Waiau River Aquatic Birds
December 1995 and March 1996

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prepared for the Waiau River Working Party
of the Southland Regional Council

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EXECUTIVE SUMMARY

The aquatic birds of the lower Waiau River were surveyed in December 1995 and March 1996 in order to compare bird numbers with records from baseline surveys carried out in November 1993 and March 1994. Of particular concern was the reduction in Black-billed Gull numbers from 4365 breeding pairs in November 1993 to 316 breeding pairs in December 1995, and the reduction of Black-fronted Tern numbers from 39 in November 1993 to 13 in December 1995. The possible causes for reduction in birds recorded are discussed as a difference in breeding timing and high flows which may have reduced the available breeding habitat or destroyed nesting attempts. A recommendation is made for future work to determine the potential for an impact of hydro-electric power induced freshes on the nesting of these two species in particular.

INTRODUCTION

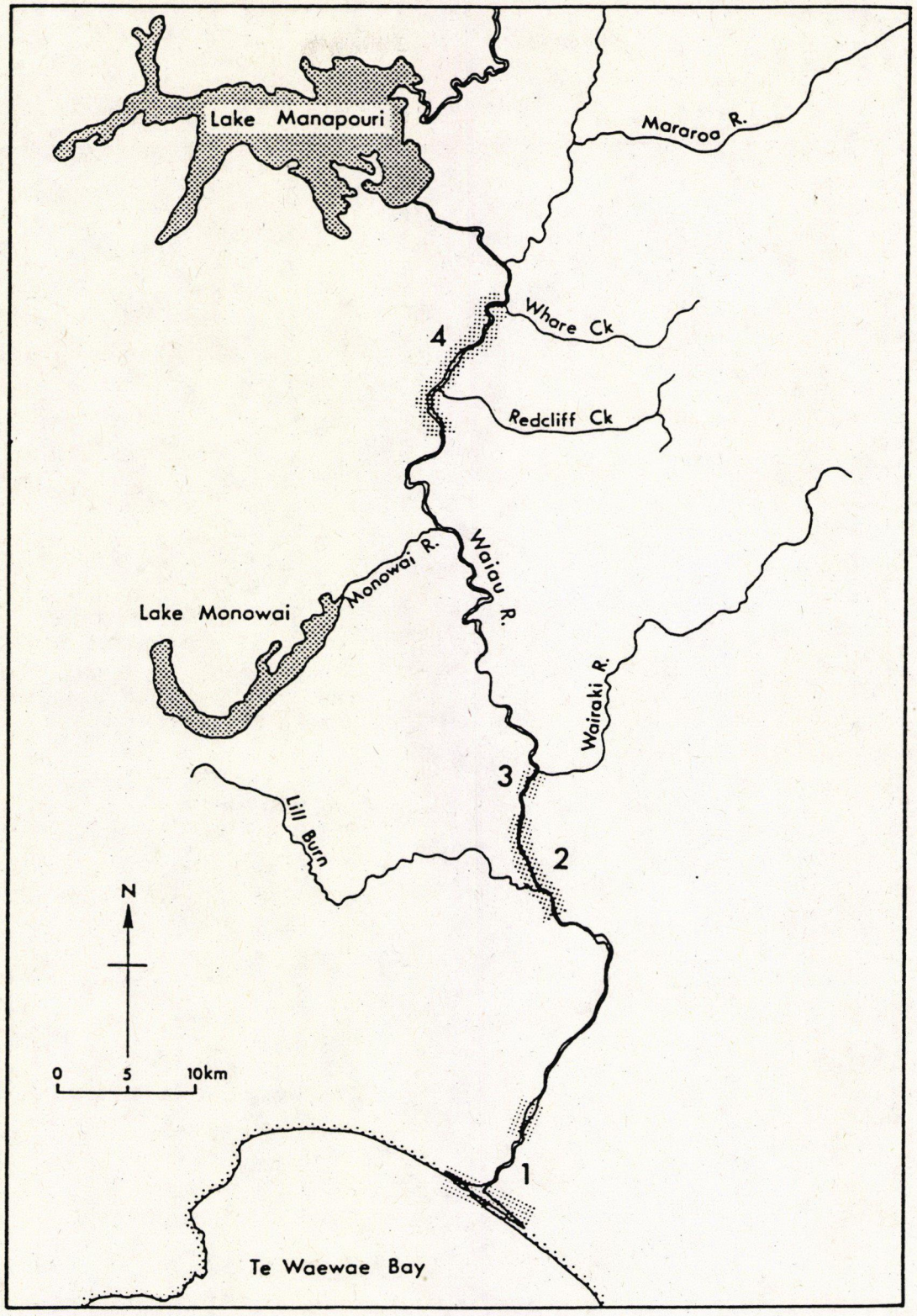
This survey was a follow-up from that undertaken by Paul Sagar during the November 1993 breeding season and March 1994 post-breeding season (Sagar 1994). The purpose of that study was to determine the aquatic bird populations of the Waiau River between the Mararoa weir and the sea. The purpose of this follow-up survey was to commence the collection of data which could be compared with Sagar's baseline survey, with a view to incorporating any results in a long-term monitoring plan.

The reaches used in this survey were similar to that of Sagar 1994 (see Figure 1), with the only difference being that the Lagoon and Lower River Reach was separated into two reaches and the Clifden and Wairaki Reaches were combined as one reach with the entire length of the river from the Wairaki River to the Clifden bridge being surveyed (approximately an extra 0.5 km) (see Figure 2).

METHODS

In order to obtain comparable date, the methodology used in this survey was the same at that used by Sagar 1994. This consisted of observers walking downstream and counting the aquatic birds they passed. As in the 1993/94 survey, observers were spaced 100-200 m apart in areas where the riverbed was broad, and where possible channels were crossed in order to survey mid-channel islands. Also, this survey used similar precautions as those given in Sagar 1994 to ensure that birds were not counted more than once and that only birds using the river or floodplain were counted. As in Sagar 1994, the bird totals given in Table 1 should be considered as indices of relative abundance rather than absolute counts.

Due to high river levels, the breeding survey was delayed until December 1995 in the hope that the river level would decrease. River levels did not decrease by mid-December, and the survey commenced as any further delays would have made the survey fall outside the main breeding time.



Location of reaches in the Waiau River surveyed for birds. 1. Lagoon and lower river reach; 2. Clifden section; 3. Wairaki section; 4. Redcliffreach.

Figure 1. River Reaches used in Sagar 1994 (from Sagar, 1994).

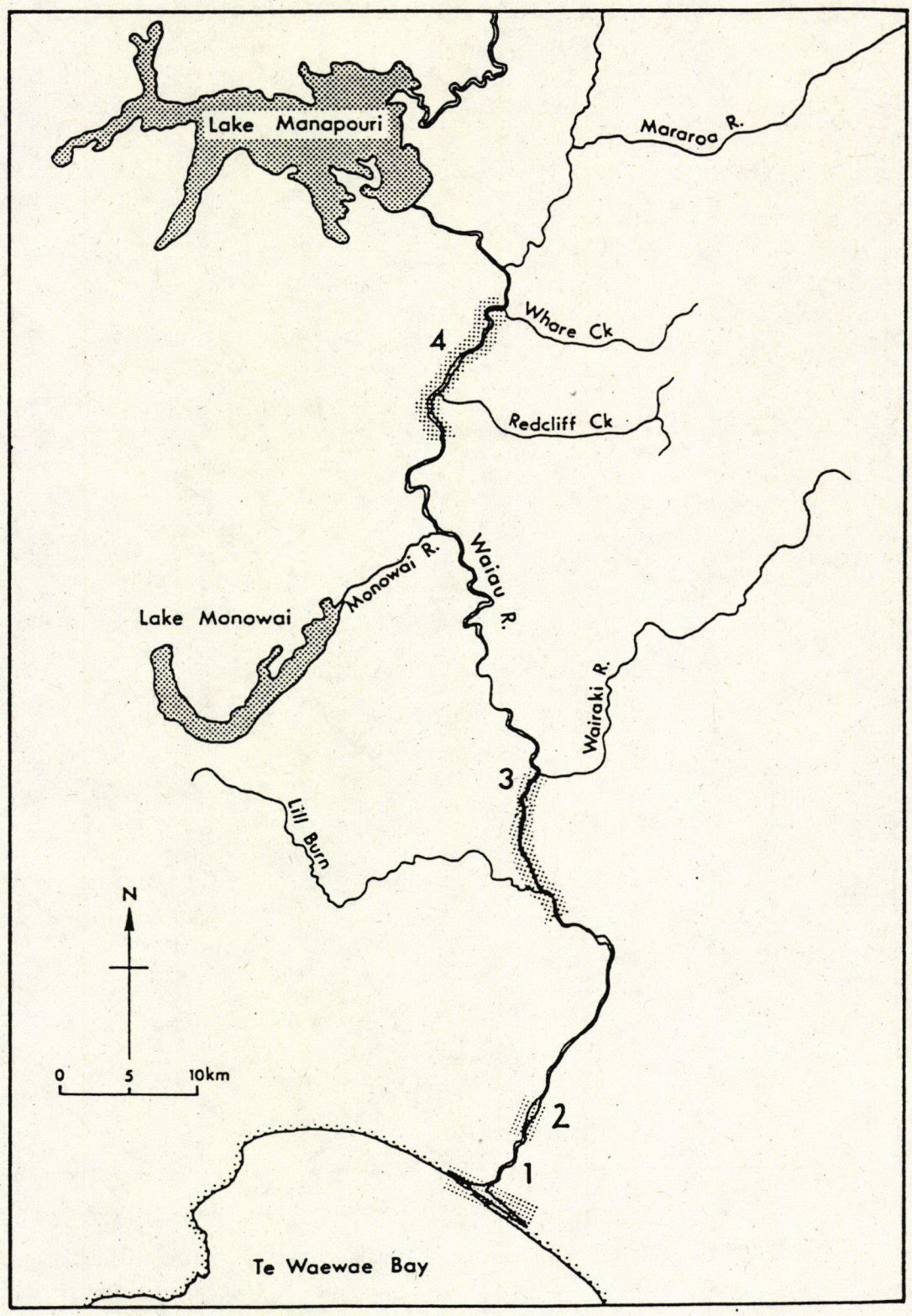


Figure 2. River Reaches Surveyed in December 1995 and March 1996. 1) Lagoon Reach; 2) Lower River Reach; 3) Clifden/Wairaki Reach; 4) Redcliffs Reach

The Redcliff and the Wairaki/Clifden Reaches were surveyed concurrently on 11 December 1995 and the Lagoon Reach was surveyed on 15 (eastern spit) and 18 (western spit) December 1995. The Lagoon Reach was split into two due to the extremely fast velocity of water at the Waiau mouth and equipment failure on 15 December. The Lower River Reach (2 km of river immediately upstream of the Lagoon Reach) was only surveyed from accessible areas on the east bank due to high river levels (400+ cumecs) which covered the mid-channel islands and made the River impassable.

The post-breeding survey took place on 17 March 1996, when the Lagoon and Lower River Reaches were surveyed, and on 21 March 1996, when the Redcliffs and Wairaki/Clifden Reaches were surveyed.

RESULTS

TABLE 1. Numbers of aquatic birds recorded on three reaches of the Waiau River, 11; 15; and 18 December 1995 and 17 and 21 March 1996.

Species	Lagoon			Lower River		Clifden/Wairaki		Redcliffs	
	East 15.12.95	West 18.12.95	17.3.96	18.12.95	17.3.96	11.12.95	21.3.96	11.12.95	21.3.96
Black Shag	1	1	3	-	-	7	5	8	7
Pied Shag	5	2	1	-	-	-	-	-	-
Little Shag	2	-	4	-	1	-	-	-	-
Spotted Shag	451	3	700+	-	-	-	-	-	-
White-faced Heron	3	1	-	-	-	-	-	-	2
Black Swan	2 (+2 cygnets)	-	-	-	-	-	-	-	-
Canada Goose	-	-	-	-	-	-	1	-	-
Feral Goose	-	-	-	-	4	-	-	-	3
Paradise Shelduck	4 (+3 juv)	-	3	-	3	170 (+44 juv)	19	28 (+38 juv)	28
Mallard	74	5	333	-	11	10	480	-	89
Grey Duck	-	-	-	-	-	-	-	1	5
Scaup	-	-	-	-	-	-	-	4	-
Pied Oystercatcher	11	6	-	-	-	22	-	11	-
Variable Oystercatcher	-	-	7		-		-		-
Pied Stilt	-	-	-	-	-	6	-	2	-
Banded Dotterel	-	-	-	-	-	13	-	-	-
Black-fronted Dotterel	-	-	-	-	2	-	-	-	-
Spur-winged Plover	18	-	70	-	130	76	12	7	5
Black-backed Gull	206	18	221	82	2	52	10	14	3
Red-billed Gull	19	-	34	-	3	-	-	-	-
Black-billed Gull	3	500+	-	-	17	130	-	-	-
Black-fronted Tern	-	-	1	-	2	13	-	-	-
Caspian Tern	1	1	-	-	-	-	-	-	-
White-fronted Tern	6	3	154	-	-	-	-	-	-

Following is a list of the aquatic birds recorded during these surveys, including information about their distribution and numbers on the river. Information about habitat and food requirements and breeding seasons for all of the above species, except the Pied Shag, Domestic Goose, and Black-fronted Dotterel are included in Sagar 1994 (Pied Shags, Domestic Geese, and Black-fronted Dotterels were not recorded during the 1993/94 survey).

A comparison of the numbers of birds recorded for each survey is included in Appendix A.

Black Shag *Phalacrocorax carbo*

Occurred in all reaches except the Lower River Reach, but not in any large numbers. Majority of recordings were of single birds. Feeding groups not recorded. Sagar 1994 recorded Black Shags in all reaches, although noted that they were not abundant.

Pied Shag *Phalacrocorax varius*

Found on both the eastern and western sides of Te Waewae Lagoon, although not abundant. This species was not recorded in Sagar 1994.

Although not a common species in Southland, there is a Pied Shag rookery at a wetland near Roundhill. Primarily an estuarine species, although they can be found on inland lakes and rivers.

Little Shag *Phalacrocorax melanoleucos*

Recorded on the eastern side of Te Waewae Lagoon in both surveys and in the Lower River Reach in the March 1996 survey, in very low numbers. Sagar 1994 found Little Shags distributed throughout the areas surveyed.

Spotted Shag *Stictocarbo punctatus*

A large roost was present on the inland edge of the eastern spit near the Waiau mouth. This roost was basically in the same position as that recorded by Sagar 1994 and was larger during each of these comparative survey periods (see Appendix A).

White-faced Heron *Ardea novaehollandiae*

White-faced Herons were only found in the Lagoon Reach during December 1995 and only in the Redcliffs Reach in March 1996. In comparison, the November 1993 survey recorded this heron in all reaches, and the March 1994 survey recorded one heron in the Lagoon Reach and one in the Redcliffs Reach.

Black Swan *Cygnus atratus*

Sagar 1994 only recorded these swans during the March 1994 survey, when they were recorded in the Lagoon Reach. The December 1995 survey found a breeding pair, with cygnets, near the easternmost end of the Lagoon. As the cygnets were not fully fledged (by size estimation approximately 4 months old), it is safe to assume that the pair nested near the Lagoon.

Canada Goose *Branta candensis*

One solitary bird was recorded on a backwater of the Wairaki Reach during the March 1996 survey. Large numbers (600+) were present around the Redcliffs Reserve and Jericho Farm, however these were not included with the survey records as they were on pasture areas not visible from the Waiau River.

Domestic Goose *Anser "domesticus"*

Not recorded by Sagar 1994. Recorded in both the Redcliffs and Lower River Reaches in March 1996.

This large, predominantly white goose is common on farms. Individuals or groups frequently move between pasture land and wetland/riverine areas.

Paradise Shelduck *Tadorna variegata*

Both the November 1993 and the December 1995 survey found mainly breeding pairs with ducklings. By the March 1996 survey all the ducklings had fledged, although some family groups were still evident. Paradise Shelduck observations in March 1996 were similar to those for Canada Goose in that there were large numbers not included as they were on pasture areas not visible from the Waiau River.

Mallard *Anas platyrhynchos*

No ducklings or family groups of Mallards were recorded in either the December 1995 or March 1996 surveys. For the most part, these ducks were loafing and feeding in the quieter waters.

Grey Duck *Anas superciliosa*

As noted in Sagar 1994, Mallards and Grey Ducks interbreed making species identification difficult. However, this survey has separated the two species because a definite identification of a solitary Grey Duck was made in the Redcliffs Reach.

Scaup *Aythya novaeseelandiae*

The four birds recorded in December 1995 were two pair found in a deep, slow water area of the main river channel, however no ducklings were seen.

Pied Oystercatcher *Haematopus ostralegus*

During the December 1995 survey, most birds were in pairs, some of which appeared by their behaviour to be breeding, although this was not confirmed.

Pied Stilt *Himantopus himantopus*

Only recorded in the Clifden/Wairaki and Redcliffs Reaches during the December 1995 survey, usually associated with alluvial gravel bars.

Banded Dotterel *Charadrius bicinctus*

Banded Dotterels were only recorded during the December 1995 survey and all were found in the Clifden/Wairaki Reach. This is directly comparable to Sagar 1994 which also only recorded Banded Dotterels in November 1993 and only in this Reach.

Black-fronted Dotterel *Charadrius melanops*

Not recorded by Sagar 1994. Two birds were recorded in the Lower River Reach in March 1996.

A self-introduced species from Australia which was first recorded in New Zealand in 1954. While it is mainly found in the southern half of the North Island, small numbers have been recorded in Marlborough, Canterbury, Otago, and Southland (Robertson, 1985). This species generally bases its territory around fine sediment backwaters and is very susceptible to fluctuations in river flows.

Spur-winged Plover *Vanellus miles*

Recorded in the Redcliffs, Clifden/Wairaki and Lagoon Reaches in December 1995, with the majority being found in the Clifden/Wairaki Reach. The March 1996 survey recorded Spur-winged Plovers in all the Reaches.

Southern Black-backed Gull *Larus dominicanus*

Most of these were recorded in the Lagoon and Lower River Reaches in the December 1995 survey with a breeding colony of approximately 206 birds being found on the eastern spit (103 nests).

Red-billed Gull *Larus novaehollandiae*

Recorded in the Lagoon Reach in December 1995 and in both the Lagoon and Lower River Reaches in March 1996.

Black-billed Gull *Larus bulleri*

In the December 1995 survey, Black-billed Gulls were only recorded in the Lagoon and the Clifden/Wairaki Reaches, and only in the Lagoon Reach was there evidence of a breeding colony. In comparison, the Black-billed Gull was the most common bird recorded in all reaches in November 1993, with breeding colonies present in all reaches as well.

Black-fronted Tern *Sterna albostriata*

Only recorded in the Clifden/Wairaki Reach in the December 1995 survey. While two breeding colonies were found in November 1993, only the possibility of a small breeding colony (on an inaccessible island opposite the Lillburn River mouth) was found in this survey.

Caspian Tern *Sterna caspia*

Only recorded in the Lagoon Reach in the December 1995 survey. None were recorded in the November 1993 survey, although Caspian Terns were recorded in the Clifden/Wairaki Reach in March 1994.

White-fronted Tern *Sterna striata*

Only recorded in the Lagoon Reach in both the December 1995 and March 1996 surveys. While White-fronted Terns were also only recorded in the Lagoon Reach during both the November 1993 and March 1994 surveys, the breeding season survey (November 1993) recorded a large breeding colony. In the December 1995 breeding season survey, no birds were associated with breeding colonies.

DISCUSSION

Breeding Season Surveys - November 1993 and December 1995

Overall bird numbers recorded in December 1995 were well down from the survey carried out in November 1993 (Sagar 1994). This survey was carried out 2 to 3 weeks later in the breeding season than the November 1993 survey (late November versus early to mid December), and this timing could mean that the peak of breeding was missed and that some birds had left the area.

Another possible factor for the decrease in the bird numbers is the high river flows from around August 1995 through December 1995. As noted above, the Lower River Reach which was walked during the November 1993 survey was inaccessible due to high river flows during the December 1995 survey. Higher river flows result in a reduction in available suitable breeding habitat. For example, on the Clifden/Wairaki Reach survey participant Roger Sutton noted that "Banded dotterel breeding habitat was minimal throughout. Two suitable areas both held some dotterel."

Species of particular importance are Black-billed Gulls and Black-fronted Terns. Sagar 1994 noted that the Black-billed Gull population on the Waiau (4365 pairs) "may represent a minimum of 5.8% of the Southland population". With regard to Black-fronted Terns, Sagar 1994 noted that although less than 40 birds were recorded, this represented "1.3-3.9% of the entire population of Black-fronted Terns, a significant proportion". Since both of these species were mainly only recorded in November 1993, the reduction in numbers found in the December 1995 survey (Black-billed Gulls - 316 breeding pairs; Black-fronted Terns - 13 birds) is worth noting, and potentially of concern.

It should be remembered that, population counts for these two species in particular can exhibit wide variations due to seasonal or environmental conditions which may affect the timing of breeding.

In terms of impact of flows on nesting birds, all the December 1995 survey can do is note the reduction in available habitat and a corresponding reduction in the numbers of nesting birds, particularly when compared with the November 1993 survey. What it cannot ascertain is whether or not high flows during August - December may have destroyed breeding attempts. This is especially relevant in the Redcliff, Clifden/Wairaki, and Lower River Reaches with regard to Black-billed Gulls and Black-fronted Terns as they usually nest in lower areas which are more prone to flooding during a fresh. As noted in Sagar 1994, "HEP induced freshes during the breeding season of these species may adversely affect breeding success".

Post-Breeding Season - March 1994 and March 1996

The numbers of birds recorded during the post-breeding seasons varied widely between the two surveys. This variation is not unexpected in that several climatic (e.g. wind, rain, sun, etc.) and environmental (e.g. river flows, food availability, etc.) factors play a dominant role in where birds locate for roosting and feeding during the post-breeding season.

Once more post-breeding surveys have been completed, a trend analysis of birds which frequent and use the Waiau River during this time will be able to be developed. This type of trend analysis is vital for determining habitat usage during the post-breeding season and cannot be developed from the 'snapshot' data held to date.

RECOMMENDATIONS

1. That Black-billed Gulls and Black-fronted Terns, in particular, be surveyed in August, September and October in order to determine nesting sites and possible impacts of any hydro-electric power induced freshes during this time.

2. That breeding, post-breeding and winter habitat use surveys be carried out and reported as comparisons of similar surveys (e.g. breeding, post-breeding, etc.) in order to progress trend analyses.

ACKNOWLEDGEMENTS

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Appendix A

Survey Comparisons

Species	Lagoon and Lower River Breeding Season		Lagoon and Lower River Post-Breeding Season	
	22.11.93	15.12.95	07.03.94	17.3.96
Black Shag	7	2	9	3
Pied Shag	-	7	-	1
Little Shag	9	2	3	5
Spotted Shag	330	454	650	700+
White-faced Heron	5	4	1	-
Black Swan	-	2 (+2 cygnets)	6	-
Canada Goose	-	-	-	-
Feral Goose	-	-	-	4
Paradise Shelduck	1	4 (+3 juv)	-	6
Mallard/Grey Duck	71	79	167	344
Grey Duck	-	-	-	-
Grey Teal	2	-	4	-
Shoveler	4	-	4	-
Scaup	-	-	1	-
Pukeko	1	-	2	-
Pied Oystercatcher	8	17	-	-
Variable Oystercatcher	1	-	-	7
Pied Stilt	1	-	-	-
Banded Dotterel	18	-	-	-
Black-fronted Dotterel	-	-	-	2
Spur-winged Plover	147	18	-	200
Bar-tailed Godwit	12	-	-	-
Black-backed Gull	606	306	22	223
Red-billed Gull	-	19	8	37
Black-billed Gull	4754	500+	-	17
Black-fronted Tern	-	-	-	3
Caspian Tern	-	2	-	-
White-fronted Tern	650	9	4	154

Species	Clifden/Wairaki Reach Breeding Season 24.11.93	11.12.95	Clifden/Wairaki Reach Post-Breeding Season 09.03.94	21.3.96
Black Shag	1	7	21	5
Pied Shag	-	-	-	-
Little Shag	-	-	1	-
Spotted Shag	-	-	-	-
White-faced Heron	2	-	-	-
Black Swan	-	-	-	-
Canada Goose	-	-	-	1
Feral Goose	-	-	-	-
Paradise Shelduck	97	170 (+44 juv)	41	19
Mallard/Grey Duck	41	10	14	480
Grey Duck	-	-	-	-
Grey Teal	-	-	-	-
Shoveler	4	-	-	-
Scaup	-	-	-	-
Pukeko	-	-	-	-
Pied Oystercatcher	21	22	-	-
Variable Oystercatcher	-	-	-	-
Pied Stilt	14	6	-	-
Banded Dotterel	29	13	-	-
Black-fronted Dotterel	-	-	-	-
Spur-winged Plover	21	76	24	12
Bar-tailed Godwit	-	-	-	-
Black-backed Gull	16	52	8	10
Red-billed Gull	-	-	-	-
Black-billed Gull	3319	130	-	-
Black-fronted Tern	34	13	1	-
Caspian Tern	-	-	2	-
White-fronted Tern	-	-	-	-

Species	Redcliffs Reach Breeding Season		Redcliffs Reach Post-Breeding Season	
	23.11.93	11.12.95	08.03.94	21.3.96
Black Shag	9	8	2	7
Pied Shag	-	-	-	-
Little Shag	3	-	1	-
Spotted Shag	-	-	-	-
White-faced Heron	2	-	1	2
Black Swan	-	-	-	-
Canada Goose	2	-	28	-
Feral Goose	-	-	-	3
Paradise Shelduck	50	28 (+38 juv)	51	28
Mallard/Grey Duck	6	-	48	89
Grey Duck	-	1	-	5
Grey Teal	3	-	-	-
Shoveler	-	-	-	-
Scaup	-	4	-	-
Pukeko	-	-	-	-
Pied Oystercatcher	3	11	-	-
Variable Oystercatcher	-	-	-	-
Pied Stilt	4	2	-	-
Banded Dotterel	-	-	-	-
Black-fronted Dotterel	-	-	-	-
Spur-winged Plover	2	7	1	5
Bar-tailed Godwit	-	-	-	-
Black-backed Gull	58	14	-	3
Red-billed Gull	-	-	-	-
Black-billed Gull	658	-	-	-
Black-fronted Tern	5	-	-	-
Caspian Tern	-	-	-	-
White-fronted Tern	-	-	-	-