

W I L D L I F E   V A L U E S  
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W I L D L I F E   C O N S E R V A T I O N  
I N   S O U T H   W E S T L A N D

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A. INTRODUCTION

Recent years have seen a growing awareness of the need for careful management of our lands and resources. The Government has responded to this need by embarking on a series of interdepartmental studies aimed at a wider consideration of possible land uses.

In June 1976, the Minister of Lands and Forestry directed a land use study of South Westland to consider the present and future use there of Crown Land. The results of this study were published jointly by the Department of Lands and Survey and the New Zealand Forest Service in a report entitled "South Westland Land Use Study 1977". This report expressed concern "for the adequate preservation of unmodified lowland forest and the protection of rare fauna and flora". This concern is shared by the Wildlife Service. The South Westland region contains a rich diversity of unique forest and wetland habitats of great importance to wildlife.

The fourth chapter in that report dealt with nature conservation, but in general terms only. It did not provide sufficient information to permit the adequate preservation of representative wildlife communities, nor did it identify the occurrence of rare or endangered wildlife in the region. The authors recognised the shortcomings of the Report in these respects and expressed the hope that it would stimulate further study.

The Wildlife Service was invited to contribute to the original report, but could not in the short time allowed. Field and scientific staff were fully committed with other survey work. However, in recognition of the importance of South Westland for wildlife it was decided that a proper wildlife survey should be undertaken, even though the Land Use Report had already been published. The Department of Lands and Survey have agreed to regard this study and

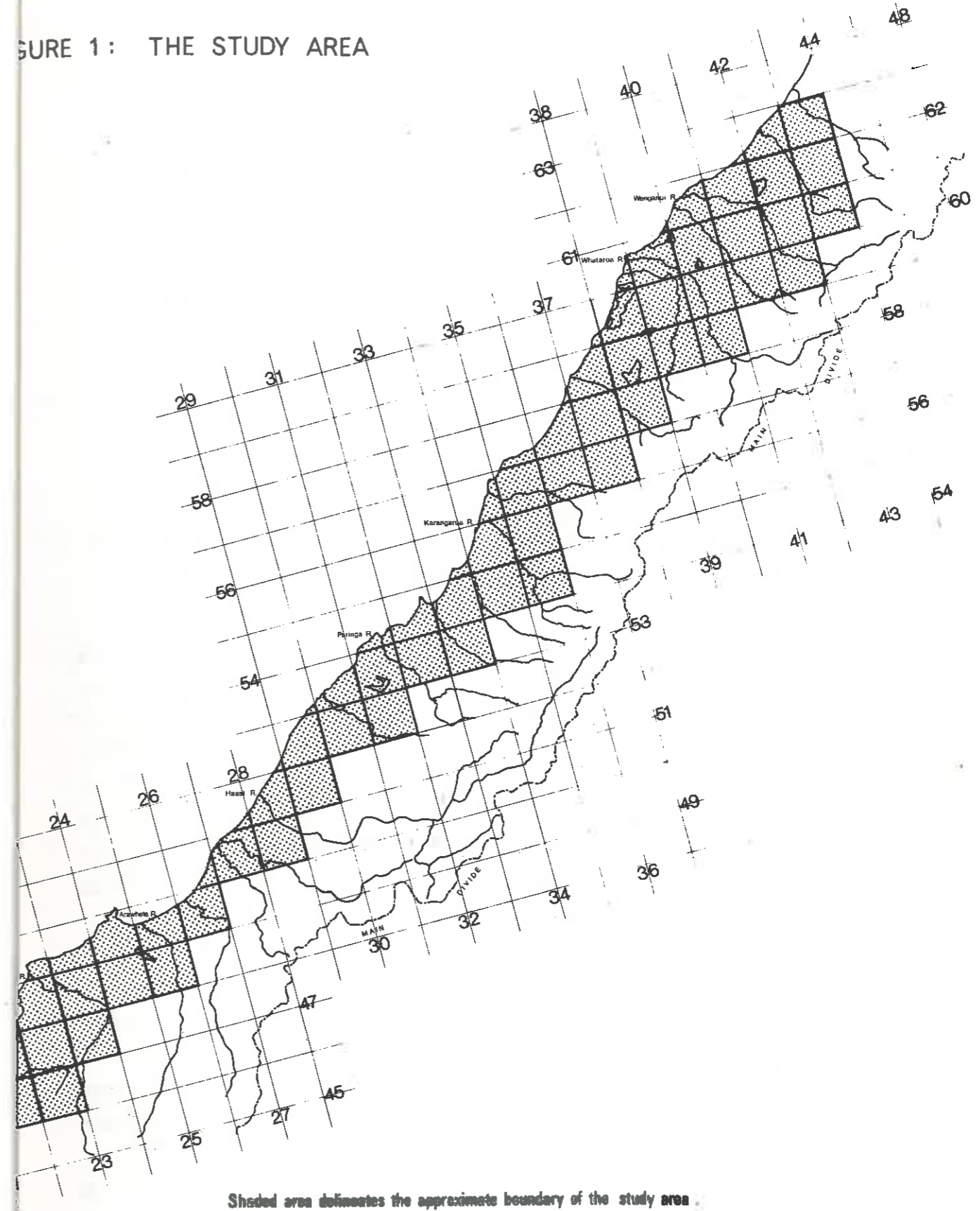
report as an official supplement to the Land Use Report and offered us their assistance in the production of our maps.

The aim of the survey was to make an inventory of all important wildlife habitats in the region and, in particular, to assess the value of the wetlands, coastline and forests to wildlife. Special attention was given to the occurrence and abundance of species with limited distribution or special habitat requirements (e.g. kiwi, robin, kaka, and parakeet) to ensure that current and proposed reserves were consistent with their requirements for long-term survival.

This report is mainly based on information gathered in the field by Wildlife Officers during the January/March periods of 1977 and 1978.

A brief preliminary report on bird abundance in some State forests was prepared by Crook and Best after the first survey period in 1977.

FIGURE 1: THE STUDY AREA



### Waiatoto S.F. Pakihi

This is the largest example of a logging-induced pakihī. It is possibly less podsolized than other examples and some regeneration is taking place. The area also contains several stands of kahikatea. Fernbird occur here in moderate numbers. Tui, bellbird, long-tailed cuckoo, yellow-breasted tit, brown creeper, fantail, silvereye and introduced passerines were recorded also. Recent reports indicate that marsh crake may still exist in this area.

#### (c) Coastal Swamps

These are swamps adjacent to the coast where creeks and small rivers branch into a network of slow flowing peaty creeks. Although they share some of the characteristics of lagoons (e.g. brackish water) they are much smaller and their features are more consistent with those of a swamp.

As they are open to the sea they contain a higher diversity of food species (e.g. galaxiids, other small fish and detritus feeding creatures such as mudsnails and crabs) than areas containing freshwater only. They are important feeding areas for waders and waterfowl.

Flax and, less commonly, kowhai, are important seasonal nectar sources for tui and bellbirds. These swamps usually contain fernbird, bittern and crakes, and are often frequented by dotterel, terns, gulls and oystercatchers.

#### Examples

##### Kakapotahi Swamp

Predominantly a flax and Leptocarpus swamp with stands of

manuka and kahikatea, this area contains several moderately large areas of open water with loafing sites, cover and abundant food supply making it a good habitat for waterfowl. Mallard, grey duck, pukeko, bittern and fernbird are among the birds present.

##### Waikukupa/Omoeroa Coastal Wetland

This is a large area of swampland with freshwater lagoons between the mouths of the Waikukupa and Omoeroa rivers. It is predominantly a flax swamp with areas of Carex secta and rushes and is part of a seral sequence to kahikatea and rimu forest. Both fernbird and bittern were observed in this swamp.

Freshwater creeks and lagoons opening out to brackish areas provided a good diversity of food species for black shag, little shag, white-faced heron, white heron, bittern, black swan, mallard and grey duck.

Sand spits increase the area's value by providing roosting areas for caspian tern, white-fronted tern and black-billed gull. Banded dotterel and variable oystercatcher use the sand spits and river bed. Gorse poses a threat to some parts of the swamp, and cattle are causing some damage to vegetation. The area could be threatened by beach mining which would certainly diminish its value for wildlife, particularly waterfowl.

##### Waikowhai Stream

A zonation from Leptocarpus and rushes to flax, kowhai and shrubs, manuka, and kahikatea borders the east side of this stream. Small mudflats and a brackish stream provide a good area for waders and waterfowl.

Fernbird, bittern, little shag, black shag, mallard, white-faced heron and variable oystercatcher use the area along with several passerines including bellbirds and tui.

Barn Bay Dunes and Swamp

This is a diverse habitat consisting of a flax swamp with patches of Baumea teretifolia and rushes, several pockets of open water (up to 2 ha in size) with reed beds, and a creek bisecting the swamp. Adjacent sand dunes are vegetated with flax and toetoe merging into Olearia avicenniaefolia and a low forest of hardwood and rimu. This area supports good numbers of waterfowl and swamp birds. It also represents one of the southern-most areas of this type on the West Coast.

Bittern, fernbird, white-faced heron, little shag, pukeko and grey duck were among the species recorded.

(d) Freshwater Swamps

The vegetation of inland swamps is more uniform than their coastal counterparts. Flax, rushes and sedges, frequently with a fringe of kahikatea, form the dominant plant communities. Over three quarters of the swamps recorded had permanent open water for waterfowl.

The birdlife in freshwater swamps is slightly different from that of coastal swamps. High species diversity is dependant on the presence of open water. Flax or flax/sedge dominated swamps with very little or no open water may contain bittern, crakes, fernbird, pukeko, and harrier. Introduced finches, tui, bellbird, silvereye, fantail and grey warbler also make some use of such areas. Habitats with streams or small lakes may support welcome swallow, black shag, little shag, grey duck, mallard, black swan, scaup, paradise shelduck, kingfisher, white-faced heron and white heron in addition to the above species.

Examples

White Heron Lagoon

A large area of flax and Carex spp. dominated swamp, adjacent to Lake Rotokino containing a small lake. All the species listed above (including spotless crake) are present.

Saltwater S.F. Swamp

A flax dominated swamp with several small-leaved Coprosma species, some Juncus and raupo adjacent to several small oxbows of water. Pukeko, grey duck and introduced finches were recorded during the survey.

One One River Swamp

An extensive area bordering the One One River. It has been logged for kahikatea in the past, and present vegetation consists of flax, shrubs, and mature and regenerating kahikatea. It contains good numbers of fernbird.

Mumu Creek Swamp

A large raupo dominant swamp with several moderately sized stands of kahikatea occur throughout. It is drained by two creeks and is of value for waterfowl and fernbird.

Ohinetamatea Swamp

An extensive flax swamp with large areas of Carex and Scirpus species, some raupo and fringe stands of kahikatea. The Ohinetamatea River and several of its tributaries flow through the swamp and provide open water for paradise shelduck, mallard, and grey duck. Fernbird are concentrated

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were recorded in the swamp vegetation around the margin of Lake Moeraki.

#### Lake Nisson and Pakihi

This is a fertile lake surrounded by pakihi - a type of lake not widely represented in Westland. It is extensively used by waterfowl, particularly grey duck and paradise shelduck, and also supports bittern, fernbird, pukeko, shags and harrier.

#### Waiuna Lagoon

A large shallow, mesotrophic lake providing feeding, nesting and moulting areas for a high number of waterfowl. Some 100 black swans, over 200 grey ducks, approximately 250 scaup (many of which were moulting), over 80 paradise shelduck, and good numbers of shoveler and mallard were observed. Fernbird live around the margins. This is the most important habitat for waterfowl south of the Waiho River.

### 3. River mouths and lagoons

The rivers of South Westland flow through flat, often swampy country before they reach the coast. At their mouths they generally form a lagoon and/or estuary with sand-bars, and are frequently accompanied by brackish swamps and some forest. Such a mosaic of mudflats, open water, sand-bars and plant communities makes these areas most valuable wildlife habitats which support a high diversity of birds. (See figure 2)

The silty substratum of an estuarine area contains a rich micro-fauna which forms the basis of a productive food chain. The small fish, shellfish, crustacea and other invertebrates which abound in these areas are readily accessible at low tide to waders, waterfowl and seabirds. In the permanent, relatively shallow water of the lagoons, algae and other bottom vegetation are available as food for black swan and ducks.

Although the major significance of lagoons is their value as a food source for many species, they are also important as breeding areas for waterfowl. The tall swamp vegetation around the edges provides nesting cover and refuge, particularly for black swan.

Many of the habitats recorded in this category are partly surrounded by kahikatea and rimu stands which provide nesting sites for white-faced heron, shags and some species of ducks.

The sand-bars separating a lagoon from the sea are important breeding and roosting areas for many seabirds and waders.

One of the major threats to estuarine ecosystems is that increased run-off caused by logging and careless land use will cause an increase in the rate of siltation. This could kill a proportion of the benthic fauna resulting in a reduced food supply for some time.

Examples

Okarito

This is the largest and most important lagoon on the West Coast. It is relatively shallow (1-5 metres) and the large quantity of weed growing on the bottom is readily accessible to black swan and ducks. Extensive areas of mudflat exposed at low tide provide food for many other birds.

A list of 27 species use the lagoon, namely: banded dotterel, bittern, variable and pied oystercatchers, black shag, little shag, white-fronted tern, Caspian tern, red-billed gull, black-billed gull, mallard, grey duck, scaup, shoveler, black swan, harrier, pied stilt, pukeko, spur-winged plover, fernbird, welcome swallow, white-faced heron, white heron, royal spoonbill, paradise shelduck, eastern bar-tailed godwit and little egret. All but the last five breed in the immediate vicinity of the lagoon.

The proximity of the lagoon as a feeding ground is probably an important factor for the success of white herons breeding at the Waitangirotto colony.

Okarito Lagoon is a significant area for black swan on the West Coast supporting a population of around 2,000 birds at the height of the breeding season. The neighbouring Salt-water Lagoon has rarely more than 100. The extensive areas of swamp vegetation around the northern and western margin of Okarito provide ideal nesting sites and also harbour bittern and fernbird.

Okarito lagoon is biologically most valuable as an example of the transition from a saltwater to a freshwater wetland with a mixture of sandy and silty substrate. Such transitional zones support a particularly rich diversity of life forms.

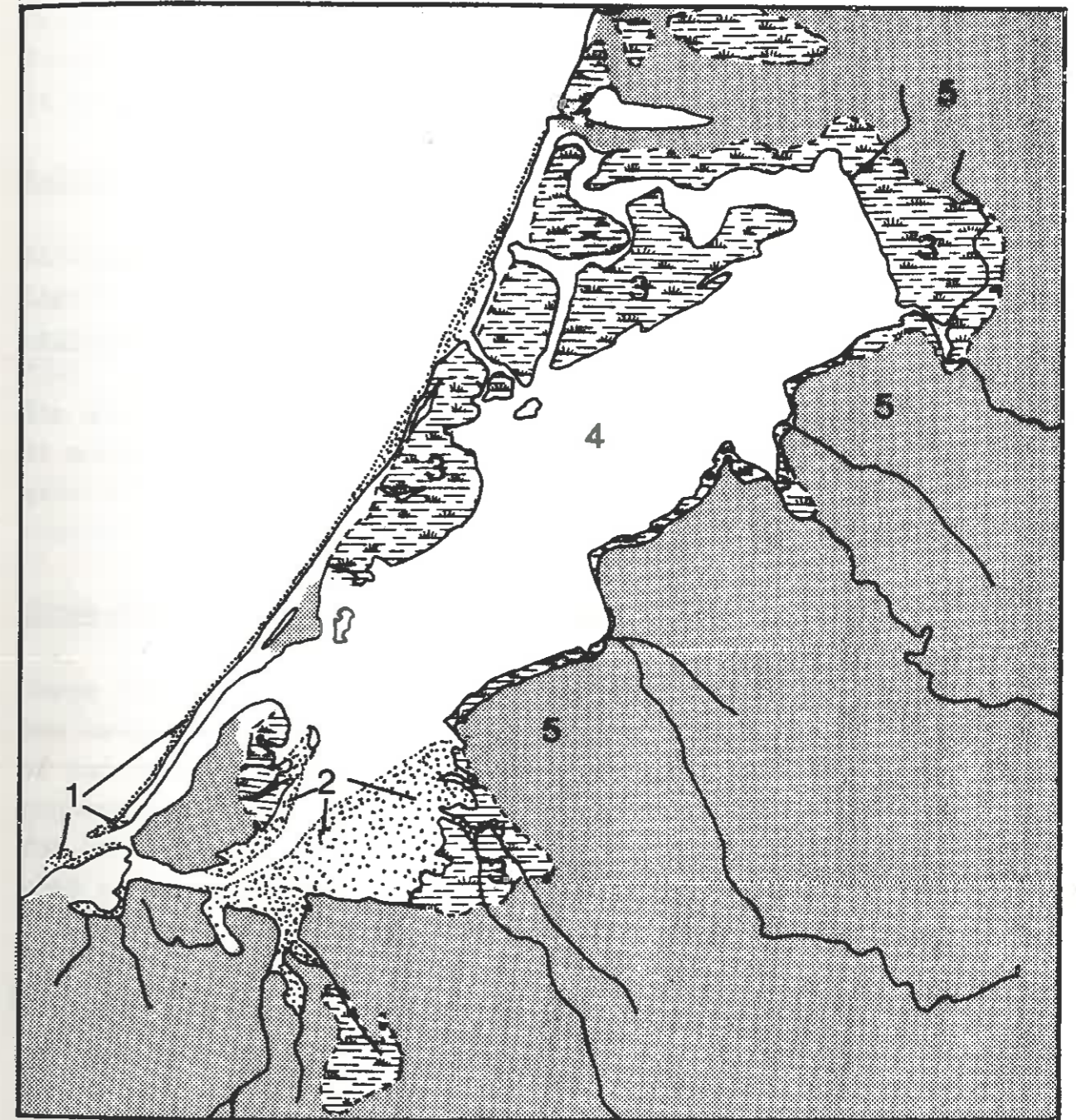


Figure 2: Okarito Lagoon showing the variety of habitat types present

- 1 Sand-spits
- 2 Mud-flats exposed at low tide
- 3 Swamp vegetation
- 4 Open water
- 5 Forest

(Scale 1:63,360)

Careful consideration should be given to the effects of future logging to ensure that present rate of sedimentation is not altered to the detriment of the ecosystem.

#### Saltwater Lagoon

Although smaller, this area is very similar to Okarito Lagoon as a wildlife habitat. A substantial edge of Leptocarpus similis makes it an attractive area for waterfowl. There are also extensive weed beds as a food source. The mudflats at low tide are not as large as those of Okarito. It supports a similar list of species, but numbers are generally lower than at Okarito. Brown teal have been observed here within the last 20 years.

#### Three-Mile Lagoon and Five Mile Lagoon

These two lagoons are considerably smaller than the previous two examples and the vegetation is in a more advanced state of succession. Both have similar birdlife. The preponderance of swamp in both areas also makes them valuable for bitterns, crakes and fernbirds. Five-mile Lagoon is used as a moulting area for approximately 150 paradise shelduck. Gold dredging poses some threat to these areas.

#### Waiatoto Lagoon

This area is notable for the presence of grey teal and marsh crake. It also has grey duck, shags and breeding colonies of black-billed gull, red-billed gull and white-fronted tern.

#### Cook River Mouth and Flats

The mapped boundaries of this habitat were extended inland to include a large area of the shingle river flats as many of the species recorded here seem to make use of both the river mouth and these flats. A wide diversity of birdlife is supported by this habitat.

Black-backed gull, white-fronted tern, South Island pied oystercatcher, and black-billed gull all have breeding colonies on or close to the sand-spit at the river mouth. Further back on the river flats are breeding grounds of pied stilt, banded dotterel and spur-winged plover. Several broods of paradise shelduck were observed. Other species recorded from the area included mallard, grey duck, little shag, black shag, spotted shag, kingfisher, harrier, white-faced heron and variable oystercatcher. Bitterns and marsh crakes have been reported from a small swamp beside the Bullock Creek tributary.

#### Karangarua River Mouth

The important features of this habitat are the southern sand-spit and the small adjacent lagoon. It is a breeding area for white-fronted tern, black-billed gull, black-backed gull, and Caspian tern. Variable and pied oystercatchers, several species of waterfowl, white-faced heron, black-fronted tern, shags, and fernbird were recorded. One of the most important paradise shelduck moulting grounds in South Westland is on the flats adjacent to this river mouth. Over 200 birds use it every year.

#### Hapuka/Okuru/Turnbull Estuary

A valuable estuary with large areas of mudflats exposed at low tide. A high density of crustaceans and molluscs gives this area the potential to feed good numbers of waders, sea

birds and some waterfowl. Pied oystercatcher, white-fronted tern and black-billed gull were reported to be breeding on the sand-spit. This is one of the best estuarine areas in the southern part of the study area.

#### Haast River Mouth

This habitat combines some swampland and a large estuary with sand-spits and a stretch of coastline. As with the above two habitats it is important as a breeding area for white-fronted tern and black-backed gull. Black-billed gull, banded dotterel, bar-tailed godwit, oystercatchers, shags, white-faced heron, white heron and grey duck were all recorded in the area. Bittern and fernbird were observed in the swamp. A rubbish dump at the south end detracts from the scenic quality of the area and is a source of pollution.

#### 4. Coastline

The coastline of the study area measures approx. 320 km. A total of 58 km are considered valuable for wildlife. The majority of the habitats were recorded primarily for the conservation of two important species; the Fiordland crested penguin and the New Zealand fur seal (Arctocephalus forsteri).

Fur seals use various locations on the South Island's West Coast as hauling grounds and rookeries. More commonly they are found around Fiordland and on subantarctic islands such as The Snares, Campbell and Auckland Islands. Apart from isolated ones at Cape Foulwind and Wekura Point (Cape Farewell), the northern most seal rookeries are at the Open Bay Islands (which supports approximately 3000 seals) and Big Green Island near Cascade Point. Both were recorded as habitats of national importance.

The remainder of the sites where seals were recorded are hauling grounds used by non-breeding seals. Altogether, there are approximately 20 known hauling grounds in the South Island and 10 in the North Island. In the study area they are distributed along the entire coast, but with a greater concentration in the south. The major sites are at Greens Beach, Galway Beach, Hanata Island, Murphy Beach, Iota Bluff - Barn Bay coastline, Browne Island and Arnott Point. (Greens Beach does not appear as a habitat on the map as its significance was not known to us until recently). Unfortunately several of these sites are so readily accessible to the public that the seals have become subject to some disturbance. The construction of viewing platforms could alleviate this problem.

The Fiordland crested penguin is endemic to the New Zealand biographical region, and the total population is thought to be around 6000. The breeding distribution of

this species is limited to the area of the West Coast south of Knights Point, Solander Island and the west coast of Stewart Island. It comes ashore to breed in June/July, preferring to rest in caves or deep cavities under rocks or tree roots. Colonies are usually located along rocky coastlines where there is sufficient coastal forest for protection.

Breeding colonies were recorded at Titira Head, Abbey Rocks, Monroe Beach, Murphy Beach, Open Bay Island, Jacksons Head, and between Jacksons Head and Cascade Point, Cascade Bay and Barn Bay, and Gorge Island and Longridge Point. The Jacksons Head penguin colony is the most important one on the West Coast. It contains 100-150 breeding pairs distributed through the coastal forest areas of the headland. This is the only colony of this species readily accessible for scientific investigation. Its proximity to a small settlement, however, poses a real danger to its continued welfare. For example, local dogs destroyed 130 birds in 1974. Further human development on the headland or mining activities could be detrimental.

Jacksons Head is also a breeding ground for some species of petrels and possibly prions.

Another noteworthy species found in a few coastal areas of South Westland is the sooty shearwater. Although common in the New Zealand region, there are only a few breeding sites of this species left on the mainland. The most important one in the study area lies between Iota Bluff and Barn Bay, where 69 occupied burrows were recorded.

The fairy prion is the commonest breeding prion around New Zealand and usually nests on off-shore islands between the Poor Knights and the Snares. However, the Open Bay Islands is one of the few confirmed breeding sites off the West Coast of the South Island.

Nesting colonies of the southern race of the little blue penguin were recorded at Titira Head, Barn Bay and Open Bay Islands. This bird's breeding range extends from the Otago Peninsula, around the southern end of the island and along the greater part of the West Coast. It is the commonest penguin around New Zealand's coast. The three recorded colonies in South Westland are shared, to some extent, with the Fiordland crested penguin. The Barn Bay breeding colony appeared to hold the greatest density of blue penguins.

Other species commonly recorded from coastal habitats include Caspian tern, black-billed gull, black-backed gull, red-billed gull, variable and South Island pied oystercatchers, white-fronted tern, fairy prion, reef heron, little shag, and spotted shag.

Open Bay Islands, situated 4 km off the Okuru River mouth is one of the most significant coastal habitats in the South Westland region. They are used by a great number of species: fur seal (c 3000), Fiordland crested penguin (c 30), little blue penguin, spotted shag (c 60). Fernbird and possibly fairy prion and sooty shearwater breed there. Other species recorded include western weka, variable oystercatcher, little shag, reef heron, kingfisher, gannet, white-fronted tern, black-backed gull and red-billed gull.

##### 5. Indigenous forests

Forests are the dominant feature of South Westland's landscape.

Together with the forests of Fiordland, North Westland and Nelson they form the largest continuous area of indigenous forest left in New Zealand (Imboden and Crook, 1977). These forests represent the country's original natural heritage.

Within this West Coast forest belt, the forests of South Westland are of particular significance. They contain the highest proportion of lowland forest (particularly the podocarp dominant terrace and swamp forests) left anywhere in New Zealand. Lowland forests are of special importance for wildlife conservation: they have been more heavily modified and reduced by man than high altitude forests and generally harbour a richer bird life than the mountainous protection forests.

The importance of large, unmodified and diverse forests for the long-term conservation of native wildlife communities cannot be overestimated. The majority of New Zealand land birds are partly or entirely forest dwellers and while some are sufficiently adaptable to use modified or man-made habitats, many will always depend on the availability of this original habitat type. The West Coast forests, particularly the lowland stands of South Westland, are of national significance. They play the role of a large reservoir for native forest bird communities where the individual species can maintain their crucial genetic diversity by having access to a great number of different forest types, at different altitudes and in different topographical situations.

Cascade River (Potential)

This includes the Martyr, Hope and Gorge Rivers. None of these catchments have been surveyed or inspected, but are known to contain resident brown trout populations and attract unknown numbers of anadromous brown trout. All these catchments are largely inaccessible and would receive minimal angling pressure from seasonal whitebait fishermen and shooters.

I. SUMMARY AND RECOMMENDATIONS

1. Together with the forests of Fiordland, North Westland and Nelson, the forests of South Westland form the last, large and continuous area of indigenous forest left in New Zealand.
2. These forests are still relatively intact and thus present a complete sequence of habitats from the mountain tops to the sea. Such a sequence is not found to the same extent elsewhere in New Zealand.
3. Extensive areas of predominantly podocarp forest are present over the lowland and terrace country. This is a most valuable habitat type and generally harbours a greater species diversity and abundance of birds. It is also important as a winter habitat for birds which spend the warmer months in the hill country. Podocarp forest has been severely depleted over much of New Zealand.
4. Wetlands are also a dominant feature of the South Westland landscape. They are highly productive ecosystems and support a wide variety of species. Since they are very sensitive areas, most alternative uses would be incompatible with their value as wildlife habitats.
5. Both the forests and wetlands of this region contain species which are sensitive to modification of their habitats. Such species have declined in many other parts of New Zealand and they now have limited distributions. Conservation of their habitats in South Westland is the efore of prime importance to enhance the survival of these species.

6. The juxtaposition of wetlands and forest and the successions of habitats from wetlands through forests on poorly drained sites, terraces and hill and montane lands form a unique and diverse mosaic. Most of the plants and animals that form these communities are found nowhere else in the world. Together they are part of a diverse and irreplaceable reservoir of continually evolving genetic material which is important for long term wildlife conservation. New Zealand has a responsibility on both national and international levels to ensure the survival of the unique bird and plant communities of South Westland.

#### RECOMMENDATIONS

1. All wildlife "habitats of note" with outstanding or high value, not already protected, be provided with an appropriate designation.
2. Logging of remaining lowland podocarp forest be kept to an absolute minimum.
3. As a general concept, sufficient areas of South Westland forest be retained for the conservation of wildlife and that these areas should comply with the biological principles necessary for maintaining viable wildlife communities. It is particularly important that they contain a full sequence from high to low altitude and that they fully provide for the movements and dispersal of birds (for example with season or altitude) (Imboden and Crook, 1977).
4. Where indigenous timber is to be extracted, only selective logging techniques which do not significantly alter the canopy and understory be used; also, that such extraction be done in accordance with the 'Forest Operations Guidelines' (Water and Soil Management Publication No. 5).

5. There should be at least four such altitudinal sequences as described in 3., distributed evenly down the length of the region. Ideally these should include Saltwater, Waikukupa, Mataketake and Cascade State Forests.
6. All forests south of and including Cascade State Forest be preserved in perpetuity. The Wildlife Service is opposed to any further roading or encroachment into this area.
7. Having regard to the brown kiwi population, no logging should take place in that area of Okarito State Forest south of the road between The Forks and the coast.
8. Where selective logging takes place within the vicinity of wetlands, buffer strips of sufficient width should be left (generally at least 100 metres of tall forest).
9. The Wildlife Service carry out a study to investigate the effects on wildlife of selective logging in the terrace podocarp and hill country podocarp/hardwood forest.
10. Any shingle removal or beach dredging operations likely to effect gull or tern breeding colonies be restricted to a period outside the breeding season of these birds and that all areas concerned be restored to as near as possible their original state after the cessation of operations.



<u>Habitat name</u>	<u>Grid ref.</u>	<u>Size(ha)</u>	<u>Value</u>	<u>Habitat description</u>
b) <u>Modified or Induced Pakihi</u>				
The Forks pakihi	3858 5902	100	1	Pakihi → manuka → mixed podocarp. Burnt.
Lake Kini pakihi	3340 5450	1100	3	Small lake with pakihi → kahikatea. Grazed.
Jacobs River pakihi	3375 5495	50	2	Pakihi → rimu. Burnt
Tui Creek pakihi	3385 5485	60	2	Pakihi → kahikatea, rimu. Burnt.
Ruera Creek pakihi	3365 5482	120	2	Pakihi → kahikatea, rimu. Burnt.
Bruce Bay pakihi	3300 5455	85	2	Pakihi → low rimu. Burnt.
Papakari Creek pakihi	3359 5485	200	3	Pakihi → flax, manuka. Small creek.
Collyer Creek East pakihi	2745 5070	240	1	Pakihi, manuka, Phyllocladus, podocarp mosaic. Burnt.
Collyer Creek West pakihi	2760 5045	420	1	Induced by logging
Waiatoto S.F. pakihi	2680 5000	3700	3	Pakihi, flax, scrub mixed with podocarp. Logged.

<u>Habitat name</u>	<u>Grid ref.</u>	<u>Size(ha)</u>	<u>Value</u>	<u>Habitat description</u>
c) <u>Coastal Swamps</u>				
Te Rahotaiepa River mouth	4215 6227	580	2	Flax → Kahikatea. Sluggishly flowing stream.
Waiho Beach swamp	3709 5838	50	2	Cabbage tree, gorse, rushes, other low swamp vegetation.
Waikukupa/Omoeroa swamp	3690 5800	350	3	Carex, rushes, flax → Kahikatea, rimu. Open water.
Waikowhai Stream	3517 5706	110	3	Leptocarpus → flax → manuka → rimu. Open water.
Ohinetamatea River mouth	3467 5644	80	2	Rushes, flax → kowhai → kahikatea, rimu. Open water.
Waita Beach dune swamp	2885 5204	50	2	Rushes → mixed podocarp. Narrow strip of open water.
Barn Bay dune swamp	2225 4850	140	3	Rushes, flax → rimu, kamahi. Open water.
<u>Inland Swamps</u>				
Wanganui River flat	4100 6155	320	2	Flax swamp → kahikatea.
Pye Creek swamp	4065 6135	70	2	Flax swamp with open water.
One One River	4065 6150	810	3	Rushes, flax swamp → kahikatea.
White Heron Lagoon	4053 5980	405	3	Flax swamp with open water.
Waitangirototo swamp	3963 6003	80	1	Raupo swamp with open water
Saltwater S.F. swamp	3990 6045	160	3	Flax, rushes, Coprosma spp., open water.
Mumu Creek swamp	3925 6048	890	3	Raupo swamp with kahikatea fringe. Open water.
Clearwater Lagoon	3690 5663	2	2	Rushes, flax, small lagoon.
Ohinetamatea swamp	3526 5570	1500	3	Flax, sedges, rushes, shrubs, → kahikatea. Open water.

### 3. Lagoons and River Mouths

<u>Habitat name</u>	<u>Grid ref.</u>	<u>Size(ha)</u>	<u>Value</u>	<u>Habitat description</u>
Waitaha River mouth	4250 6255	80	2	Sandpits and backwaters.
Wanganui River mouth	4045 6162	160	2	Sandy beach.
Saltwater Lagoon	3980 6085	850	4	<u>Leptocarpus</u> podocarp surround.
Okarito Lagoon	3860 5970	3240	4	Reeds/flax podocarp surround.
Three-mile Lagoon	3785 5905	110	3	Leptocarpus/manuka surround.
Five-mile Lagoon	3750 5869	80	3	Flax, scrub podocarp surround.
Waiho River mouth	3717 5854	20	1	Shingle beach and river flats.
Cook River flats	3560 5640	2400	3	Shingle river flats and swamp.
Karangarua River mouth	3445 5599	165	3	Sandpits and lagoon.
Mahitahi River mouth	3303 5440	160	1	Sandpits and lagoon.
Waita River mouth and lagoon	2898 5225	85	3	Flax, kowhai, totara surround.
Haast River mouth	2835 5155	320	3	Scrub, shingle flats.
Hapuka/Okura/Turnbull estuary	2725 5085	132	3	Mudflats
Waiototo Lagoon and river mouth	2630 4990	210	3	Flax, kowhai, podocarp/hardwood surround.
Arawhata River mouth	2520 4960	88	2	Sandpit, shingle flats.

### 4. Coastline

<u>Habitat name</u>	<u>Grid ref.</u>	<u>Size(ha)</u>	<u>Value</u>	<u>Habitat description</u>
Galway Beach	3563 5718	40	3	Rocky coast.
Hanata Island	3195 5441	1	3	Rocky islet.
Tititira Head	3170 5428	20	4	Coastal bush, rock headland.
Abbey Rocks	3092 5372	5	3	Coastal bush and shoreline.
Monroe Beach	3030 5340	3	3	Coastal bush and shoreline.
Murphy Beach	3004 5323	20	4	Coastal bush and shoreline.
Arnett Point	2982 5312	2	3	Coastal bush and shoreline.
Open Bay Islands	2700 5131	17	4	Rocky coast.
Jacksons Head	2470 4999	130	4	Coastal bush.
Cascade-Jacksons coastline (incl. Big Green Island)	2403 4960	320	4	Podocarp/beechn/hardwood.
Iota - Barn Bay bluffs	2248 4907	90	3	Rocky coast, coastal bush.
Iota Bluff	2241 4903	5	3	Podocarp/hardwood.
Barn Bay	2219 4585	20	3	Podocarp.
Barn Bay - Cascade coast	2295 4925	20	3	Sand dunes with coastal vegetation.
Browne Island	2157 4770	0.2	3	Coastal forest.
Gorge - Longridge coast	2100 4709	50	3	Rocky islet.
Big Bay sand dune	2040 4550	150	3	Coastal bush, rocky coast. Dunes, wetland, podocarp/hardwood.