A trend count of Kuruwhengi, the Australasian Shoveler Duck - 2023

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Photo: Nigel Simpson

Contents

Summary

Fish and Game New Zealand conducted a national count of kuruwhengi, Australasian shoveler duck (*Spatula (Anas) rhynchotis*) on 7 August 2023. This is the 24th annual count (2000 – 2023) to monitor change in the New Zealand shoveler duck population. Four indices were examined, total national count (*n*=256 survey sites), the sum of counts from sites that have been counted every year (*n*=75), a two–year (2022–2023) and a 24-year trend (2000–2023). The 2023 count (12,272) increased 34% on the 2022 count. However, the long-term trend indicates a very small decrease (average change =-0.02; 95% CI -0.04 – 0.0; *n*=249). The total counts at the 75 sites that have been counted every year was the lowest (3,936) since 2000.

Sex ratios were examined using a chi-squared test. Reported observations of males were significantly more numerous (*P*<0.0001) with a ratio of 1.49 males to females. This sex imbalance is consistent with ratios from previous years (1.59 males to females).

The national survey is an index of population change. Count sites were not randomly selected so inference about national shoveler populations must be made with caution. Fish and Game regions may wish to take into consideration an apparent small decrease in the population trend when recommending their 2024 shoveler duck regulations.

Introduction

Two species of extant shoveler duck are recorded in New Zealand, the northern shoveler (*Spatula clypeata*), a rare arctic vagrant, and the Australasian shoveler (*S. rhynchotis*) or kuruwhengi, a common native (Heather and Robertson 1996). The male northern shoveler in breeding plumage is distinguished from the Australasian male shoveler by having green head (cf. grey-blue) and prominent white chest (cf. speckled).

Shoveler are filter feeders (Crome 1985; Potts 1977) that extract relatively fine seeds, plantonic animals (e.g. cladocerans, copepods, rotifers, and ostracods), and small snails by sifting water through lamellae on their bills (Marchant and Higgins 1991; Potts 1977). They are considered a bird of lowland fertile wetlands (Heather and Robertson 1996; Williams 1981b) but also frequent sheltered estuaries (Marchant and Higgins 1991).

The effective monitoring of game birds was set as a high priority by the New Zealand Fish and Game, Game Bird Research Committee. It was proposed to monitor Australasian shoveler duck, within a national framework (Rodway 1999) as this species is very mobile and tends to disperse nationally (Barker, Caithness, and Williams 2005; Sutton et al. 2002; Williams 1981b) compared with other more sedentary game species in New Zealand such as the mallard (*Anas platyrhynchos*) (Balham and Miers 1959; M. McDougall 2012) or the paradise shelduck (*Tadorna variegata*) (Barker 1990; Williams 1981a).

National shoveler harvest was examined in 2019 (M. B. McDougall 2020) and a decline over time, 1993 – 2019, was detected. This harvest data has been updated (2023) and is presented in Appendix 1. Like mallard duck harvest, the decline in shoveler harvest can be attributed to a decrease nationally of annual hours spent hunting waterfowl ($\beta_{Average\_Hours} = 0.965$; *P*<0.0001), however it appears that

some other factor/s may also be contributing to the decline in harvest. This is deduced when we examine annual shoveler harvest per hour spent hunting waterfowl which has declined significantly, however the rate of decline is very small[1] ($\beta_{year} = -0.00019$; P<0.0001; See 2022 shoveler count report). One possible explanation for the decrease in shoveler per hour hunting waterfowl is a decreasing population.

Method

Survey Design

The aim of the shoveler survey is to detect an annual change in the population of shoveler duck at indicator ponds (Figure 1) and to monitor long term changes at these sites.

$$\lambda = \frac{P_{t+1} - P_t}{P_t}$$

Where:

$\lambda =$ Population change at selected shoveler habitats;
$P_t =$ The population in year t;
$P_{t+1} =$ The population in year t+1.

Survey forms (Appendix 4) were distributed to all Fish and Game Regions who made them available to surveyors. The survey forms included pre-printed site name, grid references, the name of last year's observer (to try and ensure observes are paired with the same sites each year to minimise observer bias) and site access details. Site information was provided to minimise between year observer variation.

The survey date was Monday 7th of August 2023 to coincide with pre-breeding flock formations (Williams 1981b). Chosen sites were visited and the number of male and female shoveler duck and total grey teal were recorded. Where sex could not be determined due to light conditions, distance, or large numbers, they were recorded as unidentified sex.

Survey Sites

Shoveler prefer lowland fertile waterways such as ponds and lakes (Williams 1981b). We did not have data on this type of habitat to allow us to randomly select count sites so in 2000 staff were asked to select a minimum of 10 count sites in each region where shoveler were known to congregate. Over the 23 years, 435 different survey sites (annual range = 207–291 in 2009 and 2001 respectively; Figure 1) have been counted but some are not surveyed every year due to a number of factors including, loss of access and consistent zero counts. New count sites have been added to offset some of these sites.

[1] The rate of decline is so small because the denominator (hours spent hunting waterfowl is large cf. the numerator (total shoveler harvest).

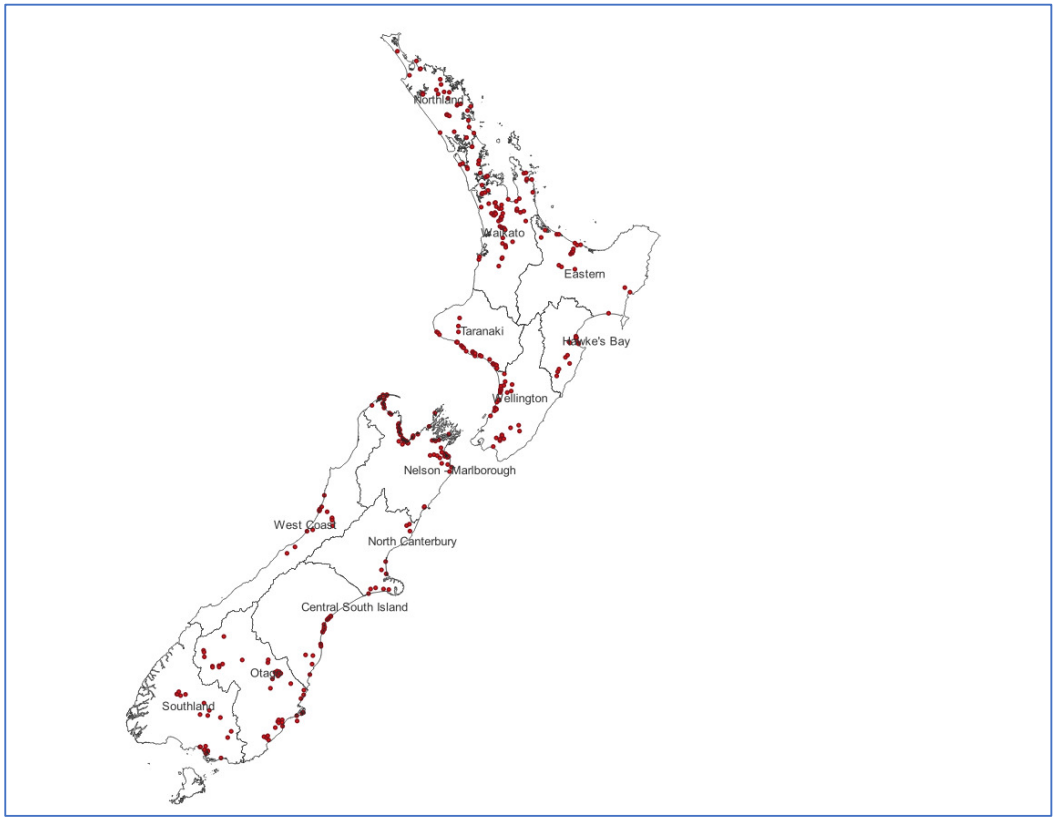

Figure 1. Shoveler count locations (red dots). Black lines are regional Fish and Game boundaries.

Analysis

Count data was analysed using two different methodologies; (1) sites that have been counted for the 22 years were summed and, (2) a variant on the route regression method (Geissler and Sauer 1990) where counts were converted to their natural log ($lnC_{ij} + 1 = y_{ij}$) and a temporal regression line was fitted to each site then the average regression coefficient across all sites was estimated to provide the long-term trend. These estimates were derived using a Bayesian hierarchical model (Appendix 1). Priors were left uninformative. Analysis was conducted using the app RStudio (RStudio Team 2020), package R2OpenBUGS (Sturtz, Ligges, and Gelman 2005), in program R (R Development Core Team 2018).

The percentage population change (lambda) was derived as the exponent of the mean regression coefficient:

$$\hat{\lambda} = (e^{\bar{b}} - 1) \times 100$$ (Rosenberg 1998).

The best way to deal with the natural log of zeros in regression models lacks consensus (Bellégo, Benatia, and Pape 2022). I chose to add 1 to the natural log for the sole reason that the natural log of 1 is zero.

The back transformation of the natural log estimate can be biased. A possible correction is (Geissler and Sauer 1990):

$$\hat{\lambda} = \exp\{\ln(\bar{b} - 0.5\widehat{variance}[\ln(b)]\}$$

Male:Female Ratio

The chi-square goodness of fit test was used to test whether the expected ratio of 50:50 males to females was observed.

$$\chi^2 = \sum_{i=1}^{k} \frac{(O - E)^2}{E}$$

Where:

$E_i =$ The expected frequency of the ith class

$O_i =$ The observed frequency of the ith class

Degrees of freedom; v = k-1 = 2-1 =1

The Hypothesis is:

Ho: That the ratio of males to females is 50:50,

H_A: The ratio of males to females is not 50:50.

Results

Sites

In 2023 a total of 256 sites were counted throughout New Zealand (Table 1; Appendix 6), 75 of which have been counted for the past 24 years. The number of sites counted in each region varied from 11 – 38.

Count Spread

85% of the 256 sites were counted on the 7th of August 2023 and 6% on the 8th of August. The remainder were counted between 1 – 17 August 2023.

Count Results

12,272 shoveler were counted throughout the country, an increase of 34% on 2022 count of 9,136 (Figure 2, Table 2).

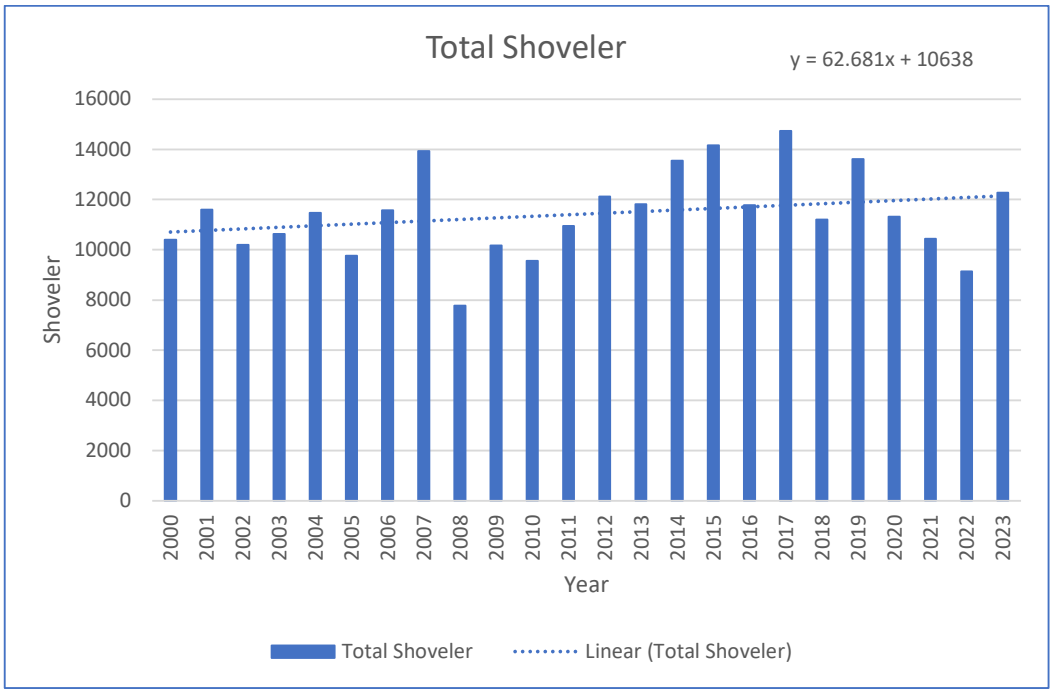

Figure 2. Total shoveler counted throughout New Zealand 2000–2023. The dashed line is the regression line.

The trend (average regression coefficient) over the 24 years indicates a very small decrease in the shoveler population at the sites counted (average change =-0.02; 95% CI -0.04 – 0.0; *n*=249; Figure 3).

The raw data shows no change in average slope, or regression coefficients, for each site ($\sum \widehat{\beta_{Year}} = 0.315$, 95% CI -0.539 – 1.169).

The estimate of the average regression coefficient (log transformed data) for the last two years (2022 – 2023) was positive (0.216; 95% CI 0.012 – 0.421).

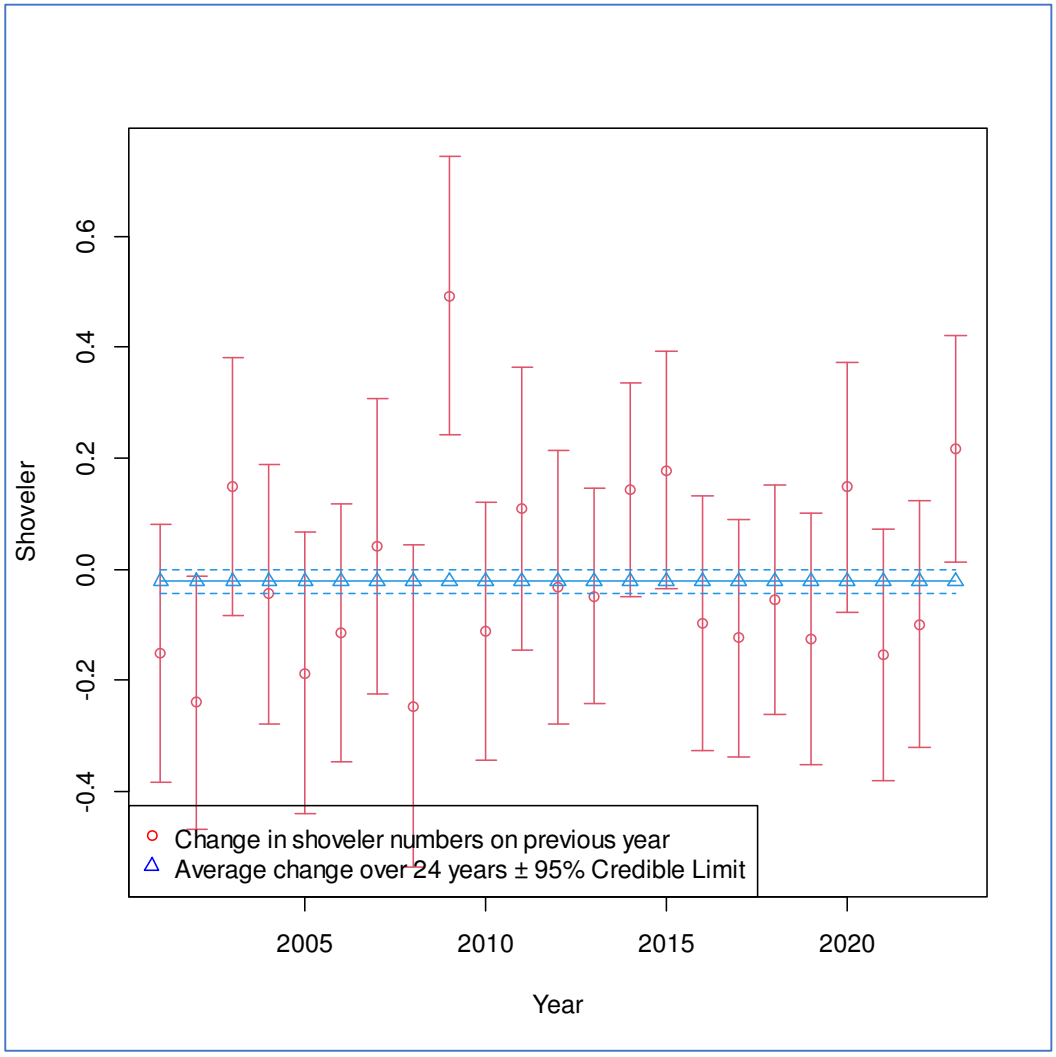

Figure 3. Annual change in shoveler count (red point estimates ±95% BCI). Blue line is change over the 24 years (±95% CI; *n*=249).

For sites that had been counted every year (n=75; Figure 4) count data was separated into South Island and North Island totals (2000 –2022[1]) and generalized linear models were used to examine the influence of the Southern Oscillation Index (SOI; i.e., total SOI for the preceding year), hunter harvest (by the respective North and South Islands), and count year on the standardised count data. These parameters did not explain shoveler counts (North Island AIC = 72.387[2], North Island null AIC = 68.249; South Island AIC = 71.472, South Island null = 68.249).
Using the same set of parameters (above) count data was modelled their fit to the national count (2000 – 2022), and again the data did not show a good fit (AIC = 66.428, null = 68.249).

[1] 2023 was not included as Hawke's Bay Fish & Game did not conduct the hunter survey for 2023.
[2] The model with the lowest AIC receives the best support. Models within 2 units of the top model are considered to have some support. The null model includes no parameters (other than the variance and the intercept). If the top model is similar to the top model, it suggests the top model does not fit the data very well.

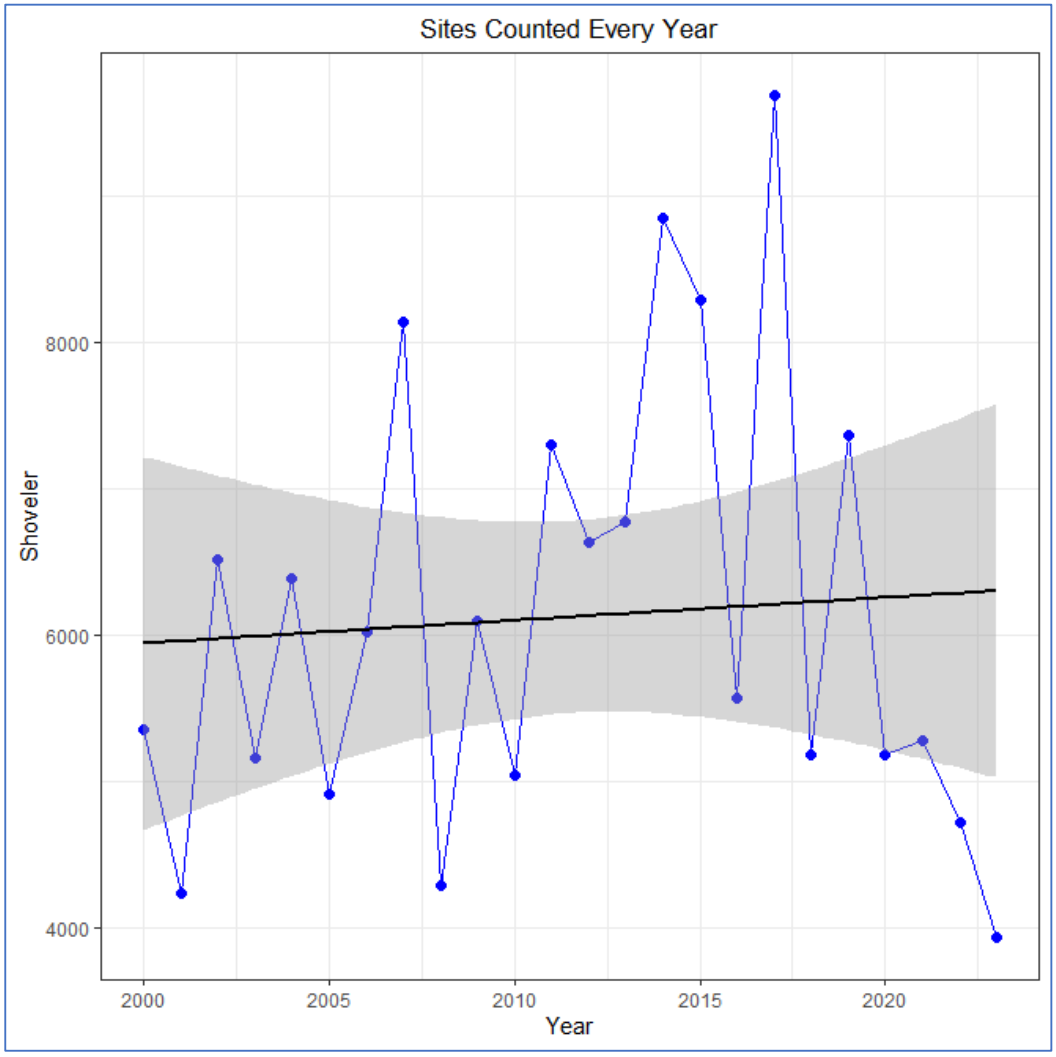

Figure 4. Total shoveler count (blue dots) of the sites that have been counted for all 24 years (*n*=75). The linear model (black solid line) does not fit the data any better than the null model. The 2023 count was 3,936.

Male Female Ratios

The 2023 female: male ratio was 0.67 which differs from the 50:50 ratio hypothesised ($\chi^2 = 312.618$; P<0.0001). The observed imbalance in the male: female ratio in 2023 is similar to previous years (Appendix 3; Table 4). Over the 24 years the average ratio of recorded females to recorded males is 0.63 ($\chi^2 = 6063.21$; P<0.0001).

Table 1. Number of sites counted by year and region

Region	Northland	Auckland/Waikato	Eastern	Taranaki	Hawke's Bay	Wellington	Nelson/ Marlborough	West Coast	North Canterbury	Central South Island	Otago	Southland	Total
2000	19	47	17	23	10	18	63	10	7	16	42	16	288
2001	20	48	17	23	10	22	67	11	8	17	32	16	291
2002	23	27	17	15	9	20	45	12	9	20	30	15	242
2003	21	26	16	16	9	22	43	14	8	20	30	16	241
2004	18	17	18	16	9	23	44	13	9	20	29	16	232
2005	21	22	18	23	9	23	56		7	20	31	16	246
2006	16	21	18	18	11	23	55	12	9	20	27	16	246
2007	22	20	18	22	11	23	42	12	9	20	29	16	244
2008	12	20	19	11	10	23	33	12	9	22	21	16	208
2009	10	21	17	11	11	24	26	12	9	22	23	16	202
2010	12	21	19	21	11	29	26	12	8	22	25	16	222
2011	12	20	16	22	11	32	26	12	5	22	26	16	220
2012	13	20	16	22	10	32	26	12	7	22	31	17	228
2013	15	20	19	23	10	32	26	13	8	22	32	12	232
2014	15	20	20	25	10	32	26	13	8	22	31	17	239
2015	15	20	20	25	12	32	26	13	9	22	34	17	245
2016	19	21	19	25	11	31	26	13	9	22	35	17	248
2017	21	21	17	25	11	31	24	13	9	22	38	17	249
2018	26	21	17	25	9	30	23	13	9	22	38	17	250
2019	29	22	18	26	9	30	21	14	9	22	38	17	255
2020	29	21	17	25	9	21	21	14	9	21	36	16	239
2021	26	22	17	25	9	22	19	14	9	22	38	16	239
2022	27	21	17	26	10	23	19	15	16	22	38	17	251
2023	28	20	15	25	11	23	21	19	16	22	38	18	256

Table 2. Shoveler and grey teal counts for the last eight years (2015–2023) by region (previous years are in Appendix 2)

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Auckland/Waikato									
Shoveler Males	614	355	272	253	417	398	311	169	206
Shoveler Females	406	258	161	143	193	202	212	92	134
Shoveler Unknown Sex	1751	1450	1826	1695	2239	2632	2880	622	810
Total Shoveler	2771	2063	2259	2091	2849	3232	3403	883	1150
Grey Teal	293	187	424	505	301	205	190	164	325
Central South Island	0	0	0	0	0	0	0	0	0
Shoveler Males	442	352	450	178	99	391	116	339	552
Shoveler Females	243	191	328	110	63	245	74	253	360
Shoveler Unknown Sex	38	125	147	53	188	47	7	156	195
Total Shoveler	723	668	925	341	350	683	197	748	1107
Grey Teal	2573	2395	3731	1182	3383	3991	456	2533	3081
Eastern									
Shoveler Males	189	112	64	68	87	140	131	73	96
Shoveler Females	166	86	37	44	61	99	87	44	61
Shoveler Unknown Sex	41	265	53	112	180	69	12	47	94
Total Shoveler	396	463	154	224	328	308	230	164	251
Grey Teal	300	57	131	86	187	181	75	64	90
Hawke's Bay									
Shoveler Males	91	621	1395	140	246	209	198	104	279
Shoveler Females	76	280	595	60	321	149	186	54	174
Shoveler Unknown Sex	2830	703	2377	1662	1515	52	252	1462	17
Total Shoveler	2997	1604	4367	1862	2082	410	636	1620	470
Grey Teal	18	382	1667	5	0	62	65	13	337

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Nelson/Marlborough									
Shoveler Males	134	181	167	176	138	290	111	93	101
Shoveler Females	58	143	102	63	77	120	44	28	43
Shoveler Unknown Sex	1714	1525	1108	2213	1507	1944	1676	956	1653
Total Shoveler	1906	1849	1377	2452	1722	2354	1831	1077	1797
Grey Teal	77	350	347	207	166	329	166	71	1131
North Canterbury									
Shoveler Males	128	217	561	188	88	156	40	421	1194
Shoveler Females	88	184	568	132	67	138	29	263	680
Shoveler Unknown Sex	164	240	0	86	2046	155	0	7	754
Total Shoveler	380	641	1129	406	2201	449	69	691	2628
Grey Teal	445	640	880	589	2253	153	20	276	3863
Northland									
Shoveler Males	67	14	57	116	64	112	44	63	82
Shoveler Females	36	8	42	58	44	53	45	42	44
Shoveler Unknown Sex	0	0	0	6	0	10	81	0	0
Total Shoveler	103	22	99	180	108	175	170	105	126
Grey Teal	99	56	42	67	58	125	39	72	66
Otago									
Shoveler Males	183	391	1412	300	487	392	1055	1008	904
Shoveler Females	128	346	982	183	378	332	793	532	577
Shoveler Unknown Sex	1387	354	23	448	436	541	0	1	221
Total Shoveler	1698	1091	2417	931	1301	1265	1848	1541	1702
Grey Teal	800	735	1256	871	1053	628	776	1483	1299
Southland									

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Shoveler Males	393	782	460	487	614	516	551	465	534
Shoveler Females	240	457	155	219	213	196	192	241	651
Shoveler Unknown Sex	22	63	50	26	49	4	17	334	60
Total Shoveler	655	1302	665	732	876	716	760	1040	1245
Grey Teal	271	448	344	246	298	770	296	353	374
Taranaki									
Shoveler Males	326	194	198	190	199	178	266	167	281
Shoveler Females	161	88	80	66	75	69	110	73	106
Shoveler Unknown Sex	692	16	47	268	218	54	14	82	23
Total Shoveler	1179	298	325	524	492	301	390	322	410
Grey Teal	397	55	171	286	196	125	153	82	108
Wellington									
Shoveler Males	491	979	459	674	215	533	297	329	420
Shoveler Females	289	623	335	682	169	567	166	186	304
Shoveler Unknown Sex	419	88	135	51	827	135	318	292	510
Total Shoveler	1199	1690	929	1407	1211	1235	781	807	1234
Grey Teal	354	374	226	321	832	643	185	389	413
West Coast									
Shoveler Males	34	50	42	27	62	128	74	98	106
Shoveler Females	22	40	36	24	35	69	47	43	46
Shoveler Unknown Sex	85	0	9	0	0	0	0	0	0
Total Shoveler	141	90	87	51	97	197	121	141	152
Grey Teal	278	446	121	405	377	337	212	295	516
Total Shoveler Males	3092	4248	5537	2797	2716	3443	3194	3329	4755
Total Shoveler Females	1913	2704	3421	1784	1696	2239	1985	1851	3180
Total Shoveler Unknown Sex	9143	4829	5775	6620	9205	5643	5257	3959	4337

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Grand Total Shoveler	14148	11781	14733	11201	13617	11325	10436	9139	12272
Total Grey Teal	5905	6125	9340	4770	9104	7549	2633	5795	11603

Discussion

Fish and Game staff and volunteers conducted the 24th annual national shoveler duck count in August 2023. Although termed national, the sites were not randomly selected, so the survey is considered an index of population status.

Count Results

Four indexes of population change at the sites counted were examined; total annual count (*n*=256 survey sites in 2023), a total annual count from sites that have been counted for the 24 years (*n*=75), an average of the two-year trend (*n*= 241) and 24-year trend (*n*=249). Last year's analysis (2022) indicated a decreasing trend in the shoveler duck population while this year's count data shows an increase in the total count, and two-year trend, though the 24-year trend was still slightly negative. Observed shoveler abundance at sites that have been counted each year have decreased for the last four years.

Following the apparent decline detected following last year's count, the two regions that typically harvest the most shoveler (Southland and Otago), introduced more restrictive regulations (Southland two drakes, Otago one drake). At this stage it was not clear if these restrictions made any difference to the 2023 shoveler count (Appendix 1, Figure 5) and further monitoring/analysis is needed to assess the impact of these regulatory changes.

Count design

There are issues with a single count providing an indication of population change (Johnson 2008). For example, this survey does not account for detectability or observer bias. Detectability is influenced by the distance from the observer to the birds, cover, weather, light and the conspicuousness of the animal being observed (male shoveler plumage is more recognisable than that of the female and so are more easily identified). Further, observer bias is influenced by experience, skill, and the type of binoculars/ spotting scope they use. To overcome some of this bias survey sheets are circulated prior to the count with details of who conducted the count in the preceding year, to try and ensure that the same person counts the same sites each year with instructions on where to count the birds from (i.e., standardise the observation point and the observer).

Detectability is difficult to accurately assess and may bring its own set of bias and inaccuracy (depending on the surveyor). In some larger wetland complexes detectability may also change due to wetland water levels as birds may be more concentrated or widely dispersed depending on habitat availability, particularly in tidal areas. Shoveler however, generally appear to occupy the same areas of the wetlands from year to year (pers. obs.), perhaps reducing the consequences of not recording detectability. Weather is also a contributing factor to detectability. Observers regularly make a comment on the weather if the conditions are not conducive to counting. Nevertheless, when count data (2000 – 2021) was modelled against weather covariates the results were counter intuitive. It was hypothesised that wind strength and rain would decrease the count, however the covariate estimates suggest otherwise. The only covariate that made sense was the count decreasing when there was a southerly component in wind direction. Part of this anomaly may be explained by the large number of low counts, almost 40% of counts were 1 or 0.

But it is unclear why the covariates fit the data so well (P<0.001) and yet do not make sense (M. B. McDougall 2021).

Sites

The non-random selection of survey sites is a weakness of this monitoring programme. Ideally a random sample would be taken from all shoveler habitat but as shoveler habitat has not been mapped this cannot be easily completed. Ideally a stratified sampling regime should be developed. Staff should be encouraged to record the location/habitat when they encounter shoveler during their normal activities to enable the development of a shoveler habitat GIS layer. Additionally, hunters could be canvassed during the gamebird harvest survey to help identify areas that hold shoveler. A third option is to assess the representativeness of these sites is to compare them to the E-Bird (OSNZ) mapping scheme showing known shoveler sites.

The consequence of non-random habitat selection is that no formal inference about the status of the national population can be made. Readers will have to judge for themselves if counts from 256 sites are a fair representation of the national shoveler population.

An application to the research fund has been made to try and improve the statistical robustness of the survey design has been approved.

Sex ratios

The consistent imbalance of males: females in the count data may be due to the ease of distinguishing male shoveler from other waterfowl at this time of the year. Alternatively, the result may occur because males were identified as males and females as unidentified sex, or it may be a true reflection of the population balance. This imbalance is very similar to mallards trapped for banding in the Eastern Region (1.5 juvenile males: juvenile females; 1.35 adult males: adult females) (M. McDougall 2010) and many other dabbling duck populations globally which is largely attributed to sex specific mortality. Shoveler banding data (Department of Conservation band schedules 1971 – 1986; n=3284 adults) further corroborates these observations with an imbalance of 2.37 shoveler males to females (McDougall unpublished data). Nevertheless it is likely that the imbalance is a combination of a sex imbalance and observers identifying a higher proportion of the males as males.

Count Date

The 7th of August was chosen as count date. This date coincides with the end of the waterfowl season and the pre-breeding flocks that begin to gather at the end of July (Williams, 1981a). The timing of the count is a compromise between females moving away to nest and the end of the waterfowl season. The date is also consistent between years for the past two decades which removes another factor of variability with the census counts.

Analysis technique

A regression estimate of the natural log of the count data over time was calculated and the average of these slope estimates were back transformed to indicate annual percentage population change (termed a variant on the route regression method).

Using the route regression method is useful where counted sites are not consistent from year to year. In addition:

- New sites can be included.
- Small sites are comparable to large sites.
- Sites that are disturbed or missed don't affect the estimate (but may affect the error of the estimate).
- The estimate is an estimate of the change in population with an associated error.

Nevertheless, this method provides no insight on the total population size and, as alluded to above, is compromised by lack of randomisation in count site selection. Further the variance estimates shown in the graph do not account for the individual variance of each regression estimate nor detection probabilities. Therefore, the very narrow CI around the trend estimates is underestimating the true variability and the very small decrease that is reported may not be a true representation of the long-term trend.

Managers are left to judge for themselves if the average trend of approximately 250 sites is going to be indicative of the population at large. The 75 sites counted each year likely provide a good basis for a longitudinal study, however these sites might be preferred shoveler habitat and not reflect what is happening to the wider population. The counts at these sites may in fact increase in years when other habitat has dried up or is sub-optimal and the population has decreased.

Conclusion and Recommendations

Shoveler duck abundance at the sites counted has increased between 2022 and 2023 this increase may have stabilised the long-term trend. Councils should take this into consideration when recommending the 2024 Open Season Game Bird regulations for shoveler duck in their region. Reducing daily bag limits is generally unlikely to make much difference to total national harvest however reducing season length in some regions probably will as the daily bag limit is seldom limiting harvest of waterfowl in New Zealand. Nevertheless it appears that the sex based limits reduced shoveler harvest in Otago and Southland this season.

Fish and Game should consider a review of the survey. The review could consider:

- Inclusion of randomly selected sites (some form of random stratified design)[1].
- Consider creating a national database of known shoveler habitat.
- If it is useful to know the size of the national population of shoveler duck (for example every five years), or density (shoveler km^{-2}) nationally and regionally.
- If Fish and Game should agree on a national harvest strategy given the presumption that the population is monitored as such?

[1] An application for research funding has been submitted and approved.

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Appendix 1

Shoveler Harvest

Total shoveler duck harvest was down slightly on last year but not significantly different from what is expected from the long-term trend (Figure 5).

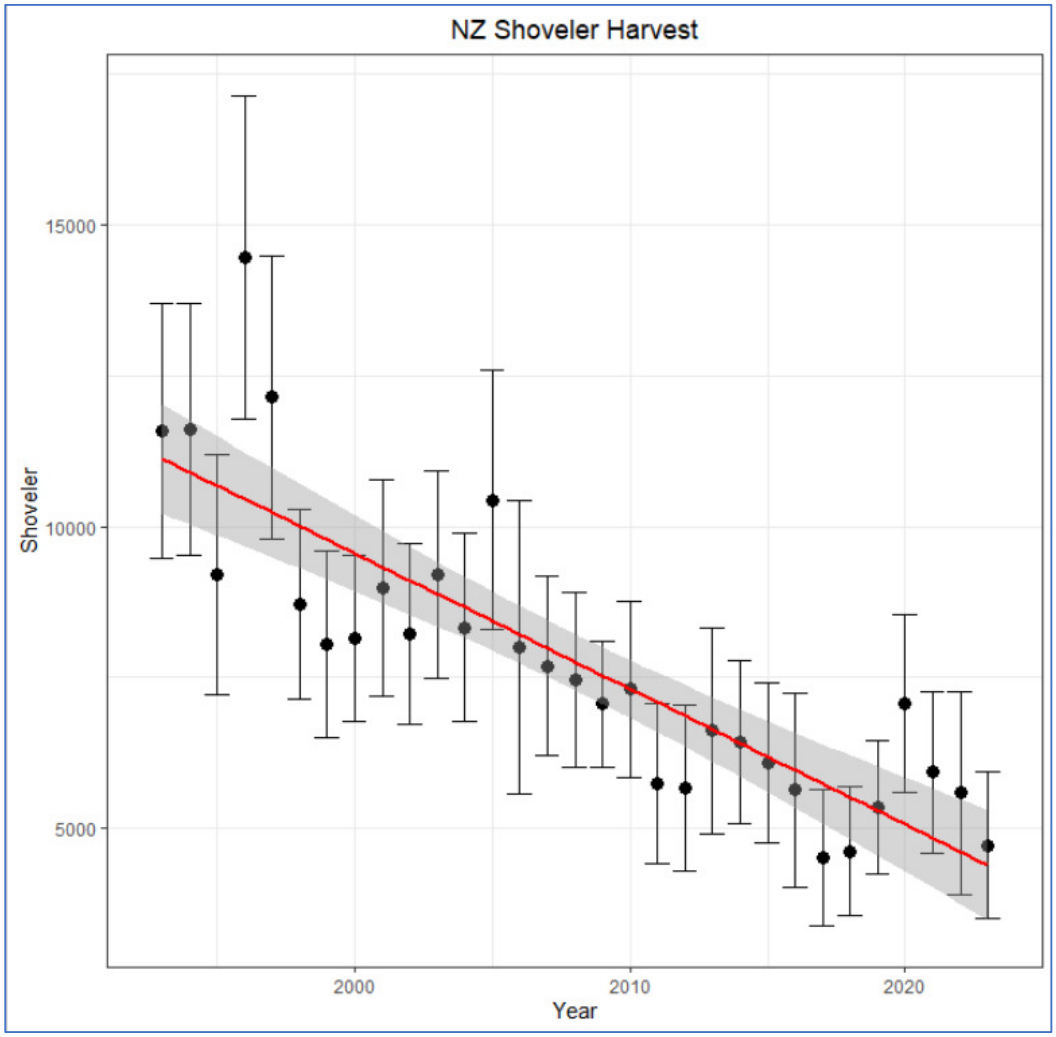

Figure 5. Total national shoveler duck harvest (mean ± 95% CI) 1993–2023 excluding Hawke's Bay data as the hunter survey was not done in this region in 2023. The least squares estimate is shown as the red solid line.

Both Otago and Southland introduced sex based (male only) bag limits for the 2023 game bird season following concerns that the population may be declining (McDougall 2022). It appears the sex based bag limits may have been instrumental in reducing harvest (Figure 6), whereas there was no apparent decline in North

Canterbury and Central South Island Fish and Game whose shoveler duck harvest regulations remained the status quo (Figure 7).

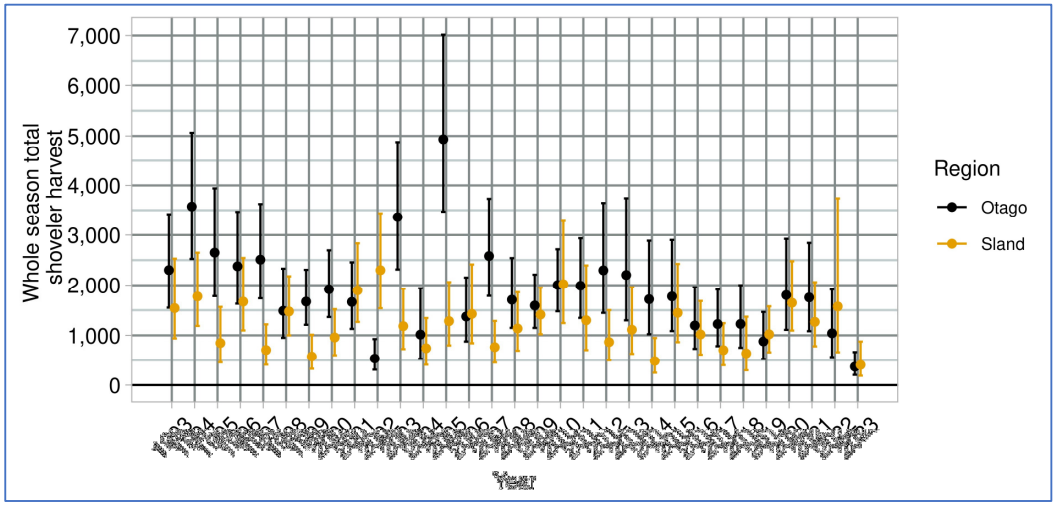

Figure 6. Total shoveler harvest in Otago and Southland Fish and Game Regions (1993 – 2023) (Source Jayde Cooper).

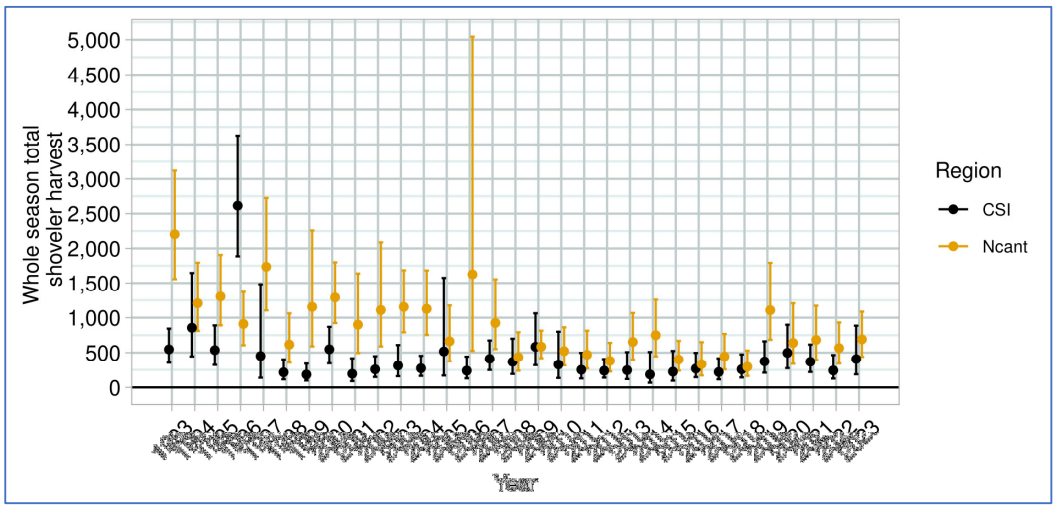

Figure 7. Total shoveler harvest in CSI and North Canterbury Fish and Game Regions (1993 – 2023) (Source Jayde Cooper).

Appendix 2

Shoveler and grey teal counts by region and year

Table 3. Count data 2000 - 2014

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Auckland/Waikato															
Sum of Shoveler Males	561	356	181	242	186	322	222	62	123	201	572	619	175	475	498
Sum of Shoveler Females	397	240	94	176	139	227	150	36	69	161	328	222	102	303	379
Sum of Shoveler Unknown Sex	168	1434	259	987	1602	151	2210	1548	1010	934	268	2247	713	982	4144
Sum of Total Shoveler	1126	2030	534	1405	1927	700	2582	1646	1202	1296	1168	3088	990	1760	5021
Sum of Grey Teal				0	348	732	15	98	0	12	511	101	446	1000	348
Central South Island															
Sum of Shoveler Males	0	229	166	241	168	174	267	220	267	825	265	228	1296	191	1161
Sum of Shoveler Females	0	138	140	167	115	127	210	154	122	242	122	183	67	97	437
Sum of Shoveler Unknown Sex	629	94	160	31	52	134	18	56	98	49	281	33	99	511	16
Sum of Total Shoveler	629	461	466	439	335	435	495	430	487	1116	668	444	1462	799	1614
Sum of Grey Teal					510	3033	2143	1817	4882	4303	3467	5980	3011	3102	3746
Eastern															
Sum of Shoveler Males	549	232	77	177	638	216	99	162	57	119	149	60	96	64	110
Sum of Shoveler Females	288	124	60	121	402	82	58	104	40	72	58	31	62	42	91
Sum of Shoveler Unknown Sex	285	2786	683	931	91	697	936	534	1027	59	731	174	129	163	80
Sum of Total Shoveler	1122	3142	820	1229	1131	995	1093	800	1124	250	938	265	287	269	281
Sum of Grey Teal					38	146	113	111	44	149	92	208	83	438	173
Hawke's Bay															
Sum of Shoveler Males	446	400	267	307	357	355	55	183	97	161	430	223	128	51	17
Sum of Shoveler Females	304	281	200	188	235	246	36	133	102	77	148	115	105	36	15
Sum of Shoveler Unknown Sex	2404	1055	3059	1575	2501	2093	2834	4243	1803	2758	2373	1988	3054	2644	1615

Sum of Total Shoveler	3154	1736	3526	2070	3093	2694	2925	4559	2002	2996	2951	2326	3287	2731	1647
Sum of Grey Teal					283	3836	458	2529	212	854	385	375	161	277	260
Nelson/Marlborough															
Sum of Shoveler Males	111	116	122	198	155	205	169	135	143	236	82	165	257	132	71
Sum of Shoveler Females	61	100	94	204	120	141	111	93	112	179	69	96	183	126	47
Sum of Shoveler Unknown Sex	453	22	27	301	366	1055	851	1373	327	885	668	694	1707	2230	1615
Sum of Total Shoveler	625	238	243	703	641	1401	1131	1601	582	1300	819	955	2147	2488	1733
Sum of Grey Teal					957	1220	170	468	105	547	872	115	66	247	110
North Canterbury															
Sum of Shoveler Males	83	38	278	482	181	120	108	636	27	148	106	101	186	80	194
Sum of Shoveler Females	68	27	124	308	152	124	89	586	21	112	122	92	102	56	116
Sum of Shoveler Unknown Sex	185	143	124	10	73	65	482	256	0	75	13	0	0	62	68
Sum of Total Shoveler	336	208	526	800	406	309	679	1478	48	335	241	193	288	198	378
Sum of Grey Teal					4014	3570	4135	1966	86	0	510	1025	250	23	178
Northland															
Sum of Shoveler Males	30	53	28	53	60	41	24	12	64	17	23	33	101	46	54
Sum of Shoveler Females	27	44	26	49	46	27	28	9	73	12	24	13	76	31	26
Sum of Shoveler Unknown Sex	0	5	0	0	1	0	0	0	0	0	0	1	0	0	0
Sum of Total Shoveler	57	102	54	102	107	68	52	21	137	29	47	47	177	77	80
Sum of Grey Teal					246	158	43	44	37	73	13	67	36	46	159
Otago															
Sum of Shoveler Males	0	800	662	123	110	760	578	568	296	350	266	158	482	417	148
Sum of Shoveler Females	0	505	507	105	96	509	532	475	120	331	233	204	444	348	285
Sum of Shoveler Unknown Sex	1073	136	290	826	1103	241	213	423	535	338	430	845	57	737	639
Sum of Total Shoveler	1073	1441	1459	1054	1309	1510	1323	1466	951	1019	929	1207	983	1502	1072
Sum of Grey Teal					1496	1926	1940	863	895	361	810	392	759	2773	1091
Southland															
Sum of Shoveler Males	369	260	27	92	98	216	117	228	126	114	183	430	489	337	380

Sum of Shoveler Females	210	164	22	96	101	116	103	133	68	72	93	257	243	153	214
Sum of Shoveler Unknown Sex	56	134	806	651	1118	640	359	519	204	569	537	102	128	0	105
Sum of Total Shoveler	635	558	855	839	1317	972	579	880	398	755	813	789	860	490	699
Sum of Grey Teal					268	243	317	128	377	604	175	295	429	144	195
Taranaki															
Sum of Shoveler Males	76	100	155	135	30	72	8	25	26	51	85	203	147	207	227
Sum of Shoveler Females	47	84	114	98	25	58	3	22	10	27	63	134	86	124	120
Sum of Shoveler Unknown Sex	210	196	165	68	238	3	121	124	0	40	82	115	37	29	11
Sum of Total Shoveler	333	380	434	301	293	133	132	171	36	118	230	452	270	360	358
Sum of Grey Teal					7	44	76	23	0	29	98	93	43	34	160
Wellington															
Sum of Shoveler Males	246	480	253	455	203	152	114	489	347	461	366	565	657	569	303
Sum of Shoveler Females	196	244	104	150	94	78	67	214	220	293	265	313	364	412	202
Sum of Shoveler Unknown Sex	755	459	815	787	367	311	243	60	108	116	45	175	196	72	44
Sum of Total Shoveler	1197	1183	1172	1392	664	541	424	763	675	870	676	1053	1217	1053	549
Sum of Grey Teal					269	322	146	381	84	178	216	217	169	292	203
West Coast															
Sum of Shoveler Males	39	34	37	125	89		48	55	71	54	35	82	80	48	68
Sum of Shoveler Females	18	37	40	115	85		38	51	47	30	42	49	71	36	54
Sum of Shoveler Unknown Sex	48	49	32	50	66		71	0	3	0	0	0	0	4	0
Sum of Total Shoveler	105	120	109	290	240		157	106	121	84	77	131	151	88	122
Sum of Grey Teal					210		91	79	270	83	142	317	206	113	69
Total Sum of Shoveler Males	**2510**	**3098**	**2253**	**2630**	**2275**	**2633**	**1809**	**2775**	**1644**	**2737**	**2562**	**2867**	**4094**	**2617**	**3231**
Total Sum of Shoveler Females	**1616**	**1988**	**1525**	**1777**	**1610**	**1735**	**1425**	**2010**	**1004**	**1608**	**1567**	**1709**	**1905**	**1764**	**1986**
Total Sum of Shoveler Unknown Sex	**6266**	**6513**	**6420**	**6217**	**7578**	**5390**	**8338**	**9136**	**5115**	**5823**	**5428**	**6374**	**6120**	**7434**	**8337**
Total Sum of Total Shoveler	**10392**	**11599**	**10198**	**10624**	**11463**	**9758**	**11572**	**13921**	**7763**	**10168**	**9557**	**10950**	**12119**	**11815**	**13554**
Total Sum of Grey Teal				**0**	**8646**	**15230**	**9647**	**8507**	**6992**	**7193**	**7291**	**9185**	**5659**	**8489**	**6692**

Appendix 3

Male: female ratios

Table 4. Male: Female ratio by year

Year	M:F Ratio
2000	1.55
2001	1.56
2002	1.48
2003	1.48
2004	1.41
2005	1.52
2006	1.27
2007	1.38
2008	1.64
2009	1.71
2010	1.63
2011	1.67
2012	2.15
2013	1.48
2014	1.63
2015	1.62
2016	1.57
2017	1.62
2018	1.56
2019	1.6
2020	1.53
2021	1.69
2022	1.79
2023	1.49

Appendix 4

Shoveler Counts Survey Sheet

Fish & Game Region:_____ Observer:_____

Date:_____ Time:_____

Location:_____ Grid ref:_____

Map No (260 Series):_____

Access Details: _____

_____

_____

Weather Conditions

Wind direction:_____ Wind Strength[1]:_____

Cloud[2]:_____ Rain[3]:_____

Shoveler Males:_____

Shoveler Females:_____

Shoveler unknown sex:_____

Total Shoveler:_____

Comments:_____

_____

Please return completed form to your nearest Fish and Game Office
If you have any queries phone Matthew McDougall 07-357-5501 (wk) 07-357-2687 (AH)

[1] Wind strength: Nil, moderate, Strong.
[2] Cloud: Estimate percentage cover; eg no cloud 0%, complete cover 100% cover.
[3] Rain: Drizzle, Moderate Showers, Heavy Showers, Moderate, Heavy.

Appendix 5

2023 Count Details

Region Auckland/Waikato

Site	Males	Female	Unknown	Total
Caldwells Dam	0	0	0	0
Chick's Pond	2	1	4	7
Clarks Bay Shelbank	39	28	0	67
David Saxton Wetland	0	0	0	0
Fisher Pond	4	4	0	8
Helensville Oxy. Ponds	1	1	0	2
Karaka Lakes	1	1	0	2
Lake Waikare	0	0	230	230
Leighton's Lake	7	2	0	9
Mangere Water Storage	20	11	0	31
Meremere WWTP	0	0	0	0
North Shore Oxy. Ponds	6	6	0	12
Ralph Road Ponds	11	9	0	20
Rhyburns Lagoon	22	14	14	50
Strakas Refuge	10	5	0	15
Tee Head Pond	6	2	2	10
Tuakau Oxy. Ponds	0	0	0	0
Wairewa Oxy. Ponds	40	26		66
Whangamarino	15	9	560	584
Whitney's Lake	22	15	0	37

Region Central South Island

Site	Males	Female	Unknown	Total
All Day Bay Lagoon	18	7	4	29
Bells Irrigation Pond	9	1	0	10
Bortons Settling Pond	0	0	0	0
Devils Bridge Wetland	7	3		10
Horseshoe Lagoon	0	0	0	0
Normanby Lagoon	10	9	6	25
Old Orari Lagoon	13	4	0	17
Opihi Lagoon	5	3	0	8
Opihi Lagoon Nth Arm	21	4	0	25
Opihi Lagoon Sth Arm	0	0	0	0
Orari Lagoon	0	0	0	0

Otipua Wetland	17	8	0	25
Pareora Freezing Works	1	0	0	1
Pareora Lagoon	0	0	0	0
Pig Hunting Creek Lagoon	12	8	0	20
Rooneys Pond	12	7	0	19
Saltwater Creek	1	1	0	2
Smithfield Settling Pond	2	1	0	3
Spider Lagoon	20	5	10	35
Wainono Lagoon	365	269	110	744
Wainono Reserve	23	18	65	106
Washdyke Lagoon	16	12	0	28

Region Eastern

Site	Males	Female	Unknown	Total
Aniwhenua Lake	8	0	37	45
Awaiti Wildlife	1	1	0	2
Bethleham Wetlands	1	1	0	2
Bookers Pond	0	0	0	0
Braemar Lagoon	6	2	2	10
East Valley Pond	1	0	0	1
Kaituna Cut	0	0	0	0
Kaituna Wildlife	0	0	0	0
Kawerau Road Pond	0	0	0	0
Matata Wildlife Refuge	28	19	0	47
Rerewhakaaitu	4	3	0	7
Rotomahana Wildlife	7	7	0	14
Rotoroa Lake	25	16	55	96
Tamurenui Lake	1	1	0	2
Thornton Lagoon	14	11	0	25

Region Hawke's Bay

Site	Males	Female	Unknown	Total
Clive East Road	14	10	2	26
Horseshoe Lake	11	2	0	13
Lagoon Farm	20	13	2	35
Pirimu	3	1	7	11
Poukawa	128	77	0	205
Roto O Kiwa	45	37	6	88
Turfrey Swamp	0	0	0	0
Waitangi (Horseshoe)	43	24	0	67
Westshore Ponds	1	1	0	2
Whatuma	5	4	0	9

	Willow Dam	9	5	0	14

Region Nelson/Marlborough

Site	Males	Female	Unknown	Total
Bell's Island	28	11	0	39
Best Island	0	0	0	0
Big Lagoon	0	0	740	740
Coastal Highway Pond	5	0	0	5
Corder Pond	0	0	0	0
Havelock Estuary	0	0	109	109
Kumaras/Oxidation Ponds	0	0	0	0
Kumera Estuary	9	3	0	12
Maori Is Oxidation	0	0	240	240
Mapua	0	0	0	0
Mapua School	0	0	0	0
Motueka River mouth	0	0	0	0
Moutere Inlet	0	0	0	0
Mouth of O'Connor's	0	0	0	0
Oxidation Ponds	0	0	460	460
Pearl Creek	0	0	0	0
Port Motueka Estuary	0	0	0	0
Te Aropipi Channel	0	0	90	90
Wakapuaka Oxidation	56	28	14	98
Wakapuaka Pond	3	1	0	4

Region North Canterbury

Site	Males	Female	Unknown	Total
A&P Ponds	8	5	0	13
Brooklands Lagoon	112	58	0	170
Cheviot Settling Ponds	30	23	0	53
Coopers Lagoon	0	0	0	0
Greenpark Sands (Lake	27	13	269	309
Harts Creek Reserve	7	9	17	33
Janet Stewart Reserve	0	0	0	0
Kaiapoi Wastewater	732	435	0	1167
Lake Ellsmere - Kaituna	88	66	121	275
Lake Forsyth	71	22	67	160
Prestons Ponds	0	0	0	0
St Annes Lagoon	41	10	0	51
Styx Mill Reserve	8	8		16
The Sister Ponds	1	0		1
Travis Wetland	69	31	0	100

	Tutaepatu Lagoon	0	0	280	280
Region	Northland				
	Site	**Males**	**Female**	**Unknown**	**Total**
	Ararua	0	0	0	0
	Borrowcut Wetland	0	0	0	0
	Dargaville (Oxidation	0	0	0	0
	Flaxmill Wetland	0	0	0	0
	Glinks Gully	0	0	0	0
	Hikurangi Oxidation	0	0	0	0
	Hokianga (Rawene	10	10	0	20
	Hospital Pond	0	0	0	0
	Kaitaia Oxidation Ponds	2	2	0	4
	Kaiwaka Rail Pond	21	10	0	31
	Karikari Oxidation	0	0	0	0
	Kawakawa Wetlands	25	11	0	36
	Lake Manuwai	0	0	0	0
	Lake Omapere Kaikohe	0	0	0	0
	Lake Ora	1	1	0	2
	Lake Owhareiti	1	1	0	2
	Mangawhai Pond	0	0	0	0
	Ngunguru Oxidation	1	0	0	1
	Opahi Swamp	0	0	0	0
	Port Marsden Hwy	0	0	0	0
	Red Hill	1	1	0	2
	Rototuna	0	0	0	0
	Ruakaka Oxidation	0	0	0	0
	Smiths Irrigation	0	0	0	0
	Taipa Marsh	0	0	0	0
	Taipa Oxidation Ponds	2	2	0	4
	Waitangi Wetlands	0	0	0	0
	Waro Lake	0	0	0	0
	Wellsford	18	6	0	24
Region	Otago				
	Site	**Males**	**Female**	**Unknown**	**Total**
	Balclutha Backwater	5	4	0	9
	Balclutha Oxidation	0	0	0	0
	Blakelys Dam	10	8	0	18
	Blueskin Bay	0	0	0	0
	Borrow Pits	10	6	0	16
	Camerons Dam	27	23	0	50

Creamery RD Pond		0	0	0
Finegand WR	8	3	0	11
Hawksbury Lagoon	175	100	0	275
Inch Clutha WMR	6	5	0	11
Kaikorai Estuary	3	3	0	6
Kaitangita Oxidation	0	0	0	0
Lake Dunstan	11	6	0	17
Lake Tuakitoto	0	0	105	105
Lake Waihola	13	8	0	21
Lake Waipori	0	0	93	93
Lone Pine Reservior	125	72	0	197
Mathias Dam	10	8	0	18
McSkimmings Pond	0	0	0	0
Merton Arm	0	0	0	0
Old River Channel	0	0	0	0
Palmerston Oxidation	28	22	0	50
Patersons Dam	19	11	23	53
Prison Oxidation Ponds	3	2	0	5
Puerua River Estuary	0	0	0	0
Ranfurly Sewage	0	0	0	0
Rutherfords Dam	100	75	0	175
Sinclair Wetland	76	15	0	91
Stirling Oxidation	0	0	0	0
Styx	18	10	0	28
Taieri Lake	15	10	0	25
Taieri Mouth School	6	6	0	12
Takitakitoa Wetlands	125	100	0	225
Tapanui Oxidation	25	27	0	52
Tomahawk Lagoon	1	1	0	2
Tomahawk Lagoon	3	2	0	5
Waikouaiti Sewage	30	20	0	50
Winmill Dam	52	30	0	82

Region Southland

Site	Males	Female	Unknown	Total
Acton Downs Pond	0	0	0	0
Big Lagoon	0	0	0	0
City Lagoon	42	29	0	71
Daffodil Bay	150	265	0	415
Dawson City GMA	4	4	0	8

	Gore Oxidation Ponds	90	64	0	154
	Lake Murihiku	48	79	0	127
	Lake Te Anau Outlet	0	0	0	0
	Little Lake Waituna	0	0	0	0
	Lumsden Oxidation Ponds	40	25	0	65
	Mahinga Kai Pa site	40	139	60	239
	Mataura Oxidation	42	11	0	53
	Outlet Area Kakapo	0	0	0	0
	Peter Menlove's Pond	0	0	0	0
	Riversdale Gravel Pit	0	0	0	0
	Ryan's Pond	1	3	0	4
	Te Anau Oxidation Ponds	28	12	0	40
	Waimatuku Wetland	49	20	0	69

Region	Taranaki				
	Site	**Males**	**Female**	**Unknown**	**Total**
	Eltham Oxidation Ponds	66	15	0	81
	Hauroto Road	0	0	0	0
	Hawera Oxidation Ponds	20	8	10	38
	Julian's Lake	0	0	0	0
	Kaitoke Lake	27	17	6	50
	Lake Herengawe	0	0	0	0
	Lake Marahau	11	11	0	22
	Lake Oturi	49	8	0	57
	Lake Pauri	3	1	1	5
	Lake Rotokauwau	8	9	4	21
	Lake Waiau	0	0	0	0
	Lake Waikato	0	0	2	2
	Lake Waipu	11	5	0	16
	Lake Westmere	19	8	0	27
	Lake Wiritoa	2	2	0	4
	Lower Ball Road	0	0	0	0
	Lower Taumaha Road	0	0	0	0
	Manaia Oxidation Ponds	6	2	0	8
	Milne's Lake	0	0	0	0
	Nowell's Lake	0	0	0	0
	Opunake Oxidation Ponds	0	0	0	0
	Opunaki Lake	55	20	0	75
	Patea Oxidation Ponds	1	0	0	1
	Stratford Oxidation Ponds	3	0	0	3

	Waverly Oxidation Ponds	0	0	0	0

Region Wellington

Site	Males	Female	Unknown	Total
Barton's Lagoon	0	0	0	0
Carterton Sewage Ponds	24	24	0	48
Duncans Lagoon	2	5		7
Featherston Sewage Ponds	15	15	0	30
Kourarau Dam	1	1	0	2
Lake Omanu	37	28	0	65
Lake Omanuka	25	11	56	92
Lake Rotomahana	22	17	0	39
Lake Wairarapa - Lake	0	0	400	400
Lake Wairarapa -	60	38	10	108
Lake Wairarapa -	17	0	20	37
Lake Wairongomai	0	0	8	8
Masterton Sewage Ponds	66	39	0	105
Matthews Lagoon	2	2	0	4
Otaki Sewage Ponds	52	43	0	95
O-Te-Pua Wetland	6	4	0	10
Pounui Lagoon	62	62	0	124
Pukepuke Lagoon	0	0	16	16
Smiths	4	2	0	6
Voss Lagoon	0	0	0	0
Waikanae Sewage Ponds	25	13	0	38
Waitawa Lake	0	0	0	0
Waiterere Beach Road	0	0	0	0

Region West Coast

Site	Males	Female	Unknown	Total
Barry Town Lagoon	0	0	0	0
Bisset Ponds	5	2	0	7
Blaketown Lagoon	8	5	0	13
Bradshaws Wetland	4	2	0	6
Buller Lagoon	0	0	0	0
Hokitika Oxidation Ponds	18	9	0	27
Karoro Oxidation Ponds	2	1	0	3
Lake Brunner - Iveagh	1	1	0	2
Lake Brunner - Swan	5	3	0	8
Lake Ianthe	3	3	0	6
Lake Poerua	0	0	0	0
Lake Ryan	16	6	0	22

Mahinapua	3	3	0	6
NE Shore Lake Brunner	17	7	0	24
North Cobden Lagoon	7	3	0	10
Okuku Reservoir	0	0	0	0
Pheonix Meat Works	0	0	0	0
Runanga Oxidation Pond	17	1	0	18
South Cobden Lagoon	0	0	0	

Appendix 6

Count site details

Region Auckland/Waikato

Site	Map No	Grid Ref	Access Details	Ref No
Beachlands	R11	775-874	North Beachlands Marina "Pine Harbour"	433
Black Lake,	S13	913-189		378
Caldwells Dam	R13	847-175	Through Andrew Caldwells Farm, past woolshed, see dam from top of hill. Farm is first on right (North) past Glen Murray Hall SH22	578
Cambridge Oxy.	S15	243-642		400
Cathcart	S12	910-370	From Mill Creek, left boat and walked McKenzie stopbank. Scanned Cathcart from McKenzie	436
Chick's Pond	T13			391
Clarks Bay	R12	665-540	Private	581
David Saxton	R13	881-146		609
Duck Creek -	T11	623-568	Access by road (Hikenai-Pauanui Rd 16acre "sanctuary" opp Tanners Sawmill. Small numbers present for last 6 years	437
Finlayson Road	S12	038-333	From findlayson Road	376
Firth of Thames	T12	312-400	From landing (Pipiroa Landing) Very popular shoveler counts	377
Fisher Pond	T13	324-225		390
Francis's Pond				559
Friedlanders				561
Hahei Oxy.Ponds	T11	605-808		387
Helensville Oxy.	Q10	393-038		370
Helensville	Q10	400-010	From side of Mangakura Road	534
Howarth	T13	490-030		397
Huntly Oxy.	S13	023-055		395
Karaka Lakes	Q10	264-092	woodhill Forest Block 7b. Note may be closed due to deer hunting. Access via gate immediately of Lake Kereta (marked no trespassing) thence 100m to locked forest gate, past Karaka Lake No. 1along Decon Road, thence next track left along forest boundary	535
Kidds, Karaka	R12	722-562		445
Kopuatai West	T13	326-259	Checked most ponds from Dagger Road to the Waikaka	446

			River along the side of the Piakp River.	
Lake Areare	S14	045-905		406
Lake B	S14	085-890	Through andrew Singers property	402
Lake C	S14	082-895	Via Andrew Hayes	403
Lake D	S14	072-894		404
Lake E	S14	105-865		405
Lake Harihari	R16	610-310		412
Lake Huiputea -	S16	040-326		453
Lake Kimihia	S13	040-112		394
Lake	S14	060-715		454
Lake	S15	053-610		407
Lake Ngaroto	S15	109-575	Used walking track around perimeter of Lake - viewing from all outcrops. Started from jetty finishing at rowing club approx 6km walk	408
Lake Ohinewai	S13	025-097	From Ohinewai Domain	384
Lake Pikopiko	S14	035-910		401
Lake Pokorua	R12	533-442	Awhiitu Peninsula. Private, scoped from private road end off Douglas Raod	611
Lake	S13	040-113	Access canal waikare-Rotokawau - boated length of lake until too shallow	383
Lake Taharoa	R16	625-360	By foot from Taharoa Village	410
Lake Waahi	S13	980-030	from crossing, under haulage road tunnell to Coalcorp plantings, to marae and back (includes bays and streams)	396
Lake Waikare	S13	060-175	From yacht club to refuge islands then down lake to Rotokawau entry.	380
Lake Whangape	S13	900-137	from Shuggs Landing to SE Arm to Swann Island to Tikotiko arm and back.	385
Leighton's Lake	Q10	310-113	95 Tuparekura Road	542
Main Karaka	260 (sheet Q10)	261-095	Parked car in Wilson's Road (at south end of Main Kareta Lake) Crossed private property of Geoff and Belinda Ward (025 933 729) to get to eastern edge of Woodhill Forest. Followed a well formed track (heading south) that runs along the western margins of the Kareta South Lakes (H2+3) and also the Main Karaka Lake.	530
Mangere Water	R11	670-705	Due to major works at the Ponds access is limited to Perimeter	371

			Roads	
Matarangi Oxy.	T10	495-933		386
Meremere	S12	940-301	Drive along Island Block Road Treatment pond on RHS when coming off SH1 500m from turnoff	598
Miranda	S12	162-438	South of Pukorokoro and Miranda Streams	467
Murray Young	S13	043-054	Drive down Evans Road, over bridge, wetland on right.	616
Ngaruawahia	S14	005-931	Park in entrance to /ponds and walk approx 80 mtrs to ponds which are visible from the road	399
North Shore	R10	639-933	Along southern shore from plant to motorway box tunnel	369
Otorohanga	S16	050-345		409
Owera Oxy.	R10	605-102		368
Paeroa Oxy.	T13	455-215		413
Patetonga / Piako	T13	323-230		389
Peter	S13	035-265		381
Pike's Pond				558
Ralph Road	S13	015-059	Ralphs Road	393
Rhyburns Lagoon	S12	924-378	From creek, walked along stopbank	375
Seagrove	R12	678-555	Through private property walked the foreshore from Clarks Creek 3.5km West	548
Strakas Refuge	R10	613-162	From weir to opposite teal	366
Te Awamutu	S15	115-538	Walked perimeter	411
Te Kuiti Oxy.	S16	983-186		414
Tee Head Pond	T13	392-192	Awaiti Canal	392
Thames Oxy	T12	370-450		388
Tuakau Oxy.	R12	797-357	From internal roads round ponds off Friedlander Rd	374
Waikato Delta	R13	655-292	Hoods Landing. Waikato Delta to top of windy channel.	373
Wairewa Oxy.	R10	619-165	On foot from road entrance along stopbank	367
Wattle Downs	R11	785-605		372
Wellsford Oxy	Q09	487-425	From St1 used Ray McFaddens race to pond entrance - walked perimeter of ponds.	487
Whangamarino	S13	995-265	Used boat from end Wattle Rd launched at Herlet's Hut, down Reo Stream, along Suttons causeway to Penninsula, then across country to scan by binoc to Lone Pine	476

Whangapoa	T10	455-925	5 different points including inlets to Opitonui, Owera and Matarangi Stream	488
Whitford	R11	743-859	cnr Potts and Clifton Rds - Ayrlies Pond owner Bev Conner	489
Whitianga	T11	505-795	Via various farms and by boat	490
Whitianga Oxy.	T11	510-820		379
Whitney's Lake	S13	929-165	From roof of Whitney family hut.	382

Region Central South Island

Site	Map No	Grid Ref	Access Details	Ref No
All Day Bay	J42	438-526	Count from Waianakarua Beach Rd	77
Bells Irrigation	J41	495-882	Count from Ross road off Ikiwai Raod at Tawhai. Count from road skirting pond.	519
Bortons Settling	J41	358-895	Access via angler access/public road off SH 83. count while driving road that skirts pond.	518
Devils Bridge	J41	480-722	Devils Bridge Road from Ardgown Road. Source of an Oamaru Creek tributary.	517
Horseshoe	K38	762-553	From end of Connollys road walk south approx 800m along stopbank/beach. Count from beach	70
Normanby	J39	707-378	drive to end of lagoon drive off Normanby road. Count from beach Dune	73
Old Orari Lagoon	K38	834-623	Walk along beach north of river mouth and count from Beach dune starting near marcrocarpas	64
Opihi Lagoon	K38	784-573	Count from Milford huts	69
Opihi Lagoon	K38	794-585	Park at the end of White Rd. Walk along stopbank and beach. Count all lagoon and farm pond oxbows as you go. Long walk.	67
Opihi Lagoon	K38	779-569	From end of Connollys road, north, Count from about the macrocarpus row	68
Orari Lagoon	K38	827-617	count from stopbank at the end of Parke rd.	65
Otipua Wetland	J39	705-415	Count from public walking track around wetland	72
Pareora	J39	681-329	Access along beach from freezing works	75
Pareora Lagoon	J39	678-323	Park adjacent to freezing works, walk south along track and beach to lagoon (approx 500m further along bach from freezing works pond)	76
Pig Hunting	J39	703-369	Access from end of Craigies road off SH1. count from top of	74

				beach dune and walk 800m along southern bank to count the top end of the lagoon.	
	Rooneys Pond		646-055	Access off Myers or Hayman Road via farm track. Count from southern end in paddock.	554
	Saltwater Creek	J39	715-415	Walk true right of saltwater creek from SHWY 1 to sea and then along coast	71
	Smithfield		703-466	Count from car park (deer unloading area) off Westcott Road (back entrance to Smithfield works)	555
	Spider Lagoon	K38	816-607	Access from end of Macaulay rd. walk north along stopbank. Count all water visible until standing near centre of the laggon complex	66
	Wainono Lagoon	J40	640-100	count using spotting scope from both sides. Western side from the end of Clay road opposite café. Eastern side count from two or more central points whilst driving along beach dune track	78
	Wainono Reserve	J40	645-086	Access from Poingdestres rd. count from top of dune using spotting scope	79
	Washdyke	J39		Park near train overbridge, walk along beach, count from two central points on beach.	429

Region	Eastern				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	Aniwhenua Lake	V16	410-126	Access at Rabbit Bridge or Dam. Count from Kopuriki Bridge first (upstream and downstream). Good idea to do this area by Kayak and lower lake by motor boat.	12
	Awaiti Wildlife	V15	453-577	Access off Gregg Road.	7
	Bethleham	U14	853-858	SH 2 Tauranga, turn rigth at Bethleham round-about into Bethleham Road, right into Westmorland Rise, and follow down to first wetland	550
	Bookers Pond	V15	356-442	The outlet is used for sprinklers on the effluent ponds.	20
	Braemar Lagoon	V15	382-507	Braemar Road	25
	East Valley	V15	361-449	Henarae Kapa 0212232957 (security) Really two ponds. Count top pond when first comes into view as drive down hill (from Hogg Road entrance) and bottom pond once have driven down to bottom of hill and along shoreline short	21

			distance adjacent to main pond. This flows into pond 3.	
Kaituna Cut	V14	110-780	End of Ford Road	27
Kaituna Wildlife	U14	070-780	Access off Parr Road, where road takes a sharp right angle to the West.	9
Kawerau Road	V15	330-410	Kawera Road. Rotopatoka Trust for permission	26
Lake McLaren	U14	779-722		416
Matata Wildlife	V15	410-615	Access off SH 2. Can get good view from on top of sand dunes.	8
Poverty Bay	Y18	440-694	via Golf Club	575
Repongaere	Y18	345-780	Though John Tuhoe's property. Access track to ridge line which overlooks the lake. 4WD when dry.	18
Rerewhakaaitu	V16	160-170	Access off Brett Road or Ash Pit Road.	11
Rotoitipaku Lake	V15	358-427	As coming from Rotorua to kawerau go through first set of traffic lights (offices go left big car park opposite) there is an overhead road with access to it off to right off SH34. Go over bridge and head towards river will need to phone 07-323-3456 to get to open green gate (Saftey Card No. 3395 exp 4/8/2010). From Norsk Skog Effluent Plant	23
Rotomahana	V16	110-200	Turn off Waimangu Road into Wairua Road then follow angler access signs to Lake.	10
Rotoroa Lake	V15	360-445	Is called pond 4 & is the pond before the outfall into the Tarawera River. First large pond come to when coming via Hogg Rd entrance is Pond 3 count them (ie 3& 4) as one pond	19
Tamurenui Lake	V15	375-460	Access off SH 30.	24
Thornton	W15	518-583	Access off Thornton Road	532
Urupa Lake	V15	359-430	From Norske Skog Tasman Effluent Plant	22
Whakaki	X19	040-300	View from railway line. Eastern side viewed from Max Pakus or A Power? Access via 1st gate on left when traveling from Whakaki to Wairoa when you first reach the lake. Whakaki Farm Brownrig - Manager Wayne Feck Manager 06-838-3998. Other access to the Eastern end can be through via Whakaki Trustees harold Ngarimu??? Brownrigg Manager Pane Hook 06-8377654. Trustee Paul	17

				Teaho 06-8384043. Permission on sign 06-8377901	
Region	Hawke's Bay				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	Clive East Road	v21	479-728	Estuary that starts at the end of old Ferry Road in Clive. There is a cycle path along the estuary	587
	Horseshoe Lake	v22	310-360	Access off Mangarara Road. Stop at the gate that's sign posted for lake viewing point - walk along fence at top and walk towards lake for 5- 10m	579
	Hurimoana	V21	297-767	Access of Taihape Road. Second gate after cross the Ohiwa Stream. Follow farm track around base of hill. Gate is next to a sheep dip. Farm owners are Selwyn Dorward Alness Farm 644 Taihape Road, Hastings.	2
	Lagoon Farm	V21	425-827	Shallow wetlands by Lagoon Farm parralel to Prebensen Drive West of HW 2B	589
	Oingo Lake	V21	315-745		15
	Pirimu	U23	068-126	Access off Lake Road. Travel along high ridge Gate is the second? one back from the Lake Road intersection. John & Raymer? Barrett, Lake Station 478 Lake Road.	4
	Poukawa	V22	271-515	Access Settlement Road. Turn left at sign that says Private Access beyond this point. Travel down farm track until hit drain that enters Pokawa from South end. Can Launch boat/kayak here.	6
	Pump House	V21	431-830	Best access is from Tamatea Drive and walking down eastern side of drain.	14
	Roto O Kiwa	V22	232-475	At the end of Boundary Road turn left and follow farm track. Land is managed by Brownriggs. First pod is dry, other one is on the West side of the railway tracks.	3
	Runanga Lake	v21	427-860		16
	Turfrey Swamp	V21	428-870	From SH2, 200m past Turfrey Rd by Napier airport. Best done early am to get light right.	507
	Waitangi	V21	467-749	Off SH2, across Railway. Count from Railway embankment.	545
	Westshore Ponds	V21	433-846	Turn off SH 2 at Westshore on to Watchman Road. Count birds from causway.	13
	Whatuma	V23	110-255	Access sign off Race Course Road	529

				by cattle stop (past race course)	
	Willow Dam	U23	085-205	Access off Nichols Road. Farm House Doug Mackie 852 Porongahau Road.	5

Region Nelson/Marlborough

Site	Map No	Grid Ref	Access Details	Ref No
Aorere Estuary	M25	807-614	Road	309
Aorere	M25	814-602	Road	310
Aorere River	M25	824-593	Boat -Ruataniwha Inlet/Aorere Mouth	308
Balfour's Pond	P28	970-618	From road bridge	256
Bankhouse	O28	694-637	Canoe from south bank	268
Bell's Island	N27	249-907	On NE Pond + other ponds	284
Best Island	N27	233-896	From road. Corner besides estuary + bridges	285
Big Lagoon	P28	035-624	From 4WD Track	251
Carter's Pond	N27	174-845	With permission, downstream pond	290
Casey Road	P29	024-466	From road	248
Coastal Highway	N27	137-028	All ponds cut off by highway, especially freshwater (Easton's)one	292
Corder Pond	O27	367-968	From beside internal road. Remove as no longer holds water	279
Duck Shooter's	P28	020-602	Top of terrace & Department of Conservation sign	255
Dune Lake,	M24	882-773	From vehicle track	313
Eastern Waimea	N27	275-868	From Whakatu Drive	280
Elterwater	P29	058-334	Gate/Hill past gravel stock pile, Mrs Sandall's front lawn	246
Ferrer Creek	N26	106-149	From both sides of Lodder Lane	299
Grove Arm	P27	862-927	From road	269
Grove Mill	P28	766-650	From behind winery	267
Grovetown	P28	916-695	From Crafar maimai, olive nursery to road side	263
Havelock Estuary	P27	733-917	From vantage points from SH6	274
Island Lake,	M24	810-772	From vehicle track	314
Kaihoka Lakes	M24	756-726		317
Kenepuru Head	P27	044-035		271
Kidney Ponds	P28	042-611	From 4WD Track	253
Kumaras/Oxidati	N26	125-119	From end of Staples St through eastuary to east of ponds down to coastal area	297
Kumera Estuary	N26		Walk down Northern boundary of Phil Peters horse paddock to get accurate count of birds	501

			between Kumueras carpark and oxidation pond carpark	
Lake Grassmere	P29	095-415	SH 1 Clifford Bay Farm gate	247
Lake Jasper	P29	912-487	From vehicle halfway along lake	249
Lake Otuhie	M25	603-575		319
Lake Rotoiti	O31	588-677		245
Lake Rotorua	O31	583-663	Brian Seddon on both sides of lake	244
Lower Opawa				257
Lower Pelorus				275
Lower Waimea	N27	218-915	From Rough Island and O'Connors and out to boat ramp on Rabbit Island	282
Mahikipawa	P27	795-905	Boat	270
Mangarakau				318
Maori Is	P28	914-696	Drive along Maori Island Rd	262
Maori Lookout	P28	020-603		252
Mapua	N27	183-938	Grossis Point Reserve to Noman's Island	289
Mapua School	n27	177-955	Park at Mapua school - pond immediately behind school	590
Marahau	N26	108-235	High tide roosts at mouth of Marahau	302
Marlborough	P28	828-631	From Lake View Rd	266
Mississippi	P28	969-647	From True LH Stopbank	259
Motueka River	N26	115-138	From west bank road and from Kaiteriteri Road	298
Motueka	N26	123-102	From Motueka Quay only	296
Motupipi Inlet	N25	961-407	Boat - Mouth and estuary of Motupipi.River. On Foot at grid ref	304
Moutere Inlet	N27	141-022	From vehicle, especially at head and beside island	291
Mouth of	N27	197-921	From Hunter Brown Reserve and Equestrian Road	287
Neiman's Creek	N27	234-890	From track leading from corner of Lansdowne Rd and from Best Island road corner	281
North Wairau	P28	981-668	From Department of Conservation track beside large pines	261
Otarawao	O26	675-180	Ask Jeremy Foley	272
Otuwhero	N26	097-213	In estuary from Marahau Road	301
Oxidation Ponds	P28	969-632	All ponds including PPCS	258
Pakawau	M25	833-688	Road	311
Para	P28	898-780	By canoe from new pond outlet to Boat Point and Mackels &	265

				return	
	Parapara Inlet	M25	833-543	Road	525
	Parapara Inlet	M25	832-526	Road	306
	Pearl Creek	N27	210-904	End of Cotterel's Rd	283
	Port Motueka	N27	113-080	High tide roost from York Park looking towards Wharf Rd	295
	Puponga	M24	875-758	Road	312
	Riverside Pond	N27			293
	Riwaka River	N26	100-159	High tide roosts from Kaiteriteri Road	300
	Robinson's	P25	785-434	D'Urville Island	273
	Rough Island	N27	208-911	Old Waimea R channel to west	288
	Saxton Field	N27	281-867	Off Station Road	513
	Takaka River	N25	933-431	Boat - Mouth and estuary of Takaka River from Rangitaeata to Waitapu Estuary	305
	Taylor Dam	P28	877-589	Flushed lake edges	264
	Te Aropipi	P28	996-652	From Boulder Bank, near Waverley wreck	254
	Traverse	N27	204-928	From bridge and drive along road on Southern side	286
	Triangle Lake	M24	883-768	From East	315
	Upper Lagoon	P28	977-633	From Harding's Rd and walkway	250
	Upper Moutere	N27	107-901	Various locations	294
	Wainui Inlet				303
	Wairau Estuary				260
	Wakapuaka	O27	465-034	From Maori Pa Rd	276
	Wakapuaka	O27	377-007	From northern access road	277
	Wakapuaka Pond	O27	375-990	Sewerside Drive and adjacent estuary	278
	Westhaven	M24	741-710	Ferguson's Letterbox	316

Region	North Canterbury				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	A&P Ponds	m36	759-394	Southside riding for the disabled carpark whin showgrounds off Curletts Road	627
	Bromley Sewage	M35	870-415	Drove and walked around pond. 6 ponds in all.	131
	Brooklands	M35	862-553	Survey from several shoreline locations (including observation tower).	633
	Cheviot Settling	O33	315-216		556
	Coopers Lagoon	M37	540-044	Viewed from McEvedys Road, then drove along beach side to top of lagoon in order to cover all bays.	205

Greenpark Sands	M36	672-152	From Eeglens? At Wolfs Road to Halswell River mouth. NB covers two Maps M36 & M37, E672 to 756, N152 to 210	417
Harts Creek	M36	578-130	Along boardwalk North to South + use of hide. Access off Timber Yard Road	133
Janet Stewart	M35	824-494	Off Lower Styx Rd	624
Kaiapoi	M35	846-582	Full survey of all ponds - Follow internal perimeter road.	632
Lake Ellsmere -	M36	820-130	Parked vehicle at both ends and walked along old rail enbankment.	514
Lake Forsyth	M36	920-120	Started from top end of bay near Kinlock? Homestead; round bay to little river; through rushes & swamp & willows along eastern embankment to settlement and to outlet.	130
Prestons Ponds	M35	828-495	End of Metehau St (4 ponds)	625
Rakaia Lagoon	L37	490-017	Launch boat at ramp and observe from the closed game area to the river mouth	623
St Annes	O33	253-320	Walked around the North Side from the entrance to Rentoul Park, to a point where the Western end of the water could be seen. Southern side not walked as ewes lambing.	203
Styx Mill Reserve	M35	782-489	Styx Reserve Birds on all 3 ponds. Access via public walkway off Styx Mill road.	585
The Sister	O32	306-347	Walked around Southern end of main pond to be able to see all of thewater area. NB the pond on the North side of the Sisters Rd alongside the entrance to the main pond was viewed from the road.	204
Travis Wetland	m35	858-459	Carpark of Mairehau Rd. Walk to bird hides + access points	626
Tutaepatu	M35	860-645	This was originally recorded as Woodend Lagoon. Gladstone Road, then walk 400m to lagoon. NB Cannot walk around shore. Or via Tahaitaua coastal park Woodend Beach	132

Region Northland

Site	Map No	Grid Ref	Access Details	Ref No
Ararua	Q08	152-707	12.4 km on Ararua Rd from SH 12. 10 Ha irrigation lake on edge of road Jackson's prepoerty.	428
Aupouri Forest	N03		Travelled 5km North of Lake Bullrush to un named lake . Situated in D.O.C RESERVE. Just North of Swan Lake.The	153

			Grid ref for this is wrong. Have change GR but not sure if this is the site???	
Aupouri Forest	NO3	051-072	Access on foot at end of Road	152
Borrowcut	QO6	026-021	Turn left off State Highway 1 next to Hikurangi and follow Jordan Valley Rd until the Wairua River bridge is reached . Cross bridge and turn right then follow stopbank Rd until wetland is reached on the right hand side.	155
Bulrush Lake	N03	109-215		620
Dargaville	PO7	091-085	Turn left off State Highway 14 just over bridge prior to entering Dargaville. Follow road to pondes.	147
Doug Donaldson	Q08	381-595	Farm track past Burnt? 1/2 round shed off Ranganui Road off Oneriri Road Kaiwaka. Farm for sale. Doug Donaldson 09-431-2228	580
Flaxmill	PO7	089-087	Located off Waihue Rd, Northwest of Dargaville (5km). Observed from town end (Southern Pond)	533
Glinks Gully	P08	886-691	In gully on left approx. 250m down Glinks Road	599
Greenheart	P07	062-004	End of Bob Taylor Rd and walk in	586
Hikurangi	Q06	026-021	Turn left into oxidation ponds off Jordan Valley road from state Highway 1 near Hikurangi. Ponds situated at the end of the raceway.	138
Hokianga	O05	563-428	Short drive from township. (Western side of bight) Clear. Bino observation.(7x50)The grid ref for this site was wrong think I have corrected it?? (MM)	143
Hospital Pond	O05	564-432	Below hospital 445m North of Rawene oxidation ponds	619
Kaikohe	PO5	050-083	Take TePua road off state highway 1. The whole lake has a road in close proximity to the lakes periphery. Bordering landowners are very helpful.	142
kaikohe	P05	853-415	Accessed of Cumbers Road, South of Kaikohe on Mangakahia Road.	503
Kaitaia	O04	316-768	303 Bonnett Road	608
Kaiwaka Rail	Q08	381-596	Off Ranganui Road (past woolshed) new manager is Brett Best 021956-676	602

Karikari	O03	446-036	Inland Road Karikari through recycling depot	606
Kauri Dairy	Q06	018-029	Access is via Dairy farm raceway prior to Dairy Company entrance when heading North. Follow race until settling pond is reached.	139
Kawakawa	P05	062-448	Off Mill Road near Kawakawa on SH1	504
KeriKeri	PO5	004-060	Access is via Te Wairoa Rd near Haruru Falls.Check Topo for details.	150
Lake Manuwai	P04	893-691	End of Sandys Road Kerikeri	531
Lake Omapere	P05	819-493	6 km North of Ohaewai on SH 1	426
Lake Ora	Q06	011-027	Able to walk around lake. Lake area approx 7 acres.	506
Lake Owhareiti	P05	964-455	Accessed off Ludbrook Road off SH 1 at Pakaraka	425
Mangawhai	R08	521-680	The sanctuary gated subdivision wetlands and ponds off Robert Hastie Drive	594
Marua	QO6	035-025	Private irrigation dam. Access through farm.	141
Matakohe	QO8	065-014	Turn right off State Highway 12 when heading to Ruawai into Oparakau Rd. Follow Rd till Ball Rd is reached . Follow Ball Rd, then take the first left into Murphy Rd. Irrigation dam is 12 Hectares in size on private property.	149
Mimiwhangata	Q06	403-103		502
Ngunguru	Q06	465-183	Off Waiotoi Road on LHS long driveway opposite No. 3132 Ponds tucked into hill	607
Opahi Swamp	P06	038-335	Off Matawai-Marommaku road swaamp right hand side of road near Maromaku from SH1	505
Port Marsden	Q07	418-920	3.9km on right from Marsden point roundabout on SH15A opposite Development gravel site Access through farm gate then Ta5ranaki gate.	595
Pouto Peninsula	QO9	135-387	Turn right just before road bridge on Pouto road. Bridge is approx 2.5km before the end of the road.Follow road until Lake is sighted on the right hand side.	144
Pouto Peninsula	PO9	042-042	Turn right off Pouto Peninsula onto Ari Ari Rd, follow road until the first t rack on the left is encountered. Follow track until lake is spotted.	146
Pouto Peninsula	PO9	004-049	45 KMS from Dargaville on	148

			Pouto Rd. Lake is visual from road on right hand side heading South.	
Pouto Peninsula	QO9	014-038	Same as Lake Rotokawau except lake is on the left hand side of the road as one proceeds.	145
Rawene	O05	564-432	393 Rawene Road Private Pond off Rawene Road between oxidation pond and hospital	613
Rawene Wetland	O05	566-408	Off Rawene Rd park in old siding 1.5km up Rawene Road on RHS. Walk into plantation forest to view wetland	593
Red Hill	R08		Off Red Hill Cemetry Road on Leith McKenzie property	427
Rototuna	P09	040-494	45 KM from Dargaville on Pouto Road	618
Ruakaka			Ponds off Imovale Road	424
Smiths	Q06	214-222	Private Farm Race Leading from Tanekaha Road, Off Jordan Valley Road	552
Souther	P05	908-595	Access on foot from Wiroa Road Past Kerikeri Airport.	415
Taipa Marsh	O04	514-884	242 Taipa View Road	604
Taipa Oxidation	O04	524-891	Off Taipa Orruru Road	605
Waipu	Q09	040-078	Situated near township. The grid ref for this site is wrong	135
Waipu	Q08	432-794	120 Nova Scotia Drive, Fontera supplier #11742. Take farm track to the right follow the river for 1km then turn left onto farm track heading into dune scrub on hill	596
Wairua wetlands	Q06	206-203	F&G and DoC sign on swamp Road just past Ballance Fert Silo on LHS Road	592
Waitangi	PO5	003-064	Check topo for access via KeriKeri township.	151
Waro Lake	Q06	274-230	Go into Hikurangi township, drive past recycling/rubbish station down side road (east of main road). Lake at end of side road.	570
Wellsford	Q09	487-425	First turn right off State Highway 1 past Golf Course.Oxidation ponds situated at end of road.	134
Whakapara River	Q06	024-027	Access off state highway 1 where the road crosses the Whakapara river. Follow Southern river bank.	140
Whangarei	QO7	005-030	Aprox 1km down RewaRewa Rd off State Highway 1 when entering Whangarei. Easy access	154

				from road edge through gates. District Council owned property.	
Region	Otago				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	Balclutha	H46	576-362	Behind Nash Park. Accross (NW) from Balclutha township	584
	Balclutha	H46	583-334	Through gateof sewage pond turn right approximately 250m to point where all of the pond can be seen.	163
	Big Boggy Burn	F9	827-241	Counting point from 20m above trail, on hill @ 300m from lake. Plus count where possible on North side of wetland	583
	Blakelys Dam	H42	783-568	#188 off Gimmerburn/ Waipata Rd. Geoff Winmall new owner 0274380647	188
	Blueskin Bay			Viewed from vantage point approximately 500m past railway on rout to Warrinton?	173
	Borrow Pits	I45	912-677	View from main road	569
	Camerons Dam	H41	650-750	Drive up Hills creek Road off Oturehua Road through the Ida Valley turn left into McKnight Road it is right beside the road. (Please check grid reference as this was guess from instructions and Google Earth)	600
	Carr's Oxbow	H42	736-445	From gate 1/2 way down hill on Pateroa - Puketoi Road LHS	423
	Creamery RD	H42	803-543	From Creamery Road	183
	Diamond Lake	E40	446-981	Old day use picnic area midway off Gly/Paradise RoaD NE end.	192
	Duffys Lane			Drive along fence line from Duffys lane to end of willow view driveway	182
	Finegand WR	H46	586-631	Walked flood bank on SW bank	164
	Flood Free				165
	Frankton Arm	F41	737-668	Kawarau Falls Motor camp pier south side at outlet	191
	Glenorchy	E41	461-860	Elevated above lagoons midway on road eastern shore	194
	Hawksbury	j43	321-146	Waikouaiti - Walked along the stop bank in the centre of Hawksbury Lagoon	176
	Hoopers Inlet	I44	290-800	Glassed area from Kohuka (outlet) to Hoopers Inlet Road along Hoopers inlet Road to Allans Beech Road, and along road to Murray Farm Point?	171
	Inch Clutha	H46	592-345	Drove along road next to main ponds	161
	Kaikorai			From standing next to bridge on	169

			main road.	
Kaitangita	H46	663-300	From Road	159
Kidds Rd			Standing on Southern side of pond	180
Kirkpatrick	E41	614-665	Outlet North end of lake	189
Kogans Bridge				181
Lake Dunstan	G41	170-801	Gilmoree Rd off SH6. Drive to end of road through gate walk up hill to get some elevation for glasing	582
Lake Hayes	F41	802-725	Bendmeer Reserve and Aslo counted GR 797-737 Mill creek confluence reserve north shore	190
Lake Johnson	F41	736-695	Elevated position above lake on east shore	196
Lake Tuakitoto	H46	647-379	Stationary from anglers access gate at NE corner of main lake	158
Lake Waihola	H45	855-620	From Titi Road (GR 855-620).	166
Lake Waipori	H45	852-677	From Bert O'Briens front lawn	168
Lone Pine	I42	080-357	Off Golden Point Road?	547
Mathias Dam	H42	840-500	Access through Anglers Access point off Patearoa - Waipiata Road. From hill behind shooters hut.	184
Matukituki Valley				200
McSkimmings	h41	657-803		571
Merton Arm			Walked 3/4 length of estuary along SH1	174
Middlemarch			From access road.	179
Minaret Station				199
Moke Lake	E41	612-685	Elevated point off track SE corner	195
Old River	H46	647-258	Walked NW side from Sth to Nth mouth of Clutha	160
Paddock Bay				198
Palmerston	J43	325-235	Walked length of pond (West Shore) adjacent to Horse Range road	178
Papanui Inlet	J44	310-820	Glassed from Inakays? Road over entrance area, then along Cape Saunders? Road, Papanui Inlet Road to Dicks? Road, then along edge of inlet to cribs.	172
Patersons Dam	H42		Off Moa Creek Road, Ida Valley Station	564
Prison	H45	789-532	Oxidation ponds can be seen off Back Road	597
Puerua River	H46	639-244	Turn off Kaka Point Road down farm track to the fishing hunts at river mouth	615

Ranfurly Sewage	H42	823-591	Behind Ranfurly Township	187
Reid Lake	E40	455-947	Along high terrace, east side midway?	193
Rutherfords	H42	863-578	Off Waipata - Naseby Road. From dam wall at SW corner	186
Sinclair Wetland	H45	835-645	From Road to SW at top of the hill (GR 835-645) and from boat ramp	167
Stirling Oxidation	H45	621-342	From gravel Road at GR H46 621 342	162
Stoney Ck			walked along the Southern Shore	177
Styx	H43	698-270	Off the upper Taieri - Paerau Road	572
Taieri Lake	H42	894-548	From high ground at GR H42 895-545	185
Taieri Mouth	I45	925-559	Off Akatore Rd, Behind Taieri Mouth School	588
Takitakitoa	I45	916-626	Off Takitakitoa Road - access true left bund wall	601
Tapanui	g45	187-675	Access off Duncan Road, Tapanui	630
Tomahawk	I44	191-755	Glassed area from Tomahawk Road	170
Tomahawk	I44	198-656	From behind hall and Northern carpark and track	365
Waikouaiti	I43	270-076	Counted birds by standing on the north shore	175
Wanaka				201
Winmill Dam	H42	766-561	Crn of Gimmerurn-Waipiata Road and Patearoa-Maniotot Road	617

Region Southland

Site	Map No	Grid Ref	Access Details	Ref No
Acton Downs	E44	453-994	Adjacent Acton Downs Homestead	98
Big Lagoon	E46	530-455	Through Tony Riegers property	543
City Lagoon	E47	520-095		523
Daffodil Bay	E47	487-048	From Sandy Point track to Daffodil Bay - walking track to North and grassed area to West.	568
Dawson City	D43	107-157	Via Wilderness Road	106
Gore Oxidation	F45	962-464	Located on southern outskirts of Gore	93
Invercargill City	E47	524-095	From Bluff Rd, on new walking track	538
Invercargill	E46	520-100	Via city tip	102
Lake Murihiku	E46	457-120	Via Mark Sutton's old place. New owner Keryn Crook 03-2131208. 26 Huges Road. Take waders as you will need to wade	103

				out about 20m into lake. Be careful as mud becomes very deep about this point. Count done at -46.405518, 168.2622 degrees	
	Lake Te Anau	D43	944-163		521
	Lake Te Anau	D43	955-163	Shoreline adjacent Te Anau Golf Course	105
	Little Lake	F47	770-965	Via eastern end Lake Waituna	92
	Lumsden	E44	552-857	Located via .5km SW of Lumsden via NS Transport access road	96
	Mahinga Kai Pa	F47	773-964		635
	Mataura	F46	896-348	Located I km south of Mataura on true right of Mataura River	94
	Outlet Area	D43	015-135	Via public right of way though O. Buckinghem farm.	107
	Peter Menlove's	E44	523-761	At Caroline adjacent State Highway 6	97
	Riversdale	F44	760-723	Located on Dunn and Cody Road 3kms west of Riversdale.	95
	Ryan's Pond	E44	379-780	Via Castle Downs Road	99
	Te Anau	D43	982-207	Adjacent left bank lower Upukeroa River	104
	Waimatuku	E46	375-173	Adjacent mouth of Waimatuku Stream	100
	Wallacetown	E46	482-187	Adjacent Makarewa Stream	101
Region	Taranaki				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	Eltham	Q20	225-953		576
	Geary Road	Q21	299-678	Southern side of Manutahi Raod at the Geary Road corner. Go into paddock on LHS of lake	45
	Hauroto Road	Q21	151-785	Irrigation pond on Hauroto Road north of Hawera.	622
	Hawera	Q21	189-762	Off Fairfield Road off SH3 or Manawapou Road	41
	Hawken's	R22	536-503	Off the end of Hawken Road, follow track round to the right and along fence line. Climp to top of highest mound.	52
	Ihupuku Road	R22	522-557	Ihupuku Raod opposite the end of Lennox Road	50
	Julian's Lake	P21	870-902	Michelle & Richard Julian Off SH45 just north of Watino Road	40
	Kaitoke Lake	R22	871-360	Kaitoke Road. From Pritchard property, top of farm track	56
	Lake Grassmere	S22	929-333	SH3, From drive way track shown on topomap	60
	Lake Herengawe	R22	503-555	From Ihupuku Road	49

	Lake Kohata	R22	876-350	Kaitoke Road. Access track from road		57
	Lake Marahau	R22	656-497	Waitotara. Marahau Road, 'Marahau'. Follow tracks to southern and northern ends of lake		54
	Lake Oturi	Q22	490-572	Rob Amon 0274713767 063465812 On RHS of Waverley Beach Road heading toward the sea. Entry on lake front (drives birds to far side of lake), then enter Dairy No.90, go into left hand paddock at the second set of gates (the one with a single pine tree in it), go to far bottom corner of paddock, across stile, out on boardwalk to maimai		48
	Lake Pauri	R22	895-343	Pauri Road. At east end of lake, from road		59
	Lake Ratapiko	Q19	248-213	Ratapiko Rd. Access at boat ramp for power boat armof the lake. Access at ski club for ski arm of the lake.		537
	Lake Rotokauwau		S22	940-326	SH3 Ken McDowall's	
place	61					
	Lake Waiau	R22	540-548	Chris & Carley Amon 063465533 Off Ihupuku Road, walk from southern end half way up the north-western side		51
	Lake Waikato	R22	628-513	Russell Road, stables entrance. Roger Handley 3074 SH3 to access Northern end of lake follow race.		53
	Lake Waipu	S23	940-269	Rangatahi Road. Through gate with railway irons down to below woolshed		63
	Lake Westmere	R22	810-436	Rapanui Road. Enter at Westmere Refuge sign		55
	Lake Wiritoa	R22	884-346	SH3&Kaitoke Road. North arm accessed from Campbell's property (SH3), view points also ski club and Scoutlands		58
	Lower Ball Road	Q21	305-664	Mark Shrider 0276688176 Up farm race by cowshed and onto gravel track to centre of cresent shaped lake		46
	Lower Taumaha	Q21	278-697	Edna Saxton 067589290 Glenn WingateThrough gate on RHS near lower end of lower Taumaha Road, Manutahi		44
	Manaia	P21	062-803	At the end of Sutherland road		612
	Milne's Lake	Q21	208-757	Left hand lake at the end of Nowell Road off Manawapou Road Hawera		43
	Nowell's Lake	Q21	204-760	Paul Roberts 021360260 Right		42

				hand lake at the end of Nowell Road off Manawapou Raod, Hawera	
	Opunake	p20	817-953	Off SH 45	574
	Opunaki Lake	P20	842-938	?	603
	Patea Oxidation	Q22	372-590	From gate on Motor Camp Road	536
	Ratana	S23	949-272	Rangatahi Road, 2 ponds	62
	Spence Road	Q21	325-652	RHS by old dairy shed. Park by shed and walk across concrete crossing and then left to centre of cresent shaped lake	47
	Stratford	Q20	224-061	Victoria Road Stratford	577
	Waverly	Q22	492-583	Turn right over railway line 700m down Waverly Beach Road from Waverly.	546

Region Wellington

Site	Map No	Grid Ref	Access Details	Ref No
Barton's Lagoon	S27	041-018	Form Featherston via Murphy's Line and Lake Domain Road. Barton's Lagoon is immediately north of the toilet block situated under pine trees at Lake Domain, it is immediately west of the adjacent count sites at Lake Domain wetland.	526
Carterton	S26	203-154	Turn off SH 2 onto Dalefield Road. Entrance to sewage ponds is sign posted.	497
Duncans Lagoon	S24	232-966	Owner: William Duncan 0274431998	232
Featherston	S27	077-949	Turn off State Highway 53 onto Donald Street and then turn right onto Viles Road. Entrance to sewage ponds is the first turn on the left along Viles Road.	528
Foxton 3	S24	014-838		495
Foxton 4	S24	014-845	Nigel Sexton 06-329-9797. turn off main road by water tank drive along farm track as far as possible Gap between 3 & 4 on left.	562
House Lake	S24	016-865	1st lake on LHS of Rd, En route to Lake Koputara. Mr Sexton 06-329-9797	563
Kaikokopu Lake	S24	022-898	Owner Charlie Pederson, Access via Himitangi Beach Road 404. Combination Lock 1310	566
Kourarau Dam	T27	371-093	From Gladstone via Tupurupuru Te Wharau Road	243
Lake Domain	S27	044-012	From Featherston via Murphy's Line and Lake Domain Road. To avoid any confusion the count site is not the Lake Domain Lagoon but the wetland	238

			immediately adjacent to Simmonds Lagoon at the far eastern boundary of Lake Domain.	
Lake Koputara	S24	018-869	Owner: Tom Willis 06 327 7397	228
Lake Omanu	S24	009-816	Owner: Wellington Fish and Game	229
Lake Omanuka	S24	077-949	Owner: Cameron McKelvie 06 324 8526	226
Lake Pukekura	S24	140-816	Contact: Richard and/or Geoff George, 06 363 8576	230
Lake	S25	945-635	Off Hokio Beach.	235
Lake Rotowhero	S23	087-165	Owner: Jim McDonald 06 327 5566	225
Lake Wairarapa	S27	041-014	From Featherston via Murphy's Line and Lake Domain Road. Count site is immediately infront of the stand of Radiata Pine at Lake Domain camping ground.	239
Lake Wairarapa	S27	004-940	Off Parera Road then along the stop bank on the south side of the Oporua Spillway. Count is made from the end of the stop bank.	241
Lake Wairarapa	S27	039-990	From Featherston via SH53 and Diversion Road, then access property of Jane Gillett to the mouth of the Otakura Stream.	240
Lake Wairarapa	S27	935-964	From Featherston via Western Lake Road. Count is made from the road side adjacent to the	242
Lake	S25	910-528	From Main Street in Otaki, turn onto Te Rauparaha Street, and continue along Convent Road, and then past the Otaki Golf Course onto Wairongomai Road. The Lake lies to the west of the end of Wairongomai Road across farm land.	234
Lakeview Farm	S25	985-668	Turn off Hokio Beach Road onto Moutere Road. Farm managers residence is at the end of Moutere Road, from this point lagoon can be reached via farm tracks. Contact Lindsay or Wendy Smitt, farm managers.	236
Masterton	T26	355-202	Entrance to sewage ponds is sign posted on Manaia Road just south of intersection with Homebush Road.	496
Matthews Lagoon	S27	003-913	Turn off Kahutara Road onto Parera Road. From Parera Road walk down the access track to the edge of Matthews Lagoon and then follow the eastern shore of the lagoon south past to row of poplars until a clear view of	498

				the lagoon can be obtained.	
	Middle Lake	S24	016-868	This Lake is Between Koputara and House Lake	565
	Otaki Sewage	S25	902-473	Turn off SH 1 onto Riverbank Road, the entrance to the sewage ponds is signposted.	500
	O-Te-Pua	S25	938-498	Turn Off Statehighway 1 just before reaching the Forest Lakes Road turn-off on the left heading north. Contact landowner Graham Booth to arrange access (04 476 9603 or 06 364 5584)	527
	Pounui Lagoon	R28	878-803	Turn off Western Lake Road and travel along the stop bank that forms the northern shore of Lake Onoke.	499
	Pukepuke Lagoon	S24	024-936	Dept Conservation, PNth, 06 350 9700	227
	Smiths	S23	101-021		494
	Voss Lagoon	S24	215-843	Owner: Max Voss 06 329 6835	231
	Waikanae	R26	827-377	Off State Highway 1, via Moana Road, turn left at Waikanae Bowling Club onto Ono Huiawa Street, then onto Field Way and William Street, turn left off William Street onto Rutherford Drive, entrance to Sewage Treatment Plant is at the end of Rutherford Drive, contact Kapiti Coast District Council on 04-9045700 to arrang entry.	233
	Waitawa Lake	S25	935-513	Off Forest Lakes Road	567
	Waiterere Beach	S25	985-682	Via the McKay property off Waiterere Beach Road	237
Region	West Coast				
	Site	**Map No**	**Grid Ref**	**Access Details**	**Ref No**
	Barry Town	k31	710-887	Drive down race on George Coutts (ph: 7311805) farm Count lagoon and small pond adjacent - take kayak to ensure small pond viewed adequately.	573
	Bisset Ponds	k31	705-811		637
	Blaketown	J32	615-594	Count from Raleigh street and from Floodwall pump station	122
	Bradshaws	k29	877-373		638
	Buller Lagoon	k29	923-394		639
	Hokitika	J32	492-241	View from road.	516
	Karoro	J32	603-566		621
	Lake Brunner -	K32	857-419	Boat 150m from shore along western shores of bay to end of Stormy Point	127

Lake Brunner -	K32	854-448	Count via centre of Lagoon looking to both edges.	431
Lake Ianthe	I34	160-920	Motor from jetty across lake to Raupo then anticlockwise around lake edge (150m off shore) 100m down outlet also.	120
Lake Poerua	K32	865-315	Boatramp to lake outlet 150m offshore then down middle of lower lake to outlet stream.	129
Lake Rotokino	I34	010-800	Up outlet creek then into western arm of lake. Count from outlet of that lake. Around southern lake edge 150m off shore to White heron lagoon. Then go into arm with hut at the end. (SW corner)	121
Lake Ryan	J31	625-629	Counted from access road to farm and from main road to Pt Elizabeth.	124
Mahinapua	J33	385-214	Anticlockwise around lake 100m off shore - up mirror creek 100m and down lake outlet 200m.	430
NE Shore Lake	K32	855-465	Start at yacht club ramp travel around Molloy, Howitt and Pah Bays 150m from edge. Stop at entrance to Iveagh Bay (separate count /survey line).	432
North Cobden	J31	620-614	Counted from tiphead road then from Jellyman Park for northern end.	125
Okuku Reservoir	J33	651-293		636
Pheonix Meat	K32	763-579	Counted from dumping platform just through gate	128
Runanga	J31	661-672	Off Bathhouse Road to oxidation pond outlet.	123
South Cobden	J31	620-613	Off stopbank along road edge	126