IN THE ENVIRONMENT COURT OF NEW ZEALAND
AUCKLAND REGISTRY

I TE KŌTI TAIAO O AOTEAROA
TĀMAKI MAKAURAU ROHE

IN THE MATTER	**of the Resource Management Act 1991**
AND	**of appeals under clause 14 of Schedule 1 of the Act**
BETWEEN	**CEP SERVICES MATAUWHI LIMITED**
	ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INCORPORATED
	MANGAWHAI HARBOUR RESTORATION SOCIETY INCORPORATED
	NEW ZEALAND REFINING COMPANY LIMITED
	Appellants
AND	**NORTHLAND REGIONAL COUNCIL**
	Respondent

DR ROBERT MARK BELLINGHAM
EVIDENCE IN CHIEF
INDIGENOUS BIODIVERSITY MAPPING – HOKIANGA HARBOUR

TOPIC 11: BIODIVERSITY
16 OCTOBER 2020

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Introduction

1. My full name is Robert Mark Bellingham.

2. I am a Principal Ecologist with Ecology New Zealand Ltd.

Qualifications and Experience

3. I am an accredited Ecology Specialist with the EIANZ's[1] Certified Environmental Practitioner Scheme. I hold a PhD in Conservation Planning from Auckland University and I am a full member of the New Zealand Planning Institute. I have been a practicing ecological and planning consultant for over 30 years. My practice area has mainly been in the upper North Island, particularly Northland, Auckland, Waikato and Bay of Plenty.

4. I have appeared as an ecologist and planner before the Planning Tribunal, Environment Court and council plan reviews since 1986.

5. I was the ecological and planning witness in *MacRae v Mangonui County 1986* that determined criteria for the identification of the inland extent of the coastal environment, before Judge Turner in the Planning Tribunal.

6. The most recent major cases where I have appeared have been before the Independent Hearings Panel for the Auckland Unitary Plan, and then the Environment Court appeals on Rural Subdivision in the Auckland Unitary Plan as a planning and an ecology expert witness.

7. I have assessed Significant Natural Areas (SNAs) for the Rodney District Council's Rodney Plan 2000 and I have assessed many additional sites in Auckland Region that have potentially met the SNA criteria through ecological restoration and regeneration of natural areas. I initiated the DOC Threatened Species assessment

[1] Environment Institute of Australia and New Zealand

process when I was employed as Royal Forest & Bird Protection Society's Senior Planner in Wellington in 1990 and provided advice to DOC on these matters.

8. I have also lectured in Environmental Planning at Auckland and Massey Universities. I have served on the Ministerial Advisory Committees for the Review of Protected Area Legislation (1989-90) Oceans Policy (2002-4), and as an Auckland Regional Councillor.

Code of Conduct

9. I have read and agree to comply with the Environment Court's Expert Witness Code of Conduct (Consolidated Practice Note 2012). This evidence is within my area of expertise, except where I state that I am relying on the evidence of other experts. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of evidence

8. In my evidence I address the following issues:

   a) The criteria used for identifying Significant Ecological Areas (SEAs) in the Proposed Northland Regional Plan (PNRP);

   b) The ecological survey information that was not used in NRC's SEA assessment of areas on Hokianga Harbour; and

   c) Whether any additional areas qualify as SEAs on Hokianga Harbour, when assessed against the plan criteria.

Significant Ecological Area Criteria for the Proposed Northland Regional Plan

9. The Regional Policy Statement for Northland (RPS) sets out criteria for assessing ecological significance in Appendix 5 of the RPS (operative 9 May 2016) and states that a site is ecologically significant if it meets one of the four criteria, and by doing so meets s.6(c) of the Act as significant indigenous vegetation or significant habitat of indigenous fauna.

10. The four criteria are: 1. Representativeness, 2. Rarity / distinctiveness, 3. Diversity and pattern, and 4. Ecological context. Each of these criteria are divided into sub-criteria.

11. The criteria are absolute and without degree. There is no ranking system or any requirement for a site to meet any combination of the criteria. According to the RPS, if a site meets any one of the sub-criteria it is ecologically significant.

12. The methodology for defining and identifying SEAs around the Northland coast in the PNRP are outlined in the Council report "Methodology Report Mapping of significant ecological areas in Northland Prepared by Vince Kerr, Kerr & Associates, January 4, 2016." This report developed a mapping system for "*Northland Regional Council's coastal management area for the identification of significant ecological marine areas (SEAs)*."[2] I have read this report and the reports on the SEAs and maps, and it is not clear to me whether the marine SEAs mapped are those SEAs entirely within the CMA, or whether they include SEAs that are in the CMA and extend into the coastal environment as intended by Policy D.2.16 Managing adverse effects on indigenous biodiversity:

> *Manage the adverse effects of activities on indigenous biodiversity by:*
>
> *1)* ***in the coastal environment****:*
>
> *a) avoiding adverse effects on:*

[2] Pg. 2, para. 1

i. indigenous taxa that are listed as Threatened or At Risk in the New Zealand Threat Classification System lists, and

ii. areas of indigenous vegetation and habitats of indigenous fauna that are assessed as significant using the assessment criteria in Appendix 5 of the Regional Policy Statement,

13. RPS method 4.4.3(1) states that the regional plan is to implement RPS Appendix 5 "*for water bodies (including wetlands), in, on or under the beds of rivers or lakes, and in the CMA*". "Wetlands" are defined in the RMA and in the Hokianga Harbour wetlands within the CMA includes mangroves, salt marsh and some of the brackish marshes. The maintenance of the indigenous biodiversity of the brackish marshes and adjoining freshwater wetlands above MHWS are specifically a function of the regional council under s.30(1)(c)(iiia) and (ga). It appears that the Regional Plan only addresses biodiversity in selected parts of the CMA.

14. Mr Kerr's methodology report refers to SEAs mapped in the PNRP as "marine SEA" and this raises the issue of whether anyone actually assessed the coastal parts of the CMA or non-CMA parts of water bodies, wetlands, rivers and lakes, as required by RPS method 4.4.3(1).

15. A further complication with this methodology report is that it proposes Significant Bird Areas (SBAs). I cannot discern whether these SBAs are a subset of SEAs or an equivalent set of significant areas. Also there is no clarity as to when a SEA becomes a SBA, whether this is based on the extent of significant indigenous vegetation of bird habitat in the area being assessed, or the highest relative weighting of the SEA criteria for a potential significant bird area or potential SEA (non-bird) area.

PNRP mapped SEA Areas in Hokianga Harbour

16. The PNAP SEA maps only show an area around the Hokianga Harbour entrance up to Koutu Point and Kawehitiki Point, and the online maps include the assessment sheet for this area: Hokianga Harbour Entrance and Lower Harbour Marine Values. I agree that this area meets the SEA criteria.

17. Hokianga Harbour has one SBA area in the lower harbour that covers the same area as the mapped SEA. But there are species on the assessment sheet attached to this area that do not occur in the area mapped. These species are Australasian bittern, fernbird, banded rail and spotless crake, which are found in mangroves, salt marsh and brackish marsh further up the harbour and these ecosystems are absent from the lower harbour SBA shaded on the PNRP maps.

18. The assessment sheet for the five SBAs (harbour inlet SBAs) in the middle and upper harbour is the same as that for the lower harbour, it does not denote those species that occur in the lower harbour SBA as opposed to those species that occur in the harbour inlet SBAs. The assessment sheet does describe species that meet the SEA/ SBA criteria that occur on the tidal flats of the harbour e.g. white heron, red-billed gull, Caspian tern, pied stilt, white-fronted tern, eastern bar-tailed godwit and variable oystercatcher. These species all trigger the SEA/SBA criteria, but do not occur in the SBAs on the PNRP maps.

Report on Potential SEA Areas in Hokianga Harbour

14. I have surveyed wildlife habitat in all of Northland's large harbours from 1981 to the present. I have carried out ecological surveys of indigenous vegetation, indigenous fauna and fauna habitat on Hokianga Harbour since 1982, when the entire harbour was surveyed for wildlife and wildlife habitats for the NZ Wildlife Service (NZWS) and

a draft report was prepared for the NZWS. This was referenced by Mr Kerr in a DOC report in 2001.[3]

15. The authors of the 1984 NZWS report, Alison Davis and myself, have continued updating wildlife habitat surveys on Hokianga Harbour and have proposed a major resurvey of the harbour next year with Te Rarawa hapu.

16. In November 2019 I prepared a report for CEP Services assessing potential SEA in Hokianga Harbour (attached at Appendix 1). My report uses the 1984 data (with minor additions) that has been inputted into GIS for mapping and analysis. I subsequently provided the GIS data to NRC.

17. Hokianga Harbour was provisionally assessed by the NZWS as a high value wildlife habitat as it has the largest areas of tall mangrove forest in New Zealand (trees up to 15m high and 1m diameter at the base) and large intact sequences of mangrove forest, mangrove shrubland, saltmarsh, and brackish marsh transitioning into freshwater marsh. The harbour has the largest population of the At-Risk[4] banded rail in New Zealand, due to the large habitat area available, and significant populations of the nationally critical Australasian bittern and At-Risk North Island fernbird.

18. My recent mapping has revealed that most of the vegetated tidal areas I identified as potential SEA in the attached report have changed very little since 1982 when the NZWS survey started. This has been tracked through aerial photos used in 1982, with topographic maps from that time, to the latest aerial imagery available. Less than 2% change has occurred to wetlands within the coastal environment of this harbour over the past 40 years and no net loss of wetlands. This is remarkable in itself, when compared to estuaries on the east coast of Northland and most estuaries throughout New Zealand.

[3] R.J. Davidson: V. Kerr. Habitats and Ecological Values of Hokianga Harbour. A **report** to Northland Conservancy, Department of Conservation, Sept, 2001.

[4] **Conservation status of New Zealand birds, 2016.** Hugh A. Robertson, Karen Baird, John E. Dowding, Graeme P. Elliott, Rodney A. Hitchmough, Colin M. Miskelly, Nikki McArthur, Colin F.J. O'Donnell, Paul M. Sagar, R. Paul Scofield; Graeme A. Taylor. *New Zealand Threat Classification Series 19. 27* p.

19. As noted above I concur with the one rocky reef area around the harbour entrance identified in the NPRP as a SEA. But I do not understand why NRC have not identified significant vegetation sequences and fauna habitat in most of the larger arms of the Hokianga Harbour as SEA.

20. I have read Mr Kerr's evidence for Topic 11 (2 October 2020), that relates to how the SEAs were identified and mapped. The PNRP SEAs cover the Northland CMA. - In my opinion this mapping exercise to include these coastal vegetation and habitat sequences should have included sequences that may have fringing freshwater wetlands, straddling the MHWS and outside the CMA but in the coastal environment. NRC's SEA assessment for the Hokianga Harbour seems to have excluded coastal ecosystems e.g. mangroves, salt and brackish marshes, and contiguous wetlands in the coastal environment on the basis that they are terrestrial ecosystems.

21. Paragraphs 4.1, 4.2 and 9.6 of Mr Kerr's Topic 11 Evidence explain how these areas were left out and these matters are:

    a) The Appendix 5 criteria are not necessarily directly applicable to the marine environment (Paragraphs 4.1 & 4.2 of Mr Kerr's evidence);

    b) Are the marine components of the ecological sequence in question good examples of their type, degraded and of significance size? (Paragraph 9.6 of Mr Kerr's evidence)

    c) What are the catchment values, riparian cover, wetlands and presence of active restoration activity and support by the community? (Paragraph 9.6 of Mr Kerr's evidence)

22. In my experience in developing ecological assessment systems and knowledge of terrestrial and coastal ecosystems, I consider that:

    a) the Appendix 5 criteria are applicable to the coastal environment in Northland;

b) In my opinion the coastal and marine components of the Hokianga Harbour and its ecological sequences are exceptional and nationally significant examples of their type, and of significant size.

c) There has been minimal net change in catchment values, riparian cover, and wetlands over the past 40 years, and kaitiaki actively support the protection of the harbour reaches within their rohe.

23. I note that all of the Hokianga Harbour has been identified as high or outstanding natural character in the PNRP. I concur with Ms Collins that high or outstanding natural character can be a reliable indicator of high SEA values also.

24. I have assessed the ecological values of the Hokianga Harbour against the SEA criteria for the PNRP in the table on page 4 of the attached report. I assessed all of the Hokianga Harbour from the available data, and six reaches of the harbour in my opinion clearly meet multiple RPS Appendix 5 criteria and are summarised below.

a) Mangamuka River meets criteria 1(a) i & ii, (b)ii, 2(a) iii (a & c), (b), 3(a & c), 4 (a & b)

b) Waihou Orira Rivers meets criteria 1(a)i, (b) i & ii, 2(a) iii (a & c), (b), 3(a & c), 4 (a & b)

c) Taheke River: meets criteria 1(a) i, (b) i & ii, 2(a) iii (a & c), (b), 3(a & c), 4 (a & b)

d) Tapuwae- Motukaraka: meets criteria 1(a) i, (b) ii, 2(a)iii (a & c), (b), 3(a & c), 4 (a & b)

e) Motuti-Panguru: meets criteria 1(a) i, (b) I & ii, 2(a) iii (a & c), (b), 3(a & c), 4 (a & b)

f) Whirinaki-Oue Rivers meets criteria 1(a) i, (b) ii, 2(a) iii (a & c), (b), 3(a & c), 4 (a & b)

25. I have reviewed the SEA/SBA assessments and background information of these areas, and other harbours in Northland where I have also surveyed indigenous coastal vegetation, indigenous fauna habitat and indigenous wildlife. This includes all of the other Northland west coast estuaries (Herekino, Whangape, North Kaipara), Parengarenga, Houhora, Rangaunu, and Whangarei). Hokianga Harbour is the one

harbour or estuary where in my opinion both the information considered, and the subsequent assessments were seriously deficient.

26. Additionally, I note that in September-October, when flocks of several hundred northern hemisphere migratory birds (bar-tailed godwit, lesser knot and turnstone) are moving through Northland, these species have been recorded on the sandy and silty flats in Hokianga, Herekino and Whangape Harbours, but this has often been overlooked as DOC and the NZ Wildlife Service compared these harbours with the internationally ranked (IUCN criteria) Parengarenga, Rangaunu and Kaipara Harbours where flocks are in the thousands and tens of thousands at times.

27. I have recorded low numbers of the following species on the tidal flats in Hokianga, Herekino and Whangape Harbours.

reef heron	Nationally endangered	Resident on rocky shore and channel edges in the middle section of Hokianga Harbour from Opononi to Rawene
Caspian tern	Nationally vulnerable	Resident in the middle section of Hokianga Harbour from Opononi to Rawene
wrybill	Nationally vulnerable	Sandy flats in winter
South Island pied oystercatcher	At risk - declining	Sandy flats in winter
Red-billed gull	At risk – declining	Resident throughout the year
Eastern bar-tailed godwit	At risk – declining	Higher numbers in September-October, in middle section of Hokianga Harbour from Opononi to Rawene
White-fronted tern	At risk - declining	Resident throughout the year

These species all trigger the Northland RPS SEA criteria.

Summary of evidence

28. Six additional areas have been assessed against the criteria in Appendix 5 for the Northland RPS. The introduction to Appendix 5 clearly states that "*An area of*

indigenous vegetation or habitat(s) of indigenous fauna is significant if it meets one or more of the following criteria". The six areas in the attached report meet a minimum of 10 criteria or sub-criteria in Appendix 5.

29. These six areas (mapped in the attached report), in my experience in assessing natural areas throughout New Zealand are significant ecological areas and I recommend they be added to the Northland Regional Plan as Significant Ecological Areas.

Dated: 16 October 2020

Dr Robert Mark Bellingham

Principal Ecologist – Ecology New Zealand Ltd

MNZPI, PhD (Planning), CEnvP (Ecology Specialist)

Attachment

Areas of significant indigenous vegetation and significant habitats of indigenous fauna in terrestrial, freshwater and marine environments around the Hokianga Harbour, report by Dr Mark Bellingham, November 2019

EB.311

Areas of significant indigenous vegetation and significant habitats of indigenous fauna in terrestrial, freshwater and marine environments around the Hokianga Harbour

Dr Mark Bellingham

PhD, MNZPI, CEnvP Accredited Ecology Specialist

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November 2019

Summary

The middle and upper reaches of the Hokianga Harbour meet the Northland Regional Policy Statement Appendix 5 criteria for significant indigenous vegetation and significant habitats of indigenous fauna for Representativeness, Rarity /Distinctiveness, Diversity and Pattern and Ecological Context. Most of these reaches meet a number of the sub-criteria within these criteria classes. We note that only one criterion needs to be met to qualify as significant vegetation or fauna habitat.

The reaches of the harbour that meet the significant criteria are Mangamuka River, Orira River, Waihou River, Taheke River, Whirinaki River, Tapuwae River and the smaller estuaries between these major rivers in the catchment. Most of the intact sequences of intertidal, brackish and freshwater wetland vegetation, are occupied by wetland bird species typical of these vegetation types and they occupy about 3,500ha of the harbour (attached maps).

The wetland bird species use the indigenous intertidal vegetation as a large continuous habitat area, flying between wetlands across reaches and across the harbour, and to freshwater wetlands not directly connected to the intertidal wetland complex. Importantly it is one of the few major areas of intertidal vegetation and fauna habitat in Northland and probably New Zealand that has shown minimal change in area over the past 30-40 years.

The mangrove forest and shrublands, salt and brackish marshes and connected freshwater wetlands, with fringing terrestrial forests and shrublands are the habitat of a nationally significant population of the banded rail (*Gallirallus philippensis assimilis*)[1]. This species is classified as At Risk-Declining in the Department of Conservation's most recent review of the threatened status of New Zealand birds (2016)[2]. The Hokianga Harbour population is second in habitat area and numbers only to the banded rail habitat area and numbers on the Kaipara Harbour. The banded rail population for the Hokianga Harbour is estimated to be approximately 2,300 birds.

The harbour is also significant for the presence of the following threatened bird species:

- Australasian bittern *Botaurus poiciloptilus* is classified as Nationally Critical as it continues to decline throughout the country. It is found throughout the mangrove forest and shrublands, salt and brackish marshes and connected freshwater wetlands in the harbour catchment. Bittern move between freshwater and intertidal habitat around the harbour and probably occupy 30-40ha of wetland habitat per pair (DOC are confirming bittern home range estimates from the Whangamarino wetland with estimates from the late 1970s).
- North Island fernbird *Bowdleria punctata vealeae* is found in mangrove shrublands, brackish marshes and connected freshwater wetlands in the harbour catchment. This species is classified as At Risk-Declining.
- Spotless crake *Porzana tabuensis tabuensis* are found in the upper reaches of brackish and freshwater marsh throughout the harbour, whereas marsh crake *Porzana pusilla affinis* are found in brackish and

[1] Bellingham M. 2013. Banded rail. *In* Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz

[2] Conservation status of New Zealand birds, 2016 Robertson et al. Dept of Conservation https://www.doc.govt.nz/Documents/science-and-technical/nztcs19entire.pdf

salt marshes in a few localities. Both of these species are classified as At Risk-Declining, and the marsh crake is uncommon in Northland and the upper North Island.

The 35 year ecological dataset available for the Hokianga Harbour provides an insight into the nationally significant coastal vegetation and fauna habitat on that harbour. The large wetland wildlife populations, diversity of indigenous vegetation, ecosystems types and habitats provide data for species that occur on a number of other Northland estuaries.

Methods

The data used for this analysis comes originally from the 1982-83 NZ Wildlife Service survey of the Hokianga Harbour (Bellingham & Davis 1984)[3].

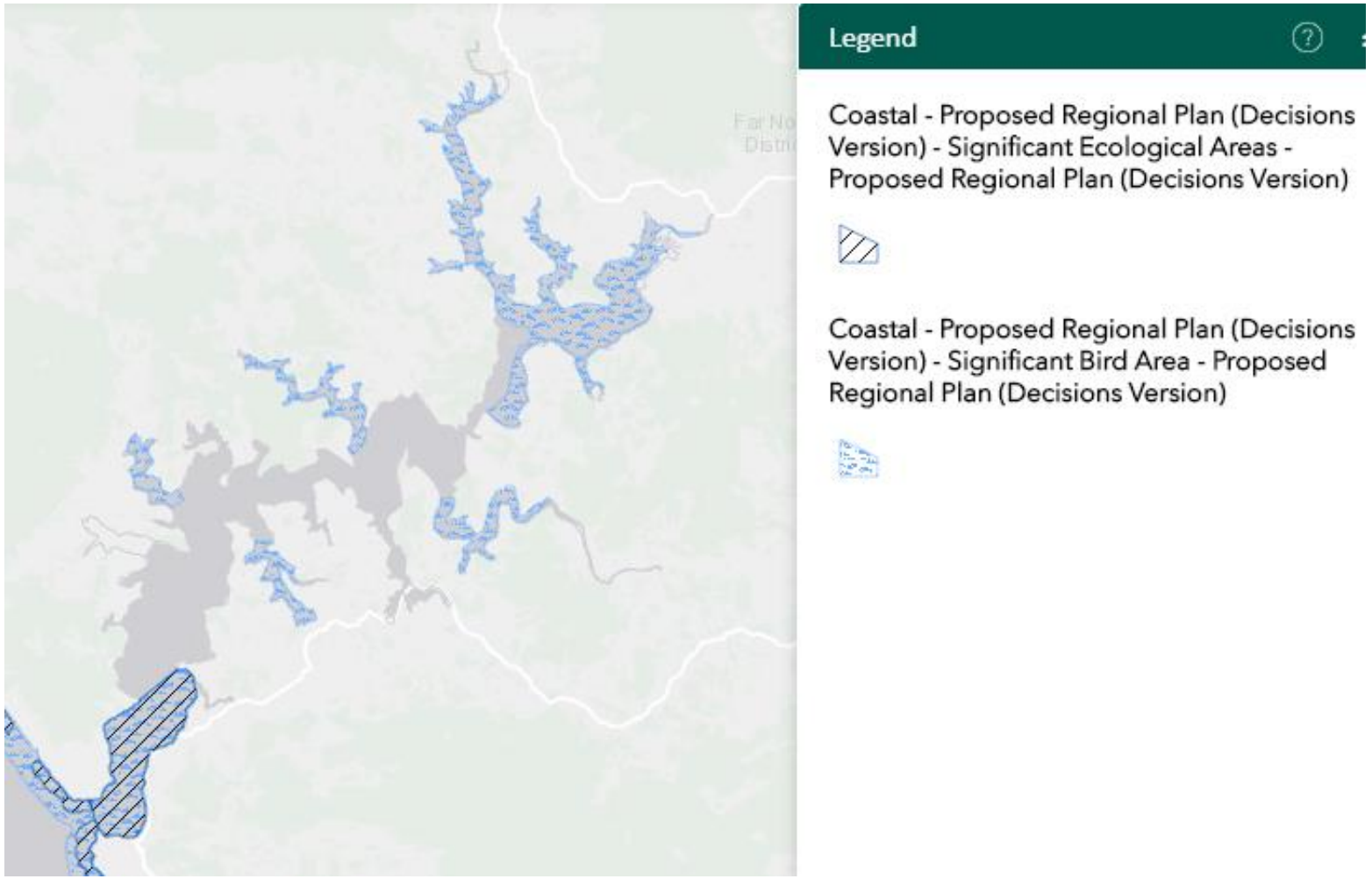
The data from that survey has been further analysed using ARCGIS with additional data from surveys of other harbours in Northland and Auckland, and some minor resurveying of transects from the 1982-83 NZ Wildlife Service survey.

Estimates of banded rail home ranges come from a number of harbour surveys of wildlife habitat and estuarine vegetation in the Bay of Plenty, Coromandel, Southern Kaipara Harbour and Northland Harbours (Parengarenga, Houhora, Rangaunu, Herekino, Whangape, Hokianga, Whangarei and Mangawhai). This has been supplemented by intensive surveys of rail home ranges on Hokianga, Southern Kaipara, Whangamata, and Ohiwa Harbours, which are all mangrove/saltmarsh habitat areas, where rail home ranges are 2.5-2.75ha/pair and home range estimates from Nelson & Marlborough salt marshes where rail home ranges are 3.7ha/pair (Elliot ??).

[3] Davis, A.; Bellingham, M. 1984. Hokianga Harbour Wildlife survey. Wellington: Unpublished report of the New Zealand Wildlife Service, Department of Internal Affairs. 127 pp and appendices.

Coastal Overlays- Proposed Regional Plan (Decisions Version)

The Proposed Regional Plan Significant Ecological Areas only include the harbour entrance to Koutu Point and the Significant Bird Areas cover a few of the larger reaches of the harbour. The assessment for the Significant Bird Areas does not appear to have included the data from the most intensive wildlife, wildlife habitat and intertidal-brackish-freshwater wetland survey of this large harbour by the NZ Wildlife Service in 1982-83 (Bellingham & Davis 1984).



Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

SNA Criteria

The criteria for significant natural areas (SNAs) are explained in Appendix 5 of the Northland Regional Policy Statement and they have been reassessed using the complete dataset for the Hokianga Harbour from the data from NZ Wildlife Service's wildlife, wildlife habitat and intertidal-brackish-freshwater wetland survey and additional data gathered up until 2011.

	Mangamuka River	Waihou Orira Rivers	Taheke River	Tapuwae-Motukaraka	Motuti-Panguru	Whirinaki-Oue Rivers
1. **Representativeness** a) Regardless of its size, the ecological site is largely indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity at the relevant and recognised ecological classification and scale to which the ecological site belongs:		Most intact mangrove-salt marsh-brackish-freshwater marsh sequence in NZ				
i. If the ecological site comprises largely indigenous vegetation types; and	√	√	√	√	√	√
ii. Is typical of what would have existed circa 1840; or		√				
iii. Is represented by faunal assemblages in most of the guilds expected for the habitat type; or	√	√	√	√	√	√
(b) The ecological site						
i. Is a large example of indigenous vegetation or habitat of indigenous fauna, or		√	√	√	√	
ii. Contains a combination of landform and indigenous vegetation and habitat of indigenous fauna, that is considered to be a good example of its type at the relevant and	√	√	√	√	√	√

	Mangamuka River	Waihou Orira Rivers	Taheke River	Tapuwae-Motukaraka	Motuti-Panguru	Whirinaki-Oue Rivers
recognised ecological classification and scale.						
2**. Rarity / distinctiveness**						
(a) The ecological site comprises indigenous ecosystems or indigenous vegetation types that:						
i. Are either Acutely or Chronically Threatened land environments associated with LENZ Level 4); or						
ii. Excluding wetlands, are now less than 20% of their original extent; or						
iii. Excluding man made wetlands, are examples of the wetland classes that either otherwise trigger Appendix 5 criteria or exceed any of the following area thresholds (boundaries defined by Landcare delineation tool);	√	√	√	√	√	√
a) Saltmarsh greater than 0.5 hectare in area; or	√	√	√	√		
b) Shallow water (lake margins and rivers) greater than 0.5 hectare in area; or						
c) Swamp greater than 0.4 hectare in area; or	√	√	√	√		√
d) Bog greater than 0.2 hectare in area; or						
e) Wet Heathlands greater than 0.2 hectare in area; or						
f) Marsh; Fen; Ephemeral wetlands or Seepage / flush greater than 0.05 hectares in area.						
(b) Indigenous vegetation or habitat of indigenous fauna that supports one or more	Brown teal	Australasian bittern	Australasian bittern	Australasian bittern	Australasian bittern	Australasian bittern

Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

	Mangamuka River	Waihou Orira Rivers	Taheke River	Tapuwae-Motukaraka	Motuti-Panguru	Whirinaki-Oue Rivers
indigenous taxa that are threatened, at risk, data deficient or uncommon, either nationally or at the relevant ecological scale.	Australasian bittern Banded rail NI fernbird Spotless crake	Banded rail NI fernbird Spotless crake Marsh crake	Banded rail NI fernbird Spotless crake	Banded rail NI fernbird Spotless crake	Banded rail NI fernbird Spotless crake Marsh crake	Banded rail NI fernbird Spotless crake
(c) The ecological site contains indigenous vegetation or an indigenous taxon that is: i. Endemic to the Northland-Auckland region; or ii. At its distributional limit within the Northland region;						
(d) The ecological site contains indigenous vegetation or an association of indigenous taxa that:						
i. Is distinctive of a restricted occurrence; or						
ii. Is part of an ecological unit that occurs on an originally rare ecosystem; or						
iii. Is an indigenous ecosystem and vegetation type that is naturally rare or has developed as a result of an unusual environmental factor(s) that occur or are likely to occur in Northland; or						
iv. Is an example of nationally or regionally rare habitat as recognised in the New Zealand Marine Protected Areas Policy.						
3. Diversity and pattern						
(a) Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of:						
i. Indigenous ecosystem or habitat types; or	√	√	√	√	√	√

Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

	Mangamuka River	Waihou Orira Rivers	Taheke River	Tapuwae-Motukaraka	Motuti-Panguru	Whirinaki-Oue Rivers
ii. ii. Indigenous taxa;						
(b) Changes in taxon composition reflecting the existence of diverse natural features or ecological gradients; or						
(c) Intact ecological sequences.	√	√	√	√	√	√
4. Ecological context						
(a) Indigenous vegetation or habitat of indigenous fauna is present that provides or contributes to an important ecological linkage or network, or provides an important buffering function; or	√	√	√	√	√	√
(b) The ecological site plays an important hydrological, biological or ecological role in the natural functioning of riverine, lacustrine, palustrine, estuarine, plutonic (including karst), geothermal or marine system; or		√	√	√		√
(c) The ecological site is an important habitat for critical life history stages of indigenous fauna including breeding / spawning, roosting, nesting, resting, feeding, moulting, refugia or migration staging point (as used seasonally, temporarily or permanently).						

The widespread occurrence of threatened wetland bird species (Australasian bittern, banded rail, marsh and spotless crake, and North island fernbird) throughout the middle and upper reaches of the harbour and the extensive interconnected mangrove, salt and brackish marshes and freshwater marshes, often fringed with indigenous forests and shrubland, led us to recognise the middle and upper harbour as one large inter-connected wildlife habitat. Further survey work on the harbour and resurvey of selected areas has reinforced this assessment from 1984.

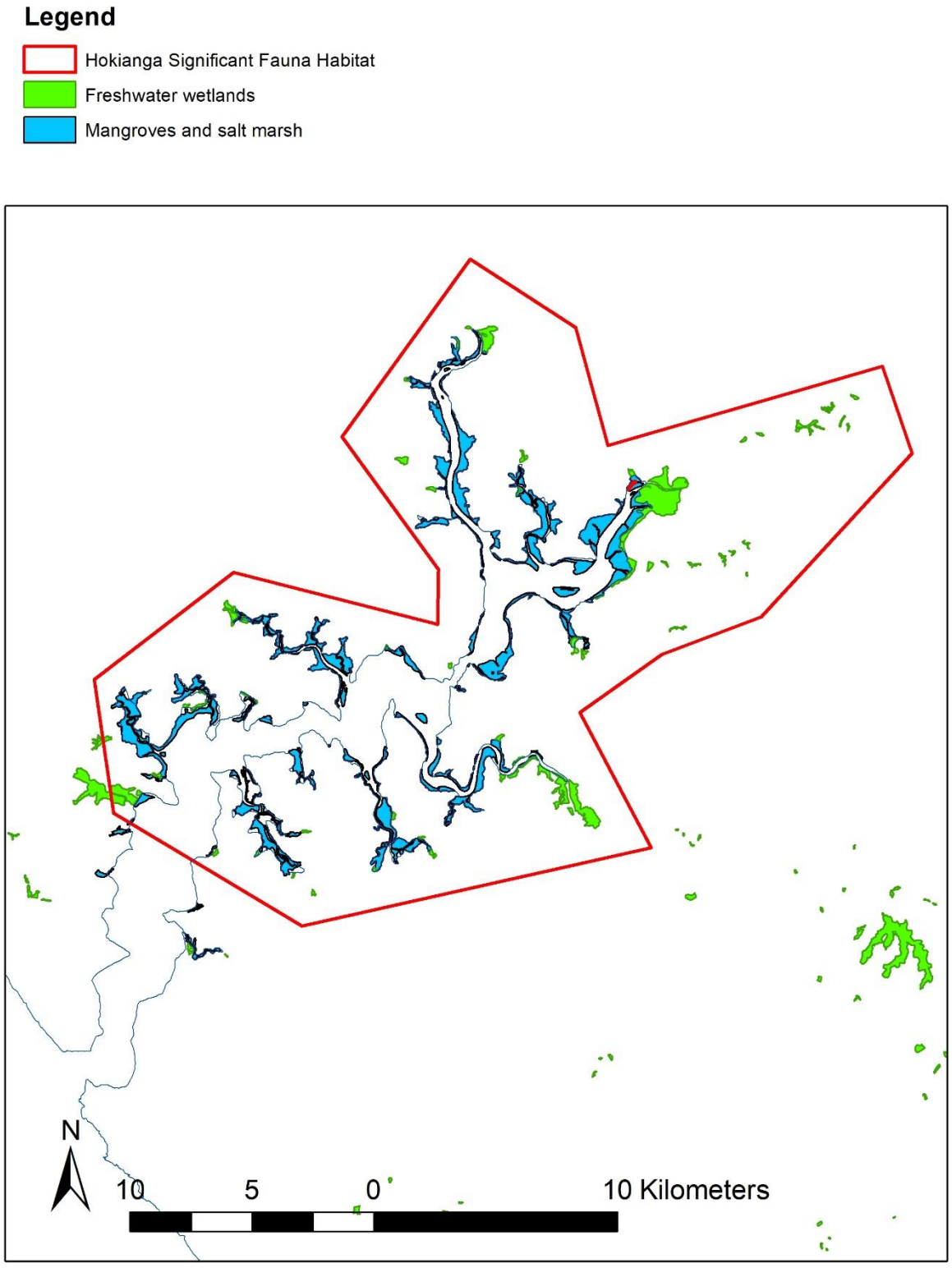
Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

Legend

- ▲ Banded_rail
- ✚ NI fernbird
- ★ Australasian bittern
- ⬟ Marsh crake
- ● Spotless crake
- Freshwater wetlands
- Mangroves and salt marsh

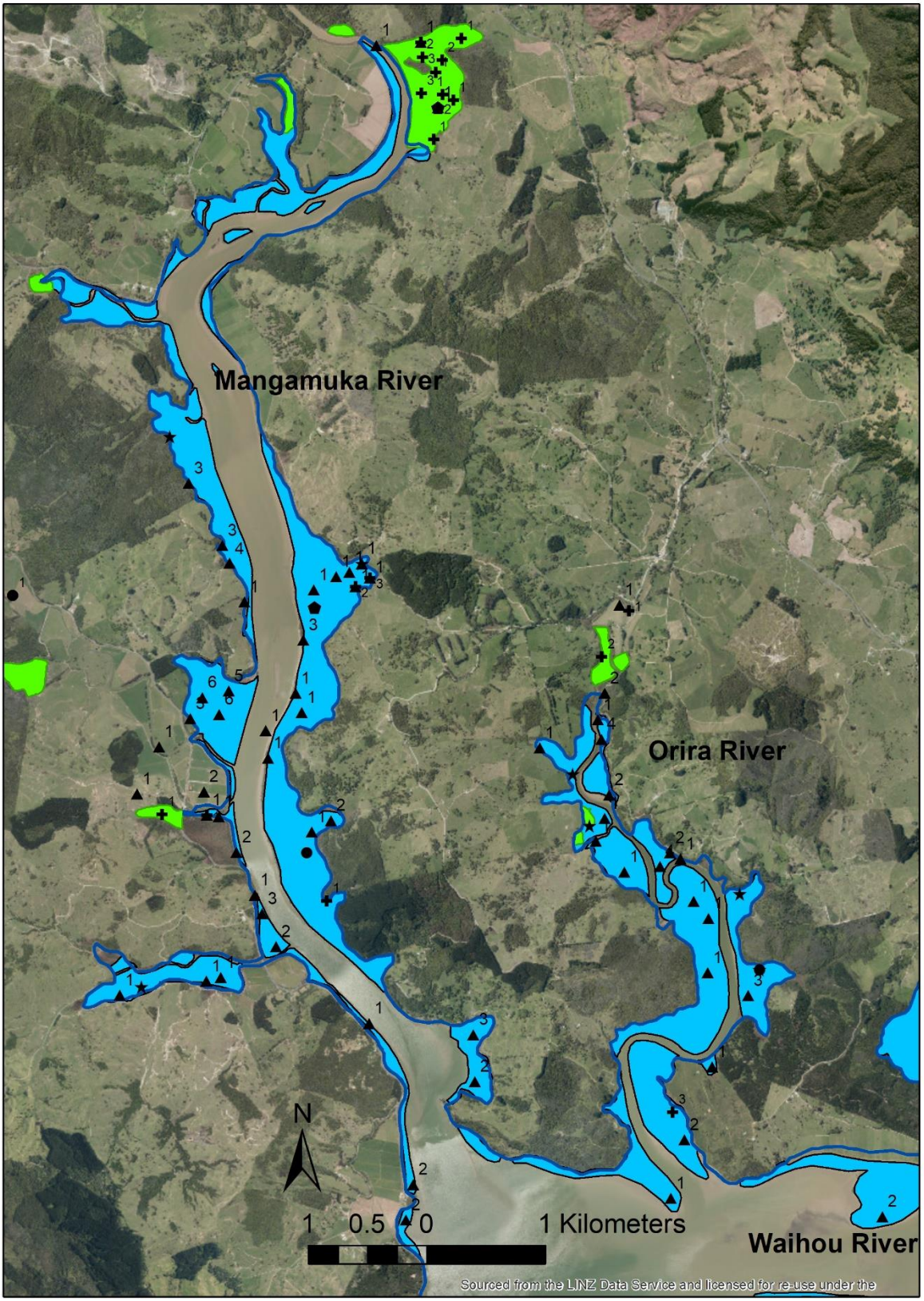
Note: Numbers 1 - 6 beside species symbols indicate number of observations of that species at that location

Hokianga Harbour Intertidal Significant Vegetation and Fauna Habitat



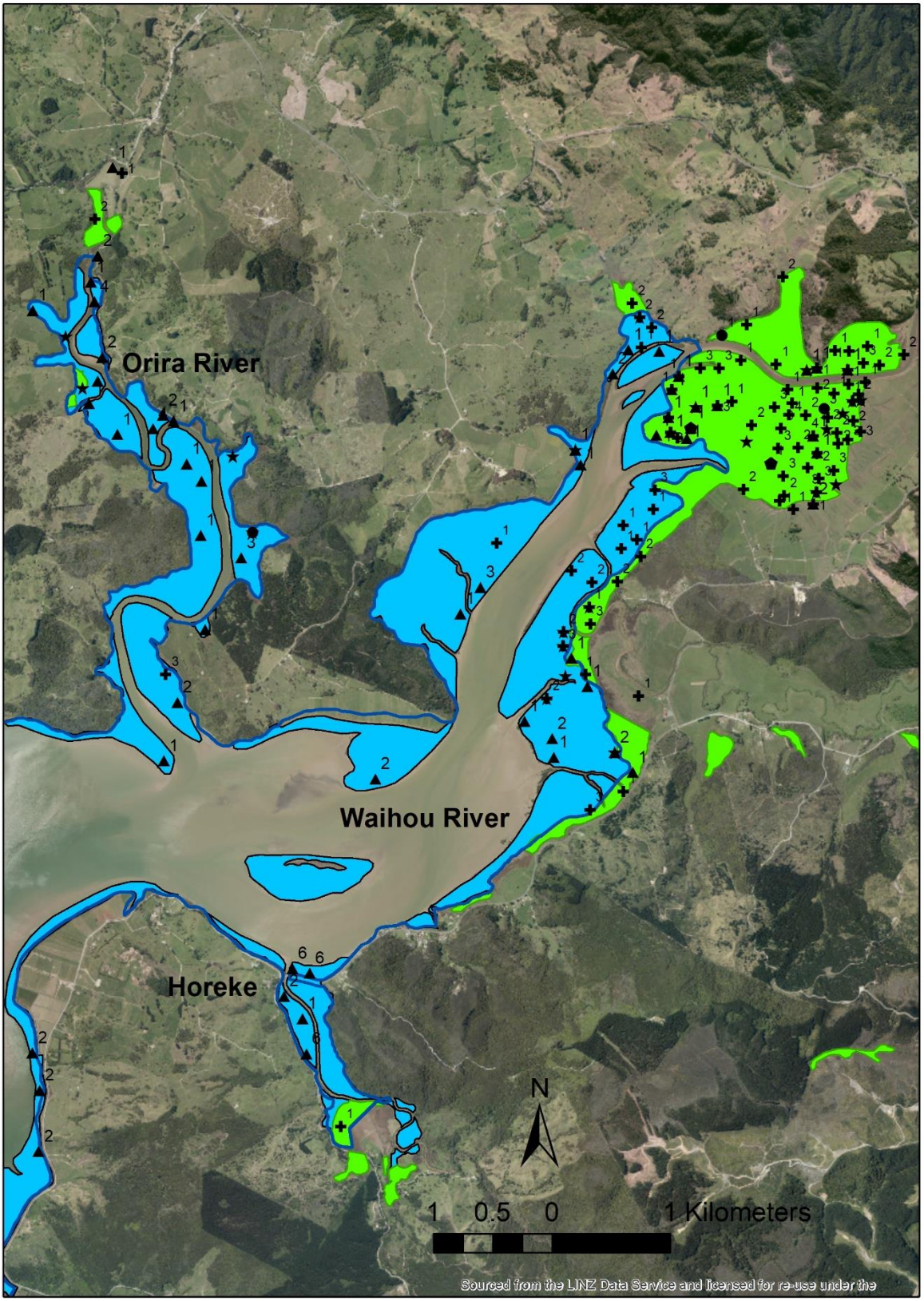
Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

Mangamuka River



Significant indigenous vegetation and significant habitats of indigenous fauna on Hokianga Harbour Nov 2019, M Bellingham, Aristos Consultants Ltd

Orira & Waihou Rivers



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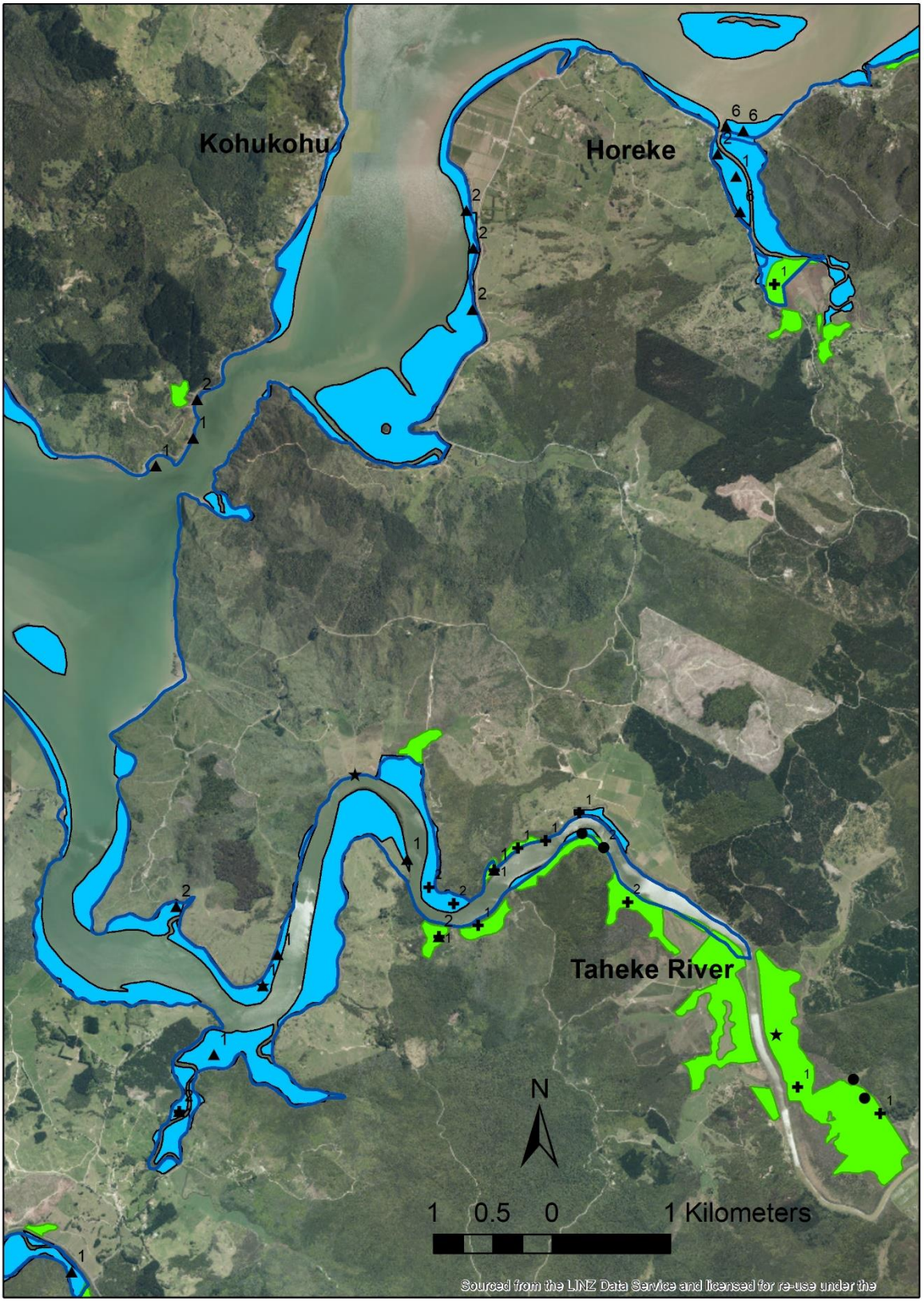
Horeke toTaheke River



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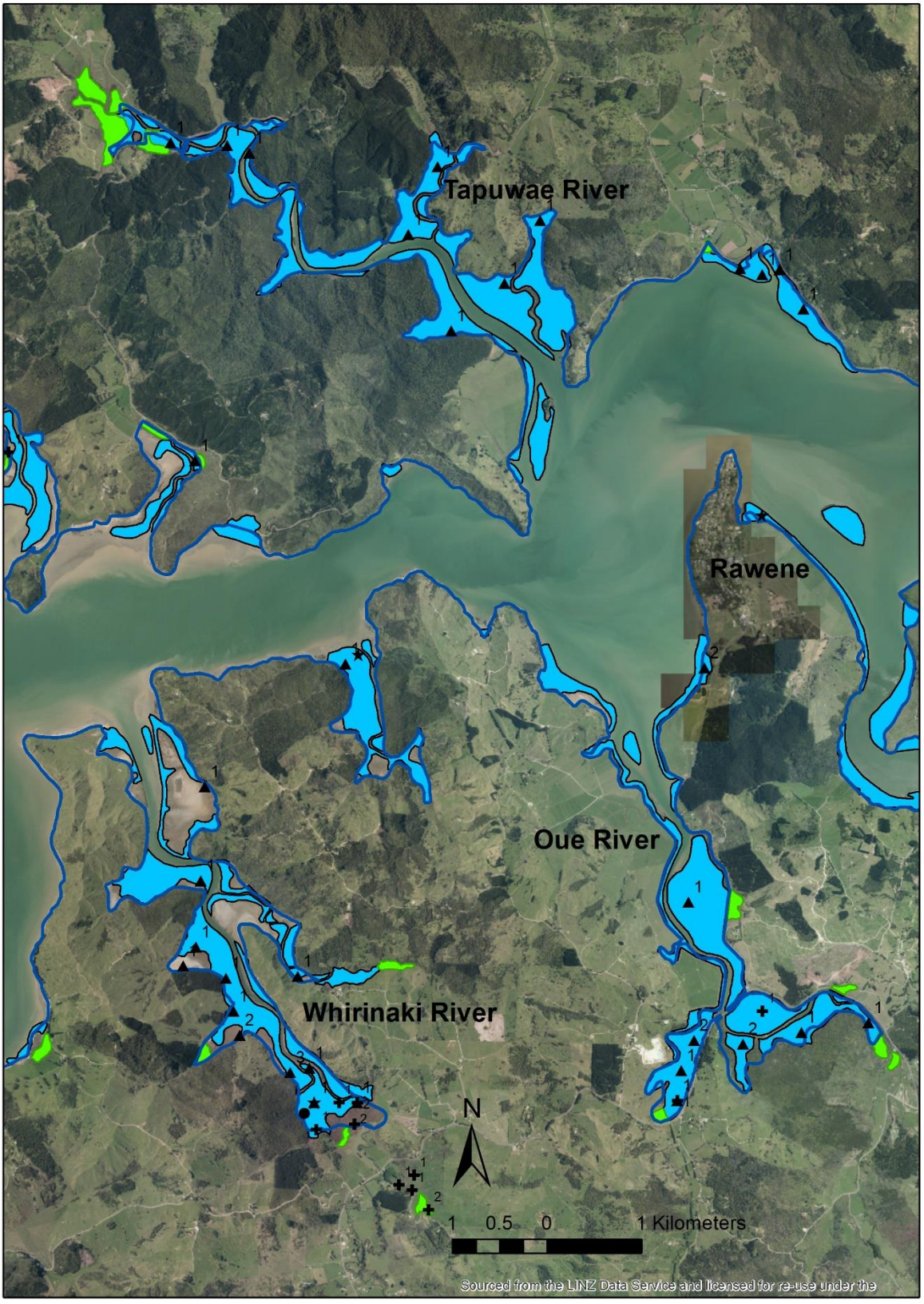
Tapuwae, Oue & Whirinaki Rivers



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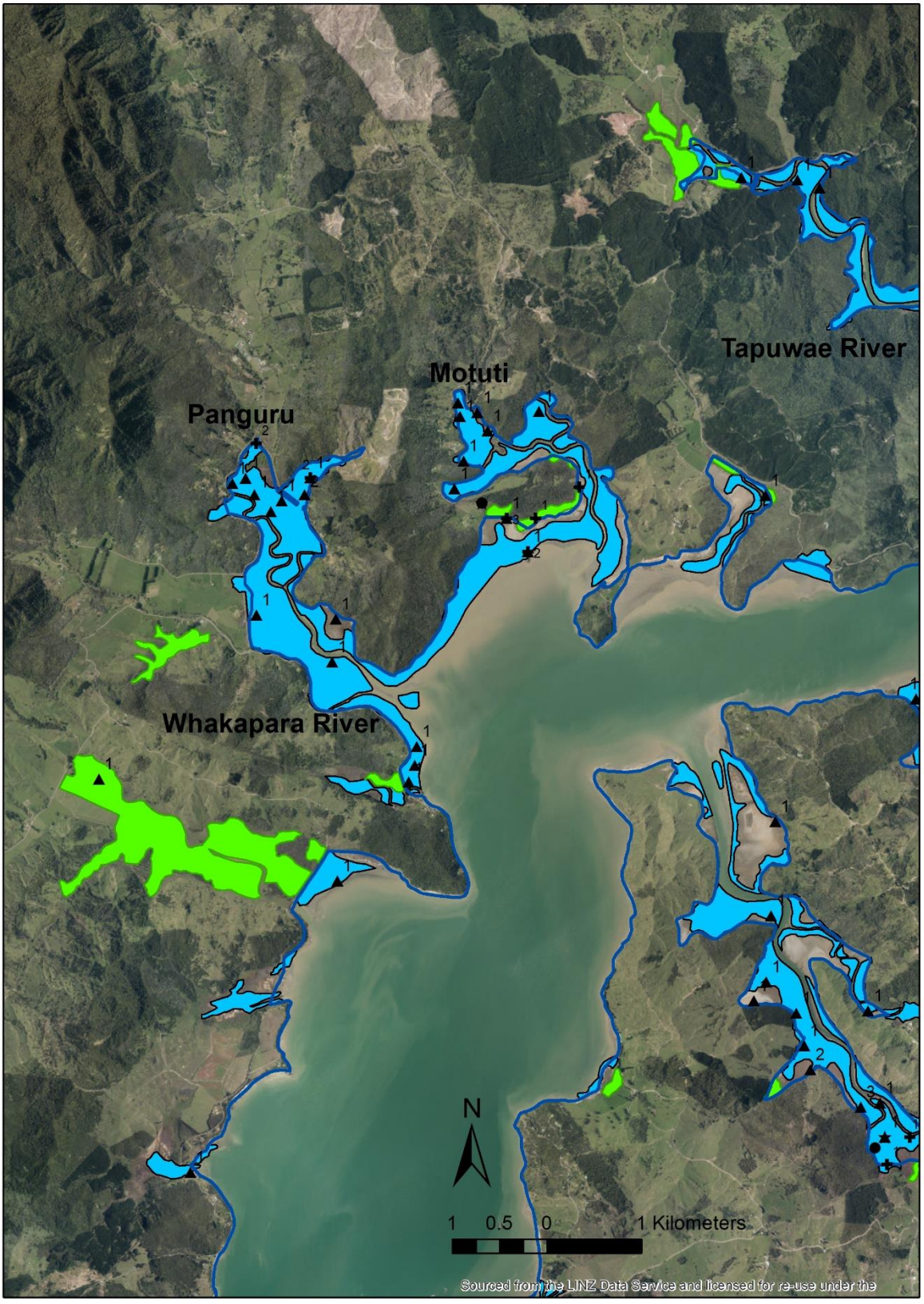
Whakapara River & Motuti Estuary



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