

Paradise Shelduck Moulting Survey

January/February 2021

Results of annual counts at West Coast moulting sites.



Baylee Kersten, Fish & Game Officer, March 2021



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Summary

*The endemic Paradise Shelduck (*Tadorna variegata*) is the West Coast Regions most intensely managed game bird. Large concentrations of birds can cause conflict with landowners resulting in opportunities for hunters to harvest surplus birds. Each year repeat counts are made of known moult sites to gain an index of relative abundance. This year 24,758 birds were observed in total, this is a 9% decrease from the previous year and about 7,000 birds above the 25-year average. Long-term monitoring (over 25 years) indicates that the northern moult sites have slowly increased by 4% but in the short term (5 years) has increased by 9%. Long term monitoring (over 25 years) indicates that the southern moult sites have increased by 19% on average but the rate of increase has slowed in the short term (5 years) to just 4%. Both the northern and southern populations have exceeded management levels. Staff recommendations are that the following three regulation recommendations be considered for the game bird regulation for the 2021/22 game bird season and are again reviewed annually: 1. Extend the summer season for paradise shelduck by a week to the last weekend in February. 2. Paradise shelduck hunting being restricted to locations 200m or more away from open water during the summer season. 3. Adjust the summer swan seasons to align with the summer paradise shelduck season. Continue to promote the West Coast shelduck population as an underutilised resource and rewarding hunting opportunity. Undertake organised hunts in areas with high shelduck populations and properties where significant crop predation occurs. Ask additional survey questions during the game harvest survey to assess utilisation and game harvest during the March summer season. Begin carrying out annual counts on the swan population at locations that landowner complaints occur.*

Introduction

Paradise Shelduck (*Tadorna variegata*) ('shelduck') are an endemic New Zealand species and well distributed throughout much of the country. Highest concentrations of shelduck are typically found adjacent to areas of developed farmland. On the West Coast large concentrations of shelduck can be found in the Grey Valley and its catchments, the Buller, Karamea and South Westland.

Since monitoring began in the 1990s populations of shelduck on the West Coast have increased and numbers have exceeded the management levels prescribed in the West Coast Region Fish & Game Management Plan. This population increase is a response to improvement and expansion of their desired habitat – productive farmland (Kelly, 2010). Monitoring has now become critical, both in appeasing landowner concerns that the population is not escalating unchecked, and to allow and to promote opportunities for hunters to harvest surplus birds. This survey provides the baseline information to inform regulation setting, including season length, bag limits and special seasons.

Shelduck congregate during January to March at specific sites to moult. These areas are typically a small to medium sized water body with a nearby food supply. By identifying the location of these

moult sites, shelduck populations can be monitored from year to year by counting birds present at each site.

The aim of the current survey was to:

- 1) Repeat the annual counts of known shelduck moult sites to gain an index of relative abundance of shelduck on the West Coast.
- 2) Identify any new sites holding shelduck for repeat counting in 2022.
- 3) Use route regression analysis to assess population trends in the northern and southern management units.
- 4) Provide recommendations for management of the shelduck population in context of the goals and objectives of the West Coast Region 'Sports Fish & Game Bird Management Plan'.

Method

Most of the 2021 moult site counts were undertaken in late January and early February using a DJI Mavic Pro drone. Sites were flown around first to identify what birds were present. Moulting shelduck tend to swim out onto open water when they hear the drone. Video and/or photos were then taken, and the footage reviewed in the office. The remaining sites were counted aerially, using a Piper Super Cub aircraft operated by Knights Point Air from Haast Airstrip on February 4th, or from the ground/boat using binoculars/spotting scope. Where accurate counts were difficult to obtain from the air sites were revisited with the drone or on foot to get a more accurate count. During the aerial flight the location any new or changed sites were identified and counts undertaken (Appendix 1).

The number of birds and the percentage change from the previous year was calculated for all sites and then for the northern and southern management units. Fish & Game best practice 'route regression analysis' was then used to analyse the count data. The annual change in counts at individual sites was calculated and summarised into the northern and southern management units. Finally, the data within the northern and southern management units was summarised for population change over time.

Results

Overall numbers

A total of 24,758 shelduck were observed moulting across all sites in 2021. This value was down 2,534 shelduck from the 2020 count of 27,292 this equates to an approximate 9% decrease in overall numbers counted from the previous year.

Paradise Moulting Counts 1993-2021

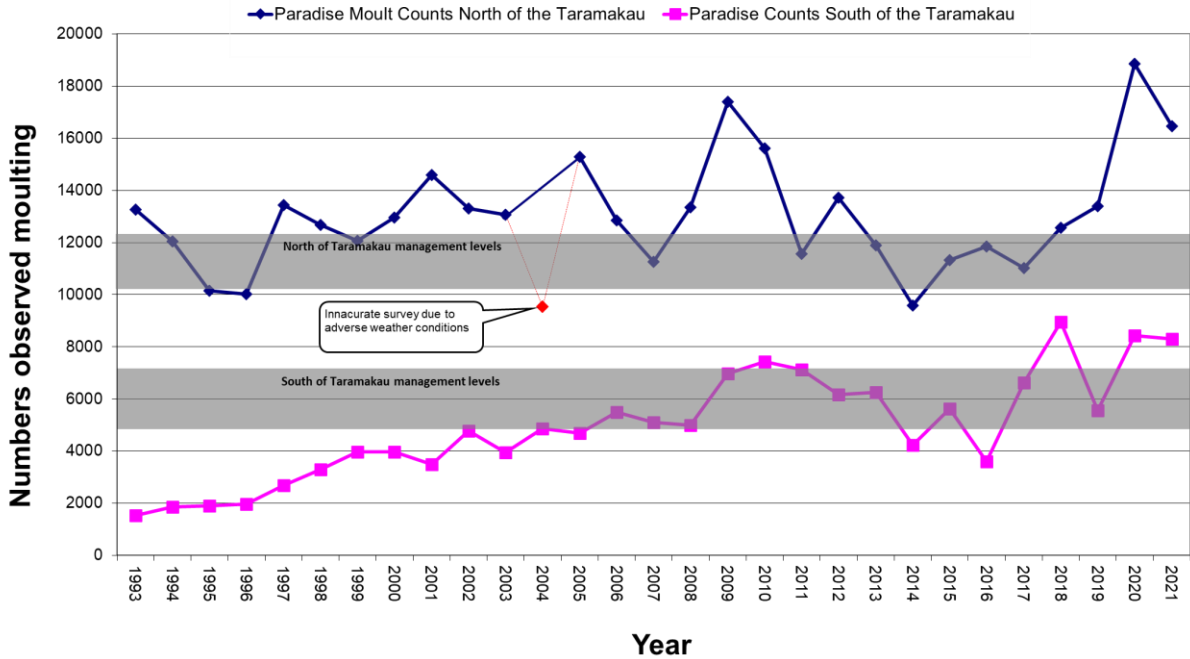


Figure 1: Number of Paradise Shelduck observed moulting in each of the separate management areas since 1993.

Northern Management Unit (north of Taramakau River).

A total of 16,466 shelduck were observed moulting at sites north of the Taramakau River in 2021. This value was down 2,397 birds from the 2020 count of 18,863, this equates to an approximate 15% decrease in overall numbers counted from the previous year (see Figure:1). Over the past 29 years (1993-2021) shelduck across all monitored sites north of the Taramakau have increased by 4% on average. However, over the past five years (2017-2021) numbers of shelduck across all sites north of the Taramakau have increased by 9% on average (Figure 2).

The Mean Change in Paradise Shelduck Moulting Counts at Sites in Northern Management Unit

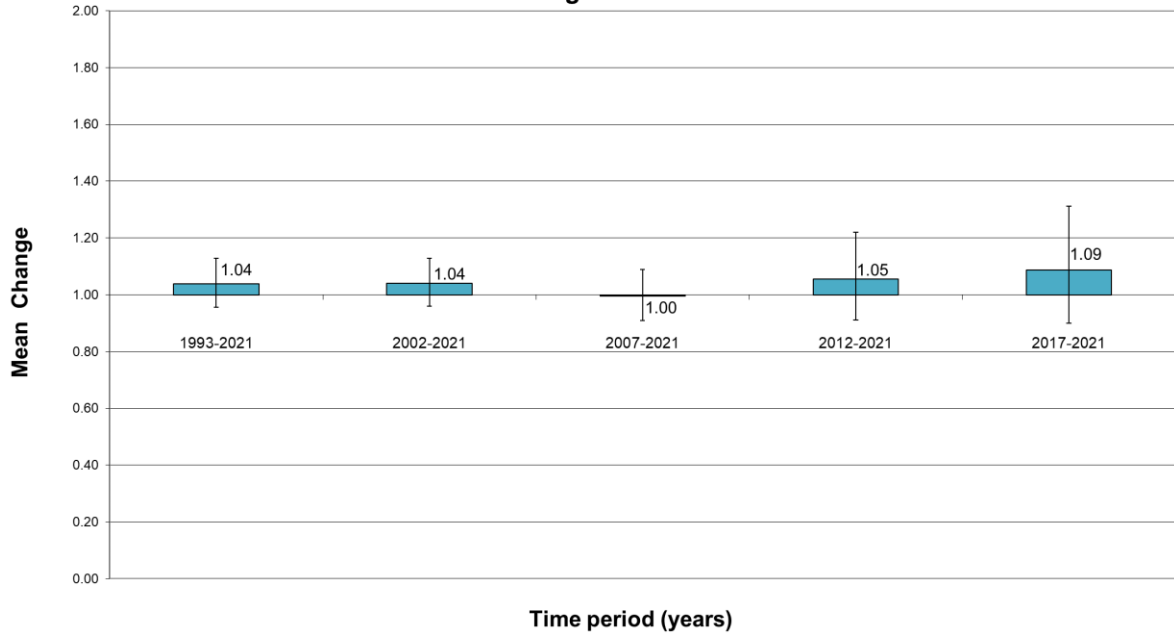


Figure 2: The mean change (\pm standard error) in Paradise Shelduck moulting counts at sites north of the Taramakau River over specified time periods. Values above or below 1.0 represent an increase or decrease in population over that period.

Southern Management Unit (south of the Taramakau River)

A total of 8,292 birds were observed moulting south of the Taramakau River in 2021. This value is a decrease of 137 birds from the 2020 count of 8,429 and equates to a 2% decrease in overall numbers from the previous year (see Figure 1). Over the past 29 years (1993-2021) shelduck across all monitored sites south of the Taramakau have increased by 19%. However, over the past five years (2017-2021) distribution and numbers of shelduck across many sites south of the Taramakau have increased 4% on average (Figure 3).

The Mean Change in Paradise Shelduck Moulting Counts at Sites in Southern Management Unit

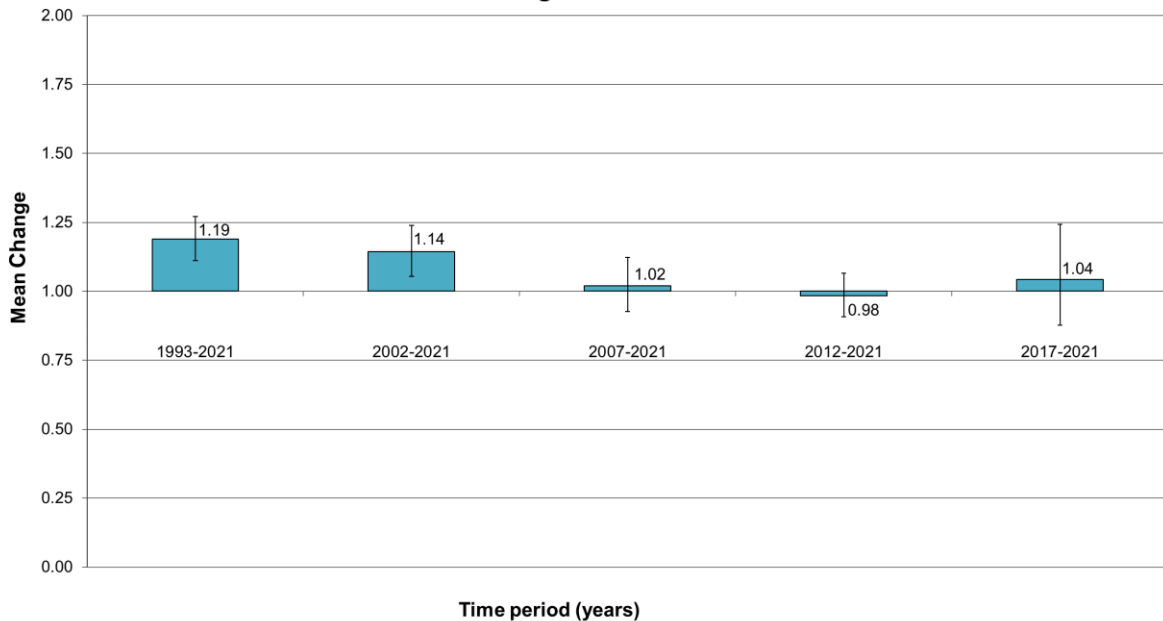


Figure 3: The mean change (\pm standard error) in Paradise Shelduck moult counts at sites south of the Taramakau River over specified time periods. Values above or below 1.0 represent an increase or decrease in population over that period.

Discussion

This year's Paradise Shelduck moult count is again extremely high being the second highest on record followed by last year's count. Numbers were down 2,500 on last year's count, particularly in the north likely the result of increased harvest. It was well promoted and encouraged the hunting of paradise shelduck last season. From the game harvest survey an estimated total of 5,004 shelduck were harvested by West Coast and out of region licence holders, being 1,374 additional birds than 2019. The drop in population is also to be expected as the very productive spring of 2019 where the population rose 8345 birds are yet to be of breeding age. Paradise Shelduck do not breed until they are two to three years of age (Williams, 1979). As a result of there being more birds to shoot, hunter harvest is up but the additional birds are not yet contributing to sustaining the population. Instead, yearlings tend to form large mobs at desirable feeding locations. This explains the large mobs observed over the last year and the source of farmer complaints even during the breeding season when issues are typically are nonexistent.

Fluctuations in moult sites and relocation of birds were again observed this year. For example, combined Lake Brunner and Lake Haupiri resulted in a population drop of approximately 1,500 birds, where neighboring sites Lake Poerua, Bellhill house pond and the Arnold river combined observed an increase of approximately 1,000 birds potentially indicating relocation. Due to only approximately 400 additional birds being counted from the plane last year, to keep cost down, the Grey Valley was not flown this year. Therefore, some of this year's drop can also be accounted to potentially missing small river moulting mobs. Paradise shelduck in Grey River continue to be very mobile with 500 birds moulting near Totara Flat this year. After seeing the Moonlight site was down 1,000 birds and communication with local farmers, birds were found in a small willow lined creek where it joins the Grey River. This outlines the importance of positive relationship with landowner as even with plane flight it would of likely been missed with the thick willows hiding the birds. Another location of interest is the Haast area, with area's population of paradise shelduck appearing to be rising rapidly likely the result of pasture development in the area (G Newton, 2021, *pers. comm*, 15 March). With our closest monitored moult site being 80km (in a direct line) away, it may be of value to look for a moult site in the Haast area.

When the results from both the annual moult counts, and the game harvest survey are combined, management tools can be put in place to maintain a sustainable shelduck population while maximising hunting opportunities. In the regular 2020 season, an estimated total of 5,004 shelduck were harvested by West Coast and out of region licence holders. West Coast licence holders harvested on average seven shelducks for the regular 2020 season.

Bringing back the March paradise shelduck season appears to have been well received and utilised by hunters. To better gauge the March seasons utilisation and game bird harvest, licence holders should be surveyed in May when carrying out the usual game harvest survey. This will then allow for a better estimate of annual harvest and result in more informed management decisions. From a management perspective the West Coast Fish and Game Council's decision of increasing the opportunities to hunt paradise shelduck rather than just increasing its bag limit to accommodate the increase numbers of shelducks aligns well with the West Coast Sports Fish and Game Management Plan. Furthermore, the season helps disperse large mobs of paradise shelducks post moult, improving relationships with landowners.

Frequent visits were carried out to several moult sites over the moult period this year and it was observed that majority of birds had finished moulting two weeks before the West Coast Paradise Shelduck season started. Furthermore, there is a desire to create uniformity across the regions around summer seasons to avoid confusion and increase utilisation. Therefore, there is good reason to extend the West Coast season forward a week on the condition that a rule is adopted to protect late moulters by not allowing the hunting of paradise shelduck within 200m of open water during the summer season. Lastly, the current summer swan season is a week shorter than the summer paradise shelduck season. With swan complaints becoming regular it would be beneficial to extend the season to match the paradise shelduck season encouraging additional harvest. In addition to annually carrying out swan counts to make informed management decisions.

Staff Recommendations

- That the following three regulation recommendations be considered for the game bird regulation for the 2021/22 game bird season and are again reviewed annually:
 1. Extend the summer season for paradise shelduck by a week to the last weekend in February.
 2. Paradise shelduck hunting being restricted to locations 200m or more away from open water during the summer season
 3. Adjust the summer swan seasons to align with the summer paradise shelduck season.
- Continue to promote the West Coast shelduck population as an underutilised resource and rewarding hunting opportunity.
- Undertake organised hunts in areas with high shelduck populations and properties where significant crop predation occurs.
- Ask additional survey questions during the game harvest survey to assess utilisation and game harvest during the March summer season.
- Begin carrying out annual counts on the swan population at locations that landowner complaints occur.

References

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Newton, G. (2020). *Paradise Shelduck Moulting Survey January/February 2020*. Fish & Game West Coast internal report.

Williams, M. (1979). "The social structure, breeding and population dynamics of paradise shelduck in the Gisborne-East Coast District". *Notornis*. 26 (3): 213–272.

Appendices

Appendix A: Aerial and ground counts of moult sites from 1993 to 2021.

NMU

Area	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
L. Haupiri	702	794	762	540	660	660	490	420	450	450	300	200	350	180	80	320	200	20	20	100	230	230	150	330	430	250	1491	1842	1286	
L. Poerua	190	216	298	480	210	300	160	320	150	600	300	450	300	160	70	110	450	50	300	30	120	108	232	596	790	400	592	460	735	
Lake Brunner	2722	1400	1440	1200	2200	1950	2100	2550	2050	400	1680	750	1000	800	1000	1350	1400	300	500	900	500	700	1655	2100	1020	1500	1548	2809	1724	
Arnold River																														
Ikamatua	1522	1500	2062	2500	2800	2200	1800	2000	2500	1900	1410	600	2500	1600	1200	1500	1000	1000	120	700	120	70	3	0	80	0	5	2	0	
Ikamatua					600	550	400	400	1000	700	3	0	1000	1350	700	1500	1750	2000	1300	600	500	980	900	420	750	355	415	907	886	
Barrytown Lagoon	156	219	164	204	266	230	215	165	270	300	210	150	300	450	450	320	400	370	400	290	230	290	330	170	192	333	450	628	367	
Fergusons pond	300	2900	1600	0	175	350	550	12	450	0	5	0	0	150	200	150	0	0	0	0	0	0	0	0	20	0	0	0	0	
Karamea	226	383	354	580	740	450	780	850	1450	1400	1120	1300	570	660	1000	1000	1100	2000	200	1200	1450	950	1450	1100	950	1050	967	1530	1199	
Glasseye Lake																														
Virgin Flat																			700	650	600	450	580	700	124	218	195	53	136	
Collins and Gillows	340	437	426	542	873	890	705	990	1186	1330	1060	1100	1050	1600	1085	700	950	1850	1200	1000	288	450	580	350	380	520	962	1453	1312	
Kokiri pond	2400	2200	2400	2280	3200	3000	2100	3500	3350	4000	3200	1800	2600	2500	1500	2500	3000	3500	3300	2000	1800	1900	1500	1100	426	560	937	733	438	
Ahaura River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	35	50	95	120	115	56	114	110	113	400	305	190	0	
Grey River	3902	400	74	182	10	80	200	160	0	0	230	230	165	150	570	410	1960	200	280	320	747	191	910	1261	2579	2700	2571	3030	2434	
Grey River Ngahere					450	510	530	580	750	1150	2500	1260	3000	560	350	900	500	1000	280	1950	2500	500	400	1150	309	2500	345	530	163	
Runanga Oxidation Ponds																														
Inangahua/Buller	166	77	78	148	150	160	160	220	180	160	85	100	100	90	60	100	80	80	200	150	150	290	280	170	130	118	259	487	748	
Bell Hill Airstrip			440	850	400	10	1400	310	4	100	550	1250	2200	1800	2200	1600	3000	1600	1400	900	950	450	276	250	120	68	166	215	149	
Bell Hill house															0	0	450	500	400	190	1	300	290	17	8	0	178	730	1229	
Bell Hill New Pond																														
Waipuna Farm Pond				163	0	220	150	1	0	0	2	50	50	50	30	70	0	0	0	0	0	0	0	0	0	0	0	0	0	
Waipuna Farm				340	0	0	0	120	0	0	0	95	0	0	30	100	0	160	150	205	195	139	225	34	90	300	43	237	96	
Lake Kangaroo	0	0	0	0	0	0	0	0	0	0	0	0	0	130	0	150	180	160	0	8	20	30	6	27	10	30	20	0	95	
Lady Lake					700	1110	270	360	800	820	410	200	110	350	80	310	200	250	80	250	120	60	145	25	40	0	64	89	20	
Lake Swan	0	0	0	0	0	0	0	0	0	0	0	0	0	200	600	200	150	0	150	100	125	220	180	97	170	100	151	250	212	
Mawheraiti							65	10	0	0	0	0	0	0	0	0	0	0	100	0	40	0	37	104	93	321	0	0	100	40
Greenstone Pond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	350	20	100	110	40	55	50	0	85	70	87	60	130
Reefton Oxi ponds																														
Camerons (new River pond)																														
Reddale Pond																					1600	700	750	400	800	1100	200	360	398	968
Total	13267	12051	10140	10011	13434	12670	12075	12968	14590	13310	13065	9535	15295	12780	11255	13340	17405	15610	11575	13713	11181	9576	10879	10950	9867	12372	13385	18863	16466	
Change		-1216	-1911	-129	3423	-764	-595	893	1622	-1280	-245	-3530	5760	-2515	-1525	2085	4065	-1795	-4035	2138	-2532	-1605	1303	71	-1083	2505	1013	5478	-2397	
% Change		-9	-16	-1	34	-6	-5	7	13	-9	-2	-27	60	-16	-12	19	30	-10	-26	18	-18	-14	14	1	-10	25	8	41	-13	

SMU

Area	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
L. Arthur	100	68	150	239	200	120	170	135	50	60	58	20	30	20	0	0	20	4	40	50	86	135	175	80	190	50	92	80	240	
L. Rotokino	1196	840	1430	1307	1960	1992	2470	2825	2350	3120	3050	2300	2000	2000	1500	1900	2800	1000	700	1490	2070	430	1530	570	1210	4000	1440	2350	1800	
Lake Wahapo	0	0	0	0	0	0	0	0	0	0	0	0	0	200	20	0	0	25	70	30	40	98	0	60	150	100	150	30	220	
Saltwater Lagoon	0	940	0	0	0	0	250	50	0	0	0	0	30	0	50	0	10	0	60	100	90	61	45	50	31	50	90	0	0	
Five Mile Lagoon	0	0	0	0	0	0	0	0	0	0	0	0	0	280	260	80	70	50	130	100	103	104	110	160	94	70	34	0	30	
Totara Lagoon	239	0	320	420	210	370	165	170	160	165	80	0	100	100	70	135	0	120	140	170	295	81	38	235	295	20	225	122	300	
Lake Pratt	0	0	0	0	0	0	0	0	0	0	0	0	0	200	350	200	400	250	150	160	200	280	120	200	250	200	140	450	280	
Cook Lagoon	0	0	0	0	0	0	0	0	0	0	0	0	0	300	350	300	300	350	1200	300	300	0	120	50	150	50	72	0	150	
Cook River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	59	284	70	296	0	140	400	280	
Waitaha Lagoon	0	0	0	0	0	0	0	0	0	0	0	170	350	400	350	370	250	360	240	140	300	230	150	5	30	10	4	165	54	
Arahura	0	0	0	0	0	0	0	200	390	780	88	230	280	940	500	900	1500	600	1200	920	500	665	450	184	422	450	384	710	800	
Kapitea Reservoir	0	0	0	0	320	810	610	450	510	650	520	136	390	100	30	110	120	20	5	65	5	29	54	20	2	20	40	30	45	
Grove Swamp	0	0	0	0	0	0	300	140	40	0	150	2000	1500	700	550	700	1500	4000	2000	1100	1650	1300	1550	380	745	2000	1400	1250	1850	
Hokitika River	0	0	0	0	0	0	0	0	0	0	0	0	0	300	500	180	0	100	50	240	64	56	53	208	205	50	137	170	160	
Whataroa River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	110	0	66	170	0	10	14	0	60
Lake lanthe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	300	50	200	160	200	338	200	330	400	444	
Lake Mapourika	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	0	2	8	2	0	0	2	0	
Okarito Lagoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	550	900	780	70	484	530	565	1854	1600	600	2150	1300	
Wanganui Lagoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	110	0	0	0	0	0	0	0	5	0	10	3	2	0	
Poerua River pond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	18	0	65	60	140	0	70	30	75	
Hari Hari farms	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	20	6	0	185	68	0	55	4	15	
Gillespies beach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	5	0	0	0	2	0	10	
Lake Kaniere	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	17	70	0	147	70	140	44	129	
Waiho River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	
Taramakau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	1535	1848	1900	1966	2690	3292	3965	3970	3500	4775	3946	4856	4680	5540	5090	4985	6970	7429	7135	6175	6251	4235	5632	3590	6619	8960	5562	8429	8292	
Change		313	52	66	724	602	673	5	-470	1275	-829	910	-176	860	-450	-105	1985	459	-294	-960	76	-2016	1397	-2042	3029	2341	-3398	2867	-137	
% Change		20	3	3	37	22	20	0	-12	36	-17	23	-4	18	-8	-2	40	7	-4	-13	1	-32	33	-36	84	35	-38	52	-2	

Appendix B: West Coast Region Paradise Shelduck moult count sites.

Moult Area	NZTM Map grid reference			
	Northing	Easting	Northing	Easting
L. Haupiri	5286391.6	1492479.8		
L. Poerua	5270574.8	1476089		
Lake Brunner	5283205.2	1475503.2		
Ikamatua	5320364.6	1491629.2		
Ikamatua	5321226.3	1491977.2		
Barrytown Lagoon	5327157.7	1460956.3		
Karamea	5434333.2	1524774.8		
Virgin flat	5366728.3	1476234.5		
Collins and Gillows	5374297.5	1480421.9		
Kokiri pond	5295944.1	1466377.7		
Ahaura River	5290399.1	1501656	5299918.4	1496530
Grey River	5317371.8	1490202	5305236.3	1469544.9
Grey River Ngahere	5303381	1468471.8		
Runanga Oxidation Ponds	5305572.1	1456214.1		
Inangahua/Buller	5363806.6	1510086.6		
Bell Hill Airstrip	5288284.4	1479090.3		
Bell Hill House	5286461.7	1485843.4		
Waipuna Farm pond	5219923.9	1496637.4		
Waipuna Farm	5309914.6	1496662.7		
Kangaroo Lake	5280914.9	1480401.7		
Lady Lake	5282324.1	1483041.4		
Lake Swan	5276598	1479592.2		
Mawheraiti	5335951.8	1497432.6		
Greenstone Pond	5277640	1454678.5		
Reddale Pond	5339256.4	1508720.5		
Reefton Ponds	5337230	1504823.3		
L. Arthur	5248056	1444683		
L. Rotokino	5218444.3	1391019.8		
L. Wahapo	5207542.5	1378773.9		
Saltwater Lagoon	5218445.1	1384909.2		
Five Mile Lagoon	5205162.7	1364472		
Totara Lagoon	5255928.5	1425496.2		
Lake Pratt	5196286.2	1370685.3		
Cook Lagoon	5184874.4	1339758.6		
Waitaha Lagoon	5239832.6	1407604		
Arahura	5270233.6	1442185.1		
Kapitea Reservoir	5272033.4	1452226.9		
Grove Swamp	5255748.5	1430778.7		
Hokitika River	5265407.4	1436224		
Whataroa River	5217600.8	1386907.3	5254807.1	1433662.3
Lake Ianthe	5230228.7	1406335.3		
Lake Mapourika	5199140.6	1372443.9		
Okarito Lagoon	5213936.1	1373735		
Wanganui Lagoon	5231805.4	1390435.9		
Poerua River pond	5222394.3	1393511.6		
Hari Hari farms	5224603	1403356.4		
Lake Kaniere	5252602.6	1449532.2		
Gillespies beach creek	5188677.5	1343434.5		
Camerons pond	5287587.5	1447367.5		