Before the Fast-track Panel

Under: Fast-track Approvals Act 2024

In the matter of: FTAA-2603-1178 – Alternative to the Brynderwyn Hills – Brynderwyn Hills section

Statement of advice: Dr. Amber McEwan

Freshwater ecology (streams and wetland aquatic fauna)

Contractor for the Department of Conservation

11 August 2026

Department of Conservation
Te Papa Atawhai

Te Kāwanatanga o Aotearoa
New Zealand Government

Introduction

1. My full name is Amber McEwan.

Instruction

2. I have been requested to provide expert advice to the Director-General of Conservation (DOC/the Department) for the purposes of his comments on the Alternative to the Brynderwyn Hills Project Fast-track application.

Qualification and Experience

3. I hold three relevant degrees from New Zealand universities: BSc (ecology), MSc (conservation biology), and PhD (ecology). All of my postgraduate and professional work has been focussed exclusively on freshwater ecology.

4. I have been working as a freshwater ecologist in New Zealand for over 20 years, primarily as a consultant out of Riverscapes Freshwater Ecology Limited. I have published seven peer reviewed journal articles as first author (including three on the physical habitat requirements of New Zealand native fishes) and am a member of the New Zealand Freshwater Sciences Society.

Code of conduct

5. Whilst it is acknowledged this is not an Environment Court Proceeding, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in the preparation of this advice. Unless I state otherwise, this advice is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of advice and expert opinion

6. My expert advice focusses on streams and aquatic fauna values of wetlands and relates to the following:

    i. Adequacy of the values information and data collection methods relating to wetland aquatic fauna, stream fauna, and stream habitat.

    ii. Suitability of the effects assessment methods, including lack of detailed information, unsupported modification of standard definitions and assessment frameworks, and selective inclusion of values throughout the process.

    iii. The use of language and methodological choices that seem to minimise values rather than consider them objectively.

    iv. Adequacy of the proposed effects management measures, particularly in relation to lack of detail and the unreliability of the conclusions based on the methods used to estimate value and effect magnitude.

    v. Comments on conditions.

Material Considered

7. In preparing this advice, I have reviewed the following documents as part of the substantive application:

    i. Volume A FTAA Substantive Application (Main Application)

    ii. Volume B Appendix D07 Assessment of Effects on Freshwater Ecology (FWAEE)

    iii. Volume A Appendix D4A Stormwater Drawings

    iv. Volume A Appendix D4B Stormwater Drawings

    v. Volume B Appendix E Draft Resource Consent Conditions (13 July 2026)

8. I did not join the DOC site visit on 26 June 2026, although my colleagues collected and provided me with comprehensive information regarding the

relevant values of the site via photos, maps, and descriptions. I am confident that I have a good appreciation of the freshwater values of the site.

Summary of activities

9. The application involves a highway development in Northland that affects four catchments: Ahuroa and Waihoihoi – sub catchments of the Waipu, which joins the east coast marine environment via the Waipu estuary; and Pukekaroro and Wairau – which enter the west coast marine environment via the Kaipara harbour. Proposed activities include instream works, piping and reclamation of approximately 11 km of streams, permanent diversions and culverts that block fish passage, sediment release, and potential changes to catchment hydrology.

Key issues with the Freshwater AEE in relation to streams and aquatic fauna in wetlands (FWAEE)

Summary of issues

10. The FWAEE provides no information about indigenous aquatic fauna in the wetlands and limited information about aquatic indigenous fauna and aquatic habitats in the streams. In my opinion, the report's characterisation of fauna values is not supported by available data. This makes it difficult to understand what the potentially affected values are, and how they might be affected by the proposed activities.

11. The assessment undertaken has involved modifying established definitions and valuation frameworks without adequate support, and has led to outcomes that consistently underrepresent ecological value. It has also underestimated the level of potential adverse effects from the project.

12. In most cases, I was not able to assess proposed effects management measures, because they are either not provided in sufficient detail (and will be determined in to-be-developed management plans), or the applicant's ecologist considers they are not required. The latter is because the

assessment methods used in the FWAEE generate the conclusion that the levels of effect are so low that they do not require effects management.

13. While I accept that ecological assessment necessarily involves professional judgement, I also consider that professional judgement needs to be applied within a scientifically defensible methodological framework and be based on any relevant peer-reviewed research. In this case, I do not consider that the departures from standard practice in the FWAEE are scientifically justified, especially when the choices made in the assessment contradict or deviate significantly from peer reviewed scientific evidence and/or established expert consensus. As a result of the approach taken in the FWAEE, I consider that the conclusions drawn in it are not reliable.

14. Overall, the FWAEE contains a number of significant methodological limitations that reduce confidence in its suitability to reliably inform decision-making.

<u>No information on fish in the wetlands</u>

15. The report has not assessed aquatic fauna in the affected wetlands. Despite this, the FWAEE concludes (Page 36) "*There were no Threatened or At Risk wetland taxa found in these wetlands*." While accurate, this portrayal has the potential to misinform actual wetland value.

16. Northland wetlands can provide important habitat for aquatic fauna such as black mudfish[1] a species that is nationally classified as 'At Risk – Declining')[2]. The project is inside the known range of this species (Fig. 1), and the appearance of the wetlands as presented in the application materials suggests that some could be suitable habitat for black mudfish. For example, based on photos in the FWAEE and post-site visit discussion with my

[1] Hicks, B. J. & Barrier R. F. G. (1996). Habitat requirements of black mudfish (Neochanna diversus) in the Waikato region, North Island, New Zealand. New Zealand Journal of Marine and Freshwater Research. 30(1), 135-151.

[2] Dunn, N.R.; Closs, G.P.; Crow, S.K.; David, B.O.; Goodman, J.M.; Griffiths, M.; Hicks, A.S.; Hickford, M.J.H.; Jack, D.C.; Kitson, J.C.; Ling, N.; Waters, J.M.; Wylie, M.J.; Hitchmough, R.A.; Makan, T. 2025: Conservation status of New Zealand freshwater fishes, 2023. New Zealand Threat Classification Series 46. Department of Conservation, Wellington. 66 p

colleagues, I would have expected fish surveys to be undertaken in wetlands 8, 11, 12, 13, and 16. In addition, there could be habitat that is suitable for black mudfish[3] that is not identifiable from the site photos (i.e. ~20cm of water at the base of wetland vegetation[4]), but these habitats and their potential to contain black mudfish (or other aquatic fauna) are not mentioned in the application.

17. The current absence of black mudfish records in the project corridor or the affected catchments is not justification for failing to survey for such a cryptic species. Their cryptic nature is one of the main reasons that they are declining, making surveying in potential habitats that are proposed to be lost even more important.

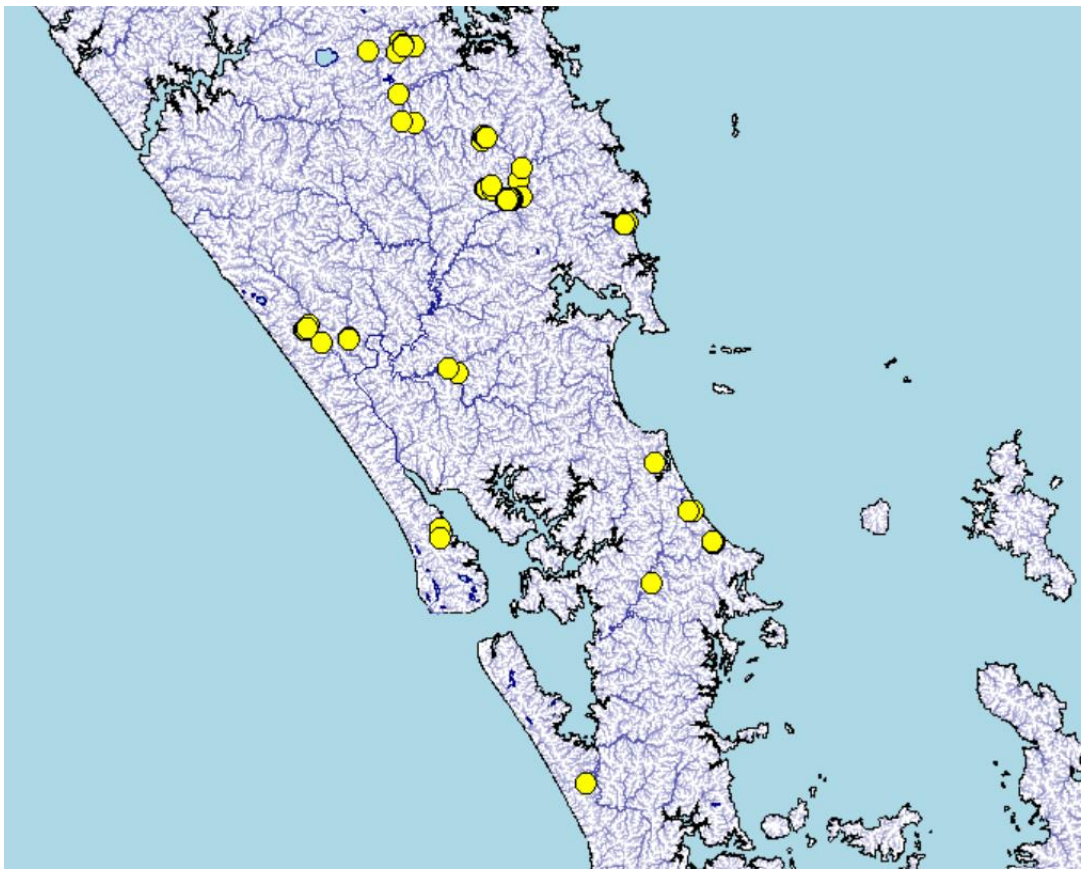

Figure 1. Freshwater Fish Database (FFDB) records for black mudfish *Neochanna diversus* (Nationally 'At Risk – Declining').

[3] Hicks, B. J. & Barrier R. F. G. (1996). Habitat requirements of black mudfish (Neochanna diversus) in the Waikato region, North Island, New Zealand. New Zealand Journal of Marine and Freshwater Research. 30(1), 135-151.

18. Wetlands support a range of aquatic fauna[5]. While the wetland delineation process does not include surveying for aquatic animals, wetland values assessments should[6]. In the absence of this information, I consider that the values generated for the wetlands are likely too low, and thus the conclusions regarding effects on wetlands are likely uncertain.

Limited information on fish in streams

19. The FWAEE acknowledges that the information gathering approach is limited and provides the author's opinion as support:

> *"The ecological data necessary to manage effects on freshwater ecology is relatively low. Understanding effects on streams does not require extensive studies of water quality, spatially detailed macroinvertebrate data sets, extensive fish surveys or complex details of physical habitat. Instead, it is important that there is sufficient data to determine:*
>
> • *if avoidance of any particular stream or wetland is paramount; and*
>
> • *the quantum and condition of streams that are being affected to apply an appropriate quantity of mitigation measures in the correct locations."*

20. This opinion is inconsistent with standard practise, the NPS-FM[7], and the existence of multiple comprehensive documents (including the applicant's

[5] The RMA defines wetlands as "*permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants **and animals** that are adapted to wet conditions*".

[6] For example, see discussion in Allen, W. J., Bartlam, S., Beattie, A. E., Denyer, K., Dunn, N. R., Hicks, A., Innes, J., Keesing, V., O'Donnell, C. F. J., Robertson, H., Suren, A., Watts, C., White, H., Zhao, Z., & Burge, O. R. (2025). Animals of New Zealand wetlands. *New Zealand Journal of Ecology*, *49*(1), 3607. doi.org

[7] **NPS-FM 3.24(3):** *"Every regional council must make or change its regional plan to ensure that an application referred to in subclause (2) is not granted unless: (a) the council is satisfied that: (b) the applicant has demonstrated how each step in the effects management hierarchy will be applied to any loss of extent or values of the river (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity"*

own guidelines[8]) on effects assessment. The report does not further explain the rational for this statement, and in my opinion the way the assessments of value and effects have been undertaken have produced unreliable conclusions.

21. The report describes a desktop review of existing fish information by consulting Northland Regional Council (NRC) SOE monitoring sites (outside of the affected catchments), McArthur & Beveridge (2015)[9], and the Freshwater Fish Database (FFDB). The assessment does not include physical surveying for fish and instead relies on eDNA samples taken at 14 or 15 sites (the map shows 15 sites, but most tables show 14, although by the end of the assessment the tables only show 12 (and site names seem to vary throughout the report) along the proposed designation (sample location map pasted at end of this evidence statement for ease of reference). The assessment only used 2 eDNA sample replicates per site.

22. The report does not discuss the limitations associated with only using eDNA sampling instead of combining it with fish surveying. Earth Science's eDNA guidelines (Melchior & Baker 2024)[10] advise that, at its current stage of development, this technique has limitations and should not be used to completely replace established survey methods, but should instead be used as a complementary tool. The use of multiple methods is particularly important where a survey goal is to assess ecological values related to native fish.[11]

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[8] Page 25 of NZTA's EIA Guidelines: "*The EcIA must establish the value of all ecological features that could be affected by the project.*" And, Page 34: *"At a minimum the Preliminary Technical Assessment should (PTA): Identify the full extent of key ecosystem species and habitats that may be affected"*.

[9] McArthur, K., Beveridge, A. (2015). *Freshwater native fish in Northland: Conservation status, critical habitat requirements and recommendations for management*. The Catalyst Group (Report No. 2015/036)

[10] Melchior, M., & Baker, C. (2023). Environmental DNA guidelines and field protocols for lotic systems (NIWA Client Report No. 2023279HN). National Institute of Water & Atmospheric Research Ltd.

[11] As discussed in Melchior & Baker (2024) and references therein: eDNA sampling cannot currently provide information regarding several important indicators of ecological value relating to native fish species and habitats:

23. The report does address eDNA sample replication, but only to note the author's opinion that (despite the availability of peer reviewed research and best practise national guidelines that report otherwise): "*One sample is sufficient to undertake eDNA analysis to determine the presence of a particular species.*" The NIWA eDNA guidelines recommend 6 replicates per site[12], and the findings of Smith et al. (2024)[13] indicate that 2 replicates will likely miss 25% of fish species – meaning that, for example, the detection of 6 native fishes (including giant kōkopu and torrentfish) at and upstream of the Waipu Gorge site[14] could indicate a further 2 species present that were not detected.

24. I found the section describing fish values (3.2.2) confusing. For example, Table 6 notes giant kōkopu and torrentfish as recorded in the FFDB, but then says they were not recorded in the FFDB and were only recorded in the eDNA samples (a table heading error would explain this discrepancy, but not others). The report notes that īnanga were one of the most commonly occurring FFDB records within the affected catchments, but then does not mention īnanga when discussing which of the recorded species are likely to be present in reaches within the designation. Then, Tables 7 and 8 note īnanga as recorded

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- Abundance (informs population and habitat value; identifies critical sites (e.g. population 'strongholds', or key spawning habitats).
- Population size structure (informs habitat value, migratory access).
- Fish Condition (informs habitat value, existing stressors).
- Life stage (informs habitat importance for species that require multiple habitats to complete their life cycle (e.g. lamprey juveniles require very different habitats compared to nesting adults but eDNA alone will not indicate which life stage(s) the habitat currently supports).

[12] Melchior and Baker 2023 – Section 5.2 reviews the evidence base that supports this recommendation

[13] Smith, Josh & David, Bruno & Hicks, Andy & Wilkinson, Shaun & Ling, Nicolas & Fake, Daniel & Suren, Alastair & Gault, Amy. (2024). Optimizing eDNA Replication for Standardized Application in Lotic Systems in Aotearoa, New Zealand. Environmental DNA. 6. 10.1002/edn3.70017: < 100 m elevation sites required 6 replicates to reliably detect 89.5% of fish species, > 100m elevation sites required 5 replicates to reliably detect 90.8% of fish species.

[14] The applicant describes these sample results in relation to (an unreported number or location of) existing records based on fish surveying in a way that seems intended to support the use of two replicates only: *"It is curious to note that records from standard fish surveys recorded in the FFDB do not show the presence of giant kōkopu or torrent fish (despite these being identified through the Project's eDNA sampling)"*

by eDNA sampling rounds, but later (section 3.2.5) says that the presence of īnanga "has not been concluded through any sample data". This section also states that lamprey "*may be present within the proposed designation*" but does not explain this conclusion, and there is no mention of lamprey anywhere else in the document.

25. The report's mention of lamprey serves in part to illustrate one of the key issues with the FWAEE: the applicant has carried out limited fish surveying that is particularly unlikely to detect lamprey[15]. Then, with no accompanying explanation, the FWAEE states that lamprey *"may also be present within the Proposed Designation*" and if so, *"there are management options to minimise or avoid effects when the Waihoihoi main stem is realigned."* There is no further discussion of lamprey presence, the use of the specific methods needed to detect or salvage them, what the potential effects of realignment on lamprey are or how those effects might be managed. Lamprey, lamprey threat status, and lamprey habitats are not included in the effects assessment process as affected values. I do not consider that this approach represents an appropriate way to collect values information, assess effects, and put forward methods for adequately managing those effects.

26. The report specifically indicates that the author does not consider smelt and giant bully (recorded in desktop review) to be affected because these species are only identified in reaches downstream of the project designation (and īnanga may have been included in this category). Firstly, I note that map information and photos indicate that īnanga are likely to be present in multiple locations including upstream of the designation, and this is consistent with predicted distribution data for īnanga (Fig. 2). Secondly, species occurring upstream and downstream are conventionally considered affected (e.g. by sedimentation and other discharges, hydrological change, barriers to fish passage) because this is a basic principle of fluvial ecology.

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[15] See Baker, C., Franklin, P., & Gee, E. *(2024)*. Locating lamprey: Guidelines for identification of critical habitats and population monitoring. Department of Conservation / National Institute of Water & Atmospheric Research (NIWA). Department of Conservation Guidelines

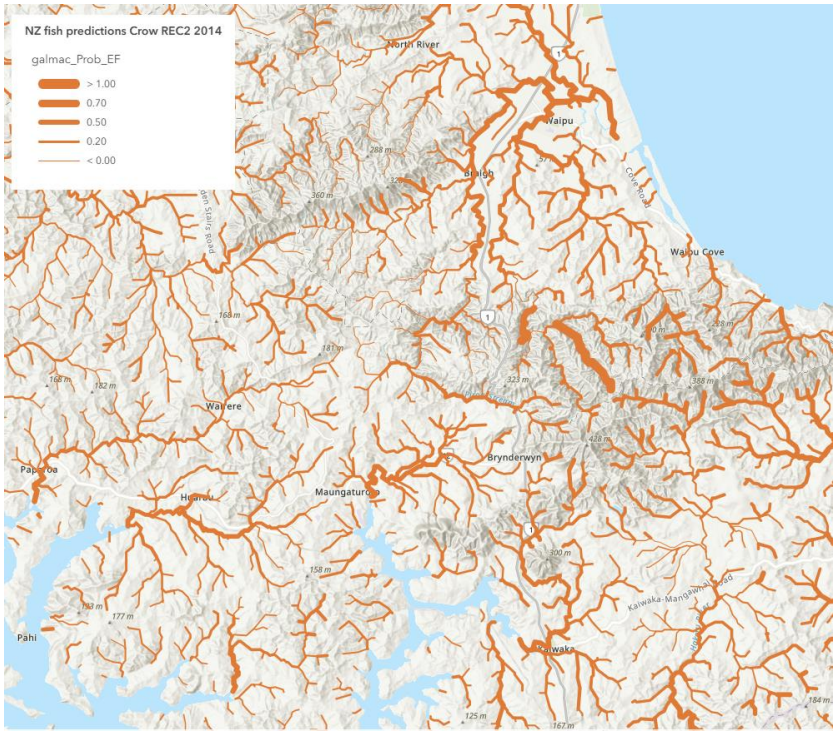

Figure 2. Probability of īnanga occurring in the affected catchments. Taken from Crow, S. K., Booker, D. J., Sykes, J. R. E., Unwin, M. J., & Shankar, U. (2014). *Predicting distributions of New Zealand freshwater fishes*. NIWA Client Report CHC2014-145. National Institute of Water and Atmospheric Research.

27. The report notes the detection of kākahi (*Echyridella menziesii*) in one of the eDNA samples, but does not note this species' threat status ('At Risk – Declining'), does not mention them again, and I cannot tell if this species has been included in values assessment or effects management. Based on habitat descriptions and photos from the DOC team site visit, I consider it likely that kākahi are present in many more locations than the single site reported in the application.

28. Banded kōkopu and giant bully are considered regionally significant species[16] in Northland, but the report does not mention this and I was not able to tell whether this status was accounted for in rarity-related criteria applied during assessment (although I assume it likely was not due to the stated intention in

[16] Lux J, Martin T, Beadel S. 2007. Natural areas of Waipu Ecological District – Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Northland Conservancy. Available online.

the report to not include rarity values if they relate to freshwater fish – see paragraphs 45-46 below).

29. A 'Threatened – Nationally Vulnerable' caddisfly has been recorded in the Ahuroa (Fig. 3), but the report does not mention it or account for it. The report does not mention īnanga spawning habitat, the indicative presence of īnanga within the project catchments (Fig. 4), or provisions relating to īnanga spawning habitat in the Regional Plan for Northland 2026 (RPN 2026)[17].

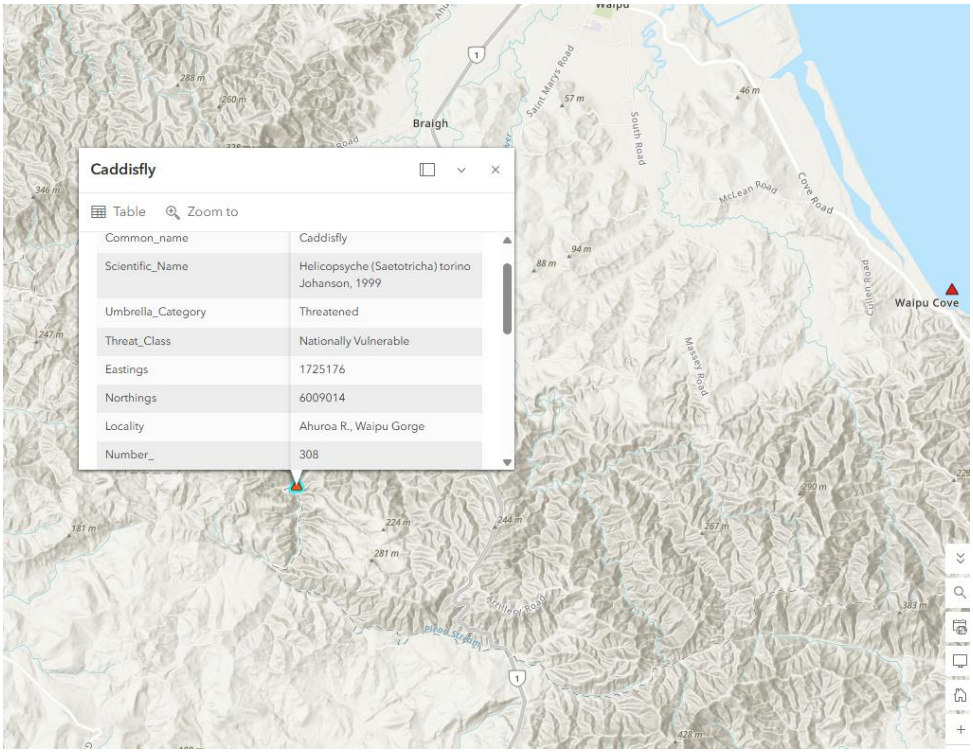

Figure 3. Location of a recorded occurrence of a 'Nationally Vulnerable' freshwater invertebrate species in the Ahuroa. Source: Department of Conservation (DOC), Threatened Freshwater Invertebrates spatial dataset publicly available at https://doc-deptconservation.opendata.arcgis.com/datasets/d9d0ca229b214ab9aa820c89e765f952_0/explore

[17] For example, C.8.2.1 (2)(b) in relation to stormwater, and C.8.3 related to earthworks, could be relevant, particularly in relation to the Ahuroa.

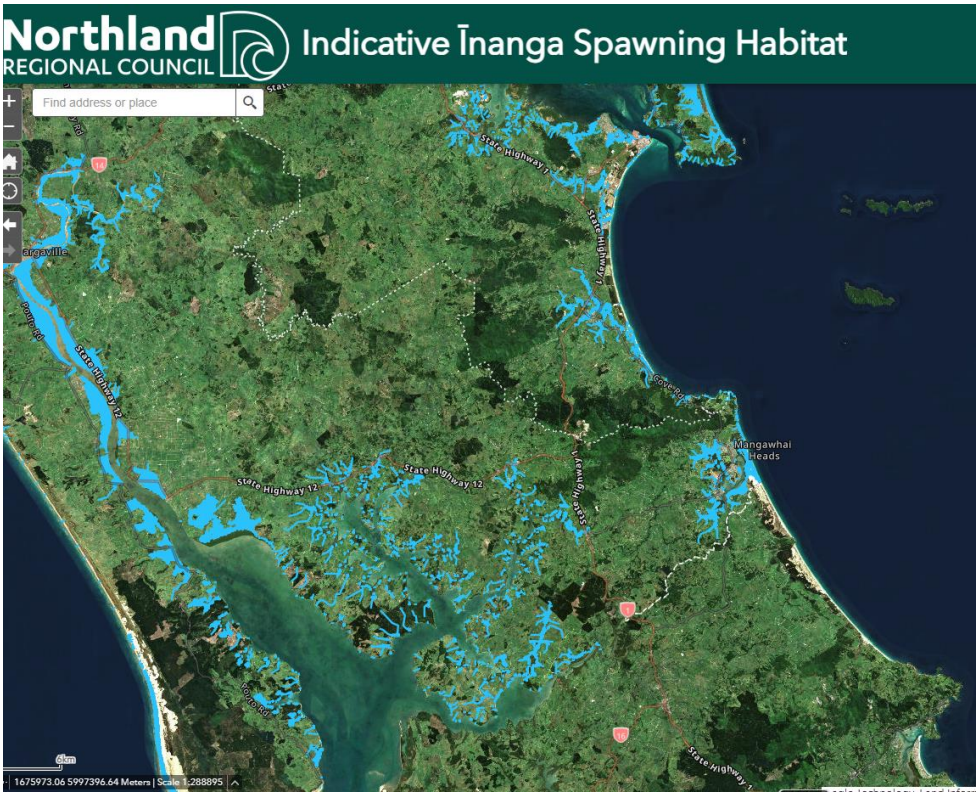

Figure 4. Indicative īnanga spawning habitat in the affected catchments. From NRC online mapping tools.

30. The report uses updated threat classifications for some species but superseded classifications for īnanga in the same tables (Tables 7 and 8) – and Table 7 labels these classifications as *"New Threat Classification (2025)"*. Īnanga have been revised from 'At Risk' to 'Threatened', but remain categorised as 'At Risk' in the FWAEE. This means that the species with the highest threat status of all fish species confirmed as present in the affected catchments (but see paragraphs 24-25 regarding lamprey) has not had this status reported, discussed, or likely accounted for.

31. To summarise, the limited data collection methods have resulted in 14 native species – only 3 of which are 'Not Threatened' being recorded throughout the affected catchments (Table 1). Despite this, sections 3.3.2 – 3.3.3 of the FWAEE appear to suggest and progressively rationalise the idea that only a small number of them are worth further consideration. By the end of the stream assessment, Tables 10 and 11 conclude that only one site should be considered to contain 'High' native fish values, and most are assigned a value of 'Low'. The values summary section of the FWAEE (section 3.2.5) includes

the statement: *"few notable species have been found within the Proposed Designation"*. I do not consider that to be accurate.

Table 1. The report's description of the freshwater fish (kōura and kākahi are included in this definition for brevity) present in the affected catchments. Only includes records that identify to species level. Classifications are provided for fish (regionally[18] and nationally[19]) and invertebrates[20].

Species		**Status**	
		National	Regional
Anguilla australis	Shortfin eel	Not threatened	-
Anguilla dieffenbachii	Longfin eel	AT RISK-Declining	-
Cheimarrichthys fosteri	Torrentfish*	AT RISK-Naturally uncommon	-
Galaxias argenteus	Giant kōkopu	AT RISK-Declining	-
Galaxias fasciatus	Banded kōkopu	AT RISK-Naturally uncommon	Regionally Significant
Geotria australis	Lamprey	THREATENED-Nationally Vulnerable	-
Galaxias maculatus	Īnanga	THREATENED-Nationally Vulnerable	-
Gobiomorphus cotidianus	Common bully	Not threatened	-
Gobiomorphus basalis	Cran's bully	AT RISK-Naturally uncommon	-
Gobiomorphus gobioides	Giant bully	AT RISK-Naturally uncommon	-
Gobiomorphus huttoni	Redfin bully	AT RISK-Naturally uncommon	-

[18] Lux J, Martin T, Beadel S. 2007. Natural areas of Waipu Ecological District – Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Northland Conservancy. Available online.

[19] Dunn, N.R.; Closs, G.P.; Crow, S.K.; David, B.O.; Goodman, J.M.; Griffiths, M.; Hicks, A.S.; Hickford, M.J.H.; Jack, D.C.; Kitson, J.C.; Ling, N.; Waters, J.M.; Wylie, M.J.; Hitchmough, R.A.; Makan, T. 2025: Conservation status of New Zealand freshwater fishes, 2023. New Zealand Threat Classification Series 46. Department of Conservation, Wellington. 66 p.

[20] Grainger, N.; Harding, J.; Drinan, T.; Collier, K.; Smith, B.; Death, R.; Makan, T.; Rolfe, J. 2018: Conservation status of New Zealand freshwater invertebrates, 2018. New Zealand Threat Classification Series 28. Department of Conservation, Wellington. 25 p

Species		Status	
		National	Regional
Retropinna retropinna	Common smelt	AT RISK-Declining	-
Paranephrops planifrons	Kōura	Not threatened	-
Echyridella menziesii	Kākahi	AT RISK-Declining	-
Gambusia affinis	Mosquito fish	Introduced	-

Limited information about stream habitat

32. I found it difficult to establish a clear idea of how stream extent has been classified. If I understand correctly, digital terrain analysis has been used to map location and extent of perennial, intermittent, and ephemeral streams. This technique relies on setting a number of parameters, and the results can vary widely depending on how these parameters are set. I cannot comment on whether the results are reasonable or not because I have not been able to find the description of the methods that were used for setting parameters. Northland Regional Council provides recently-developed stream network mapping data, but the report does not mention this. The mapping results used in the assessment have generated a much higher estimate of catchment extent compared to the NRC data (see evidence of Dr Richard Storey).

33. In section 5.4.3 of the FWAEE, the report refers to tributaries *that are "mapped as intermittent and perennial"*, (and are intended to be used as spoil sites) but then seems to exclude them from further consideration based on the opinion that they *"are no more than larger farm drains and I do not consider them to have sufficient natural form and values to be considered streams requiring consideration independently"*. This seems at odds with the Regional Plan for Northland 2026 (RPN) definitions[21], and I think that determining what is and is not a stream should be based on the RPN rather than opinion.

[21] The RPN 2026 defines an artificial watercourse as a man-made channel constructed in or over land for carrying water, and includes an irrigation canal, roadside drains and water tables, water supply race, canal for the supply of water for electricity power generation and farm drainage canals. It

34. In section 2.2.4 of the FWAEE the report uses imprecise language instead of available technical terms (which created uncertainty regarding what had been included and what had not) to describe 'ephemeral flow paths' and/or 'ephemeral headwaters' when noting their intention to exclude ephemeral streams from assessment:

Page 16 FWAEE: *"The numerous ephemeral flow paths intersected by the Proposed Designation (especially in the Brynderwyn Hills area) were also confirmed by topographic and catchment size hydrological modelling. These are terrestrial systems that drain rain fall to the headwater (ephemeral) and do not have aquatic habitat and aquatic species (native frogs aside) therefore are not relevant for this assessment. Following their classification, I have not considered ephemeral systems further in undertaking this assessment."*

35. The uncertainty resulting from the above examples, the 'black box' modelling of stream extent and flow regime, the discrepancy between the applicant's and NRCs stream mapping results, plus the indication that the wetland mapping process missed multiple natural inland wetlands that should have been included (see statement of evidence of Dr Timothy Martin) leaves me concerned that the stream extent data is not accurate – in particular, that permanent streams may have been classified as intermittent, and intermittent streams as ephemeral and thus excluded from assessment. This would have contributed to underrepresentation of affected values.

36. Stream Ecological Valuation (SEV) data was collected at the sampling sites along the proposed designation (see map at the end of this statement of evidence). The report outlines the author's choice to not include fish or invertebrate data in the SEV score calculations despite this being required to calculate a reliable SEV score regarding health or condition[22]:

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specifically **excludes channels constructed in or along the path of any historical or existing stream, river, or natural wetland**.

[22] Storey, Richard & Neale, Martin & Rowe, David & Collier, Kevin & Hatton, Chris & Joy, Mike & Maxted, John & Parkyn, Steph & Phillips, Ngaire & Quinn, John. (2011). Stream Ecological Valuation

FWAEE page 13 "*While I have eDNA fish and macroinvertebrate data, I chose to use only the physical metrics components of the model in forming the SEV. As it is an averaged score, this approach does not overly modify the SEV outcome and better reflects the habitat condition*."

37. The report justifies excluding it in large part on the basis that its inclusion does not overly modify the outcome. If fauna values data are required to generate reliable results, and the inclusion of the data makes little difference to the outcome then I would expect it to be included.

38. Only final scores are presented in the values tables (Tables 10 and 11) – for hydraulic and biogeochemical provision function combined, and a final score for biogeochemical provision function. No biodiversity provision function score is provided or discussed (further to noting the exclusion of the fish and invertebrate data), potentially indicating that the assessment may also have excluded riparian vegetation function from assessment.

39. The decision to exclude required values data from the SEV process has likely underrepresented values estimates, and thus also effect levels and proposed management. These values go on to be used to calculate loss of stream value by piping and are recommended to be used to calculate ECRs for offset/compensation.

40. The report also describes the use of the Rapid Habitat Assessment protocol (RHA)[23] to assess stream habitat, and as far as I can tell (it is not specified in the methods or noted on the sample sites map), only did this at the main sample sites along the proposed designation (where SEV and MCI information is from). It would have been helpful for RHA to be used in other parts of the catchments. The per-metric RHA results are not provided, and the total scores

(SEV): a revised method for assessing the ecological functions of Auckland streams: "*Information on the invertebrate and fish communities present at test sites is required to calculate an SEV score. The collection and processing of the biological samples is the most onerous part of the SEV method, but the value of the information provided by these biological samples is high*."

[23] Clapcott J 2015. National rapid habitat assessment protocol development for streams and rivers. Prepared for Northland Regional Council. Cawthron Report No. 2649. 29 p.

(which are used in the values calculation tables as representative of all affected stream habitat) are very low (i.e. less than 20 in some cases).

41. Apart from the use of specific methods at sites along the proposed designation, it seems clear that the vast majority of the affected catchments have not been visited by the applicant's ecologists, which is not unreasonable per se, but I would expect a conservative approach when estimating the value of habitats that have not been assessed but that will be affected by the proposed activities (because effects on fluvial systems occur outside of actual works sites). Instead, the report assigns low habitat value to these reaches based on little information and uses these values to reach conclusions regarding effect level and the need for effects management measures.

42. Overall, it seems unlikely that the methods used to characterise stream extent and habitat have produced conclusions that are sufficiently accurate for robust decision making, and have likely contributed to underestimation of perceived values, and thus effect level and need for effects management.

Problematic effects assessment methods

43. The effects assessment methods described in the FWAA set up the assessment to underestimate effects, by modifying definitions of the terms that inform values, and by selecting an inappropriate scale to estimate magnitude of effect. Then, throughout the assessment process, fish are selectively included and excluded in ways that consistently generate lower levels of effect (summarised in paragraphs 58-59 below).

44. In section 2.2 of the FWAEE, the report outlines the two key measures they have used to assess the current values within the proposed designation: "*Condition (ecosystem health)*", and *"Value"*. The NPSFM provides a definition of 'ecosystem health', and it explicitly includes fish[24]. The report does not

[24] NPS-FM Appendix 1A(1): *"There are 5 biophysical components that contribute to freshwater ecosystem health, and it is necessary that all of them are managed. They are: [water quality..., water quantity...,habitat...aquatic life – the abundance and diversity of biota including microbes,*

acknowledge this definition, and instead proposes an alternative definition of 'ecosystem health' that excludes fish and focusses on habitat.

45. The report uses the definition of 'value' that is consistent with the NPSFM and this definition includes fish. However, the report then qualifies this definition in a way that excludes fish – by noting the author's opinion that it is not appropriate to include fish when considering rarity in modified, degraded streams such as some of those in the project.

46. While degraded streams will generally have less fish in them than streams that are not degraded, this does not mean that the presence of fish has no bearing on the ecosystem health of the habitat, and thus does not justify their exclusion from a definition of value in this context. Biological assemblages are central indicators of ecological condition – this is the premise that underlies the science of biomonitoring, and why metrics like the MCI exist.

47. I consider that the approach taken by the FWAEE is not in line with the findings of McArthur & Beveridge[25] which is one of the main sources of information for the FWAEE, nor the provisions that those findings informed in the RPN 202626.

48. A catchment scale – instead of the standard, contextually relevant reach scale – is used to assess magnitude of effect. The rationale in the Freshwater AEE for this approach is that reach scale assessment has no ecological meaning: "In general, I do not consider it is appropriate to assess effects at a site or

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invertebrates, plants, fish and birds, and ecosystem processes". Appendix Table 13 describes the attribute bands for fish values – all of which include native fish AND habitat.

[25] Page 36: "*Determining ecological significance for native fish populations using aquatic habitats is problematic…* ***In many cases, the recorded presence of species is the only or best indicator for whether a site, reach, wetland or lake is a significant habitat***.*"* And,

P36" *Given the high proportion of threatened species in the national and regional fish fauna, the highly uncertain nature of the habitat and fish survey data, and the difficulties associated with accurate prediction of significant fish habitats****; a presence/absence approach, based on NZFFD survey records is recommended as the first step in providing for significant native fish sites in Northland."***

[26] Section D.4.25: *"When considering resource consent applications for activities in freshwater bodies recognise: 1) that in the absence of alternative evidence,* ***most Northland continually or intermittently flowing rivers*** *and some lakes and natural wetlands* ***provide habitat for threatened or at risk indigenous fish species****".*

reach scale. In my opinion, a site or reach scale has no ecological meaning, and is based on an arbitrary boundary."

49. The report suggests further support for the above statement with a paragraph describing the connected nature of waterways, which, while not inaccurate, is not directly relevant to the effects assessment methods being considered. It would be difficult to even begin to carry out effects assessment in this context without applying a reach scale - as demonstrated by (reach-scale) use of the SEV and RHA methods during this assessment. In my opinion, situations in which it would be reasonable to apply a catchment scale in this context would include when considering connectivity-related effects such as fish passage or cumulative effects such as sediment discharges to downstream receiving environments – but that is *alongside* reach scale effects at the point of impact, not in place of them.

50. The use of catchment scale is accompanied by the replacement of the relevant set of EIANZ[27] criteria for describing magnitude of effect (Table 8) with a novel set of criteria, without accompanying scientific justification. The criteria themselves are also not scientifically justified, and are simply broad numerical bands that do not differentiate between effects or between different parts of rivers (e.g. headwaters, lowland reaches) and thus far less likely to generate useful results than the standard, peer-reviewed criteria in Table 8 (both criteria sets pasted below as Fig. 5).

51. The choice to use catchment scale in this context has resulted in all the values being combined together and accounted for as simply 'stream extent as a proportion of total catchment'. The choice to replace the EIANZ criteria has resulted in all the effects being combined together and accounted for as simply 'effect of the activities'. The EIANZ guidelines[28] and the applicant's own

[27] Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. 2018. Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

[28] EIANZ: "*The values assigned to different components can be combined to give a single site value if required; it is important not to suppress values and potential impacts on specific components.*

guidelines[29] explicitly instruct not to do this. To illustrate one reason why, this approach would only generate an effect magnitude of 'Very High' on the Ahuroa if, for example, the application was proposing to infill over 300 kilometres of the catchment.

Table 8. **Criteria for describing magnitude of effect** (Adapted from Regini (2000) and Boffa Miskell (2011))

Magnitude	Description
Very high	Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature

- <1% of the total catchment's waterway affected = negligible,
- 1-10% = low,
- 10+-25% = moderate,
- 25+-50% = high,
- >50% = very high

Figure 5. (top) Table 8 from the EIANZ guidelines showing standard criteria used to describe magnitude of effect. (bottom) snip and paste from the FWAEE showing the criteria used to describe magnitude of effect.

52. This approach has allowed the (underrepresented) stream values to be combined with 'Negligible' magnitudes of effect to conclude that the piping and reclamation of several kilometres of stream reaches has a 'Very Low' level of effect that therefore does not require mitigation.

53. In response to concerns raised by practitioners regarding this approach, EIANZ has recently (5 August 2026) issued an Explanatory Note[30] that 1) reiterates the

[29] NZTA guidelines etc, Page 38: *"The matrices' assessment results should not be 'lumped' or averaged. The value and level of effect of each distinct ecosystem and focus species needs to be afforded separate consideration at the appropriate scale with appropriate context"*

[30] Explanatory Note is available at: https://www.eianz.org/document/item/8955

importance of values assessment and effects magnitude assessment being carried out using the same spatial scale, and 2) clarifies that the approach described above misrepresents the guidance in the EIAGs."

54. In addition to the above issue regarding scale and the substitution of peer-reviewed standard criteria with unsuitable and unsupported criteria, the report describes a further unsupported change to the EIANZ process. Consideration of species with an 'At Risk' or 'Threatened' classification is integrated into the EIANZ process, and the report (2.2.2 of FWAEE) says that "*rarity (species at risk and threatened)"* is included when assigning ecological value under this process. However, during the process itself, only species that are 'Threatened' are included and species that are 'At Risk', i.e. 9 out of the total 14 species, are not. The report supports this choice with reasoning that I found difficult to understand, but essentially seems to infer that given most native freshwater fish species are now classified as At Risk or Threatened, the threat classification of the species present should not influence how the stream is rated in accordance with the EIANZ Guidelines (page 31 FWAEE).

55. Aside from the decision to make this unusual methodological departure, I found the description how the fish Index of Biotic Integrity (IBI) was used here confusing. A Northland-specific IBI model has been developed[31], but does not seem to have been used (the reference to Northland data on page 15 FWAEE seems to more likely represent the applicant's own data on Northland fish, rather than the Northland IBI model). The report says that IBI scores will be used in valuations, but actual IBI scores are not reported, nor are the fish species included for each site.

56. The IBI method itself includes the assignment of score ranges to integrity classes, but the report instead uses the four NPSFM integrity bands (which are based on quartiles present in national data). I could not find any explanation for this choice or supporting data for the (poor) values generated by the method (and which differed between Tables 10 and 11 for one of the sites).

Overall, I was not able to gain a reasonable understanding of how or why the author carried out the IBI analysis and substituted it for 'At Risk' species, but what does seem clear is that significant effort has been expended to avoid accounting for the 'At Risk' classification of many of the affected fish species – when doing so would have been consistent with robust practise, consistent with the AEEs for other species in this application, and very straightforward. These choices have likely resulted in significant underestimation of rarity-related values.

57. The report does not consider cumulative effects on streams outside the current application, despite the application describing works that are just one part of a bigger project of works that will likely have similar effects in the same wider area, especially related to stream reclamations, diversions, and sediment discharges.

58. To summarise the way that fish species have been included and excluded in the assessment without justification: the report bases assessment on definitions that exclude fish, despite the availability of standard definitions that include fish. Fish are included during scoping but excluded from values estimation during the SEV process. During the EIANZ evaluation process, 'Threatened' fish are included (although actually may not have been included[32]), and 'At Risk' fish are excluded, and the 'At Risk' attribute (which would likely have increased average value figures) is replaced with NPSFM-related IBI attribute bands (which would likely have decreased average value figures).

59. The latter process may have only included fish that the report noted as likely to be present in reaches within the proposed designation (despite earlier rejection of the use of a reach scale in effects assessment), but I was not able to be sure of this due to limited description of methods and presentation of results. These choices serve to reduce perceived stream values, and are only

[32] The applicant may have not included any 'Threatened' species given that they 1) note lamprey may be present but do not report their 'Threatened' status, and 2) record inanga with multiple methods but mislabel them as 'At Risk' instead of their current classification – 'Threatened'.

supported by opinion, despite departing from standard practice and recommendations in peer-reviewed published guidance.

60. The approach used in the FWAEE to assess effects is not scientifically robust and has led to unreliable conclusions. In turn, I consider that those conclusions are unlikely to be able to reliably inform decision making.

Presentation and discussion of data in a way that appears to underrepresent values.

61. In addition to methodological choices that minimise the inclusion of 'Threatened' and 'At Risk' species, the report seems to generally underrepresent the importance of the values data. For example:

    Of McArthur and Beveridge (2015), the report notes: *"That paper does not indicate there are any fish taxa of conservation concern"* but then immediately follows this with mention of the presence of longfin eel ('At Risk-Declining') and īnanga – to which the report attributes a superseded (and lesser) threat classification[33]. In other parts of the report, correct threat classifications are used for other species but the mischaracterisation of īnanga is repeated alongside (Tables 7 and 8 FWAEE).

62. Banded kōkopu are a regionally significant species and are nationally classified as 'At Risk – Naturally Uncommon'. The report notes the national threat classification in Tables 7 and 8 but does not mention it anywhere else, and on several occasions dismisses stream reaches as unimportant because they likely only contain banded kōkopu.

63. The report notes that lamprey could be affected but does not mention their threat classification ('Threatened – Nationally Vulnerable').

64. The report assesses the effects of piping and infilling headwater streams with a method that does not account for the high value of headwaters[34], and the report makes no mention of the relevant conclusions in McArthur and

[33] Īnanga were previously classed as ('At Risk-Declining'), but are now ('Threatened – Nationally Vulnerable').

[34] For example Richardson, J.S. (2019). Biological Diversity in Headwater Streams. Water, 11(2), 366.

Beveridge (2015)[35] or the particularly vulnerable status of headwater streams in the RPN 2026[36].

65. The report states: *"While few notable species have been found within the Proposed Designation"*; and: "*Only the Waihoihoi main stem in the Waihoihoi catchment had a diversity of fish species of conservation concern"* despite the applicants own limited information indicating the presence of *11 'Threatened' or 'At Risk' fish species* throughout the catchments (and thus potentially affected by the activities).

Proposed effects management

66. The report lists the potential effects of the activities and then provides some general statements that conclude that effects related to contaminant discharge, instream works, fish mortality, aquatic biosecurity, stormwater management, and flow reduction "*will be appropriately avoided or minimised through standard management practices so that the effect will be 'less than minor*". No further detail is provided in relation to freshwater ecology (but see paragraph 67), so I am not able to provide technical assessment of these effects and associated management measures.

67. The report discusses groundwater drawdown in section 4.4 with general comments that do not adequately address the potentially severe losses of water caused by the activities (see evidence of Dr Richard Storey for more detail). Aside from this, the report conclusions are based on the current assessment of the nature of the streams and wetlands (which are likely

[35] Page 40 in their report regarding native fish values in Northland: *"**Intermittent or headwater streams are important to all native fish and are of critical importance to a number of at risk and threatened species.** Often these first and second order streams are written out of rule and policy approaches to managing freshwater habitat and quality. However, they are critical to maintaining **habitat quality, invertebrate food sources, spawning habitats, juvenile refugia and buffering catchment water quality and temperature."***

[36] RPN 2026 D.2.18 b)(iii) *"…indigenous ecosystems and habitats that are **particularly vulnerable to modification**, including estuaries, lagoons, coastal wetlands, intertidal zones, rocky reef systems, eelgrass, northern wet heathlands, coastal and **headwater streams**, spawning and nursery areas and saltmarsh…"*

unreliable and re-assessment could result in different proposed effects management measures for groundwater drawdown):

"In conclusion, there is a potential that groundwater drawdown arising from large cuts will result in aquatic habitat reduction or loss. But because of the nature of the existing streams and wetlands in those drawn down zones, the effect is most likely to be subtle macroinvertebrate assemblage changes. I consider that effect will be less than minor and likely very difficult to measure"

68. The FWAEE reports that the proposed activities will increase sediment loadings in the Pukekaroro by 1.66%, the Waihoihoi by 4.6%, the Ahuroa by 8.54%, and the Wairau by 16.35%. These percentages could be inaccurate because the percentatge increase will primarily affect the catchment downstream of the proposed designation – for example, if 50% of the catchment is downstream, then the project will actually be increasing the affected part of the catchment's sediment load by over 30%. The report provides extremely limited assessment regarding how sediment could affect species or habitats in the affected catchments, despite the substantial literature available that describes effects ranging from mild and temporary to severe and more permanent (e.g. see recent review by Gupta et al. 2022)[37]. Sediment issues related to the affected catchments are already the focus of care groups. For example, the Kaipara Moana Remediation Collective[38] aims to halve the amount of sediment flowing into local waterways and the Kaipara Harbour – an area that has been severely degraded by sediment deposition originating from increased erosion from upstream land development (Swales et al. 2011).[39]

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[37] Gupta, Lav & Pandey, Manish & Raj, P. & Shukla, Anoop. (2022). Fine Sediment Intrusion and its Consequences for River Ecosystems: A Review. Journal of Hazardous, Toxic, and Radioactive Waste. 27. 10.1061/(ASCE)HZ.2153-5515.0000729.

[38] Information regarding the Kaipara Moana Remediation Collective and the group's focus on sediment issues can be found here: https://kmr.org.nz/the-kaipara-moana/understanding-sediment/"

[39] "Swales, A., Gibbs, M., Ovenden, R., Costley, K., Hermanspahn, N., Budd, R., Rendle, D., Hart, C. & Wadhwa, S. (2011). Patterns and rates of recent sedimentation and intertidal vegetation changes in

69. The Piroa Conservation Trust recently published the Bream Bay Catchment Action Plan (Rosa & Basilio 2024)[40] to address erosion, high sediment levels, and poor water quality. The plan identified the Ahuroa as a particular contributor of sediment to the lower catchment, and included goals to protect īnanga spawning habitat identified in the Ahuroa, and to advocate for adequate compliance enforcement in the upstream catchment.

70. Instead, the FWAEE provides the author's opinion that – based on existing sediment issues – increased sediment yield is "*not of concern ecologically*" for the Pukekaroro or the Waihoihoi. For the Ahuroa, the report simply notes that the author 'expects communities will persist and recover' from sediment impacts based on an anecdote from the Wellington region (where the underlying geology is more resistant to erosion compared to the ranges in the present application).

71. Despite the significant predicted increase in the Wairau, the report does not suggest mitigation and instead recommends a monitoring programme that requires *ecological assessment of the effects of sediment* (but does not suggest any outcomes of such assessment) at sites where turbidity exceeds 500 NTU (a level far in excess of those at which sublethal negative effects have been documented for native fish[41]).

72. I do not consider the proposed measures likely to adequately address the effects of sediment discharge on the affected catchments including downstream receiving environments. I suggest that an appropriate approach would be to consider effects in more detail and in relation to local factors, and include cumulative effects within and between catchments and wider areas as

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the Kaipara Harbour. NIWA Client Report HAM2011-040. National Institute of Water & Atmospheric Research Ltd. Prepared for Auckland Council and Northland Regional Council

[40] Rosa, F., Basilio, M. 2024. Action Plan: Bream Bay Catchment. Report for Piroa Conservation Trust. Available at: https://environment.govt.nz/assets/publications/bream-bay-catchment-action-plan.pdf

[41] For example, reduced feeding activity and movement upstream by banded kokopu at 20-25 NTU (Richardson, J., Rowe, D. K., & Smith, J. P. (2001). Effects of turbidity on the migration of juvenile banded kokopu (Galaxias fasciatus) in a natural stream. New Zealand Journal of Marine and Freshwater Research, 35(1), 191–196.

appropriate (e.g. FMUs). I suggest that effects management measures should include consideration of regional direction and existing restoration initiatives related to sedimentation of freshwater environments, and set monitoring objectives and triggers based on turbidity levels that differentiate between base and flood flows, avoid effects on a species-specific basis, and follow established, evidence-based frameworks such as Earth Science New Zealand's 'Setting maximum turbidity levels for riverine fish (DSS)'.

73. The applicant has not applied for Complex Freshwater Fisheries Activity approval, but the FWAEE describes the use of permanent culverts, permanent diversions, structures that will permanently block fish passage, and fish salvage activities.

74. The proposed management of effects on fish passage is mostly limited to a general assumption that culverts and diversion channels will either 1) not affect fish passage, or 2) will affect fish passage but only at sites where fish passage is "*relatively unimportant*". However, information from the applicant provided in Memorandum of counsel dated 26 June 2026 makes it clear that there is not currently sufficient information available regarding structures and diversions to consider how they could affect fish passage[42].

75. Regarding assertion 1 (that culverts and diversion channels will not affect fish passage): I am concerned about the potential effects of the culverts and diversion channels on fish passage due to the lack of information provided in the FWAEE. Transmission Gully monitoring data (GWRC 2020, 2023, 2026)[43]

[42] *"NZTA's position on Freshwater Fisheries Approvals (Memorandum of counsel 26 June 2026) 4.1 As outlined in its Application,1 NZTA has chosen, based on the expert assessments undertaken, not to apply for a Complex Freshwater Fisheries Approval (CFFA) at this stage of the Project. NZTA does not currently consider a CFFA is required. 4.2 The current culvert/diversion design is indicative only and will not be confirmed until the detailed design phase of the Project. If, at that stage, approvals under the Freshwater Fisheries Regulations are needed, NZTA will of course apply for those approvals at that time, with the benefit of detailed design. 4.3 The decisions as to which approvals NZTA seeks as part of the FTAA process, and which are deferred to a later stage pending detailed design, are a matter for NZTA to determine as the applicant."*

[43] Transmission gully monitoring data provided to Riverscapes Freshwater Ecology via email by Greater Wellington Regional Council on 15th June 2026

describes widespread and pervasive issues associated with the project's culverts and diversion channels that are due to channel design features:

- "*Fish passage barriers include: no surface flow through riprap at base of ramp, fast, shallow water on ramp and culvert outlet, no resting pool, perched culvert outlet, and waterfall barrier caused by the weir(s).*"
- "*There are large lengths of stream diversions across the TGP that do not retain surface flow in a similar state to the natural stream sections.*"
- "*The loss or partial loss of surface flow from streams affected by the TGP is primarily due to design and construction practices allowing the stream water to flow sub-surface.*"
- "*There appears to have been no attempt to provide for crossings that ensure that the access track does not impede the flow or habitat values of the tributaries.*"

With the following effects:

- "***a)*** *Loss of stream habitat for fish, invertebrates and plants. In some cases, this is partial loss due to reduced water width and depth, and in other cases this is a near complete loss of habitat associated with normal surface flow.*

b) *Loss of fish passage. Where the flow is sub-surface, there is likely to be a near complete loss of upstream fish passage during normal baseflow conditions. The ability of fish to travel upstream through sub-surface flow paths is likely to be severely compromised by physical barriers, sections filtering through small gravels, and velocity barriers.*

c) *Loss of connection with riparian vegetation and food sources for invertebrates.*"

76. Some indications in the present application documents reduce confidence in the ability of the eventual design of the channels to provide fish passage. For example, the assessment methods have generated such low levels of effect (points 33-49) that the report concludes that mitigation (for the reclamation of several kilometres of stream reaches) is not required, and instead only

'recommends' the use of stream simulation design in constructed channels "(*where practicable), as good practise"*.

77. In addition, the application notes that channel design "*will incorporate habitat features and erosion-resistant elements* ***where appropriate****"*. Also, typical details of the indicative stream diversions are provided[44] but are filed as 'stormwater drawings' and the specifications in the drawings for "low planting that is not an impediment to flow" and that "Habitat features are not required for the spoil sites. Planting to comprise topsoil and grass" reduces confidence further.

78. Regarding assertion 2 (that culverts and diversion channels will only affect fish passage at sites where fish passage is "*relatively unimportant*"): determining where fish passage 'might be unimportant' runs counter to S42 of the Freshwater Fisheries Regulations 1983 (FFR 1983), which requires that fish passage remain *unimpeded* by all instream structures[45]. I would expect any discussion that suggests otherwise to be supported by robust, evidence-based data. The report instead relies on assumptions which seem at odds with the project data in some cases and which also have the outcome of reducing the perceived value of the stream habitats and thus the perceived magnitude of effect in relation to impeding fish passage.

79. The report refers to recently published peer-reviewed national guidelines regarding fish passage (the New Zealand Fish Passage Guidelines; NZFPG[46]), which is standard practice and consistent with the applicant's own guidance.[47]

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[44] Drawings10722-PTA-22B0-SW-DRG-1432 in Vol.A- Appendix D4.

[45] FFR 1983 42()1: "*Notwithstanding regulation 41(2)(d), no person shall construct any culvert or ford in any natural river, stream, or water in such a way that the passage of fish would be impeded, without the written approval of the Director-General incorporating such conditions as the Director-General thinks appropriate.*"

[46] Franklin, P., Gee, E., Baker, C., & Bowie, S. (2024). *New Zealand Fish Passage Guidelines Version 2.0* (Report No. 2024157HN). National Institute of Water and Atmospheric Research. https://niwa.co.nz/freshwater/fish-passage-home/new-zealand-fish-passage-guidelines

[47] NZTA's website says to use FPGs: "*On 26 September 2025, the NZTA's Fish Passage Guidance for State Highways (2013) was formally withdrawn due to legislative changes. For current guidance, please refer to the New Zealand Fish Passage Guidelines for Structures up to 4 Metres (2024)"*

The report further notes however the decision to instead refer to a flow chart from an Auckland Council report from 2009[48] to determine where fish passage is recommended. No explanation is provided for this choice.

80. The report describes not proposing fish passage in some streams as being based on lack of upstream fish habitat. However, supporting data is not comprehensive or easy to find. In some cases, this statement is inconsistent with project sampling data. For example, the application (page 24) notes in relation to the Pukekaroro tributary: *"Due to its location being high above sea level and away from any coastal river, migratory fish access is difficult. Based on these factors, as well as the lack of water flow during summer, it was considered that there is* ***no stable fish habitat within the tributary****."* However, the eDNA sampling at the Pukekaroro tributary site recorded three native fishes (two classed as 'At Risk).

81. The FWAEE indicates fish distributions in the catchments (see paragraphs 24-31 above) that seems inconsistent with the assignment of a 'negligible' value for fish passage function to 7 out of the 12 sample sites in Table 10. I would expect 'negligible' fish passage function to mean none at all, which is not reflected in the data.

82. Collectively, the above factors make it difficult to have confidence in the report's conclusions regarding fish passage effects or management of those effects.

83. Regarding piping and reclaiming streams within the designation: I was unable to form a clear understanding of the activities proposed for various stream reaches based on the numbers presented in Table 15 FWAEE . It seems clear however that the proposed activities include piping of approximately 3.3 km (with pipe lengths up to 370 m long and potentially longer), reclamation and replacement of between 2.8 km and 7.8 km , and reclamation of between 554 m and 5 km of stream reaches with no replacement. 2.8 km is more realistic for loss with replacement and 5 km is more realistic for loss without

[48] Auckland Regional Council (2009) "Fish Passage in the Auckland Region–a synthesis of current research," Auckland Regional Council Technical Report, 84.

replacement, given that the 'spoil realignments' are unlikely to result in surface flowing stream reaches.

84. Even if precise figures were systematically presented, the assessment methods have generated the conclusion that piping and reclaiming (including loss without replacement) approximately 11 km of stream will have a 'Very Low' level of effect and thus requires no mitigation, offsetting, or compensation. To provide a contrasting example of standard practise when assessing these kinds of effects, the freshwater AEE for the Mount Messenger Bypass categorised loss of stream extent as having *'very high adverse environmental effect* (even with mitigation)". [49]

85. I consider this conclusion is anomalous, as it is based on unsound assessment methods as I have explained above, and as such, cannot reliably inform decision making regarding the effects of the activities and how to manage them. In my opinion a reliable effects assessment using appropriate methods would be as follows:

i. Re-assess which species and habitats are likely to be present in the affected catchments taking a conservative approach that reflects the lack of data.

ii. Provide detailed and objective habitat information, using updated maps that facilitate effective understanding of the affected catchments, what information was collected where and when, and where uncertainty may remain regarding values.

iii. Use correct national and regional species classifications and include them in values criteria as per Table 5 in the 2018 EIANZ guidelines. Include fish and invertebrate data in SEV calculations of ecological value.

iv. Systematically and objectively describe and assess effects individually in relation to specific species and habitats at a reach scale (and additional scales where necessary) as per Section 4.3 of the NZTA EcIA Guidelines.

[49] The freshwater AEE for the Mount Messenger Bypass categorised loss of stream extent as having *'very high adverse environmental effect* (even with mitigation)".

v. Include consideration of cumulative effects and effects-management in relation to other highway development applications.

vi. Assess effect level using updated values information and a reach scale for effect magnitude. Use established methods except where departures can be robustly supported.

vii. Provide the working behind metric calculations and mapping methods in appendices and explain the conclusions presented in Tables 10 and 11 in the FWAEE once they are updated.

Comments on draft conditions

86. The proposed designation and resource consent conditions are based on the conclusions generated by the current assessment in the FWAEE. Given the unreliability of these conclusions and the current form of the proposed conditions, it is difficult to draft sufficiently specific wording for conditions at this point. In the interest of efficiency, I have provided what comment I can regarding the currently proposed conditions below.

87. RC5 Fish salvage and instream works methods should be covered under a to-be-certified management plan.

88. Whether the measures to manage the effects of the structures on fish passage (including in relation to fish salvage methods and fish-friendly design of the constructed channels associated with the diversions) will be certified, monitored, and enforced by DOC or NRC will depend on which approval pathway ends up being sought/issued for which structures.

89. RC7 Changes to management plans should require certification by the administering agency (as is usual practice), not be determined by one party based on their opinion regarding whether a change will result in more than minor effects.

90. RC8 in the interests of review efficiency and management plan effectiveness, Advice Notes specifying an expected response timeframe should be applied instead of condition wording that deems certification after a specified interval.

91. RC10, RC11, RC13 There is not currently enough information to draft conditions relating to temporary instream structures, fish salvage and relocation. The wording in these draft conditions is too general and contains uncertainty related to the 'as practicable' qualifier. Details regarding temporary instream structures, other instream disturbance, and fish salvage and relocation methods should be included in a to-be-certified management plan(s).

92. RC13 Fish should be salvaged from any dewatered, diverted, or otherwise disturbed reach – not just reaches that an SQP considers 'supports a viable population of indigenous freshwater fish'.

93. RC15 does not currently contain sufficient detail to comment on.

94. RC20-RC22 Measures proposed in the ESCP to manage the ecological effects of sediment discharge should be detailed, relate specifically to local conditions and affected values, and provide more certainty than is suggested in the current wording. Monitoring conditions should be outcome based and include specified methods, triggers, and responses.

95. RC 21-31 Given the risk of hydrological impacts in the affected catchments, and the potential need to augment stream flows, monitoring conditions that are outcome-based, and include specified methods, triggers, and responses should be developed.

96. RC32 Specific conditions related to structures should be developed once the relevant approval pathway has been identified and reliable conclusions have been reached regarding values and effects.

97. RC36 The design of constructed channels should be specified in a management plan to be certified by the appropriate administering agency (which will depend on which approval pathway related to fish passage management is identified).

98. RC37-38 Fish passage provisions should be determined once the relevant approval pathway has been identified. Decision-making should be based on available decision-making frameworks, rather than an SQP's opinion on whether fish passage provision is necessary or not. Related management

plan(s) should be certified by the administering agency, rather than just provided by the applicant.

99. RC38 says that culverts must provide fish passage, but this is not as specific as the NES-F and FFR 1983 which say that culverts must provide the same fish passage as existed before the culvert was installed, and "must not impede fish passage." Because it is possible to provide fish passage to different levels (e.g. allowing fish to pass under some flow conditions but not others, or allowing some species to pass but not others) it is important that these conditions are as specific as in the NES-F and FFR 1983.

100. The words "as far as practicable" leave open the possibility that the outcomes may not be achieved. NES-F Section 70 does not include the phrase "as far as practicable." Clause (a) is weaker than the corresponding NES-F requirement. Clause (a) says "The width of the culvert must be wider than the Watercourse it has replaced, whereas the NES-F says "the culvert's width where it intersects with the bed of the river" must be 1.3 times the width of the bed (for streams <3 metres wide) or 1.2 times the width of the bed plus 0.6 metres (for streams >3 metres wide).

101. The requirement to achieve at least the same riparian cover as before the realignment is a low standard for streams currently in pasture. Given the uncertainties around ecological outcomes inherent in stream realignment, it is reasonable to expect that at least the riparian zone of realigned streams should be planted, so that net ecological gain is offered to compensate for the risk of ecological loss. Noting that the FWAEE says that there is a high risk of failure for several of the realignments.

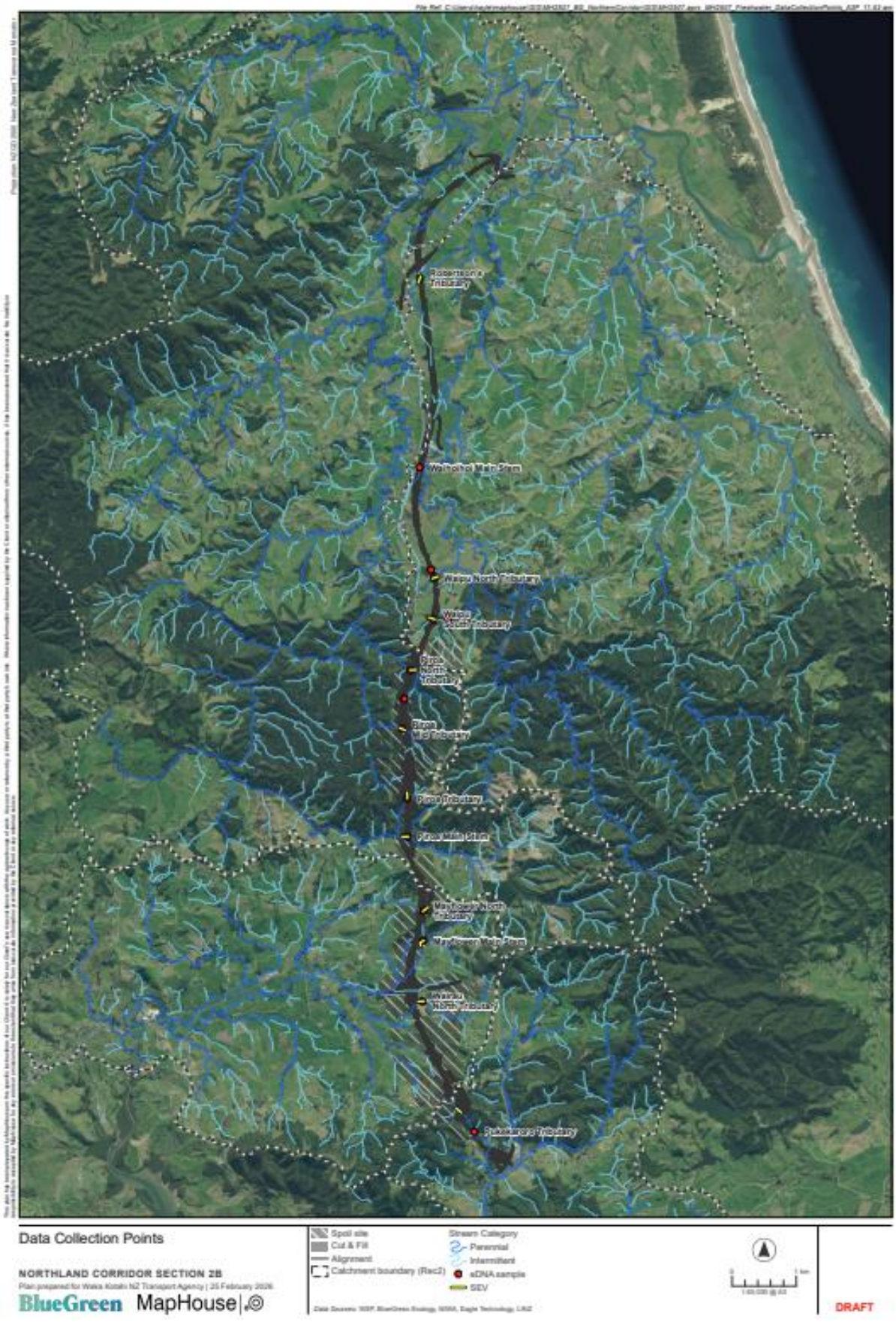

Figure x. Sample site map taken from the FWAEE