

APPENDIX F:

BEFORE THE PROPOSED NATURAL RESOURCES PLAN HEARINGS PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER Wetlands and Biodiversity

AND

IN THE MATTER of the Right of Reply evidence to matters raised during Hearing Stream 5

**STATEMENT OF RIGHT OF REPLY EVIDENCE OF ALTON
PERRIE ON BEHALF OF WELLINGTON REGIONAL
COUNCIL**

TECHNICAL -

- (a) Inanga spawning period; and
- (b) the trout fishery and trout spawning value of the Papawai Stream

16 July 2018

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2. INTRODUCTION

2.1 My name is Alton Perrie. I work as an Environmental Scientist for Greater Wellington Regional Council. My qualifications and experience are set out in my primary technical evidence.

2.2 My Right of Reply evidence relates to:

(c) Submissions in relation the inanga spawning period; and

(d) A submission on the trout fishery and trout spawning value of the Papawai Stream

3. CODE OF CONDUCT

3.1 I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note and that I agree to comply with the code. My evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions which I express.

4. EVIDENCE ON BEHALF OF THE MINISTER OF CONSERVATION – MS PETROVE AND MS COOPER: WETLANDS GENERAL CONDITIONS (E) – INANGA SPAWNING PERIOD

4.1 In my primary evidence (paragraphs 10.6 to 10.9), I state that the inanga spawning times listed in Schedule F1a range from February to July, with a peak period of March to May, and that I consider this an accurate representation of the inanga spawning period.

4.2 In her primary evidence, Ms Petrove, agrees with the range and peak spawning periods, but notes that the purpose of Sections 5.5.2 (wetlands general conditions) and 5.5.4 (beds of lakes and rivers general conditions) is to set out exclusion periods to protect inanga spawning. In paragraph 41 of her evidence she provides justification for increasing the exclusion period from 1 March to 31 May to 1 January to 31 May to cover the months prior to peak spawning.

4.3 The justification for increasing the exclusion period relates to the time required for riparian vegetation in areas of inanga spawning habitat to recover post disturbance/degradation. Ms Petrove states that a period of at least two months prior to the peak spawning period should provide sufficient vegetation recovery time if disturbance/degradation occurs.

- 4.4 I agree with Ms Petrove because the disturbance of vegetation leading up to peak spawning time has the potential to reduce the quality of spawning habitat and, hence, inanga spawning success. Riparian vegetation needs to be of sufficient quality and density to provide suitable temperatures, humidity/moisture levels, and protection from UV radiation, to allow for the survival and successful development of inanga eggs (Taylor & Marshall 2016; Hickford & Schiel 2011). Therefore, I agree with Ms Petrove that a more suitable exclusion period to protect inanga spawning habitat and inanga spawning should encompass 1 January to 31 May. Furthermore, inanga tend to start congregating in these lower reaches prior to spawning taking place (Taylor & Marshall 2016); hence, this exclusion period will also afford protection to potentially large numbers of adult inanga as they prepare to spawn in this habitat.
- 4.5 A five month exclusion period may seem like a significant period for an exclusion period within a permitted activity rule but I note that, as shown on Map 14 (see Appendix 2), the indicative extent of inanga spawning habitat across the region is very limited, being generally restricted to the reach of tidal influence within a river or lake mouth.
- 4.6 I also note that, as the conservation status of inanga is “At Risk”- “Declining” (Goodman et al. 2014) provisions to protect their habitat, especially spawning areas, are particularly important.

5. EVIDENCE ON BEHALF OF THE FISH AND GAME COUNCIL – MR WILSON: WETLANDS GENERAL CONDITIONS (E) – INANGA SPAWNING PERIOD

- 5.1 Mr Wilson (Fish and Game) requests deletion of 5.5.2 Wetlands general condition (e) which restricts activities which involve bed disturbance, diversions of water or sediment discharge from occurring during the inanga breeding season (1 March - 31 May). He considers that this condition could prevent any management activities taking place during the most appropriate maintenance periods, which occur during the summer, and also when volunteers undertake wetland work prior to the gamebird season. He also states that it is not clear how the likely scale of the works affects inanga spawning habitat as, usually, works in wetlands are seeking to maintain vegetation suitable for inanga spawning, or, removing sediment to ensure more open water for fish passage.

- 5.2 It is important to recognise that this exclusion period only relates to the inanga spawning habitat identified in Schedule F1b (see paragraphs 5.1 to 5.9 below for discussion/recommendations on this Schedule). By its very nature, inanga spawning habitat is of very minimal regional extent as it is only located within areas of tidal influence (refer to Map in Appendix 2).
- 5.3 Hence any restrictions on activities in wetlands will only occur where there is an overlap between a natural wetland and those sites identified in Schedule F1b. I note that this does not apply to the majority of wetlands throughout the Region (refer to Map Appendix 3). Paragraphs 5.2 to 5.6 above explain why an exclusion period to protect inanga spawning habitat is important. Lastly, where restoration of inanga spawning habitat is planned, this is also best to occur prior to the peak spawning period to allow the riparian habitat sufficient time to recover/develop prior to spawning occurring.
- 5.4 For these reasons, I consider that the exclusion period in Section 5.5.2 Wetlands general conditions, condition (e) is appropriate (taking into account paragraphs 3.1 to 3.6 above) and should be retained.

6. CONSOLIDATION OF THE LIST OF SITES WITH INANGA SPAWNING HABITAT AND CLAUSE (E) OF SECTIONS 5.5.2 AND 5.5.4

- 6.1 In the Section 42 Report: Wetlands and Biodiversity, responding to a submission from Porirua City Council (S163/114) and relying on my advice, Ms Guest recommended that clause (e) of Sections 5.5.2 (Wetlands general conditions) and 5.5.4 (Beds of lakes and rivers general conditions) should refer to Schedule F1b and Map 14 for a list of inanga spawning sites, rather than Schedules F4 and F5. The rationale for this was that Schedule F1b provides a dedicated list of known rivers and parts of the coastal marine areas with inanga spawning habitat, whereas Schedule F4 (Sites with significant indigenous biodiversity values in the coastal marine area) and Schedule F5 (Habitats with significant indigenous biodiversity values in the coastal marine area) only identify a subset of sites.
- 6.2 Subsequent to Hearing Stream 5, Ms Guest asked me to carry out a full check of the inanga spawning sites listed in Schedule F1b to make sure

that it includes all of the inanga spawning sites listed in schedules F1, F4 and F5 (as all these schedules include sites listed as providing inanga spawning habitat). I have completed this check and have identified seven inanga spawning sites that are listed in Schedule F4 that, for completeness, should also be listed within Schedule F1b. These are the: Awhea River, Kaiwharawhara Stream, Kaiwhata River, Ngakauau Stream, Okau Stream, Waiwhetu Stream and Wharemauku Stream

6.3 I also note that some of the naming conventions used in Schedule F1b lack clarity and I suggest some minor modifications to better identify the site.

(a) Modify Lake Onoke to “Lake Onoke and Ruamahanga River” because the Ruamahanga River (reach of tidal influence) is currently listed in Schedule F1 but not in F1b

(b) Modify Lake Pounui Stream to “Pounui Lagoon/Lake Pounui Stream” to better reflect the habitat where inanga spawning is currently taking place.

6.4 These changes to Schedule F1b should also be reflected in an updated Map 14 (Known rivers and parts of the coastal marine area with inanga spawning habitat (Schedule F1b)) to show the indicative extent of inanga spawning areas. The updated versions of Schedule F1b and Map 14 are shown in Appendices 1 and 2.

6.5 The technical detail and background that provides the justification for the inclusion of sites in Schedules F1, F1b, F4 and F5 can be found in Marshall and Taylor 2017, Taylor and Marshall 2016, Todd et al. 2016; Taylor and Kelly 2001 and Taylor and Kelly 2002.

6.6 Lastly, it is important to reiterate that the sites listed in the Schedule F1b only relate to the area of tidal influence and hence the extent (i.e., river length) across the Wellington Region that is located within Schedule F1b is minimal.

7. EVIDENCE OF HAMMOND LIMITED (S132): INCLUSION OF PAPAWAI STREAM IN SCHEDULE I: IMPORTANT TROUT FISHERIES AND SPAWNING WATERS

7.1 Hammond Ltd requests that the Papawai Stream be removed entirely

from Schedule I or, at minimum, reduced in mapped extent so that it is more confined to the lower reaches of the stream. The submitter cites various reports and observations that generally indicate poor habitat and water quality, and low numbers of adult trout in the Papawai Stream. This leads the submitter to conclude that the stream, as it is currently indicated in Map 22, is unlikely to support high trout numbers or an appropriate spawning environment for trout. The submitter does acknowledge that based on some records/reports of large numbers of juveniles observed/caught, trout spawning may occur in the lower reaches of the Papawai Stream.

- 7.2 The Papawai Stream is listed in Schedule I as an important trout spawning water; which is supported by the primary evidence of Dr Canning (Wellington Fish and Game); with Table 4 in his evidence showing that it meets the relevant criteria.
- 7.3 I acknowledge the concerns raised by Mr Hammond, as I agree that Papawai Stream does have some areas with degraded habitat and reduced water quality, such as concentrations of dissolved oxygen and deposited sediment that may impact on trout spawning values in some reaches. Nonetheless, trout spawning is known to occur in this stream, in particular the lower reaches around the vicinity of the confluence of the Papawai Stream with Tilson's Creek, and down to the Ruamahanga River.
- 7.4 Thus the key issue appears to be whether the existing extent of Papawai stream, as shown in Map 22, is still appropriate for spawning or whether this should be reduced in extent to the lower reaches. However, any reduction in extent would need to rely on additional survey information. Until a new survey is carried out to confirm the extent of trout spawning habitat in the Papawai stream, I recommend that it be retained in Schedule I.
- 7.5 I also note that the Papawai Stream is erroneously shown on Map 22 as an important trout fishery river and I consider that this error should be rectified by removing Papawai Stream from this map layer (although I note that it should remain on Map 22 shown as an important trout spawning water).

Discrepancies between Schedule I and Map 22 for important trout fishery rivers

7.6 In reviewing the mapping of the Papawai Stream listing I noted that there are several other sites shown on Map 22 that are not identified as important trout fishery rivers in Schedule I, nor have they recommended be added to Schedule I by Ms Guest in her S42A Report: Wetlands and Biodiversity. Examples include Enaki Stream, and Beef Creek. I have subsequently carried out a review of Map 22 and recommend a number of changes to this map so that it accurately shows only those sites supported by Dr Canning's evidence as important trout fishery rivers. The recommended changes are shown in Appendix 4.

8. REFERENCES

Goodman J, Dunn N, Ravenscroft P, Allibone R, Boubee J, David B, Griffiths M, Ling N, Hitchmough R and Rolfe J. 2014. *New Zealand Threat Classification Series 7*. Department of Conservation, Wellington.

Hickford M and Schiel D. 2011. *Synergistic Interaction within disturbed habitats between temperature, relative humidity and UVB radiation on egg survival in a diadromous fish*. PLoS One 6 (9):8.

Marshall W and Taylor M. 2017. *Inanga spawning habitat surveys in the Wellington Region, 2017*. Prepared for the Greater Wellington Regional Council, AEL Report No. 146.

Taylor M and Kelly G. 2001. *Inanga spawning habitats in the Wellington region. Part 1*. NIWA Client Report CHC01/67.

Taylor M and Kelly G. 2002. *Inanga spawning habitats in the Wellington region. Part 2*. NIWA Client Report CHC01/67.

Taylor M and Marshall W. 2016. *Inanga Spawning habitat quality, remediation and management in the Wellington Region*. Prepared for the Greater Wellington Regional Council, Wairarapa Moana Wetlands Group, Porirua City Council and Wellington City Council. AEL Report No. 138.

Todd, M.; Kettles, H.; Graeme, C.; Sawyer, J.; McEwan, A.; Adams, L. 2016: *Estuarine systems in the lower North Island/Te Ika-a-Māui: ranking of significance, current status and future management options*.

Department of Conservation, Wellington, New Zealand. 400 p.

Appendix 1: Proposed modifications/additions to Schedule F1b

Schedule F1b: Known rivers and parts of the coastal marine area with inanga spawning habitat



Shown on Map 14

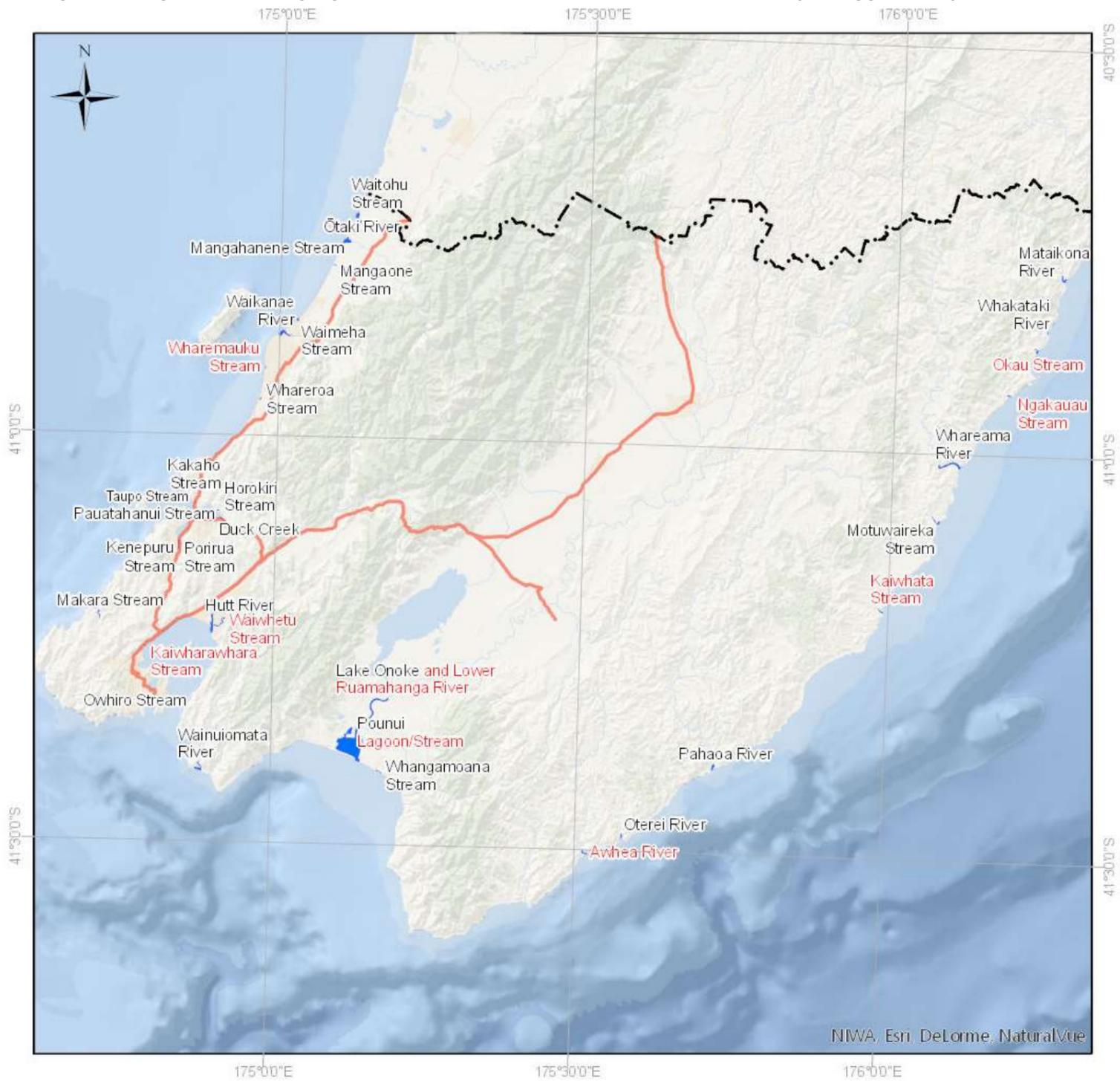
Areas of tidal influence in the following rivers and parts of the coastal marine area have been surveyed and found to have habitat suitable for inanga spawning.

Schedule F1b: Known rivers and parts of the coastal marine area with inanga spawning habitat		
River mouth	NZTM 2000 Northings	NZTM 2000 Eastings
Awhea River	5402705	1809752
Duck Creek	5447610	1759575
Horokiri Stream	5449063	1760078
Te Awa Kairangi/Hutt River	5433469	1759213
Kakaho Stream	5449786	1759092
Kaiwharawhara Stream	5430930	1749786
Kaiwhata River	5435384	1850224
Kenepuru Stream	5444564	1754767
Lake Onoke and Ruamahanga River	5416845	1778194
Pounui Lagoon/Stream	5417992	1777311
Makara Stream	5435099	1743790
Mangahanene Stream	5485553	1777891
Mangaone Stream	5482519	1775861
Mataikona River	5480409	1875649
Motuwaireka Stream	5447359	1858444
Ngakauau Stream	5464751	1867807
Okau Stream	5473474	1873301
Ōtaki River	5485803	1777717
Oterei River	5404526	1815107
Owhiro Stream	5421506	1747076
Pahaoa River	5413965	1827650
Pauatahanui Stream	5447850	1760630
Porirua Stream	5444645	1754685
Taupō Stream	5450123	1756889
Waikanae River	5473228	1768909
Waimeha Stream	5475080	1771010

Schedule F1b: Known rivers and parts of the coastal marine area with inanga spawning habitat

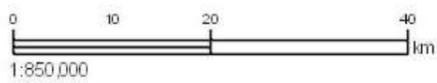
River mouth	NZTM 2000 Northings	NZTM 2000 Easting
Wainuiomata River	5413904	1757358
Waitohu Stream	5489199	1779175
Waiwhetu Stream	5434497	1760969
Whakataki River	5470591	1871916
Whangamoana Stream	5413371	1781986
Whareama River	5455105	1860140
Wharemauku Stream	5468628	1766788
Whareroa Stream	5464269	1765818

Appendix 2: Updated Map 14 to reflect proposed modifications/additions to Schedule F1b (see Appendix 1)



This version of the map is not complete. The version of this map available online through the online web map viewer shows the complete, detailed information on a GIS overlay that is not shown on this hard copy. The online version is available on the Council's website at <http://mapping.gw.govt.nz/gwrc/> (select theme **Proposed Natural Resources Plan 2015**) and can be accessed from the Council offices or public library.

- State Highway
- Inanga spawning site
- Region boundary line

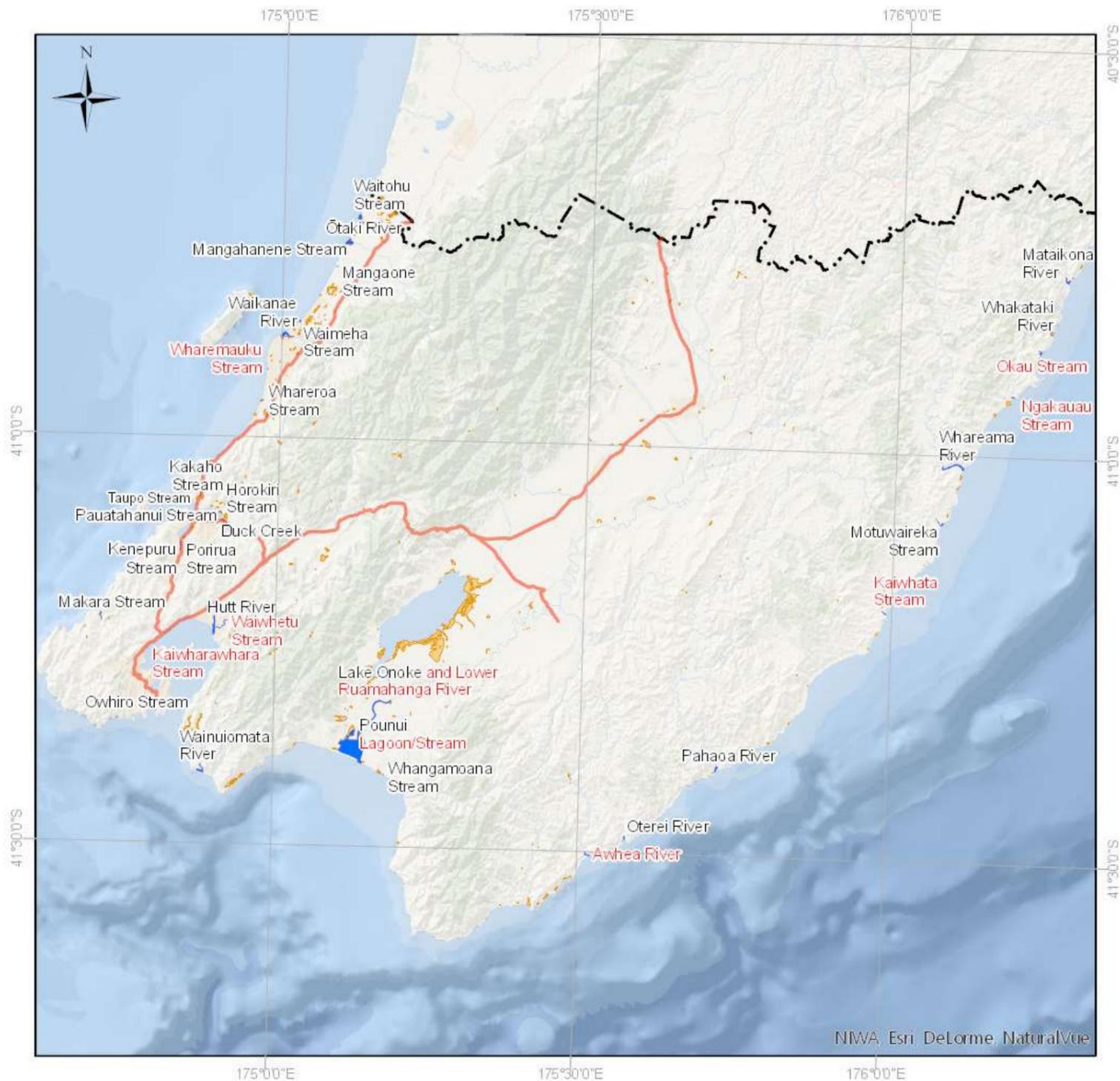


Basemap: World Oceans Base
Projection: NZTM 2000



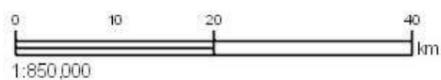
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and other contributors
Topographic and Cadastral: LINZ & CoreLogic Ltd

Appendix 3: Updated Map 14 (inanga spawning) with natural wetlands layer overlaid



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- Scientific Wetlands (2016)
- Inanga spawning site
- State Highway
- Region boundary line

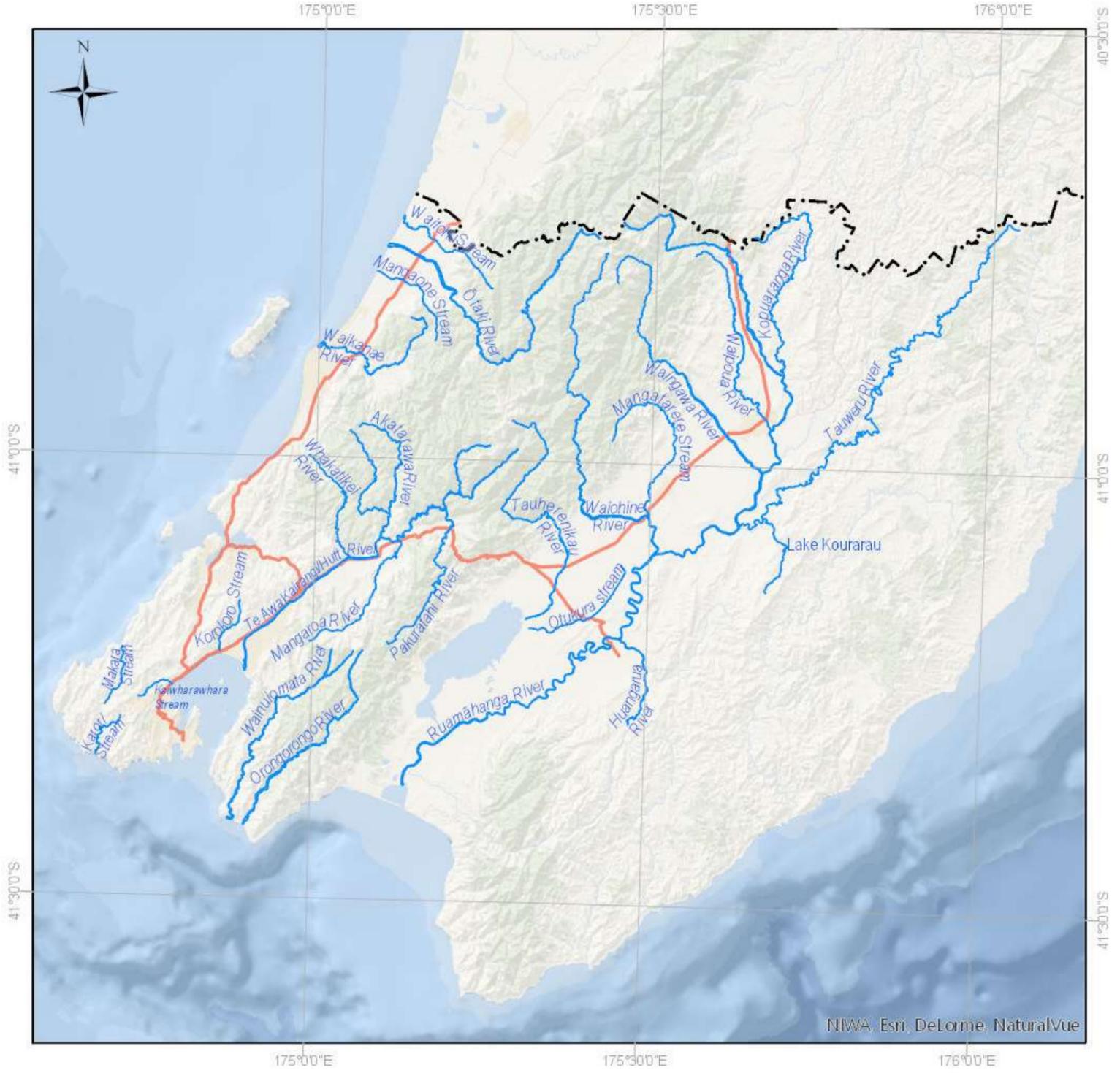


Basemap: World Oceans Base
Projection: NZTM 2000



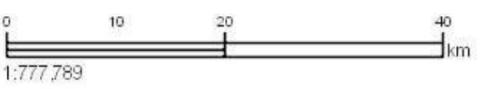
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Appendix 4: Updated trout fishery rivers



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- Trout fishery river
- State Highway
- Region boundary line



Basemap: World Oceans Base
Projection: NZTM 2000

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