

Sites of importance to coastal and estuarine birds on the east coast of the Waikato region

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

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Approved for release by:
Peter Singleton

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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

May 2013

Summary

This report was commissioned by Environment Waikato to identify sites of importance to shorebirds on the east coast of the Waikato Region. Summaries are provided for 36 sites; each summary lists the major known avian values of the site, notes threats to those values, and identifies 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 and other coastal and estuarine birds. Threatened and At Risk taxa are common around much of the coast, and almost all sites qualify as significant habitat of indigenous fauna under Waikato Regional Council guidelines. The outstanding values of the Firth of Thames for shorebirds are already well known, but there are an additional eight Priority 1 sites on Coromandel Peninsula.

Shorebirds face a wide range of actual and potential threats in the region. 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 non-breeding (migratory) species.

Basic inventory information (species, numbers, and locations) is lacking or limited for some sites; in particular the importance of many sites for cryptic waterbirds (such as bittern, crakes and banded rail) is poorly known. There is normally limited information about habitat use and the importance of different areas within each site. The data collected at one site (Tairau Harbour) suggest that most parts of that site were used by different species at different times. Experience at Tairua also suggests a number of factors that should be taken into account when detailed assessments of habitat use within an estuary are being undertaken.

A very high proportion of the bird species in the coastal zone 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 relatively numerous does not lessen their significance.

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

Introduction

Waikato Regional Council will be reviewing its Regional Coastal Plan in 2015, and as part of that process wishes to identify areas of importance to shorebirds within the region.

The brief for the present report was to provide a summary of recent information that identifies areas important to shorebirds on the east coast of the Waikato Region (i.e. from Kaiāua in the Firth of Thames to just north of Waihi Beach on the east coast of Coromandel Peninsula; hereafter referred to as “the 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.

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

Coastal habitats are of varying importance to a wide range of bird species. The particular brief for this report was to identify areas important to shorebirds, a term most commonly used (and used here) to describe the ‘typical’ waders – members of the sub-orders Charadrii and Scolopaci. 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 dotterel (NNZD) around Coromandel Peninsula are particularly well known, partly because a national census of the taxon was undertaken in October 2011, and partly because many of the sites are managed and monitored annually as part of the NZ Dotterel Watch programme (Dowding 2006). These surveys have also provided information on numbers and distribution of variable oystercatchers (VOC) around the peninsula, as the two species usually nest in similar

habitat. Coromandel Peninsula is a notable stronghold for both species, with about 20% of the global NNZD population, and probably in the order of 15% of the VOC population.

Other predominantly coastal species include the gulls and terns, and records of these are included where available. Red-billed gulls are currently classified as Threatened (Nationally Vulnerable) because the species appears to be declining rapidly; it is however still relatively numerous and its presence and numbers are therefore rarely recorded during surveys. For this reason the species does not often appear in the site inventories, although it is still widespread around the Firth of Thames and Coromandel coasts. Many shag species are also largely coastal, and several are Threatened or At Risk. They are also commonly overlooked during surveys, and some are more widely distributed than the site inventories suggest.

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 – bittern, crakes, banded rail, brown teal and fernbird. These species are typically secretive and cryptic; with the possible exception of fernbird, they are normally 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.

Native bird species mentioned in the text are listed in Appendix 1, with their scientific names (Checklist Committee 2010) and 2012 threat rankings (Robertson *et al.* 2013).

Data sources

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

- Unpublished results of a national census of northern New Zealand dotterels in 2011 (NNZD census 2011), with an update for some sites in 2012 (Susan Bryant, *pers. comm.*). The 2011 census resulted in a population estimate of 2100-2200 individuals, including an estimated 900 breeding pairs. 1% levels for this taxon were therefore set at 9 pairs or more at breeding sites, and 21 adult individuals or more at roosting, flocking, or feeding sites;
- Data on northern New Zealand dotterels contained in Dowding (2006);
- Unpublished sightings and counts of shorebirds made in the Firth of Thames and on Coromandel Peninsula between 2005 and 2012, and retrieved from the Ornithological Society's shorebird database. This dataset contained 1136 individual counts, 974 of them from the Firth of Thames and 162 from sites on Coromandel Peninsula;
- Two reports on shorebirds in the Firth of Thames (Battley & Brownell 2007, Dowding 2008a);
- Information from papers in the Ornithological Society's journal *Notornis*;
- 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 database;
- Records from a Department of Conservation waterbird database under construction, listing records of crakes, rails, and fernbird;
- A report by Bouma (2007), listing the biological values of ASCVs in the Waikato Region. Some older information from this report was used where more recent data do not exist;
- A report on habitat networks of New Zealand shorebirds (Dowding & Moore 2006);
- Sightings and counts recorded at Birding-NZ.net;
- Personal communications from individuals;
- Unpublished counts, observations, and reports by the author.

It should be noted that almost all the records in these sources give a count and a general location only. In the case of shorebirds other than NNZD and VOC, almost all counts and surveys are undertaken at or near high water to maximise numbers recorded. Information on distribution and habitat use at other stages of the tidal cycle is therefore 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 the significance level of any site.

Assessing site significance

Determining the level of significance of sites based on their avian (or other biodiversity) values is by no means straightforward, but two documents have proved useful in this case.

At an international level, the Ramsar Convention (1971) provides guidelines for the identification of wetlands of international importance. It sets out nine criteria for determining whether a wetland qualifies as ‘internationally important’. Two criteria are particularly 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 or threatened ecological communities.*”

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 Proposed Waikato RPS (Environment Waikato 2010) 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, at risk, or data deficient; or*
- *endemic to the Waikato region*

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 were classified as Threatened under the New Zealand Threat Classification System List for 2012 (Robertson *et al.* 2013). 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.

Priority 2

The site regularly holds one or more Threatened or At Risk species or subspecies, or values are insufficiently known but type of habitat, older data, or other factors suggest that this is probable.

Priority 3

The values of the site for coastal birds are not presently considered high; Threatened or At Risk shorebird or wetland bird taxa are not currently known to be present.

Priority 4

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

Note that these priority rankings relate only to shorebirds and other coastal and wetland bird species, and are not intended to provide overall avian biodiversity rankings for sites. A few of the sites included here (particularly the offshore islands) have low (Priority 3) ranking for shorebirds, but are of high importance for various seabird taxa.

Results

Sites of importance to coastal birds

Thirty-six sites of importance to shorebirds and other coastal and wetland birds have been identified in the region. 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 are different in most cases. The sites, with their priority rankings and any overlap with an ASCV, are listed in Table 1.

Priority 1 (10 sites)

The outstanding values of the two Firth of Thames sites are well documented (e.g. Dowding & Moore 2006, Battley & Brownell 2007, Dowding 2008a), and require little further comment. Excluding those sites, there are eight sites on Coromandel Peninsula with Priority 1 ranking. Most achieve that ranking by virtue of have 1% of the global population of northern New Zealand dotterel; however, six of the eight are sizeable estuaries or harbours that have a wide range of other shorebird and waterbird values as well.

Priority 2 (22 sites)

Many of these sites contain Threatened species, but not at the 1% level; a number do have At Risk species at the 1% level, however. All Priority 1 and 2 sites constitute significant habitat of indigenous fauna by regional criteria (Environment Waikato 2010).

Priority 3 (3 sites)

The three Priority 3 sites are islands or island groups that have very little shorebird or wetland bird habitat. Some are of high importance to procellariiform seabirds, however.

Priority 4 (1 site)

Te Kouma Harbour is ranked Priority 4 because its current shorebird and waterbird values appear largely unknown. It probably does contain Threatened or At Risk species; if so, it would become a Priority 2 site.

While the lists of species in site inventories are obviously incomplete in most cases, all the lists contain sufficient information (in the form of at least one record of a Threatened or At Risk species) 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 species at a Priority 2 site and raise it to Priority 1, although such cases seem likely to be relatively few.

Table 1 Sites of importance to coastal birds identified on the east coast of the Waikato Region

Site number	Site name	Priority	Some overlap with
01	Firth of Thames (Kaiaua to Waihou River)	1	ASCV 9
02	Firth of Thames (Waihou River to Tararu)	1	ASCV 10
03	Coast north of Thames (Te Puru to Matariki Bay)	2	
04	Manaia Harbour	2	ASCV 11
05	Te Kouma Harbour/Peninsula	4	
06	Coromandel Harbour	1	ASCV 12
07	Koputauaki Bay to Tukituki Bay	2	
08	Colville Bay	1	ASCV 13
09	Waiaro Bay	2	
10	Port Jackson to Fletcher Bay	2	ASCV 14
11	Stony Bay	2	ASCV 14
12	Port Charles	2	
13	Waikawau Bay (incl Little Bay)	1	ASCV 15
14	Kennedy Bay	2	
15	Whangapoua Harbour, including Whangapoua Beach and Matarangi Spit	1	ASCV 16
16	Gray's Beach-Kuaotunu Beach	2	
17	Kuaotunu Peninsula, incl. Otama Beach and Opito Bay	1	ASCV 17
18	Ohinau Island Group	3	ASCV 18
19	Matapaua Bay to Whauwhau Beach	2	
20	Mercury Island Group and Cuvier Island	2	ASCV 19
21	Wharekaho	2	
22	Whitianga	2	ASCV 20
23	Cooks Beach, Purangi Estuary, Cathedral Cove, Hahei Beach	2	ASCV 21
24	Hot Water Beach	2	
25	Alderman Islands	3	ASCV 22
26	Tairua Harbour, incl. Tairua Ocean Beach, Pauanui Beach and Spit, and Pauanui Waterways)	1	ASCV 23
27	Slipper Island	2	
28	Ohui	2	
29	Opoutere Sandspit and Wharekawa Harbour	1	ASCV 24
30	Onemana	2	
31	Tokakahakaha (peninsula south of Onemana)	2	
32	Whangamata Harbour	1	ASCV 25
33	Otahu Estuary	2	ASCV 26
34	Clark Island Group	3	ASCV 27
35	Whiritoa Beach	2	
36	Mataora Bay	2	

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

Threats

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). For resident breeding species, the outcome is likely to be a very gradual decline in average breeding success over time.

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 2006). Clearly the identification of all the areas required by bird species at a site is the first step in reducing or preventing 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 intertidal 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. Natural factors, notably big tides, already affect some breeding species by washing out nests, and this could 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

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. These information gaps are not difficult to rectify, but they do require resources, so priorities are likely to be needed. 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).

Detailed habitat use within sites

Documenting fine-scale habitat use of a site is necessarily much more time-consuming (and therefore more expensive) 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 and under a range of different conditions. 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. However, as is obvious from the individual site inventories, basic surveys and anecdotal observations can often provide some information on habitat use within a site.

Factors to be taken into account when carrying out surveys are outlined below.

Discussion

Distribution and spatial information

The data available appear adequate to identify the important sites for 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. As noted by Dowding & Moore (2006): “... *the important breeding and non-breeding sites for indigenous shorebirds in New Zealand are well known. At larger spatial scales, movement patterns and the links between breeding and non-breeding sites are reasonably well understood... At smaller scales, particularly within individual estuaries or harbours, there is often a lack of detail about feeding areas and usage of alternative roost sites for most species.*”

There is however 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 detailed surveys to determine which species occurred in significant numbers and which areas in and around the harbour were important for each. The results of those surveys 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. To date, study of habitat use by shorebirds in Tairua Harbour has been limited, and it is almost certain that further research would reveal patterns of movement, foraging, loafing, and roosting that have not yet been documented. In particular, we still have very little information on preferred nocturnal feeding and loafing areas for any shorebird species in Tairua Harbour.”

While the knowledge gained on shorebird behaviour at Tairua was not complete, even that level of information appears to be available for no other site in the region. 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 important for local and migratory bird populations. Where detailed studies have not been undertaken, the Tairua experience suggests that a precautionary approach would be to assume that most areas in an estuary will be used by shorebirds or waterbirds at some time, until it has been proven otherwise.

Collection of further information

In general, birds are highly mobile and their distribution may 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 when surveying for basic inventory purposes 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, red-billed gull, pied shag) or At Risk (e.g. South Island pied oystercatcher, pied stilt, white-fronted tern). Because they may be locally numerous, the status of these species may not be appreciated, and they are therefore often overlooked in surveys. Given the provisions of the NZCPS (2010, policy 11), it is important to note the presence of all Threatened or At Risk species 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 enumerate, and Threatened. The total New Zealand population is unknown, but may be in the order of 1000 individuals, in which case 10 birds would constitute 1% of the national population. Careful surveying of larger estuaries with suitable bittern habitat (e.g. Whangapoua Harbour) could reveal local populations of 10 birds, 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 at appropriate points 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

Adverse weather may cause shorebirds to roost or forage in different areas that offer more shelter.

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. Some species (e.g. red knot, pied stilt) often move unpredictably between sites.

Threatened or 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).

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 a site of international importance for the taxon (Ramsar Convention 1971, criterion 2) and/or as significant habitat of indigenous fauna under regional guidelines (Environment Waikato 2010). In fact, at least 32 of the 36 sites identified in Table 1 have one or more Threatened shorebird or wetland bird species.

The fact that there are so many coastal sites of significance in New Zealand probably results in such sites being viewed as less important than they really are, on the assumption that something common 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 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 (Miskelly *et al.* 2008). 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 (which now has more than 80% of its population on the east coast of the North Island) (Dowding 2008b), 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 taxon at the population level.

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 in the region. Additional sites containing Threatened or At Risk species in smaller numbers could easily be added to this list however, as a result of further surveying. As well as adding to the list, periodic revision will also be necessary; habitat may change (naturally or through human activity), site-fidelity of birds can change, and threat rankings of important species may be revised. As a result, the importance of sites can change. Acquisition of additional data at sites already identified can also lead to changes in site significance. Complete and up-to-date information is clearly important for conservation management planning and for assessing potential impacts of proposed developments. Inevitably, the information in this report will need to be updated from time to time.

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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.* (2013).

Common name	Scientific name	Threat status (2012)
Northern blue penguin	<i>Eudyptula minor iredalei</i>	At Risk, Declining
Grey-faced petrel	<i>Pterodroma macroptera gouldi</i>	Not Threatened
Brown teal	<i>Anas chlorotis</i>	At Risk, Recovering
Little shag	<i>Phalacrocorax melanoleucos</i>	Not Threatened
Black shag	<i>Phalacrocorax carbo</i>	At Risk, Naturally Uncommon
Pied shag	<i>Phalacrocorax varius</i>	Threatened, Nationally Vulnerable
Reef heron	<i>Egretta sacra</i>	Threatened, Nationally Endangered
Australasian bittern	<i>Botaurus poiciloptilus</i>	Threatened, Nationally Endangered
Banded rail	<i>Gallirallus philippensis</i>	At Risk, Declining
Eastern bar-tailed godwit	<i>Limosa lapponica baueri</i>	At Risk, Declining
Ruddy turnstone	<i>Arenaria interpres</i>	Migrant
Variable oystercatcher	<i>Haematopus unicolor</i>	At Risk, Recovering
South Island pied oystercatcher	<i>Haematopus finschi</i>	At Risk, Declining
Pied stilt	<i>Himantopus himantopus</i>	At Risk, Declining
Black stilt	<i>Himantopus novaehollandiae</i>	Threatened, Nationally Critical
Pacific golden plover	<i>Pluvialis fulva</i>	Migrant
Northern New Zealand dotterel	<i>Charadrius obscurus aquilonius</i>	Threatened, Nationally Vulnerable
Banded dotterel	<i>Charadrius bicinctus</i>	Threatened, Nationally Vulnerable
Wrybill	<i>Anarhynchus frontalis</i>	Threatened, Nationally Vulnerable
Red-billed gull	<i>Larus novaehollandiae</i>	Threatened, Nationally Vulnerable
Caspian tern	<i>Hydroprogne caspia</i>	Threatened, Nationally Vulnerable
White-fronted tern	<i>Sterna striata</i>	At Risk, Declining
North Island fernbird	<i>Bowdleria punctata vealeae</i>	At Risk, Declining

Appendix 2

Site inventories

Common names, scientific names, and 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 relate only to the importance of each site for coastal birds (mainly shorebirds and estuarine birds); some sites with low priority for coastal species are important for other groups (e.g. seabirds). Taxa shown with two asterisks (**) were classified as Threatened under the New Zealand threat classification system lists in 2012; taxa shown with one asterisk (*) were classified as At Risk under the New Zealand threat classification system lists in 2012 (Robertson *et al.* 2013).

Polygons on maps show the total areas within each Priority 1 or 2 site that are currently known or 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, and will probably identify additional sites. On some maps, inland areas are included in polygons; these are areas sometimes used by coastal birds for foraging (e.g. on wet paddocks) or for roosting on very high tides or during adverse weather.

Individual site inventories

Site 01	Firth of Thames west (Kaiaua to Waihou River)
Priority	1
Assets	<p>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:</p> <ul style="list-style-type: none"> *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. **Red knot - non-breeding site for c 4000-5000 birds, exceeds 1% level. <p>Wide range of other arctic-breeding shorebird species in small numbers.</p> <p>Resident breeding species include;</p> <ul style="list-style-type: none"> *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. <p>See Battley & Brownell (2007) and Dowding (2008a) for more details on the avifauna values of this site. Earlier values summarised by Veitch & Habraken (1999).</p>
Threats	<p>For non-breeding shorebirds:</p> <ul style="list-style-type: none"> 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. <p>For breeding shorebirds:</p> <ul style="list-style-type: none"> 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. <p>See Dowding (2008a) for more details on threats.</p>
Detailed spatial information available?	<p>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. red knot)</p>

	<p>move unpredictably into and out of the site.</p> <p>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.</p>
Additional information	<p>Ramsar site, designated 1990, covers c 7800 ha; qualifies under four Ramsar Convention criteria. Waikato Region ASCV 9. Significant habitat of indigenous fauna (EW 2010). Identified as 1 of the top 19 wintering sites nationally for indigenous shorebirds by Dowding & Moore (2006). Ecologically connected to Site 02, with birds known to move between them.</p>
Information gaps	<p>Relative importance of different intertidal areas largely unknown.</p> <p>Extent and importance of some anthropogenic impacts (e.g. pollution) unknown.</p> <p>Not clear whether Australasian bittern is still present.</p>
References and sources	<p>Veitch & Habraken (1999), Dowding & Moore (2006), Battley & Brownell (2007), Dowding (2008a), unpublished OSNZ shorebird database, NNZD census 2011, DOC banded rail database.</p>

Map 01-1 (Firth of Thames west)

The main high-tide roosts for shorebirds are shaded yellow. The greatest numbers of birds 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 also has breeding black-billed gulls (blue arrow) and breeding New Zealand dotterels (green arrow). A few pairs of variable oystercatchers breed within the area, but recent locations do not appear to be documented.



Site 02	Firth of Thames east (Waihou River to Tararu)
Priority	1
Assets	<p>Feeding areas and HW roost sites for many of the species recorded in Site 01</p> <p>*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.</p> <p>*South Island pied oystercatcher – wintering site for large flocks in the range 1000-8000 birds, exceeds 1% level.</p> <p>*Pied stilt – wintering flocks of 300-1200 birds, exceeds 1% level.</p> <p>**Northern New Zealand dotterel – 1-2 pairs breed on Shelley Beach.</p> <p>**Banded dotterel – winter flocks of 20-100 birds.</p> <p>**Wrybill – flocks of 100-600 birds recorded occasionally; band sightings show these are birds that normally roost further west in Site 01, exceeds 1% level when present.</p> <p>*Bar-tailed godwit – summer flocks of 1000-3000 birds, exceeds 1% level.</p> <p>**Red knot – flocks of 1000-3000 occasionally recorded, these are probably also birds that normally roost at Site 01, exceeds 1% level when present.</p> <p>**Caspian tern and *white-fronted tern recorded breeding on Shelley Beach.</p> <p>**Black-billed gull – small numbers recorded breeding occasionally.</p>
Threats	As for Site 01
Detailed spatial information available?	Limited. Some HW roosts known.
Additional information	Waikato Region ASCV 10. Significant habitat of indigenous fauna (EW 2010). Contiguous with Site 01, 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	No information on which areas are important for foraging.
References and sources	Battley & Moore (2004), A. Habraken (<i>pers. comm.</i>), unpublished OSNZ shorebird database.

Map 02-1 (Firth of Thames east)

Important high-water roost sites for shorebird species are shown in yellow. However, 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 (green).



Site 03	Coast north of Thames (Te Puru to Matariki Bay)
Priority	2
Assets	<p>*Variable oystercatchers and **New Zealand dotterels breed in small numbers at stream mouths along this stretch of coastline. New Zealand dotterel pairs in 2012 were located at: Te Puru Stream (5 pairs) Tapu (3 pairs) Te Mata River (5 pairs) Waikawau River (2 pairs) Wairotoroto Stream (2 pairs) Omawhiti Stream (1 pair) Kereta (1 pair) Matariki Bay (1 pair) No individual site exceeds the 1% level, but collectively the area is significant.</p>
Threats	<p>High levels of disturbance at some sites (people, dogs, vehicles). Predation by mammalian and avian predators. Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	Breeding sites of dotterel pairs known, numbers and exact locations vary annually.
Additional information	Significant habitat of indigenous fauna (EW 2010).
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.

Map 03-1 (Thames coast)

Green arrows show breeding sites of New Zealand dotterels between Thames and Mania Harbour in 2011.



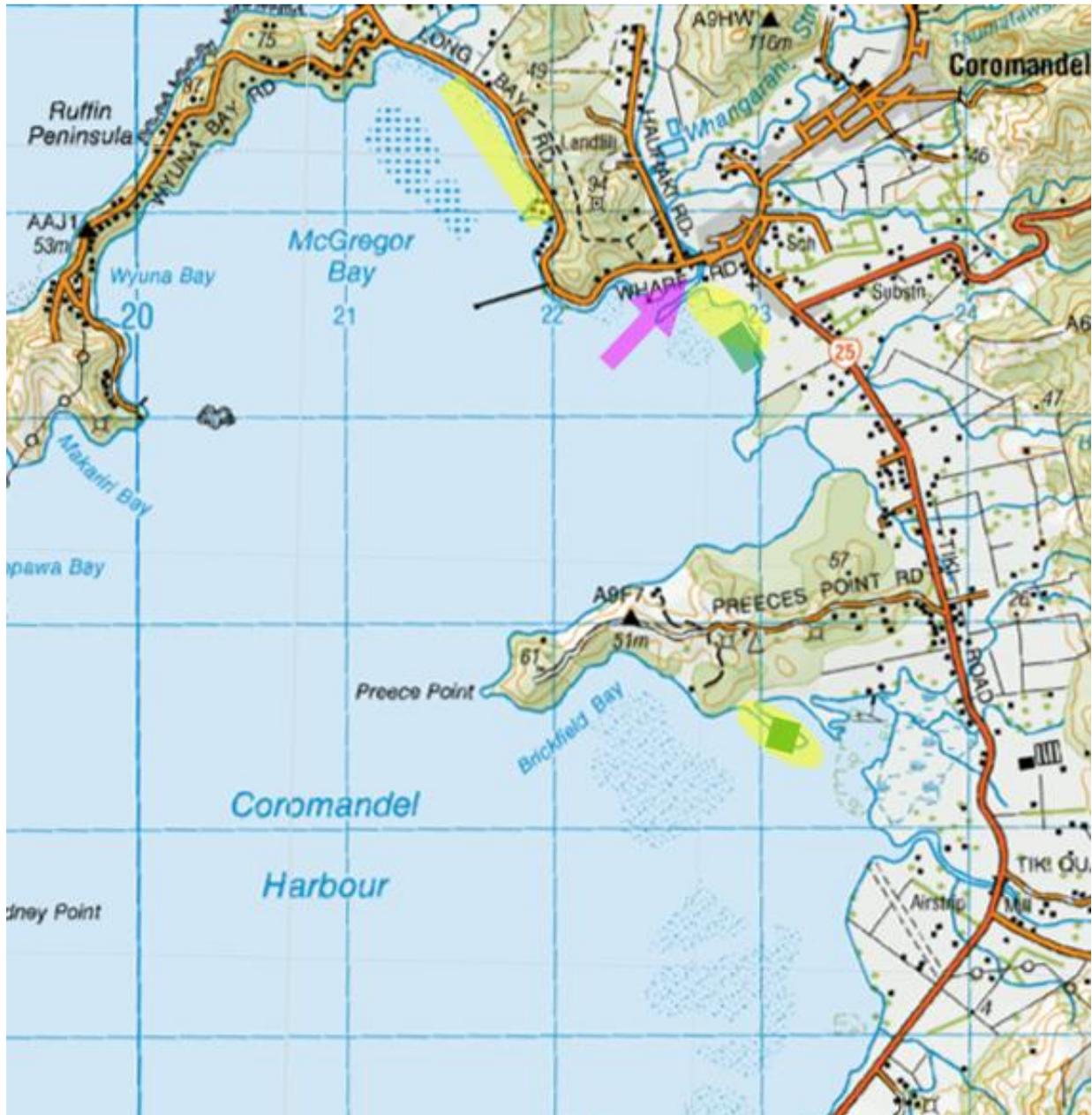
Site 04	Manaia Harbour
Priority	2
Assets	<p>**Northern New Zealand dotterel – breeding (10 recorded in 2004, 2 in 2011).</p> <p>*Variable oystercatcher – resident and breeding in small numbers.</p> <p>Records of:</p> <p>**Pied shag, *fernbird, *banded rail (Graeme 2008).</p> <p>*South Island pied oystercatcher.</p> <p>*Bar-tailed godwit.</p>
Threats	<p>No site-specific information, but almost certain to include:</p> <p>Predation impacts on resident breeding species (loss of eggs, chicks and adults to mammalian predators).</p> <p>Disturbance levels unknown but probably relatively low.</p> <p>Possible loss of habitat from mangrove encroachment.</p>
Detailed spatial information available?	Apparently little recent information.
Additional information	Overlap with Waikato Region ASCV 11. Significant habitat of indigenous fauna (EW 2010).
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 censuses 2004 and 2011.

Site 05	Te Kouma Harbour/Peninsula
Priority	4 (Insufficient data)
Assets	May contain northern New Zealand dotterel, but not surveyed in 2004 or 2011.
Threats	<p>No site-specific information, but almost certain to include:</p> <p>Predation impacts on resident breeding species.</p> <p>Disturbance levels unknown but probably relatively low.</p> <p>Possible loss of shorebird habitat from mangrove encroachment.</p>
Detailed spatial information available?	No.
Additional information	Public access limited.
Information gaps	<p>Apparently very little recent information; surveys required to determine species and numbers of coastal birds present.</p> <p>Priority will probably change with further information; small numbers of Threatened or At Risk species likely to be present.</p>
References and sources	NNZD censuses 2004, 2011.

Site 06	Coromandel Harbour
Priority	1
Assets	<p>*Variable oystercatcher – scattered pairs breeding around the harbour.</p> <p>*South Island pied oystercatcher – up to 300 recorded.</p> <p>**Northern New Zealand dotterel – scattered pairs breeding, post-breeding flock of 27 in 2013 exceeds 1% level.</p> <p>**Banded dotterel – flock of 64 in 2013.</p> <p>*Bar-tailed godwit – typically 200-300 in austral summer.</p> <p>*Brown teal – 5 at Whangarahi Stream mouth in 2013.</p> <p>*North Island fernbird – records from 1980s, may still be present.</p>
Threats	<p>Predation impacts on resident breeding species (loss of eggs, chicks and adults to mammalian and avian predators).</p> <p>Disturbance (particularly on Long Bay causeway).</p> <p>Probably some loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	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. Significant habitat of indigenous fauna (EW 2010).
Information gaps	<p>Numbers and distribution of breeding and roosting shorebirds incomplete.</p> <p>Feeding areas largely unknown for most species.</p> <p>Information on presence/distribution of banded rail, fernbird and other cryptic species required.</p>
References and sources	P. Stewart (<i>pers. comm</i>), unpublished OSNZ shorebird database, NNZD census 2011, Birding-NZ.net.

Map 06-1 (Coromandel Harbour)

Two known New Zealand dotterel breeding sites are shown in green; other sites may exist. Shorebird high-water roosting areas are shown in yellow. The pink 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.



Site 07	Coast north of Coromandel (Koputauaki Bay to Tukituki Bay)
Priority	2
Assets	<p>*Variable oystercatchers and</p> <p>**New Zealand dotterels breed in small numbers at stream mouths along this stretch of coastline. In 2011, New Zealand dotterels were located at:</p> <p>Koputauaki Bay Papaaroha (1 pair) Amodeo Bay (1 pair) Waitete Bay (1 pair) Tukituki Bay (2 pairs)</p> <p>*Brown teal – 5 recorded at Papaaroha in 2010; breeding noted.</p>
Threats	<p>High levels of disturbance at some sites in late spring/summer (people, dogs, vehicles).</p> <p>Predation by mammalian and avian predators.</p> <p>Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	Breeding sites of dotterel pairs known, numbers and exact locations vary annually.
Additional information	Significant habitat of indigenous fauna (EW 2010).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Birding-NZ.net.

Map 07-1 (Coast north of Coromandel)

Green arrows show New Zealand dotterel breeding sites in 2011. The pink arrow shows the location of brown teal recorded in 2010.



Site 08	Colville Bay
Priority	1
Assets	<p>**Northern New Zealand dotterel breeding site; post-breeding flock site, routinely exceeds the 1% level for the species.</p> <p>*Variable oystercatchers resident and breeding; post-breeding flock may exceed the 1% level for the species.</p> <p>*Brown teal, recent records suggest the site exceeds the 1% level for the species.</p> <p>Other species recorded include:</p> <p>*Banded rail.</p> <p>*North Island fernbird.</p> <p>**Red-billed gull.</p> <p>*South Island pied oystercatcher (autumn flock of 500 recorded).</p> <p>*Pied stilt.</p> <p>*Bar-tailed godwit.</p>
Threats	<p>Little site-specific information, but almost certain to include:</p> <p>Predation on breeding species (feral and domestic mammals, avian predators).</p> <p>Disturbance levels unknown but probably moderate at the main high-water roost in summer.</p> <p>Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	<p>Some breeding sites and HW roost sites known.</p> <p>One location known for brown teal.</p>
Additional information	<p>Overlap with Waikato Region ASCV 13. Significant habitat of indigenous fauna (EW 2010).</p>
Information gaps	<p>Feeding areas largely unknown for all species.</p> <p>Distribution of banded rail, fernbird and other cryptic species incomplete.</p>
References and sources	<p>Dowding (2006), NNZD census 2011, Graeme (2013), Birding-NZ.net, unpublished OSNZ shorebird database, DOC fernbird database.</p>

Map 08-1 (Colville Bay)

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



Site 09	Waiaro Bay
Priority	
Assets	*Variable oystercatcher – breeding on gravel spit (3 pairs in 2011). **Northern New Zealand dotterel – breeding on gravel spit (3 pairs in 2011).
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	
Information gaps	Estuary behind gravel bank needs to be surveyed; likely that other avian values exist.
References and sources	NNZD census 2011.

Site 10	Port Jackson to Fletcher Bay
Priority	2
Assets	*Variable oystercatcher – resident and breeding in small numbers. **Northern New Zealand dotterel – resident and breeding in small numbers
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 – breeding at Port Jackson (3 pairs) and Fletcher Bay (1 pair). Exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 14. Significant habitat of indigenous fauna (EW 2010).
Information gaps	No important information gaps.
References and sources	NNZD census 2011.

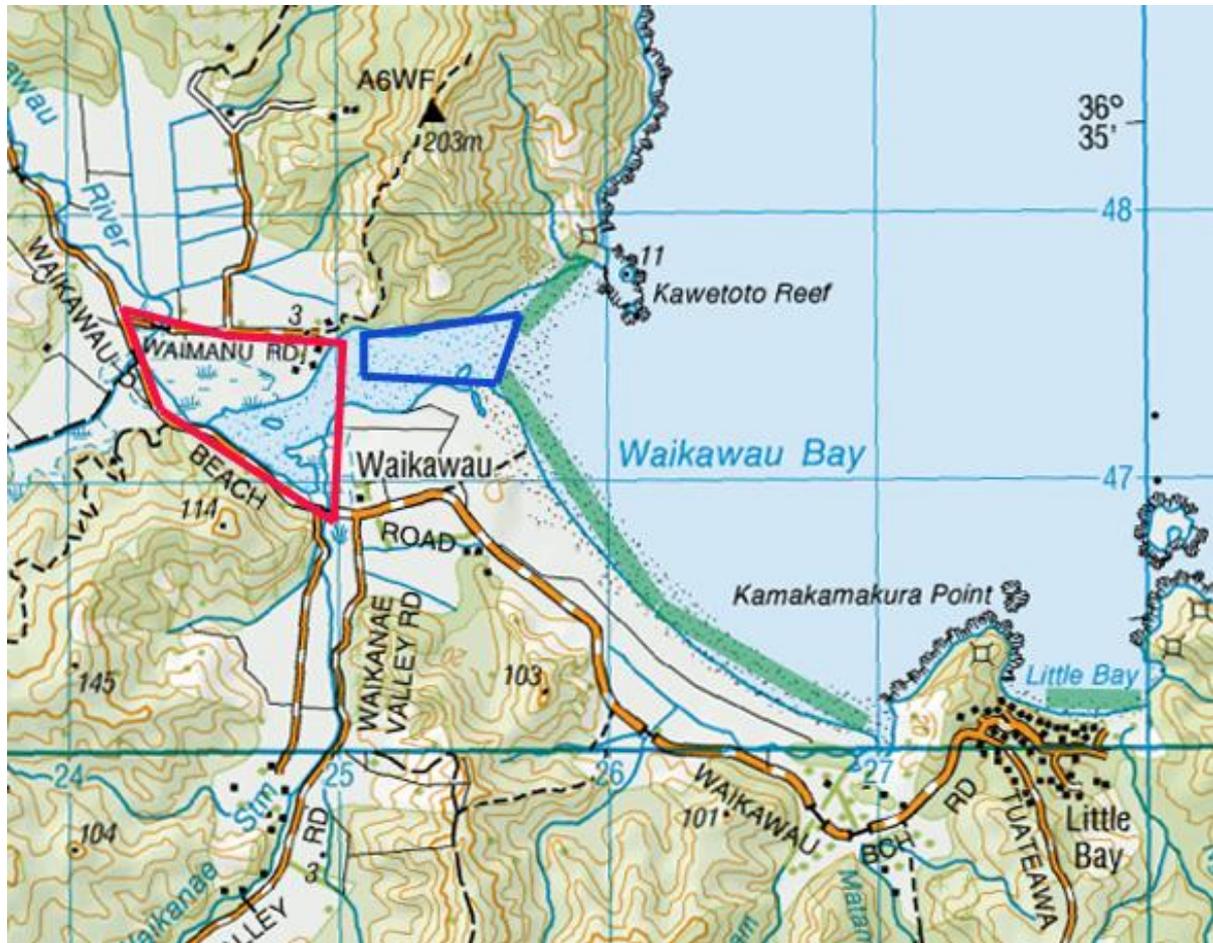
Site 11	Stony Bay
Priority	2
Assets	*Variable oystercatcher – 1 pair breeding annually. **Northern New Zealand dotterel – 1 pair breeding annually.
Threats	Some disturbance (campground) in late spring/summer. Predation (reduced by predator control).
Detailed spatial information available?	No.
Additional information	Overlap with ASCV 14. Significant habitat of indigenous fauna (EW 2010). Small site with limited shorebird habitat; probably at or close to carrying capacity with 1 pair of VOC and 1 pair of NNZD.
Information gaps	No.
References and sources	NNZD census 2011.

Site 12	Port Charles
Priority	2
Assets	*Variable oystercatcher – a few pairs breeding. **Northern New Zealand dotterel – at least 1 pair breeding in 2011 and 2012. **Caspian tern – recorded in 2009 and 2011. *Brown teal – 50-70 recorded in recent years, exceeds 1% level. **Reef heron – 1 recorded in 2009.
Threats	Disturbance to breeding shorebirds. Predation by feral and domestic mammals.
Detailed spatial information available?	No.
Additional information	Significant habitat of indigenous fauna (EW 2010). Brown teal population established following releases.
Information gaps	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.

Site 13	Waikawau Bay (including Little Bay)
Priority	1
Assets	<p>*Variable oystercatcher – important breeding site.</p> <p>**Northern New Zealand dotterel – at least 9 pairs annually at Waikawau, 1 pair at Little Bay, exceeds 1% level.</p> <p>*Banded rail – present and increasing.</p> <p>*Brown teal – more than 100 in 2010, exceeds 1% level.</p> <p>*Fernbird – 120+ counted in 2010.</p> <p>*Spotless crane – resident.</p> <p>**Australasian bittern – regularly present and breeding.</p>
Threats	<p>Disturbance to breeding shorebirds.</p> <p>Predation (reduced by predator control).</p> <p>Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	<p>Breeding territories of NNZD and VOC spread along the beach, exact positions vary annually.</p> <p>Wetland species distributed throughout estuary behind northern end of beach.</p>
Additional information	Overlap with Waikato Region ASCV 15. Significant habitat of indigenous fauna (EW 2010).
Information gaps	No important information gaps.
References and sources	NNZD census 2011, Moehau Environment Group (2010).

Map 13-1 (Waikawau Bay)

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



Site 14	Kennedy Bay
Priority	2
Assets	*Variable oystercatcher – 2011 record of 34 birds, some birds resident and breeding. *South Island pied oystercatcher – 2011 record of 12 birds. **Northern New Zealand dotterel – 3-5 pairs breeding. **Caspian tern – 2011 record of 2 birds.
Threats	Disturbance (including vehicles and dogs on beach). Predation by feral and domestic mammals.
Detailed spatial information available?	No.
Additional information	Significant habitat of indigenous fauna (EW 2010).
Information gaps	Distribution of resident breeding species not recorded.
References and sources	NNZD census 2011.

Site 15	Whangapoua Harbour, including New Chums Beach, Whangapoua Beach, and Matarangi Spit
Priority	1
Assets	<p>*Pied stilt – winter flock of 20-80 birds.</p> <p>*Variable oystercatcher – Matarangi Spit is an important breeding site and holds a large post-breeding flock (commonly 150-190 birds), exceeds 1% level.</p> <p>*South Island pied oystercatcher – wintering site for 750-1300 birds; reaches 1% level in some years.</p> <p>**Northern New Zealand dotterel – Matarangi Spit is a major breeding site, one of the two most important post-breeding flock sites globally with 150+ birds, exceeds 1% level.</p> <p>**Banded dotterel – winter flock of 150-250, exceeds 1% in some years.</p> <p>*Eastern bar-tailed godwit – flock of 1000+; exceeds 1% level nationally.</p> <p>Other arctic migrant shorebirds in small numbers (turnstone, golden plover).</p> <p>**Australasian bittern – 2009 sighting in Matarangi Wildlife Habitat Reserve.</p> <p>*Banded rail – records from 1980s, probably still present.</p> <p>*North Island fernbird – records from 2000, probably still present.</p> <p>*Brown teal – recorded in 2009 and 2010 in the Pungapunga River.</p>
Threats	<p>Periodic severe loss of roosting habitat (all shorebirds) and breeding habitat for NNZD and VOC on Matarangi Spit through erosion; see comments in Dowding (2006, section 4.3.2).</p> <p>Disturbance to breeding birds (Matarangi Spit, Whangapoua Beach) in late spring and summer.</p> <p>Predation by mammalian and avian predators (reduced at Matarangi Spit by predator control during shorebird breeding season).</p> <p>Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	Limited. Matarangi Spit is an important breeding site for variable oystercatcher and New Zealand dotterel, and a high-water roost for all waders.
Additional information	Overlap with Waikato Region ASCV 16. Significant habitat of indigenous fauna (EW 2010). Harbour identified as 1 of the top 19 wintering sites nationally for indigenous shorebirds.
Information gaps	<p>Whether there are other HW roosts is not apparent, 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.</p> <p>The distribution and numbers of waterbirds in the upper reaches of the harbour are largely unknown.</p>
References and sources	Dowding (2006), Dowding & Moore (2006), NNZD census 2011, DOC bittern and fernbird databases, Birding-NZ.net.

Map 15-1 (Whangapoua Harbour)

Areas shaded or arrowed green show breeding sites of New Zealand dotterels (and in most cases, variable oystercatchers). The yellow ellipse indicates the main shorebird high-tide roost at the tip of Matarangi Spit. The purple arrows show approximate locations of a recent bittern sighting, and the pink arrow the location of brown teal sightings in 2009 and 2010. Identification of areas important to shorebirds and waterbirds in this harbour is incomplete; areas of the upper harbour are probably important for cryptic waterbirds and intertidal areas important for shorebird foraging have not been identified. Shorebirds may also breed on islands and shellbanks within the harbour or along the western shoreline.



Site 16	Gray's Beach-Kuaotunu Beach
Priority	2
Assets	*Variable oystercatcher – a few pairs breeding. **Northern New Zealand dotterel – 4 pairs on each beach in 2012. **Caspian tern – recorded at Gray's Beach in 2011.
Threats	Disturbance to breeding birds in late spring and summer. Predation by mammalian and avian predators.
Detailed spatial information available?	Breeding sites of dotterel pairs known, exact locations vary annually.
Additional information	Significant habitat of indigenous fauna (EW 2010).
Information gaps	No.
References and sources	NNZD census 2011.

Site 17	Kuaotunu Peninsula (includes Otama Beach and Opito Bay)
Priority	1
Assets	**Australasian bittern – 2008 sighting in Otama Beach wetland reserve. *Variable oystercatcher – breeding on both beaches. **Northern New Zealand dotterel – breeding on both beaches; if considered a single site, easily exceeds the 1% level; if considered two sites, Opito Bay reached 1% level alone in 2012.
Threats	Predation, reduced by predator control. Disturbance, partly reduced by management.
Detailed spatial information available?	Breeding sites of dotterel pairs largely known, numbers and locations vary annually.
Additional information	Overlap with Waikato Region ASCV 17. Significant habitat of indigenous fauna (EW 2010).
Information gaps	List of important species probably incomplete; values of the wetland behind Otama Beach apparently not well documented.
References and sources	NNZD census 2011, DOC bittern database.

Map 17-1

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 Whareoi 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 18	Ohinau Island Group
Priority	3
Assets	Apparently no recent records of shorebirds or wetland birds, little suitable habitat, except possibly for a few pairs of *variable oystercatchers. Important islands for breeding seabirds.
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.
Detailed spatial information available?	NA
Additional information	Waikato Region ASCV 18.
Information gaps	NA
References and sources	Chappell (2008).

Site 19	Matapaua Bay to Whauwhau Beach
Priority	2
Assets	<p>This is a stretch of rocky coastline with several sandy bays and beaches.</p> <p>**Northern New Zealand dotterels are present on several of these beaches.</p> <p>New Zealand dotterel pairs in 2012 were located at:</p> <p>Matapaua Bay (1 pair)</p> <p>Waitaia Bay (3 pairs)</p> <p>Woodcock's-Whauwhau Beach (2 pairs)</p> <p>*Variable oystercatcher – a few pairs breeding on the same beaches.</p>
Threats	<p>Disturbance at Matapaua in late spring and summer, other sites isolated and more difficult of access.</p> <p>Predation at all sites, possibly reduced by predator control in nearby areas.</p> <p>Loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	<p>NNZD breeding sites known, exact locations vary annually.</p> <p>See map 19-1.</p>
Additional information	<p>Significant habitat of indigenous fauna (EW 2010).</p>
Information gaps	<p>No important information gaps.</p>
References and sources	<p>NNZD census 2011.</p>

Map 19-1 (Matapaua Bay to Whauwhau Beach)

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



Site 20	Mercury Island Group and Cuvier Island
Priority	2
Assets	<p>Site 20A Great Mercury has sandy beaches with: *Variable oystercatcher – breeding. **Northern New Zealand dotterel – breeding.</p> <p>Other islands in the Mercury Group have very little suitable shorebird habitat, but have high values for seabirds, forest birds, and other fauna.</p> <p>Site 20 B Cuvier Island has very little suitable habitat for typical shorebirds or cryptic waterbirds, but there are nesting colonies of **Red-billed gull; *White-fronted tern High values for seabirds, forest birds, and other fauna.</p>
Threats	<p>Predation by mammals on Great Mercury only. Avian predation at all sites. Disturbance levels occasionally high on beaches on Great Mercury (popular yachting destination in summer), very low elsewhere.</p>
Detailed spatial information available?	No recent information. Previous records of New Zealand dotterels at Coralie Bay and White Beach, Great Mercury.
Additional information	<p>Waikato Region ASCV 19. Significant habitat of indigenous fauna (EW 2010).</p> <p>There appears to be considerable suitable habitat for NNZD on Great Mercury; given the rapid increase in numbers on Coromandel Peninsula in recent years, numbers should be checked – they may have reached 1% level.</p>
Information gaps	Survey of Great Mercury required; surveyed infrequently, and not included in any recent NNZD census, so information lacking on distribution and numbers of all shorebirds; VOC and NNZD known present, but other important species may occur.
References and sources	Some older information cited in Bouma (2007).

Site 21	Wharekaho
Priority	2
Assets	<p>**Northern New Zealand dotterel – 1-3 pairs breed. *Variable oystercatcher – typically 2 pairs breeding **Caspian tern – 5 recorded in 2011.</p>
Threats	<p>Mammalian predators, including domestic dogs. Moderate-high levels of disturbance during the breeding season.</p>
Detailed spatial information available?	Exact territory locations vary annually, but both species tend to breed at southern end of beach.
Additional information	Significant habitat of indigenous fauna (EW 2010).
Information gaps	No important information gaps.
References and sources	Author (unpubl. data), unpublished OSNZ shorebird database, NNZD census 2011.

Site 22	Whitianga
Priority	2
Assets	<p>**Northern New Zealand dotterel – 4-6 pairs breed on Buffalo Beach, normally 2-4 pairs at Taputapuatea Stream.</p> <p>*Variable oystercatcher – a few pairs breed on Buffalo Beach.</p> <p>**Australasian bittern – numerous records in the upper harbour near Coroglen.</p> <p>*Banded rail – older records, probably still present.</p> <p>*North Island fernbird – present.</p>
Threats	<p>Disturbance levels high on Buffalo Beach, dogs common.</p> <p>Predation of nests and chicks by mammalian and avian predators (reduced locally on Buffalo Beach by predator control during shorebird breeding season).</p>
Detailed spatial information available?	Breeding territories of NNZD and VOC on Buffalo Beach are known, exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 20. Significant habitat of indigenous fauna (EW 2010).
Information gaps	Apparently little recent information available on the composition, distribution, or significance of the avifauna of the inner harbour.
References and sources	NNZD census 2011, Graeme (2009), DOC bittern and fernbird databases.

Map 22-1 (Whitianga)

The areas shaded green show sites used by New Zealand dotterels and variable oystercatchers for breeding and roosting. One pair of New Zealand dotterels breeds in Flaxmill Bay (green arrow). There are records of bittern, banded rail and fernbird from the upper reaches of the harbour, but there appears to be little recent or site-specific information.



Site 23	Cooks Beach, Purangi Estuary, Cathedral Cove, Hahei Beach
Priority	2
Assets	**Northern New Zealand dotterel – in 2012, 3 pairs bred at Cooks Beach, 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).
Detailed spatial information available?	Shorebird breeding territories on sandy beaches; exact locations vary annually.
Additional information	Overlap with Waikato Region ASCV 21 (does not include Cooks Beach). Significant habitat of indigenous fauna (EW 2010).
Information gaps	Importance of Purangi Estuary to cryptic waterbirds is not well known.
References and sources	NNZD census 2011, W. Hare (<i>pers. comm.</i>).

Site 24	Hot Water Beach
Priority	2
Assets	*Variable oystercatcher – 2 pairs breeding in 2011. **Northern New Zealand dotterel – in 2012, 5 pairs breeding.
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	No.
Information gaps	No important information gaps.
References and sources	NNZD census 2011

Site 25	Alderman Islands
Priority	3
Assets	Almost no habitat suitable for shorebirds or estuarine birds, with the possible exception of small numbers of variable oystercatcher. Important for seabirds.
Threats	No mammalian predators. Isolated, disturbance levels low.
Detailed spatial information available?	NA
Additional information	Waikato Region ASCV 22.
Information gaps	NA
References and sources	

Site 26	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. **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. A few pairs of NNZD and VOC breed at Pauanui Waterways in small numbers, moving regularly to avoid construction activity. Predation, including by domestic cats and dogs, at most parts of the site.
Detailed spatial information available?	Yes.
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. Significant habitat of indigenous fauna (EW 2010).
Information gaps	Few for shorebirds, but periodic updates on numbers of key species are desirable. Information on cryptic wetland species is sparse.
References and sources	Larcombe (2005), Pierce (2005), Dowding (2005), NNZD census 2011, DOC banded rail database.

Map 26-1 (Tairua Harbour)

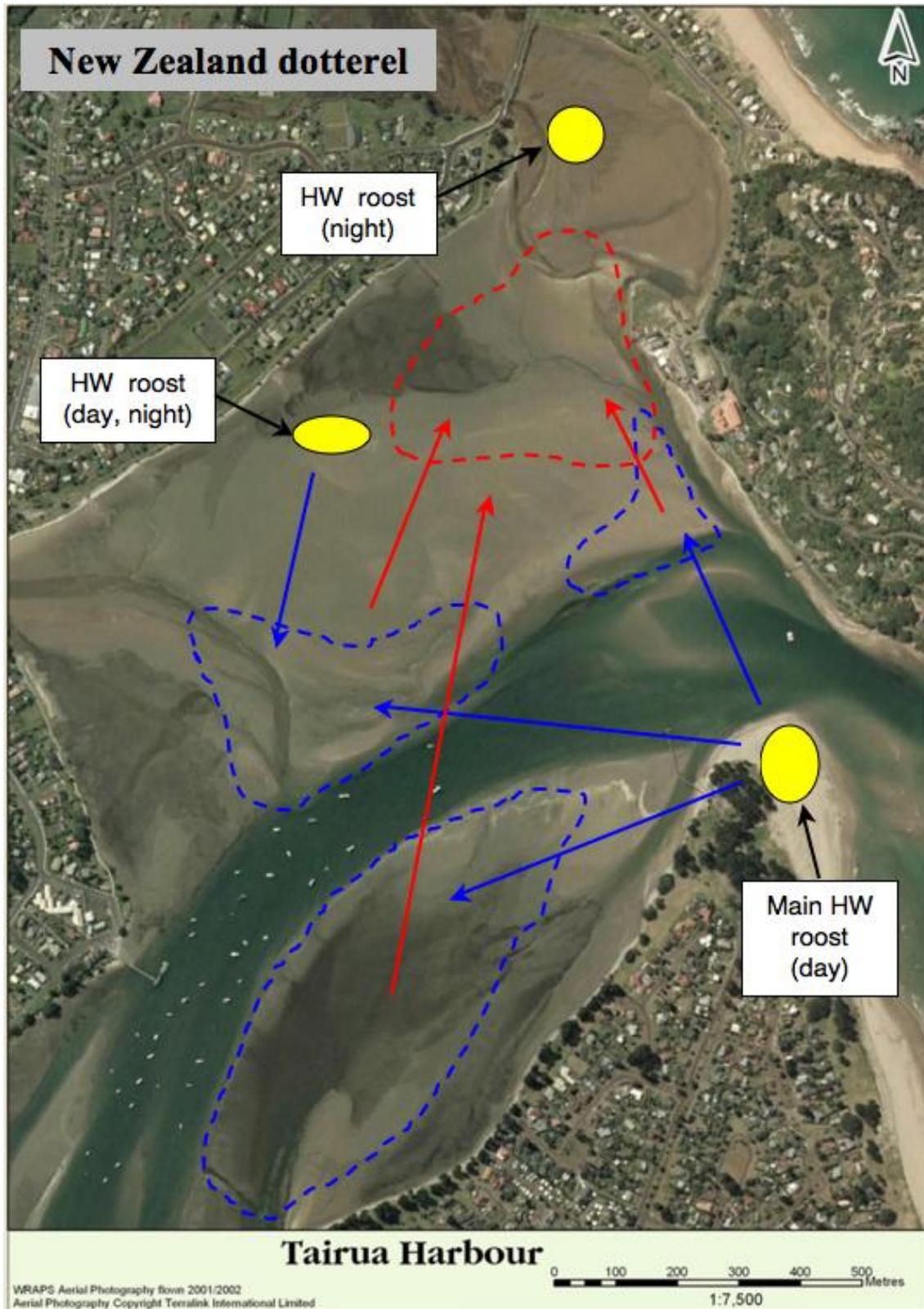
Breeding areas for New Zealand dotterels and variable oystercatchers are shown in green; HW roost sites are shown in yellow.

Inter-tidal foraging areas used by three shorebird species in April 2004 are shown in maps 26-2 to 26-4.



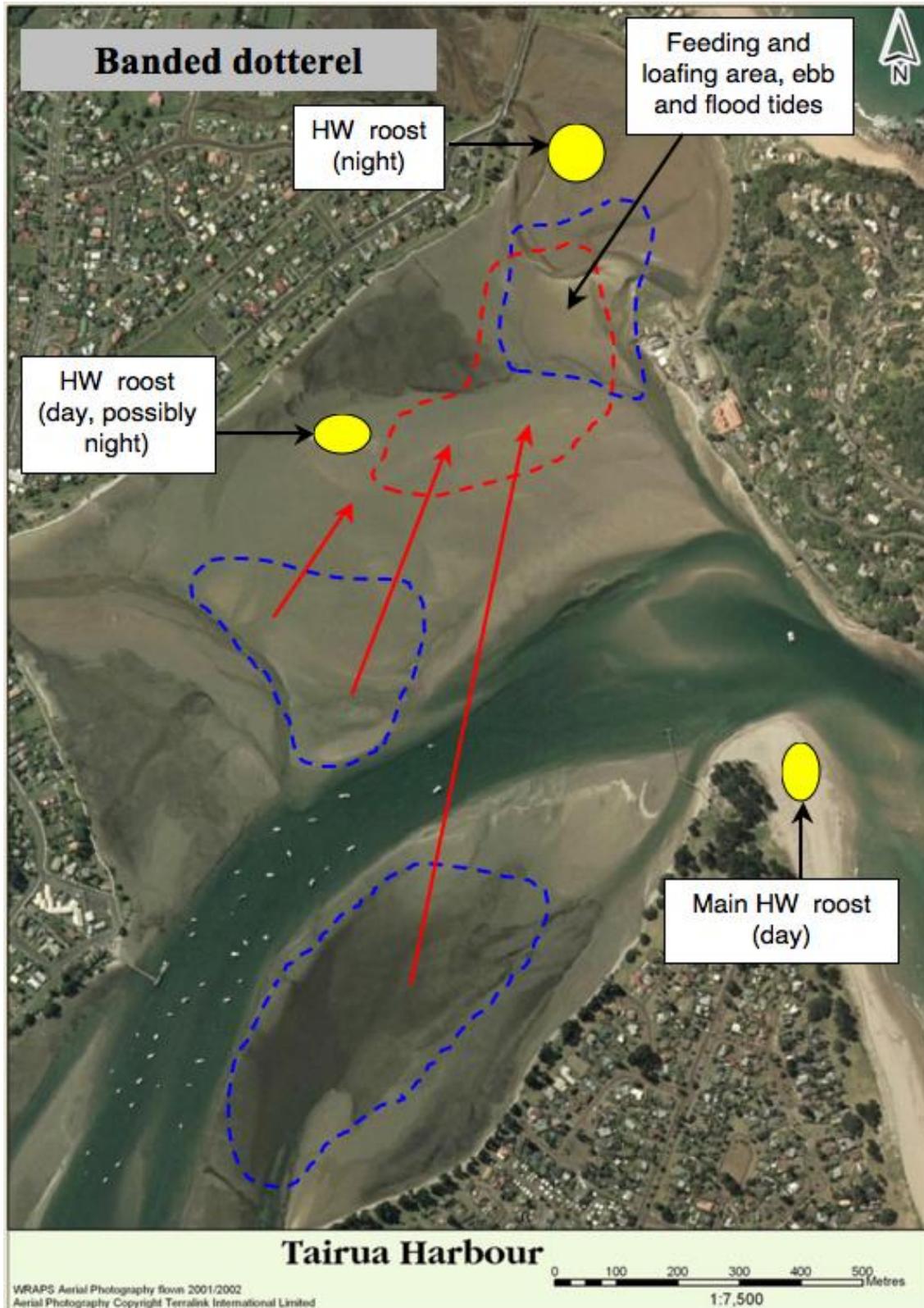
Map 26-2 (Tairua Harbour)

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 to this area. From Dowding (2005).



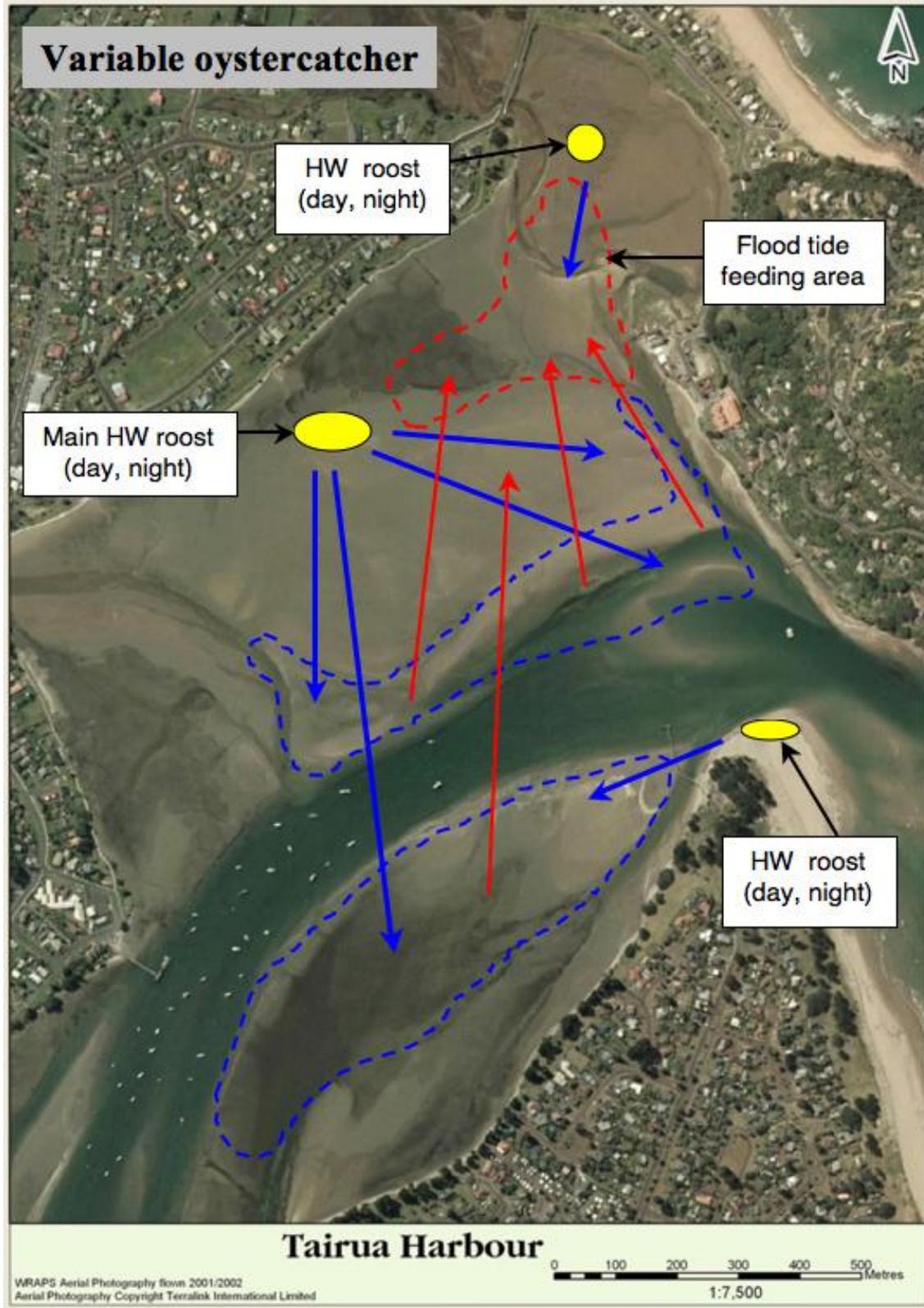
Map 26-3 (Tairua Harbour)

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 to this area. From Dowding (2005).



Map 26-4 (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 towards this area. From Dowding (2005).



Site 27	Slipper Island
Priority	2
Assets	**Northern New Zealand dotterel – 1-2 pairs breed.
Threats	Disturbance likely to be limited. Predation by mammalian and avian predators.
Detailed spatial information available?	NNZD breed at South Bay.
Additional information	Significant habitat of indigenous fauna (EW 2010). Privately-owned.
Information gaps	No information on other species. *Variable oystercatcher (and probably others) likely to be present.
References and sources	NNZD census 2011.

Site 28	Ohui
Priority	2
Assets	*Variable oystercatcher – breeding site for several pairs. **Northern New Zealand dotterel – breeding site for 5-7 pairs. *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 within 1 km of northern end.
Additional information	Not included in Waikato Region ASCV 24. Significant habitat of indigenous fauna (EW 2010).
Information gaps	No recent information on numbers and distribution of wetland species (crakes, rail, bittern).
References and sources	Dowding (2003, 2012).

Site 29	Opoutere Sandspit and Wharekawa Harbour
Priority	1
Assets	<p>Very high avian values of this site noted by Dowding (2012), included:</p> <ul style="list-style-type: none"> *Variable oystercatcher – major breeding and post-breeding flock site for the species, exceeds 1% level. **Northern New Zealand dotterel – exceeds 1% level both as a breeding site and post-breeding flock site. **Banded dotterel. *Bar-tailed godwit. **Reef heron – seen regularly in small numbers, probably a pair breeding on Hikunui Rock. **Red-billed gull – resident, 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	<p>Predation by mammalian and avian predators (reduced by predator control on Opoutere Sandspit during the shorebird breeding season).</p> <p>Disturbance levels high in late spring and summer (people, dogs, vehicles).</p> <p>Some loss of nests to big tides and storm surges.</p>
Detailed spatial information available?	<p>Territories of shorebirds on the beach and spit are well known.</p> <p>Some feeding areas for shorebirds identified.</p> <p>Limited information on distribution of cryptic wetland species in the harbour.</p>
Additional information	<p>Overlap with Waikato Region ASCV 24. Significant habitat of indigenous fauna (EW 2010). Management programme for NNZD and VOC on Opoutere Sandspit/Beach has been in place since 1986/87.</p>
Information gaps	<p>Distribution of banded rail and bittern incomplete.</p>
References and sources	<p>NNZD census 2011, Dowding (2006, 2012), DOC bittern and banded rail databases.</p>

Map 29-1 (Opoutere Sandspit and Wharekawa Harbour)

The area shaded green 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 (blue outline). Banded rails are regularly seen at the mouth of Wahitipu Creek (purple 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).



Site 30	Onemana
Priority	2
Assets	*Variable oystercatcher, a few pairs breeding. **Northern New Zealand dotterel, 5 pairs breeding in 2011 and 2012.
Threats	Predation of nests and chicks has been recorded (reduced by predator control during shorebird breeding season). Disturbance to breeding birds in late spring and summer.
Detailed spatial information available?	Breeding territories spread along beach; exact locations vary annually.
Additional information	Significant habitat of indigenous fauna (EW 2010). 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.

Site 31	Tokakahakaha (peninsula south of Onemana)
Priority	2
Assets	*Variable oystercatcher, 1-3 pairs breeding. **Northern New Zealand dotterel, 2-4 pairs breeding. **Caspian tern, 2011 record of 1 pair.
Threats	Predation (mammalian and avian predators). Disturbance levels probably low. Loss of nests to big tides and storm surges.
Detailed spatial information available?	No.
Additional information	Significant habitat of indigenous fauna (EW 2010).
Information gaps	
References and sources	Author (unpubl. data), NNZD census 2011.

Site 32	Whangamata Harbour
Priority	1
Assets	*Variable oystercatcher, numbers using the harbour exceed 1% level. **Northern New Zealand dotterel, post-breeding flock site, exceeds 1% level. *Bar-tailed godwit, feed in the harbour, records of 150-200 there and in a HW flock on the beach. List of other species summarised by Rayner (2011).
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?	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. Significant habitat of indigenous fauna (EW 2010).
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).

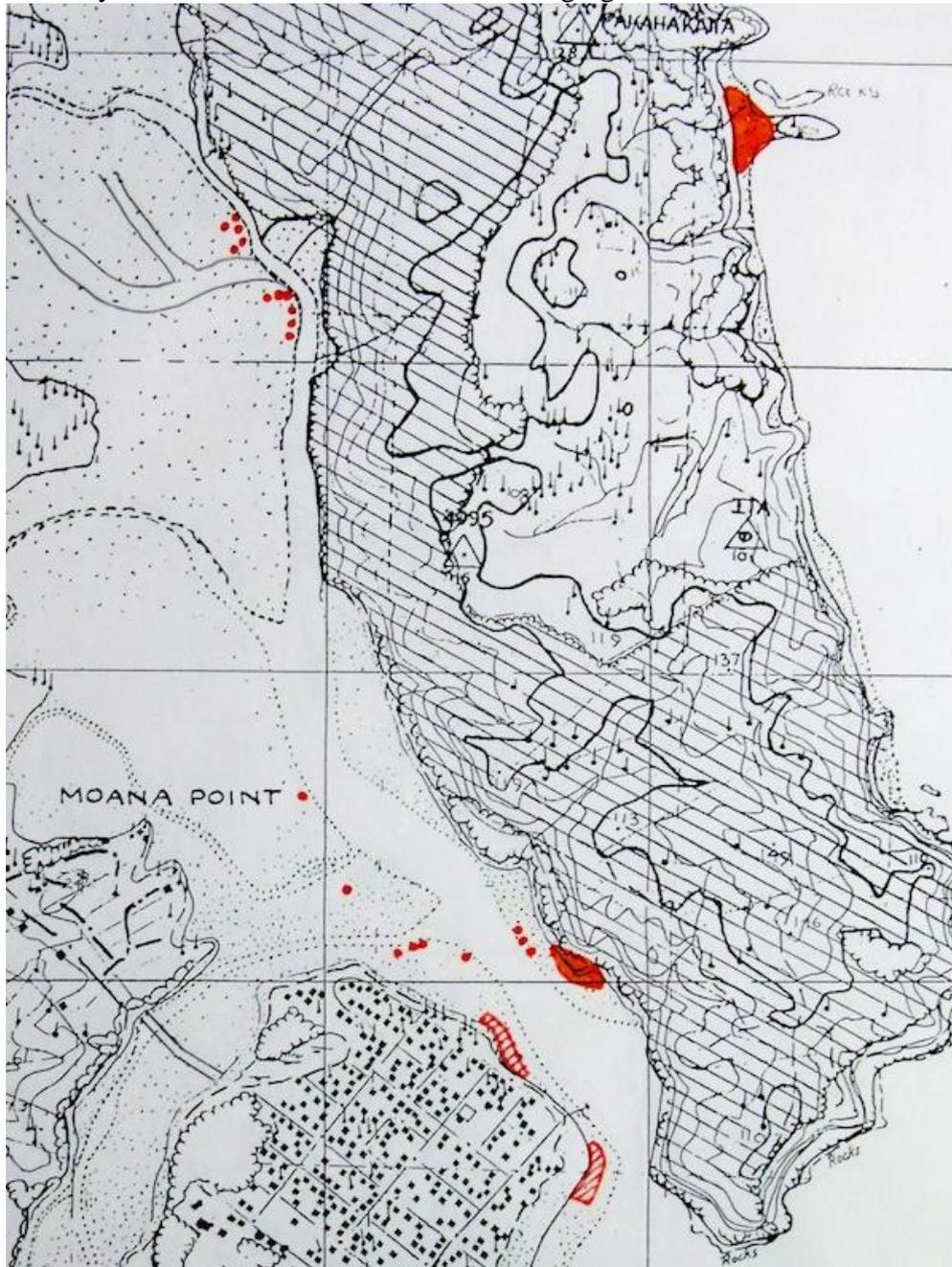
Maps 32-1 to 32-3 (Whangamata Harbour)

Maps showing habitat use by three shorebird species in Whangamata Harbour on 05 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 32-2), while bar-tailed godwits commonly feed on eel-grass flats between channels (map 32-3).

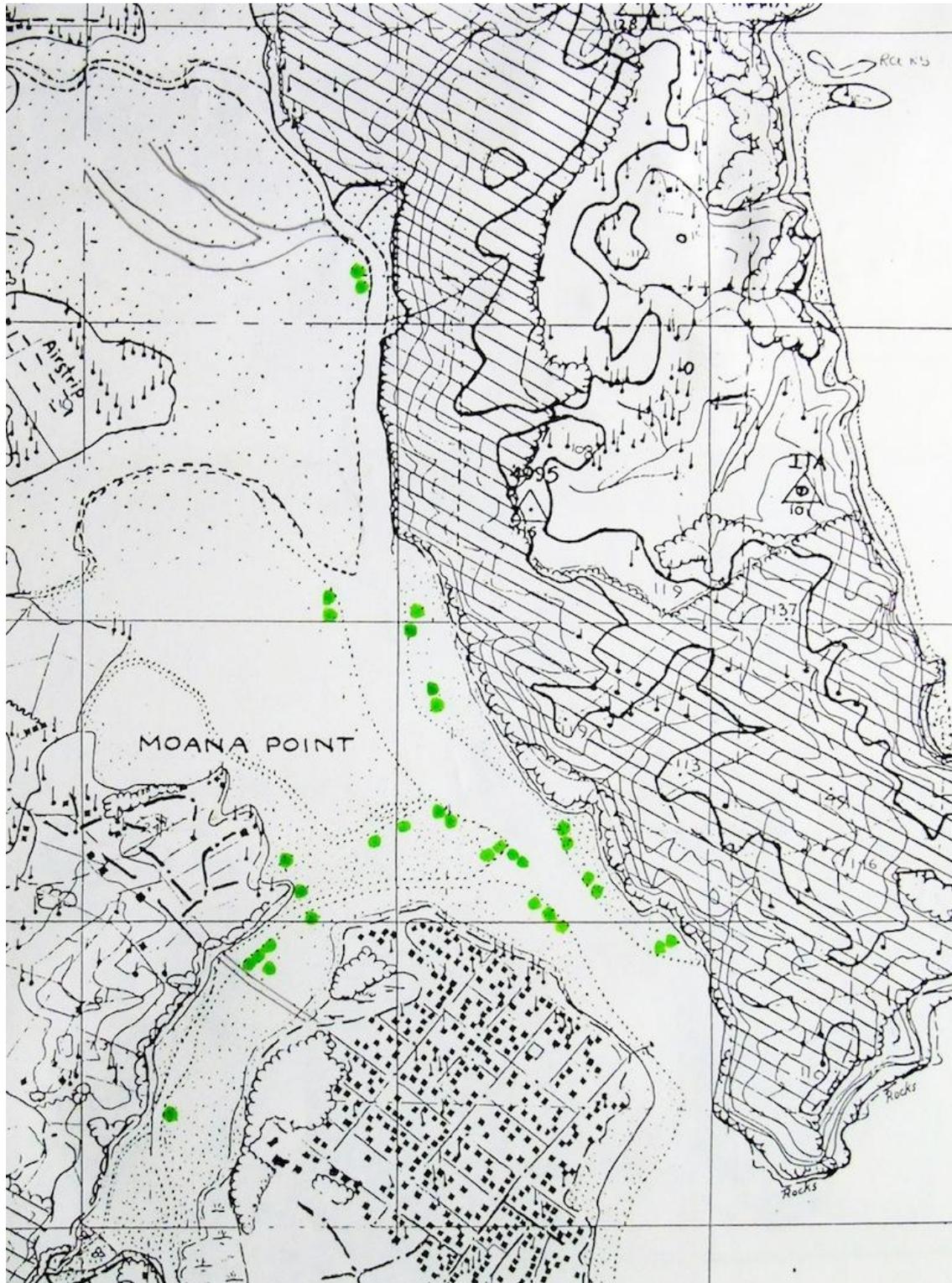
Map 32-1

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 32-2 (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 32-3 (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.



Site 33	Otahu Estuary
Priority	2
Assets	*Variable oystercatcher. **Northern New Zealand dotterel, 5-9 pairs at the southern end of Whangamata Beach in recent years, most of them clustered around the northern side of the mouth of Otahu Estuary.
Threats	Very high levels of disturbance in late spring/summer. Predation, including by domestic cats and dogs (reduced by predator control during shorebird breeding season).
Detailed spatial information available?	Breeding territories of New Zealand dotterels known, otherwise not.
Additional information	Waikato Region ASCV 26 appears to include the estuary itself, but not the beach area at the mouth used by nesting shorebirds. Significant habitat of indigenous fauna (EW 2010). Beach will qualify for Priority 1 status if 9 pairs of New Zealand dotterels are found to breed regularly.
Information gaps	Older data suggest the upper reaches of the estuary could be important for wetland birds, such as bittern, banded rail, and fernbird. Up to date information is required on species, abundance and distribution in the upper estuary.
References and sources	Bouma (2007), author (unpubl. data), NNZD census 2011.

Site 34	Clark Island Group
Priority	3
Assets	No known shorebird or wetland bird values, habitat largely unsuitable. Older records indicate breeding by: *Northern blue penguin. Grey-faced petrel.
Threats	Some disturbance, mainly in summer.
Detailed spatial information available?	NA
Additional information	Waikato Region ASCV 27.
Information gaps	NA
References and sources	Bouma (2007).

Site 35	Whiritoa Beach
Priority	2
Assets	*Variable oystercatcher. **Northern New Zealand dotterel, usually 5-7 pairs in recent years. **Red-billed gulls – regularly seen at river mouth, northern end 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 and dogs on beach.
Detailed spatial information available?	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	Significant habitat of indigenous fauna (EW 2010).
Information gaps	Avian values of wetlands at northern and southern ends of beach may not have been documented.
References and sources	Author (unpubl. data), NNZD census 2011.

Map 35-1 (Whiritoa and Mataora Bay)

Areas shaded green have breeding New Zealand dotterels and variable oystercatchers. Avian values of the three small wetlands (red arrows) are unknown.



Site 36	Mataora Bay
Priority	2
Assets	*Variable oystercatcher – several pairs breeding. **Northern New Zealand dotterel – typically 4-7 pairs. **Caspian tern – 1 pair recorded 2011.
Threats	Predation by mammalian and avian predators of shorebird eggs, chicks, adults. Disturbance during breeding season – people, dogs, vehicles on beach.
Detailed spatial information available?	Breeding territories spread along beach and in foredunes; exact locations vary annually.
Additional information	Significant habitat of indigenous fauna (EW 2010). Privately owned, access by arrangement only.
Information gaps	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.