Mahinerangi Wind Farm Stage 2

Native Fish Recovery Plan

Tararua Wind Power Limited

Prepared by:

SLR Consulting New Zealand Limited

SLR Project No.: 810.031205.00001

8 October 2025

Revision: V1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V1.0	8 October 2025	Keren Bennett	Ben Ludgate	Ben Ludgate

Basis of Report

This report has been prepared by SLR Consulting New Zealand Limited (SLR) on the instructions of our Client, in accordance with the agreed scope of work. It is intended to support the Client's application under the Fast Track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While SLR has exercised due care in preparing this report, it does not accept liability for any use of the report beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

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Acronyms and Abbreviations

eDNA	Environmental DNA
EPA	Environmental Protection Authority
MPI	Ministry for Primary Industries
MWF	Mahinerangi Wind Farm
NZFFD	New Zealand Freshwater Fish Database
ORC	Otago Regional Council
TWP	Tararua Wind Power Limited

1.0 Introduction

Tararua Wind Power Limited (TWP) is progressing Stage 2 of the Mahinerangi Wind Farm (MWF), which is to be known as “Puke Kapo Hau” (“the Project”, “Puke Kapo Hau” or “MWF Stage 2”).

The MWF is located on the eastern foothills of the Lammermoor Range, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin.

This Native Fish Recovery Plan (‘the Plan’) will apply to a headwater tributary of Lee Stream located in the northwest of the wind farm site at coordinate 45°44'5.00"S, 169°54'53.71"E. An access road/track is required to cross the tributary and involves the construction of a new culvert to replace an existing culvert associated with a farm track crossing (Figures A and B). The existing farm track crossing is not usable for wind farm construction traffic due to the unfavourable track geometry. This new culvert is one of two places of the MWF Stage 2 that cannot avoid a watercourse, with direct disturbance of the bed and banks required[1].

Culvert construction works are proposed to be undertaken during a low flow period between January and March and to last approximately 7 days.

The non-migratory Eldon's galaxias (*Galaxias eldoni*), classified as 'Threatened – Nationally Endangered' (Dunn *et al*., 2018), has been recorded upstream of the culvert (e.g., environmental DNA (eDNA) sampling; SLR, 2025). Eldon’s galaxias have also been found in nearby waterways (Photo 1) and are therefore expected to be present throughout the stream in suitable habitats (e.g., riffles, pools). No other fish species are expected to be present within the works reach.

1.1 Objective

The objective of this Plan is to minimise actual or potential adverse effects on native freshwater fish present within the stream reach that will be impacted by the culvert works and demonstrate how the conditions of consent will be met.

The purpose of this Plan is to describe the toolbox of native fish salvage procedures that will be implemented to minimise actual or potential adverse effects on native fish against adverse effects resulting from the instream works within the construction footprint.

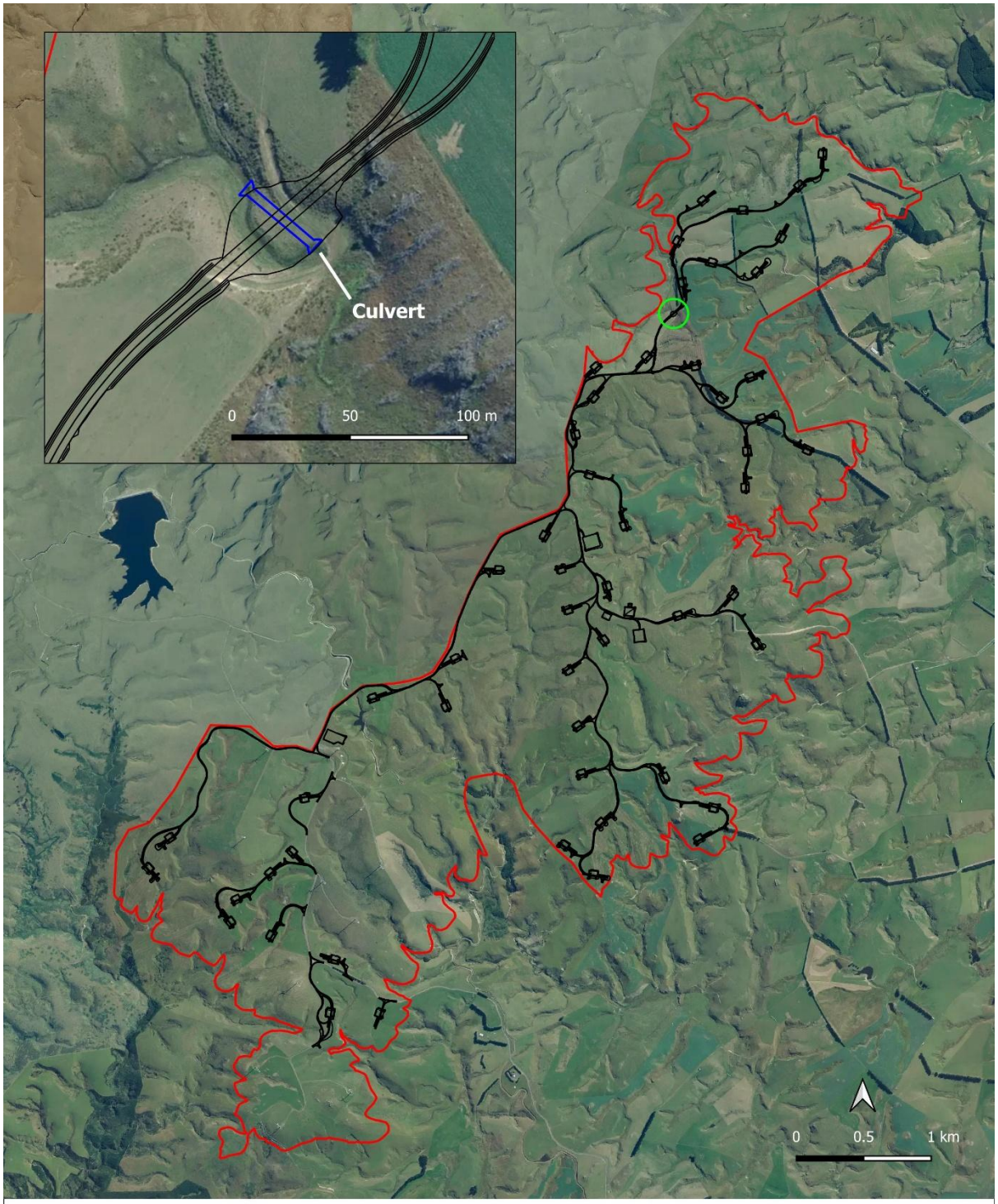
1.2 Project Ecologist

A suitably qualified ecologist will be required to manage the implementation of this plan.

Works will need to be completed under special permit from the Ministry for Primary Industries (MPI) that authorises the capture and transfer of fish within the same catchment. SLR hold the necessary permits.

[1] The second place is the track at wetland 43 which will be managed by the Rehabilitation Management Plan.

Figure A: Approximate location of Lee Stream tributary culvert.



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Projection:	NZGD 2000/NZTM 2000

Legend
- Culvert site
- Stage 2 Layout
- Windfarm Site

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Stage 2

Figure B: Approximate layout of Lee Stream tributary culvert.

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Legend
- Stage 2 Layout
- Culvert
- Wetland

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Stage 2

2.0 Summary of Stream Works Methodologies

During culvert construction, the Lee Stream tributary will be temporarily diverted and disturbance of the bed of the watercourse will be required to complete the construction activities.

The envisaged construction methodology/sequence for the stream culvert works is outlined below. The alignment of the proposed stream culvert is offline from the existing stream, thus the temporary stream diversion works during culvert installation will be low impact and is considered a Standard Freshwater Fisheries Activity. The expected duration of Phase 1 works (works within the stream) is approximately 7 days.

The Civil Engineering Assessment by Riley Consultants Ltd (2025) outlines the methods to be used for culvert installation:

Phase 1 (works within the stream):

1 As far as is practical undertake works during dry/low flow periods where no significant rain is forecasted.

2 Construct diversion bunds to divert clean water runoff away from the working area.

3 Construct non-erodible dams (using sand-bags or similar) at the upstream and downstream end of the culvert. Form temporary/isolated stream diversions to direct stream flow around bunded areas. Downstream dam to feature a T-bar decant to drain the works area if required to keep the area dry from groundwater/water leakage.

4 Offline from stream - construct culverts, wingwalls, riprap aprons, place riprap within the culvert as per design.

5 Place and compact backfill material around the culvert to the soffit levels of the pipe/s.

6 Remove diversion bunds, and upstream and downstream dams - allowing flows to pass through the new culvert.

Phase 2 (works adjacent to the stream):

1 Install silt fences around the base of the fill embankment.

2 Continue with backfill over the culvert and forming of the fill embankment.

3 Form sediment control measures for approach tracks (e.g., drop out pits) and commence earthworks to form the tracks.

4 Existing farm track crossing and culvert to be removed and area remediated (undertake works during low-flow dry period).

5 Stabilize the earthworks area and remove sediment controls.

The proposed culvert construction methods mean that there will be localised stream channel dewatering associated with the culvert installation, which triggers the requirement for salvage to avoid adverse effects on the resident fish.

Installation of the culvert will be undertaken during dry/low flow periods, proposed to be undertaken between January and March and to last approximately 7 days.

Works during September to November (inclusive) may only occur with prior approval from the consent authority if it can be demonstrated the works will avoid the disturbance of Eldon's galaxias spawning habitat.

To the extent practicable, screened pump intake pipes should be positioned mid-channel, as small native fish are more likely to be utilising areas adjacent to stream banks.

The Project Ecologist will be advised immediately of any changes to the instream construction works methodology that may impact implementation of this Plan. The Otago Regional Council (ORC) will be advised by the Project Ecologist if any significant changes to the Plan are required, prior to instream works commencing.

3.0 Site Features

The new culvert will be a permanent structure and will replace an existing, smaller culvert located under a farm track approximately 20 m downstream of the new culvert. The Lee Stream tributary in the vicinity of the proposed new culvert is unfenced and sits in open pasture (Photo 2) upstream of a former forestry plantation area (now harvested) and wetland. The channel is dominated by instream vegetation (primarily grasses), with bed substrates of soft sediments and fine gravels. Instream habitats comprise runs with low water velocities.

Photo 1: Eldon's galaxias juveniles (left) and adults (right) found in the Lee Stream catchment. From SLR (2025).

Photo 2: Lee Stream tributary, immediately upstream of the existing culvert and at the site of the new culvert. Taken May 2025.

Observations made onsite in 2025 indicate that during dry periods the stream can be reduced to minimal amounts of flowing water through vegetation (SLR, 2025). The stream channel surrounding the existing culvert and in areas upstream have been historically excavated (evident from discrete clumps of soil distributed along the stream banks), presumably to facilitate flow through the existing undersized culvert. The stream habitat is typical of modified first and second order streams flowing through farmland in the Lee Stream and neighbouring catchments.

4.0 Recovery and Relocation Methods

4.1 Overview

The Plan will be implemented prior to and during instream works. The methodologies described below are intended as a 'toolbox' of techniques that will be utilised, as practicable, for each stage of instream works.

To the extent practical, removal results from each removal area will be used to estimate local population size, using the Hayne (1949) regression method or Zippen (1958) removal algorithm (see Appendix A). A minimum of 80% removal is to be achieved for each species identified. It is worth noting that these models rely on fish capture effort remaining the same each day of salvage. However, effort, and salvage methodology, may vary on a daily basis, given the nature of the recovery operations and the potential for limited habitat for fish in the area, to ensure the recovery occurs in a timely fashion to avoid fish stress.

Overall, the intent of the capture and relocation exercise is to remove the native fish present within the affected reaches down to a level such as they are practically absent and are no longer being captured or observed.

4.2 Fish Recovery

Fish salvage works will generally include the following:

- At the outset of the salvage works, and prior to any instream works commencing, the Project Contractor(s) and Project Ecologist will meet to identify and delineate the upstream and downstream extent of instream works, and to discuss how the Plan will be implemented during instream works.
- A permeable, fine mesh barrier (3-5 mm) will be constructed immediately upstream and downstream of the site to prevent recolonisation of the stream works reach following fish relocation. The fish barriers will be permeable to allow water flow but fitted to prevent fish movement. The fish barriers will extend from bank to bank and be secured to the stream bed.
- Methods utilised will be at the discretion of the Project Ecologist and are likely to require a combination of trapping (baited gee-minnow and/or fyke nets), hand netting and electric fishing. The optimal technique to be used in each habitat will be dependent on-site conditions at the time of fish removal.
- The number of nets and traps utilised will depend on the size of the stream area being dewatered. In general, it is recommended to set traps and nets as densely as possible.
- Prior to instream works commencing, fish traps will be deployed in suitable locations and will remain in place overnight before being cleared of fish the following morning. Traps will be deployed for a minimum of two consecutive nights.
- At least 15 cm of water is required to set minnow traps, though they can be dug into the sediment in shallower water.
- A minimum of approximately 35-40 cm water depth is required to set fyke nets. The small size of the stream and generally shallow water depths is likely to limit the ability to deploy fyke nets at this site.
- Where water depths permit the use of fyke nets, nets will preferentially comprise fine mesh types.
- Where practicable, trapping and hand netting will be utilised in preference to electric fishing.
- Following the completion of the trapping exercises, impermeable bunds will be installed surrounding the works reach and the isolated reach will be dewatered. The project ecologist will be onsite during dewatering, to capture any remaining fish observed within the works reach.
- Where ‘mucking out’ of surface stream sediments is proposed, sediment slops will be spread in a thin layer on nearby banks and will be visually assessed by the project ecologist for remnant fish.

4.3 Fish Relocation

After capture, indigenous fish shall be transferred to the release site in a lidded container filled with clean stream water.

Fish will be held for the minimum time possible, and holding containers kept in a shaded location.

The density of the fish within the holding container will be monitored and kept to an appropriate level (e.g., less than 15 fish per container) to ensure that low dissolved oxygen within the container does not lead to mortality. Portable, battery powered aerators will be available for use in the holding containers, if required.

Fish shall be handled as little as possible and shall not be handled with dry hands.

If any individuals show signs of stress (loss of righting response, gaping, gulping air) the water shall be changed to provide more oxygen and/or portable aerators or bubblers used to maintain oxygen levels.

All fish recovered will be identified, measured and counted prior to release.

Fish will preferentially be released upstream of the works reach, into suitable habitat (e.g., flowing sections with water depths greater than 4 cm, pool areas) within the same stream system. The preferred release site is in the lower reaches of the true right branch of the stream upstream of the existing culvert (Photo 3). Upon release, fish shall be distributed over, at minimum, a similar length of stream as they were caught.

4.4 Biosecurity

All nets, traps and other equipment used during the fish relocation exercise will be clean and dry at the outset of works to avoid the potential spread of unwanted organisms and diseases.

Photo 3: Example of pool / run habitat suitable for fish release in the Lee Stream tributary, in the lower reaches of the true right branch of the stream upstream of the existing culvert. Taken May 2025, from SLR (2025).

5.0 Reporting

A report will be prepared and provided to ORC at the completion of the fish recovery and relocation exercise. The report will, at a minimum, detail the following:

- Methodologies used to recover fish from the works reach;
- Outcomes of the fish relocation exercise (fish species, numbers and size ranges); and
- Location of final fish release sites.

Fish records will be sent for inclusion in the New Zealand Freshwater Fish Database (NZFFD).

6.0 Closure

Sincerely,

SLR Consulting New Zealand Limited

[redacted]

Keren Bennett
Technical Director – Freshwater Ecology

[redacted]

Ben Ludgate
Principal Ecologist

7.0 References

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Appendix A Population Estimate Methods

Mahinerangi Wind Farm Stage 2

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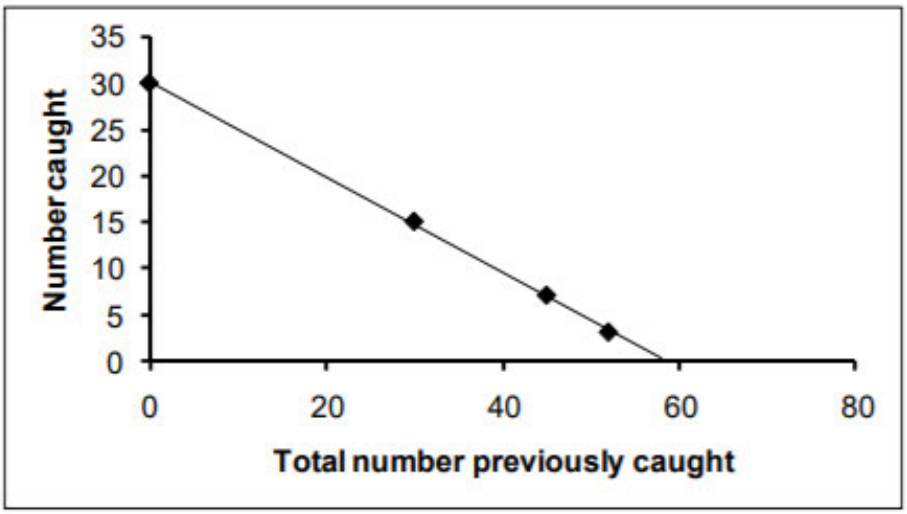
Box1: Estimating local population size by sequential removal

Removal estimates require at least 2 removals (2 periods of sampling) and in each case the sampling effort must be the same. If animals are released after capture they must be marked in some way so that they are not recounted if captured again. Suppose that a wetland was sampled with 10 minnow traps on 4 consecutive nights and the following data were obtained:

Night 1 – 30 fish, night 2 – 15 fish, night 3 – 7 fish, night 4 – 3 fish

Hayne's (1949) regression method: the results are plotted as follows and a regression line through the data is extrapolated to the x-axis giving a total population estimate of 59 fish.

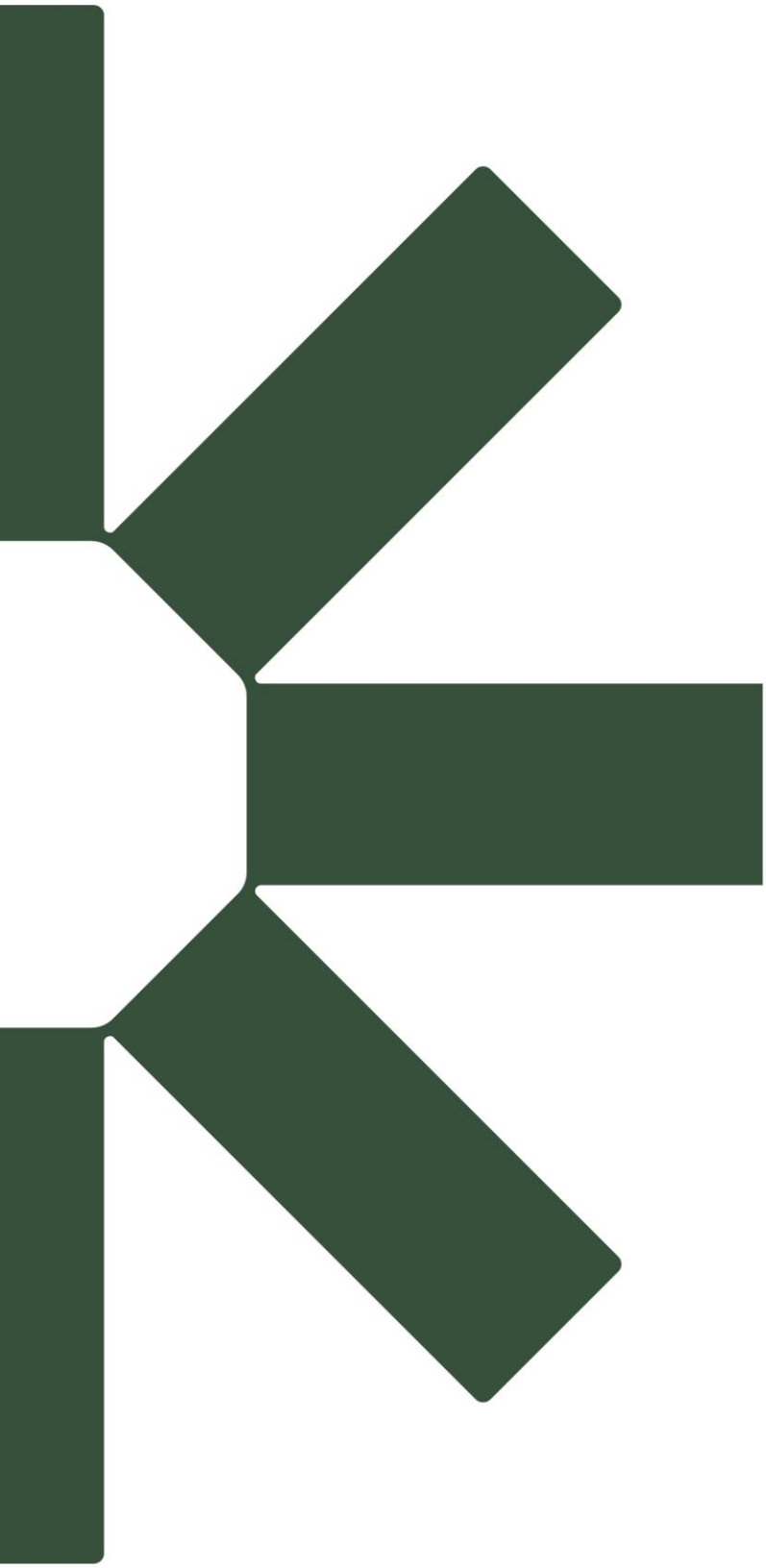


Zippin's (1958) removal algorithm:

This method requires 2 removals and the total population is estimated from the following equation:

$$N = \frac{n_1^2}{(n_1 - n_2)}$$

Where n_1 and n_2 are the first and second removals, respectively, and N is the total population estimate. Applying this equation to the data above gives a population estimate of 60 fish.



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