

# MEMORANDUM

---

**To** Steve Harding, Roaring40s Wind Power

**From** Ruth Goldsmith and Greg Ryder, Greg Ryder Consulting

**Date** 9 December 2025

**Subject** Southland Wind Farm environmental DNA sampling, November 2025

---

## 1. Introduction

The Southland Wind Farm (SWF) project requires the construction of roads which include watercourse crossings. There are nine 'notable' stream crossings – with 'notable' being defined as watercourses having catchment areas greater than 40 ha. Eight of the nine notable stream crossings (NSC) will be culvert crossings<sup>1</sup> (Table 1, Figure 1). Depending on their design, culverts can create barriers to fish passage, which in some situations may be beneficial to prevent predatory trout accessing threatened native fish populations. During development of the SWF project and proposed management measures, consideration has been given to fish passage requirements at culverts to ensure that the existing freshwater ecology values of watercourses are protected in accordance with clause 3.26 of the National Policy Statement for Freshwater Management 2020 (NPS-FM).

Table 1. Location of SWF notable stream crossings within catchments, listed progressing downstream to upstream within the catchment.

Catchment	Stream	NSC's downstream to upstream
Mimihau Stream	Mimihau Stream North Branch	NSC1, NSC7
Mimihau Stream	Mimihau Stream North Branch Tributary 1	NSC5
Mimihau Stream	Mimihau Stream South Branch	NSC2
Mimihau Stream	Mimihau Stream South Branch Tributary 1	NSC3, NSC4
Mimihau Stream	Mimihau Stream South Branch Tributary 2	NSC9
Kaiwera Stream	Kaiwera Stream East Branch	NSC6, NSC8

An assessment of the effects of the SWF project on freshwater ecology was submitted with the substantive application lodged for the project in August 2025 (Ryder (2025<sup>2</sup>)). Based on the fish distribution information available at the time, Ryder (2025) concluded that five of the eight notable stream culvert crossings should be constructed to provide fish passage, while the remaining three culverts (NSCs 1, 3 and 6) should be constructed to provide a barrier to trout passage in order to protect threatened non-migratory galaxiid populations upstream. This was a conservative view at the time, given that the presence of non migratory galaxiids had not been proven upstream of NSC1 and NSC6.

Given that information on fish distribution at some NSCs was lacking when the Ryder (2025) fish passage recommendations were made, it was suggested that additional fish community sampling be undertaken. In November 2025 environmental DNA (eDNA) samples were collected at five of the notable stream crossings, NSC 1, 2, 3, 5, 6 and at a location downstream of NSC9. The results of these surveys will confirm which NSCs should

---

<sup>1</sup> The remaining NSC (NSC2) requires a bridge crossing, which replaces an existing bridge and therefore fish passage remains unchanged.

<sup>2</sup> Goldsmith, R. J. and Ryder G. I. June 2025. Southland Wind Farm Technical Assessment: Freshwater Ecology.

be constructed to provide a barrier to trout passage (noting that the eDNA sample taken at NSC2 was just for information purposes, given that this stream crossing is proposed to be as a bridge).

## 2. Method

eDNA sampling was undertaken on 19 November 2025 by Steve Harding (Roaring 40s Wind Power). Details of the sampling methods are provided in Appendix One. Table 2 and Figure 1 show the location of eDNA sampling sites in relation to notable stream crossings. Note that NSC2 has an existing bridge, NSCs 6 and 7 have existing culverts, NSCs 1, 5, 3, 4, and 8 have unformed ford crossings, and NSC9 does not have any form of existing crossing. As NSC2 is an existing bridge which is proposed to be replaced with a new bridge, the passage of trout at this location is not relevant and not addressed any further.

Table 2. Location of SWF notable stream crossings where culverts are required and the associated eDNA sampling sites.

Catchment	Stream	NSC's downstream to upstream	eDNA sampling site
Mimihau Stream	Mimihau Stream North Branch	NSC1, NSC7	NSC1
Mimihau Stream	Mimihau Stream North Branch Tributary 1	NSC5	NSC5
Mimihau Stream	Mimihau Stream South Branch Tributary 1	NSC3, NSC4	NSC3
Mimihau Stream	Mimihau Stream South Branch Tributary 2	NSC9	SRRK gully*
Kaiwera Stream	Kaiwera Stream East Branch	NSC6, NSC8	NSC6

\*Southern Rata-Rimu – Kamahi Gully

## 3. Results

The results of eDNA sampling undertaken in November 2025 are shown in Table 3.

Table 3. Fish species detected at SWF eDNA sampling sites, November 2025.

Fish species	Brown trout	Koaro	Longfin eel	Southern flathead galaxias	Pomahaka galaxias <sup>3</sup>	Gollum galaxias
<b>Migratory</b>	Yes	Yes	Yes	No	No	No
NSC1	✓	✓	✓	✓		✓
NSC5	✓		✓			✓
NSC3			✓			✓
SRRK gully	✓	✓	✓			✓
NSC6			✓		✓	

The presence (or absence) of brown trout and/or non-migratory galaxiids at a site based on the November eDNA sampling, and existing information on fish distribution (Ryder 2025), was used to determine whether a barrier to trout passage was required at notable stream culvert crossings (Table 4).

If trout are already known to be present at a NSC then there is no rationale for requiring a trout barrier at that location (without a plan for trout removal). If a trout barrier is not recommended then passage is required to be

<sup>3</sup> These have previously (Ryder 2025) been referred to as Clutha flathead galaxias, however DOC considers that the Clutha flathead galaxias are actually Pomahaka galaxias based on morphological and genetic research.

provided at the NSC as per the New Zealand Fish Passage Guidelines (Franklin *et al.* 2024<sup>4</sup>). Note that if a trout barrier is recommended at a downstream NSC within a catchment it is not necessary to provide a trout barrier at NSCs upstream (e.g. trout barrier is recommended at NSC6 so is not required at NSC8, located upstream).

Based on the reasoning above, it was determined that culvert crossings at NSC 3 and 6 should be designed as an exclusion barrier to prevent the passage of predatory trout<sup>5</sup>, and all other NSCs should provide for fish passage (Table 4).

A trout barrier had previously been recommended at NSC1 (Ryder 2025), however, as the November eDNA sampling confirmed that trout are present at NSC1 (and likely also at NSC7 approximately 1.5 km upstream of NSC1) a trout barrier is no longer required at NSC1. For the same reason, trout barriers are not required at NSC5 or NSC9 given the presence of both trout and galaxiids at NSC5 and at the location sampled downstream of NSC9).

Table 4. Recommended fish passage requirements at SWF notable stream culvert crossings, based on November 2025 eDNA sampling, and existing information on fish distribution (Ryder 2025).

Catchment	Stream	NSC	Fish present	Fish passage requirements
Mimihau Stream	Mimihau Stream North Branch	NSC1, NSC5	Trout and non-migratory galaxiids	NSC1 and NSC5 fish passage
		NSC7	Assume trout and non-migratory galaxiids	NSC7 fish passage
Mimihau Stream	Mimihau Stream South Branch Tributary 1	NSC3, NSC4	Non-migratory galaxiids	NSC3 trout barrier, NSC4 fish passage
Mimihau Stream	Mimihau Stream South Branch Tributary 2	NSC9	Trout and non-migratory galaxiids	NSC9 fish passage
Kaiwera Stream	Kaiwera Stream East Branch	NSC6, NSC8	Non-migratory galaxiids	NSC6 trout barrier, NSC8 fish passage

<sup>4</sup> Franklin, P., Baker, C., Gee, E., Bowie, S., Melchior, M., Egan, E., Aghazadegan, L., and Vodjansky, E. 2024. New Zealand Fish Passage Guidelines Version 2.0. NIWA Client Report No. 2024157HN.

<sup>5</sup> Section 6 of the New Zealand Fish Passage Guidelines (Franklin *et al.* 2024) provides information on how trout barriers can benefit populations of threatened non-migratory native fish, and guidance on the design of exclusion barriers to achieve this.

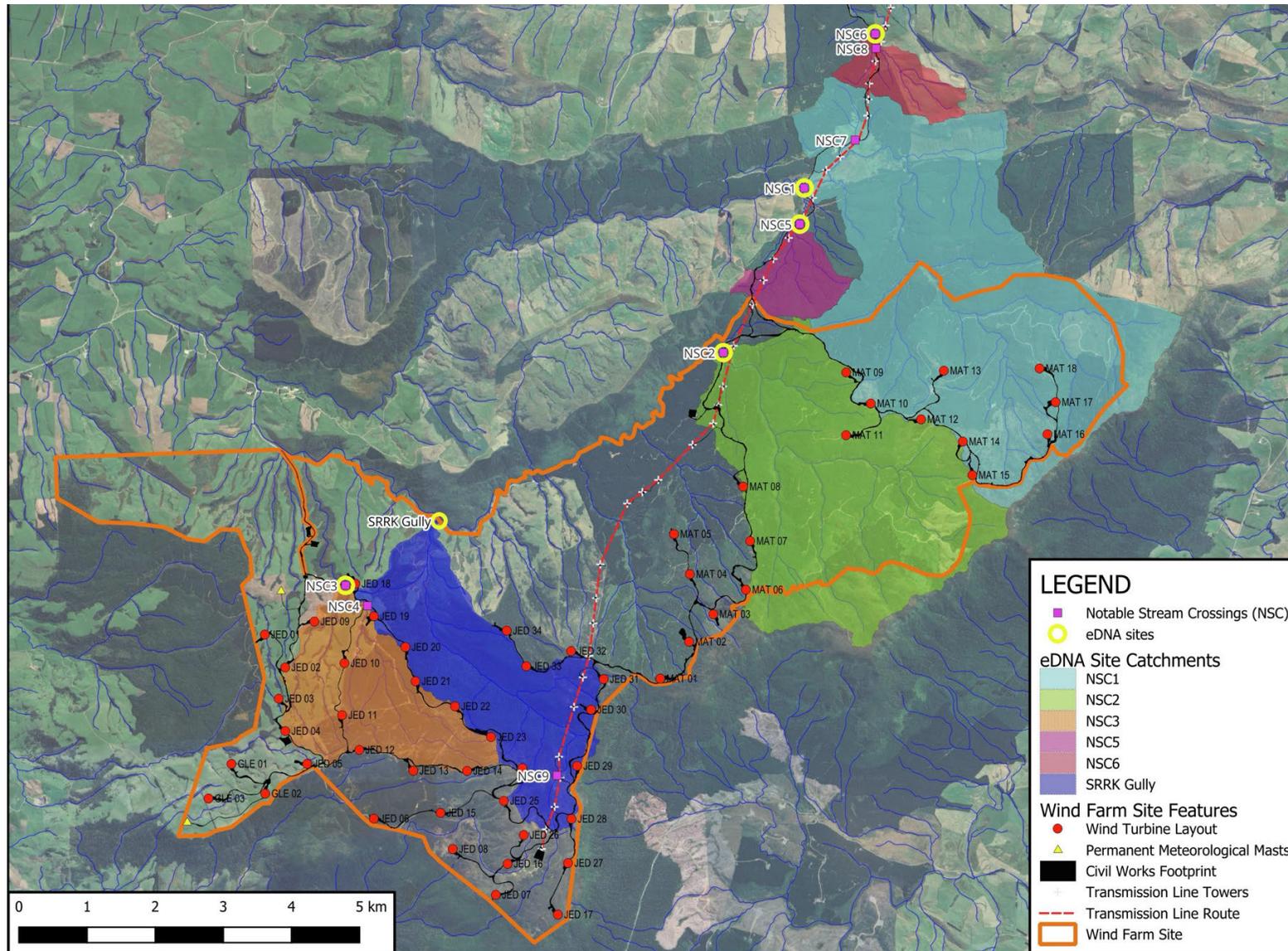


Figure 2. Location of eDNA sample sites, NSCs and SWF footprint (figure provided by Steve Harding, Roaring40s Wind Power).

## 5. Conclusion

The results confirm culvert crossings at NSC 3 and 6 should be designed as an exclusion barrier to prevent the passage of predatory trout upstream to protect threatened non-migratory galaxiid populations. At all other notable culvert crossings fish passage is required to be provided as per the New Zealand Fish Passage Guidelines (Franklin *et al.* 2024). These recommendations supersede the recommendations outlined in Ryder 2025.

## 6. Appendix One

# MEMO



To: Greg Ryder, Ruth Goldsmith

CC: Thad Ryan

From: Steve Harding

Roaring40s Wind Power

**Subject: Southland Wind Farm – eDNA samples**

**3 December 2025**

Greg/Ruth

This memo describes the site visit on 19 November 2025 to collect eDNA samples at six locations on the proposed Southland Wind Farm (SWF) site.

The results of the eDNA samples are not discussed in this memo (other than a very high-level summary of fish species detected) but the complete set of results of the tests (as undertaken by Wilderlab) have already been provided to you in Excel format via email on 1 December 2025.

## The test kits

Six 'Standard' (1.2 µm filter) test kits were collected from Wilderlab (<https://wilderlab.co/>) in Wellington, on 18 November 2025, the day before the site visit.

Clear instructions were included in the test kits and additional information on the Wilderlab website (including a video) were also read and viewed, prior to collecting the samples.

## Notable Stream Crossings

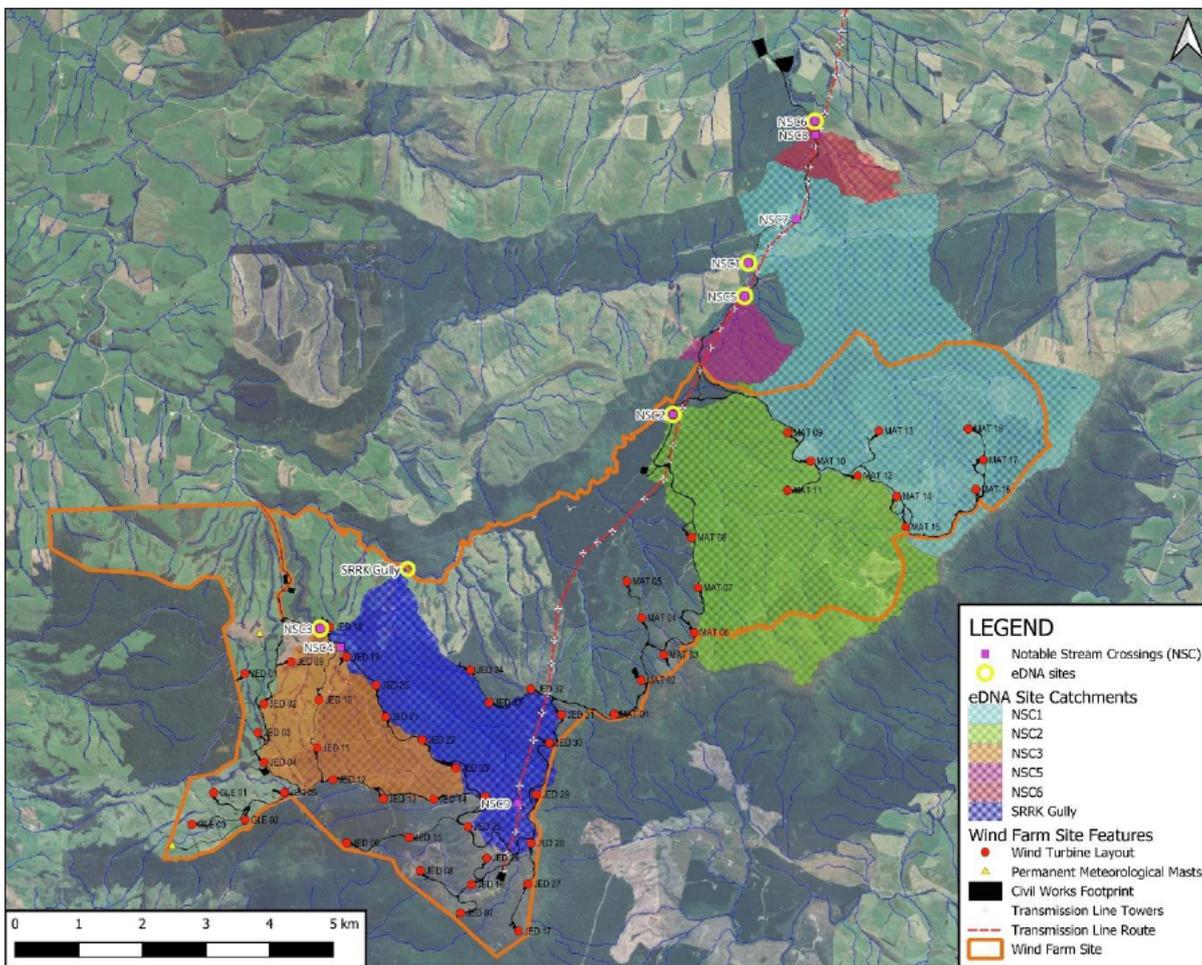
There are nine 'Notable Stream Crossings' (NSC) associated with the SWF project. NSC's are defined as being where stream crossings have catchment areas (upstream) greater than 40ha.

All NSC's are proposed to be culverts, except for NSC2, which is proposed to be a bridge (which will replace an existing bridge). NSCs 6 and 7 have existing culverts, the remainder currently have unformed ford crossings where farm or forestry tracks cross the stream (other than NSC9, which is not currently crossed by a track of any type).

## The eDNA site locations

The locations of the eDNA sample sites are shown on Figure 1. Also shown are the catchments associated with each sample site, the Notable Stream Crossings, and the proposed wind farm layout and civil works footprint.

All of the eDNA sample sites are either at NSC locations or downstream of NSC locations. Table 1 summarises the key attributes of the eDNA sample site locations.



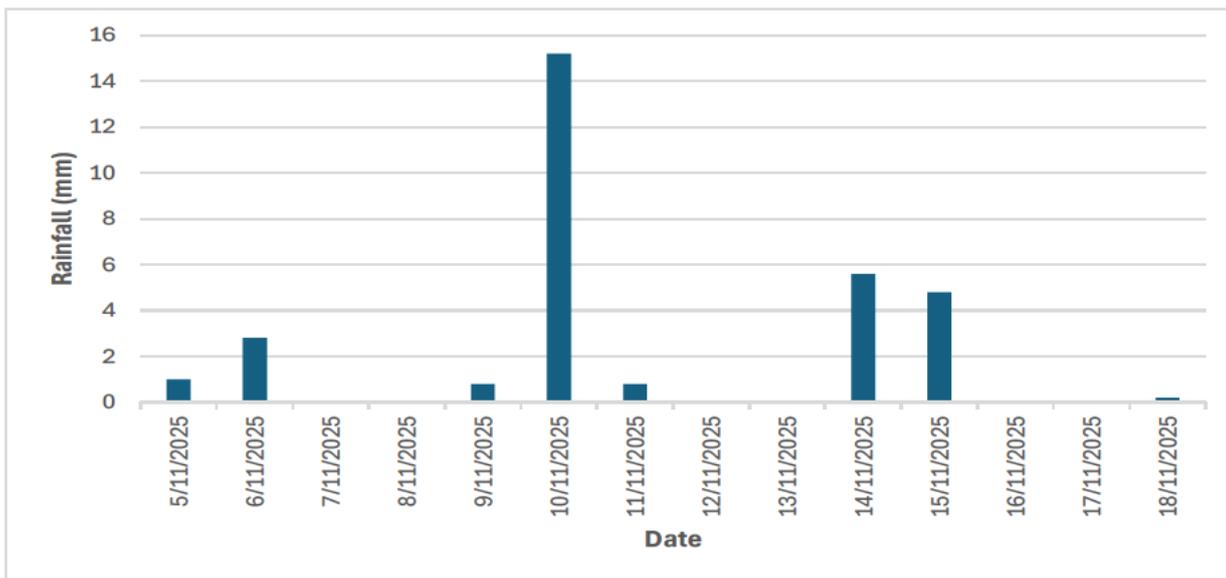
**Figure 1** Location of eDNA sample sites, NSCs and wind farm footprint

**Table 1** eDNA sample site location descriptions

eDNA site	Upstream NSC	Catchment	Stream	Catchment Area (km <sup>2</sup> )	Easting	Northing	Elevation (m)
NSC1	NSC7	Mimihau Stream	Mimihau Stream North Branch	17.98	-46.27130	169.12573	262
NSC2	n/a	Mimihau Stream	Mimihau Stream South Branch	12.36	-46.29276	169.10935	292
NSC3	NSC4	Mimihau Stream	Mimihau Stream South Branch Tributary 1	4.61	-46.32057	169.03546	355
NSC5	n/a	Mimihau Stream	Mimihau Stream North Branch Tributary 1	1.34	-46.27653	169.12503	282
NSC6	NSC8	Kaiwera Stream	Kaiwera Stream East Branch	1.23	-46.25203	169.14111	293
SRRK Gully	NSC9	Mimihau Stream	Mimihau Stream South Branch Tributary 2	6.41	-46.31284	169.05373	153

### Site Conditions

The weather conditions during the site visit were excellent with no rainfall. The previous 14 days of rainfall, as recorded on the site (at proposed turbine location 'JED-32') are shown in Figure 2 below.



**Figure 2** Daily rainfall totals in the fortnight before the site visit

**Results**

The samples were submitted to Wilderlab on 21 November 2025. The samples were processed for Comprehensive Panels. These provide an expansive approach to biological monitoring, encompassing species across the tree of life. They offer all the coverage of the basic analysis panel (fish, mammals, birds, reptiles, and amphibians) with additional assays included for detecting land and aquatic plants, algae, zooplankton, microorganisms, and the invasive *Corbicula* golden clam. It also includes the taxon-independent community index (TICI) which is a way to track aquatic ecological health.

The tests were completed and results made available on 1 December 2025. A summary of the results relating to the detection of fish species only are described in Table 2. This includes results from a previous eDNA survey undertaken at site NSC3 in 2023. These results will be helpful in determining whether the prevention of the passage of trout at specific NSC's is warranted.

**Table 2** Detection of fish species

Site	Date	Brown Trout	Southern flathead galaxias	Clutha flathead galaxias	Gollum galaxias	Koaro	Longfin Eel
NSC1	19/11/2025	Yes	Yes	No	Yes	Yes	Yes
NSC2	19/11/2025	No	No	No	Yes	Yes	No
NSC3	19/11/2025	No	No	No	Yes	No	Yes
NSC3 (2023)	20/09/2023	No	No	No	Yes	No	No
NSC5	19/11/2025	Yes	No	No	Yes	No	Yes
NSC6	19/11/2025	No	No	Yes	No	No	No
SRRK Gully	19/11/2025	Yes	No	No	Yes	Yes	Yes

Kind regards

Steve

Steve Harding

Ph [Redacted]  
 Email: [Redacted]

## Appendix 1 – Photos of eDNA Sample Sites

