

COUNCIL REPORT

Otago Region Mallard Monitoring Study, April 2018

Introduction

Fish and Game Councils and universities have coordinated together to spearhead recent research into mallard duck populations. As part of the research for Otago, mallard population monitoring has been undertaken to determine long term trends which are necessary to manage game birds sustainably. Accurate information on population trends will allow Fish and Game managers to make informed decisions when setting game bird harvest regulations. The intention in future will be to look at the relationship between the mallard monitoring results and the Otago hunter harvest and effort estimates which are sourced from game bird hunter telephone surveys.

Otago Fish and Game completed a pilot mallard monitoring project in 2015. This report is on the past four years of the mallard monitoring study (2015 – 2018).

Methods

The methods used for the mallard monitoring in Otago are largely based on methodology used by Southland Fish and Game, which has been refined over the past few years. The Otago site selection criteria and methodology for selecting the sampling units (ponds and transects) is attached in Appendix 1. The mallard monitoring aerial survey methodology is attached in Appendix 2. The original flight plan in 2015 comprised of 46 ponds, seven 10 km river transects and ten 10 km cross country transects (Figure 1). The flight was conducted on 13 April 2018.

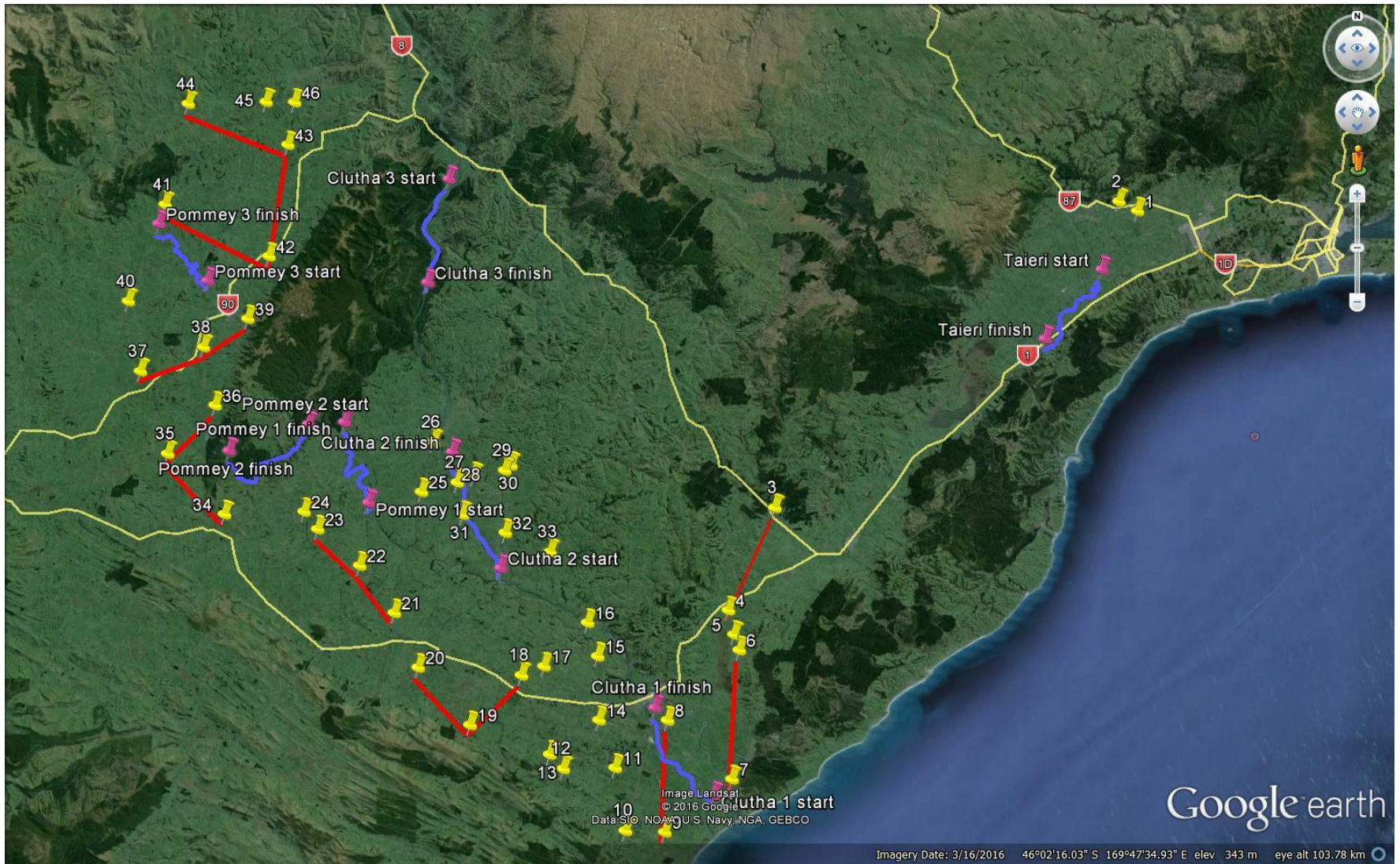


Figure 1. Otago Mallard Monitoring flight plan showing the original total of 46 ponds (yellow), seven 10km river transects (blue) and ten 10km land transects (red)

Results

All of the original 2015 flight plan was completed except for one river transect (Pomahaka 2), and 2 ponds (5 & 17) (Figure 1, Table 1). Over the past four years a number of sampling units have not been completed. Reasons for not completing all the counts have included;

- The helicopter had to return to base to refuel
- An aerial hazard (wire) was identified on Pomahaka 2 river transect and it was dropped from subsequent monitoring for safety reasons
- Ponds were not correctly identified from the air and nearby ponds were counted instead (these have not been included in the results)
- Sampling units were missed (from the flight plan or during the count) and these oversights were only realised after the counts were complete

Table 1. The number of mallard monitoring counts completed 2015 - 2018

	No. of ponds counted (*46)	No. of river transects counted (*7)	No. of cross-country transects counted (*10)
2015	41	6	8
2016	44	6	10
2017	45	6	9
2018	44	6	10

* Denotes the original number of sites selected

The number of mallards counted for each of the survey sampling units is shown in the sub-totals for 2015 - 2018 (Table 2). A total of 3134 mallards were counted in 2018 (Table 2). There were a number of variables that have changed between the 2015 and 2018 surveys. These minor changes include;

- A different pilot in 2016
- A different and Fish and Game observer in 2015
- A different number of counts completed over all years
- A different amount of time surveying (flying hours)
- Different cameras for taking photos during the counts

Table 2: Otago mallard duck monitoring results showing the separate strata (ponds, river and cross-country transects) and total counts for 2015 - 2017 (NC = no count)

Pond No.	2015	2016	2017	2018
1	2	0	30	134
2	0	0	3	21
3	32	148	71	21
4	0	0	0	0
5	0	NC	NC	NC
6	0	157	30	55
7	0	0	1	0
8	44	239	43	230
9	71	77	242	23
10	17	0	33	8
11	0	0	0	0
12	13	40	24	13
13	3	0	13	9
14	56	67	14	43
15	22	51	10	32
16	16	81	49	11
17	0	4	0	NC
18	13	0	9	0
19	35	20	111	4
20	2	0	5	11
21	0	6	12	0
22	430	379	6	8
23	2	0	83	16
24	12	3	4	5
25	62	0	116	6
26	11	0	12	6
27	0	0	0	0
28	77	142	84	8
29	0	6	84	29
30	9	8	2	1
31	0	NC	0	0
32	0	0	0	7
33	26	6	5	8
34	2	0	35	0
35	0	13	0	0
36	16	0	0	0
37	3	11	28	48
38	6	38	31	0
39	40	10	2	0
40	NC	284	135	100
41	NC	45	177	0
42	61	61	76	65
43	0	20	0	59
44	NC	35	0	0
45	NC	0	0	0
46	21	40	4	25

Sub-total Ponds	1104	1991	1574	1006
River Transect	2015	2016	2017	2018
Taieri transect	1560	1408	662	981
Clutha 1 transect	610	639	912	126
Clutha 2 transect	225	63	174	69
Clutha 3 transect	47	10	128	42
Pomahaka 1 transect	683	736	570	376
Pomahaka 2 transect	39	NC	NC	NC
Pomahaka 3 transect	NC	97	364	63
Sub-total River Transects	3164	2953	2810	1657
Cross Country Transect				
Transect 1	101	48	NC	90
Transect 2	182	26	656	95
Transect 3	58	119	417	66
Transect 4	3	0	42	22
Transect 5	595	116	37	48
Transect 6	27	0	22	38
Transect 7	6	0	60	67
Transect 8	NC	26	112	41
Transect 9	25	0	108	0
Transect 10	NC	0	5	4
Sub-total Cross Country Transects	997	335	1459	471
TOTAL	5265	5279	5843	3134
Total flying time (Hours)	4.8	5.4	6.2	5.5

Discussion

A total of 3134 mallards were counted in 2018 which is down approximately 40% on previous years. This figure in itself is not a reliable metric of changes to the mallard population in the survey region (MacKenzie, 2018). Annual variability in where ducks are concentrated ie what fraction of mallard population is being sampled in pond, river and cross country transect could be different. MacKenzie (2018) states that it is difficult to determine how changes in number of mallards counted in each type of survey correspond to each other and has cautioned how they should be interpreted.

Despite the lower count in 2018, reasonable concentrations of mallards were noted on some nearby water bodies that were not included in the counts. The most notable decline in mallards counted was on the Clutha and Pomahaka river transects (Table 2). High river flows on both

of these rivers is thought to be the reason for the low counts. Birds were likely to be displaced from the usual quiet backwaters and calmer water off the main stem. With this in mind, we could have expected to see a shift in these birds to higher counts in nearby pond and cross country transect counts. This hasn't transpired and it would be fair to say that there were generally less mallards across the board from previous years (Table 2).

The counts may also be down due to normal fluctuations based on environmental conditions. This summer was very dry from November through to January which would have resulted in lower fledgling survivability. On top of that, grain was typically harvested 3 -4 weeks early this year which could have made a difference to the pond and cross country transects in the south Otago areas. This season the stubble had already been re-sown and so the mallards had presumably distributed over wider areas.

One of the main considerations for all future mallard monitoring is to reduce the number of independent variables. Efforts have been made to use the same observer, same helicopter and pilot, complete the original flight plan and count the same number of sampling units. Comments and recommendations from MacKenzie (2016 and 2018) have been noted and these improvements to the monitoring will be incorporated where possible to improve the overall mallard monitoring study.

As this is the fourth year of monitoring no inferences about mallard population trends in South Otago have been made from this limited amount of data collected over four surveys. The relationship between the mallard survey results and the annual hunter harvest for Otago has not been investigated. The annual game hunter survey results for 2018 are typically not available until August. The autumn population monitoring is conducted after the regulations have been set. All of these factors need to be considered when looking at the bigger picture of how the information collected during the mallard monitoring is to be used within the management process including setting the Game Season regulations. (MacKenzie, 2018).

Recommendation

That the survey continues to be conducted annually using this methodology.

That this report be received

Acknowledgements

Thanks to Grant Smith from Otago Helicopters Ltd for undertaking the mallard monitoring flight. Grant's excellent GPS and observational skills made the mallard monitoring flight more efficient and effective.

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References

MacKenzie, D. I. 2016. Review of Fish and Game Regional 2016 Mallard Reports. Unpublished report, Proteus Wildlife Research Consultants.

MacKenzie, D. I. 2018. Review of Fish and Game Regional 2017 Mallard Reports. Unpublished report, Proteus Wildlife Research Consultants.

Appendix 1

Otago Mallard Monitoring Selection Methodology

Otago Fish and Game established mallard monitoring sites and completed a pilot monitoring study in 2015. The methodology for selecting the 46 ponds, seven 10km river transects and 10 10km cross-country transects was completed by Southland staff. The monitoring was conducted by Otago staff.

Monitoring Area Selection Criteria

Habitat characteristics;

- All land in South Otago was considered.
- Areas more than 200m above sea level were excluded to avoid surveying in hill-country which tends to be less favourable waterfowl habitat.
- Densely forested areas were also excluded due to the lack of duck habitat.
- Google earth maps were used for identifying the location of ponds, river and cross-country transects.

Pond selection criteria;

- All ponds >20m in diameter were identified and recorded in an Excel spreadsheet.
- From the identified ponds 46 “good” ponds were randomly selected.
- Ponds were deemed unsuitable for a variety of reasons, but generally because they were too close to buildings, were near places of common human activity, such as beside tracks or other structures, or they had been modified and did not meet the original size criteria, e.g. had been fully or partially drained.
- For the 80 or so unsuitable ponds, the next closest ponds that did meet the size and isolation criteria were used instead.

- On-going replacement of ponds will be necessary if surveyed ponds become unsuitable, which will be assessed annually.
- Ponds in excess of 20ha were also excluded because they are too difficult to count accurately and prone to annual variations in the distribution of birds.

River transect selection criteria;

- The upper limit of the transect count was based on known mallard habitat within the survey area;
- The total km of the river was calculated and 1 km potential start points were assigned
- Random numbers were chosen which was the distance from the sea (km) for the downstream start point for the 10km transect.
- Up to five transects were selected within the total distance of the river to be surveyed.
- To ensure transects did not overlap, start points were randomly selected until five 10 km non-overlapping transects were selected.

Cross- country transect selection criteria;

- Ten 10km cross-country transects were selected.
- The start points chosen were randomly selected ponds (as described above) where there was a minimum distance of 10 km between that point and the next randomly selected pond.
- This enabled the completion of a transect while flying to the next pond location, thereby minimising flight-time.

Appendix 2

Otago Mallard Monitoring Aerial Survey Methodology

General

- Counts are undertaken between April 07 and 18.
- An Otago Helicopters Robinson Class 22 is used for the survey.
- The pilot provided assistance in locating the sampling unit (pond or transect) with GPS and looking for birds where safety was not compromised.
- The shortest route between ponds and transects was flown.
- The weather was fine and wind < 12 knots.
- The survey was undertaken between 0900 and 1700 hours.
- Species other than mallards, particularly geese, paradise shelduck, grey teal, scaup and shoveler were identified and excluded from the count.
- The helicopter was positioned to enable the clearest view of the survey area.
- If birds were seen under trees or scrub the count was done when these had emerged.
- The helicopter could be positioned so that birds slowly came out from cover without making them fly off.

- When birds did fly off an estimate of the number departing was made and added to the total count.
- Groups of more than about 30 birds were photographed and the birds were counted on the computer using Microsoft paint. The paintbrush application allowed the user to count individual mallard ducks on the image which ensured that no mallards were double counted.

Ponds

- If there were < 30 birds on the pond they were counted manually otherwise they were photographed.
- The helicopter flew at a height so that the mallard ducks did not fly off from the pond but could be clearly counted or photographed.

River transects

- Main river backwaters were not surveyed if they were more than about 100m from the main channel, otherwise they were and included as part of the river transect.
- For the river transect the helicopter slowed to a hover over or adjacent to the willow lined sections so that the ducks would swim out to become visible to observers and then easily counted.

Cross country transects

- Mallards were counted within 100m either side of the helicopter as it flew along the transect.
- This gave a fixed width of no more than about 200m from the line of the survey.
- The helicopter flew at an approximate fixed height so that birds could be easily seen and identified as mallards.
- Generally the transect was undertaken at a fixed cruising speed but if an accumulation of mallards was found, e.g. a pond was on the transect line, the helicopter was slowed so the birds could be accurately counted.
- Birds were not generally encountered unless there was a water feature present.