following data sources were consulted:

- The action plans for New Zealand seabirds by Taylor (2000a, 2000b);
- Information on shearwater populations in New Zealand from Waugh *et al*. (2013);
- A report by Frost (2017);
- Information from the Ornithological Society/Birds New Zealand's publications, including *Notornis*, *Southern Bird*, and regional newsletters;
- A report by Bouma (2007), listing biological values of ASCVs in the region;
- Information recorded at a number of websites, including NZ Birds Online, Birding-NZ.net, eBird New Zealand, and iNaturalist NZ.

Assessing site significance

Determining the level of significance of sites based on avian values is not straightforward, but two documents are useful in this case, particularly for shorebirds and wetland birds.

At an international level, the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971) provides nine criteria for determining whether a wetland qualifies as 'internationally important'. Two criteria are relevant to the present exercise.

Criterion 2 states that: "*A wetland should be considered internationally important if it supports*

vulnerable, endangered, or critically endangered species …"
The IUCN categories Vulnerable, Endangered, and Critically Endangered are equivalent to the New Zealand categories Nationally Vulnerable, Nationally Endangered, and Nationally Critical.
Criterion 6 states that: "*A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird."*

At a local level, the Waikato Regional Policy Statement (Environment Waikato 2016) provides guidelines for assessing whether a site constitutes significant habitat of indigenous fauna.
Table 11-1, Criterion 3 states that: "*It is vegetation or habitat that is currently habitat for indigenous species or associations of indigenous species that are:*

- *classed as threatened or at risk, or*
- ***endemic** to the Waikato region, or*
- *at the limit of their natural range.*

Based on a combination of these criteria, sites were assigned to one of four broad categories:

Priority 1
The site regularly holds 1% of the global population of one or more species or subspecies that are classified as Threatened or At Risk under the New Zealand Threat Classification System List for 2016 (Robertson *et al*. 2017). This category sets a higher bar than any of the individual criteria above, requiring at least one taxon to exceed the 1% national or global threshold *and* be Threatened or At Risk.

Priority 2
The site regularly holds one or more Threatened or At Risk species or subspecies (but not at the 1% level), or values are insufficiently known but type of habitat, older data, and/or other factors suggest that this is very likely.

Priority 3
The values of the site for coastal birds and/or seabirds are not presently considered high; Threatened or At Risk shorebird or seabird taxa are not currently known to be present.

Priority 4
If shorebird/seabird values of a site are unknown, it is classified as Priority 4 (Insufficient Data).

Note that these priority rankings are not intended to provide overall biodiversity rankings for sites.

It is apparent that the ranking scheme above may not always result in an appropriate priority category, either due to individual site circumstances or because of a lack of data. The latter is the case for some of the important seabird sites identified below. This is usually because the population sizes of some seabird species at individual sites are not known, and it is therefore not clear whether they exceed the 1% threshold. However, large seabird breeding colonies only persist on offshore islands in the absence of mammalian predators, and their predator-free status makes these sites of very high value to a wide range of animals and plants. In cases where the scheme indicates a priority level that is considered inappropriate, a suitable level has been designated and the reasons for the designation have been noted.

Results

Sites of importance to shorebirds and seabirds

Fifty-one sites of importance to shorebirds and/or seabirds have been identified in the region, 11 on the west coast and 40 on the east coast. Decisions about what constitutes a site are necessarily subjective, and the sites identified here vary considerably in size, and in the types of habitat included. Many of the sites overlap with existing Waikato Region ASCVs (Areas of Significant Conservation Value), but the boundaries of the identified sites of importance and of the ASCVs differ in many cases. The sites, with their priority rankings and any overlap with an ASCV, are listed in Tables 1 and 2. Two sites overlap with areas classified as Outstanding Natural Features and Landscapes (ONFLs).

Individual site inventories, which include a summary of the assets, threats, additional information, and information gaps for each site, are shown in Appendix 2.

Table 1 Sites of importance to shorebirds or seabirds on the west coast of the Waikato Region

Site number	Site name	Priority	Overlap with
W01	Mokau Estuary	2	ASCV 1
W02	Awakino	2	
W03	Marokopa	2	ASCV 2
W04	Taharoa	1	
W05	Kawhia Harbour and Ocean Beach	1	ASCV 4
W06	Aotea Harbour, including North Head/Potahi Point	1	ASCV 5
W07	Gannet Island/Karewa	1	ASCV 6
W08	Raglan Harbour	2	ASCV 7
W09	Waikorea Stream-Waimai Stream	2	
W10	Kaawa Stream	2	
W11	Port Waikato	2	ASCV 8

Table 2 Sites of importance to shorebirds or seabirds on the east coast of the Waikato Region

Site number	Site name	Priority	Overlap with
E01	Firth of Thames (Kaiaua to Waihou River)	1	ASCV 9
E02	Firth of Thames (Waihou River to Tararu)	1	ASCV 10
E03	Coast north of Thames (Te Puru to Matariki Bay)	2	
E04	Manaia Harbour	2	ASCV 11
E05	Te Kouma Harbour/Peninsula	4	
E06	Coromandel Harbour	1	ASCV 12
E07	Koputauaki Bay to Tukituki Bay	2	

E07 A	Motukawao Islands	2	
E08	Colville Bay (including Whangaahei Bay)	1	ASCV 13
E09	Waiaro Bay	2	
E10	Port Jackson to Fletcher Bay	2	ASCV 14
E11	Stony Bay	2	ASCV 14
E12	Port Charles	2	
E13	Waikawau Bay (including Little Bay)	1	ASCV 15
E14	Kennedy Bay	2	
E15	Whangapoua Harbour, including Whangapoua Beach and Matarangi Spit	1	ASCV 16
E16	Gray's Beach-Kuaotunu Beach	2	
E17 A	Otama Beach	2	ASCV 17
E17 B	Opito Bay	2	ASCV 17
E18	Ohinau Island Group	1	ASCV 18
E19	Matapaua Bay to Whauwhau Beach	2	
E20 A	Cuvier Island	1	ASCV 19
E20 B	Great Mercury Island	1	ASCV 19
E20 C	Mercury Islands other than Great Mercury	1	ASCV 19
E21	Wharekaho	2	
E22	Whitianga	2	ASCV 20
E23	Cooks Beach, Purangi Estuary, Cathedral Cove, Hahei Beach	2	ASCV 21
E24	Hot Water Beach	2	
E25	Alderman Islands	1	ASCV 22
E26	Tairua Harbour, incl. Tairua Ocean Beach, Pauanui Beach and Spit, and Pauanui Waterways)	1	ASCV 23
E27	Slipper Island	2	
E28	Ohui	2	
E29	Opoutere Sandspit and Wharekawa Harbour	1	ASCV 24
E30	Onemana	2	
E31	Tokakahakaha (peninsula south of Onemana)	2	
E32	Whangamata Harbour	1	ASCV 25
E33	Whangamata Beach and Otahu Estuary	1	ASCV 26
E34	Clark Island Group	2	ASCV 27
E35	Whiritoa Beach	2	
E36	Mataora Bay	2	

Priority 1 (19 sites)

There are four Priority 1 sites on the west coast; two are large harbours important for a range of shorebirds, one is an island with a large seabird colony (designated Priority 1), and one is an important wetland. On the east coast, there are 15 Priority 1 sites; 11 achieve that status based on their values for shorebirds, and four (all islands or island groups, one designated) for their values for seabirds. The outstanding values of the Firth of Thames for shorebirds are well documented (e.g. Dowding & Moore 2006, Battley & Brownell 2007, Dowding 2008a).

Elsewhere in the region, there are nine sites on Coromandel Peninsula that achieve Priority 1 ranking by virtue of having 1% of the global population of northern New Zealand dotterel.

Priority 2 (31 sites)
These sites contain Threatened or At Risk species, but not at the 1% level. There are seven such sites on the west coast, and 24 on the east coast By definition, all Priority 1 and 2 sites constitute significant habitat of indigenous fauna by regional criteria (Environment Waikato 2016).

Priority 3 (0 sites)
No sites were ranked Priority 3 for shorebirds in the 2013 report. The inclusion of sites important to seabirds in the brief has similarly not resulted in any sites being assessed as Priority 3 for that guild.

Priority 4 (1 site)
Te Kouma Harbour is still ranked Priority 4 because its current shorebird and waterbird values appear largely unknown. It probably does contain Threatened or At Risk species (such as variable oystercatcher and red-billed gull), but they are unlikely to be in large numbers; if so, it would become a Priority 2 site.

While the lists of species in site inventories are obviously incomplete, all the lists are thought to include sufficient information (in the form of at least one record of a Threatened or At Risk species regularly present) to allow a Priority level to be assigned with some confidence. Further surveys will detect additional species, some of them Threatened or At Risk; they may also detect 1% levels of Threatened or At Risk species at a Priority 2 site and raise it to Priority 1, although such cases seem likely to be relatively few. The discovery of 4-5 Australasian bitterns at a site appears the most likely situation to result in elevation of a site to Priority 1.

Migration route
On the west coast of the Waikato Region, there is one highly important value that is not adequately captured by the individual-site approach used here. The entire western coastal strip of the region has very high ecological value as the primary north-south shorebird migration route in the country.

Several endemic shorebird species (notably the South Island pied oystercatcher and the wrybill) breed in the South Island and winter in the harbours around Auckland and Northland. High proportions of the populations of both species migrate north annually in late summer, generally following the east coast of the South Island and the west coast of the North Island, then following the same route south in late winter/early spring. Smaller proportions of the populations of other indigenous breeding shorebirds also use this route (e.g. pied stilt and banded dotterel), as do Arctic-breeding migrants, such as the eastern bar-tailed godwit (Dowding 2006b, 2009).

The exceptional importance of this route was highlighted during research on the potential impacts of proposed coastal windfarms at Taharoa and between Port Waikato and Raglan. Radar and observational data from those sites showed that while most flocks are generally following the coastline, the migration route extends several kilometres offshore and inland

from the coast, and in places may be up to 10 km or more wide (Kessels & Associates 2009). Toward the northern end of this flyway, there are branches heading inland that take migrating birds to their wintering grounds in the Firth of Thames and the Manukau Harbour, but these branch routes are not well defined yet. About 90,000–100,000 shorebirds are estimated to use the flyway twice a year, and virtually all of them are Threatened (banded dotterel, wrybill) or At Risk (pied oystercatcher, bar-tailed godwit) (Dowding 2009).

Threats

SEABIRDS

As noted above, most of the important seabird sites are islands that have no or few mammalian predators. In the short term, incursions of mammalian predators larger than mice on any of these islands are the main threat. Most of the islands have reserve status and access is restricted, so disturbance levels are generally low. However, the small and medium-sized petrels and shearwaters breeding in the region are all burrow-nesters; soils are friable on many seabird islands and burrows are fragile, and the trampling and collapse of occupied seabird burrows by visitors is a potential threat. In the medium-long term, changes in oceanic productivity related to climate change may affect breeding success of a wide range of seabird species.

SHOREBIRDS

A substantial number of actual and potential threats to shorebirds in the coastal zone have been identified (see Dowding 2008a). In the short term, predation and disturbance have the greatest impact on resident species. In the longer term, habitat loss and degradation are threats to both resident and migratory species.

Predation, primarily by introduced mammals but also by native avian predators, is the single most important threat to all indigenous shorebirds on the New Zealand mainland (Dowding & Murphy 2001). In general, its impacts are greater during the breeding season, because eggs and chicks (and the adults defending them) are very vulnerable—all New Zealand shorebirds are ground-nesting, and have extended incubation and fledging times. Non-breeding birds are occasionally also subject to predation, however (e.g. Battley & Moore 2004). Predation at varying levels is almost certain to be a threat at all the mainland sites identified here. It is often reduced by predator-control programmes, but is never eliminated entirely. Increasing human occupation of the coastal zone brings greater numbers of domestic cats and dogs, both known predators of shorebirds and waterbirds.

At some sites, disturbance is a significant problem, particularly for breeding shorebirds. As noted by Dowding (2012), it can act in a number of ways.

"*There is a substantial body of international literature on the negative impacts of disturbance on shorebirds. People, vehicles and dogs can crush nests. When birds leave nests or small chicks repeatedly in hot or cold weather, thermal stress may kill those eggs or chicks; if disturbance occurs regularly, pairs may desert. Disturbance can also result in higher predation rates - birds leaving nests or chicks to perform defensive displays leave eggs and chicks more susceptible to predation, particularly by avian predators, such as gulls. Repeated disturbance results in repeated movements to and from a nest, and this leaves a higher density of tracks that makes nests more obvious to potential predators. Disturbance often causes chicks to run into territories of neighbouring pairs, where they are sometimes attacked and occasionally killed. Disturbance*

also reduces feeding time, particularly for chicks, and can jeopardise their survival.

These consequences of disturbance are often indirect and difficult to measure, and thus less often recognised and recorded than, say the consequences of predation or flooding, which are much more evident. In addition, losses may be attributed to predation, when that predation was in fact ultimately caused by disturbance. My experience suggests the impacts of human disturbance on shorebirds are routinely under-estimated."

Non-breeding species are also affected by disturbance. When it is frequent, there may be substantial energetic costs (such as repeated flights from a threat, or reduced feeding times) that may impact on the ability to undertake or complete migration. The steady increase in development and recreational activities on the North Island east coast will inevitably result in growing levels of disturbance. These can be reduced by management to a limited extent at a few sites, but cannot be eliminated (Dowding 2010).

Collision with man-made structures and objects does result in mortality of shorebirds in New Zealand, as it does elsewhere in the world. Collisions with powerlines, fence lines, aircraft, and vehicles have been reported and, based on overseas studies, some collision with wind turbines, buildings, and other structures is likely. Collision with drones is a novel threat, and they also have the potential to cause disturbance. At least one council has put rules in place prohibiting the use of drones within 50 m of nesting or roosting birds (Auckland Council 2019). The importance of collision relative to other sources of mortality in New Zealand is unknown, but it is probably largely additional to other sources.

Loss and degradation of habitat may be natural (e.g. erosion of sandspits used for breeding and roosting), or the result of human activities (e.g. loss of foraging habitat in estuaries to marina construction). Natural loss of habitat can sometimes be reduced, for example by stabilisation of sandspits, as proposed for Matarangi Spit (Dowding 2006a). The identification of all areas required by bird species at a site is the first step in reducing human-induced habitat loss.

In the longer term, two other factors have obvious potential to alter the coastal environment significantly. First, sedimentation rates in the Firth of Thames and in Coromandel Peninsula estuaries have increased markedly since human settlement. This is changing the ecology of inter-tidal areas (not least by speeding up the advance of mangroves in many estuaries), and is already having an impact on shorebird distribution in the Firth of Thames (Battley & Brownell 2007). Second, climate change will alter shorebird habitat, notably by causing a rise in sea level, and increasing salinisation of estuaries. Natural factors, notably big tides and high winds, already affect some breeding species by washing or blowing out nests, and this will probably become more common. Both these changes will presumably be gradual however, and the extent to which coastal bird species will be able to adapt remains unknown.

Information gaps

The site inventories reveal two general areas where information is lacking.

Basic inventory

In the case of seabirds, there is general knowledge of which species occur in larger numbers on which islands, although for less-common species distributional data are almost certainly

incomplete. As noted above, population size data on most of the islands in the region are very approximate.

In the case of shorebirds, basic survey data – which species are present in what numbers at a site at different times of year – are lacking for a few sites, and incomplete for many. There are four situations in which completion of a basic inventory seems appropriate:

- At any Priority 1 site lacking such information. The obvious candidates at present appear to be Coromandel Harbour, Colville Bay, and Whangapoua Harbour;
- At any Priority 1 or 2 site that is the subject of a consent application for an activity or development that may have an impact on shorebirds or their habitat;
- At any Priority 2 site that is believed to have potential to be upgraded to Priority 1;
- At any site classified Priority 4 (Insufficient Data).

In the case of wetland species (bittern, crakes, banded rail, and North Island fernbird, there are some distributional data, but local population sizes are unknown in most cases, largely because of the difficulty of enumerating these cryptic species in thickly vegetated habitats. Many shag species are classified as At Risk, and while their general distributions are reasonably well known, local population sizes of these species are also rarely recorded.

Detailed habitat use within sites

Documenting fine-scale habitat use of a site is necessarily much more time-consuming than basic surveying, especially when impact assessments are being undertaken; these commonly seek to identify all the areas used by a number of species at different times of year, times of day, and under a range of different weather conditions and differing disturbance regimes. For this reason, detailed surveys of habitat use are likely to be confined mainly to situations where developments or activities are proposed that require such assessments. Some of the factors that may need to be considered when carrying out such surveys are outlined below.

Discussion

Distribution and spatial information

The data available appear adequate to identify the important sites for seabirds and shorebirds in the region. However, as in other parts of the country, detailed spatial information on habitat use within those sites is either limited or lacking for most of them (Dowding & Moore 2006).

There is one case that gives an insight into the complex patterns of habitat use by shorebirds in and around an estuary. The various applications for consents to construct a marina in Paku Bay, Tairua Harbour, resulted in a number of detailed surveys which were summarised in reports and briefs of evidence by Larcombe (2005), Pierce (2005) and Dowding (2005, 2008b). In spite of the considerable survey effort, later surveys revealed additional information and differences from the original surveys. As noted by Dowding (2008b):

"*These differences are a clear indication that our knowledge of this system is incomplete. Habitat use by shorebirds is a highly complex process that is affected by a wide range of interacting factors, including time of year, tide height, time of day, level of disturbance, shelter in relation to weather, food availability, the potential for predation, and numbers of other species. … we still have very little information on preferred nocturnal feeding and loafing areas*

for any shorebird species in Tairua Harbour. "

Although incomplete, the surveys undertaken at Tairua suggest that in an estuary of that size, the need for breeding, roosting, and foraging areas, by a range of different species with differing ecological requirements, coupled with the variability in environmental conditions that will occur over time, mean that almost all parts of the site are likely to be used by birds at some time. Where detailed studies have not been undertaken, a precautionary approach would be to assume that most areas in an estuary will be used by shorebirds or waterbirds at different times.

Collection of further information

In general, birds are highly mobile and their distribution can change markedly over time-scales of hours, days, or months. Shorebirds in particular move between feeding grounds, breeding territories, and high-water roost sites daily, and they may move between breeding sites and post-breeding sites, either locally or by migrating long distances on an annual basis. Some migratory species may move between wintering sites (e.g. Riegen & Dowding 2003, Battley *et al.* 2011), tern colonies often show low site-fidelity between years, and pied stilts make unpredictable movements to ephemeral wetlands. All these movements need to be borne in mind when surveys are being planned or detailed habitat use by shorebirds is being assessed. In addition, there may be long-term changes in use of a site by one or more species; for example, there has been a gradual movement of wintering wrybills from the Firth of Thames to the Manukau Harbour over the past few decades (Riegen & Dowding 2003).

Experience at Tairua Harbour and elsewhere suggests that a number of factors are important either for basic inventory surveys or to establish habitat use by shorebirds at a finer scale.

Species coverage

Some coastal species are still relatively common but are declining at rates that make them either Threatened (e.g. banded dotterel) or At Risk (e.g. South Island pied oystercatcher). Given the provisions of the NZCPS (2010, policy 11), it is important to note the presence of all Threatened and At Risk species (even if they appear locally numerous) when assessing the significance of a site. It is also important to search all habitat types at a site. For example, bitterns are highly cryptic, very difficult to count, and classified as Nationally Critical. The total New Zealand population is unknown, but may be in the order of 400-500 individuals, in which case 4-5 birds would constitute 1% of the national population. Careful surveying of larger estuaries with suitable bittern habitat (e.g. the upper reaches of Whitianga Harbour) could reveal local populations of that size, and increase the number of Priority 1 sites.

Time of year

Many shorebirds are migrants, and surveys must therefore be undertaken at different (and appropriate) times of year to detect all the birds using a site. For shorebird species, this means that at a minimum surveys are required in spring (e.g. October-December), when resident breeding species will be maximally dispersed and international migrants will be present, and in autumn (e.g. March-April), when resident species may be dispersed or in flocks (sometimes at sites other than their breeding sites) and internal migrants will be present.

Tide state and height

Surveys must be conducted over the whole tidal cycle, as different parts of an estuary may be used by different species at different stages of the cycle. Survey dates must also include a range of tide heights. Shorebirds commonly have distinct neap-tide and spring-tide high-water roosts.

Time of day
Where detailed habitat use is being ascertained, surveys should be undertaken by day and night. Shorebirds often use different high-water roosts at night (probably to reduce predation; Pierce 2005), and may use different foraging areas.

Weather and disturbance
Adverse weather or disturbance may cause shorebirds to roost or forage in different areas.

Repeat surveys
Even under the same conditions of time and tide, surveys should be repeated over several days. Shorebird numbers can vary considerably over short time-frames for many reasons (see Dowding & Moore 2006, section 4.2.2), some of them understood and others not.

Threatened and At Risk species in the coastal zone
One notable feature of the coastal zone in New Zealand is that it contains a very high proportion of Threatened and At Risk bird species. Analysis by habitat of threat rankings in 2008 showed that of 32 species or subspecies of indigenous breeding birds found entirely or predominantly in coastal habitats in New Zealand, no fewer than 20 (62.5%) were classified as Threatened, by far the highest proportion for any habitat type in the country. A further eight (25%) were classified as At Risk (Miskelly *et al*. 2008). Of the 10 seabird species recorded here, eight are Threatened or At Risk, as are a majority of the wetland species and shags (Appendix 1). One of the consequences of this is that almost any site on the coastline of the region is likely to contain one or more Threatened or At Risk species, and thereby to qualify as significant habitat of indigenous fauna under regional guidelines (Environment Waikato 2016).

The fact that there are so many coastal sites of significance in the region (and throughout New Zealand) probably results in such sites being viewed as less important than they actually are, on the assumption that because they are widespread and common they cannot be of high value. That perception should be resisted for several reasons. First, the ranking schemes are not overly precautionary—it is an unfortunate fact that New Zealand has one of the highest proportions of Threatened and At Risk bird species in the world. Second, the proportion of Threatened species in the coastal zone is the highest in any habitat type in this country. Third, there is steadily increasing human pressure on the coastal environment, particularly on the North Island east coast, and as a result the outlook for coastal species is likely to deteriorate rather than improve. That pressure results in loss and degradation of habitat, and higher levels of disturbance, impacts that are additional to those caused by natural factors. These issues have been highlighted for the northern New Zealand dotterel (Dowding & Davis 2007), which now has 85% of its population on the east coast of the North Island (Dowding 2019), but they also apply to other species.

It was also noted by Dowding & Davis (2007) that where species are thinly spread along the coastline, with small numbers at many sites, there is likely to be a perception that impacts at any one site may be unimportant. However, the cumulative effects of minor impacts at many such sites can easily become significant for a species at the regional or national level.

Other values of seabird islands

Many of the listed islands off the east coast of the region are free of introduced mammals. As noted in the site inventories, many of them support very large numbers of burrow-nesting seabirds. In some cases (e.g. the Mercury Islands), these populations are easily sufficient to achieve Priority 1 status. Some of the islands (such as Cuvier) may not achieve Priority 1 status on the basis of their seabird species, but they are of very high conservation value because their predator-free status allows them to support populations of other Threatened and At Risk taxa that can no longer survive on the mainland. In the Waikato Region, these include predator-sensitive forest birds, tuatara, lizards, and invertebrates. Clearly, the overall conservation value of any site should not be judged only by its value to one or two guilds of birds.

Importance of up-to-date information

The list of sites identified here is thought to provide a good preliminary indication of the main areas that are currently important for shorebirds and seabirds in the Waikato Region. However, additional sites containing Threatened or At Risk species in smaller numbers could easily be added to this list as a result of new information and further surveying.

Inevitably, the information in this report will need to be updated from time to time. New sites may be added to the list, and periodic revision of site inventories will be necessary. Habitat may change (naturally or through human activity), site-fidelity of birds can change, and threat rankings are currently revised every four years. As a result, the importance of sites can change.

Complete and up-to-date information is clearly important for conservation management planning. It is also vital when assessing the potential impacts of proposed activities and developments; the present report provides broad guidelines only, and robust impact assessments for most of the mainland sites listed here will require much more information to be collected.

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Appendix 1

Names and threat status of native bird species mentioned in the text. Scientific names follow Checklist Committee (2010), and threat status is from Robertson *et al*. (2017).

Common name	**Scientific name**	**Threat status in 2016**
Little spotted kiwi	*Apteryx owenii*	At Risk (Recovering)
Black swan	*Cygnus atratus*	Not Threatened
Paradise shelduck	*Tadorna variegata*	Not Threatened
New Zealand scaup	*Aythya novaeseelandiae*	Not Threatened
New Zealand dabchick	*Poliocephalus rufopectus*	At Risk (Recovering)
Northern blue penguin	*Eudyptula minor iredalei*	At Risk (Declining)
Grey-faced petrel	*Pterodroma macroptera gouldi*	Not Threatened
Pycroft's petrel	*Pterodroma pycrofti*	At Risk (Recovering)
Flesh-footed shearwater	*Puffinus carneipes*	Threatened (Nationally Vulnerable)
Sooty shearwater	*Puffinus griseus*	At Risk (Declining)
Fluttering shearwater	*Puffinus gavia*	At Risk (Relict)
North Island little shearwater	*Puffinus assimilis haurakiensis*	At Risk (Recovering)
White-faced storm petrel	*Pelagodroma marina maoriana*	At Risk (Relict)
Northern diving petrel	*Pelecanoides urinatrix urinatrix*	At Risk (Relict)
Brown teal	*Anas chlorotis*	At Risk (Recovering)
Australasian gannet	*Morus serrator*	Not Threatened
Little shag	*Phalacrocorax melanoleucos*	Not Threatened
Black shag	*Phalacrocorax carbo*	At Risk (Naturally Uncommon)
Pied shag	*Phalacrocorax varius*	At Risk (Recovering)
Little black shag	*Phalacrocorax sulcirostris*	At Risk (Naturally Uncommon)
Reef heron	*Egretta sacra*	Threatened (Nationally Endangered)
Australasian bittern	*Botaurus poiciloptilus*	Threatened (Nationally Critical)
Royal spoonbill	*Platalea regia*	At Risk (Naturally Uncommon)
Banded rail	*Gallirallus philippensis*	At Risk (Declining)
Spotless crake	*Porzana tabuensis tabuensis*	At Risk (Declining)
Lesser knot	*Calidris canutus rogersi*	Threatened (Nationally Vulnerable)
Eastern bar-tailed godwit	*Limosa lapponica baueri*	At Risk (Declining)
Ruddy turnstone	*Arenaria interpres*	Migrant
Variable oystercatcher	*Haematopus unicolor*	At Risk (Recovering)
South Island pied oystercatcher	*Haematopus finschi*	At Risk (Declining)
Pied stilt	*Himantopus himantopus*	Not Threatened
Black stilt	*Himantopus novaezelandiae*	Threatened (Nationally Critical)
Pacific golden plover	*Pluvialis fulva*	Migrant
Northern New Zealand dotterel	*Charadrius obscurus aquilonius*	At Risk (Recovering)
Banded dotterel	*Charadrius bicinctus bicinctus*	Threatened (Nationally Vulnerable)
Wrybill	*Anarhynchus frontalis*	Threatened (Nationally Vulnerable)
Red-billed gull	*Larus novaehollandiae*	At Risk (Declining)
Caspian tern	*Hydroprogne caspia*	Threatened (Nationally Vulnerable)
White-fronted tern	*Sterna striata striata*	At Risk (Declining)
North Island saddleback	*Philesturnus rufusater*	At Risk (Recovering)
North Island fernbird	*Bowdleria punctata vealeae*	At Risk (Declining)

Appendix 2
Site inventories

Common names, scientific names, and current threat classifications of taxa listed below are shown in Appendix 1. There is no attempt to list all avian species present at each site, but sufficient species are shown to justify the Priority level. Note that Priority levels apply only to the importance of each site for shorebirds and/or seabirds; some sites with low priority for those species may be important for other groups. Taxa shown with two asterisks (**) were classified as Threatened in the New Zealand threat classification system lists in 2016; taxa shown with one asterisk (*) were classified as At Risk under the New Zealand threat classification system lists in 2016 (Robertson *et al*. 2017).

Polygons on maps show the total areas within each Priority 1 or 2 site that are currently known or very likely to be important for coastal birds. Different parts of each polygon may be used by different species for different activities (e.g. breeding, roosting, feeding). It should be noted that in almost all cases detailed information (i.e. data on use of particular parts of a site by different species at different times) is incomplete. The fact that part of a site is not currently included in a polygon should therefore not be taken as evidence that there are no avian values in that area; further surveying will almost certainly add areas of importance to existing sites (notably foraging areas in inter-tidal parts of estuaries), and will probably identify additional sites. On some maps, inland areas are included in polygons; these may be areas sometimes used by coastal shorebirds for foraging (e.g. on wet paddocks) or for roosting on very high tides or during adverse weather, or in the case of procellariiform seabirds they will be nesting areas.

Individual site inventories (west coast)

Site W01	**Mokau Estuary**
Priority	2
Assets	**Black stilt – wintering site for an individual in some years, does not currently exceed 1% level. *Variable oystercatcher – a few pairs breeding. *Royal spoonbill – flock of 15 reported in 2015 (<1%). *White-fronted tern – small flocks occasionally roost on the ocean beach. Older records include **Caspian tern – a pair breeding; *North Island fernbird.
Threats	For non-breeding shorebirds, predation, and disturbance at HW roosts by human recreational activities. For breeding shorebirds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides.
Detailed spatial information available?	No
Additional information	Estuary is small, but other shorebirds (SIPO, pied stilt) recorded in small numbers in winter; possibility of breeding by a few *northern blue penguins. Overlap with

	Waikato Region ASCV 1. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Apparently little recent information, but no obvious information gaps.
References and sources	Dowding & Moore (2006), Bouma (2007), Birding-NZ.net, eBird NZ.

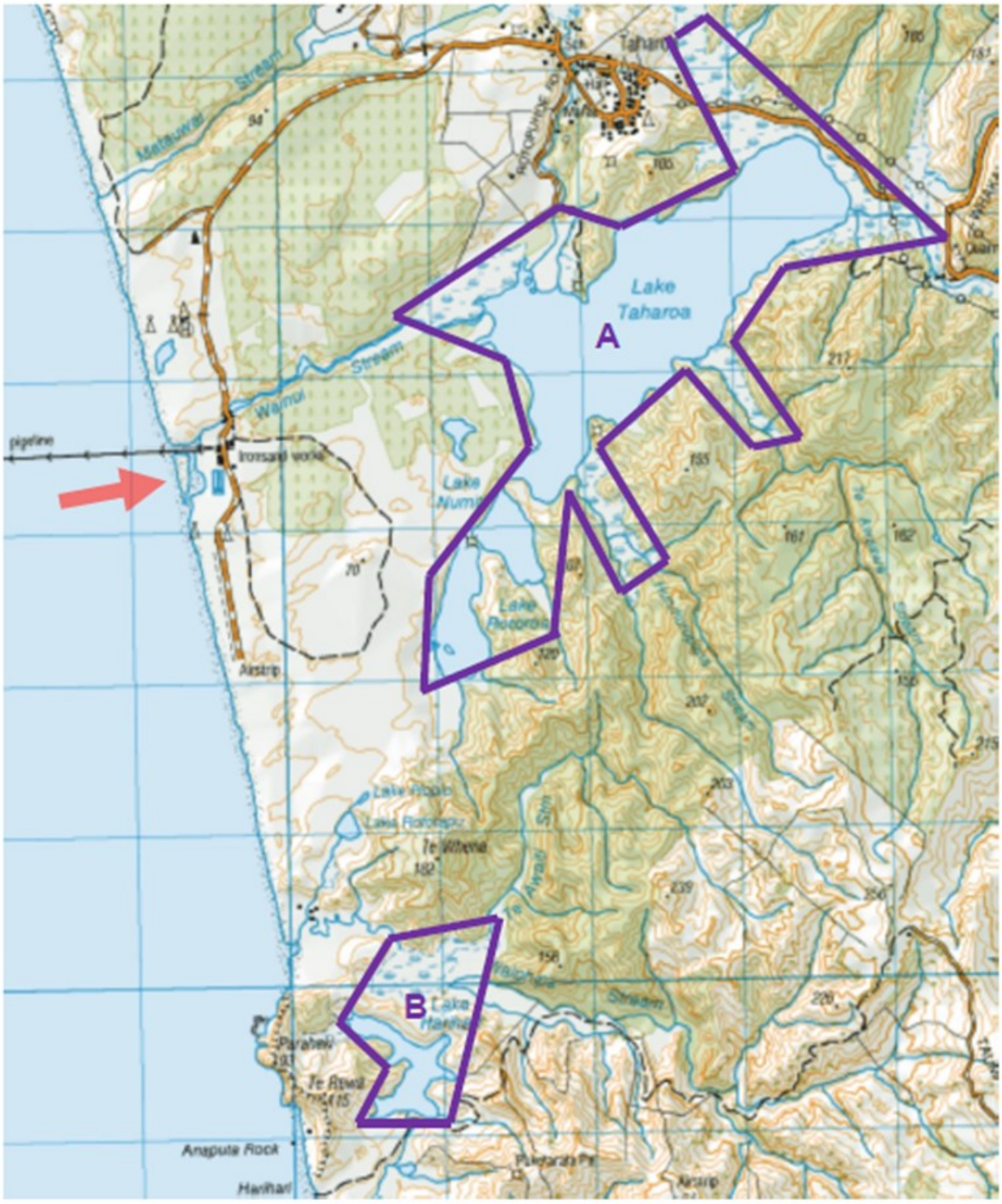
Site W02	**Awakino**
Priority	2
Assets	*Pied shag – 22 recorded in 2018 (<1%). **White heron – single recorded 2018 (<1%). *Variable oystercatcher – small numbers apparently resident (<1%). Pied stilt – small numbers.
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	No.
Additional information	A small estuary and coastal strip, unlikely to hold large numbers of most species. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No obvious information gaps.
References and sources	eBird NZ, Birding-NZ.net

Site W03	**Marokopa**
Priority	2
Assets	**Australasian bittern – single record in 2015 (<1%). *Red-billed gull – small numbers (<1%). *Pied shag – small numbers (not 1%). *Variable oystercatcher – a few pairs resident.
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	No.
Additional information	Overlap with Waikato Region ASCV 2. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Not clear whether bitterns are regularly present. Needs checking for breeding *northern New Zealand dotterel (has bred at this site in the past) and possibly **banded dotterel.
References and sources	eBird NZ, Birding-NZ.net.

Site W04	**Taharoa**
Priority	1
Assets	*New Zealand dabchick – c 10 recorded on the lake complex in 2008 (<1%). **Australasian bittern – 4 birds detected in September 2008; probably more present, and site is likely to hold 1% of national population. *Spotless crake – numerous responses to taped calls in September 2008. *Black shag – 2-5 birds in 2008. *Little black shag – 25-45 birds in 2008. *Variable oystercatcher – a few pairs breeding. *Northern New Zealand dotterel – 1-3 pairs breeding.
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	See Map W04. Waterbirds (bittern, crakes, shags) resident around the Lake Taharoa complex. Variable oystercatcher and New Zealand dotterel on Taharoa Beach at Wainui Stream mouth.
Additional information	Priority 1 ranking based on cryptic waterbirds and waterfowl, not shorebirds or seabirds. Lakes used by large numbers of waterfowl, notably New Zealand scaup (>1% of the population, but taxon Not Threatened), paradise shelduck, and black swan. Size of *little black shag population unknown, 45 birds may represent about 1%. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Listed as a wetland of international importance under Ramsar criteria by Cromarty & Scott (1996).
Information gaps	Status of bittern, crakes and shag spp in the Lake Taharoa complex need updating and values of the smaller Lake Harihari (which is known to hold waterfowl and waterbirds) need to be documented.
References and sources	Cromarty & Scott (1996), Dowding (2006b), Fuller et al. (2009).

Map W04 (Taharoa)

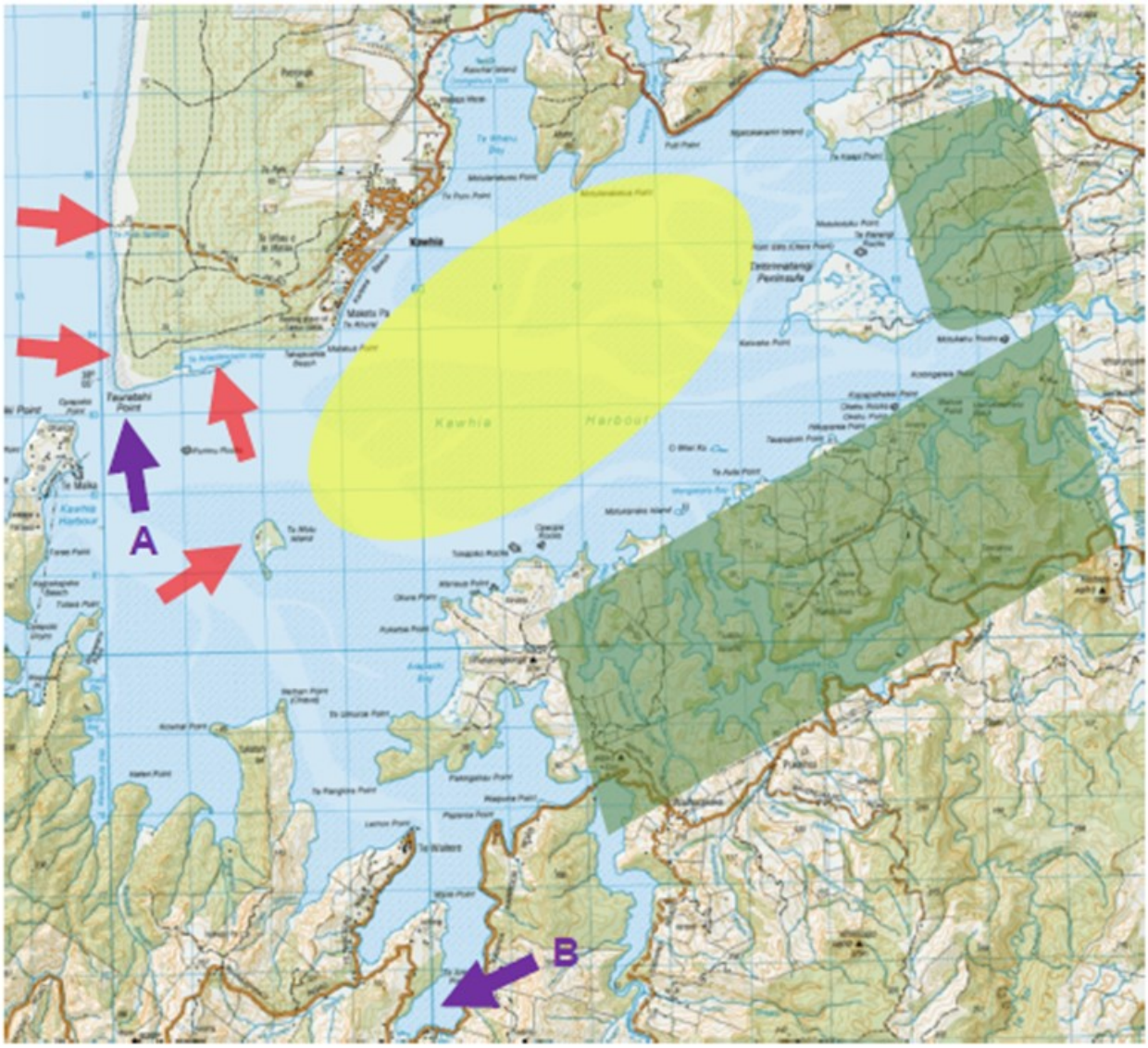
The red arrow indicates the area at the mouth of Wainui Stream used for breeding by variable oystercatchers and New Zealand dotterels. The areas outlined in purple are the Lake Taharoa complex (A) and Lake Harihari (B).



Site W05	Kawhia Harbour and Ocean Beach
Priority	1
Assets	*South Island pied oystercatcher – typically has 3000-5000 birds in winter (c. 3-5% of the global population). Pied stilt – typically about 500 birds in winter (>1% of the NZ population) **Black stilt – several individuals in all winters (>1%) *Variable oystercatcher – resident and breeding. *Northern New Zealand dotterel – typically 3-5 pairs breeding. **Banded dotterel – winter flock of 300-400 birds (>1%); in top ten wintering sites in New Zealand. *Eastern bar-tailed godwit – 3000-6000 annually (>1%).
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	See Map W05. Recent breeding sites of New Zealand dotterels known (Ocean Beach, Te Ariaotewiwini Inlet, and Te Motu Island). A major HW roost at Tauratahi Point, with other roosts around the harbour (e.g. at the head of Kinohaku Inlet). On neap tides, large flocks of shorebirds often roost on exposed shellbanks in the centre of the harbour. Shorebird foraging areas widespread around inter-tidal parts of the harbour. Many creeks and inlets in the upper harbour are vegetated and used by waterbirds.
Additional information	Probably some short-term movements of wintering shorebird flocks between this site and Aotea Harbour (Site W06) in response to weather, tidal conditions and/or disturbance. Harbour holds significant populations of other waterbirds, including *royal spoonbill (>1% of national population). Overlap with Waikato Region ASCV 4. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). One of 19 wintering sites of national importance to indigenous-breeding and migrant shorebirds (Dowding & Moore 2006). Listed as a wetland of international importance under Ramsar criteria by Cromarty & Scott (1996).
Information gaps	Ocean Beach and outer harbour frequently visited, and few information gaps for shorebirds; status of waterbirds (bittern and crakes) needs checking in upper arms of the harbour.
References and sources	Cromarty & Scott (1996), Dowding & Moore (2006), Dowding (2006b), M. Lellman (pers.comm.).

Map W05 (Kawhia)

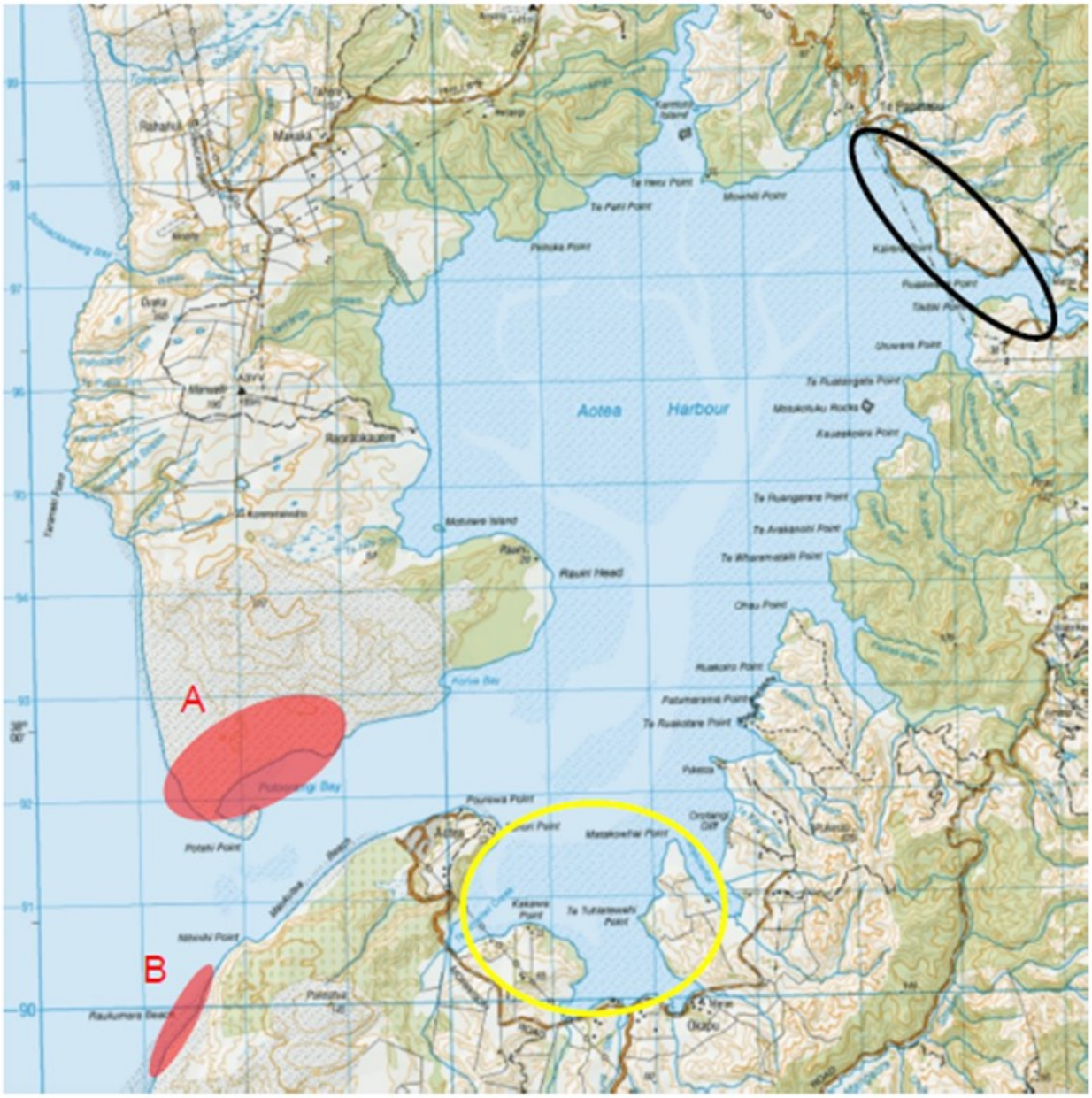
The red arrows indicate recent breeding sites of New Zealand dotterels (and in most cases variable oystercatchers). Shorebird high-tide roosts are arrowed in purple (A=Tauratahi Point, B=Kinohaku). Shorebirds feed on inter-tidal flats throughout the harbour, but notably in the central area (shaded yellow); on neap tides, flocks also roost on exposed shell banks in this area. Other roosts almost certainly exist. There are many vegetated inlets and creeks in the upper harbour (shaded green) that are likely to be important for waterbirds (bittern, crakes, rail, fernbird).



Site W06	Aotea Harbour, including North Head/Potahi Point
Priority	1
Assets	*South Island pied oystercatcher – typically 1000-2000 birds in winter (c. 1-2% of the global population). *Variable oystercatcher – several pairs resident. Pied stilt – numbers vary but up to 700 recorded in winter (>1%) *Northern New Zealand dotterel – typically 3-4 pairs breeding. **Banded dotterel – winter flock typically of 250-300 birds (>1%). *Bar-tailed godwit – 4000 recorded in 2018 (>1% of population visiting NZ).
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	Map W06. Northern New Zealand dotterel and variable oystercatcher breeding sites (and post-breeding flock sites) on North Head/Potahi Point; exact locations vary annually. Small numbers of shorebirds and shags recorded in the north-eastern corner of the harbour.
Additional information	Probably some short-term movements of wintering shorebird flocks between this site and Kawhia Harbour (Site W05) in response to weather, tidal conditions and disturbance. Overlap with Waikato Region ASCV 5. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). One of 19 wintering sites of national importance to indigenous-breeding and migrant shorebirds (Dowding & Moore 2006).
Information gaps	Northern and central parts of the harbour are difficult of access and rarely surveyed; there are almost certainly feeding areas and roost sites for shorebirds and habitat for cryptic waterbirds, but these appear largely unknown at present. Degree of movement between Kawhia and Aotea Harbours by shorebird flocks is not clear.
References and sources	Dowding & Moore (2006). eBird NZ.

Map W06 (Aotea)

Variable oystercatchers and New Zealand dotterels are known to breed within the areas shaded red on Aotea North Head (A) and on Raukumara Beach (B). North Head (A) is also used as a high-water roost by flocks of migrant shorebirds. Flocks of shorebirds are also known to feed and roost in the southern arms of the harbour (yellow oval); little information is available on the values of the upper harbour, but small numbers of shorebirds and shags have been recorded in the north-east (black oval).



Site W07	Gannet Island/Karewa
Priority	1 (designated). Does not fall into an appropriate priority category, because the Australasian gannet is not currently classified as Threatened or At Risk. For the same reason (and because it is not endemic to the region or at the limit of its range), the site does not constitute significant habitat of indigenous fauna under EW criteria. In spite of the gannet's Not Threatened ranking, the site is of national and global significance to the species, as it probably holds 10-15% of the world population.
Assets	Australasian gannet – colony of about 8000 pairs in 1980-81 (the largest in NZ at the time, and about 15% of the global population); current size unknown (counts from 2000-01 apparently not yet analysed). Grey-faced petrel – reported in 1990.
Threats	About 20 km offshore, so few anthropogenic threats. Storms and changes in oceanic productivity may affect breeding success.
Detailed spatial information available?	Aerial photos will show distribution of nests.
Additional information	Waikato Region ASCV 6. This site is undoubtedly one of the most important breeding colonies for the species worldwide. New Zealand fur seals haul out (and a few apparently breed).
Information gaps	Rarely visited or photographed, recent colony size is unknown.
References and sources	Wodzicki et al. (1984), Stephenson (2005), Bouma (2007), Frost (2017).

Site W08	Raglan Harbour
Priority	2
Assets	*Pied shag – small numbers. *South Island pied oystercatcher – autumn/winter records of several hundred roosting on North Head (<1%). *Variable oystercatcher – a few pairs resident. *Northern New Zealand dotterel – 1-2 pairs normally breeding north of harbour entrance. *Eastern bar-tailed godwit – up to 600 feed in the harbour annually (<1%). **Australasian bittern – occasional sightings of single birds around the harbour margins. *Royal spoonbill – regular sightings of 15-30 birds in 2015. *Banded rail – older reports of occasional sightings.
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	Map W08. Shorebird high-water roost on North Head, otherwise little information.
Additional information	Overlap with Waikato Region ASCV 7. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Values of the northern parts of the harbour for shorebirds and waterbirds appear largely unknown.
References and sources	eBird NZ, *Matuku* (OSNZ Waikato newsletter).

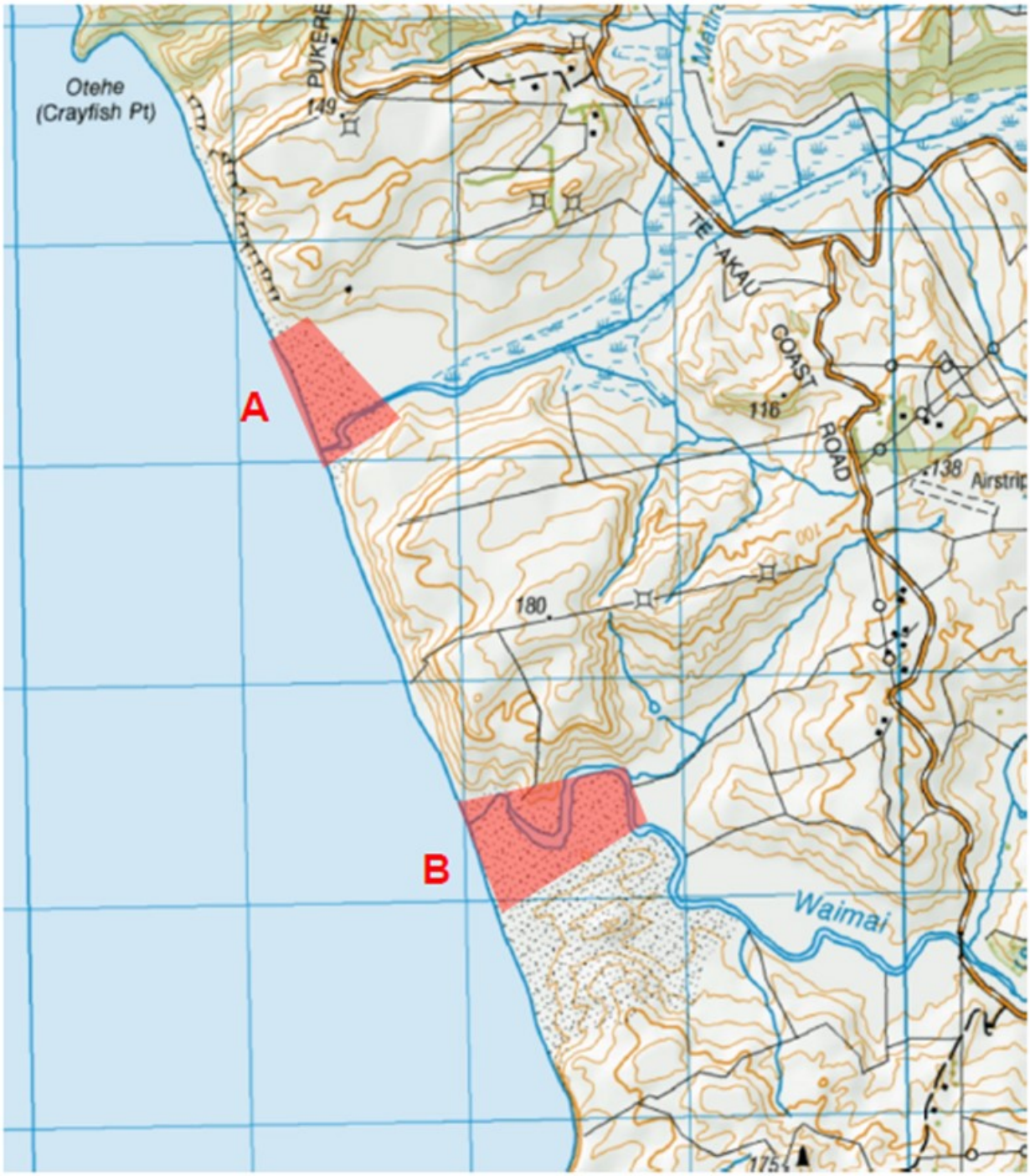
Map W08 (Raglan)

The main high-tide roost for shorebirds and breeding site for New Zealand dotterels is shaded red. Little is known about use of most parts of the harbour by shorebirds or waterbirds, but small numbers of shorebirds are seen in Cox and Lorezen Bays (shaded yellow) and Haroto Bay (shaded green).

Site W09	**Waikorea Stream-Waimai Stream**
Priority	2
Assets	*Variable oystercatcher – a few pairs resident *Northern New Zealand dotterel – typically 2-4 pairs breeding (1-2 pairs each at Waikorea and Waimai Stream mouths).
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	See Map W09. General locations of territories known, but exact sites vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	A short stretch of beach, no obvious information gaps.
References and sources	Author (pers. obs.), K. Opie (pers. comm.).

Map W09 (Waikorea-Waimai)

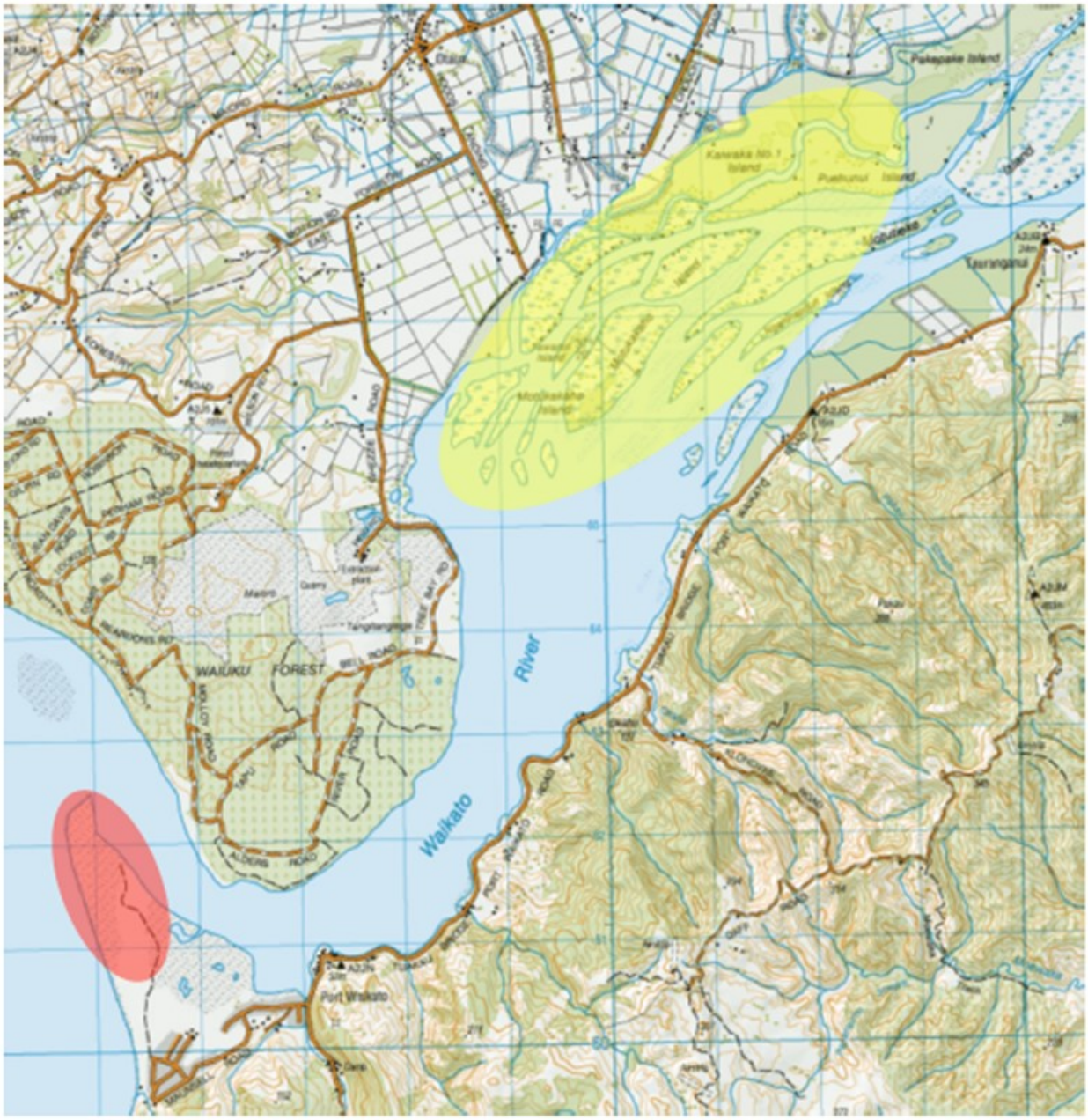
The areas shaded red indicate the territories around the mouths of Waikorea Stream (A) and Waimai Stream (B) used for breeding, feeding, and roosting by New Zealand dotterels.



Site W10	**Kaawa Stream**
Priority	2
Assets	*Northern New Zealand dotterel – typically 2 pairs breeding.
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	A small sandy beach at the mouth of Kaawa Stream. General locations of dotterel territories known, exact sites vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	A small site, accessible only through private property and with permission.
References and sources	Author (pers. obs.), K. Opie (pers. comm.).

Site W11	**Port Waikato (including lower reach of river)**
Priority	2[†]
Assets	**Australasian bittern – individuals occasionally sighted near river mouth and further upstream, numbers currently at site unknown. *Variable oystercatcher – post-breeding flock site for 60-80 birds (~1%) *Northern New Zealand dotterel – 1-3 pairs breeding in recent years. *Pied shag – 25 recorded in 2017 (<1%). *Royal spoonbill – 11 in 2018 (<1%).
Threats	For non-breeding birds, predation, and disturbance at HW roosts by human recreational activities. For breeding birds, predation of eggs, chicks, adults during breeding, disturbance during breeding (reducing productivity), natural factors, e.g. loss of nests/chicks to extreme weather, large tides, floods.
Detailed spatial information available?	Map W11. Breeding sites of oystercatchers and dotterels on spit recorded annually.
Additional information	Apparently suitable habitat for wetland birds upstream from the mouth, but little information available. [†]If number of bitterns exceeds 4-5, site may be Priority 1. Large **Caspian tern colony at mouth in previous years now absent. Overlap with Waikato Region ASCV 8. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Listed as a wetland of international importance under Ramsar criteria by Cromarty & Scott (1996).
Information gaps	Sand spit visited frequently, but much less information from wetland areas in the lower river.
References and sources	Cromarty & Scott (1996), Dowding & Moore (2006), DOC bittern database, K. Opie (pers. comm.)

Map W11 (Port Waikato).
The distal part of the sand spit at Port Waikato (shaded red) is used by variable oystercatchers and New Zealand dotterels for breeding, and by gulls, terns, and flocks of migrant shorebirds for roosting. The vegetated islands and river margins upstream of the mouth (shaded yellow) are likely to be important habitat for bitterns and other waterbirds, but there is little recent information.



Individual site inventories (east coast)

Site E01	**Firth of Thames west (Kaiaua to Waihou River)**
Priority	1
Assets	One of the most important wintering sites for shorebirds in New Zealand. Over the past 20 years, the site has held an average of about 32,700 birds (20,000+ in winter, 15,000+ in summer). These include: *South Island pied oystercatcher – wintering site for c 15,000 birds, exceeds 1% level. **Black stilt – wintering site for a few individuals, exceeds 1% level. Pied stilt – the most important wintering site in NZ, exceeds 1% level. **Banded dotterel – 100-200 annually. **Wrybill – wintering site for c 40% of the global population (exceeds 1% level). *Eastern bar-tailed godwit – non-breeding site for c 7,000 birds, exceeds 1% level. **Lesser knot - non-breeding site for c 4000-5000 birds, exceeds 1% level. Wide range of other arctic-breeding shorebird species in small numbers. Resident breeding species include; *Variable oystercatcher – a few pairs breed, scattered groups of pre-breeders. *Northern New Zealand dotterel – a few pairs breed, post-breeding flock at Kaiaua, site as a whole exceeds 1%. **Black-billed gull – a small colony breeds annually on a shellbank at Miranda. *Banded rail – regular sightings, probably relatively common in parts of the site. See Battley & Brownell (2007) and Dowding (2008a) for more details on the avifauna values of this site. Earlier values summarised by Veitch & Habraken (1999).
Threats	For non-breeding shorebirds: Predation recorded, but extent and significance unknown. Disturbance at HW roosts by human recreational activities. Sedimentation and agricultural run-off potential threats but extent and significance unknown. Loss of roost sites through mangrove encroachment. For breeding shorebirds: Threats listed above, plus: Predation of eggs, chicks, adults during breeding. Disturbance during breeding (reducing productivity). Natural factors, e.g. loss of nests/chicks to extreme weather, large tides. See Dowding (2008a) for more details on threats.
Detailed spatial information available?	See Map E01. Some information available – see Battley & Brownell (2007). High-water roost sites fairly well known, foraging areas less well known - most of the inter-tidal areas are not easily accessible, so the importance of particular areas for foraging by different species is not well understood. Movement of marked individuals and flocks between different HW roost sites has been recorded, between and within high-tide periods. Some flocks (e.g. lesser knot) move unpredictably into and out of the site. On the south coast, mangrove forest has covered old roosts, and high-water flocks of shorebirds are routinely seen on farmland and stopbanks around Karito, the Waitakaruru River, and the Piako River.
Additional	Ramsar site, designated 1990, covers c 7800 ha; qualifies under four Ramsar

information	Convention criteria. Waikato Region ASCV 9. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Identified as 1 of the top 19 wintering sites nationally for indigenous shorebirds by Dowding & Moore (2006). Ecologically connected to Site E02, with birds known to move between them.
Information gaps	Relative importance of different intertidal areas largely unknown. Extent and importance of some anthropogenic impacts (e.g. pollution) unknown. Not clear whether Australasian bittern is still present.
References and sources	Veitch & Habraken (1999), Dowding & Moore (2006), Battley & Brownell (2007), Dowding (2008a), unpublished OSNZ shorebird database, NNZD census 2011, DOC banded rail database.

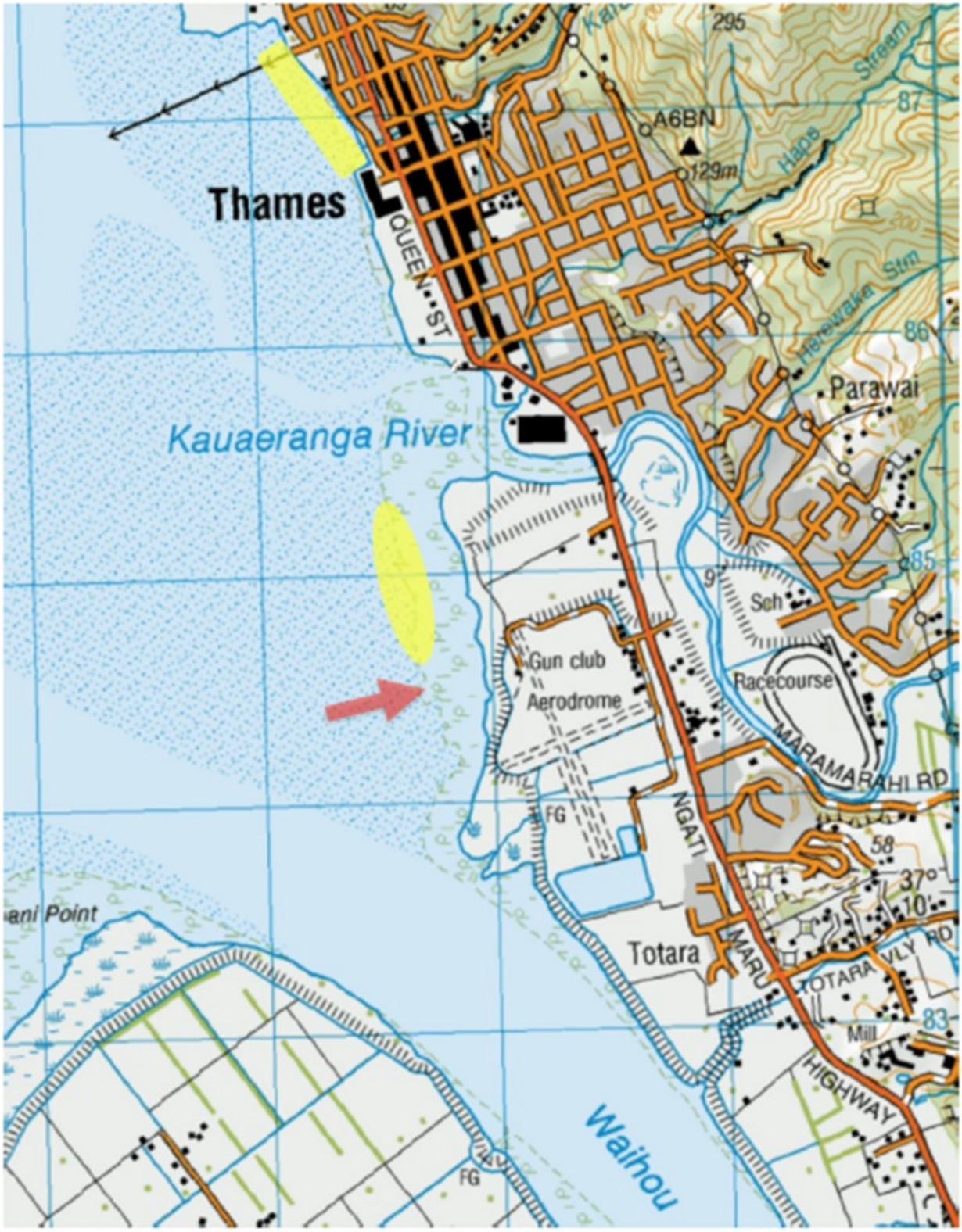
Map E01 (Firth of Thames west)

The main high-tide roosts for shorebirds are shaded yellow. The largest flocks are normally at sites 3 (Taramaire) and 4 (Spit/Stilt Pools/Limeworks). However, shorebirds are also routinely seen on farmland (including west of the road), between sites 1 and 4, and small flocks may roost almost anywhere on this stretch of coastline. Site 4 has a small colony of black-billed gulls (purple arrow) and breeding New Zealand dotterels (red arrow). A few pairs of variable oystercatchers breed on this stretch of coast, but recent locations do not appear to be documented.

Site E02	**Firth of Thames east (Waihou River to Tararu)**
Priority	1
Assets	Feeding areas and HW roost sites for many of the species recorded in Site 01 *Variable oystercatcher – scattered pairs breeding along the Thames coast, flocks (probably of pre-breeders) of 20-40 birds; totals for the area may reach 1% level. *South Island pied oystercatcher – wintering site for large flocks in the range 1000-8000 birds, exceeds 1% level. Pied stilt – wintering flocks of 300-1200 birds, exceeds 1% level. *Northern New Zealand dotterel – 1-2 pairs breed on Shelley Beach. **Banded dotterel – winter flocks of 20-100 birds. **Wrybill – flocks of 100-600 birds recorded occasionally; band sightings show these are birds that normally roost further west in Site E01, exceeds 1% level when present. *Eastern bar-tailed godwit – summer flocks of 1000-3000 birds, exceeds 1% level. **Lesser knot – flocks of 1000-3000 occasionally recorded, these are probably also birds that normally roost at Site E01, exceeds 1% level when present. **Caspian tern and *white-fronted tern recorded breeding on Shelley Beach. **Black-billed gull – small numbers recorded breeding occasionally.
Threats	As for Site E01.
Detailed spatial information available?	Limited; see Map E02. Some HW roosts known.
Additional information	Waikato Region ASCV 10. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Contiguous with Site E01, and birds known to move between the two sites. Birds also known to move between roosts within this site. Transient roost sites on farmland and stopbanks occur on both sides of the Waihou River.
Information gaps	Little information on which areas are important for foraging.
References and sources	Battley & Moore (2004), A. Habraken (*pers. comm*.), unpublished OSNZ shorebird database.

Map E02 (Firth of Thames east)

Important high-water roost sites for shorebird species are shown in yellow. During spring tides or in adverse weather, flocks are commonly seen on farmland and stopbanks on both sides of the Waihou River. One or two pairs of New Zealand dotterels and variable oystercatchers breed on Shelley Beach (red arrow). The inter-tidal flats around the mouths of the Waihou and Kauaeranga Rivers are used for feeding by many species of shorebirds.



Site E03	**Coast north of Thames (Te Puru to Matariki Bay)**
Priority	2
Assets	*Variable oystercatchers and *New Zealand dotterels breed in small numbers at stream mouths along this stretch of coastline. New Zealand dotterel pairs in 2017/18 were located at: Te Puru Stream (3 pairs); Tapu (4 pairs); Te Mata River (6 pairs); Waikawau River (3 pairs); Wairotoroto Stream (2 pairs); Omawhiti Stream (1 pair); Kereta (1 pair); Kirita Bay (1 pair). No individual site exceeds the 1% level, but collectively the area is significant.
Threats	High levels of disturbance at some sites (people, dogs, vehicles). Predation by mammalian and avian predators, including domestic cats. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E03. Breeding sites of dotterel pairs known, numbers and exact locations vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps, although some sites may have additional values as roost sites for small flocks of other shorebirds.
References and sources	NNZD census 2011, Miller (2018).

Map E03 (Thames coast)
Red arrows show breeding sites of New Zealand dotterels (and in most cases variable oystercatchers) between Thames and Manaia Harbour in 2017/18.

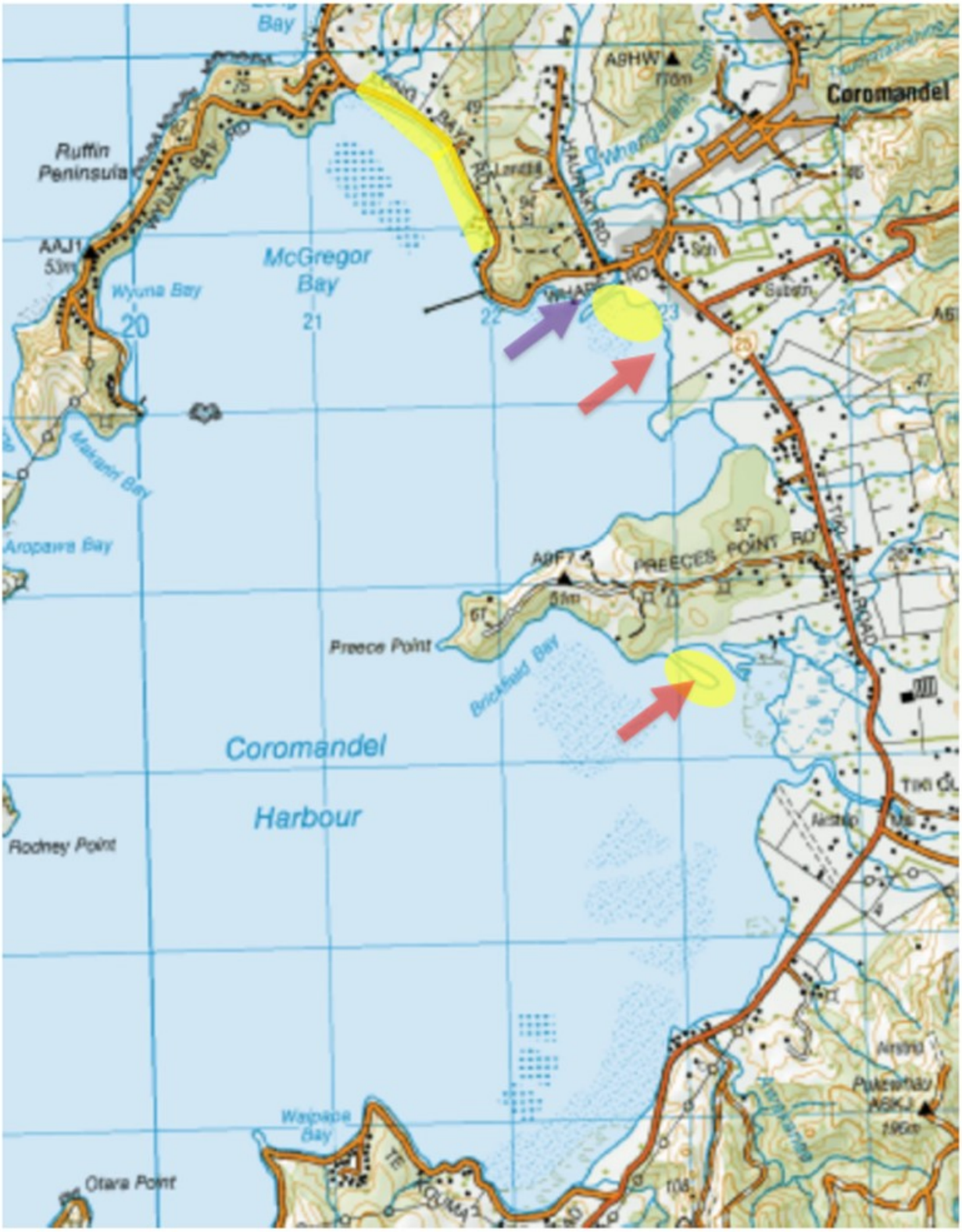
Site E04	**Manaia Harbour**
Priority	2
Assets	*Northern New Zealand dotterel – breeding (2 in 2011). *Variable oystercatcher – resident and breeding in small numbers. Records of: *Pied shag, *North Island fernbird, *Banded rail (Graeme 2008). *South Island pied oystercatcher. *Eastern bar-tailed godwit.
Threats	No site-specific information, but almost certain to include: Predation impacts on resident breeding species (loss of eggs, chicks and adults to mammalian and avian predators). Disturbance levels unknown but probably relatively low. Possible loss of feeding and roosting habitat from mangrove encroachment.
Detailed spatial information available?	Apparently little recent information.
Additional information	Overlap with Waikato Region ASCV 11. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Site is likely to contain other shorebird species and cryptic wetland species; spring and autumn surveys required. Not currently thought to reach 1% level for any species, but further data required to confirm this. Spatial information on areas important for breeding, foraging and roosting is lacking.
References and sources	Graeme (2008), NNZD census 2011.

Site E05	**Te Kouma Harbour/Peninsula**
Priority	4 (Insufficient data)
Assets	May contain *northern New Zealand dotterels (not surveyed in 2004 or 2011) and *variable oystercatchers.
Threats	No site-specific information, but almost certain to include: Predation impacts on resident breeding species. Disturbance levels unknown but probably relatively low. Possible loss of shorebird habitat from mangrove encroachment.
Detailed spatial information available?	No.
Additional information	Public access limited.
Information gaps	No recent information; surveys required to determine species and numbers of coastal birds present. Priority will almost certainly change with further information; small numbers of Threatened or At Risk species likely to be present, which would make the site significant habitat of indigenous fauna (EW 2016).
References and sources	NNZD censuses 2004, 2011.

Site E06	**Coromandel Harbour**
Priority	1
Assets	*Variable oystercatcher – scattered pairs breeding around the harbour. *South Island pied oystercatcher – up to 300 recorded (<1%). *Northern New Zealand dotterel – scattered pairs breeding, post-breeding flock of 27 in 2013 exceeds 1% level now, but current number needs checking. **Banded dotterel – flock of 64 in 2013 (<1%). *Eastern bar-tailed godwit – typically 200-300 in austral summer (<1%). *Brown teal – 9 in 2015. *North Island fernbird – records from 1980s, may still be present.
Threats	Predation impacts on resident breeding species (loss of eggs, chicks and adults to mammalian and avian predators). Disturbance (particularly on Long Bay causeway). Probably some loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E06. Some NNZD breeding sites and flock site known. Information on some other species available. Both oystercatcher species sometimes roost on oyster farm structures.
Additional information	Overlap with Waikato Region ASCV 12. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Numbers and distribution of breeding and roosting shorebirds needs updating, notably for NNZD (current priority 1 status relies on 2013 flock count alone). Feeding areas largely unknown for most species. Information on presence/distribution of cryptic waterbird species required.
References and sources	P. Stewart (*pers. comm*), unpublished OSNZ shorebird database, NNZD census 2011, Birding-NZ.net, eBird NZ.

Map E06 (Coromandel Harbour)

Two New Zealand dotterel breeding sites are arrowed in red; other sites probably exist. Shorebird high-water roosting areas are shown in yellow. The purple arrow shows the location of a sighting of brown teal in 2013. Variable oystercatchers breed in pairs scattered around the harbour, but their locations appear not to have been documented. Identification of areas important to shorebirds and waterbirds in this harbour is incomplete and/or partly out of date.



Site E07	**Coast north of Coromandel (Papaaroha to Tukituki Bay)**
Priority	2
Assets	*Variable oystercatchers and *New Zealand dotterels breed in small numbers at stream mouths along this stretch of coastline. In 2017/18, New Zealand dotterels were located at: Papaaroha (1 pair) Amodeo Bay (2 pairs) Tukituki Bay (2 pairs) *Brown teal – 5 recorded at Papaaroha in 2010 and 2016/17; breeding noted.
Threats	High levels of disturbance at some sites in late spring/summer (people, dogs, vehicles), predation by mammalian and avian predators, and loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E07. Breeding sites of dotterel pairs known, numbers and exact locations vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Miller (2018), Birding-NZ.net.

Map E07 (Coast north of Coromandel)

Red arrows show New Zealand dotterel breeding sites in 2017/18. The black arrow shows the location of a brown teal pair that bred in 2016/17.

Site E07 A	Motukawao Islands
Priority	2 (designated). Does not fall into an appropriate priority category, because the Australasian gannet is not currently classified as Threatened or At Risk. For the same reason (and because it is not endemic to the region or at the limit of its range), the site does not constitute significant habitat of indigenous fauna under EW criteria. In spite of the gannet's Not Threatened ranking, the site is significant for the species, as it held 8-9% of the global population in 1980/81.
Assets	Little suitable habitat for typical shorebirds, and rats probably preclude establishment of procellariiform seabirds. Australasian gannet – a total of about 4600 pairs in 1980/81 in three locations: Bush Island/Motukaramarama – 3500 pairs in 1980/81; Motutakapu – about 1000 pairs in 1980/81; Double Island/Motuwi stack – about 100 pairs in 1980/81.
Threats	Norway rats recorded on Bush Island/Motukaramarama and Double Island/Motuwi, other rat species may be present. Incursions by larger mammalian predators, particularly cats and mustelids, a threat.
Detailed spatial information available?	Aerial photos will show gannet colony locations.
Additional information	Rodent eradication(s) being considered. If undertaken successfully, they would probably lead to colonisation by a range of procellariiform seabird species.
Information gaps	No recent counts of gannets. Pest status needs confirmation.
References and sources	Wodzicki et al. (1984), J. Russell (pers. comm.), R. Chappell (pers. comm.).

Site E08	**Colville Bay (including Whangaahei Bay)**
Priority	1
Assets	*Northern New Zealand dotterel breeding site; post-breeding flock site, routinely exceeds the 1% level (e.g. 27 in 2017). *Variable oystercatchers resident and breeding; post-breeding flock of 85 in 2017 exceeds the 1% level. *Brown teal, recent records suggest the site exceeds the 1% level for the species. Other species recorded include: *Banded rail. *North Island fernbird. *Red-billed gull. *South Island pied oystercatcher (autumn flock of 500 recorded, <1%). Pied stilt. *Eastern bar-tailed godwit (<1%).
Threats	Little site-specific information, but almost certain to include: Predation on breeding species (feral and domestic mammals, avian predators). Disturbance levels unknown but probably moderate at the main high-water roost in summer. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E08. Some breeding sites and HW roost sites known. One location known for brown teal.
Additional information	Overlap with Waikato Region ASCV 13. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Feeding areas largely unknown for all species. Distribution of banded rail, North Island fernbird and other cryptic species incomplete.
References and sources	Dowding (2006a), NNZD census 2011, Graeme (2013), Birding-NZ.net, unpublished OSNZ shorebird database, DOC fernbird database, eBird NZ.

Map E08 (Colville Bay)

Red arrows show New Zealand dotterel and variable oystercatcher breeding sites. The yellow area is the main HW roost for most shorebird species. The black arrow shows the site of the brown teal flock. Identification of areas important to shorebirds and waterbirds in this harbour is incomplete.

Site E09	Waiaro Bay
Priority	2
Assets	*Variable oystercatcher – breeding on gravel spit (3 pairs in 2011, <1%). *Northern New Zealand dotterel – breeding on gravel spit (6 pairs in 2017/18, <1%). *Brown teal – flock of 25 in 2017 probably approaching the 1% level.
Threats	Predation by mammalian and avian predators. Possible trampling of nests by stock. Disturbance levels likely to be low.
Detailed spatial information available?	No.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Estuary behind gravel bank needs to be surveyed; likely that other avian values exist.
References and sources	NNZD census 2011, Miller (2018), eBird NZ.

Site E10	Port Jackson to Fletcher Bay
Priority	2
Assets	*Variable oystercatcher – resident and breeding in small numbers. *Northern New Zealand dotterel – 5 pairs breeding at Jackson Bay in 2017/18, and 2 pairs at Fletcher Bay. *Brown teal – small numbers recorded in 2015 at Fletcher Bay.
Threats	No site-specific information, but almost certain to include: Predation impacts on breeding species (mammalian and avian predators). Disturbance during late spring and summer. Loss of nests to big tides and storm surges.
Detailed spatial information available?	New Zealand dotterel territories known, exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 14. Within ONFL 10/2 (EW 2016). Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Miller (2018), eBird NZ.

Site E11	Stony Bay
Priority	2
Assets	*Variable oystercatcher – 1 pair breeding annually. *Northern New Zealand dotterel – 2 pairs breeding in 2017/18. *Pied shag – small numbers (<1%).
Threats	Some disturbance (campground) in late spring/summer. Predation (reduced by predator control).
Detailed spatial	No.

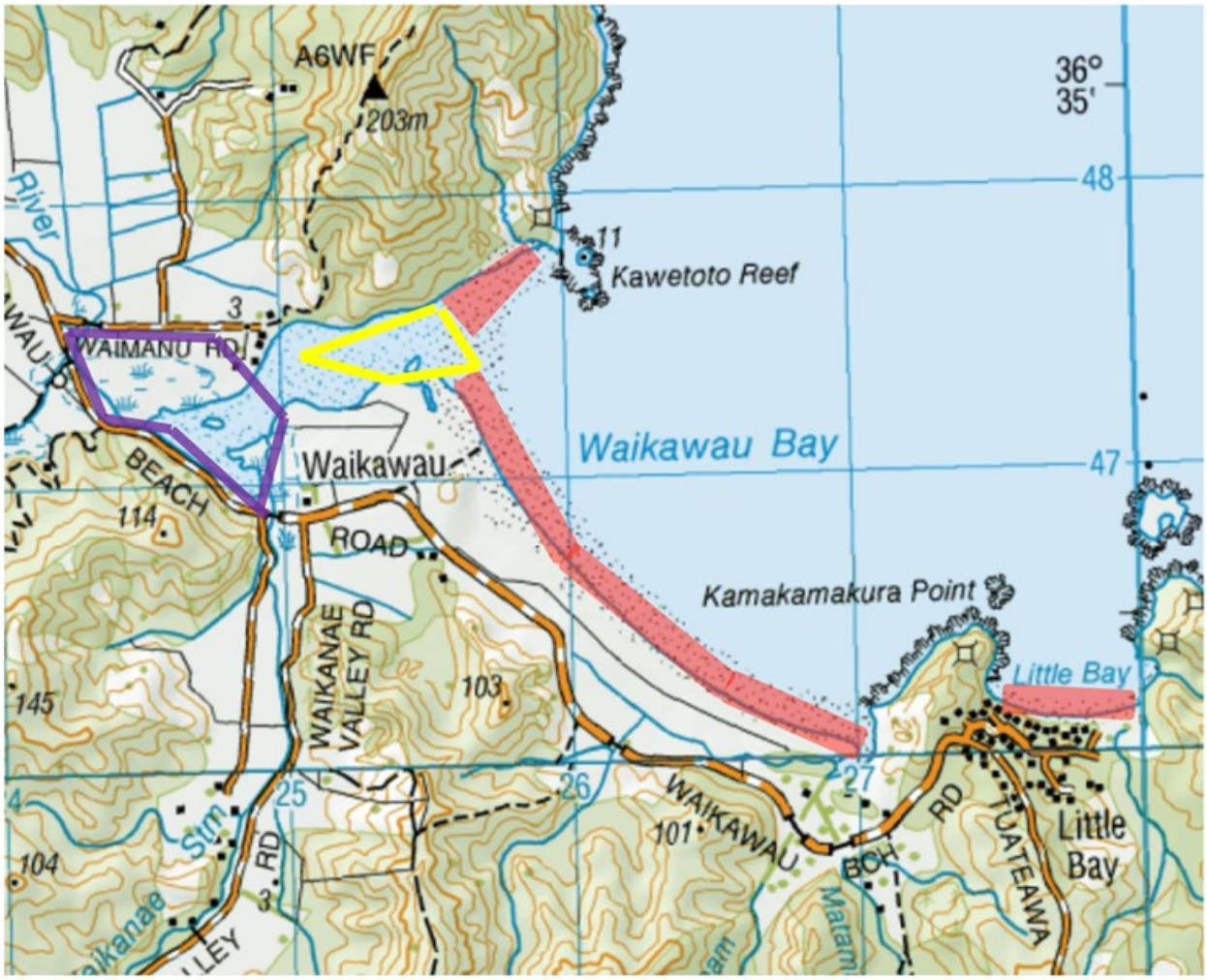
information available?	
Additional information	Overlap with ASCV 14. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Small site with limited shorebird habitat; probably at or close to carrying capacity with 1 pair of VOC and 2 pairs of NNZD.
Information gaps	No.
References and sources	NNZD census 2011, Miller (2018), eBird NZ.

Site E12	**Port Charles**
Priority	2 (designated). The presence of >1% of the brown teal population in 2010 justified Priority 1 status for the site. However, there appear to be no recent counts. The national population has grown, and as some of the translocated birds will probably have dispersed or died, the site is designated Priority 2 until information suggests >1% of the population is still present. Other avian values do not support a higher priority.
Assets	*Variable oystercatcher – a few pairs breeding. *Northern New Zealand dotterel – 1 pair breeding in 2017/18. **Caspian tern – small numbers recorded in 2009 and 2011 (<1%). *Brown teal – see above. **Reef heron – 1 recorded in 2009.
Threats	Disturbance to breeding shorebirds. Predation by feral and domestic mammals.
Detailed spatial information available?	No.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Brown teal population established following releases.
Information gaps	Brown teal total needs to be updated to confirm priority level. Very little information on habitat use for any species, and list of important species probably incomplete.
References and sources	Birding-NZ.net, NNZD census 2011, Miller (2018).

Site E13	**Waikawau Bay (including Little Bay)**
Priority	1
Assets	*Variable oystercatcher – important breeding site. *Northern New Zealand dotterel – 9 pairs breeding at Waikawau in 2017/18, and 2 pairs at Little Bay, reaches 1% level. *Banded rail – present and increasing. *Brown teal – more than 100 in 2010, (>1% level), but current numbers unknown. *North Island fernbird – 120+ counted in 2010. *Spotless crake – resident. **Australasian bittern – regularly present and breeding, numbers unknown.
Threats	Disturbance to breeding shorebirds (campground). Predation (reduced by predator control). Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E13. Breeding territories of NNZD and VOC spread along the beach, exact positions vary annually. Wetland species distributed throughout estuary behind northern end of beach.
Additional information	Overlap with Waikato Region ASCV 15. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps; bittern numbers unknown.
References and sources	NNZD census 2011, Moehau Environment Group (2010), Miller (2018).

Map E13 (Waikawau Bay)

Areas shaded red are breeding areas for New Zealand dotterels and variable oystercatchers. The mouth of the estuary outlined in yellow is used by shorebirds for foraging. The purple outline shows the approximate area of the wetland important for bittern, banded rail, and fernbird.



Site E14	**Kennedy Bay**
Priority	2
Assets	*Variable oystercatcher – 2011 record of 34 birds (<1%), some birds resident and breeding. *South Island pied oystercatcher – 2011 record of 12 birds. *Northern New Zealand dotterel – 8 pairs breeding in 2017/18. **Caspian tern – 2011 record of 2 birds (<1%).
Threats	Disturbance (including vehicles and dogs on beach). Predation by feral and domestic mammals Loss of nests to big tides and storm surges.
Detailed spatial information available?	No.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Distribution of resident breeding species not recorded.
References and sources	NNZD census 2011, Miller (2018).

Site E15	**Whangapoua Harbour, including New Chums Beach, Whangapoua Beach, and Matarangi Spit**
Priority	1
Assets	Pied stilt – winter flock of 20-80 birds (<1%). *Variable oystercatcher – Matarangi Spit is an important breeding site and holds a large post-breeding flock (commonly 150-190 birds), exceeds 1% level. *South Island pied oystercatcher – wintering site for 750-1300 birds; reaches 1% level in some years. *Northern New Zealand dotterel – Matarangi Spit is a major breeding site (18 pairs in 2017/18), one of the three most important post-breeding flock sites globally with 150+ birds, exceeds 1% level. New Chums Beach had 4 pairs in 2017/18, Whangapoua Beach had 1 pair. **Banded dotterel – winter flock of 150-250, exceeds 1% in some years. *Eastern bar-tailed godwit – flock of 1000+ annually; exceeds 1% level nationally. Other arctic migrant shorebirds in small numbers (turnstone, golden plover). **Australasian bittern – 2009 sighting in Matarangi Wildlife Habitat Reserve. *Banded rail – records from 1980s, probably still present. *North Island fernbird – records from 2000, probably still present. *Brown teal – recorded in 2009 and 2010 in the Pungapunga River, at least one pair breeding in 2018. *NZ dabchick – 2 recorded in 2018 (<1%).
Threats	Periodic severe loss of roosting habitat (all shorebirds) and breeding habitat for NNZD and VOC on Matarangi Spit through erosion; see comments in Dowding (2006a, section 4.3.2). Disturbance to breeding birds (Matarangi Spit, Whangapoua Beach) in late spring and summer. Predation by mammalian and avian predators (reduced at Matarangi Spit by predator control during shorebird breeding season). Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E15. Limited information. Matarangi Spit is an important breeding site for variable oystercatcher and New Zealand dotterel, and a high-water roost site for all waders.
Additional information	Overlap with Waikato Region ASCV 16. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Harbour identified as 1 of the top 19 wintering sites nationally for indigenous shorebirds (Dowding & Moore (2006).
Information gaps	Whether there are other HW roosts is not known, and the feeding areas used by the various species in the harbour are unknown. Whether shorebirds breed on any of the shellbanks in the harbour needs to be determined. The distribution and numbers of waterbirds in the upper reaches of the harbour are largely unknown.
References and sources	Dowding (2006a), Dowding & Moore (2006), NNZD census 2011, DOC bittern and fernbird databases, Birding-NZ.net, eBird NZ, (Miller 2018).

Map E15 (Whangapoua Harbour)

Areas shaded or arrowed red show breeding sites of New Zealand dotterels (and in most cases, variable oystercatchers). The main shorebird high-tide roost at the tip of Matarangi Spit is marked A. The purple arrow shows the approximate location of a recent bittern sighting, and the black arrow the location of brown teal sightings in 2009-2010 and 2018. Identification of areas important to shorebirds and waterbirds in this harbour is incomplete; areas of the upper harbour are almost certainly important for cryptic waterbirds and intertidal areas important for shorebird foraging have not all been identified (but include the area in the lower harbour shaded yellow). Shorebirds may also breed on islands and shellbanks within the harbour or along the western shoreline.

Site E16	**Gray's Beach-Kuaotunu Beach**
Priority	2
Assets	*Variable oystercatcher – a few pairs breeding (<1%). *Northern New Zealand dotterel – 4 pairs on each beach in 2017/18 (<1%). **Caspian tern – recorded at Gray's Beach in 2011 (<1%).
Threats	Disturbance to breeding birds in late spring and summer. Predation by mammalian and avian predators. Losses of nests to big tides and storm surges.
Detailed spatial information available?	Breeding sites of dotterel pairs known, exact locations vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No.
References and sources	NNZD census 2011, Miller (2018).

Site E17 A	**Otama Beach**
Priority	2
Assets	**Australasian bittern – 2008 sighting in Otama Beach wetland reserve. *Variable oystercatcher – a few pairs breeding. *Northern New Zealand dotterel – 3 pairs breeding in 2017/18.
Threats	Predation, reduced by predator control. Disturbance, partly reduced by management. Losses of nests to big tides and storm surges.
Detailed spatial information available?	See Map E17. Breeding sites of dotterel pairs known, numbers and locations vary annually.
Additional information	Overlap with Waikato Region ASCV 17. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	List of important species probably incomplete; values of the wetland behind Otama Beach apparently not well documented (*banded rail possible).
References and sources	NNZD census 2011, Miller (2018), DOC bittern database.

Map E17 (Otama-Opito)
Shaded green areas show areas used for breeding by New Zealand dotterels and variable oystercatchers on Otama Beach and Opito Bay. One pair of New Zealand dotterels usually breeds at Whaorei Bay (green arrow). The purple line shows the approximate extent of the wetland behind Otama Beach; there are records of bittern in this area, and it may be important for other wetland birds.

Site E17 B	**Opito Bay**
Priority	2
Assets	*Variable oystercatcher – a few pairs breeding. *Northern New Zealand dotterel – 9 pairs breeding in 2017/18.
Threats	Mammalian and avian predators. Disturbance to breeding shorebirds. Losses of nests to big tides and storm surges.
Detailed spatial information available?	See Map E17. Breeding sites of dotterel pairs largely known, numbers and locations vary annually.
Additional information	Overlap with Waikato Region ASCV 17. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	List of important species probably incomplete.
References and sources	NNZD census 2011, Miller (2018).

Site E18	**Ohinau Island Group**
Priority	1
Assets	**Flesh-footed shearwater – large colony on Ohinau Island (>10% of NZ population and >1% of global population). *New Zealand white-faced storm petrel – breeding on Ohinauiti. *Northern diving petrel – breeding on Ohinauiti. Apparently no recent records of shorebirds or wetland birds, little suitable habitat, except possibly for a few pairs of *variable oystercatchers.
Threats	No mammalian predators or browsers on main island following multi-species pest eradication in 2005. Not permanently occupied, privately owned, disturbance levels likely to be low. However, as on any seabird island, trampling/collapse of seabird burrows by visitors is a potential threat.
Detailed spatial information available?	Some information available on distribution of shearwater burrows.
Additional information	Record from 1970 of *North Island little shearwaters on Ohinauiti. Waikato Region ASCV 18. Regular presence of Threatened or At Risk seabird taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	List of seabird species may not be complete; current status of *North Island little shearwater unknown.
References and sources	Chappell (2008), Waugh *et al*. (2013).

Site E19	**Matapaua Bay to Whauwhau Beach**
Priority	2
Assets	This is a stretch of rocky coastline with several sandy bays and beaches. *Northern New Zealand dotterels are present on several of these beaches. New Zealand dotterel pairs in 2017/18 were located at: Matapaua Bay (1 pair); Waitaia Bay-Whauwhau Beach (9 pairs). *Variable oystercatcher – a few pairs breeding on the same beaches.
Threats	Disturbance at Matapaua in late spring and summer, other sites isolated and more difficult of access. Predation at all sites, possibly reduced by predator control in nearby areas. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E19. NNZD breeding sites known, exact locations vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Miller (2018).

Map E19 (Matapaua Bay to Whauwhau Beach)

New Zealand dotterel breeding sites are shown in red. Variable oystercatchers also breed at some of these sites.

Site E20 A	**Cuvier Island**
Priority	1 (designated) It is not clear whether Cuvier achieves Priority 1 status for its seabird populations, given that the sizes of those populations are unknown. However, the island's predator-free status, coupled with the presence of a range of At Risk seabird species, a number of predator-sensitive forest bird species, and other faunal values, makes the site one of high regional and national importance for fauna.
Assets	There is little suitable habitat for typical shorebirds. *White-fronted tern – breeding colony (current numbers unknown). *Red-billed gull – a colony of many hundreds of pairs has declined to a few pairs. High values for burrow-nesting seabirds. *Northern blue penguin – breeding. Grey-faced petrel – breeding. *Fluttering shearwater – small numbers breeding. *Pycroft's petrel – population established by translocation in 2001-2003.
Threats	Incursions of mammalian predators. Some avian predation. Disturbance levels normally low. As on any seabird island, trampling/collapse of seabird burrows by visitors is a potential threat.
Detailed spatial information available?	Seabirds distributed over much of the island, red-billed gulls and white-fronted terns breed at the isthmus near the eastern end of the island.
Additional information	Nature Reserve. Free of mammalian predators, and has good populations of sensitive native forest birds, notably *North Island saddleback. *Sooty shearwater may no longer be present. Part of Waikato Region ASCV 19. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Status and robust population estimates for seabird species required.
References and sources	Bouma (2007), Taylor (2000a, 2000b), NZ Birds Online, Waugh *et al*. (2013).

Site E20 B	**Great Mercury Island**
Priority	1
Assets	Great Mercury is the only island in the wider Mercury group that has suitable habitat for typical shorebirds. *Brown teal – flock of 34 recorded in summer 2018/19 (probably ≥1%). *Variable oystercatcher – breeding. *Northern New Zealand dotterel – breeding on virtually all sandy beaches in 2018/19, with a minimum of 12 pairs in total (>1%). Grey-faced petrel – a few pairs breeding.
Threats	Incursions of mammalian predators. Avian predation (swamp harrier and black-backed gull). Disturbance levels occasionally high on some beaches (popular yachting destination in summer), and visitors dogs. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E20 B. Locations of New Zealand dotterel territories known.
Additional information	Privately owned and inhabited. Eradication of rats and cats undertaken in 2014. If the island remains free of mammalian predators, its values will rise significantly; the grey-faced petrel population will increase, and it is almost certain that other burrow-nesting seabirds will establish. Existing lizard and invertebrate populations will increase, and translocations of a range of fauna will be possible. Part of Waikato Region ASCV 19. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	None.
References and sources	Bouma (2007), DOC website, P. Corson (pers. comm.).

Map E20 B (Great Mercury)

Breeding sites of New Zealand dotterels are indicated by red arrows or shading. The inter-tidal upper reaches of Huruhi Harbour (shaded yellow) are used by dotterels and small numbers of other shorebirds for feeding, and by a flock of brown teal. The central flats (shaded purple) are used by dotterels for roosting when the grass is short.

Site E20 C	**Mercury Islands except Great Mercury**
Priority	1
Assets	Very little suitable habitat for typical shorebirds. Very high values for seabirds. *Northern blue penguin – breeding on all islands. Grey-faced petrel – large numbers on Red Mercury, Double and Stanley Is (>1%). **Flesh-footed shearwater – breeds on most islands in the group. *North Island little shearwater – estimated 1000 pairs on Red Mercury, about 10% of the global population. *Pycroft's petrel –breeds on at least 4 islands in the group, 5000-10000 pairs on Red Mercury probably represent 75% of the global population. *Northern diving petrel – breeds on most islands in the group. *Fluttering shearwater – small numbers breed on several islands. *Sooty shearwater – small numbers breed on Stanley Island, probably other islands.
Threats	Incursions by mammalian predators. Occasional avian predation (mainly swamp harrier and black-backed gull). Disturbance levels generally low. As on any seabird island, trampling/collapse of seabird burrows by visitors is a potential threat.
Detailed spatial information available?	Some information on which species occur on which islands, and where large concentrations of some species occur, but species are mixed in many areas and often distributed widely across each island.
Additional information	Nature Reserves. High values for other fauna, including a population of *little spotted kiwi on Red Mercury, *North Island saddleback on Stanley Island, reptiles, and invertebrates. Part of Waikato Region ASCV 19. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Robust population estimates for seabird species required.
References and sources	Taylor (2000a, 2000b), NZ Birds Online, Waugh *et al*. (2013).

Site E21	**Wharekaho**
Priority	2
Assets	*Northern New Zealand dotterel – 8 pairs bred in 2017/18. *Variable oystercatcher – typically 2-4 pairs breeding. **Caspian tern – 5 recorded in 2011, probably not breeding.
Threats	Mammalian predators, including domestic cats and dogs. Moderate-high levels of disturbance during the breeding season.
Detailed spatial information available?	Exact territory locations vary annually, but both species tend to breed toward southern end of beach.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps.
References and sources	Author (unpubl. data), unpublished OSNZ shorebird database, NNZD census 2011, Miller (2018).

Site E22	**Whitianga**
Priority	2
Assets	*Northern New Zealand dotterel – 6 pairs bred on Buffalo Beach in 2017/18, 1 pair at Flaxmill Bay. *Variable oystercatcher – several pairs breed on Buffalo Beach. **Australasian bittern – records in the upper harbour near Coroglen 2001-2004. *Banded rail – older records, probably still present. *North Island fernbird – present.
Threats	Disturbance levels high on Buffalo Beach, dogs and horses common. Predation of nests and chicks by mammalian and avian predators. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E22. Breeding territories of NNZD and VOC on Buffalo Beach are known, exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 20. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Apparently little recent information available on the composition, distribution, or significance of the avifauna of the upper branches of the harbour. *Pied shag may be breeding. Numbers of **Australasian bittern unknown; even a small population (in the order of 4-5 birds) would raise site to Priority 1.
References and sources	NNZD census 2011, Graeme (2009), DOC bittern and fernbird databases., Miller (2018).

Map E22 (Whitianga)

The area shaded red is used by New Zealand dotterels and variable oystercatchers for breeding and roosting. One pair of New Zealand dotterels commonly breeds in Flaxmill Bay (red arrow). There are records of bittern, banded rail and fernbird from the upper reaches of the harbour. Bitterns were recorded in the area shaded yellow in 2001-2004; cryptic waterbird species probably occur elsewhere but there is little recent information.

Site E23	**Cooks Beach, Purangi Estuary, Cathedral Cove, Hahei Beach**
Priority	2
Assets	*Northern New Zealand dotterel – in 2017/18, 6 pairs bred at Cooks Beach, and 1 pair at Hahei Beach. Remaining coastline largely unsuitable for shorebirds. **Australasian bittern – recorded in Purangi Estuary in 2013. * Banded rail – recorded in Purangi Estuary in 2013. * North Island fernbird – recorded in Purangi Estuary in 2013.
Threats	High levels of disturbance at Cooks Beach and Hahei Beach. Predation (from feral and domestic mammals). Loss of nests to big tides and storm surges.
Detailed spatial information available?	Shorebird breeding territories on sandy beaches; exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 21 (which does not include Cooks Beach). Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Current importance of Purangi Estuary to cryptic waterbirds (especially bittern) needs to be determined.
References and sources	NNZD census 2011, W. Hare (*pers. comm*.), Miller (2018).

Site E24	**Hot Water Beach**
Priority	2
Assets	*Variable oystercatcher – 2 pairs breeding in 2011. *Northern New Zealand dotterel – 8 pairs breeding in 2017/18 (<1%).
Threats	Disturbance from beach-users, especially in late spring and summer. Predation by introduced mammals and native birds. Loss of nests to big tides and storm surges.
Detailed spatial information available?	Most NNZD breeding towards northern end of beach.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Miller (2018).

Site E25	**Alderman Islands**
Priority	1
Assets	Almost no habitat suitable for shorebirds or estuarine birds, with the possible exception of small numbers of variable oystercatcher. Very high values for seabirds: *Northern blue penguin. *North Island little shearwater – estimated 4000 pairs on Hongiora and Ruamahuanui Islands, together thought to be about 40% of the global population. *New Zealand white-faced storm petrel – thousands of pairs breeding on Hongiora. *Northern diving petrel – breeds on most islands in the group (>1%). Grey-faced petrel – Hongiora has one of the largest colonies (probably >10% of the

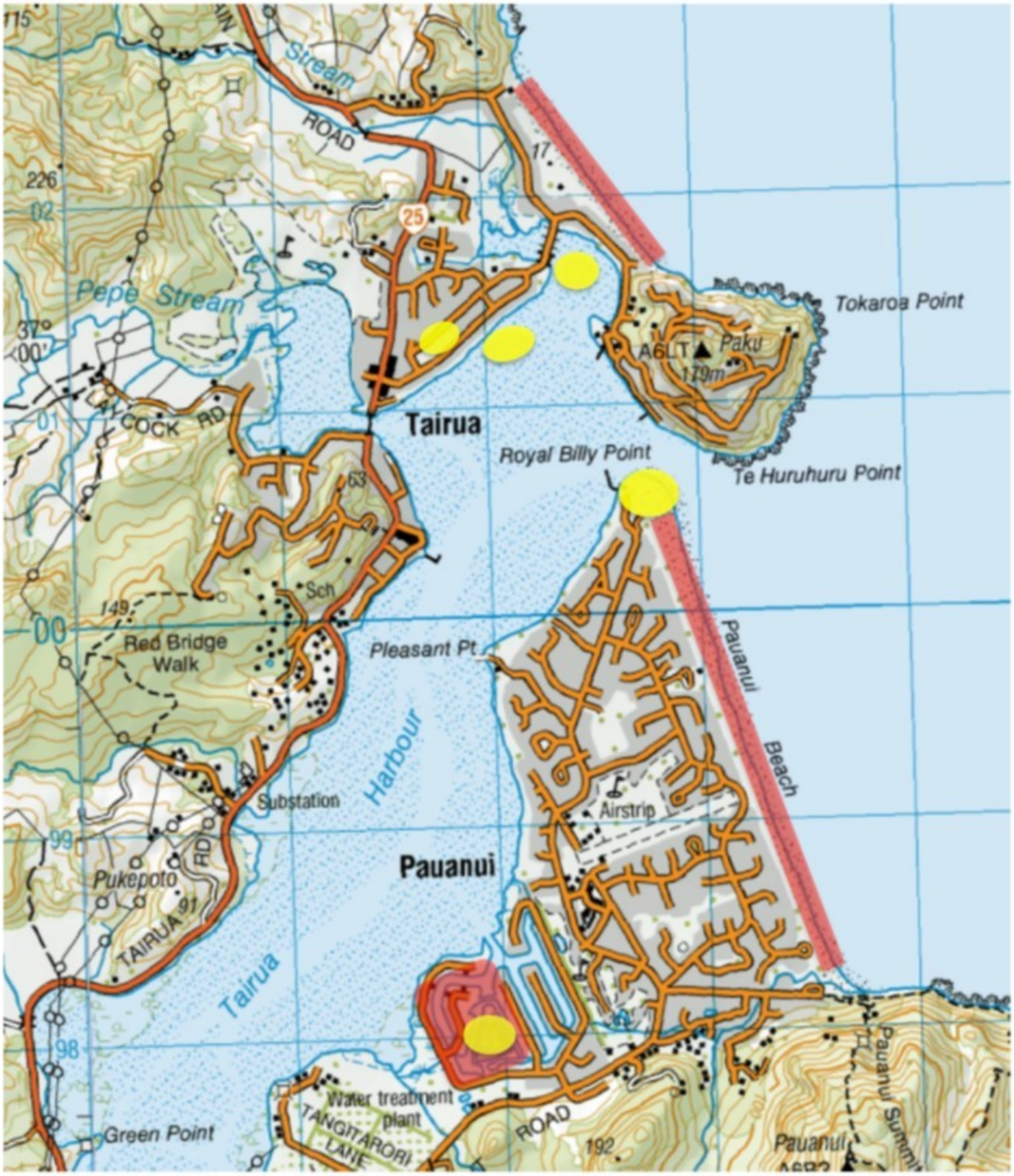
	NZ population), sizeable colonies also on Ruamahuanui and Ruamahuaiti. *Fluttering shearwater – large numbers breed on Ruamahuanui, a few elsewhere. *Sooty shearwater – small numbers breeding on Hongiora.
Threats	Incursions by mammalian predators. Isolated site, so disturbance levels generally low.
Detailed spatial information available?	Some information on which species occur on which islands, and where large concentrations of some species occur.
Additional information	Nature Reserves. Good populations of tuatara on most of the islands. Waikato Region ASCV 22. Regular presence of Threatened or At Risk seabird taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Robust population estimates for seabird species required.
References and sources	Taylor (2000a, 2000b), Waugh *et al*. (2013), NZ Birds Online.

Site E26	**Tairua Harbour (including Tairua Ocean Beach, Pauanui Beach and Spit, and Pauanui Waterways)**
Priority	1
Assets	Extensive information on avian values and habitat use of this site gathered 2003-2008 (see text). **Reef heron – resident in small numbers. *Variable oystercatcher – large resident population, exceeds 1% level. *South Island pied oystercatcher – wintering site. *Northern New Zealand dotterel – breeding and flocking sites, exceeds 1% level (total of 20 pairs in 2017/18). **Banded dotterel – wintering site probably exceeds 1% at regional level. **Caspian tern – present in small numbers. *Bar-tailed godwit – c 150 each austral summer. *Banded rail – widespread in suitable habitat around the harbour. *North Island fernbird – resident in suitable habitat around the harbour. **Australasian bittern – one recorded in 2010.
Threats	High levels of disturbance in spring and summer. Some pairs of NNZD and VOC breed at Pauanui Waterways, moving regularly to avoid construction activity. Predation, including by domestic cats and dogs, at most parts of the site. Loss of nests to big tides and storm surges on Pauanui and Tairua Beaches.
Detailed spatial information available?	Yes. See Maps E26-1 – E26-4.
Additional information	Upper harbour is Waikato Region ASCV 23. Lower harbour not included in ASCV but has much higher values for Threatened and At Risk shorebirds. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Few for shorebirds, but periodic updates on numbers of key species are desirable. Information on cryptic wetland species, particularly in the upper harbour, is sparse.
References and sources	Larcombe (2005), Pierce (2005), Dowding (2005), NNZD census 2011, DOC banded rail database, Miller (2018).

Map E26-1 (Tairua Harbour)

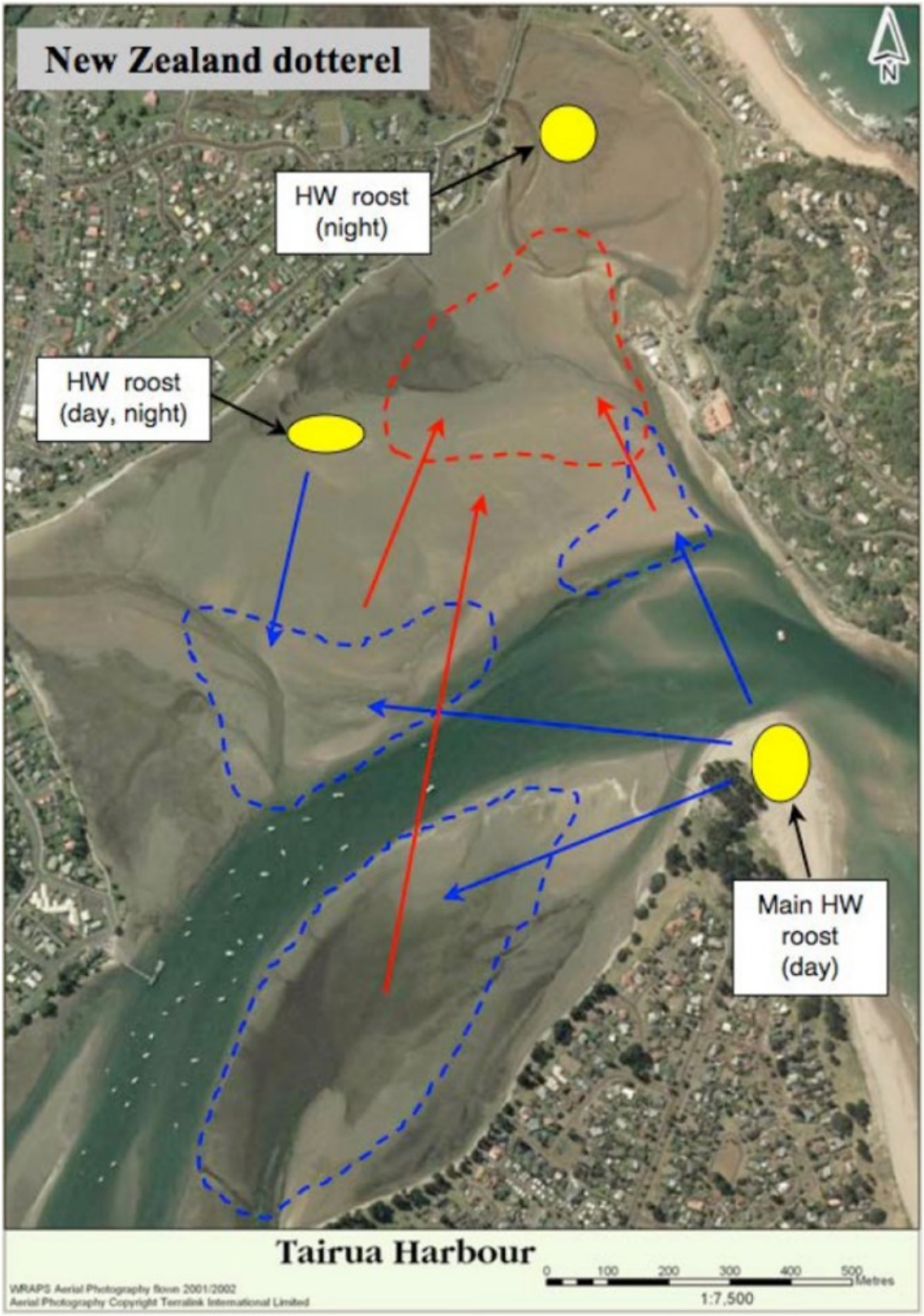
Breeding areas for New Zealand dotterels and variable oystercatchers are shown in red; primary HW roost sites for all shorebirds are shown in yellow.

Inter-tidal foraging areas used by three shorebird species in April 2004 are shown in maps E26- 2 to E26-4.



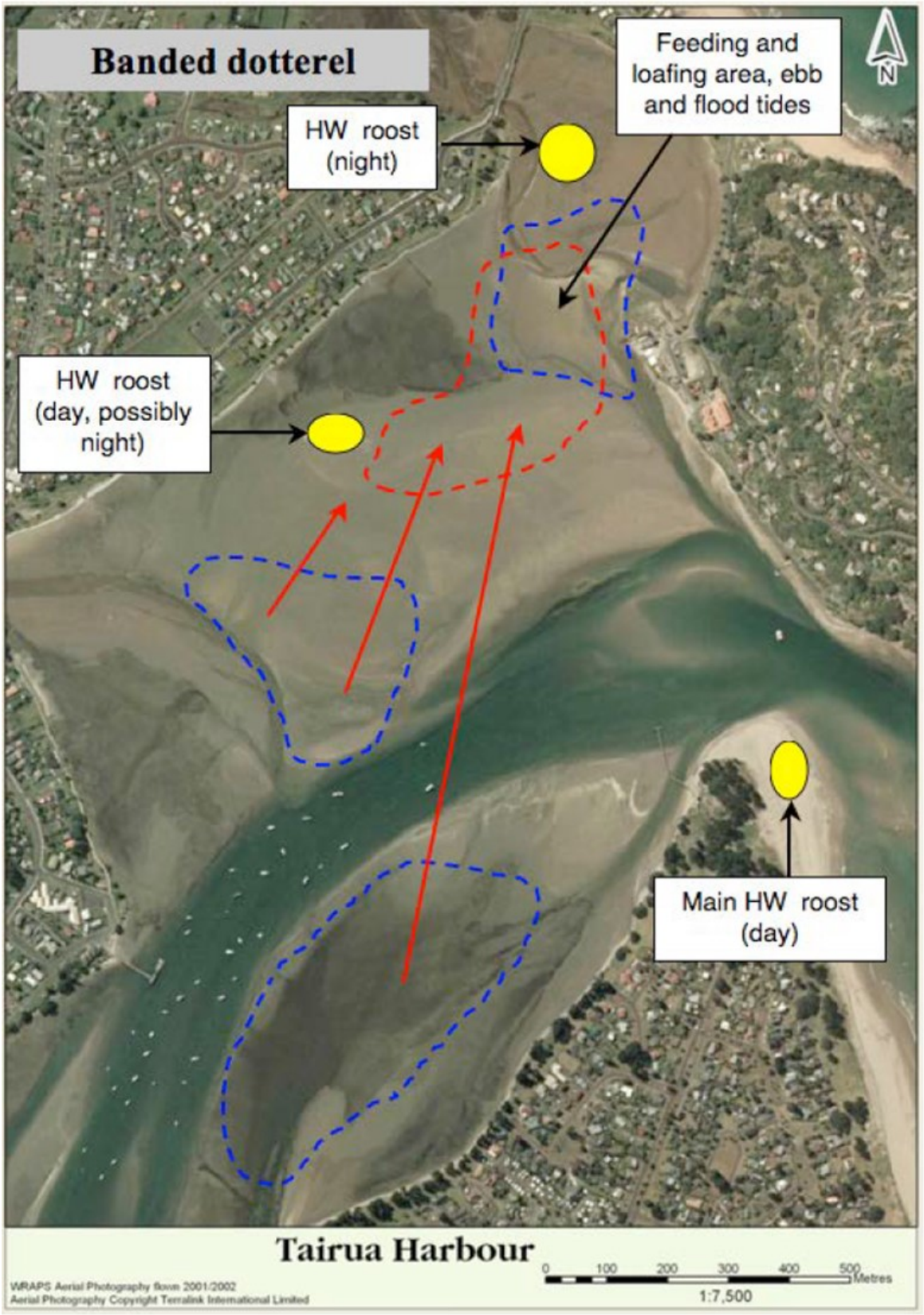
Map E26-2 (Tairua Harbour)

Use of lower Tairua Harbour by New Zealand dotterels, April 2004. HW roosts are shown in yellow. Dashed blue lines enclose main ebb/low tide feeding areas; blue arrows show movement from roosts to these areas. The dashed red line shows the main flood tide feeding area, and red arrows show movement toward this area. From Dowding (2005).



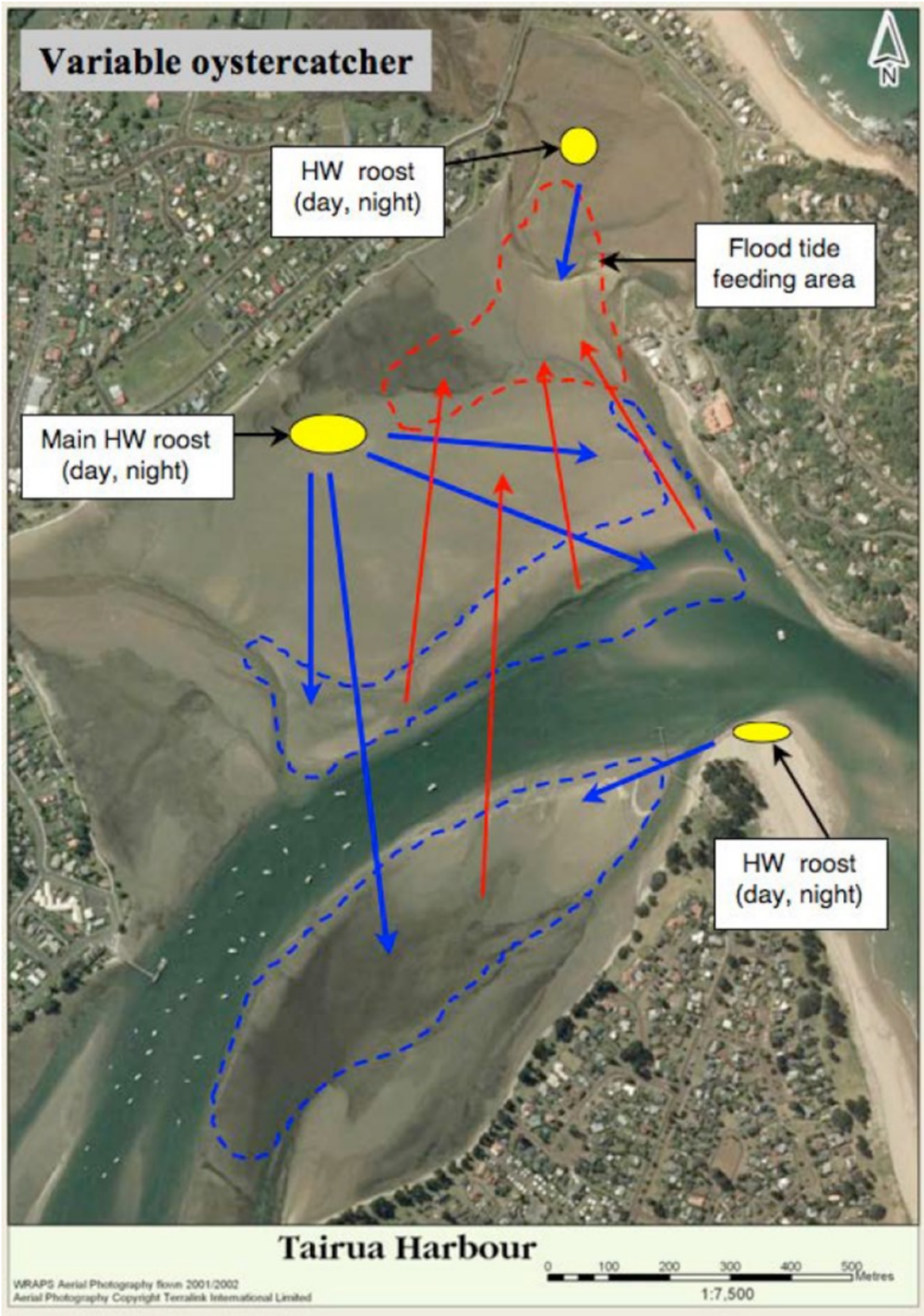
Map E26-3 (Tairua Harbour)

Use of lower Tairua Harbour by banded dotterels, April 2004. HW roosts are shown in yellow. Dashed blue lines enclose main ebb / low tide feeding areas. The dashed red line shows the main flood tide feeding area, and red arrows show movement toward this area. From Dowding (2005).



Map E26-4 (Tairua Harbour)

Use of lower Tairua Harbour by variable oystercatchers, April 2004. HW roosts are shown in yellow. Dashed blue lines enclose main ebb / low tide feeding areas; blue arrows show movement from roosts to these areas. The dashed red line shows the main flood tide feeding area, and red arrows show movement toward this area. From Dowding (2005).



Site E27	**Slipper Island**
Priority	2
Assets	*Northern New Zealand dotterel – 7 pairs bred in 2017/18.
Threats	Disturbance likely to be limited. Predation by mammalian and avian predators. Loss of nests to big tides and storm surges
Detailed spatial information available?	NNZD territories known.
Additional information	Privately-owned. Numbers of NNZD have increased significantly in recent years. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No information on other species. *Variable oystercatcher (and probably others) likely to be present.
References and sources	NNZD census 2011, Miller (2018).

Site E28	**Ohui**
Priority	2
Assets	*Variable oystercatcher – breeding site for several pairs. *Northern New Zealand dotterel –7 pairs bred in 2017/18. *Banded rail – old records from small wetland at rear of beach.
Threats	Predation by mammalian and avian predators of shorebird eggs, chicks, adults (reduced by predator control during shorebird breeding season). Disturbance during breeding – people, dogs, vehicles on beach. Loss of nests to big tides and storm surges.
Detailed spatial information available?	Breeding sites spread along beach, usually within 1 km of northern end.
Additional information	Not included in Waikato Region ASCV 24. Included in ONFL 13 (EW 2016). Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	No recent information on numbers and distribution of wetland species (crakes, rail, bittern).
References and sources	Dowding (2003, 2014), Miller (2018).

Site E29	**Opoutere Sandspit and Wharekawa Harbour**
Priority	1
Assets	Very high avian values of this site listed by Dowding (2014), and include: *Variable oystercatcher – major breeding and post-breeding flock site for the species, exceeds 1% level. *Northern New Zealand dotterel – 12 pairs bred in 2017/18; exceeds 1% level both as a breeding site and post-breeding flock site. **Banded dotterel – small numbers. *Bar-tailed godwit – typically 100-200 each summer (<1%). **Reef heron – seen regularly in small numbers, probably a pair breeding on Hikunui Rock. *Red-billed gull – resident, a few may breed on Hikunui Rock. *White-fronted tern – regularly seen, occasionally breed on Hikunui Rock. **Australasian bittern – records from the upper vegetated parts of the harbour, numbers and distribution unknown. *Banded rail – still relatively common, regularly seen around the mouth of Wahitapu Stream, almost certainly occurs elsewhere in the harbour.
Threats	Predation by mammalian and avian predators (reduced by predator control on Opoutere Sandspit during the shorebird breeding season). Disturbance levels high in late spring and summer (people, dogs, vehicles). Some loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E29. Territories of shorebirds on the beach and spit are well known. Some feeding areas for shorebirds identified. Limited information on distribution of cryptic wetland species in the harbour.
Additional information	Overlap with Waikato Region ASCV 24. Beach, sand spit, and outer harbour included in ONFL 13 (EW 2016). Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). Site includes the Wharekawa Harbour Wildlife Refuge, designated in 1967. Management programme for dotterels and oystercatchers in the refuge has been in place since 1986/87.
Information gaps	Shorebirds monitored frequently, but distribution of banded rail and bittern incomplete.
References and sources	NNZD census 2011, Dowding (2006, 2014), DOC bittern and banded rail databases, Miller (2018).

Map E29 (Opoutere Sandspit and Wharekawa Harbour)

The area shaded red is used for breeding by New Zealand dotterels and variable oystercatchers. The sandspit is also used as a high-tide roost by all shorebird species (yellow). The main shorebird foraging areas are in the lower harbour (purple outline). Banded rails are regularly seen at the mouth of Wahitipu Creek (green arrow), but occur elsewhere. The upper harbour is almost certainly important for a range of waterbirds but their distributions are largely unknown. Reef heron, red-billed gull, and white-fronted tern have been known to breed on Hikunui Rock (arrowed black) in small numbers.

Site E30	Onemana
Priority	2
Assets	*Variable oystercatcher, a few pairs breeding. *Northern New Zealand dotterel – 6 pairs breeding in 2017/18 (<1%).
Threats	Predation of nests and chicks has been recorded (reduced by predator control during shorebird breeding season). Loss of nests to big tides and storm surges. Disturbance to breeding birds in late spring and summer.
Detailed spatial information available?	Breeding territories spread along beach; exact locations vary annually.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016). No inter-tidal feeding areas, birds probably feed in upper parts of Whangamata Harbour.
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Miller (2018).

Site E31	Tokakahakaha (peninsula south of Onemana)
Priority	2
Assets	*Variable oystercatcher, 1-3 pairs breeding. *Northern New Zealand dotterel – probably 1-3 pairs breeding. **Caspian tern, 2011 record of 1 pair.
Threats	Predation (mammalian and avian predators). Disturbance levels probably low. Beaches narrow, loss of nests to big tides and storm surges.
Detailed spatial information available?	No.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Recent data lacking.
References and sources	Author (unpubl. data), NNZD census 2011.

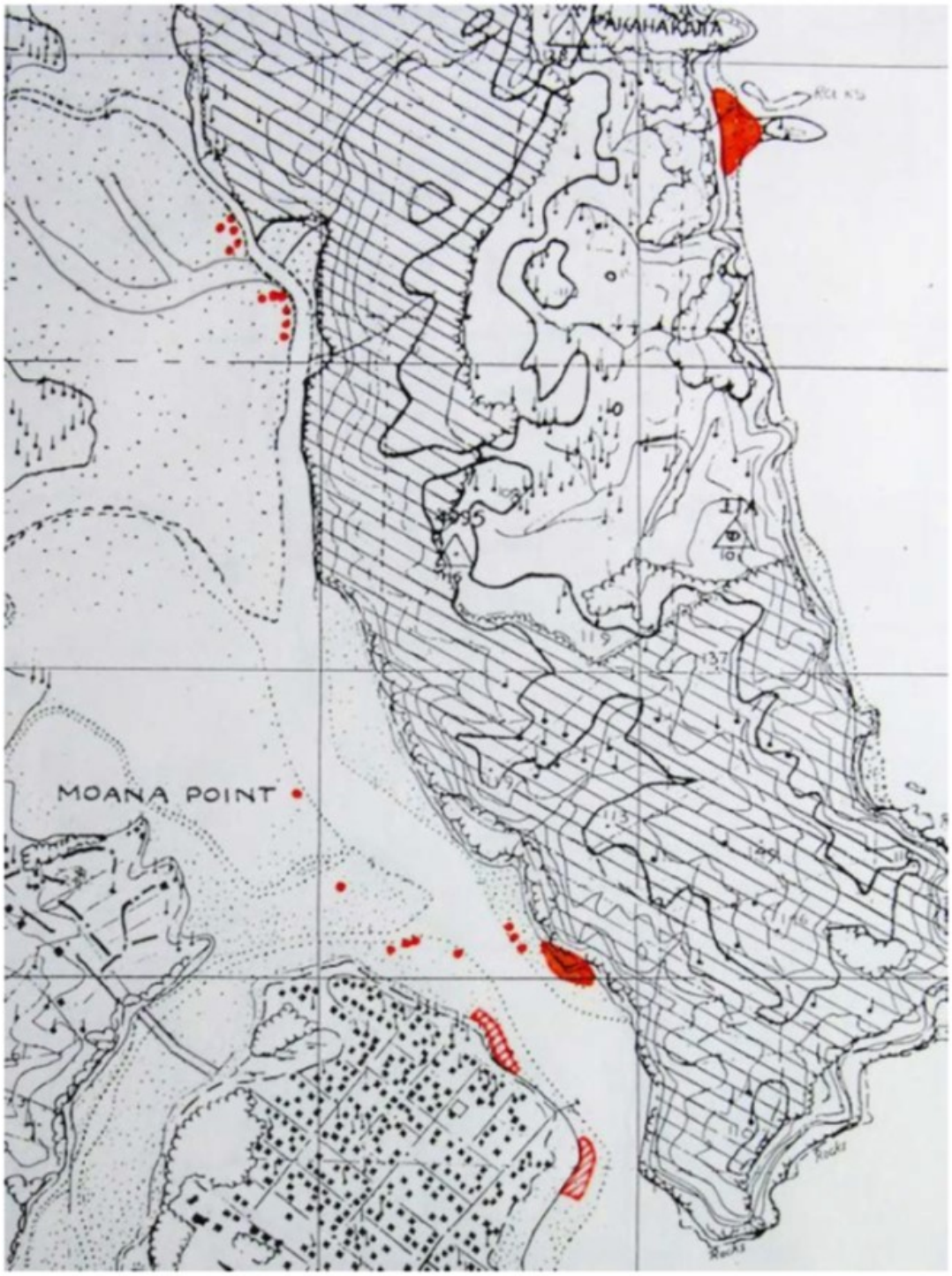
Site E32	**Whangamata Harbour**
Priority	1
Assets	*Variable oystercatcher – numbers using the harbour exceed 1% level. *Northern New Zealand dotterel – post-breeding flock site, reaches 1% level. *Eastern bar-tailed godwit – feed in the harbour, records of 150-200 there and in a HW flock on the beach (<1%). List of other species summarised by Rayner (2011), and includes: **Australasian bittern; *North Island fernbird; *Banded rail.
Threats	Substantial disturbance at HW roosts and (to a lesser extent) in foraging areas. Predation on species breeding around the harbour margins. Possible effects of mangrove removal on some species (see Rayner 2011).
Detailed spatial information available?	See Maps E32-1 – E32-3. Some 1997 data on foraging areas of New Zealand dotterel, variable oystercatcher, and godwits available (Dowding, unpublished).
Additional information	Overlap with Waikato Region ASCV 25. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Numbers of key shorebird species need updating; knowledge of high-water roost sites incomplete. More data required on numbers and distribution of cryptic wetland birds, especially in the upper reaches of the harbour. Breeding status of NNZD on north-east side of harbour needs updating.
References and sources	Author (unpubl. data), Bouma (2007), Rayner (2011).

Maps E32-1 to E32-3 (Whangamata Harbour)

Maps showing habitat use by three shorebird species in Whangamata Harbour in February 1997. Comparison of these maps shows clearly how different areas of an estuary may be used by different species. For example, variable oystercatchers forage mainly along channel margins (map E32-2), while bar-tailed godwits commonly feed on eel-grass flats between channels (map E32-3).

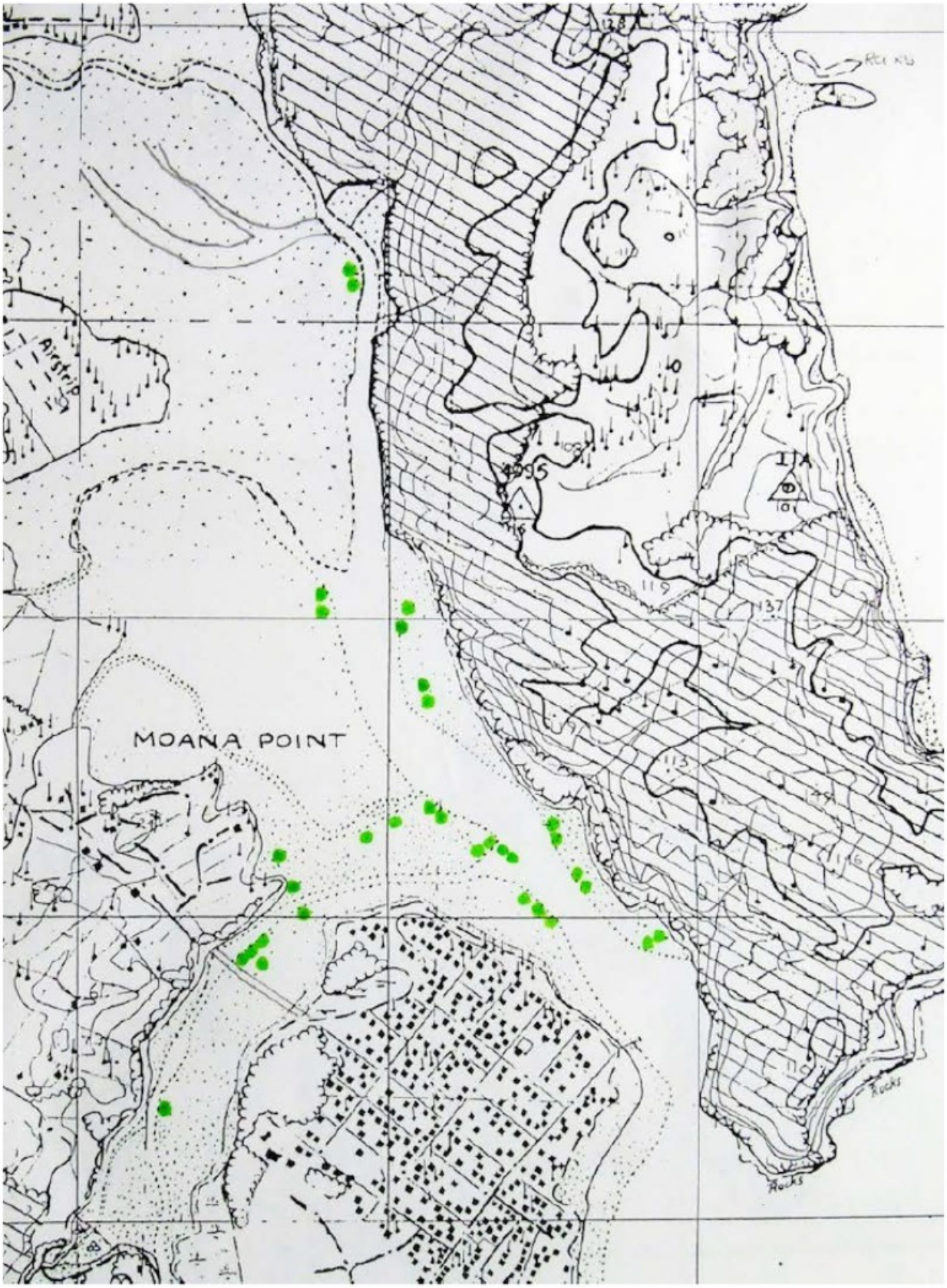
Map E32-1

Breeding sites (solid red) and roosting areas (cross-hatched) used by New Zealand dotterels in February 1997. Individual red dots show foraging locations of individual birds over low water.

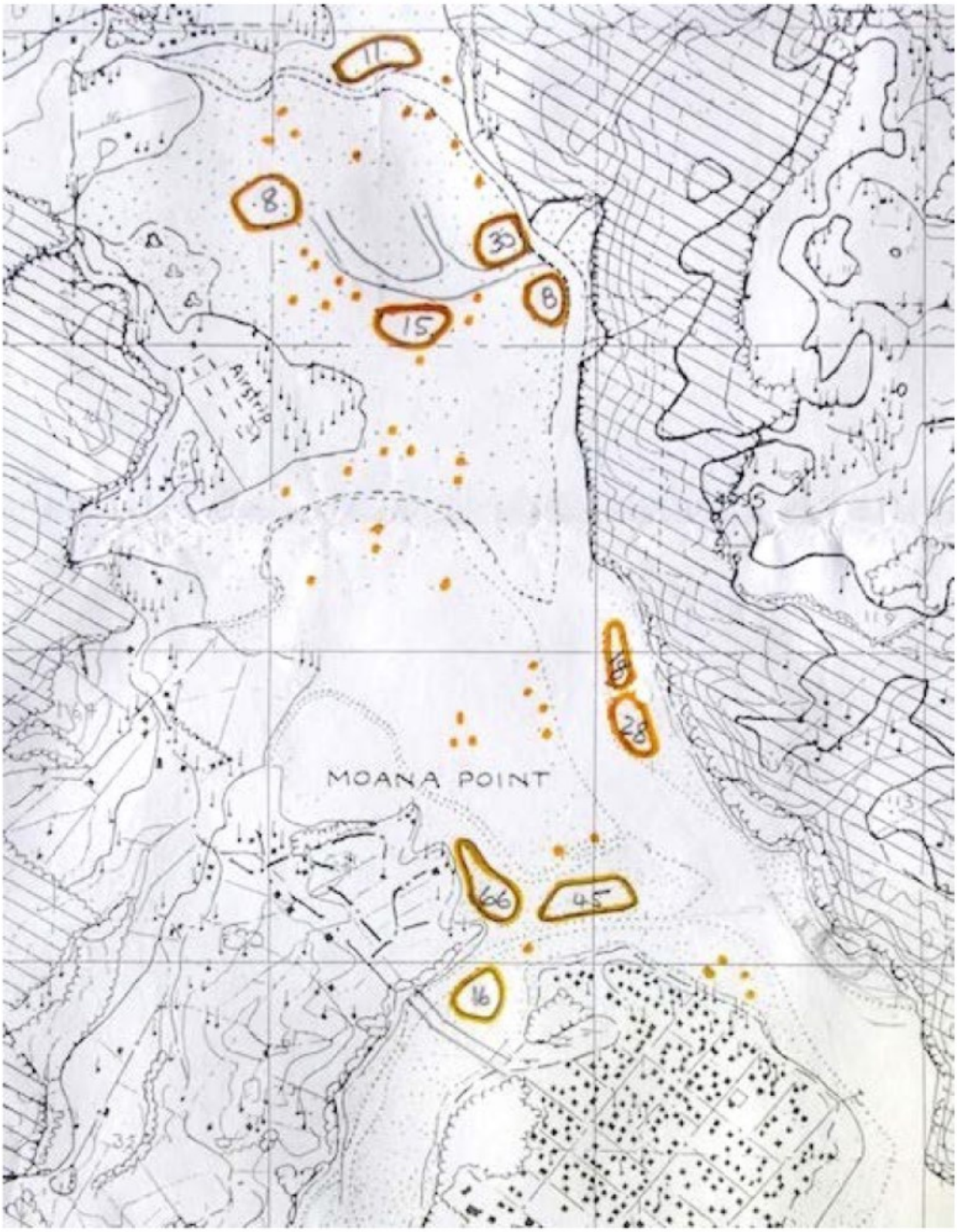


Map E32-2 (Whangamata Harbour)

Foraging areas used by variable oystercatchers in February 1997; green dots represent individual birds. Apart from the area now occupied by the marina, these distributions are thought to have remained broadly similar, as this species commonly forages on bivalves along channel margins at this site.



Map E32-3 (Whangamata Harbour)
Foraging areas used by bar-tailed godwits in February 1997. The numbers of birds foraging in a group are shown within orange outlines; orange dots show foraging sites of individual birds.


11
8
30
8
15
AIRSTRIP
MOANA POINT
66
45
16

Site E33	**Whangamata Beach and Otahu Estuary**
Priority	1
Assets	*Variable oystercatcher – a number of pairs breeding. *Northern New Zealand dotterel, 13 pairs bred in 2017/18 (>1%).
Threats	Very high levels of disturbance in late spring/summer. Predation, reduced by predator control during shorebird breeding season. Disturbance and probably some predation by domestic cats and dogs.
Detailed spatial information available?	Breeding territories of New Zealand dotterels known; most at the southern end of Whangamata Beach, clustered around the northern side of the mouth of Otahu Estuary..
Additional information	Waikato Region ASCV 26 appears to include the estuary itself, but not the beach area at the mouth used by nesting shorebirds. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	The upper reaches of the Otahu estuary could be important for wetland birds, such as bittern, banded rail, and North Island fernbird. Current information is required on species, abundance and distribution in the upper estuary.
References and sources	Bouma (2007), author (unpubl. data), Graeme (2007), NNZD census 2011, Miller (2018).

Site E34	**Clark Island Group**
Priority	2
Assets	No known shorebird or wetland bird values, habitat largely unsuitable. Older records indicate breeding by: *Northern blue penguin (probably still present); Grey-faced petrel. – a few pairs breeding on Hauturu and Whenuakura.
Threats	Some disturbance, mainly in summer.
Detailed spatial information available?	No.
Additional information	Public access prohibited since 2013. Waikato Region ASCV 27. Regular presence of Threatened or At Risk seabird taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Presence and numbers of penguins and petrels need to be confirmed. Current presence/absence of mammalian predators not known.
References and sources	Bouma (2007).

Site E35	**Whiritoa Beach**
Priority	2
Assets	*Variable oystercatcher – several pairs breed (<1%). *Northern New Zealand dotterel – 7 pairs bred in 2017/18 (<1%). *Red-billed gulls – regularly seen at river mouth, northern end of beach (<1%).
Threats	Predation by mammalian and avian predators of shorebird eggs, chicks, adults (reduced by predator control during shorebird breeding season in some seasons). Disturbance during breeding – people and dogs on beach. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E35. Breeding territories spread along beach, but concentrated towards southern end; exact locations vary annually. Some birds feed around mouth of Ramarama Stream at northern end of beach.
Additional information	Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Avian values of small wetlands at northern and southern ends of beach may not have been documented (*spotless crake and *banded rail possible).
References and sources	Author (unpubl. data), NNZD census 2011, Miller (2018).

Map E35 (Whiritoa and Mataora Bay)
Areas shaded red have breeding New Zealand dotterels and variable oystercatchers. Avian values of the two small wetlands (purple arrows) are unknown.

Site E36	**Mataora Bay**
Priority	2
Assets	*Variable oystercatcher – several pairs breeding (<1%). *Northern New Zealand dotterel – typically 4-7 pairs (<1%). **Caspian tern – 1 pair recorded 2011 (<1%).
Threats	Predation by mammalian and avian predators of shorebird eggs, chicks, adults. Disturbance during breeding season – people, dogs, vehicles on beach. Loss of nests to big tides and storm surges.
Detailed spatial information available?	See Map E35. Breeding territories spread along beach and in foredunes; exact locations vary annually.
Additional information	Privately owned, access by arrangement only. Regular presence of Threatened or At Risk taxa makes the site significant habitat of indigenous fauna (EW 2016).
Information gaps	Very small wetland at southern end of beach – avian values unknown, but not thought to be high.
References and sources	Author (unpubl. data), NNZD census 2011.

Addendum – Additional Records identified during external peer review (11 March 2020)

In the process of external peer review of the report *Sites of importance to shorebirds and seabirds in the Waikato region,* by Assoc. Professor Phil Battley (Zoology Department, Massey University) the following additional information was identified:

Page 5 Para 5 mentions that shags are likely to be more widely distributed than the site inventories suggest. The report "Pied shag: A national population review" by Wildlife Management International Ltd. confirms breeding at a number of sites around Coromandel Peninsula .https://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2011-12/pied-shag-a-national-population-review/

Site W03, Marokopa
eBird has records of 1 and 2 reef herons.
https://ebird.org/atlasnz/checklist/S61512334

Site W04, Taharoa
eBird has recent records of 15 dabchicks, 160 scaup and 50 shoveler
https://ebird.org/atlasnz/checklist/S58264880

Not included in the list is **Waikawau Beach**, for which eBird has records of 6 variable oystercatcher and 7 New Zealand dotterel.
https://ebird.org/checklist/S34034155

Site W05, Kawhia Harbour and Ocean Beach
There is a record of 508 banded dotterels on 11/6/17 (Russ Cannings, eBird).
Breeding of caspian terns on Te Motu Island is confirmed in eBird:

- 34 including 1 young and several older juveniles on 23/2/20 (Russ Cannings)
- 120 including 121 nests with 1 egg and 25 with 2 eggs on 18/11/17 (Abi Quinell)

White-fronted terns are also documented breeding (260 birds) as well as black-backed gulls, and reef heron are reported from the harbour.
https://ebird.org/atlasnz/checklist/S64884027 - caspian tern, New Zealand dotterel
https://ebird.org/checklist/S40983874 - caspian tern 125, white fronted terns 260 including chicks
https://ebird.org/checklist/S42530311 - caspian tern colony
https://ebird.org/checklist/S37517461 - 508 banded dotterel

Site W06, Aotea Harbour
This site is less known than the other Waikato Harbours, but higher counts include:

- banded dotterel, 372 on 24/3/19 (Russ Cannings)
- bar-tailed godwit, 4420 (Russ Cannings)
- caspian tern, 39 (Russ Cannings)

Site W08, Raglan Harbour
A small population of grey-faced petrel breed at Mt Karioi, with 7 chicks in 2017 and 8 chicks in 2019. This is probably the sole example of a mainland-breeding tube-nosed seabird in the Waikato region.
https://www.birdingnz.net/forum/viewtopic.php?f=9&t=7888&p=37580&hilit=grey+faced+petrel+breeding#p37580
https://www.karioiproject.co.nz/
https://www.facebook.com/karioiproject
https://www.arocha.org.nz/projects/karioi-maunga-ki-te-moana/

Site W11, Port Waikato
Banded dotterel still attempt to breed here. eBird has mention of successful breeding in 2015 (David Lawrie).

Site E01, Firth of Thames West
The black-billed gull colony is referred to as being "small" This generally is true, but in some years numbers are larger but variable within a season. In October 2019 Tony Habraken counted 940–c.1000 birds, but breeding numbers were 380 at Miranda in December.

Site E08, Colville Bay
eBird has some larger counts of NZ dotterel than listed, and also godwit counts of 60–82 birds.
https://ebird.org/atlasnz/checklist/S65069611 - 55 New Zealand Dotterel, 74 godwit
https://ebird.org/checklist/S59174252 - 60 New Zealand dotterel

Site E10, Port Jackson to Fletcher Bay
A recent record from the northern end of Port Jackson has 80 pateke. Other records of 21 and 26 birds suggest numbers may have increased since 2015.
https://ebird.org/atlasnz/checklist/S64682250

Site E22, Whitianga
Confirmation that pied shag may be breeding:
https://ebird.org/atlasnz/checklist/S33679160 - 30 birds on nests
https://ebird.org/atlasnz/checklist/S62924692 - 35 on nest