

# Mohua Distribution Survey, Makarora Valley 2021

## Report By

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November 2021

## Summary

In October 2021, habitats in the Makarora Valley where mohua may persist were surveyed to fill gaps in knowledge of Mohua distribution and identify where intensification of trapping might be most beneficial.

Transect surveys by DOC over the past decade to measure changes in mohua detection rates showed that mohua indices are climbing back up to 2011 levels recorded prior to a rat irruption that caused a population crash. An analytical report by N Whitmore in 2021 confirms this improvement which is good news for the Forest and Bird volunteers who have been maintaining a comprehensive trap network for many years specifically to protect vulnerable species like mohua.

While rising mohua detections is encouraging, the population is likely to be a fraction of its historical abundance and detections may be a biased reflection of the health of the population today. There is much variation in transect methods, numbers detected are very low overall and detections of females extremely rare.

This report summarises the findings of this survey.

The onset of breeding in October was chosen for the survey as we hoped to detect territorial birds. This should indicate whether sufficient breeding pairs remain to enable recruitment and thus sustain a viable population.

Survey effort was focused on suitable habitat on south facing slopes on the true right of the Makarora Valley from Haast Pass to the Blue River from the valley floor to about 950m altitude. Two additional north facing hills (Mt Birnam and Mt Kaye) were included for comparison at either end of this range. The Muddy Grid was also surveyed to try and get a total count of mohua there for the benefit of the Makarora trapping group.

There were 105 confirmed mohua detections comprising 70 individual birds. These individuals were from 36 separate groups of which only 5 (groups) were previously known (from the mohua fixed transect monitoring). The majority of birds detected were on low altitude terraces of the Makarora true right, the Muddy grid / Blue Pools area and on Powder Flask peak. Mohua were detected on every site surveyed, though detections ranged from 1 per day to 12 individuals detected on the best day.

There were significantly more detections in this survey than in the DOC 2012 valley wide distribution survey. However, this survey used more comprehensive methods (P Van Klink 2013) and this increase may be in part because of better detection methods.

## Introduction

The Makarora Valley lies at the head of Lake Wanaka in Mount Aspiring National Park some 65 kilometres north of the township of Wanaka. Silver beech dominates the forest canopy from valley floor (~300m asl) to the bush line (~ 1100m asl).

The Makarora mohua population lies between two Operation Ark mohua populations, in the Landsborough River and the Dart-Caples (O'Donnell 1996). There are few historical data about the Makarora mohua population itself although mohua would have once been contiguous between these sites.

In each of the last 11 years DOC has completed transect surveys during spring at thirteen sites in the Makarora and Young Valleys to monitor mohua detection rates. The survey method was a 'slow walk and listen'.

The Royal Forest and Bird Protection Society began the Mohua Protection Project in Makarora in 1998. It currently maintains >600 predator traps along the Haast highway, on trapping grids (Muddy creek and Pipson creek) and in the Blue and Young Valleys.

Wildlands Consultants recommended intensifying trapping by establishing new trapping lines in the Makarora and Blue Valleys. Recent funding secured from DOC's Mahi Mo Te Taiao Jobs for Nature by the Southern Lakes Sanctuary (SLS) makes such intensification feasible.

However, the recommendations were aimed at focusing protection efforts on whio, not mohua. This survey was commissioned to identify other sites where mohua may be present but not benefitting from pest control. Newly discovered mohua stronghold locations could influence the future distribution of pest control effort in the Southern Lakes Sanctuary.

## Methods

Eight sites were selected for survey where mohua were most likely to occur based on previous detection records or having habitat with slope and aspect suitable for mohua. The survey took place in October at the onset of breeding to detect and locate territorial birds. Jo Tilson (Kiwicentric Ltd) was contracted to do this work with Grant Maslowski helping on five of the 10 days field work.

All surveys were completed during clear, calm weather.

The Sites surveyed are listed below.

- Site 1 – Powder Flask Peak
- Site 2 – Muddy Grid / Blue Pools
- Site 3 – Castle Hill x 2
- Site 4 – Fish River / Jubilee Creek
- Site 5 – True right Makarora (from Davis flat to Cameron Flat)
- Site 6 – Birnam
- Site 7 – NW flank of Mt Kaye
- Site 8 – Haast Pass

The survey method was to walk suitable terrain slowly, counting and trying to positively identify all mohua heard along the way. This was not a transect survey. Rather, it was a route walk, either up to 950m, across a slope or along the valley floor. Where possible, tracks or trapping/tracking tunnel lines were used for ease of travel but more often it was a case of following the path of least resistance to get to the habitat needing to be searched.

Survey routes ranged from 5 to 14 km. Once birds were heard every effort was made to get visual confirmation of group size and composition. Sometimes observers stayed with a group for up to half an hour to try and figure the group out and see whether there was any obvious nesting behaviour such as courtship feeding. Recordings of mohua song and alarm calls played from a smart phone were sometimes used to elicit a response from the birds and make them easier to count as they are typically up high in the canopy and can be hard to observe visually.

Mohua locations and survey tracks were recorded with GPS waypoints. Number, sex and age of mohua were recorded if possible. Notes about their behavior were also made as this can give clues to whether birds may be part of a breeding group. At the end of each day data was entered onto an excel spreadsheet and locations plotted using a mapping program.

Following initial surveys at all sites, an assessment of survey effort versus results was used to focus the remaining survey effort in areas with most detections. The three top ranking areas were: Powder Flask peak, the Muddy Grid, and Makarora true right.

## Results

A total of 60 confirmed mohua detections were made comprising at least 65-70 individual birds (Table 1). These individuals were from 36-40 separate groups of which 5 were previously known from the DOC fixed transect surveys). While some sites were known to hold mohua, most of the other birds found were new to the observers.

**Table 1:** Detections of mohua at each site surveyed, with coloured rows having the most detections. The Blue River was surveyed at the same time as one of the Makarora TR surveys but has been included separately as it's a different valley. The Cameron Ck detection was incidental, but I included it in the table as it's the first detection here in eight years, so I thought it was worth including.

Sites	No. Detections	Groups	Total no. Individuals
TR Makarora	15	9	24
Powder Flask Pk	14	6	10
Muddy Grid / Blue Pools	8 4	5 3	8 4
Castle Hill	5	5	7
Lower Blue	4	4	6
Haast Pass	3	2	5
Birnam	2	2	2
Fish	2	2	2
Mt Kaye	1	1	1
Cameron Ck	1	1	1
<b>TOTAL</b>	60	40	70

Highest encounter rates per ha were observed along the true right of the Makarora followed closely by the Muddy grid / Blue Pools area and Powder Flask Peak. (Table 2).

The Muddy grid has been subject to intensive ground-based trapping by Forest and Bird Volunteers for many (> 10) years with a network of more than 100 traps. The other two sites have no other localised trapping specific to the site although they may be benefitting from lower immigration of rats and stoats due to nearby trapping and recent 1080 operations.

**Table 2:** Highest yielding sites based on numbers of birds.

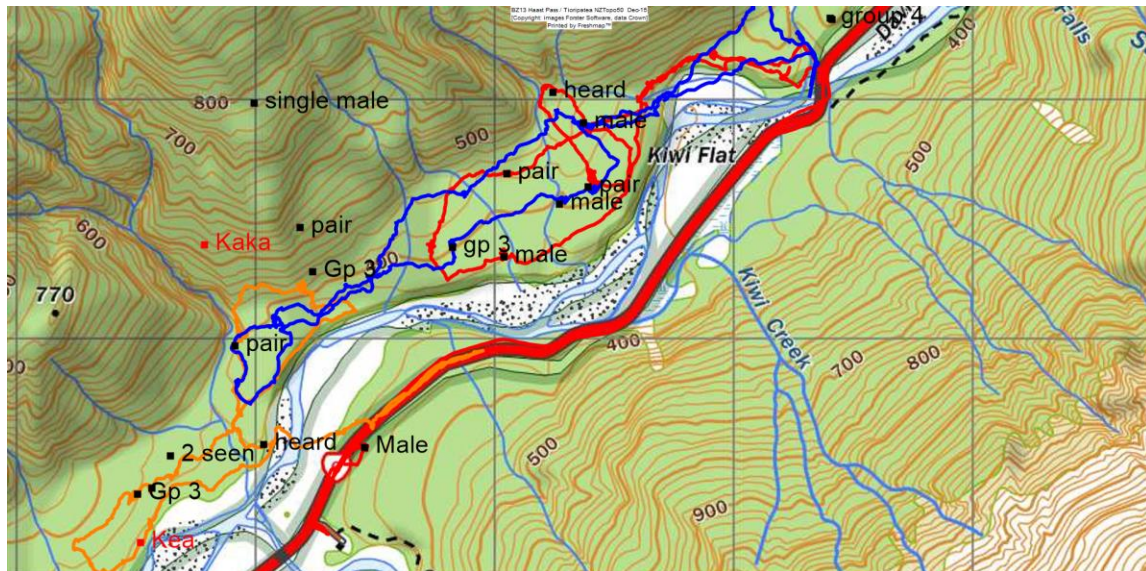
Sites	Description	Fertility	Forest Altitude (m)	Ground Trapping	1080 in 2017 & 2019?	Approx ha of site	No. mohua individuals
Muddy Grid Blue Pools	Alluvial Fan	High	340-420	Yes! Intensive	Yes	150	12
TR Makarora	River terrace	Med	350-450	None	Yes	150	20-24
Powder Flask,	Hill slope	Med	450-950	None	Yes	170	10-14
Lower Blue	River Terrace	Med	450-550	Yes	Yes	90	6
Haast Pass	Low saddle	Med	400-560	Yes	No	60	5
Castle Hill	Hill slope	Med	450-950	None	Yes	60	7
Fish	Ridge	Low	450-1000	None	Yes	20	2
Mt Birnam	Ridge, face	Low/Med	350-900	None	No	30	2
Mt Kaye	Ridge, face	Low	500-900	None	No	30	1
<b>Cameron</b>	Fan	High	360	Yes	Yes	2	1
<b>TOTAL</b>						<b>762</b>	<b>70</b>

### True Right of the Makarora

The true right of the Makarora is classic mohua habitat i.e., low altitude forest on river terraces dominated by fewer but larger trees (silver beech) and a simple understory. There is no localised pest control although it was a part of two 1080 operations. However, a significant part of the area was river buffer and so would not have received treatment. The area surveyed was approximately 150 ha and 24 individual mohua were detected of which most seemed to be territorial.

Interestingly, two of the locations where pairs were found were also identified in the 2012 mohua survey (Makarora Valley Mohua Report 2013, P Van Klink). Surprisingly, the number of birds detected in this one area is more than double what was found in the entire 2012 distribution survey (n=11). How much of this difference can be attributed to population growth or improved detection is unclear because the methods used then were not the same as those used for this survey.

Map 1: True Right Makarora showing tracks walked in dark blue and mohua locations in black.



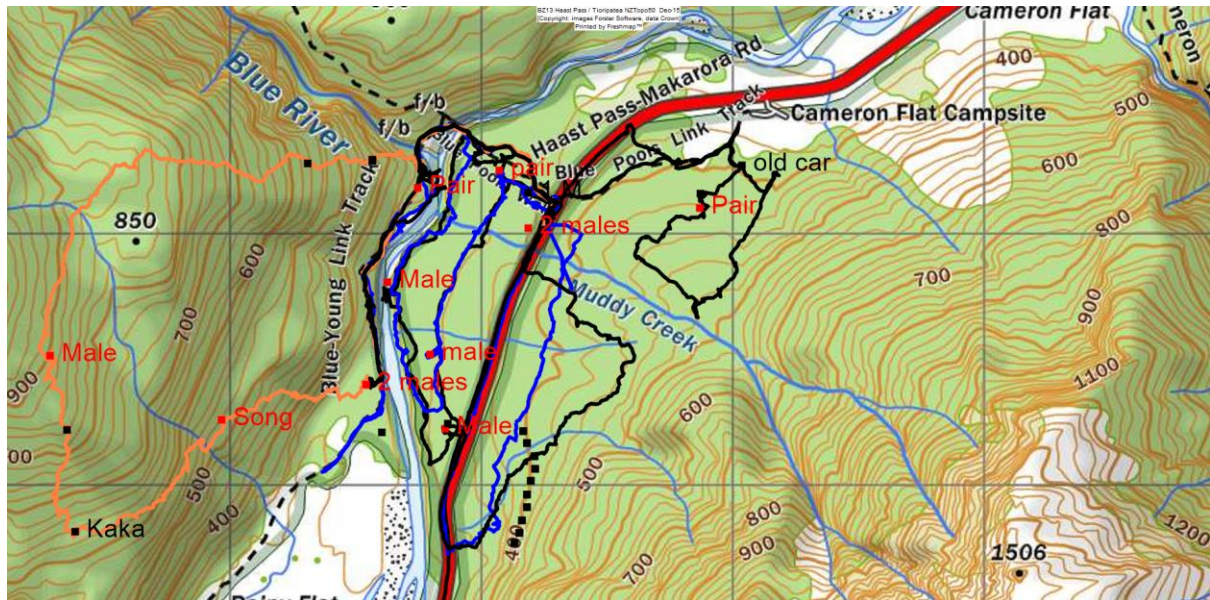
### Muddy Grid – Blue Pools

The second site where mohua were relatively abundant was the Muddy Grid / Blue Pools. The Muddy Grid is on a fertile alluvial fan of low altitude with more diverse understory vegetation than other sites. The fertility of this site makes for prime habitat for both birds and mammal pests, so it is an absolute credit to the Forest and Bird volunteers who have been maintaining an intensive network of traps for many years that there are mohua here at all. The 2012 DOC survey detected only two birds in this area (P van Klink, 2013).

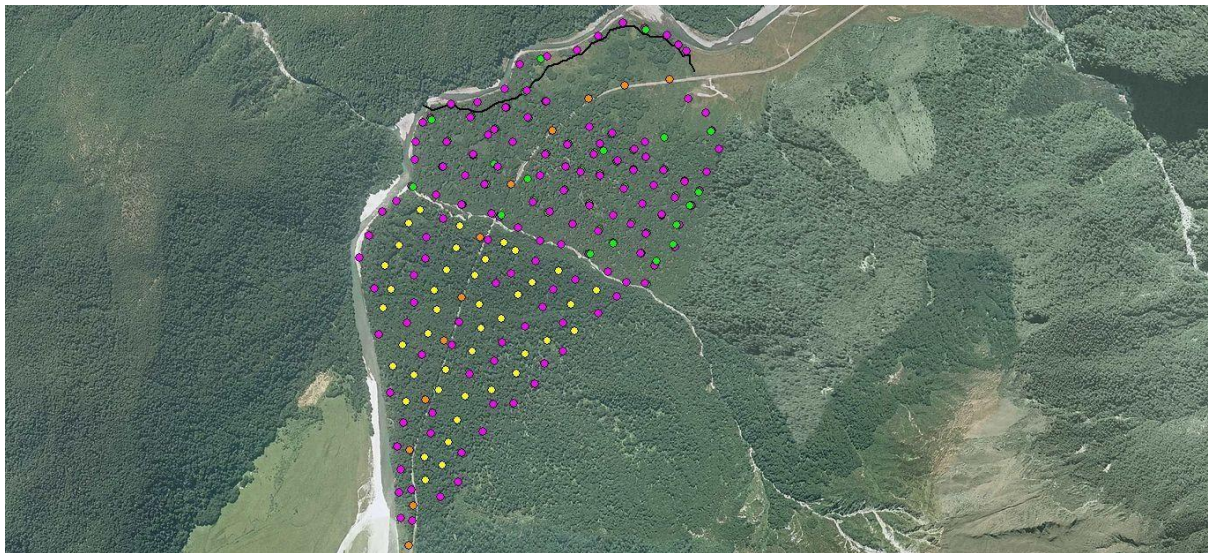
We located the three previously known pairs at the north-east of the grid, by the old carpark and near the old track. We also found at least one but possibly two single males on the south-west end of the grid and one male close to the river audible from both sides and apparently using both sides of the river. Two additional pairs were detected opposite the muddy grid near the start of the Blue-Young link track. One pair was located immediately to the south of the Blue River swing bridge and the other pair is approximately one kilometer further down the track just before the track leaves the forest for the open flats. Between these two pairs is the single male that was seen flying from side to side of the river.



**Map 2.** Muddy Grid showing tracks surveyed in dark blue and black and mohua locations in red



**Photo 1:** Aerial photo showing locations of predator traps on the Muddy Grid



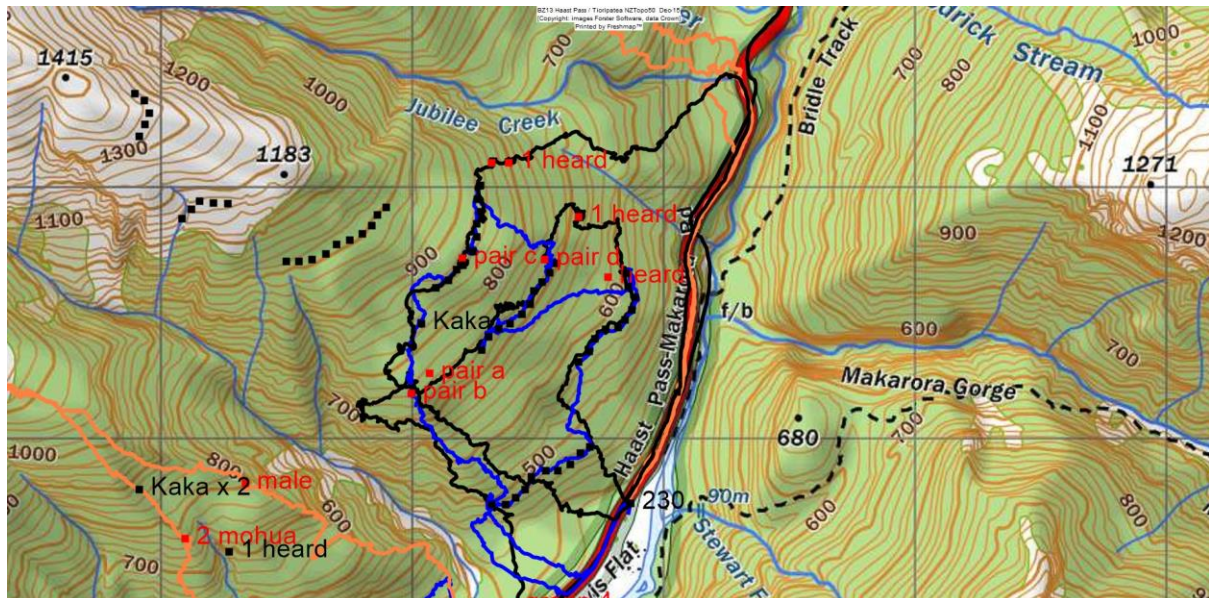
### Powder Flask Peak

Powder Flask peak is the third site with good numbers of mohua. This is, a gently sloping south facing hill rising from 500m to 1050m at bushline. It is dominated by silver beech with a simple



understory that becomes more diverse at lower elevations. A ridge-to-river suite of tracking tunnel lines on this face provides helpful points of reference for mohua locations. The birds here were high at 700-950m asl with a group of 4 present in the southern corner.

**Map 3.** Powder Flask Peak showing some of the lines walked in blue and orange and mohua locations in red. Tracking tunnel stations are the black dots.



### Other Sites

**Lower Blue.** This area has at least two resident groups of mohua with both chicks (2018) and nests (2019) found in the past. Annual DOC transect counts were at their highest in 2018 but declined thereafter. I surveyed this area once, on the 16<sup>th</sup> October and found only one very quiet male on transect four (a plateau where Forest and bird have a trapline). The pair down by camp flat came in to check me out after I played some recordings on the way back but did not call. A few other calls were heard on the way up to the 500m saddle following the trapline extension.

**Haast Pass.** This was a former hot-spot for mohua. One survey was done with three people covering the top half of Bridal Trail, the trapping fan and one km of the road down to the Fish River. Only three birds detected on the bridal trail and two birds were heard from road on the western side of highway south of the pass.

**Castle Hill North and South.** This hill has similar terrain to Powder Flask peak and may support many more mohua than we found. It appears to be good habitat but due to the quietness of mohua at the time we only heard birds close to where we walked. We decided that further searching was probably not cost effective given that there were more productive sites that were a lot easier to get to.

**Birnam and Mt Kaye Flanks.** Both sites were selected for survey as they are north facing therefore offering a comparison to the other hill sites which are all south facing. I accessed Mt Birnam just above the bridge over the Blue river and while initially the terrain was lovely it soon turned into habitat that was not quite right for mohua with smaller trees, totara shrubs, celery pine undergrowth and a rocky rather than mossy ground surface. No Mohua were heard on this face. However, at 850m asl, I traversed about a km to the south where the habitat was better and I found



mohua lower on south and east facing slopes. This was similar to Mt Kaye where only one mohua was detected on the flats between the Haast and zigzag creek.

**Fish Spur.** A lot of celery pine and many smaller trees with the good habitat between 700 and 900m. Only two mohua detected here but possibly others had I searched more extensively.

#### **Detectability of mohua and encounter rates versus survey effort.**

The survey was started in October to coincide with the onset of breeding when birds are territorial and so easier to locate and check on subsequent visits as they tend to remain within a small territory.

Early in October, territorial birds tended to be quiet with males singing short quiet songs, sometimes with a bit of answering chatter heard in response. This made them quite hard to detect beyond ~100m especially in undulating or noisy terrain. This behaviour was consistent with observations made in previous years at the start of the Makarora Mohua Fixed Transect survey period. (J Tilson 2017-2019) and seemed to me to be indicative of having nests nearby.

But because we were only hearing birds at close range and because the mohua population is not large it meant that the uphill walks did not yield as many birds per hour because travel was slower. I'm sure there are more birds out there but as they are scattered and in low numbers surveying on hills wasn't the most productive way to spend a day or the best way to count the population. I therefore abandoned the planned follow-up surveys of the two Castle Hill routes, Fish spur, Mt Birnam and Mt Kaye in favour of spending more time at the highest yielding sites from which I thought we could learn more.

**Table 4.** Survey effort

<b>Sites</b>	<b>Total hrs survey effort</b>	<b>Approx. km's walked (total)</b>	<b>Survey repeats</b>	<b>Approx. ha of site</b>	<b>Birds detected (no. individuals)</b>
Muddy Grid / Blue-Young link	20	24	x 3	150	12
TR Makarora	20	23	x 3	150	24
Powder Flask	28	28	x 4	170	10
All other sites	43	50	x 1 ea	190	24
	<b>111</b>	<b>125</b>	<b>16</b>	<b>660</b>	<b>70</b>

## Discussion

Mohua in the Makarora area can be difficult to monitor. They are tall forest specialists, favouring the largest of trees where they spend most of their time foraging high in the canopy. They are widely dispersed and are quiet early in the breeding season meaning observers are only likely to hear them occasionally when they are relatively close by.

During the sixteen-day survey, we found mohua that were previously known to us and many more that were not. Most of these new birds were found on the south facing aspects of Powder Flask peak and Castle Hill and the Makarora River terraces below these. Many of these birds were territorial and were subsequently re-located at previously marked spots.

We found 70 individuals of which most (n=43) were located on the true right of the Makarora or on the hills above. This area has no localised ground trapping although it may be benefiting from intensive trapping to the north and south. The rest of the birds were found in areas adjacent to the highway which receives ongoing predator control. At least half of these birds were previously known to us.

The number of new encounters is encouraging and strongly suggests that recruitment has been happening. However, with no previous methodologically similar surveys there is no way of knowing the former state of the population. The 2012 DOC distribution survey covered much of the same area, but the methods used were quite different. Only 11 mohua were detected in the whole 25km grid area searched. (P van Klink 2012).

Regardless of the state of the population before or after, that mohua are still present, in accessible places like the Makarora Valley is something to celebrate! It also presents ample opportunity for restoration towards former levels of abundance.

The thousands of hours of volunteer time that have gone into establishing trap lines, clearing traps, and continually finding better ways to get rid of the pests are surely paying off. This trapping effort is likely to be making a difference for mohua especially during non-plague years. The Landsborough Valley by comparison is only 35-50 km to the north and is a key refuge for mohua. While it has only a fraction of the ground trapping effort it has had a lot more 1080 over the years. But it has never had a volunteer army like the Makarora Trappers to support it. With the volunteer army, ongoing trapping, regular use of 1080 (and maybe some strategic translocations) the Makarora Valley could become an equally impressive mohua refuge.

## Recommendations

The goal of this survey was to find other sites where mohua are still present in reasonable numbers. It was not to measure indices of mohua abundance. We found more mohua out there and there are likely to be more present than we think, but only in particular habitats. The south facing slopes of Castle Hill, Powder Flask peak and the true right of the Makarora are areas containing these habitats. They are also the best location to focus future monitoring and predator control efforts.

It's very difficult to establish what proportion of the population is female and how often recruitment is happening. Mohua cannot be reliably sexed based on plumage alone, only by their calls (Read, 1984 and Cunningham and Holdaway 1986). But since females rarely call and only males sing, we cannot be certain that a pair of mohua that we see briefly are a male female pair and not two males. When going by the quiet song and short answering chatter as well as the 'sneaky' behaviour of some groups early in breeding season we 'speculate' that this could be a pair, especially if on repeat visits, they are found in the same place. However, it would be good to know for sure if some of these territorial groups do in fact contain breeding females because without females in the population there is no chance of ongoing recruitment. DOC Wanaka has just started to colour band the birds they find on the transects and this is going to big help with identification of individuals in the future, however it would still be good to keep studying some of the new groups we have found so that we can understand the species better which will help us ensure the management we do is beneficial.

One non-invasive way of doing this would be to do follow up surveys in December and January when birds are still territorial to see if we find juveniles. Maybe DOC would be keen to get involved and band some birds at the same time? This is a relatively cost-effective way of checking up on 'the locals' and seeing if any outcomes can be demonstrated.

It would be also good to know whether the breeding pairs found typically raise one brood or two in a season and whether this is the same for the pairs at low and high elevations (e.g., at 800m on Powder Flask peak), as this has important implications for whether a population can recover from periodic rat irruptions. Elliott's work at Knobs flat in the 80's showed that mohua populations in 'good' habitats can raise two broods a year which makes them sufficiently productive to withstand rat or stoat plagues if they occur at intervals of 5 or more years. Populations in poor habitats on the other hand raise only one brood and their productivity is insufficient to match losses to pests. These populations will slowly decline until they eventually become extinct. (Elliott et al 1990). Whether the Makarora mohua can raise one or two broods would be good to know as pest irruptions are now occurring more frequently. It also helps us to understand whether major 1080 interventions in mast years are useful vs critically important.

Learning more about rat indices on both the north and south side of the valley would also be useful and may help understand why there are more birds in some areas than others. Whitmore's analytical report showed that mohua populations could expect to decline at a rat tracking rate of just 11% which is less than what doc uses before planning a 1080 operation so some more understanding of associations between habitat, rodent abundance and mohua survival would be useful. (N Whitmore 2021).

## To summarise...

- Some form of low impact, follow up monitoring on easily accessible birds should be done to better understand recruitment.
- Expand small mammal index (SMI) monitoring to keep tabs on rat indices outside the trapping areas. Makarora has five Ridge to River tracking tunnel sets already established in the Valley, but DOC only run these before and after a 1080 operation (Tia Kina Manu). I think it would be a good idea to run a couple of these lines in November, one set on either side of Valley. i.e, Powder Flask Peak lines and perhaps another set on the other side of valley, either Muddy Creek, Shrimpton or even Haast Pass in order to see if there is higher tracking rates on north or west facing slopes than south, which might explain the patterns of mohua distribution observed.
- Continue trapping! And start discussions about the next steps regarding future trap expansion for mohua. Ref paragraph on Conservation Implications In Nathan Whitmore's Analytical report re the effectiveness and impracticality of localised ground based control and the need to have control sites.
- Undertake a valley wide survey general bird survey of the Blue and Top Makarora Valley to look for mohua and whio.

## Acknowledgements

Special thanks to the Southern Lakes Sanctuary for funding this work and to Ross Sinclair and Leslie Van Gelder and the COLB committee for supporting my proposal.

To Grant Maslowski for assisting me with the surveys and Sarah Forder for helping out for a day and to Chris Kjlgaard for providing good company on two of my surveys.

To the COLB volunteers whose dedication and commitment over more than two decades have ensured this population of mohua get the recognition they deserve.

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