

Makarora Mohua Fixed Transect Survey 2016

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SUMMARY

The sixth annual fixed transect mohua survey was completed in November 2016.

Ten fixed transects in the Makarora area were surveyed for mohua in 2011 and 2012. In 2013 three transects in the Young Valley were added. These 13 transects have been surveyed annually in spring using a slow walk and listen technique.

Mohua were detected on nine of the thirteen transects in 2016. The average number of mohua per transect (with four visits to each transect) was 8. The total number of mohua individuals seen or heard, (including 18 out of count, and many repeat records of the same birds) was 130. One-hundred and twelve of these were in the Young Valley.

INTRODUCTION

The Makarora River is located in Mount Aspiring National Park, near the township of Makarora, 65 kilometers north of Wanaka. The Young and Blue valleys join the Makarora River 3km upstream from Makarora. Silver beech dominates the bush canopy in these valleys, from the Makarora River at 300m altitude, to the bush line at ~800-900m altitude. The Makarora lies between two Operation Ark mohua populations, in the Landsborough River and Dart Caples (O'Donnell 1996), but there is little historical data about the Makarora mohua population itself.

The Royal Forest and Bird Protection Society began the Mohua Protection Project in Makarora in 1998 and now maintain 300 predator traps along the Haast highway and the Young Valley jointly with DOC. Nigel Babbage and the Mohua Charitable Trust provided funding for these traps to be upgraded from Fenn traps to DOC 150s in early 2011.

The Makarora mohua fixed transect survey was established in 2011 and was designed to be completed annually over at least a 10 year period in order to:

- gain an accurate measure of the mohua population and population trends within the monitoring area and the wider Makarora area
- gauge the impact of the predator control program on the local mohua population
- provide information to aid decision making regarding protection of the remaining mohua from further decline eg, to establish whether more intensive predator control is indicated.

The Mohua Charitable Trust provided funding to Florence Gaud at DOC Wanaka for mohua distribution surveys in the Blue, Young and Makarora valleys in 2012, and they have funded annual mohua transect surveys in the Makarora valley since 2013.

The Makarora Mohua population was suspected to be small and sparsely distributed among the Young, Blue and Makarora valleys and the surveys to date support this view with regards to the Makarora and Blue Valleys. However, while geographically small, the surveys indicate that the upper and north Young Valley population is much denser than the rest of the study area.

METHODS

Thirteen fixed mohua transects were surveyed in 2016 in November, when birds are most vocal due to territoriality prior to nesting. All data was collected by Julie Newell and Katharina Manno. Weather was predominantly overcast but calm. Surveys were completed in fine weather conditions where possible.

Ten transects were established in 2011 on tracks easily accessible from the highway near Makarora: transect one on the Blue Pools track; transect two on the Blue-Young Link track, between the Leven and Ore streams; three and four on the lower Blue valley track; five and six on the Haast Bridle track; eight on the Cameron Creek track; nine on the Cameron-Blue Pools track, and ten and eleven in the lower Young valley (Appendix A). In 2013 three transects were added: twelve and thirteen in the North Branch of the Young Valley on the true right side of the river, and fourteen downstream from the Young Forks swing bridge (Appendix B). All transects were established in areas of known mohua territory, with the exception of transect two, near which a mohua was seen in previous years.

Each transect was surveyed four times between November 2nd and 27th, 2016 between the hours of 07:00h and 18:30h. The survey followed the methodology of O'Donnell & Elliott (undated) and O'Donnell, Elliott, & Greene (2007). A minimum of 40 minutes, and sometimes longer than one hour, was spent on each transect, with the observer walking at a very slow pace. A standard data sheet (Appendix C) was completed in the field for each transect. A standard five minute bird count of all species was completed at the start and finish of each transect, before/after surveying for mohua.

Mohua locations were recorded with GPS waypoints. The number, sex and age of mohua were recorded if possible. Additional details about the mohua distribution survey methodology were as follows:

- The observer walked slowly at 0.8-1.0 km per hour (O'Donnell 1996) along the designated transects between 07:00h and 19:30h.
- Birds were located visually or by listening for calls.
- When mohua were heard or seen, the observer attempted to locate the birds and every effort was made to establish how many birds were in each group, and to identify bird gender and juveniles by calls, (male whistles, female buzzes, female/juvenile plumage and behaviour (courtship/juvenile feeding).
- Squeakers (polystyrene on glass) were used to determine group sizes when necessary, but not to illicit a response before mohua were located by hearing or sight alone (mohua often respond to a squeaker by coming closer and chattering). The time taken to locate and observe a specific group of birds was subtracted from total time surveying the transect - i.e.

“the clock was stopped” when a bird was first seen/heard, and restarted when the observer left the bird/group and resumed walking the transect.

- Squeaker use was avoided within 10 minutes of a five-minute bird count, so as to not influence the count.
- The observer spent up to 10 minutes establishing contact with a group. If the number of birds was not ascertained in that time, then the transect walk was resumed.
- Each group was recorded on a field sheet, noting number of birds and number of confirmed males, females and juveniles in each group.
- Double-counting of birds was minimised by continually monitoring surrounding/adjacent calls of mohua.
- Counts were undertaken in similar (good/fine) weather conditions and with little ambient noise (e.g. wind).
- Binoculars were used to aid observations.

Five-minute bird counts (5MBC) followed the methodology of Dawson & Bull (1975) and Hartley & Greene (2007). Counts were conducted at both ends of every mohua transect at the permanent blue track tag marking the transect end. Additional details for the 5MBC methodology were as follows:

- The observer stood quietly and immediately began recording all individuals detected for exactly five minutes. The number of each species of bird seen or heard was recorded. No bird was knowingly counted twice within a single count.
- If an individual bird was included in a count from a previous station it was counted again. No birds were assumed to be present without some visual or auditory clue to their presence (e.g. a flock of silvereyes was noted as the number of individuals heard calling rather than the number the observer guessed such a frequency of calling would represent). If a bird called in one place and later one of the same species called some distance away, they were taken as two individuals unless there was evidence that the first bird moved to the second place.
- Pre-printed data forms were used for recording observations (Appendix D).

If mohua were heard in a 5MBC, they were followed up once the count was finished, and their location was waypoint marked using a GPS. If mohua were seen during the 5MBC, this was noted, and the waypoint also became a mohua waypoint.

Incidental sightings/hearing of mohua outside of transect surveys were also recorded. These records were separated out for data analysis.

RESULTS

Up to six squares were completed per person per full survey day, and a total of 104 5-minute bird counts (5MBC) were completed during the survey. Excel spreadsheet DOCDM-850109 contains all data from the 2011-2016 5MBC.

There were few sunny days during November of 2016, but winds were generally light. Rain could be mostly avoided, but a few counts included light showers.

Five-minute bird counts

The chaffinch was the most commonly counted bird, with a total of 247 individuals recorded, followed by redpolls (146), grey warblers (136), bellbirds (127) and tomtits (116). Native birds accounted for 55% of all individuals seen or heard (674 natives, 558 exotic, 1232 bird encounters in total). Twenty seven species were recorded, comprising 18 native and nine exotic species. Mohua were recorded in 17 of the 5MBCs, with 22 records of individuals. The average number of mohua recorded per 5MBC was 0.21. Figure 1 shows the mean number of individuals of each species per 5MBC.

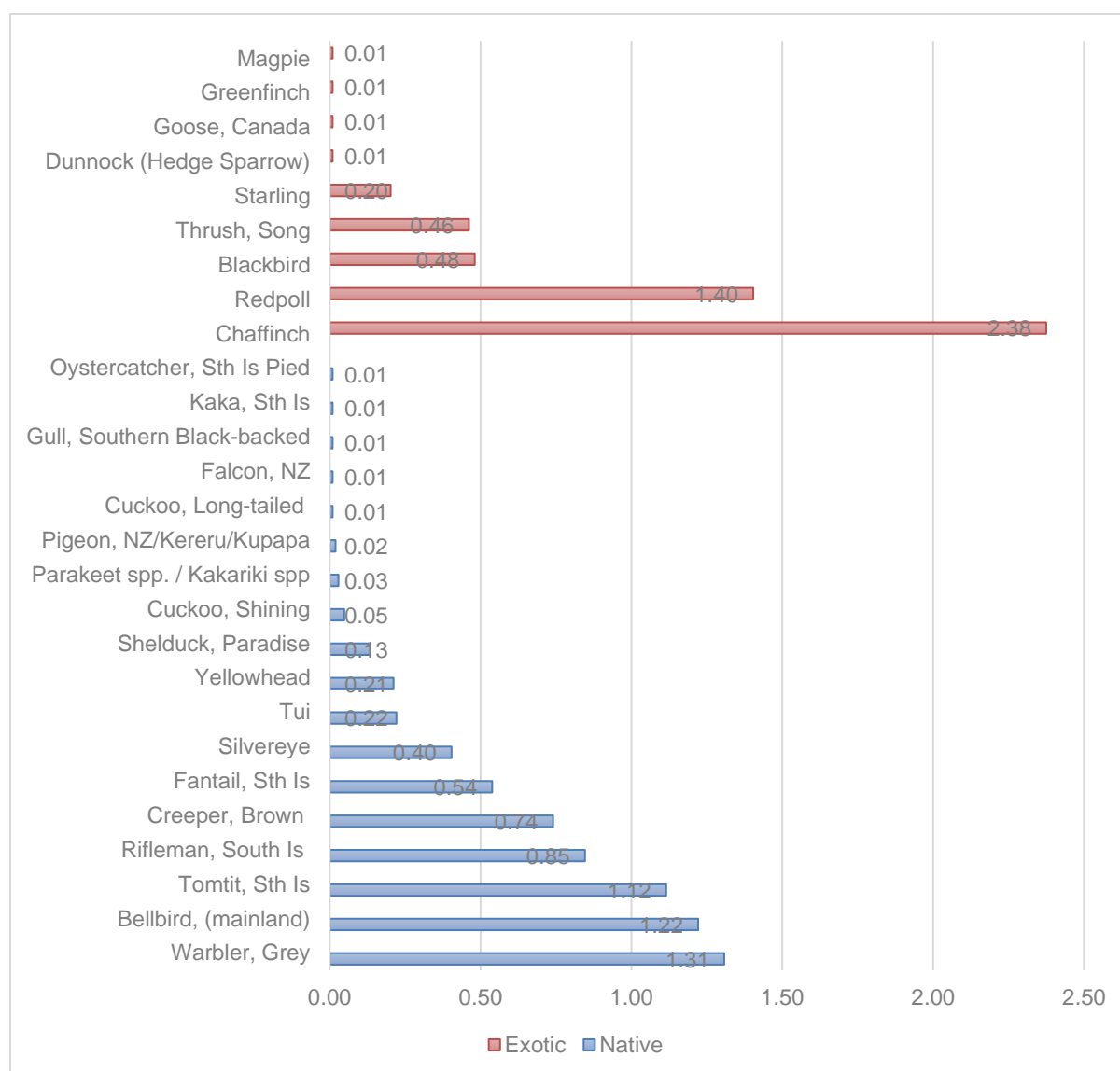


Figure 1. Mean number of birds per 5-minute bird count (5MBC) in the 2016 Makarora Mohua Survey.

Mohua survey

Mohua individuals or groups were recorded 102 times, including a total of 130 records of individual mohua during the survey (Table 1 and 1a; Figure 2), but many of these were repeat records of the same individuals. Seventeen of these records were from outside of survey times or locations (Table 1a), all of which were in the Young Valley between the Young Forks camp site and the upstream end of transect 11, apart from one mohua seen on transect three in the Blue Valley.

Table 1. Number of mohua detected per visit, per transect in the 2016 Makarora mohua survey (birds detected outside of transect survey times and locations excluded).

Visit #	Transect #													Total
	1	2	3	4	5	6	8	9	10	11	12	13	14	
1	1	0	0	0	0	0	0	0	2	0	5	8	8	11
2	1	0	0	2	4	0	0	0	2	0	1	7	8	16
3	0	0	0	3	2	2	0	0	2	0	4	7	6	23
4	1	0	1	0	0	0	0	0	1	0	2	12	11	16
Total	3	0	1	5	6	2	0	0	7	0	12	34	33	103

Table 1a. Mohua detected outside of transect counts: birds recorded outside of count times, or when walking between transects. Birds between transects are listed under the closest transect.

Transect #													Total
1	2	3	4	5	6	8	9	10	11	12	13	14	
0	0	1	0	0	0	0	0	7	2	0	0	17	27

The largest group of birds recorded was three (five records), though it's not always possible to identify every bird in a group, especially those high in the canopy. One group of three was seen in the locality a group is usually seen in the annual survey, near Brodrick Stream on the Bridle Track (Haast Pass). Courtship/juvenile feeding was observed in this group. The other four records of groups of three were on transects 13 and 14 in the Young/North Young Valley. One record included two juvenile/females in a group, and courtship/juvenile feeding was seen in another.

Groups of two were recorded 20 times. These were as follows:

Transect Six, (Bridle Track, Haast Pass) near Brodrick Stream -at least two birds high in the canopy, very likely the group mentioned above.

Transect Four, (Blue Valley) just off the upper end of the transect. Almost certainly the same birds on two different days - an adult and a juvenile who begged to the adult.

Transects 14 and 10 (Young Valley) seven and ten records respectively, all males or unknown gender (five of these records were outside survey times).

Transect 13 (North Young Valley) four records. Two records were male/unknown birds, one record included the only female call heard during the entire survey. Another record included a female/juvenile being fed by another bird.

Transect 12 (North Young Valley) three records, two included a female/juvenile, the other was male/unknown birds.

There were 75 records of single birds, all male or unidentified, including the seventeen records from outside of survey times/locations. Sixty-six of these 75 records were in the Young Valley.

Twenty seven of the 104 transect surveys had zero mohua records. Transects eight, nine, eleven and two had zero records for all four counts (table 1).

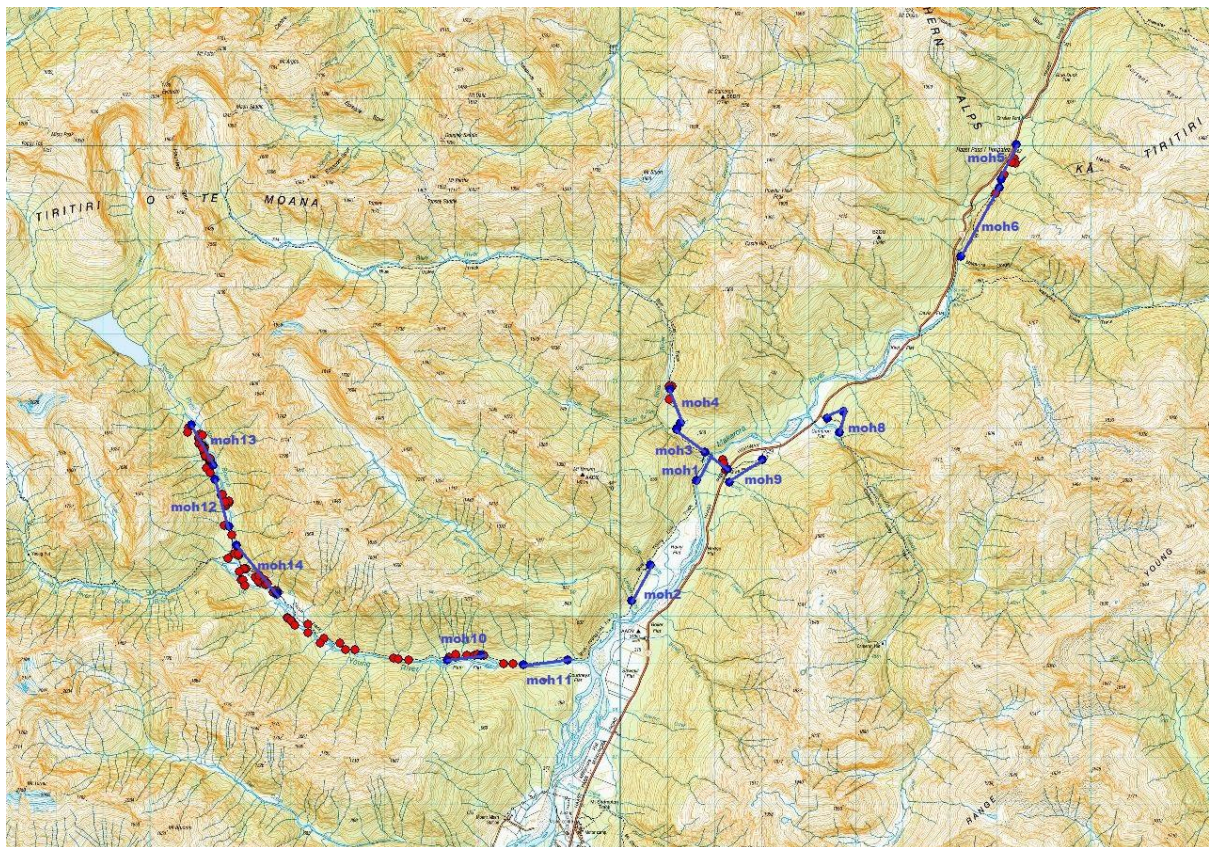


Figure 2. Locations of mohua recorded during 2016 Makarora fixed transect survey. Blue circles denote transect ends.

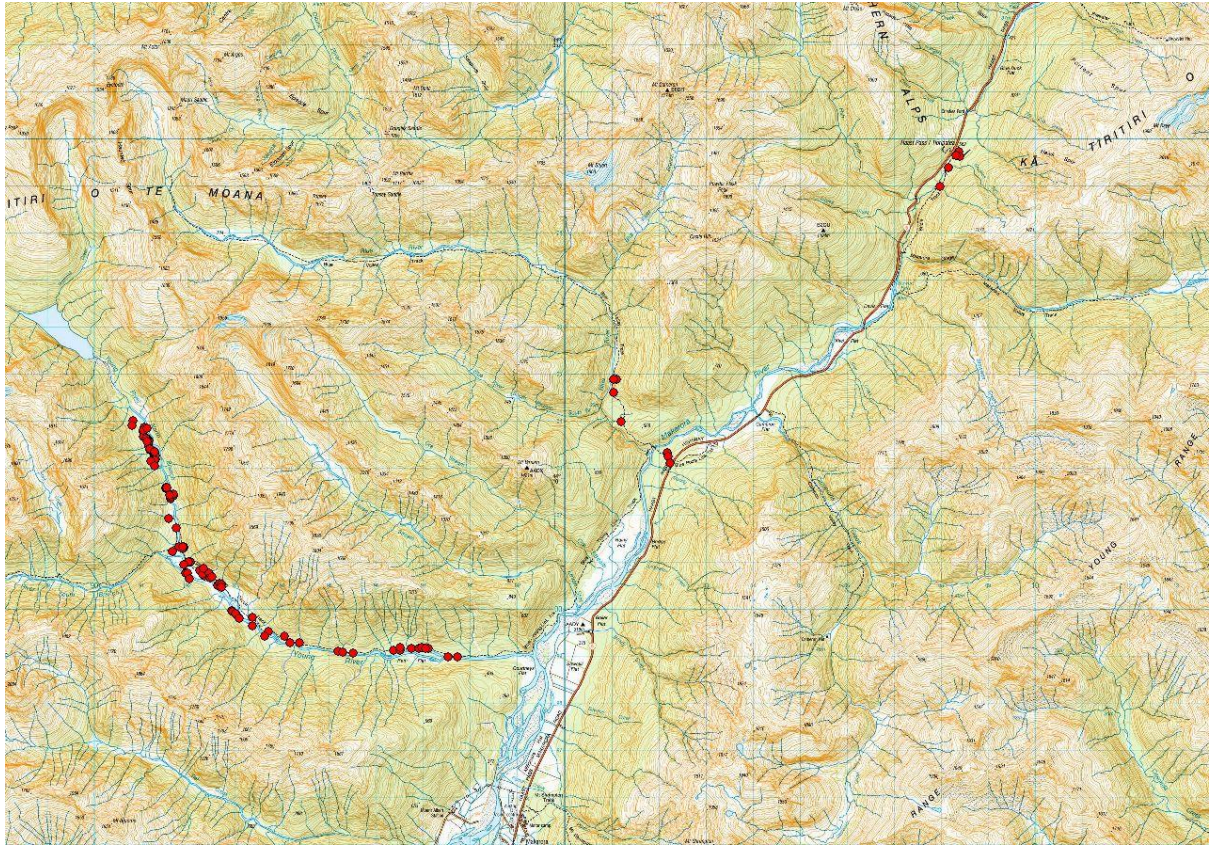


Figure 2a. Locations of mohua recorded during 2016 Makarora fixed transect survey without transects marked.

The mean number of mohua recorded per fixed transect in 2016 was 1.98. Means from 2013 on are inflated due to the addition of transects in the relatively densely populated North Young. When calculations are repeated using the original ten transects only, the 2016 mean drops to 0.6 . Averages of the North Young/Young Forks transects, (12,13 and 14), have increased over the past four years from 2.47 in 2011 to 6.7 in 2016 (Table 4).

Excel spreadsheet DOCDM-1320829 contains all data from the 2011-2016 mohua survey transects.

Table 4. Mean number of mohua detected on each transect each year, 2011-2016.

Year	Transect #													Average per transect (#1-14)	Average per transect (#1-11 only)	Average per transect (#12-14 only)			
	1	2	3	4	5	6	8	9	10	11	12	13	14						
2011	6	0	0.25	5.75	2.75	1.7 5	0.25	1.75	3.25	1.75								2.35	
2012	1	0.33	0.25	3.25	1	0	0.5	0.5	0.75	0								0.76	
2013	1	0	0.25	1.25	4.5	3.2 5	0	1.25	1	0	1.25	3.75	2.25	1.52	1.25	2.47			
2014	0.75	0	0	1	3.25	0	0.5	0.5	0	0.75	1	7.00	1.75	1.27	0.68	3.25			
2015	0.25	0	0	1.75	2.75	1.2 5	0	1.25	0.5	0	2.25	5.75	4.25	1.54	0.78	4.08			
2016	0.75	0	0.25	1.25	1.5	0.5	0	0	1.75	0	3	8.5	8.25	1.98	0.6	6.7			

DISCUSSION

The mohua population in much of the Makarora is challenging to monitor, particularly outside the upper Young Valley area, since the birds are widely dispersed and don't vocalise often. There are a small number of individuals overall, and the territories may be quite large.

The total number of mohua counted was the highest to date, but this is mainly attributable to the high numbers on the North Young and Young Forks transects. Numbers of birds outside this area (average of 0.6 birds per four transect walks) were the lowest to date, but similar to the four previous years monitoring - in the range of 0.6 to 0.8 birds per transect. The increase in numbers of birds recorded in the upper Young Valley areas is encouraging.

Of concern, however, is the absence of female birds heard, with only one female call heard in the entire survey. The vast majority of mohua heard/seen were single males/unknown gender birds. There were nine records of evidence of females or juveniles (all in groups) during the survey, identified by call, plumage or courtship/adult-young feeding behavior (one bird begging to or feeding another). Hopefully the low female numbers were because they were away nesting, rather than absent altogether. However, if the number of female mohua in the area was low, males may have been more conspicuous due to spending more time calling to attract a mate, leading to an inflated number of birds being heard.

Also of concern is the impact of increased predator numbers resulting from beech masting in the Makarora area – a full beech mast in the spring of 2014 and 2016, and a small one in the spring of 2015, and another mast year forecast for spring of 2017. Traps in the region caught very high numbers of stoats in the summer following the 2016 mohua survey - for example, in a check of traps from partway up the South Branch of the Young to the Young River mouth in February (passing through transects 10, 11 and 14, and close to 12), 28 of 50 Doc200 traps contained a

stoat. Hopefully the Battle for our Birds 1080 operation completed in March 2017 offered some reprieve from predators for the forest birds in the region. If a BFOB 1080 operation is completed in spring of 2017, this should provide a much safer breeding environment for mohua in the coming season.

With six years of mohua monitoring now completed, there is a much clearer picture of which habitat the Makarora mohua population uses. There is an obvious “hot spot” in the upper Young Valley and some areas which have consistently shown very low to no mohua recorded. A review of where surveying efforts are focused may be timely. In particular, transect two has only had a single mohua record in the six years of surveying. This transect is time consuming to survey, due to its remoteness from access points and other transects. It may be more productive to drop this transect in favour of one that helps to assess the extent of the Young Valley population, for instance an extra transect between 10 and 14, or on the true right of the Young River, or between Young Forks and Young Hut.

Given the very small numbers of mohua in the Makarora valley, it may be useful to analyse how many years of data will need to be collected before a statistically significant change in the population may be detected. It would also be good to research what other mohua populations have been known to persist across many years at such low density, and whether the likely reasons for the ability to continue and not become extinct at this low level of birds are known – eg is it likely to be a population of predominantly ageing male birds who are not vulnerable to predation when trapped in a nest hole; or a trickle feed of new individuals from neighbouring populations such as the Young and Landsborough, or a couple of strongholds such as the Bridle track and Blue Valley where a few birds successfully fledge and disperse through the valley each year.

Five-minute bird counts have consistently shown an exotic species such as the chaffinch or redpoll to be the most common bird in the area in recent years. However native birds exceeded exotics in both diversity of species and overall numbers in 2016. An analysis of trends of species numbers across the survey years and, in particular, correlations between fluctuations in numbers of mohua and other bird species, may be useful in future. An analysis of correlations between mohua numbers, numbers of mammalian predators trapped/tracked, beech masting and BFOB 1080 operations would also be useful as a tool to assess the best way to allocate resources to aid the mohua’s recovery in the area.

RECOMMENDATIONS

There is a critical need to continue mohua monitoring across the South Island in the next few years especially given recent, frequent beech masts fueling predator reproduction, and to assess the benefits to mohua of the Battle for our Birds 1080 operation(s). The fixed transect survey should be repeated again in 2017 and on an annual basis thereafter, and the Young and Blue distribution survey undertaken in 2012 should be repeated again in 2017.

With another beech mast forecast for the Makarora region in 2017, a very close eye should be kept on the local mohua population in the spring of 2017. If surveying efforts continue to show very little evidence of females, a study of nesting and fledging success, or some other gauge of the gender bias of the population may be indicated, and perhaps methods of further protecting nesting females, eggs and chicks from predation should be investigated.

Thought needs to be given to whether the study needs to be realigned in light of the importance of the population in the Young Valley, which the study to date has revealed. It is suggested that the Young Valley and the Makarora Valley mohua are treated as separate populations for the purpose of the study, as the large differences in concentrations of birds skews data for both of these areas, if they are analysed as a single population – eg. changes in the small population in the Makarora and Blue Valleys will be swamped out by the larger numbers of birds in the Young.

It is suggested that transect two be omitted from the study in future, and the time saved be utilized to further survey mohua in the upper Young Valley, or to attempt some form of monitoring nesting success. Transects five (approx. 500m) and six (>1.6 kilometers) should probably be adjusted to even out the distances of each transect. This would also help to avoid double counting of the group usually seen near the intersection of these transects, near Brodrick Stream. Historical data could be adjusted to reassign bird records to the correct, updated transect if necessary. The value of continuing to survey some of the other less mohua-dense transects, as opposed to an alternative use of time could be considered.

As survey times vary somewhat from transect to transect, an analysis of birds per hour of effort may give more accurate results than a straight analysis of birds per transect.

ACKNOWLEDGEMENTS

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2016 survey notes

The tag for the start of transect 3F (and the 5MBC there) is under large dead beech with large dead branches overhanging the count site – for staff safety it is advised this be moved.

The tag at MOH2S is absent and needs to be replaced.

The tag at MOH11F has fallen off and needs replacing.

The GPS waypoint for moh5s is 370m from the tag – down the Haast Highway - ? reason for this.

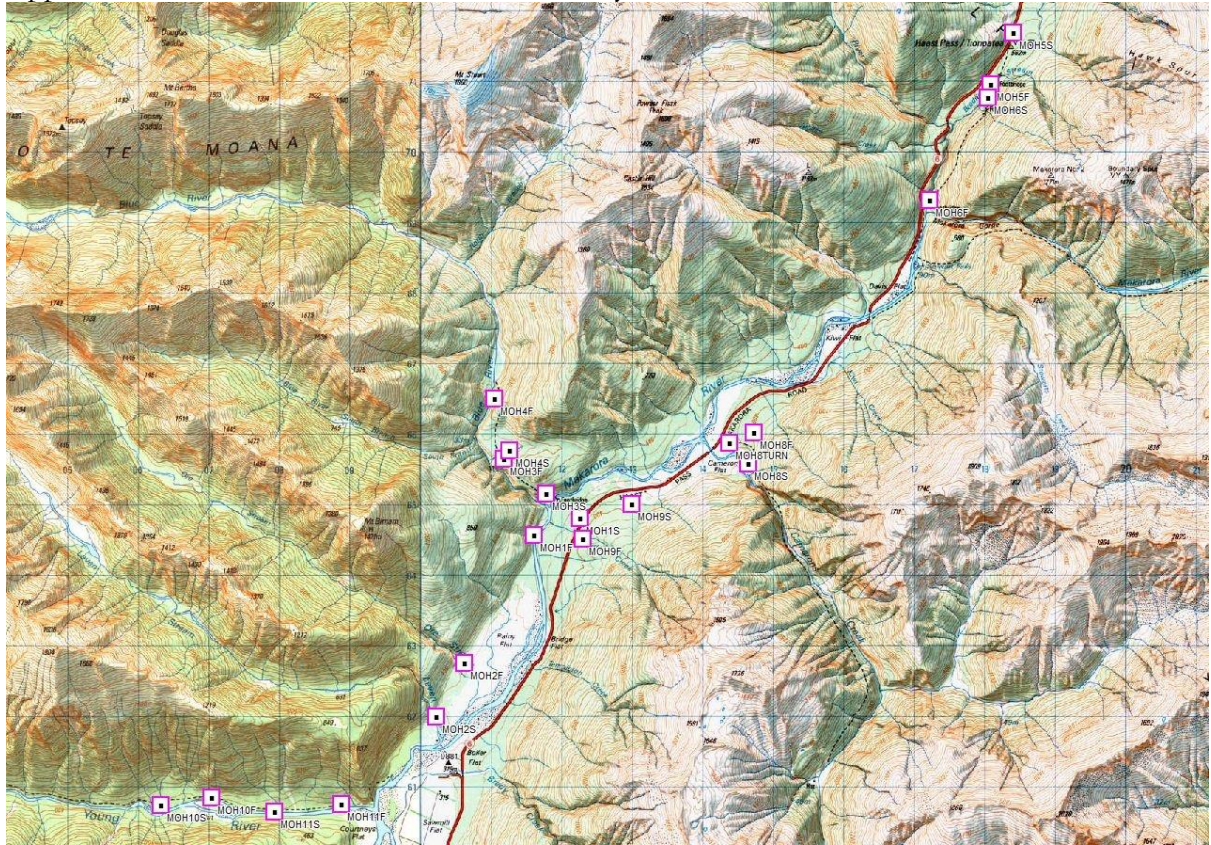
Banded trees in Blue Valley – old aluminium tree bands that historically protected mohua nests have fallen off. It would be good to nail them back in place before 2017 breeding season (coordinates: 2211155, 5665820).

It is recommended that persons completing the survey in future years consult Katharina Manno for advice in navigating the difficult terrain in the North Young Valley.

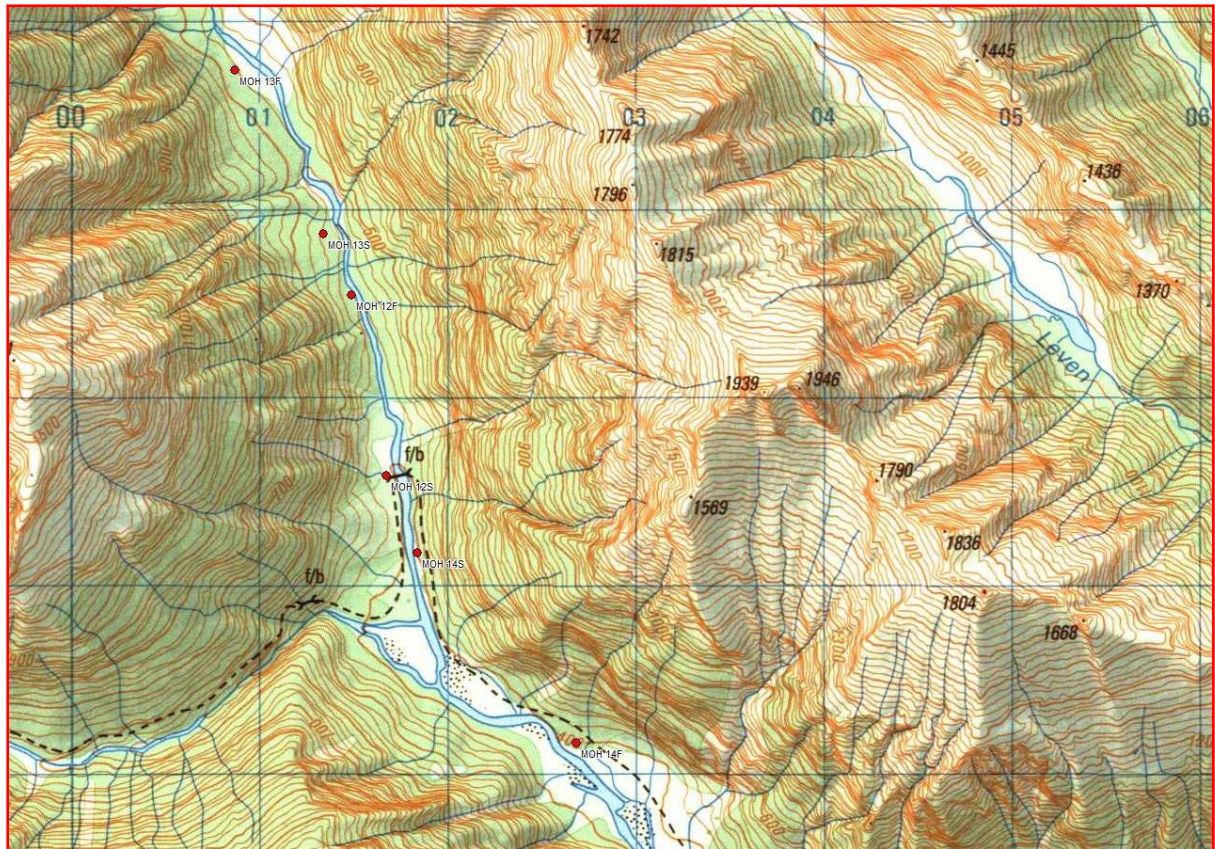
Notes for navigation - North Young Mohua transects (12 and 13)

- Watch out for deep rock crevices between giant boulders.
- In general, try to stay fairly close to the river.
- Stay out of ribbon wood patches - tend to be full of boulder slips, stinging nettle, and general unpleasantness.
- After leaving bivvy, past grassy clearings, go up onto first terrace. At stream close to MOH12f cross above the waterfall. There's a wide patch of ribbon wood to the left, and a bog to the right - stay in the bog. Follow stream by slip up, not down towards river (onga onga and windfalls below). After crossing slip go back down to river. Next old slip is ok to bash across wherever. Try to stay fairly close to river.
- Past MOH13s, after crossing creek, climb up a couple of contours to cross next to creek - follow deer trails to cross at about 530m above sea level. Climb through old stream bed, then fairly easy going til transect ends.

Appendix A. Locations of mohua transects surveyed in the Makarora area since 2011.



Appendix B. Location of the three new transects (MOH12, MOH13, MOH14) added to the Makarora fixed transect survey in 2013.



Appendix C. Mohua survey data sheet

DATA SHEET **MOHUA MONITORING**



Date Observer Start time

Valley Name Finish time

Grid Square # Total time (hrs)

Start square
GPS ref

End square
GPS ref

Cloud cover Wind Temperature



Distance back to transect start (M)	Time heard	# individuals in group	metres to group (off transect)	Way point # or grid ref	Comments

Appendix D. 5MBC data sheet (p.1)

Transect#:	5MBC1 #:	5MBC2 #:
Name		
Date		
Start Time		
Easting		
Northing		
temperature (1-6)		
wind (0-3)		
other noise (0-2)		
sun (minutes)		
precipitation type (N,M,R,H,S)		
precipitation value (0-5)		

Bellbird		
B. Creeper		
Fantail		
G. Warbler		
Kereru		
Mohua		
Rifleman		
Silver Eye		
Tomtit		
Tui		
Blackbird		
Thrush		
Red Poll		
Chaffinch		
Starling		

Transect#:	5MBC1 #:	5MBC2 #:
Name		
Date		
Start Time		
Easting		
Northing		
temperature (1-6)		
wind (0-3)		
other noise (0-2)		
sun (minutes)		
precipitation type (N,M,R,H,S)		
precipitation value (0-5)		

Bellbird		
B. Creeper		
Fantail		
G. Warbler		
Kereru		
Mohua		
Rifleman		
Silver Eye		
Tomtit		
Tui		
Blackbird		
Thrush		
Red Poll		
Chaffinch		
Starling		

Transect#:	5MBC1 #:	5MBC2 #:
Name		
Date		
Start Time		
Easting		
Northing		
temperature (1-6)		
wind (0-3)		
other noise (0-2)		
sun (minutes)		
precipitation type (N,M,R,H,S)		
precipitation value (0-5)		

Bellbird		
B. Creeper		
Fantail		
G. Warbler		
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Rifleman		
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Tomtit		
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Thrush		
Red Poll		
Chaffinch		
Starling		

Transect#:	5MBC1 #:	5MBC2 #:
Name		
Date		
Start Time		
Easting		
Northing		
temperature (1-6)		
wind (0-3)		
other noise (0-2)		
sun (minutes)		
precipitation type (N,M,R,H,S)		
precipitation value (0-5)		

Bellbird		
B. Creeper		
Fantail		
G. Warbler		
Kereru		
Mohua		
Rifleman		
Silver Eye		
Tomtit		
Tui		
Blackbird		
Thrush		
Red Poll		
Chaffinch		
Starling		

Appendix D. 5MBC data sheet (p.2)

Sun (0-5) Record approximate duration, in minutes, of bright sun on the canopy immediately overhead		
Time 24 hour clock, at the beginning of each count		
Unbounded Counts are unbounded		
Temperature	Wind The average for each five-minute count on a modified Beaufort scale:	
1 freezing < 0°C	0 Leaves still or move without noise (Beaufort 0 and 1)	
2 cold 0-5 °C	1 Leaves rustle (Beaufort 2)	
3 cool 6-10 °C	2 Leaves and branches in constant motion (Beaufort 3 and 4)	
4 mild 11-15 °C	3 Branches or trees sway (Beaufort 5, 6 and 7)	
5 warm 16-22 °C		
6 hot > 22 °C		
Other Noise i.e. Other than wind the average for the five minutes	Precipitation type Average for each count	Precipitation value
0 not important	N None	0 None
1 moderate	M Mist	1 Dripping foliage
2 loud	R Rain	2 Drizzle
	H Hail	3 Light
	S Snow	4 Moderate
		5 Heavy

Appendix E. Mohua recorded during fixed transect survey in 2016.

Date	Transect	No. of Mohua	Time heard	Observer	Total time surveying (mins)	Comments	
7/11/2016	MOH3	1	1053	Julie Newell	na	single mohua behaving like an inquisitive juvenile (didn't get a good look at its head. Flew in to check me out at moh3f (on my way to line 4). Single chip calls only	out of count
10/11/2016	MOH10	2	1408	Kat Manno	na	contact calls and male singing back from track	out of count
10/11/2016	MOH10	2	1419	Kat Manno	na	males counter singing across River from each other	out of count
11/11/2016	MOH10	1	1303	Julie Newell	na	Staccato calls, no response to squeak	out of count
13/11/2016	MOH10	1	1320	Julie Newell	na	song 50m above track	out of count
13/11/2016	MOH10	1	1328	Julie Newell	na	male song 20m from track	out of count
2/11/2016	MOH11	1	1418	Julie Newell	na	male singing across Young River on true R	out of count
2/11/2016	MOH11	1	1209	Julie Newell	na	male singing + lots of staccato calls between lines 10 and 11 for several min on true R of Young River - waypoint moved to estimated location	out of count
10/11/2016	MOH14	1	1444	Kat Manno	na	1 male singing	out of count
10/11/2016	MOH14	1	1451	Kat Manno	na	one mohua chattering - difficult to hear over River noise	out of count
10/11/2016	MOH14	1	1508	Kat Manno	na	1 male singing	out of count
11/11/2016	MOH14	1	1900	Kat Manno	na	male singing across River flat	out of count
12/11/2016	MOH14	2	1015	Kat Manno	na	two males across river	out of count
12/11/2016	MOH14	1	750	Kat Manno	na	male singing at bridge	out of count
12/11/2016	MOH14	1	1030	Kat Manno	na	male across river	out of count
12/11/2016	MOH14	1	1055	Kat Manno	na	bird chattering in canopy	out of count
13/11/2016	MOH14	2	1153	Julie Newell	na	2 birds singing across river, 1 definite male	out of count
13/11/2016	MOH14	2	1157	Julie Newell	na	male song and staccato across Young River	out of count
13/11/2016	MOH14	1	1149	Julie Newell	na	wpt 177 and 178 - 2 males heard singing across Young River	out of count
13/11/2016	MOH14	1	1149	Julie Newell	na	wpt 177 and 178 - 2 males heard singing across Young River	out of count
13/11/2016	MOH14	1	1202	Julie Newell	na	male song	out of count
13/11/2016	MOH14	1	1218	Julie Newell	na	male song and staccato across river	out of count
7/11/2016	MOH1	1	1559	Julie Newell	66	2 staccato notes heard. No response to squeaker	
18/11/2016	MOH1	1	1630	Julie Newell	59	male singing	

19/11/2016	MOH1	1	1649	Julie Newell	53	male song, moved away, couldn't locate but heard again during 5 min bird count near car park	
19/11/2016	MOH1	0	na	Julie Newell	57		
2/11/2016	MOH10	1	1345	Julie Newell	64	repeated 4 note phrase high in canopy	
2/11/2016	MOH10	1	1153	Julie Newell	64	Bird singing on my arrival, 50m up valley side from at Moh10f. Came in (not close) to sqkr. Also sang a few phrases in 5min count very close to Moh10f. Still there singing at 14:08hrs.	
10/11/2016	MOH10	2	1243	Kat Manno	54	2 males counter singing. One sounds like juvenile.	
11/11/2016	MOH10	1	1119	Julie Newell	69	Single bird singing repeated 12 note phrase and moving tree to tree in canopy. Loud and strident, but no male whistles. Followed it back to moh10f	
11/11/2016	MOH10	1	1150	Julie Newell	69	Single bird singing repeated 12 note phrase (no whistles). Came into squeaker only after 3min of squeaking, and staccatoed. may have entered a hole in a leaning tree about 15mup	
11/11/2016	MOH10	1	1251	Kat Manno	48	male singing	
11/11/2016	MOH11	0	na		60	1 kakariki heard	
12/11/2016	MOH11	0	na		47		
12/11/2016	MOH11	0	na		61		
12/11/2016	MOH11	0	na		50		
11/11/2016	MOH12	2	805	Kat Manno	50	male + female/juvenile	
11/11/2016	MOH12	1	817	Kat Manno	50	male singing across River	
11/11/2016	MOH12	1	830	Kat Manno	50	male singing	
11/11/2016	MOH12	1	1440	Kat Manno	55	Same male as seen here this morning	
12/11/2016	MOH12	2	849	Julie Newell	73	male singing and staccatoing in canopy. Female/juv flew in quietly to check me out as I left.	
12/11/2016	MOH12	2	1728	Julie Newell	55	1 bird singing male song plus lots of sub-staccato sspsspsp	
12/11/2016	MOH12	1	752	Kat Manno	50	male singing intermittently	
12/11/2016	MOH12	1	836	Julie Newell	73	male singing across stream	
12/11/2016	MOH12	1	830	Julie Newell	73	male singing and staccatoing in canopy	
11/11/2016	MOH13	3	944	Kat Manno	50	at least 3 individuals chattering in canopy	
11/11/2016	MOH13	2	1002	Kat Manno	50	singing and chattering in canopy	
11/11/2016	MOH13	2	1315	Kat Manno	55	2 males counter singing	
11/11/2016	MOH13	1	1008	Kat Manno	50	male singing and chattering in canopy	
11/11/2016	MOH13	1	1010	Kat Manno	50	male calling from across creek	
11/11/2016	MOH13	1	1035	Kat Manno	50	male in canopy	
11/11/2016	MOH13	1	1145	Kat Manno	55	male singing partial song with flock of brown creepers	
11/11/2016	MOH13	1	1209	Kat Manno	55	solo male signing, same as recorded at 1035am	

11/11/2016	MOH13	1	1225	Kat Manno	55	male singing and chattering	
11/11/2016	MOH13	1	1228	Kat Manno	55	male counter singing with above	
11/11/2016	MOH13	1	1242	Kat Manno	55	male singing	
12/11/2016	MOH13	3	1148	Julie Newell	53	Mohua seen feeding on ground - 2 more came in to squeaker. 2 with brownish patches on nose, nape and neck.	
12/11/2016	MOH13	2	1453	Julie Newell	1634	distant trill and one FEMALE BUZZ heard somewhere around here, but now silent and can't locate - ? across river	
12/11/2016	MOH13	2	1605	Julie Newell	1634	quiet ssspsppsspp calls in canopy - 1 bird fed by another = FEMALE OR JUV	
12/11/2016	MOH13	1	1017	Julie Newell	53	male singing high in canopy	
12/11/2016	MOH13	1	1017	Julie Newell	53	male singing - heard in 5min bird count, not located after	
12/11/2016	MOH13	1	1107	Julie Newell	53	male song, stopped before located	
12/11/2016	MOH13	1	1107	Julie Newell	53	male song heard in canopy - moved away. Waypoint 152 at 1111hrs probably same bird - song and staccato heard from across a gut	
12/11/2016	MOH13	1	1431	Julie Newell	1634	male song and staccato heard high in canopy	
12/11/2016	MOH13	1	1445	Julie Newell	1634	waypoint moved to presumed location of bird - 2nd male heard from waypoint 155	
12/11/2016	MOH13	1	1450	Julie Newell	1634	waypoint moved to presumed location of bird - distant song	
12/11/2016	MOH13	1	1509	Julie Newell	1634	Male singing and staccato + preening high in canopy - 13m from where 157 was moved to, so probably SAME BIRD	
12/11/2016	MOH13	1	1515	Julie Newell	1634	Male seen in canopy singing + staccato	
12/11/2016	MOH13	1	1617	Julie Newell	1634	male seen singing high in canopy	
12/11/2016	MOH13	1	1618	Julie Newell	1634	(waypoint moved) male heard singing from waypoint 162	
12/11/2016	MOH13	1	1619	Julie Newell	1634	(waypoint moved) 3rd male heard singing while searching for 163 bird. Ran out of time to find 162 and 163 bird	
10/11/2016	MOH14	3	1549	Kat Manno	55	Group chattering and singing	
10/11/2016	MOH14	2	1630	Kat Manno	55	two mohua chattering at bush edge	
10/11/2016	MOH14	2	1703	Kat Manno	55	one male singing, second bird chattering	
10/11/2016	MOH14	1	1608	Kat Manno	55	One male singing	
11/11/2016	MOH14	3	1421	Julie Newell	73	male singing 50m from Moh14 on arrival. Came into squeaker, with 2 others incl 1 f/juv (brownish over most of head and nose). Adult fed ?juv bird.	
11/11/2016	MOH14	1	1452	Julie Newell	73	male song and staccato heard in forest on far side of Young River	
11/11/2016	MOH14	1	1500	Julie Newell	73	very quiet staccato. Came into squeaker and sang full male song and staccato	
11/11/2016	MOH14	1	1501	Julie Newell	73	male singing within 20m of far river bank - not seen	
11/11/2016	MOH14	1	1529	Julie Newell	73	full staccato heard, no response to squeaker	

11/11/2016	MOH14	1	1538	Julie Newell	73	Male song on far river bank c. 100m away	
12/11/2016	MOH14	2	857	Kat Manno	55	2 males counter singing across river from track	
12/11/2016	MOH14	2	939	Kat Manno	55	at least 2 mohua	
12/11/2016	MOH14	1	825	Kat Manno	55	singing in canopy, no response to squeaker	
12/11/2016	MOH14	1	920	Kat Manno	55	Male singing and chattering	
13/11/2016	MOH14	1	1005	Julie Newell	66	male song and staccato across river	
13/11/2016	MOH14	1	1015	Julie Newell	66	single male note in canopy. no response to squeaker, song eventually heard	
13/11/2016	MOH14	1	1038	Julie Newell	66	male song	
13/11/2016	MOH14	1	1039	Julie Newell	66	song and staccato across river	
13/11/2016	MOH14	1	1045	Julie Newell	66	song across river	
13/11/2016	MOH14	1	1056	Julie Newell	66	male singing high in canopy	
13/11/2016	MOH14	1	1105	Julie Newell	66	male song, came into squeak, chased off by bellbird. possibly same bird as 171 - flew to same area as first bird seen	
13/11/2016	MOH14	1	1112	Julie Newell	66	few notes of song, not located no response to squeaker	
13/11/2016	MOH14	1	1117	Julie Newell	66	male song heard but silent on my arrival	
13/11/2016	MOH14	1	1120	Julie Newell	66	male song heard from waypoint 174	
13/11/2016	MOH14	1	1125	Julie Newell	66	male flying around canopy singing	
2/11/2016	MOH2	0	na	Julie Newell	60		
18/11/2016	MOH2	0	na	Julie Newell	53		
19/11/2016	MOH2	0	na	Julie Newell	50		
20/11/2016	MOH2	0	na	Julie Newell	50		
7/11/2016	MOH3	0	na	Julie Newell	60		
18/11/2016	MOH3	0	na	Julie Newell	55		
19/11/2016	MOH3	0	na	Julie Newell	54		
24/11/2016	MOH3	1	845	Julie Newell	55	bird heard singing, probably over Makarora river, in line 1 area during 5 min bird count before walk thru	
7/11/2016	MOH4	0	na	Julie Newell	60		
18/11/2016	MOH4	2	1357	Julie Newell	61	2 "chips" heard during 5 min bird ct. Went to location, no response to 5 min of squeaking but then heard very brown creeper like singing 50m away. 1 x ?juv (mottled brown and yellow belly, yellow head with brown mottling. Adult had bright yellow head and belly with slight brown on nape. 1 bird seen BEGGING to other, but not seen fed	
19/11/2016	MOH4	2	1356	Julie Newell	76	1 FEMALE/JUV with brown nape and mottled chest/belly. Quiet chips and staccato	

19/11/2016	MOH4	1	1313	Julie Newell	76	quiet ssspspspspspsps calls - no response to squeaker	
24/11/2016	MOH4	0	na	Julie Newell	63		
3/11/2016	MOH5	0	na	Julie Newell	61		
10/11/2016	MOH5	3	1415	Julie Newell	67	Group of three, chattering and quiet staccato. Came into squeaker. Bird seen feeding other mohua in group - courtship or feeding young. FEMALE OR JUV	
11/11/2016	MOH5	1	1452	Julie Newell	67	single bird high in canopy, quite mobile. Staccato calls only.	
24/11/2016	MOH5	1	1542	Julie Newell	55	Very distant song - found but not seen. Singing occasional few notes high in canopy. Waypoint moved to where found.	
24/11/2016	MOH5	1	1626	Julie Newell	55	Staccato calls heard during last bird count. Moved away when searched for. Likely same bird as waypoint 195.	
25/11/2016	MOH5	0		Julie Newell	57		
3/11/2016	MOH6	0	na	Julie Newell	60		
10/11/2016	MOH6	0	na	Julie Newell	66	probable single male call but unable to check out as above cliff. No response to squeaker.	
24/11/2016	MOH6	2	1234	Julie Newell	60	2+ birds staccato high in canopy, came towards squeak but stayed too high to see	
25/11/2016	MOH6	0		Julie Newell	65		
3/11/2016	MOH8	0	na	Julie Newell	61		
10/11/2016	MOH8	0	na	Julie Newell	61		
24/11/2016	MOH8	0	na	Julie Newell	60		
25/11/2016	MOH8	0		Julie Newell	63		
3/11/2016	MOH9	0	na	Julie Newell	58		
18/11/2016	MOH9	0	na	Julie Newell	52		
19/11/2016	MOH9	0	na	Julie Newell	54		
20/11/2016	MOH9	0	na	Julie Newell	58		