

*Galaxias affinis paucispondylus*  
“Manuherikia” (Alpine galaxias  
(Manuherikia River)) habitat description



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Cover: *Galaxias affinis paucispondylus* “Manuherikia” habitat, Manuherikia River. Photo by Nixie Boddy.

DOC - 7708624

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Recommended citation:

Dunn, N.R.; Boddy, N.C. 2024: *Galaxias affinis paucispondylus* “Manuherikia” (Alpine galaxias (Manuherikia River)) habitat description. Unpublished report DOC-7708624. Department of Conservation, Wellington, New Zealand. 6 p.

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# Abstract

*Galaxias affinis paucispondylus* “Manuherikia” occupy habitats typified by loosely packed cobble substrata at the upstream end of riffles often within diagonal bar chute channels in braided riverscapes. These habitats are vulnerable to invasive woody weeds causing channelisation, imbrication and armouring of substrata, and water abstraction activities reducing river flows.

## 1. Introduction



Figure 1. *Galaxias affinis paucispondylus* “Manuherikia” (Alpine galaxias (Manuherikia River)). Photo by Rod Morris.

*Galaxias affinis paucispondylus* “Manuherikia” (Alpine galaxias (Manuherikia River)) is an iteroparous, spring spawning, non-diadromous, undescribed taxon endemic to Otago on South Island. *Galaxias affinis paucispondylus* “Manuherikia” is confined to the braided gravel-bed upper reaches of the Manuherikia River within the Clutha River catchment. *Galaxias affinis paucispondylus* “Manuherikia” has a conservation status of Threatened: Nationally Endangered (Dunn et al. 2018).

Qualitative habitat descriptions based on field observations and measurements are given for *Galaxias affinis paucispondylus* “Manuherikia,” complimenting quantitative descriptions following Instream Flow Incremental Methodology assessments of Sinton et al. (2021). Descriptions are designed to typify the range of instream habitat conditions adult *Galaxias affinis paucispondylus* “Manuherikia” occur in, at a mesohabitat scale.

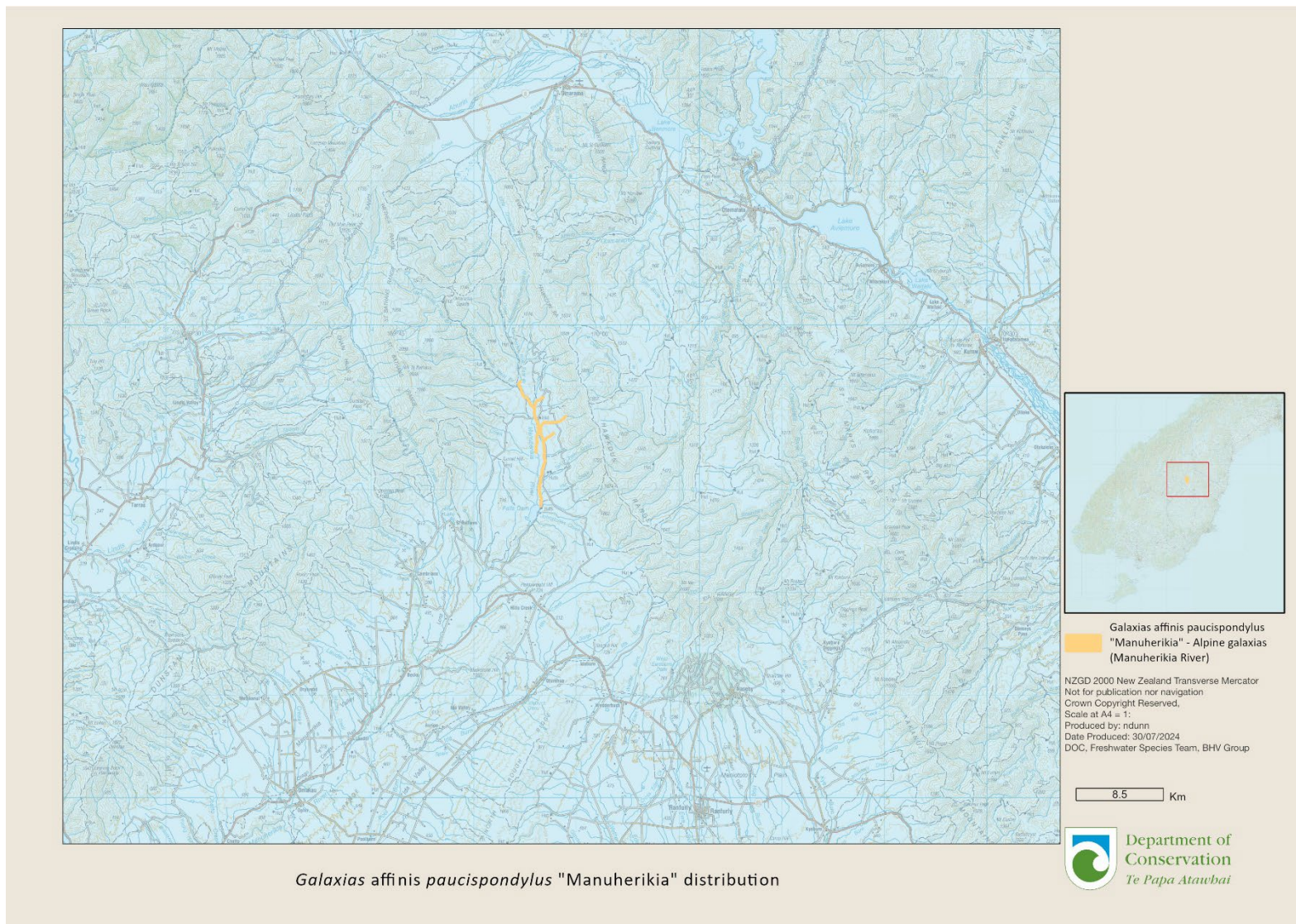


Figure 2. Known *Galaxias affinis paucispondylus* "Manuherikia" habitat.

## 2. Methods

A single reach of the Manuherikia River above Falls Dam was sampled in November 2020 (reach midpoint NZTM Easting 1356007, Northing 5037073), using the same sites as reported on by Sinton et al. (2021). Site selection was based on *Galaxias affinis paucispondylus* “Manuherikia” being previously known at this location, with timing designed to coincide with the summer low-flow period, and to not interfere with spawning and larvae/post-larval/juvenile rearing periods.

Within the river a sampling reach containing a variety of instream habitat types was selected. Starting at the downstream end of the reach, transects were marked at 3.0 m intervals. Within each transect a 0.75 m x 0.75 m quadrat was carefully placed within the river to cover the dominant flow, water depth and substrata conditions. A 1.0 m wide push net was placed along the downstream edge of the quadrat and three-pass electrofishing of the quadrat was conducted using a Kainga EFM 300 backpack electrofishing machine (NIWA Instrument Systems, Christchurch). Each pass consisted of 5 seconds of electrofishing time in a downstream direction, stopping for a minimum of 5 seconds between passes. Captured fish were identified to taxon and measured to the nearest 0.5 mm, then placed in an aerated bucket of water to recover before being released.

Locations of quadrats were recorded by GPS and water depth and velocity measured at the centre points of quadrats. Water velocity was measured at 0.6 depth using a Marsh McBirney Flo-Mate 2000 electromagnetic current meter. Percentage substrata composition was estimated within the quadrat using modified Wentworth scale size classes: bedrock (>4096 mm), boulder (256-4096 mm), cobble (64-256 mm), large gravel (8-64 mm), fine gravel (2-8 mm), sand (0.06-2 mm) and silt (<0.06 mm). Percentages of algal and macrophyte cover within the quadrat were also estimated.

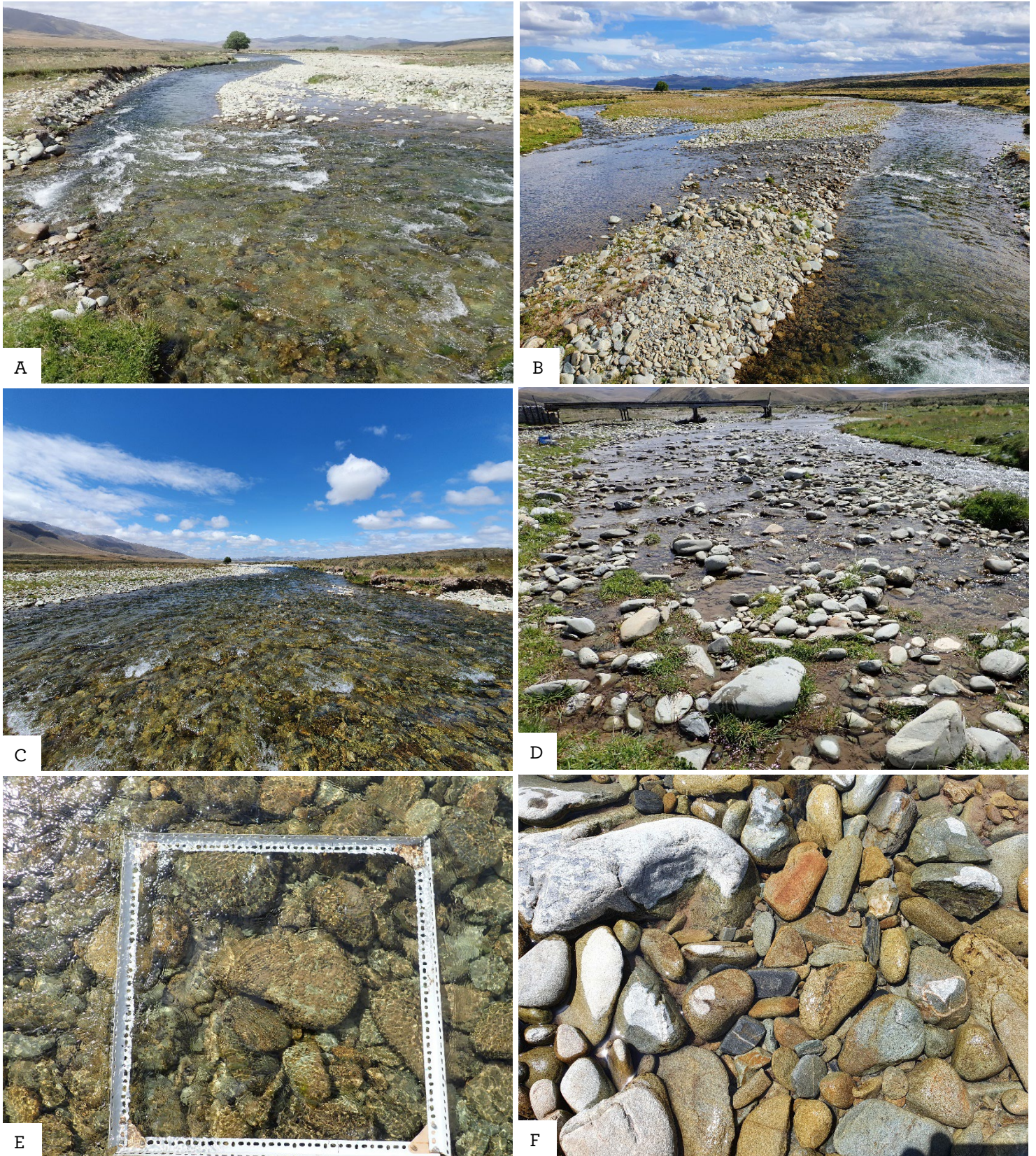


Figure 3. *Galaxias affinis paucispondylus* “Manuherikia” habitat. (A) riffle head habitat. (B) riffle habitat at change in gradient within diagonal bar. (C) shallow fast flow in cobble boulder substrata dominated run-riffle sequence. (D) complex side channel habitat. (E) clean cobble boulder run habitat. (F) imbricated substrata particles.

### 3. Results

A total of 30 quadrats were sampled in the Manuherikia River, with *Galaxias* “Teviot” captured in 11 of these. Characteristics of the quadrats *Galaxias* affinis *paucispondylus* “Manuherikia” were present in are summarised in Table 1. However, it should be noted that both the sample size, and the number of quadrats occupied is small, limiting confidence of inferences able to be drawn.

*Galaxias* affinis *paucispondylus* “Manuherikia” were recorded predominantly in moderately fast, shallow riffle-run habitat dominated by loosely packed cobble – boulder substrata in wider braids of the Manuherikia River. Diagonal point bars provided mid channel habitat structure with chute channels.

Table 1. Habitat attributes measured within the 46 quadrats where *Galaxias* affinis *paucispondylus* “Manuherikia” were present. Units are as presented, and percentages were visually estimated.

Attribute	Mean	Range (min – max)
Stream width (m)	9.7	4 – 13.3
Flow velocity (ms <sup>-1</sup> )	0.39	0.06 – 0.87
Substratum size class	>64 <sup>1</sup> - <256 <sup>2</sup>	>64 <sup>1</sup> - <4096 <sup>3</sup>
Water depth (cm)	10.2	4 – 15.5
Riffle habitat (%)	57.3	0 - 100
Run habitat (%)	40.9	0 - 100
Pool habitat (%)	1.8	0 - 10
Macrophytes (%)	0	0
Algae (%)	10.8	2 - 31

<sup>1</sup> Cobble

<sup>2</sup> Boulder

<sup>3</sup> Bedrock

### 4. Discussion

Based on field measurements and observations, *Galaxias* affinis *paucispondylus* “Manuherikia” occurs in the braided gravel-bed section of the Manuherikia River between Falls Dam and The Forks. In this section of the river the valley broadens and the flood plain concomitantly expands laterally. *Galaxias* affinis *paucispondylus* “Manuherikia” occupies the moderate gradient larger braids that appear to sustain regular bed movement encountered during high flows. These habitats are typified by moderately fast, shallow riffle-run habitat dominated by loosely packed cobble – boulder substrata often within diagonal point bars. These meso-habitat characteristics create complex stepped boulder dominated pool habitats that provide flow refugia for all life stages of *Galaxias* affinis *paucispondylus* “Manuherikia”.

Sedimentation within areas of the river are evidenced by imbricated and armoured substrata typified by smaller particle sizes and the absence of *Galaxias affinis paucispondylus* “Manuherikia”. Thus, habitats of *Galaxias affinis paucispondylus* “Manuherikia” are vulnerable to invasive weeds causing channelisation, and sedimentation which can be exacerbated by water abstraction activities reducing river flows.

## 5. Acknowledgements

We appreciate permission from landowners and managers to access streams on their properties.

## 6. References

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