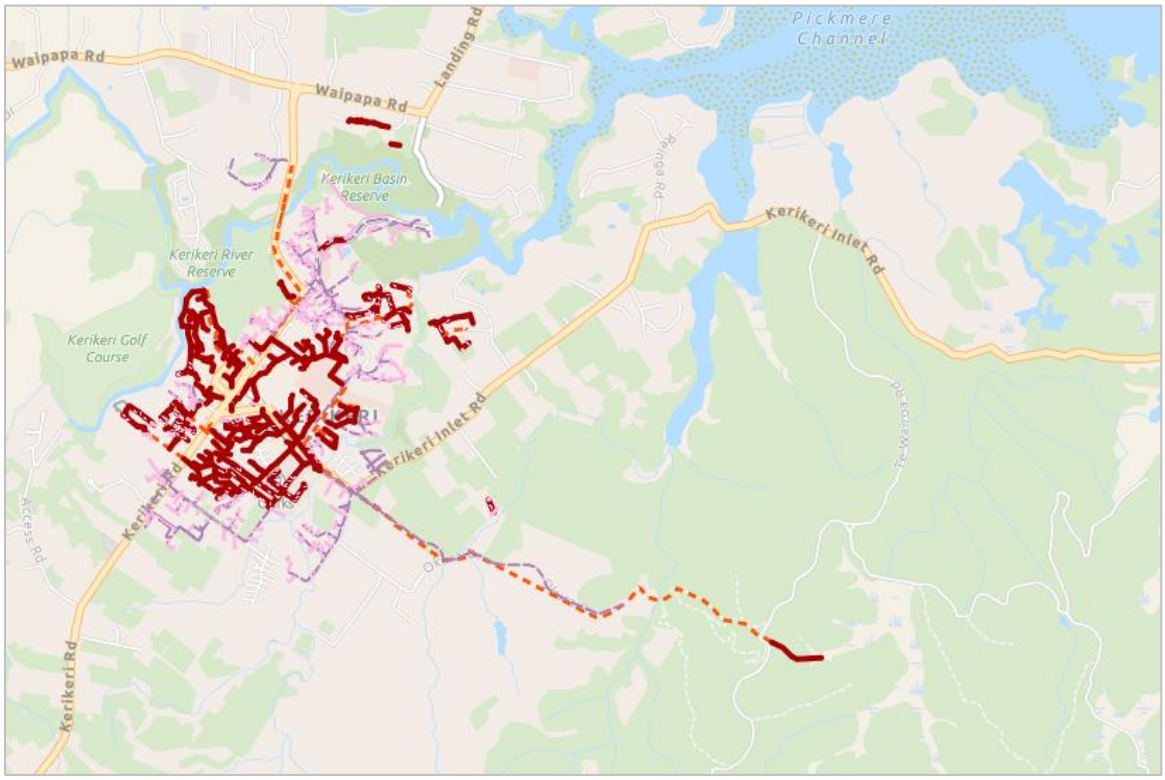
MAPS OF WASTEWATER DISCHARGE AREA - WAITANGI WETLANDS COMPLEX

Figure 1 shows the location of the discharge point of Kerikeri wastewater treatment plant (WWTP) in the Waitangi Wetlands, to the east of Kerikeri.

Figure 1: FNDC wastewater services map - Kerikeri WWTP outlet in Waitangi Wetlands



Source: FNDC Far North Atlas map – water services tab:
https://experience.arcgis.com/experience/df5f99f47450498f978166472b3500eb/page/Page?views=Water-services

The *Waitangi Wetland Complex* is an extensive area of wetlands linked by waterways and floodways, shown in Figure 2. The northern end drains into the Kerikeri Inlet.

The *Waitangi Wetland Complex* has high ecological values –

- Mapped as one of the top 30 wetlands in Northland (assessed by Wildlands Consultants for NRC Wetland Biodiversity mapping).[1]
- The main wetland areas are protected areas (Figure 3); and mapped as Protected Natural Areas (PNA) in DOC surveys.[2]
- The wetland close to the Kerikeri WWTP discharge pipe is protected by a DOC covenant (Figure 3).
- The wetlands contain mapped areas of Northland mudfish (Figure 3), an indigenous species classed as *threatened* under the NZ Threat Classification System. This species occurs only in a small area of Northland.
- The wetlands are a 'significant area' under the Regional Policy Statement Appendix 5 criteria – due to the size and type of wetlands and habitat for *threatened* and *at risk* indigenous species.

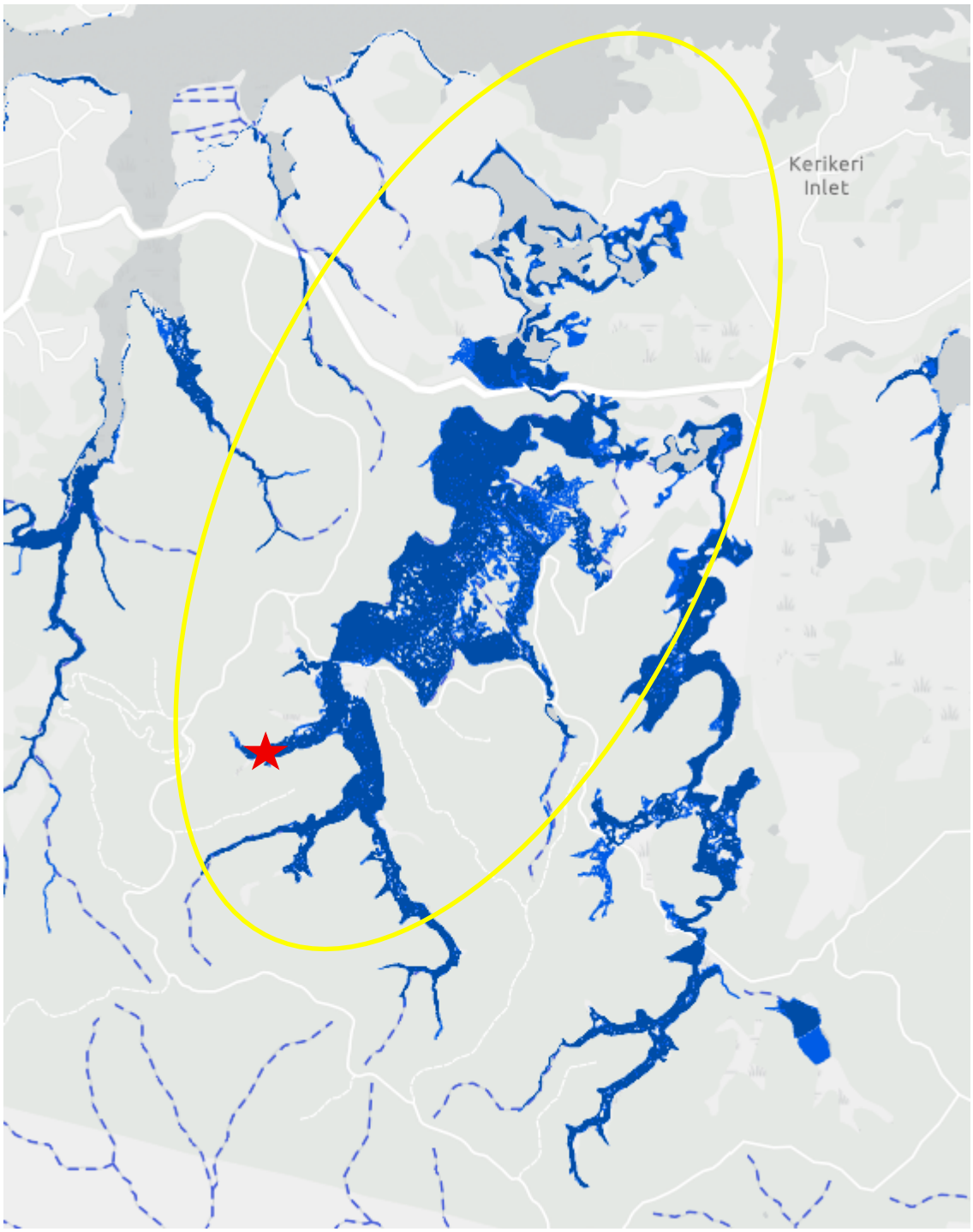
[1] NRC Biodiversity Wetlands map:
https://localmaps.nrc.govt.nz/localmapsviewer/?map=55bdd943767a493587323fc025b1335c

[2] FNDC Far North Atlas map - natural environment tab:
https://experience.arcgis.com/experience/df5f99f47450498f978166472b3500eb/page/Page?views=Legend%2CNaturalenvironment

Figure 2: Wastewater drainage area in Waitangi Wetland Complex during heavy rain

NRC river flood hazard 10 to 50-year extent

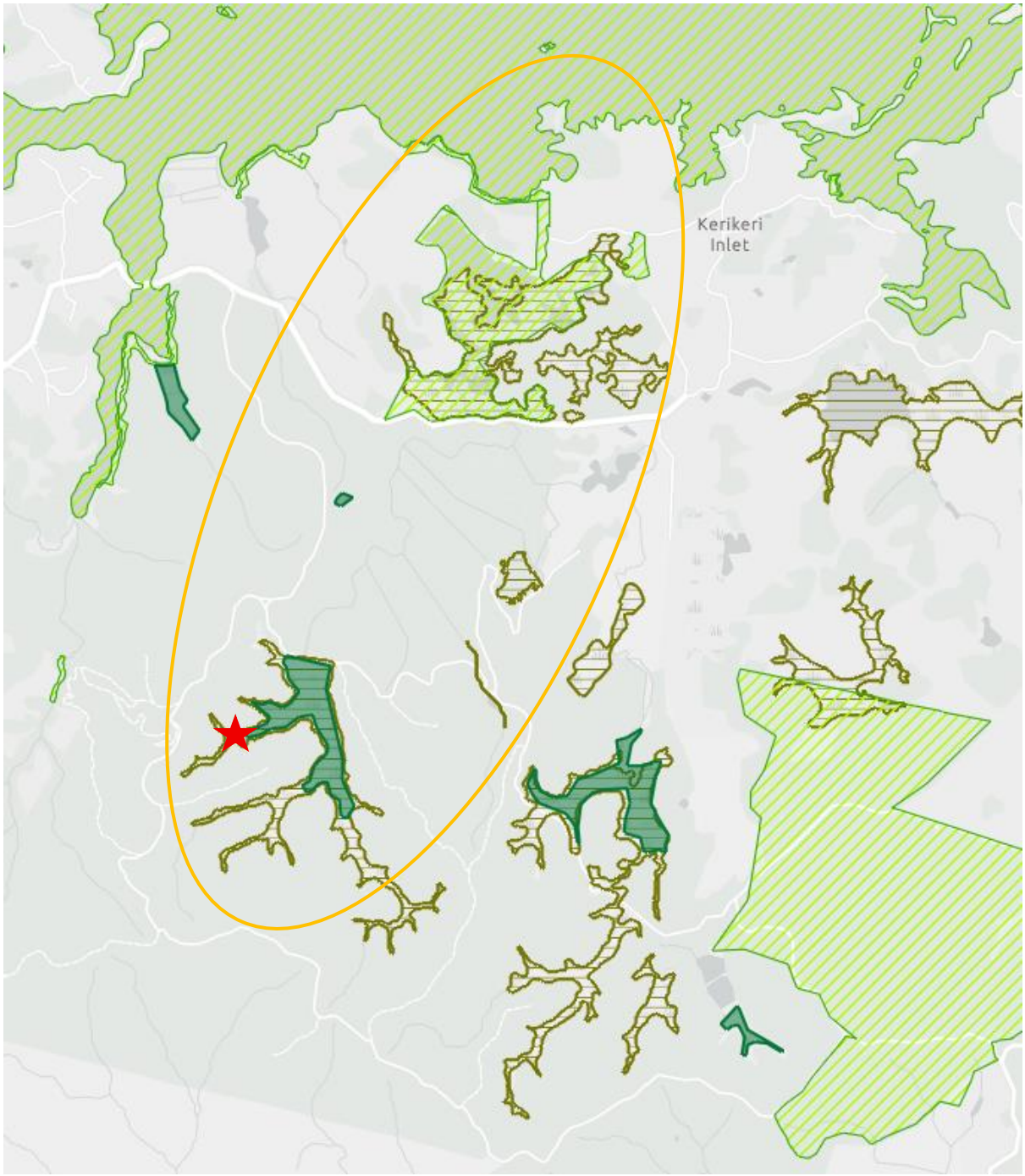
★ Kerikeri wastewater discharge location in wetland



Source: FNDC Far North Atlas map – natural hazards tab:

https://experience.arcgis.com/experience/df5f99f47450498f978166472b3500eb/page/Page?views=Legend%2CNatural-environment

Figure 3: Northland mudfish distribution, DOC covenant areas and Protected areas (LINZ)



Legend

Mudfish distribution (DOC)	Covenant areas (DOC)	Protected areas (LINZ)
Northland mudfish		

Source: FNDC Far North Atlas map - natural environment tab: https://experience.arcgis.com/experience/df5f99f47450498f978166472b3500eb/page/Page?views=Legend%2CNatural-environment

Statement of Mike McGlynn in support of the PDP Hearing submissions by Vision Kerikeri, Carbon Neutral NZ Trust, Our Kerikeri Trust and Kapiro Conservation Trust

INTRODUCTION

My name is Michael John McGlynn. I am a semi-retired ecologist specialising in freshwater fish fauna and wetlands. Over a period of approximately 35 years, I have surveyed wetlands extensively throughout Northland. I have also undertaken fieldwork in wetlands on Great Barrier Island. Survey results, numbering more than 700 have been entered onto the NIWA New Zealand Freshwater Fish database.

In the late 1990's under contract to the Department of Conservation I carried out freshwater fish survey to identify Northland mudfish (*Neochanna heleios*) sites. Northland mudfish are classified as "Threatened-Nationally Vulnerable." Approximately 25 sites were located all within a 25km radius of Lake Omapare, which equates to a very minute area for the long-term survival of this species. Many of these sites supported only a small population of mudfish and faced various problems, such as drainage, grazing, increased nutrients, and fires. At least two of these wetland habitats no longer exist due to vegetation clearance and grazing.

Staff from the Bay of Islands DOC office, along with myself, conducted surveys of the Waitangi wetlands in both 1998 and 2002. Northland mudfish were found at four different sites. Further survey in the more inaccessible interior of the wetlands would I believe find good numbers of mudfish.
Members of the DOC Mudfish Recovery Group, including myself, have expressed concerns about the long-term survival of mudfish populations in the two wetlands where wastewater is being discharged.

WAITANGI WETLAND COMPLEX

The Waitangi wetlands are extremely important both regionally and nationally and are rated highly by NRC. Only around 3% of Northland's original freshwater wetlands remain today. Low fertility wetlands such as those found in the Waitangi wetlands are amongst the rarest wetland type left in Northland. These peat substrate wetlands are characterised by a unique vegetation community and are home to a diverse range of threatened indigenous fauna and flora species as documented in the Kerikeri Protected Natural Areas Programme (PNAP) report for DOC.[1]

Wetland flora, where not impacted by colonisation of raupo (*Typha orientalis*) consists of rushes (*Machaerina and Juncus spp.*), sedges (*Baumea and Isolpsis spp.*), stunted manuka (*Leptospermum sp.*), carrier tangle fern (*Gleichenia microphylla*), and swamp kiokio (*Parablechnum minus*).

[1] https://www.doc.govt.nz/documents/conservation/land-and-freshwater/land/kerikeri-ecological-district.pdf

Wetland fauna includes several species of birds which are classified as being endangered: Nationally Critical Australasian bittern (*Botaurus poiciloptilus*), Nationally Vulnerable Grey duck (*Anas superciliosa), and* At Risk-Declining Banded rail (*Rallus philippensis assimilis*), Spotless crake (*Porzana tabuensis*) and North Island Fernbird (*Bowdleria punctata*).

Freshwater fish recorded in the wetlands are Northland mudfish, shortfin eel (*Anguilla australis*), At Risk-Declining longfin eel (*Anguilla dieffenbachii*), and banded kokopu (*Galaxias fasciatus*).

Wastewater is discharged at two locations (from the Kerikeri and Paihia treatment plants). The watercourse below the oxidation ponds has been colonised by raupo due to nutrients. The nutrient enriched water is slowly creeping into both wetlands resulting in the collapse of the original vegetation composition and allied ecosystem. Eventually raupo reedland will become the dominant vegetation type if discharges continue.

Using mudfish as an indicator species, higher pH levels may be detrimental to their survival. Data from six mudfish sites, including Bayly's and Daniell's properties adjoining the Waitangi wetlands logged pH levels from 4.98 to 5.44. Mudfish can tolerate low oxygen and pH levels which possibly could be an important factor for their survival due to the restriction of other fish species.

CONCLUSION

Protecting the Waitangi wetlands is vital, as they serve as key habitats for wildlife and should be preserved for generations to come. An alternative wastewater system urgently requires investigation as the continual outflow of nutrients will in the long-term be detrimental to those significant ecosystems. Discharge volume and nutrients will increase as infrastructure increases.

Another matter of concern is the effect that wastewater entering the Kerikeri Inlet will be having on the marine environment. I assume that monitoring for toxins in kai moana is taking place?

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