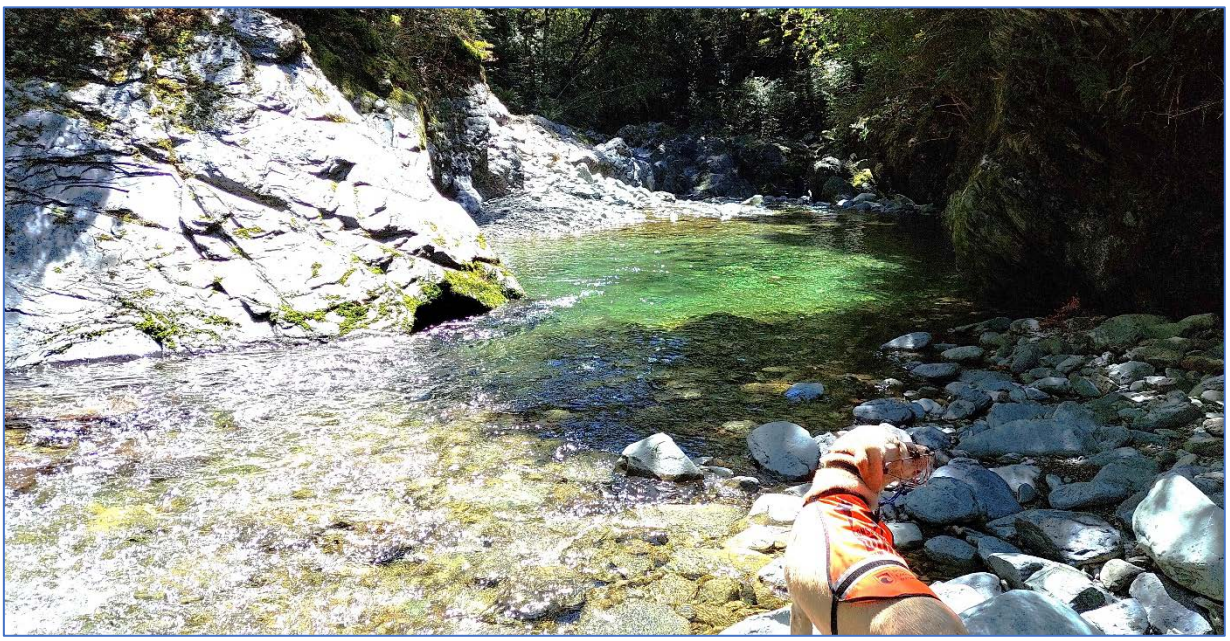
REPORT FOR THE DEPARTMENT OF CONSERVATION SOUNDS OFFICE

Habitat assessment and conservation dog team survey for whio (Hymenolaimus malacorhynchos) in the upper Te Hoiere/Pelorus River and tributaries



Species Conservation Dog Tui surveying for whio, Te Hoiere/Pelorus River, March 2022.

12-16 March 2022.

Glen Newton, Conservation Dog Handler

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Introduction

Whio were once widespread across much of New Zealand but predation, primarily by stoats, and habitat modification have now greatly limited their abundance and distribution. Whio inhabit river and stream systems with high water quality, stable stream banks, low sediment loading and native riparian scrub or forest. In the South Island remnant whio are now typically only found in less accessible high-country catchments. Four high priority 'security sites' with intensive predator control have been set up to secure the population: two in Kahurangi, one in Central Westland, and one in Fiordland. Outside of these security sites there are several 'recovery sites' with whio where some form of management is undertaken. Some of these sites are adjacent to existing security sites while some are geographically isolated. New recovery sites for whio management need to be identified within under-represented parts of their former range (Glaser *et al.* 2010).

Whio were once present in the Te Hoiere/Pelorus Catchment but appear to have declined with only infrequent reports over the last 20 years. The last records obtained from the local DOC Sounds Office was from goat hunters working in the area in the early 2000's. The only record from the DOC whio forever database in the greater Richmond Range is a lone male in observed in 2016 in the Upper Motueka River adjacent to Te Araroa trail. Additionally, the only records on the eBird data base are from within the Kahurangi area.

I have been contracted to:

1) undertake habitat assessments in the upper Te Hoiere/Pelorus River tributaries to assess their suitability for whio.
2) survey the upper Te Hoiere/Pelorus River tributaries to identify any remnant whio.

Method

Habitat Assessment

At intervals along the various waterways surveyed a standardised Fresh Water Stream Habitat Assessment was undertaken (see Appendix 1 taken from Pellowe 2015). This included assessing ten 'A5' sized cobbles by removing them from the stream and identifying the family and total number of invertebrates observed. Using excel, the total number of invertebrates were averaged across the 10 rocks per site giving the average number of invertebrates per rock sampled (inv/rock).

Whio Dog Survey

A Department of Conservation fully certified and experienced whio dog (Tui – 8-year-old Golden Labrador Retriever) was used to make either a single or double pass search along waterways and banks in the upper Te Hoiere/Pelorus River Catchment. Where possible the actual riverbed was searched but often travel in the riverbed was not practicable and detours were taken. When the handler was unable to follow the dog through a section of river (often deep water that the dog had swum), the dog was commanded to "wait" while the handler sidled around on the bank before re-joining the dog.

Whio that may have been located in full view on the river could be observed with binoculars (Swarovski EL Range10x30) to determine age and sex. Age would be categorised as adult, juvenile or duckling based on eye, bill, and plumage colour. Ducklings would be further categorised into one of five development stages. If two adult birds were found together, they were assumed to be a male – female pair. (Whio Best Practice Manual). If whio

were located under the cover of banks an attempt would be made to determine age and sex without disturbing the bird. A small headlamp (Fenix HL26R) would be used in aiding the identification of birds under cover.

A track log was used to record the actual search path and any whio observed would be marked with waypoints using handheld GPS (Garmin GPSMAP66i). The search was conducted when the water was at normal autumn-time base flow.

Results

Habitat Assessment

Table 1. Summary of habitat assessment data, Te Hoiere/Pelorus River

Site	# Sites Assessed	Invert (av/rock)*	Invert Range
Te Hoiere/Pelorus	8	4.6	3.3-7.3
Richmond	4	5	3.9-5.9
Mates	4	3.9	3.3-5.0
Roebuck	4	6.9	5.7-7.6
Total/Average	**20**	**5**	**3.3-7.9**

*see Appendices 2-4 for full details

Upper Te Hoiere/Pelorus River
The lower section surveyed from Middy Creek Hut up to Roebuck Hut (8km) starts with an apparently unstable open area dominated by cobble/boulder substrate and sections of bank instability. This is followed by a stable enclosed gorge section with deep slow-moving pools with limited areas of riffle for feeding. It then opens out again before Roebuck Hut with a nice mix of riffles interspersed with occasional bedrock pools and stable banks. Water velocity is never very fast reflecting the low gradient of the catchment at this point. Interestingly, this section had the highest numbers of invertebrates for the eight sites surveyed in the main Te Hoiere/Pelorus River.

Above Roebuck Hut the river initially remains relatively open with unstable cobble/boulder dominated substrate. Once the Mates Creek confluence is reached the river becomes more gorgy and confined continuing like this all the way up to the old goat hunters camp with bed rock gorges a feature.

Richmond Stream
Four sites were assessed in Richmond Creek. Once through the initial gorge section Richmond Creek is typified by a mix of bedrock pools, riffles, rapids, and occasional small falls. A section of slower moving water with cobble dominated substrate features in the middle reaches but in general is boulder dominated, stable and partly shaded.

Invertebrate numbers were average at the upper most site assessed and at the Echo Stream site but declined towards the lower end of the mainstream bed.

M**ates Creek**
Four sites were assessed in Mates Creek. This was the most open of the upper tributaries with large bouldery sections lower down, slips and fresh erosion causing infilling, gravel banks and instability in the mid reaches but with more stable sections further up. Invertebrate numbers were lower ranging from 3.3-5.0 inv/rock with numbers being highest towards the top.

Roebuck Creek
Four sites were assessed in Roebuck Creek. This was the smallest and most closed in of the upper tributaries but also appeared the most stable and least effected by the February floods. Invertebrate numbers ranged from 5.7-7.9 inv/rock and were very conspicuous during the survey with only the bottom site adjacent to Te Hoiere/Pelorus being average.

Overall average invertebrate abundance ranged from 3.3 to 7.9 inv/rock for sites assessed.

Saturday March 12th 2022
Te Hoiere/Pelorus River from Middy Creek Hut to Roebuck Hut, total 8km (single pass).
1115hrs Flight in.
1145hrs Started survey at Middy Creek Hut
1600hrs Finished survey at Roebuck Hut with no indication from Tui of any whio being present.

Sunday March 13th 2022
Te Hoiere/Pelorus River from Roebuck Hut to old Goat Hunters Camp at E1628202 N5410142, Total 9km (first pass).
Richmond Stream from Te Hoiere/Pelorus River confluence to forks at E1632041 N5412007, Total 6.5km (double pass)
0800hrs Started survey from Roebuck Hut
0839hrs at Mates Creek confluence
0855hrs at Te Hoiere/Pelorus River-Richmond Stream confluence, drop overnight gear
0950hrs at Echo Creek
1205hrs Finished survey up Richmond Creek with no indication from Tui of any whio being present. Completed habitat surveys while heading back downstream.
1535hrs back at Te Hoiere/Pelorus River-Richmond Stream confluence, pick up overnight gear.
1600hrs Started survey up Te Hoiere/Pelorus River
2000hrs Finished survey at Goat Hunters Camp with no indication from Tui of any whio being present. Camped overnight.

Monday March 14th 2022
Te Hoiere/Pelorus River from old Goat Hunters Camp back to Roebuck Hut, Total 9km (second pass)
0800hrs Completed habitat surveys while heading back downstream to Roebuck Hut.
1500hrs Back at Roebuck Hut with no indication from Tui of any whio being present.

Tuesday March 15th 2022
Mates Creek from Pelorus confluence to gorge at E1627701 N5413353, Total 4.5km. (single pass)
Roebuck Stream from E1627158 N5415228 to Te Hoiere/Pelorus confluence, Total 4.5km
(single pass)
0715hrs Departed Roebuck hut
0750hrs Started Survey from Mates-Te Hoiere/Pelorus confluence
1020hrs Finished survey up Mates Creek with no indication from Tui of any whio being present., completed habitat surveys while heading back downstream.
1210hrs Climbed over into Roebuck Stream.
1410hrs Started survey down Roebuck Stream.
1715hrs Finished survey down Roebuck Stream and back at Roebuck Hut with no indication from Tui of any whio being present.

Wednesday March 16th 2022
0740hrs Packed up gear and completed last habitat assessment
0900hrs Flight out.

Overall result: Total River length surveyed was **32.5km,** no whio or sign of whio was observed.

Discussion

Large sections of the Upper Te Hoiere/Pelorus River and its tributaries appear to be suitable whio habitat. They are enclosed with forested riverbanks, relatively gradual in gradient, have water filling much of the boulder dominated stream beds, typical of good whio habitat found in other regions. One limiting feature resulting from the catchments low gradient and bedrock gorges are localised areas of deep, cobble dominated pools that aren't suitable feeding areas for whio.

Closer inspection through the habitat assessments revealed average numbers of invertebrates present at most sites. While no sites assessed had high invertebrate numbers a feature of the catchment was consistent invertebrate numbers throughout. This is in the context of a one in a 100-year flood occurring in the catchment in early February - only six weeks before the current assessment was undertaken (Marlborough District Council Environmental Data). The lack of obvious damage apart from occasional gravel deposits and slips (mostly in the Mates Creek tributary) is testament of the catchment's inherent stability.

The historic presence of whio in the Te Hoiere/Pelorus catchment shows that it was once suitable for whio but that stoat predation has likely caused local extinction of the population. Whether this extinction extends across all catchments in the wider Richmond Range is unknown but in the absence of predator control it is more than likely. Further surveys of other catchments such as the Wakamarina could give a better indication.

The Richmond Range appears geographically isolated from both the Nelson Lakes and Kahurangi areas and this may limit natural dispersal of whio back into the range. The lower Wairau, Motueka and Waimea River valleys are open, with developed areas of pasture, housing and forestry in their lower reaches limiting their ability to sustain whio. This in turn may limit the potential dispersal of whio up into the headwater tributaries which drain the Richmond Range. This is supported by the whio forever sightings data base which shows only one bird recorded in the greater Richmond Range, a lone male in the head of the Motueka River East Branch adjacent to Hunters Hut in April 2016. This is likely a juvenile dispersing post breeding season, potentially from the Wangapeka/Fyfe security site. Large scale landscape-based predator control targeting stoats would need to be implemented and shown to be successful before reintroduction of whio could be considered.

An estimate of the home range needed per whio pair in a typical South Island catchment is between 1-2km/pair. Considering the size (relatively small), available habitat (pretty consistent apart from some large pool sections) , altitude (low), the frequency of periods of instability due to weather events (infrequent), and observed invertebrate abundance (the Upper Poulter River in the Central South Island had similar abundance to the Te Hoiere/Pelorus, ie 6.4 vs 5 inv/rock, data from Newton 2021 *pers. obs.*) tributaries in the upper Te Hoiere/Pelorus River are likely to have larger home ranges of 2km/pair. By dividing the habitat assessed as suitable for whio (8km Te Hoiere/Pelorus, 3km Roebuck, 2km Mates, 2km Richmond=**15km total**) by the estimated home range carrying capacity would be 7-8 pairs. This obviously excludes potential habitat found across the wider catchment not surveyed during this visit.

Recommendations

1. Discuss the report findings with the whio recovery group and make an assessment of the site in relation to other recovery sites (e.g. habitat, geographic location, existing predator control, funding options…)
2. Undertake surveys of any other areas where whio sightings have been reported in the wider Richmond Range to identify if birds are still present.

References

Andrew Glaser, Paul van Klink, Graeme Elliott and Kerri-Anne Edge 2010. Whio/blue duck *(Hymenolaimus malacorhynchos)* recovery plan, 2009–2019. Department of Conservation. Internal Report.

Marlborough District Council Environmental Data (marlborough.govt.nz)

Newton, Glen (2021) Habitat assessment and conservation dog team survey for whio *(Hymenolaimus malacorhynchos)* in the upper Poulter River and tributaries. Contractor Report for Department of Conservation Rangiora Office.

Pellowe. 2015. Assessment of stream characteristics that influence whio presence and abundance December 2015 - DOC-2700287

Whio sighting online database. Department of Conservation.

Whio Best Practice Manual. 2004. Blue Duck (Whio) Recovery Group Department of Conservation.

Appendix 1

Fresh Water Stream Habitat Assessment – Field Sheet

Location (GPS)	Easting – Northing -	Date Time	
Waypoint Name		Observer	
Stream Name		Photos	Upstream Downstream

Stream Characteristics / Water Flow Type / Water Flow Conditions (see Appendix 1 for definitions)

% Pool		Wetted Width	
% Riffle		Depth (m)	
% Run		Velocity (m/s)	
% Rapids		Flow Conditions	Low Base High

Substrate (Rock) Characteristics (% Tally)

BR (>4000mm)		B (>256mm)	
C (32-256mm)		G (2-32mm)	
SS (<0.06-2mm)		Wood / Logs	

BR = bedrock B = boulder C = cobble G = gravel SS = silt and sand

Water Quality Characteristics

Water clarity/colour	

Riparian Vegetation Characteristics

Width (m)	TLB		TRB	
Bank vegetation cover /100m	% TLB		% TRB	
Overhead Cover (%)	Open	Partially Shaded	Heavily Shaded	

Vegetation Type	% of Vegetation	Dominant Species
Grasses/Tussocks/Ferns		
Shrub (<2m) / Exotic / Native		
Sub-Canopy (2-5m) / Exotic / Native		
Canopy (>5m) / Exotic / Native		

Bank Stability

Stable Mostly Stable Highly Unstable Undercutting

Adjacent Land Use Characteristics (on map)

Native Forest Exotic Forest Farming Urban

Catchment Land Use Characteristics

Native Forest Exotic Forest Farming Urban

Comments / Observations (Bank modification, artificial (eg car tyres) or natural (eg stumps) objects? Cobble packing, odours, surface oil sheens?

Flora and Fauna of Rocks Submerged		
Periphyton	Percentage Cover	Comments
No Mat		
Thin Mat / film (<0.5mm)		
Medium Mat (0.5 – 3mm)		
Thick Mat (>3mm)		

Site Diagram

Invertebrates										
Invertebrate	Rock 1	Rock 2	Rock 3	Rock 4	Rock 5	Rock 6	Rock 7	Rock 8	Rock 9	Rock 10
Stonefly										
Mayfly										
Cased Caddis										
Uncased Caddis										
Other										

Site Assessment Protocol

This protocol is designed to be conducted from the edge of the stream or river. The assessor is not required to measure anything, so all parameters are percentage estimates only. The sample site is what can be seen up to100m upstream and 100m downstream from where the assessor is standing

1. Record site details such as the GPS location (Easting and Northing), waypoint name, stream name, date, time and assessors name. Take photos up stream and downstream which include the floodplain, riparian vegetation and in-stream channel and circle on the sheet.
2. Estimate the percentage of water flow present. **Runs** are fast flowing, but unbroken water. **Rapids** usually include portions of broken flowing "white" water. **Pools** have deep water with a smooth surface. **Riffles** are reasonably shallow with moderate to fast water flow and a rippled but unbroken surface. Appendix 1 has further details to assist with assessment.

3. Estimate the **wetted width** of the channel as the zone currently under water (this also includes non-flowing water. If you can estimate the depth and velocity of the water do so.
4. Visually compare the current water level with any plants or algae growing on the rocks to note **flow condition**. Indications of past or current high flows may be seen as bent or broken bank vegetation and debris deposited along the edge of the river. During low flows, dried plant and algal material may be visible on the rocks on the non-wetted river bed.
5. Estimate the percentage of substrate (rocks) present at the site. **Silt and sand** are very small coarse particles. **Gravel** is 2-32mm. **Cobble**s are 33 – 255mm. **Boulders** are 256mm – 4000mm. **Bedrock** is >4000mm. If there are any logs/wood in or around the river, estimate the percentage.
6. Observe if the water is clear/cloudy/dirty. Note the colour.
7. Estimate the width of the **riparian vegetation** of the left and right banks of the river. This is the zone which has different land cover or management than the wider catchment. If there is no difference (i.e. all forest), then note this as continuous. The true left bank (TLB) is the left bank looking downstream. The true right bank (TRB) is the right bank looking downstream. Looking at a map might be necessary to estimate this value.
8. Estimate how much of the river banks are covered in vegetation. Estimate how much cover the vegetation provides for the river. Open is where there is no vegetation growing over the river and sunlight reaches most of the river. Partially shaded means parts of the river have vegetation growing over it. Heavily shaded is where the river is covered by plants.
9. Estimate the types of vegetation along either side of the river and if known, note the dominant species.
10. Circle the dominant types of bank cover.
11. Circle the type of bank stability. Unstable banks may have bank undercutting, slumping, livestock tracks, obvious erosion, fallen trees and exposed soil or stony substrate. Highly stable banks will often be covered in vegetation and have few exposed soils or gravels. Record the present of bank undercutting separately in the comments/observations section
12. Circle the types of adjacent land use evident at the site if known – you may need to refer to a map for this
13. Circle the types of catchment land use evident at the site if known – you may need to refer to a map for this
14. Estimate the abundance of periphyton or visible algae on the wetted stream bed/rocks. Refer to Appendix 2 for photos of algae.
15. Draw a site diagram (bird's eye view) and mark where the photos were taken from, significant landmarks, access points, North direction, direction of stream flow, location of roads, rough scale.
16. Choose ten partially submerged rocks approximately 20cm by 15cm (~A5 sheet of paper or A4 folded in half). One at a time turn the rocks over and count how many invertebrates are present. If you can record them according to the types (stonefly, mayfly, cased caddis, uncased caddis and other). Refer to Appendix 3 for Invertebrate identification.

Definitions

Rapid – shallow to moderate depth, swift flow and strong currents, surface broken with white water.
Riffle – shallow depth, moderate to fast water velocity, with mixed currents, surface rippled but unbroken.
Pool – deep, slow flowing with a smooth water surface, usually where the stream widens and/or deepens.
Run – habitat in between that of riffle/rapid and pool, slow–moderate depth and water velocity, uniform–slightly variable current, surface unbroken, smooth–rippled.
Backwater – slow or no flow zone away from the main flowing channel that is a surface flow dead-end; although flow could down well or upwell from the groundwater zone.

Appendix 2 Habitat Assessment Sites

Appendix 3 Habitat Assessment Site Photos

Photo 1 Pelorus1Downstream

Photo 2 Pelorus1 Upstream

Photo 3 Pelorus2 Downstream

Photo 4 Pelorus2 Upstream

Photo 5 Pelorus3 Downstream

Photo 6 Pelorus3 Upstream

Photo 7 Pelorus4 Downstream

Photo 8 Pelorus4 Upstream

Photo 9 Pelorus5Downstream

Photo 10 Pelorus5 Upstream

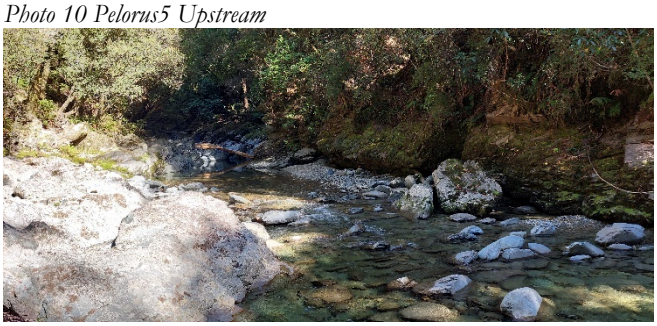

Photo 11 Pelorus6 Downstream

Photo 12 Pelorus6 Upstream

Photo 13 Pelorus7 Downstream

Photo 14 Pelorus7 Upstream

Photo 15 Pelorus8 Downstream

Photo 16 Pelorus8 Upstream

Photo 17 Rich1 Downstream

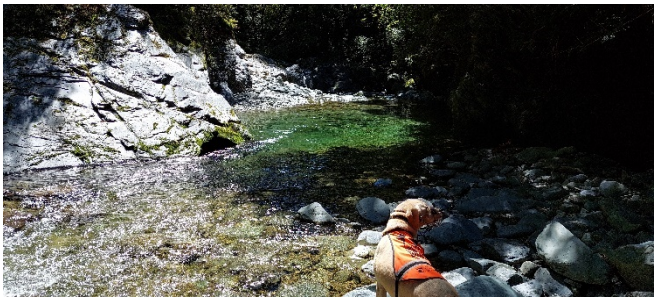

Photo 18 Rich1 Upstream

Photo 19 Rich2 Downstream

Photo 20 Rich2 Upstream

Photo 21 Rich3 Downstream

Photo 22 Rich3 Upstream

Photo 23 Echo Downstream

Photo 24 Echo Upstream

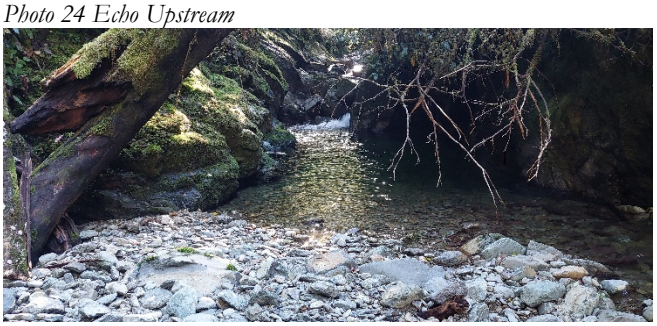

Photo 25 Mate1 Downstream

Photo 26 Mate1 Upstream

Photo 27 Mate2 Downstream

Photo 28 Mate2 Upstream

Photo 29 Mate3 Downstream

Photo 30 Mate3 Upstream

Photo 31 Mate4 Downstream

Photo 32 Mate4 Upstream

Photo 33 Roeb1 Downstream

Photo 34 Roeb1 Upstream

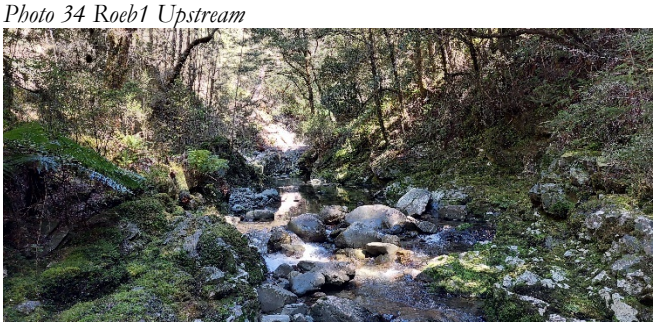

Photo 35 Roeb2 Downstream

Photo 36 Roeb2 Upstream

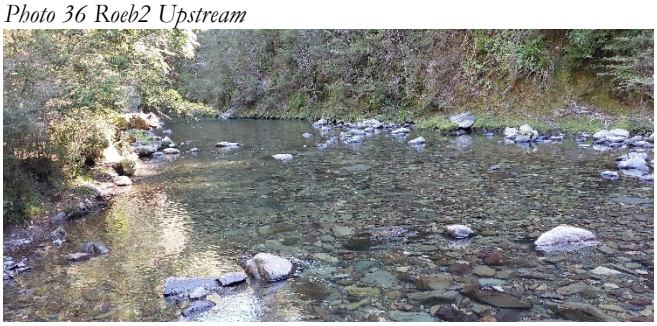

Photo 37 Roeb3 Downstream

Photo 38 Roeb3 Upstream

Photo 39 Roeb4 Downstream

Photo 40 Roeb4 Upstream

Appendix 4 Habitat Assessment Data

See excel spreadsheet

Appendix 5 Dog survey areas.