

WILDLIFE AND WILDLIFE VALUES
OF NORTHLAND

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<u>Index</u>		<u>Page</u>
1.0.0	<u>The wildlife survey</u>	1
1.1.0	The surveyed area	1
2.0.0	<u>A background to Northland's wildlife habitats and wildlife</u>	4
2.0.1	Prehistory	4
2.0.2	Historical records	5
2.1.0	The habitats	6
2.1.1	Forests	6
2.1.2	Freshwater wetlands	8
2.1.3	Estuaries	10
2.3.0	Indigenous fauna	10
2.4.0	Introduced biota	14
3.0.0	<u>The present wildlife habitats</u>	19
3.1.0	The forests	19
3.1.1	The forest ecosystem	19
3.1.2	Wildlife of forests	19
3.1.3	Mapping and ranking	28
3.1.4	Features of some significant forested habitats	30
3.2.0	Freshwater habitats	42
3.2.1	The freshwater ecosystem	42
3.2.2	Birds of the freshwater wetlands	45
3.2.3	Bird use of freshwater wetlands	46
3.2.4	Mapping and ranking	48
3.2.5	Wetlands of international importance	49
3.2.6	Features of some significant freshwater habitats	50
3.3.0	Coastal and estuarine habitats	56
3.3.1	The estuarine ecosystem	56
3.3.2	Wildlife and coastal/estuarine habitats	58
3.3.3	Feeding of birds in estuaries and harbours	58
3.3.4	Breeding of birds in estuaries and harbours	60
3.3.5	Mapping and ranking	61
3.3.6	Features of some significant coastal and estuarine habitats	63
3.4.0	Exotic Forests	74

	<u>Page</u>
3.5.0 Upland game habitats	76
3.6.0 Exotic plants and wildlife habitats	77
4.0.0 <u>The fauna</u>	80
4.1.0 Birds	80
4.2.0 Mammals	134
4.2.1 Native mammals: bats	134
4.2.2 Introduced mammals	135
4.3.0 Lizards	143
4.4.0 Amphibians	146
4.5.0 Large land snails	147
5.0.0 SUMMARY	154
6.0.0 RECOMMENDATIONS	161
6.1.0 Habitats	161
6.1.1 Forests and scrublands: general	161
6.1.2 Forests and scrublands: specific	164
6.1.3 Freshwater wetlands	165
6.1.4 Estuarine and coastal habitats	166
6.2.0 Indigenous fauna	167
6.3.0 Exotic fauna	170
6.4.0 Exotic fauna	172
6.5.0 Research and management	172
6.6.0 Assistance and advice	172
7.0.0 <u>Acknowledgements</u>	173
Postscripts	175
References	176
<u>Appendices</u>	183
1. Summary of forested habitats of note	184
2. Summary of freshwater wetland habitats of note	208
3. Summary of coastal/estuarine habitats of note	225
4. Distribution maps of fauna (order as in section 4)	231

	<u>Page</u>
5. Summary of birds of Northland: status, protection, rarity, use of habitats	252
6. Criteria for identifying wetlands of international importance	257
7. Binomials for plant names used in the text	258
8. Ranking criteria for habitats of note	259

Indexes

1 Alphabetical index to habitats	260
2 Numerical index to habitats	266

COVER : New Zealand Dotterels (Charadrius obscurus), drawn by P. M. Morse.

This New Zealand endemic wading bird is extremely vulnerable to disturbance, particularly of its coastal nesting habitat. About half of all New Zealand dotterels are resident in Northland (see p.105).

The entire wetlands are periodically flooded and are therefore very fertile and productive. They also receive nutrients from the surrounding farmlands. Unfortunately, land in headwaters of the catchments is largely cleared of forest and scrub, and floodwaters rise quickly in the downstream wetlands. Protection should be given to remnant areas of natural vegetation in the catchments for both soil and water control.

Areas of wetland without swamp forest have a very complex vegetation pattern, partly induced by summer grazing and partly dependent upon water levels, degree of mineralisation, and history of disturbance. As discussed in section 4.2.2[d], grazing of some swamp is compatible with, or may even enhance, wildlife values, provided other sections are not grazed, including all forested parts. Seeds of willow weeds, water plantain, and docks are valuable for waterfowl, and dense beds of such plants occur in some grazed areas here.

A large proportion of the species of waterfowl and swamp-inhabiting birds of Northland was found in this wetland complex, as well as upland game and birds of open country and forests, some 41 species in all. The native birds were bittern, spotless crane, banded rail, grey teal, shoveler and grey ducks, New Zealand pigeon, tui, kingfisher, kiwi, paradise shelduck, pied stilt, pukeko, a species of parakeet, morepork, shining cuckoo, fantail, grey warbler, silvereye, white-faced heron, welcome swallow, black and little shags, harrier. Other waterfowl and game birds included black swan, mallard, pheasant, California and Australian brown quail.

Kauri snails, a gecko (H. pacificus), and a skink (C. ornata) were in wooded areas, freshwater mussels and at least seven species of fish are known from the streams.

The apparent absences of fernbirds can be attributed to the lack of low fertility wetlands, and of dabchick, brown teal, and scaup to the paucity of permanent open waters with fringes of dense swamp.

Once this type of wetland was common in Northland, but now almost all similar sites are intensively farmed. The total size and wildlife values of this, the best remaining example of the region, are being reduced currently by wetland drainage, stock grazing of forest remnants, conversion of shrublands to pines and pasture, and removal of timber (mainly totara for posts).

3.3.0: COASTAL AND ESTUARINE HABITATS

3.3.1 The estuarine ecosystem

Most habitats discussed here fall within the definition of an estuary in Knox (1980): "a semi-enclosed coastal body of water with a free connection to the sea; it is thus strongly affected by tidal action, and within it sea water is mixed (and usually measurably diluted) with freshwater from land drainage."

An estuary or harbour is really a complex of habitats, each offering opportunities for use by plants and animals suitably adapted for those conditions. Each animal and plant is hence restricted to specific zones where conditions best match the ability of that species to use them. In broad terms, the habitats within an estuarine ecosystem include open water, inter-tidal flats of mud, sand, shell, or stone, vegetated zones of eelgrass, mangrove, rushes, sedges, or succulent herbaceous plants, and often other wetlands dominated by freshwater plants but within the reach of spring tides. Adjacent open beaches, dunes, shrublands and forests may add to the ecosystem's diversity and hence wildlife values.

Compared with the productivity of other terrestrial and aquatic systems, that of estuarine systems is extremely high. Knox (ibid.) quoted a net primary productivity of about 2,000 g of plant matter per square metre per year, and compared this with means of 730 g for land and 155 g for ocean productivity. In simple terms, an estuary is about four times as productive as good rye-grass pasture. This results, in part, from the efficient mixing and ready availability of nutrients, the small size and rapid growth and reproduction of many of the organisms, and from the high turnover of materials by detrital feeders. Unlike terrestrial systems, estuaries have a high proportion of animals which feed on detritus - dead plant and animal materials and animal wastes. These are either suspended in water, where they can be extracted by filter feeders including cockles, mussels and other bivalve shellfish, barnacles, and tubeworms, or they become part of the surface mud which crabs, mudflat snails, burrowing worms, some fishes and many other animals sort and ingest. Along with the detritus, these animals also take in suspended or adhering living bacteria and plant and animal plankton.

The main sources of the detritus are plants such as sedges, rushes, mangrove, eelgrass and other plants of tidal zones. Run-off from surrounding lands provides some, but may bring problem materials such as excess clay sediment, pesticides and industrial wastes.

The above discussion shows that a large and rich food supply is available in estuaries for a great variety of birds, fish and other large animals, including man. This is reflected in high numbers of birds quoted in the accounts of some of Northland's estuaries (section 3.3.6) and for particular species, e.g., godwit (section 4.1.69), knot (4.1.78), turnstone (4.1.77).

Few detailed studies of estuarine productivity have been published in New Zealand. However, Knox (1980) and Healy

(p.117, 1980) both quoted a study of cockle (Chione stutchburyi) production in the Avon-Heathcote estuary at Christchurch. There, 4000 oystercatchers consumed approximately 1,472,000 cockles per day in winter. Healy (p. 115, 1980) gave an estimate of 550 million cockles at Pauatahanui Inlet, Wellington, where active filtering by this number of cockles was estimated to process 1.6 million cubic metres of water each tidal cycle.

There is no reason to suppose that Northland's estuaries are any less productive, and this is clearly of great importance for maintaining large and diverse wildlife populations.

3.3.2: Wildlife of coastal and estuarine habitats

Most of Northland's coastline is used by wildlife. Southern black-billed gull, red-billed gull, and white-fronted tern may be seen on most beaches. Waders such as variable oystercatcher and pied stilt are widespread on tidal sands and mudflats, while trees and other elevated objects on shorelines are commonly used by kingfisher and shags. Some species of lizards occur widely among beach stones, driftwood and dry seaweed.

3.3.3: Feeding of birds in estuaries and harbours

As discussed above, certain species have specific habitat requirements and will be restricted to certain zones of an estuary, providing, too, that those zones are sufficiently large, undisturbed, and not fully used by other species. Some of the common and less common birds of the region have the following preferences, but it must be realised that the zones intergrade and that birds may cross zones as they move up and down the shore with tidal levels:

- (a) Deep waters (permanent or periodic): surface feeders include gulls, Caspian and white-fronted terns; divers include gannet, shags. Oceanic birds such as shearwaters and petrels use larger harbours in stormy conditions.

- (b) Inter-tidal flats, with or without temporary shallow water. (Some species tend to follow the tideline, while others feed on exposed flats):
 - (i) mudflats: pied stilt, royal spoonbill, white-faced heron, little egret, curlew sandpiper, oystercatchers, black swan, grey duck.
 - (ii) sandflats: eastern bar-tailed godwit, wrybill, New Zealand dotterel, banded dotterel, golden plover, oystercatchers, little egret, lesser knot, curlew sandpiper, sanderling, Terek sandpiper, whimbrels.
 - (iii) shell-stone flats: turnstone, golden plover, reef heron.
 - (iv) mangroves (sparse or dense): far-eastern curlew, banded rail, white-faced heron, shags, kingfisher, welcome swallow, mallard, grey duck, gulls, terns, shini cuckoo, fantail, grey warbler, silvereye and a variety of introduced passerines.
 - (v) muddy tidal creeks: brown teal, royal spoonbill, banded rail, terns, shags, white-faced heron, grey duck, mallard.
 - (vi) salt marshes: fernbird, New Zealand pipit, marsh crake, bittern, grey duck, mallard.

- (c) Flooded grassland, freshwater pools: eastern bar-tailed godwit, pied stilt, golden plover, pukeko, white-faced heron, glossy ibis, brown teal, South Island pied oystercatcher, banded dotterel.

Most species require terrestrial high-tide roosts. Adjacent pastures or freshwater marshes serve this role for some, but most wading birds use undisturbed shorelines, islands, or shellbanks. The non-availability of such sites limits the value of some estuaries for the majority of species. This

especially true of smaller estuaries with urban areas, public roads, industries or intensive recreational use on all sides.

Larger estuaries are likely to provide a greater variety of habitats, and more of each habitat type, than small estuaries. Large areas are usually remote from disturbances. Hence, large estuaries tend to support a greater variety of birds (Figs 4, 5).

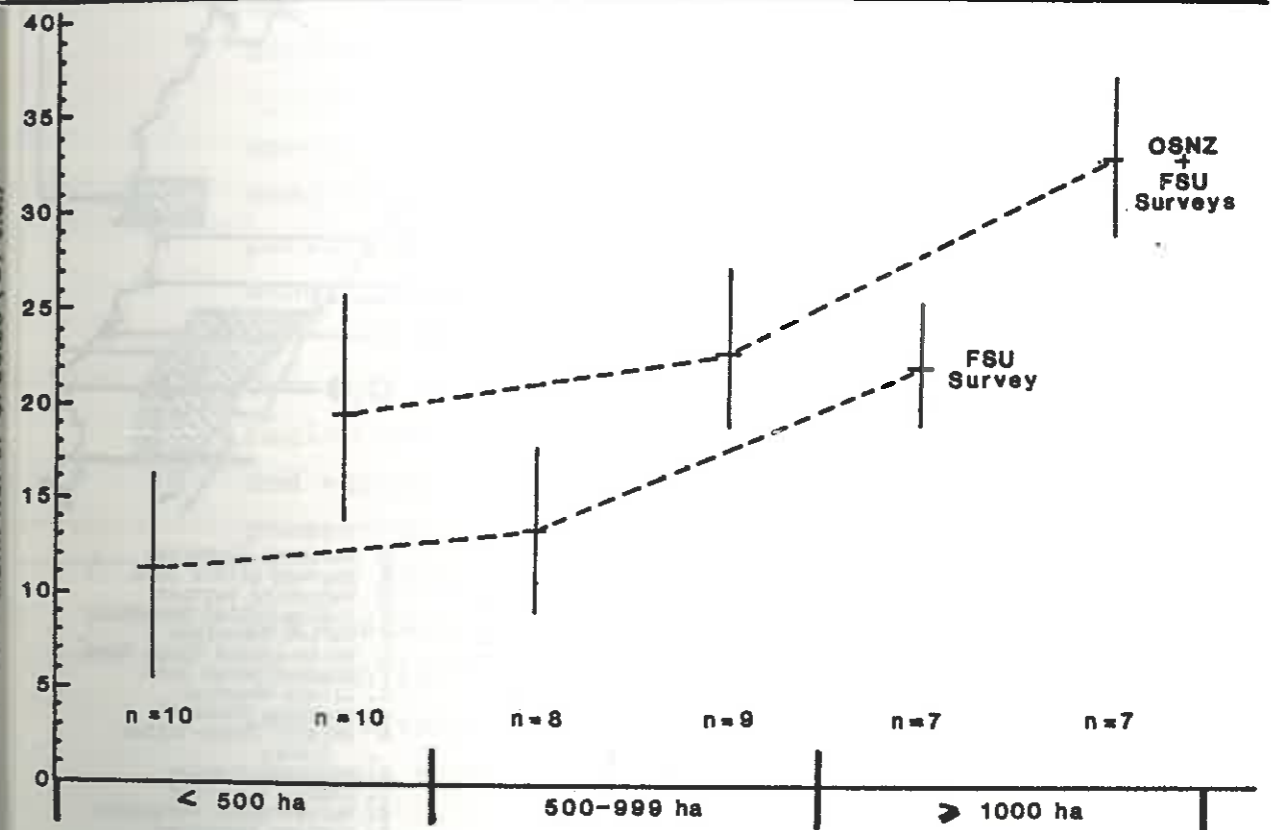
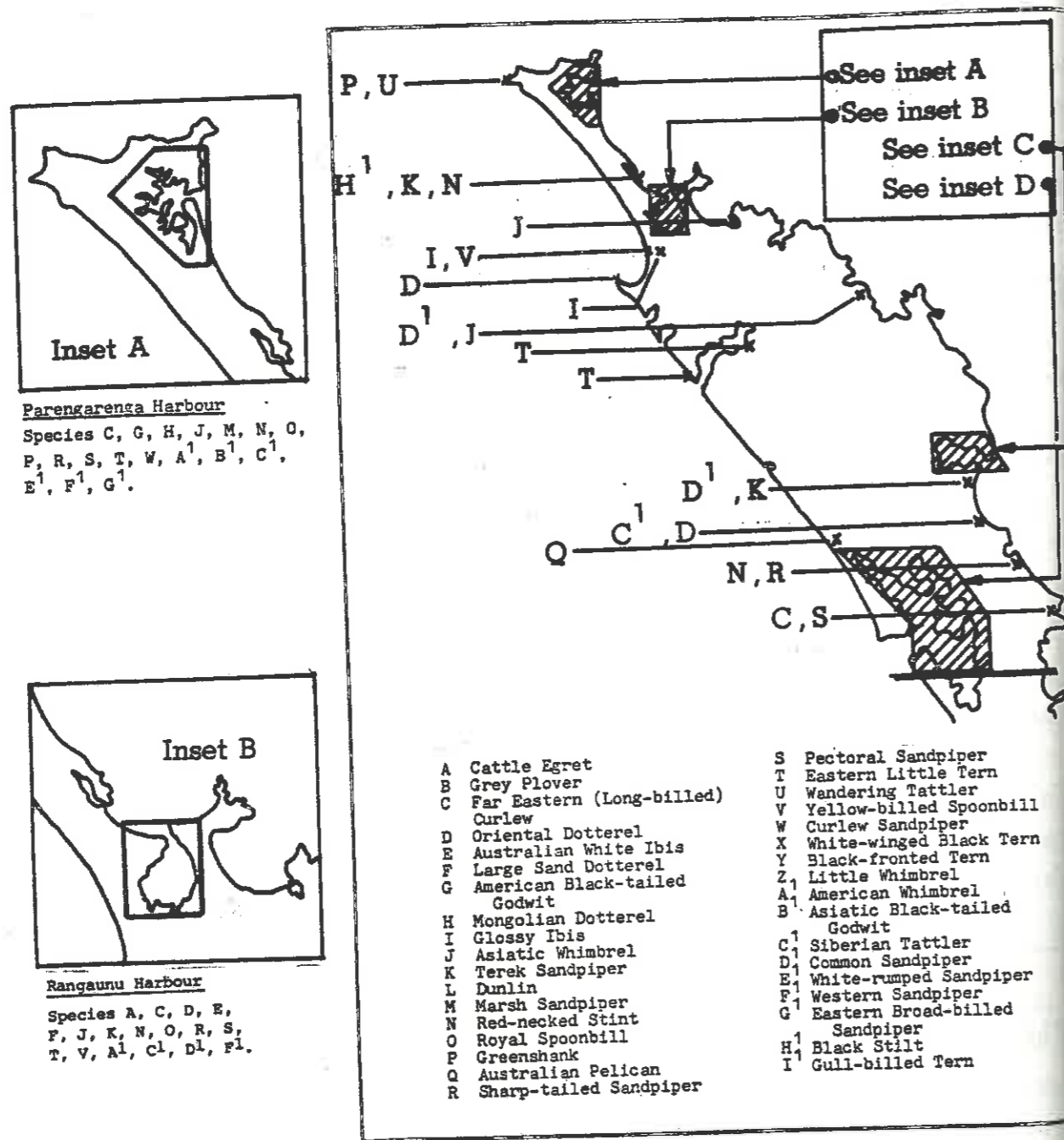


Fig 4: Numbers of bird species in estuaries of various size classes in Northland. (Seabirds and wetland birds only.)

3.3.4: Breeding of birds of estuaries and harbours
 The breeding of birds which use Northland's harbours and estuaries can be summarised as follows:

1. Residents. While some individuals may breed beyond Northland, many or most of the following birds nest locally. Some nest within the estuarine habitats on shell banks or islands, in mangroves, or on contiguous sandpits and shrublands. These include terns, gulls, New Zealand dotterel, banded dotterel, banded rail, variable oystercatcher. Other birds nest in adjacent freshwater wetlands,

Fig 5: Distribution of less commonly reported coastal and migratory birds, 1969-1981.



pastures, cliffs, or trees. Among these are ducks, pied stilt, white-faced heron, reef heron, black swan, shags, northern blue penguin.

2. New Zealand migrants. These species breed outside Northland and regularly or occasionally migrate northwards in winter (e.g., South Island pied oystercatcher, wrybill, black stilt, royal spoonbill, white heron). Large numbers of black swan breed in the Waikato and use harbours, particularly Kaipara and Parengarenga Harbours, at other times.
3. Overseas migrants. The large harbours of the region have international importance for the number and variety of Northern Hemisphere wading birds present during the New Zealand summer. More than 95% of Arctic breeding waders comprise two species, the eastern bar-tailed godwit and lesser knot (Veitch 1977), simply called 'godwit' and 'knot' respectively, in this report. The distribution of uncommon migrants is summarised in Fig. 5.

Some species are apparently regular migrants or vagrants from Australia. So far, breeding is not known in New Zealand for pelican, yellow-billed spoonbill, little egret, glossy ibis, and cattle egret, while some, such as royal spoonbill, breed in New Zealand but may be supplemented by migrants from Australia. Some banded dotterel migrate from New Zealand to Australia, but have not been recorded breeding there.

3.3.5: Mapping and ranking

The summary (Appendix 3) includes every habitat with a major part as tidal beach, estuary, brackish swamp or lagoon, or with mangroves. There is no sharp distinction between estuarine and freshwater habitats (Section 3.2), and some swamps and scrublands are included in section 3.3 where they are continuous with larger or more important estuarine or coastal habitats.

Northland is notable for the number and extent of its tidal estuaries and harbours, and a high proportion of these are extremely important wildlife habitats. In 1981, the General Assembly of I.U.C.N. (International Union for Conservation of Nature and Natural Resources) met in Christchurch, and among its resolutions passed the following: "asking the New Zealand authorities responsible for Lake Ellesmere, and a complex of northern harbours including Parengarenga, Rangaunu, Manukau, Kaipara and the Firth of Thames to maintain their ecological value and to have them listed as wetlands of international importance" (I.U.C.N. 1981). Other coastal wetlands that appear to meet I.U.C.N. criteria for similar ranking are named in section 3.2.5.)

Section 3.3.6 gives more detailed accounts of the outstanding estuarine and coastal habitats of Northland (including three of those named above), and of some with high wildlife values. The few areas given lower ratings are mostly small with heavy pressure from human recreational pursuits and urban developments. Further studies of estuaries with lower ratings can also reveal hitherto unknown values: e.g., since the wildlife maps were printed, the Ruakaka estuary (habitat 467) was shown to have breeding New Zealand dotterels and banded rails, sufficient reason to upgrade the ranking to 'High.'

Each habitat registered received a rating based on its total value to wildlife, despite the greater or lesser importance of some parts of each habitat. In the Bay of Islands the most important habitats were treated separately, as collectively they constitute less than half of the coastline and total area of the Bay, whereas the Kaipara Harbour habitats were treated as one since they covered most of the Harbour when mapped. In the latter case, the wildlife value of the whole is seen as greater than any of its constituent parts. Similar groupings of habitats were made in some other cases.

When comparing habitats given the same rankings, it should be realised that coastal and estuarine habitats may be important for quite different reasons. Some are notable for their diversity of birds, others for huge numbers of a small range of species, while others are key breeding sites for uncommon species.

The summary often gives a minimum number of bird species under "Features". This figure is for waterfowl, wading and shore birds only, excluding those usually associated with terrestrial rather than aquatic habitats. The data include species from OSNZ and other published records.

Calculation of the area of estuarine habitat proved difficult; a problem discussed but unsolved by McLay (1976) in his summary of New Zealand's estuaries. Differences between observers occur through variations in deciding whether to calculate the area of an entire closed bay or only the area exposed at low tides, or the area flooded at spring tides. Differences also occur in deciding how far to measure tidal channels, and how much, if any, of adjacent freshwater swamp zones or sand spits to include. For any one habitat a decision was made on wildlife habitat grounds rather than topography and consequently our calculated areas often deviate from McLay's.

3.6: Features of some significant coastal and estuarine habitats

(A summary of the features of all coastal and estuarine habitats is in Appendix 3).

3.6(a): Outstanding value habitats

Within this and following sections the habitats are listed alphabetically, not in order of importance.

Helena Bay Swamp (Habitat 233)

Only a small area, surrounded by farmlands and divided in two by a road. See summary for other features. Ranked highly

for its value to brown teal (an endangered endemic bird; see section 4.1.32). That the brown teal is listed in the International Union for the Conservation of Nature "Red Data Book" emphasises the value of Helena Bay, the largest known roost for brown teal outside Great Barrier Island.

Kaipara Harbour (Habitats 519, 522, 530, 549, 571, 572, 574, 575, 576, 600a, 607, 608, 620, 622).

The largest harbour/estuarine complex in New Zealand. Part of the harbour (approx. 11%) lies to the south of the survey region. Very diverse habitats for wildlife, many originally mapped and ranked separately, but because of the importance of continuity and large size, all areas within the harbour have been grouped to give one ranking for the total harbour. One of six New Zealand wetlands which were specified by I.U.C.N. (1981) for preservation (see 3.3.5).

Habitats: open water, extensive exposed banks of shell, sand, and mud at low tide,, sheltered rocky shores and low cliffs, islands form undisturbed high tide roosts, mangroves abundant at Burgess Island and in eastern harbour arms, saltmarshes grading into freshwater swamps. Little native forest adjacent to harbour. The wildlife values of lakes on North and South Heads and the harbour are mutually reinforcing.

All common waterbirds of the region are present, some in large numbers, e.g., OSNZ, March 1978 saw almost 15,000 South Island pied oystercatchers, 10,700 knots, 6,000 pied stilts, 5,600 godwits on single days. These emphasise the outstanding values of the area for overseas migratory birds (godwit, knot), migratory species within New Zealand (South Island pied oystercatchers), and birds which are to some degree resident (pied stilt). A high diversity of waterbirds includes migrants which are rarely seen in New Zealand - See Fig. 5. Important breeding areas for wetland birds such as fernbird, spotless crane, banded rail; coastal birds,

e.g., by far the largest breeding colony of Caspian terns in New Zealand is on Papakanui Spit, a wildlife refuge (500 in 1978, and also 3,000 breeding white-fronted terns); New Zealand dotterel; grey-faced petrel breeding on Moturemu Island, and on low cliffs near Poutu. Important black swan feeding and loafing area, probably serving Waikato breeding areas. Breeding of pied, black, little, and little black shags.

Human impact: most land adjacent to harbour is farmed; some exotic forestry; shore margins roaded over short distances; relatively high human population in the harbour catchment (10,000-19,999 in McLay 1976); one of three North Island harbours ranked as "grossly polluted" by McLay; considerable fishing, shell-fishing, and boating. Extensive Spartina beds, some planted. Some reclamation of margins. The effects of these on wildlife are not known, but no doubt the great size of the harbour buffers immediate harmful effects.

Kowhai Beach (38)

Sand dunes and beach with stone flats, compacted sand, and unstable dunes with sparse low vegetation. The area is a major nesting site for some coastal birds, most notably New Zealand dotterel (9 in 1978); also nesting of white-fronted tern (200 to 1978), southern black-backed gull, red-billed gull, variable oystercatcher, banded dotterel, and probably, pied stilt. It is also an occasional high tide roost for birds from Houhora Harbour (B.D. Bell, pers. comm.). The area is a gazetted wildlife refuge and is isolated from disturbance. The proximity of Houhora Harbour (habitat 37) must be important to these nesting birds for feeding, and the high ratings for both areas reflect this reinforcement of wildlife values, at least in part. Sand dunes near the breeding areas are encroaching, and current pine planting is attempting to stabilise these. However, it is important that such plantings be kept clear of the breeding sites, and locked gates maintained on the vehicle tracks into the area, especially during the breeding season.

Parekura Bay (Bay of Islands) (162)

The outstanding value of this habitat lies in two relatively large roosts of brown teal which occur here (up to 30 birds in 1980, which increased to 100 birds in 1982, after fencing was done to prevent cattle reaching the roost areas [R. Anderson, pers. comm.]). A tidal mudflat with mangroves and jointed rush saltmarsh in upper reaches; some fringing manuka grading into secondary forest of Cape Brett (163) across a public road. Roads on or close to the estuarine margin on three sides of the habitat. Other species include fernbird, banded rail, pukeko, and common coastal birds.

Parengarenga Harbour (20)

Largely an estuarine harbour with a long indented coastline. Low tide exposes extensive eelgrass, sand and mudflats; mangroves and saltmarshes with jointed rush and sea rush, grading into freshwater swamps in upper tidal arms. Large sand-spit and beach included in habitat; also islands within harbour - all these are valuable undisturbed hightide roosts for birds. Some harbour margins are buffered from stock by manuka scrub and a few coastal forest remnants; other margins are farmed to tidal limit. Cattle reach some islands at low tide (e.g. Kaipohue I.); their presence on these, or tidal areas generally is incompatible with other estuarine values. Some exotic forests are adjacent to harbour; loss of fernbird habitat is likely with some proposed plantings near harbour especially on the sandspit. Harbour waters noted as "clean" by Mclay (1976). Spartina present.

One of New Zealand's major wading bird harbours, with probably the greatest bird diversity of any habitat in Northland; especially important for migratory birds. One of six New Zealand wetlands which were specified by I.U.C.N. (1981) for preservation (see 3.3.5).

Rarer migrants (Fig. 5) have been recorded by OSNZ and others: e.g. Edgar (1971b) recorded large numbers of many species, including knot (2,100 in 1969), turnstone (800 in 1971), godwit (1,500 in 1971), wrybill (come from South Island in winter), banded dotterel (1,500 in 1970), black swan (many from Waikato wetlands). Nesting New Zealand dotterel, banded dotterel, white-fronted tern; banded rail and fernbird occur on the fringes. The Southern spit and headland of Parengarenga have been suggested as one of the two dune ecosystems in New Zealand worthy of preservation as a biosphere reserve (Knox 1979). The harbour's isolation means fewer and less frequent bird observations are made here than on other major harbours of the region. Hence the list of 40 or so species probably underestimates the variety of birds which use the habitat.

Rangaunu Harbour (56)

Estuarine harbour with the most extensive mangrove area in New Zealand. One of six New Zealand wetlands which were specified by I.U.C.N. (1981) for preservation (see 3.3.5). Outstanding area for wading birds, with large beds of eelgrass, mud and sandflats, raised shellbanks (especially Rangiputa bank), islands. Shoreline is relatively shorter than those of Parengarenga and Kaipara, but some unmodified margins remain for rails, fernbirds, and are also high-tide roosts for birds of tidal flats. Roading and land development have reduced the values of some shores. Spartina is present.

High numbers of some waders such as turnstone (800 in 1978), godwit (3,000 in 1971), knot (1,000 in 1978), pied stilt (224 in 1971), and also rich in bird species including rarely recorded migrants. Edgar (1971 a, b) noted western sandpiper, American whimbrel, terek sandpiper, far-eastern curlew, little tern (41 in 1971; 27 in 1978 during our survey). Notable, too, for New Zealand dotterel (13 in 1978, 32 + 4 chicks in 1971), Caspian tern, wrybill. Also see Fig. 5.

Major nesting area for some birds, especially on the Rangiputa Bank: New Zealand dotterel, white-fronted and Caspian terns, red-billed gull. Shags (pied, little) nesting in mangroves. Lizards Hoplodactylus pacificus, Leiolopisma smithi present. The importance of Rangaunu is enhanced by proximity of freshwater wetlands, as breeding and high-tide feeding areas both east and west of it; also sand beaches of Karikari Peninsula, and, probably most important for migratory birds, its central position in the chain of major harbours (Houhora and Parengarenga to north, Kaipara and Whangarei to south).

Takou Bay (109)

The beach from Haimana Pt southwards, the lower reaches of Owarai and Waimanga Streams, and the lower Takou and Hapuawai Rivers are included within this habitat. Vegetation: some mangroves downstream; areas of sedges, flax, and long grasses upstream; pohutukawa on some margins. The area's main value is for brown teal, one of the largest roosts on the mainland. The island in Takou River is a favoured site by teal, but Owarai Stream is also good habitat, with a similar cover of flax, jointed rush, ungrazed grass. Breeding pied shags (5 pair 1978), New Zealand dotterel, Caspian tern, variable oystercatcher, all north of Takou River mouth. The whole area is relatively undisturbed through lack of public road access, and this no doubt contributes to the continued presence of brown teal, and to the breeding of other species.

Whangarei Harbour (386)

A deep-water harbour with extensive tidal sandflats, mudflats and shellbanks. The permanent channels of deeper water are not mapped and the habitat comprises 10 discrete areas extending into this from most shores. The largest area lies in the south-west and includes the Mangapai R. estuary, but every area contributes to make a diverse tidal complex. Mangroves (10% of area), saltmarshes, and stony beaches (locally on northern shores) add to habitat variety. Some

coastal forests give a zonation from shore to ridge top (e.g. habitats 425, 426, 430) but, unlike Ngunguru Estuary, mostly from rocky shores rather than salt-marsh or mangrove communities.

Local ornithologists have listed some 47 wetland and coastal bird species (1970-80). Of particular note, and occurring as residents or migrants, are fernbird, banded rail, marsh crake, New Zealand dotterel, wrybill, banded dotterel, godwit, turnstone, knot, shags (pied, black, little, little black), herons (reef, white, white-faced), grey duck, shoveler, mallard, paradise shelduck, grey teal, terns (white-fronted, Caspian, fairy, little), pied stilt, oystercatchers, common gulls, pukeko, Arctic skua, Northern blue penguin, gannet, golden plover. A variety of rarer migrants has been recorded (Fig. 5).

Parrish (1979) reported nesting within the harbour boundaries of pied shag (68 birds), reef heron (4 pairs), grey duck and mallard (often nest on hollow mangroves), New Zealand dotterel (6 pairs), banded rail, pied stilt, southern black-backed gull (50 pairs), Caspian tern (35 pairs), red-billed gull, black and little shags, white-fronted tern, kingfisher, skylark, welcome swallow, silvereye, rosella parakeet (one nest in hollow mangrove), and some other introduced passerines.

Considerable modification has occurred: northern and western margins largely roaded, some as causeways; reclamations for industrial land, port facilities, rubbish dumps; Spartina present and spreading. Despite the concentrations of housing, and the port, airport, and industrial development, there remains a rich variety of birds, some occurring in high numbers. Parrish (1979) recorded 2000 knot at Takahiwai (6.12.79), 146 wrybill at Port Whangarei (10.8.79), and up to 4,000 godwit in late summer with 200-300 overwintering each year.

The large area must be important in "buffering" adverse effects of such modification. Planning for multiple use of the harbour resource should incorporate wildlife requirements.

Whangaruru Harbour (upper) (195)

The habitat of outstanding value includes the upper estuarine parts of Whangaruru Harbour and Punaruku Estuary. Some mudflats occur, with extensive mangrove and jointed rush communities which in turn grade into manuka scrub or farmland. The extensive Russell Forests (226) are within 1 - 2 km of most parts of the estuary. Highest wildlife importance is given to the area for presence of at least 3 roosts of brown teal: 50 birds near Tutaematai and 2 smaller roosts in Punaruku Estuary. It is possible that some brown teal nest in the Russell Forest nearby. Much of the estuary's catchment lies in State Forest. In section 3.1.4(b) there is a discussion on ways in which management of the forest could affect the downstream habitats.

Other birds include fernbird in manuka zones, banded rail, kiwi on fringes, paradise shelduck, other common coastal and passerine birds.

Stock enroach upon the estuarine zones from many points. Spartina grass is present.

3.3.6(b): High Value Habitats

(Five of the 14 habitats given this rating are discussed below; the remainder appear only in the summary, Appendix 3).

Hokianga Harbour (202)

Tidal harbour with long narrow arms extending well inland. Not a major migratory bird harbour, perhaps because exposed areas at low tide are fragmented and predominantly mudflats with mangroves and saltmarshes; extent of sandflats and beaches is very limited. Marginal shrub zones, and forested areas contiguous with harbour occur at a number of points:

some registered as habitats of note (habitats 146, 201, 240 all of high importance). The wildlife values of such forests and the harbour are complementary (section 6.1.1[c]).

Excellent areas of saltmarshes and mangroves contain banded rail (perhaps the highest population in Northland), marsh crake (OSNZ report 1980), spotless crake, fernbird. A small but apparently permanent roost of brown teal in tidal reaches of Mangamuka River; moulting site for c.200 paradise shelduck near Motukauri and possibly another site near Motukaraka. High diversity of New Zealand waders, shags, ducks, gulls, terns - some in fair numbers: the survey found 100 of each of pied stilt, banded rail, pukeko, white-faced heron, black shag, little shag, little black shag, mallard, grey duck, white-fronted tern, red-billed gull, southern black-backed gull; and others, including white heron, little egret, reef heron, in lower numbers. Area also valuable for human recreation, fishing, and as a transport route.

Main disturbances are from clearing of surrounding lands, stock grazing on tidal flats, reclamations and roading on tidal areas and margins. Recreational pressures considerable with a number of permanent villages and a large summer population. The navigable central channel and fringing roads mean little undisturbed habitat exists, including a lack of high tide roosts. Spartina is abundant on some open flats and under mangroves; the effects of Spartina on habitat value are discussed in section 3.6.

The high values outlined are likely to deteriorate as pressures continue on the harbour. However, this might be avoided by appropriate conservation planning.

Houhora Harbour (37)

A largely estuarine harbour of smaller area but similar values to Parengarenga and Rangaunu Harbours, and probably

providing an invaluable link for bird movements between those areas. Western margins largely farmed and roaded, but unmodified eastern side is particularly valuable (an estimated 100 + fernbirds there, and the main high tide rookery is on east side opposite Te Raupo). Very important area for some wading birds; e.g. Edgar (1971.b) noted 2,750 knots compared with 100 in other harbours of the northern part of Northland at the same time; also 1,100 godwits. Species of particular note during our survey in 1978 were terek sandpiper, New Zealand dotterel, golden plover, reef heron. Marsh crake reported (M. Bellingham and A. Davis, pers. comms.).

The presence of Kowhai Beach complements this area (see note on habitat 38), and the Houhora Harbour and peninsula should be regarded as an entity. Recreational pressures must be balanced against the high wildlife values as the former increase.

Mangawhai Estuary and Spit (517)

Farming, roading, and housing have modified the margins of much of this area, and the habitat is largely tidal sandflats with limited areas of saltmarsh grading to shrubland in upper tidal reaches of streams. Vegetated areas still retain fernbird, banded rail, spotless crake. The most important wildlife values are on the sandspit and island - the only regular nesting area for fairy tern in New Zealand. This part of the habitat is a Wildlife Refuge. Until recently fairy terns nested at Waipu Beach (habitat 488).

In 1979, the Mangawhai sandspit also had nesting Caspian tern (80-100 pair), white-fronted tern (100 pair), New Zealand dotterel (15 pair), and variable oystercatcher (20-30 pair). Ten golden plover were present on 26 October 1980 (OSNZ 1980).

Reduction of human disturbance and maintenance of the present vegetation are important for the retention of this valuable wildlife breeding area, but currently there is heavy disturbance by dune vehicles, casual picnickers and dogs.

Matapouri Estuary (317)

A relatively small estuary with obvious modifications resulting from roading, urban development, seasonal recreational pressures. However, a high diversity of habitats exists here, which appears to maintain a good variety of birds, including at least a pair of apparently resident brown teal. The habitats: 35% of area in mud-flats, sand, and water at low tide; 40% mangroves; 25% saltmarshes grading into brackish and freshwater swamps. Some small patches of coastal secondary forest are continuous with the estuary (part of habitat 316) but most of the immediate catchment is farmed. Banded rail, fernbird, variable oystercatcher, pied stilt, little shag, and other more widespread birds are also present.

Ngunguru - Horahora Estuaries (344)

A large and complex mosaic of wetland habitats was mapped as one habitat here. Open sand beaches, a sandspit, tidal mudflats and sandflats, saltmarshes and mangroves, brackish and freshwater swamps with diverse sedge, rush, shrub, flax, and cabbage tree communities. Regenerating forest of Whakareora is included. Whole area is also continuous with three forest habitats (342, 343, 345) and part of the value of the wetland lies in this rare occurrence of unbroken zonation from saline to fresh-water to terrestrial communities. Some species such as fernbird appeared most common at the boundaries of swamp and shrubland.

The absence of extensive open tidal flats reduces the opportunities for both variety and numbers of wading birds, but the high proportion of vegetated wetland, with long margins where open water meets vegetation, creates habitats for some other birds on a scale unknown elsewhere in Northland.

The area is most notable for banded rail, bittern, fernbird; also occasional New Zealand and banded dotterels, kiwi, rarely brown teal (1 in 1980), white heron. Other species

include variable oystercatchers, pukeko, shags (little, pied), gulls, white-faced heron, ducks (mallard, grey), paradise shelduck, upland game birds (pheasant, California and brown quail). New Zealand dotterels breed on Ngunguru sandspit (OSNZ 1982).

Habitat is relatively unmodified; some peripheral drainage and clearing; cattle and sheep graze some drier areas. However, pressures from nearby residential development, including recreational use, appear to be growing.

3.4.0: EXOTIC FORESTS

Exotic forests of Northland were not surveyed for wildlife since they are regarded as temporary wildlife habitat (unless managed rotationally as outlined below).

3.4.1: Exotic forests of Northland

Although Northland possessed some exotic forests (mainly pines) before the mid-1970's, there has been a great acceleration in planting during and since our survey. Large areas of scrub and some native forests have been cleared for pines, almost certainly including parts or all of some areas mapped as habitats of note. The fauna most directly affected by this change from indigenous to exotic vegetation includes kiwi, fernbird, nectar and fruit-eating birds, green gecko and Hochstetter's frog, and this is discussed in sections 4.1.1, 4.1.126, 4.3.1, and 4.4.1 respectively. Other fauna of scrub and forest are losing an already diminished resource, and the fragmentary network of forest 'islands' and scrub 'corridors' for bird movements is further reduced.

3.4.2 Bird use of pine forests in New Zealand

Not all the consequences of exotic afforestation are necessarily harmful to wildlife, however. It is acknowledged that coniferous forests can support certain native bird species in densities at least as high as in neighbouring native forests. This is reported specifically in Northland

for kiwi among pines of the Waitangi State Forest but special features of this site may contribute to their success there (section 4.1.1).

Clout (1979, 1980) found some other native birds in higher densities among pines than in native forests of the Nelson district. Extrapolation of his specific findings to Northland would be unsatisfactory, not the least important reason being that some species of his study are not resident in Northland (brown creeper, robin, bellbird) and others are represented by different subspecies (tomtit, fantail, weka). Gibb's observations (1961) in the Kaingaroa pine forests near Rotorua are probably more relevant, although again his study area contained at least two native birds not now in Northland (whitehead, robin).

Both Clout (1980) and Gibb (1961) showed that it is the insectivorous native birds which are most common in pines; periodic fruit and nectar feeders such as tui, bellbird, New Zealand pigeon, kaka, and parakeets are absent, or, at the most, seasonal or vagrant birds from other habitats. During the first few years of growth, pine forests can be excellent habitat for upland game.

The presence of a bird in an exotic forest should not be taken as proof that the species can exist permanently in such habitat, nor is long-term residency evidence of a breeding population.

A major drawback of forests of pines (or other exotic trees) as wildlife habitat is their temporary nature. In the early stages of growth, perhaps up to eight or 10 years, pine forests can be very suitable habitat for birds which use rank grasses and weeds (finches, pheasant, quail) but these birds become more confined to firebreaks and forest margins as the trees form a closed canopy. The period over which native forest birds obtain greatest use of exotic forest varies with

6.0.0: RECOMMENDATIONS

Recommendations have been made throughout this report, but these and others are drawn together in this section.

6.1.0: HABITATS

6.1.1: Forests and scrublands: general

- (a) The vast reduction in area which has occurred in the native forests of the region means that all forested habitats of note should be preserved. In districts where forests are now a thin scattering of 'island habitats', the retention of these is all the more important for the movements of native birds, and the maintenance of local wildlife populations.
- (b) As few forests of the region could be regarded as 'intact', restoration of forest habitats should be undertaken by:
- (i) control (aimed at eradication) of wild animals, notably goats, wild pigs, possums, and feral livestock;
 - (ii) fencing, to exclude domestic livestock;
 - (iii) re-planting in areas which have been heavily damaged by animals, timber removal, fires, recreation activities, etc.
- (c) Coastal forests are a rare resource nationally. Most of those remaining in Northland are of small area, are severely modified, and have lost their full shore-to-skyline sequences. Even the large forests which approach the coast have lost their links with shore vegetation e.g. Waima, Waipoua, and Warawara State Forests. Nevertheless, a few smaller forest habitats still have connections with mangroves, saltmarsh, or rocky shore vegetation. The protection of all these, and the restoration of others are most important for fruit and nectar-eating birds, coastal and shore birds, and certain lizards and native land snails.

- (d) Northland has many species of animal and plant at the northern limits of their distributions, and these populations should be preserved in their habitats. Most notable in this respect are the forests of the Far North, but also important are the forests of the Mangonui-Whangaroa coasts, the Maungataniwha Range and, Herekino, Puketi, and Otangaroa State Forests.
- (e) Forest and scrub areas which have not been registered as habitats of note still have many values for wildlife, and should be protected. They contribute to the pattern of 'forest islands' mentioned above, and add to the total area available for forest wildlife. With protection and management, many unregistered habitats would improve, and could be rated as habitats of note in years to come.
- (f) All areas of forest and scrub play important roles in controlling water run-off and protecting soil. The values of downstream habitats should be protected by the retention of native vegetation in the catchments above - see discussions under 'Russell Forests' [section 3.1.4(b)] and Manganui River wetlands [3.2.6(c)].
- (g) Scrub and shrublands should be recognised also for their value to wildlife which is specifically adapted for such habitats (e.g. fernbirds, kiwi, upland game). Furthermore, it must be realised that long-term retention of such wildlife in these sites will probably need habitat management. This would involve clearing parts of the habitat to induce some younger stages of succession in scrub which would otherwise advance successionally towards forest [section 3.1.2(e)].
- (h) Every habitat of the following forest species of limited distribution in the region or nationally should be protected, and managed with the conservation of those species specifically as a major goal: kokako, kaka, red-crowned parakeet, yellow-crowned parakeet, bellbird, pied tit, the skink Leiolopisma striatum, green geckos, Hochstetter's frog, kauri snails, flax snails.

- (e) Conical Peak - Dome State Forest. Pine plantings between these two areas of native forest should be managed so as to retain a permanent 'corridor' for movements of pied tits [section 3.1.4(b)].
- (f) Mareretu State Forest. This is perhaps the key area remaining for Hochstetter's frog in the region, and management should be directed at conserving this population, particularly by control of wild pigs [section 3.1.4(b)].
- (g) Russell Forests. Forest management should retain continuous and extensive native forest tracts across altitudinal and other gradients [section 3.1.4(b)].
- (h) Clear Ridge. This is an important reserve, particularly for kiwi and kauri snail: control of wild pigs and possums is needed to protect the native fauna.

6.1.3 Freshwater wetlands

- (a) In view of the severe reduction in area which has been incurred by freshwater wetlands of Northland, all remaining habitats of note should be reserved.
- (b) Since wetlands which incorporate large areas of mineralised or non-mineralised swamp or bog are particularly rare, these should have the highest priority for reservation.
- (c) The great diversity of wetland types should be recognised, and management of wetland systems should aim to preserve this diversity. As an example, the infertile "gumlands" (Section 3.2.1) are valuable for wildlife (particularly fernbirds) and have a distinctive flora; management should retain the features of such wetlands.
- (d) Because of their disturbance to wildlife, vegetation, and the fragile topography, motor vehicles, including motor cycles should be prohibited in and near the wetlands of sand-dune country.

- (e) No further plantings of exotic forest should occur in or near wetlands in sand-dune country, unless it can be demonstrated that such forests would have no effects on lake and groundwater levels (Section 3.2.4(a)). The most important wetlands in this respect are those of the South Poutu (north head of the Kaipara Harbour).

6.1.4 Estuarine and coastal habitats

- (a) Some of the greatest wildlife significance of Northland lies in the number and large area of estuarine systems which the region possesses (sections 3.3.1-3.3.4). A number of these have international significance (3.3.5). When compared with forests and freshwater wetlands, estuarine habitats have lost a relatively small proportion to development, but most have sustained some loss of area, nearly always of the fringing natural communities of marshes, mangrove shrublands, or dunes. It is recommended that conservation of remaining estuarine habitats of note should over-ride recreational, residential, and commercial pressures to use such areas.
- (b) Within most of the estuarine habitats, the following are seen to be the most vulnerable elements and must have precedence for wildlife (see sections 3.3.2, 3.3.3):
 - (i) Sandspits and shellbanks [see also 4.1.57 (New Zealand dotterel), 4.1.101 (fairy tern), 4.1.98 (Caspian tern), and others];
 - (ii) Salt-marshes, mangrove shrublands, and brackish swamplands [see banded rail (4.1.44), marsh crake (4.1.47), brown teal (4.1.32) and others];
 - (iii) Tidal sandflats and mudflats [see 4.1.51 (waders) and subsequent sections on individual species].

- (c) Specifically, and in line with recommendation 6.1.3(d), motor vehicles, including motor cycles, should be prohibited in and around wildlife habitats on sandspits, dunes, shellbanks, and also in the wading bird feeding areas on intertidal flats. Dogs should be strictly controlled in such sites generally, and prohibited from the most significant areas, especially bird breeding sites.
- (d) Specific management should continue or be undertaken for improvement of vulnerable sites and species e.g. the fencing of brown teal roosts (4.1.32).
- (e) Restoration of areas of native vegetation should be undertaken on land above the tidal zones, to link those zones with existing native forests or shrublands [see recommendation 6.1.1 (c)]. Any plantings should be propagated from locally occurring stock.

6.2.0: Indigenous fauna

Specific recommendations have been made for certain species in the text of this report, particularly in section 4. Some of the key issues are re-identified below:

6.2.1: Endemic species to Northland

Every effort must be made to protect the following in their habitats:

- Northland green gecko (Naultinus grayi) (4.3.1(d))
- Flax snail (Placostylus ambagiosus) (4.5.3 (b))
- Kauri snails (Paryphanta b. busbyi, P.b. watti) (4.5.1)

6.2.2: Threatened breeding species and species of limited national distribution

The following species have significant populations in the region, but are nationally threatened or of restricted distribution. Their habitats, particularly breeding areas, should be protected in the region:

- North Island brown kiwi (4.1.1)
- New Zealand dabchick (4.1.3)
- Reef heron (4.1.19)
- Australasian bittern (4.1.21)
- Brown teal (4.1.32)
- Banded rail (4.1.44)
- New Zealand dotterel (4.1.57)
- Fairy tern (4.1.101) (The only breeding sites in New Zealand are in Northland.)
- North Island fernbird (4.1.127)
- North Island kokako (4.1.147)
- Short-tailed bat (4.2.1)
- Striped skink (Leiolopisma striatum) (4.3.2(d))
- Green gecko (Naultinus elegans) (4.3.1(e))
- Hochstetter's frog (4.4.1)
- Flax snail (Placostylus hongii) (4.5.3(a))

While Caspian terns are neither threatened nor of limited distribution, the New Zealand populations do not appear to be supported by migration from elsewhere. Northland has the largest breeding colony (section 4.1.98) and several others of note. These should have adequate protection, particularly from man-induced disturbance.

Northland's populations of kaka (4.1.109) and native parakeets (4.1.110, 4.1.111) are probably very small and dispersed, but these three bird species fall into the category of 'nationally threatened or of restricted distribution'. The mobility of these birds makes it difficult to specify protective measures for them, but retention of the large forests appears to be the best insurance in the short-term (3.1.2(d)).

6.2.3: Migratory birds

The diversity of migratory birds which uses Northland has been discussed in some detail (3.3.1-3.3.4, and 4.1.51). The most obvious examples are the many species of Arctic migrants, but there are also annual migrations of birds to and from Pacific Islands and Australia e.g. cuckoos (4.1.114, 4.1.115),

white-fronted tern (4.1.103), little tern (4.1.102), banded dotterel (4.1.58), grey teal (4.1.31).

Northland is also the major area for post-breeding and non-breeding wrybills (4.1.63) and South Island pied oystercatchers (4.1.52), and is used spasmodically by other birds which breed only in the South Island e.g. white heron (4.1.17), royal spoonbill (4.1.24), and black stilt (4.1.89).

New Zealand has an international responsibility to maintain habitat for birds which come here for part of their life histories. Northland's importance in this is greater than that of most regions of the country; because of its geographical location and the amount of habitat available it is the host region for most of the migratory bird species in New Zealand. Large areas of habitat must be preserved in an undisturbed and unmodified state for migratory birds, particularly in the harbours of Parengarenga, Rangaunu, Whangarei, Kaipara, and Houhora.

6.2.4: Releases of native fauna into habitats of note
Releases of birds or other animals into the wild must be treated with caution: the effects of released weka on other protected species show the potential risks involved.

It is recommended that any releases should be:

- (a) of species once present or still in Northland;
- (b) derived from local stock, unless the species is extinct in Northland;
- (c) of species which demonstrably pose no threats to other rare or declining native species.

The whitehead and North Island robin are suggested for release in Northland, and bellbirds (from adjacent offshore islands rather than from south of Auckland) could be considered also. Further releases of weka should not occur. Factors causing the

decline of kaka, native parakeets, kokako, brown teal, flax snails and some others require further research before releases of these animals are likely to succeed. Unless effective control of mammals can be achieved there is little chance for releases of regionally extinct species such as saddleback and certain lizards, and for some declining species named above.

6.3.0: EXOTIC FAUNA

6.3.1. Mammals: the Wildlife Service regards all exotic mammals as being threats to wildlife, and advocates their control wherever practicable. Reasons are given in section 4.2.2 and the following recommendations stem from these:

- (a) Wild Pig: priority for control should be in the Far North and other areas with flax snails, but ideally wild pigs should be eliminated from all habitats of note. Pig hunting dogs should be under supervised control at all times.
- (b) Goat: ideally, feral goats should be eliminated from all habitats of note; priority should be given to clearing them from isolated habitats where there is little chance of re-infestation, and from areas rated more highly for wildlife.
- (c) Deer: escapes from deer farms should have the highest priority for recapture or elimination.
- (d) Cattle: fencing is needed to separate pastures from forest, estuaries and parts of freshwater wetlands. Highest priority should be for higher-rated habitats. Feral cattle should be removed from all natural areas, particularly in the Far North. Stock have some useful roles in freshwater wetland management [4.4.2(d)] but this should be under the control of persons experienced in wildlife requirements.
- (e) Possum: the worst effects of possums are yet to be felt in many areas. Controls (with full consideration for non-target

APPENDIX 3 : SUMMARY OF COASTAL AND ESTUARINE HABITATS OF NOTE

(*indicates the four major harbours for wading birds, both in variety and numbers of birds; also see Fig. 9.) (+) = habitat with expanded description in Section 3.3.6. App. 3(1)

1. OUTSTANDING VALUE COASTAL/ESTUARINE HABITATS				Area (hectares)	County	Grid Reference	Habitat Number	Name	Features (The quoted number of bird species is for wetland birds only)
Name	Habitat Number	Grid Reference	County						
Helena Bay Swamp (+)	233	1874-8310	We	20					Tidal stream with mangroves and saltmarshes on lower reaches. Upper reaches with cabbage tree - kahikatea and sedge swamps, overgrown ponds; some peripheral pohutukawa forest with kowhai, puriri, kohekohe, totara and scrub areas. One of the major mainland roosts for brown teal, used also for their breeding. Banded rail, bittern reported. Critical area recently fenced, but whole complex is of high value.
*Kaipara Harbour (+)	519, 522, 530, 549, 571, 572, 574, 575, 576, 607, 608, 620, 621, 600a	1750-7250	O, R Hb	(in Northland Region)	84000				Largest harbour/estuary complex of Northland. Very diverse: permanent water, extensive sand, shell, mudflats, protected rocky shores, low cliffs, mangroves, saltmarshes, islands, freshwater swamps at heads of tidal arms. Long indented coast. >40 bird species (see note above) including rare migratory wading birds. Large breeding colonies of Caspian and white-fronted terns, shags (4 species), also 2 grey-faced petrel breeding colonies. Large flocks of wading birds (>2000 each of godwits, knots, South Island oystercatchers at single sites). Some 1% of Harbour is south of the region. Greatest values in large areas, diversity, general low level of disturbance. However, Spartina grass is spreading over extensive areas and there has been localised "harbour reclamation". Important feeding and loafing area for black swans.
Kowhai Beach (+)	38	0645-9090	M	100					Dunes and beach; limited vegetation on compacted sand and stony flats. Area is a major nesting site for coastal birds especially NZ dotterel and 200 white-fronted terns. Major values in remoteness from disturbance, proximity of Houhora Harbour for feeding.
Parekura Bay (+) (Bay of Islands)	162	1760-8535	B	160					Tidal mudflats with mangroves, saltmarshes, grading into coastal scrub in places. Some borders roaded; urban development, recreational pressure. Most value is a roost of brown teal (up to 30 birds). Fernbird.
*Parengarenga Harbour (+)	20	0440-9400	M	7800					Largely estuarine harbour, extensive eelgrass, mangroves, and saltmarshes. Very long coastline, large sand-spit, beach, sand and mudflats, islands. One of main estuaries in NZ for migratory wading birds. >40 bird species. Excellent undisturbed high tide roosts. However, cattle graze some mangrove areas. Spartina grass spreading from c. 1966 plantings near Paua.
*Rangauu Harbour (+)	56	0800-8900	M	10000					Largely estuarine, with the most extensive mangrove area in NZ. Broad areas of eelgrass, mud and sandflats, shell banks, islands. >40 bird species; outstanding for wading birds, especially migratory waders, e.g. >1000 godwits and knots in single flocks. NZ dotterel and shags breeding. Most margins less indented than in other major harbours; development of adjacent land will leave fewer high tide roosts.
Takou Bay (+)	109	1430-8715	Wo, B	500					Tidal river and streams, estuary, beach. Mudflats, sand, grassed areas, mangroves; some fresh water swamp upstream. Main value as brown teal roost - one of 2 or 3 largest on mainland. >20 bird species include breeding NZ dotterel, Caspian tern, variable oystercatcher, pied shag.
*Whangarei Harbour (+)	386	1890-7890	We	5300					Deep water harbour with extensive tidal sand and mudflats, shell banks; mangroves and saltmarshes grading to shrubland. (Permanent deep water not mapped - the habitat comprises 10 discrete areas, much of the value of each depending on the presence of the remainder, to make a large diverse tidal complex). >31 bird species including common and rare migratory waders also marsh crane, fernbird, banded rail, and large flocks of some waders. Considerable modification of area for roading, housing, port facilities, industry, but total size means much undisturbed habitat remains.

2. HIGH VALUE COASTAL/ESTUARINE HABITATS				Area (hectares)	County	Grid Reference	Habitat Number	Name	Features
Name	Habitat Number	Grid Reference	County						
*Whangarei Harbour (+) (upper)	195	1820-8230	We	200					Estuarine harbour arms; saltmarshes, mangroves, some mudflats, and fringing scrub. Surrounding land largely developed, with stock encroachment on some tidal parts. Fencing needed. Spartina grass present. Most notable for a major roost of brown teal (>50) and 2 smaller roosts; also banded rail, fernbird, kiwi on margins.
Hokianga Harbour (+)	202	1000-8350	Hb	10600					Elongated tidal harbour; long indented coast, considerable permanent water. Some large mudflats, mangrove areas, saltmarshes, more limited sandflats, but a small brown teal roost in Mangamuka arm, high numbers of banded rail, fernbird, spotless crane. Possibly a moulting site for paradise shelduck nearby. Marshcrake seen (OSNZ 1980). >30 bird species. Some disturbance; reclamations, adjacent farming, stock grazing on estuarine zones, boating, spread of Spartina grass, roading.
Houhora Harbour (+)	37	0620-9070	M	1450					Largely estuarine harbour; coastlines little indented, but eastern fringes unmodified with extensive saltmarshes grading to fresh water swamps and shrublands. Limited mangrove areas. Excellent wading bird habitat, and since area is halfway between Parengarenga and Rangauu (habitats 20, 56), probably forms an important link in a chain of nationally important estuaries.
Mangawhai Estuary and Spit (+)	517	2110-7500	O	500					Estuary and large sandspit; tidal sandflats and limited areas of saltmarsh grading to shrubland. Excellent area for wading birds, spotless crane, fernbird, banded rail. Sandspit the most important portion - the only regular nesting area for fairy tern in NZ; also major nest area for Caspian and white-fronted terns, NZ dotterel, and some variable oystercatcher, banded dotterel, pipit. >27 bird species. Margins of estuary largely cleared; some roaded with urban development.
Matapouri Estuary (+)	317	2015-8159	We	80					A complex mosaic of habitats for a relatively small estuary: 35% mudflats, sand, and water (at low tide), 40% mangroves, 25% saltmarsh, brackish and freshwater swamp. Two brown teal in 1978. Also numbers of banded rail, fernbird. >15 bird species. Area under some pressure for roading, housing, recreation.
Ngunguru-Horahora Estuaries (+)	344	2010-8050	We	2000					Large and very diverse wetland habitats: sand beaches, tidal sand and mudflats, brackish and freshwater swamps, mangroves and saltmarshes. Sand dunes and Whakareia regenerating forest included in habitat. >28 bird species (few migratory waders) - notable for fernbird, banded rail, bittern, and occasional banded and NZ dotterels, white heron; a solitary brown teal seen (1980). Also continuous with 3 forested habitats. Area relatively undisturbed, but human use increasing.
Ocean Beach Wetland	429	2062-7892	We	65					50% vegetated dunes, 50% beach + sandspit + tidal stream. NZ dotterel nesting (12 seen); also breeding variable oystercatcher. High diversity of other coastal and open country birds. Skinks L. Smithi, C. ornata. Dunes and part of tidal stream fenced from stock. Some disturbance from trail motorcycles which enter this area from road access 6km southwards.
Ponaki Beach (south of N. Cape)	11	0480-9443	M	520					Complex mosaic of sand beach, dunes, tidal lagoon, brackish to freshwater lagoons, swamps, grading into forest (habitat No. 1). >21 bird species; NZ and banded dotterels and variable oystercatcher all probably breeding; fernbird, spotless crane. Probable supplementary area to Parengarenga for migratory waders. Value in isolation and lack of human disturbance, but extensive damage by cattle, wild pig.
Ruaakā Est. - see App. 3(4)									
Tom Bowling Bay wetland	3	0470-9520	M	900					Beach, dune, fresh-water swamp and pond complex, with small estuarine areas. Very diverse; little human disturbance. Important NZ dotterel breeding areas on both coasts. Fernbird, spotless crane, and breeding banded dotterel, pied shag, paradise shelduck, pied stilt, variable oystercatcher. Nationally important forest on two boundaries (habitat 1).

2. HIGH VALUE COASTAL/ESTUARINE HABITATS (cont)						
Waimango Swamp and beach (Karikari Peninsula)	42	0870-9010	M	220	Beach, dunes, semi-drained lagoons, large freshwater swamps. Channel cut through whole complex has modified the habitat, but area still has much wildlife value. > 21 bird species. A major nesting area for NZ dotterel. Bittern, fernbird in swamps; waders (some migratory, e.g. turnstone) use beach.	
Waipou Estuary	488	1990-7640	We	180	Sand beach, dunes, tidal river and estuary, saltmarsh grading to freshwater swamp. > 20 bird species, including NZ dotterel, godwit, knot, turnstone. Nesting of NZ dotterel and occasionally fairy tern. Considerable pressure from human use of beach and surrounding lands (once a major roost for brown teal - now gone).	
Wairahi Stream (Great Exhibition Bay)	26	0510-9233	M	120	Sand beach, dunes, tidal creek with small brackish swamp, large freshwater (raupo) swamp. Low manuka on most margins due for afforestation. Coastal end used by NZ dotterel (possibly breeding), some migrant waders. Upstream presence of bittern, fernbird, paradise shelduck; possibly spotless crane. Part of important chain of wetlands from near N. Cape to Parengatanga and Rangaunu.	
Waitahora wetland (Spirits Bay)	8	0305-9480	M	255	Complex mosaic of sand beach, dunes, tidal flats, brackish to freshwater stream and lagoon, saltmarshes, freshwater swamps. Breeding black swan, grey duck, paradise shelduck, fernbird, spotless crane, bittern present. Continuous with forest (habitat No. 1). Some disturbance from stock and vehicles, especially to NZ and banded dotterels' nesting areas.	
Whananaki Inlet	275	1950-8225	we	350	Tidal inlet; mudflats grading to mangroves, freshwater swamps, scrub and podocarp/hardwood communities. Fernbird, banded rail, NZ dotterel, wading birds. Small roost of brown teal. > 24 bird species. Most adjacent land farmed; considerable public use of inlet.	
Whareana Bay (south of N. Cape)	10	0486-9478	M	100	Beach, dunes, swamp with open water and raupo, grading into manuka/sedge-fern community, then forest (mapped in habitat No. 1). Main importance for breeding NZ dotterel. Waterfowl and waders on lagoon, fernbird on margins. Probably spotless crane, bittern.	
3. MODERATE-HIGH VALUE COASTAL/ESTUARINE HABITATS						
Awapoko (Aurere) Estuary	58	0915-8852	M	130	Estuary comprising mangroves on mudflats; sandspit at mouth. Border of dunes and farmland. Good bird diversity, including black shag, little shag, pied shag, white heron, white-faced heron, reef heron, pied still, banded rail, NZ dotterel. Rubbish dumping occurring.	
Herekino Harbour	141, 164	0700-8485	M	630	Tidal harbour with limited areas of beach and dunes; mudflats, mangroves, saltmarsh; freshwater swamps in upper reaches. Limited area for waders (but godwit, knot, and NZ dotterel present); excellent habitat with fernbird, banded rail, bittern. High tide wader roost (grid 0675-8472) disturbed by vehicles. Margins largely cleared land; some drains through upper marshes.	
Hoteo River	610	1980-7113	R	140	Mostly tidal river (no similar habitat elsewhere in Northland). Both margins with broadleaved forest (Mt Auckland - habitat 625 - on south border) largely undisturbed habitat: banded rail, shags, waterfowl. Flats into Kaipara Harbour, but rated separately as lower-most lkm is farmed to riverbanks.	

4. MODERATE-HIGH VALUE COASTAL/ESTUARINE HABITATS (cont)

4. MODERATE-HIGH VALUE COASTAL/ESTUARINE HABITATS (cont)						
Kerikeri Inlet	156, 135	1520-8600	B	1040	Tidal arm of harbour; some mudflats, mangroves, saltmarsh, and higher freshwater swamp and scrub zones. NZ dotterel and a small variety of migrant waders. Banded rail, reef heron, kiwi on Aroha Is. Although adjacent land is largely cleared and inlet is popular for boating, disturbance to wildlife is reduced by large area. Brown teal use pond (habitat 155) nearby.	
Mahurangi Harbour	617	2230-7100	R	1120	Harbour and estuary; above low tide level 50% is mud and sand flats, 45% mangroves, 5% rocky shore. Little saltmarsh, but several good coastal forests right to shore (habitats 646-8). > 14 bird species, including banded rail, godwit. Much local recreational use, and land development along shores.	
Ngatangi Stream mouth (near Houhora)	33	0580-9159	M	25	Tidal stream mouth with dunes, sand beaches. Scrub areas fenced adjacent to dotterel; pied and little shags nesting.	
Pakiri River estuary	568	2234-7340	R	80	Tidal stream, small estuary, saltmarsh. > 18 bird species, including fernbird, NZ dotterel.	
Paroa Bay (Bay of Islands)	159	1690-8515	B	90	Tidal mudflats with mangroves inshore. Notable for lack of disturbance - inaccessibility, intact vegetation on margins.	
Ruakaka River estuary (Re-ranked as 'high' value. See section 3.3.5)	467	1966-7752	We	100	Sand beach, dunes, estuary with saltmarsh and mangroves. High diversity of other Arctic waders. High pressure from roading, housing, recreation. Breeding NZ dotterel (6+ pairs), banded rail, variable oystercatcher.	
Taipa Estuary	58A	0971-8820	M	270	Estuary comprising mudflats, mangroves, rushes and remnants of coastal forests. Good bird diversity, including black shag, little black shag, pied shag, little shag, reef heron, banded rail, Caspian tern. Motorcycle presence creates disturbance.	
Tapotupotu Estuary (Spirits Bay)	5	0205-9490	M	35	Estuary with extensive jointed rush saltmarsh, some mangroves. Almost totally bordered by forest and shrubland (habitat No. 1). Limited open areas for wading birds; main values in lack of modification and low levels of human disturbance. Skinks (C. ornata, L. smithi) on margins.	
Tauranga Bay estuary (Whangaroa)	67	1292-8832	Wo	25	Sandspit, off-shore rocky stacks; estuary with some mudflats, mangroves, nesting on stacks; NZ dotterel, banded rail present. Considerably modified by roads and housing; high recreational use in summer.	
Te Aiorua Creek estuary (Bay of Islands)	132	1490-8645	B	50	Largest estuarine arm of Te Puna Inlet; mainly mangroves with some salt-exposed estuary to stock damage. Recent clearing of surrounding land has fair range of terns, gulls, shags, non-migrant waders; NZ dotterel present; kiwi in peripheral scrub.	
Uruti Bay (Russell)	158	1645-8510	B	20	Tidal mudflats and mangroves, saltmarsh grading to freshwater (raupo) swamps and manuka scrub. High numbers of fernbird; kiwi habitat on margins. Area bisected by road.	
Waikare Inlet (Bay of Islands)	193	1720-8450	B	500	Tidal inlet; many bays with extensive mangrove areas but limited open mudflats; some saltmarshes grading to freshwater swamps and shrubland. Bird diversity not high but fernbird, banded rail, bittern in excellent habitat, much undisturbed.	
Whangateau Harbour	597	2280-7240	R	800	Estuary and tidal river; mudflats, pockets of mangrove, saltmarshes on margins. Long boundary; partly continuous with forested habitat 598 on Omaha Spit. Banded rail in vegetated zones; some migratory wading birds. Heavy pressure from fishing and recreation.	

4. MODERATE VALUE COASTAL/ESTUARINE HABITATS

Location	Area (ha)	Map Reference	Code	Value	Notes
Owairangi Creek 1.	519a	1534-7444	O, Hb	80	Mangroves with glasswort saltmarsh behind. Banded rail and more common coastal birds.
Mahinepua Bay estuary	69	1346-8837	Wo	10	Small estuary with mangroves and saltmarsh; manuka fringing stream. Upper reaches with freshwater (raupo) swamp. Partly fenced but stock on salt-marsh; area also used as sports field. Good habitat for rails, crakes, brown teal but none seen. Small area means excessive disturbance through human use.
Mangonui Harbour	61	1050-8840	M	640	Tidal harbour; almost totally exposed mudflats at low tide. Some mangroves, saltmarshes, grading into freshwater swamps. Not a major migrant wader area but reef heron and many white-faced heron. Vegetated zones important for spotless crake, banded rail, fernbird.
Opote Creek estuary (Bay of Islands)	138	1565-8660	B	100	Tidal arm of Te Puna Inlet. Largely mudflats, mangroves, some saltmarsh grading into freshwater swamps; manuka scrub on periphery of some parts. Most value for banded rail. Kiwi in scrub.
1. Patava - Taiharuru Estuaries	395	2050-7960	We	650	Two estuaries, almost linked. Diverse habitats: small sandy beach, sand and mudflats, rocky islets. Mangroves; small areas of saltmarsh grading to shrub zones (main fernbird and spotless crake areas). Heavy summer recreational use; stock damage to vegetated zones.
Puhoi Estuary (upper)	644	2193-7000	R	30	Only the upper reaches of this habitat lie within the surveyed region (15% of whole estuary). This part in mangroves, saltmarsh, and peripheral shrub-land. Banded rail. Stock grazing on to estuary.
Purerua Estuary (Bay of Islands)	136	1525-8668	B	30	Tidal arm of Te Puna Inlet. Mangroves and saltmarsh, with some scrub on margins. Banded rail and fernbird habitat. Possibly visited by brown teal. Stock damage along fringes of saltmarsh.
Tahoranui River estuary (Takou Bay South)	131	1466-8691	B	20	Estuary with mudflats; mangroves grading to manuka scrub on margins. Island is a valuable part of habitat. Scrub clearing is removing shelter from estuary, and loss of kiwi habitat. Banded rail present.
Tapuaetahi Creek (Takou Bay South)	133	1485-8685	B	120	Estuary with mudflats; mangroves and small saltmarsh, grading into peripheral manuka scrub. Banded rail in mangroves, kiwi in scrub; reports of brown teal. Recreation pressure high in summer.
Te Kapa River Inlet (Mahurangi)	649	2256-7075	R	140	Estuarine sand and mudflats with some extensive mangrove areas. Some peripheral coastal forest remnants and scrub. Some recreational pressure on area. Oyster farm.
Te Tii Estuary (Bay of Islands)	134	1510-8675	B	40	Small tidal arm of Te Puna Inlet, with mudflats, mangroves, saltmarsh, and peripheral manuka scrub, pohutukawa and kowhai. Excellent habitat diversity and well-buffered by surrounding vegetation. Banded rail, fernbird; kiwi in scrub. Limited area of shell-fish farming.
Waipiro Bay (Bay of Islands)	161	1737-8530	B	80	Tidal mudflats with some fringing mangroves, saltmarsh, manuka scrub. Heavy seasonal use by public limits wildlife values. Banded rail present.
Wairoa River - Awakino River floodbanks	445	1418-7710	Hb	100	Largely a man-made habitat - stopbanks on western side of Wairoa River, and both sides of lower Awakino River. Mudflats at low tide, with dense 2m-3m Manchurian ricegrass (Zizania) forming zone above. Some waterfowl on mudflats. Bittern among ricegrass. Density of vegetation may limit use to most wetland birds.
Whangaroa Harbour	97	1230-8740	Wo	580	Three estuarine parts of harbour; mudflats and extensive mangroves; some saltmarshes, rocky shore, tidal rivers. Original tidal area already reduced by reclamations, sawmill debris; oyster farming and recreational pressures. More common waterfowl, 4 more common shag species, banded rail, fernbird. Current fencing to restore a once large roost for brown teal on Kao River. (Rating of habitat will rise if teal return in high numbers.)

5. POTENTIAL VALUE COASTAL/ESTUARINE HABITATS

Location	Area (ha)	Map Reference	Code	Value	Notes
Manawaora Bay (Bay of Islands)	160	1716-8505 1723-8520	B	80	Two areas of tidal mudflats, mangroves and saltmarsh at head of Manawaora Bay. Some fringing manuka. Small area and heavy public use limits wildlife values.
Matauri Bay estuary	107	1414-8793	Wo	5	Small estuarine creek and adjoining beach. NZ dotterel may breed near creek mouth, but excessive human disturbance now occurs each breeding season. Small size and recreational pressure reduce wildlife value.
Taupo Bay (Whangaroa)	64	1215-8840	Wo	5	Sandspit and small tidal creek, with saltmarsh grading to freshwater swamp on margins. Partly fenced; urban area on one side. Small area means excessive human disturbance seasonally reduces wildlife values.
Whangape Harbour	166	0760-8430	M, Ho	850	Tidal harbour; 53% mudflats with some saltmarsh, 19% mangroves, 28% permanent water. Surrounding land largely cleared with considerable erosion. Cattle graze saltmarsh and mangroves; local rubbish dumping on mudflats. Area has considerable wildlife potential because of large size.