

APPENDIX K

Pōrangahau Wastewater Discharge to Land: Coastal Ecology Assessment (Beca, 2021:P:D.65)

Pōrangahau Wastewater Discharge to Land: Coastal Ecology Assessment

Prepared for Central Hawke's Bay District Council

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1 Scope and Purpose

Beca Ltd was commissioned by Central Hawkes Bay District Council (CHBDC) to undertake a coastal assessment of effects to support a regional consent application. The application is for the irrigation of treated wastewater to land at the Discharge Property on the corner of Beach and Hunter Road, Pōrangahau.

The purpose of this ecological impact assessment is to identify potential ecological effects on the coastal receiving environment and to determine the level of effects on ecological values that may arise from the discharge to land.

The scope of this report includes:

- A desk-based review of existing information
- An assessment of the ecological values in the area of the proposed discharge.
- An assessment of ecological effects and recommended mitigation prepared in general accordance with the EIANZ Ecological Impact Assessment Guidelines (Roper-Lindsay et al., 2018).

The ecological effects on terrestrial and freshwater ecological values at the Discharge Property are addressed in a separate report, *Pōrangahau Wastewater Discharge to Land – Ecological Impact Assessment* (Beca, 2021:P:D.66).

2 Methodology

2.1 Desktop review

A desk-based study was undertaken using ecological information from the following sources:

- HBRC geospatial layers including catchment and hydrology layers;
- Google Earth and LINZ aerial imagery;
- iNaturalist and eBird fauna records;
- Other publicly accessible reports or information.

2.2 Site visit

A site visit was undertaken on the 23rd of June 2021 to identify significant and ecologically valuable coastal features. The coastal margin was walked by ecologists who noted vegetation types, riparian/coastal marine habitats and avifauna present. A single eDNA sample of the waters of the Pōrangahau River using a high turbidity eDNA kit with 1.2 µm and 5 µm CA filters was taken. Multi-species tests were undertaken on eDNA samples by Wilderlab Ltd using next-generation sequencing (NGS) to list out all of the species detected in each sample, within broad taxonomic groups.

2.3 Assessment of effects

A desktop assessment of ecological effects was undertaken in accordance with Ecological Impact Assessment (EclA) EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems (Roper-Lindsay et al., 2018). Although these guidelines were not developed for coastal marine ecosystems, the ecological values and effects were assessed by broadly applying the EclA principles where appropriate to do so.

The EIANZ guidelines set out a methodology to assign ecological value to species and ecosystems based on four assessment criteria which are consistent with significance assessment criteria set out in the

Proposed National Policy Statement for Indigenous Biodiversity (2019) Appendix 1: Criteria for identifying significant indigenous vegetation and significant habitat of indigenous fauna.

In summary:

- Attributes are considered when considering ecological value or importance. They relate to matters such as representativeness, the rarity and distinctiveness, diversity and patterns, and the broader ecological context.
- Determining Factors for valuing species; species span a continuum of very high to negligible, depending on aspects such as whether species are native or exotic, have threat status, and their abundance and commonality at the site impacted
- Ecological Values are scored based on an expert judgement, qualitative and quantitative data collected.

Once ecological values have been identified and valued, the severity of potential impacts is assessed by determining the change from baseline ecological values likely to occur because of the proposal/project along the lines of a magnitude of effect. Finally, once these two factors have been determined (the ecological value and the magnitude of effect), an overall level of effect on each of the identified ecological values is assessed.

3 Project description

CHBDC are currently in the process of upgrading and re-consenting the Wastewater Treatment Plants (WWTP's) for the communities of Pōrangahau and Te Paerahi.

The preferred long-term option is for the direct surface water discharge from Pōrangahau, and the discharge into sand dunes at Te Paerahi to both cease. For this to occur a staged development of a new land-based treated wastewater discharge for the communities is proposed. Eventually, both treatment plants will be decommissioned, and all wastewater reticulated to a new wastewater treatment plant servicing both communities at the Discharge Property, prior to irrigation to the property. The details of the proposed upgrade and discharge scheme are detailed in the Conceptual Design Report (LEI, 2021:P:C.15)

4 Site description

The Discharge Property (hereafter referred to as the Site) is located on the corner of Beach and Hunter Road, adjacent to the Pōrangahau River (Figure 1). An unnamed tributary flows north-south through the western part of the property and discharges at the Beach Road bridge. The coastal edge of the property is bounded by grazed pasture forming a steep scarp along the banks of the Pōrangahau River. The bank transitions from pasture species to estuarine rushland (20m strip) towards the eastern boundary.

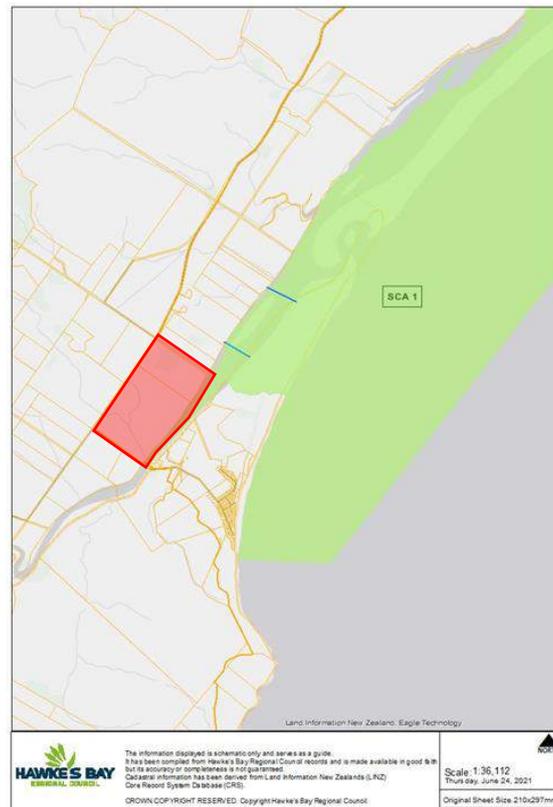


Figure 1: Discharge Property subject to irrigation in relation to Significant Conservation Area (SCA1) shown in green and Pōrangahau River showing the river mouth in dark blue and the extent of the coastal marine boundary in light blue (RCEP).

5 Ecological values

5.1 Pōrangahau Estuary

The Pōrangahau estuary is a long and narrow estuary that becomes shallow and more open to the north where it spreads across broad tidal flats. A long sandy beach separates the estuary from the open coast, and with the estuary discharging through the beach to the open coast in the northeast. The estuary entrance is relatively mobile and moves along the beach in response to changes in coastal sand movement, wave action and river flow (Stevens & Robertson, 2006). It is strongly river dominated in its upper reaches. To the south, a triangular peninsula of land is present between the river and the coast containing a dominant cover of grassland and residential development, and terrestrial forest (mainly pine trees) and rushland at the north end (Stevens & Robertson, 2006).

The estuarine sediments are uniformly mud (Smith, 2009), with obvious sediment deposition in the upper reaches of the estuary (Stevens & Robertson, 2006). The estuary has lower levels of trace metals, but elevated levels of copper compared to other Hawke's Bay estuaries and lagoons (Smith, 2009).

The estuary has lower nutrient (nitrogen and phosphorus) and organic matter levels among New Zealand Estuaries (Smith, 2009), and do not show any obvious indications of high nutrient loadings (e.g. nuisance macroalgal blooms or sulphide-rich, muddy sediments) (Stevens and Robertson, 2006). It also has low levels of chlorophyll A (Smith, 2009). However, high levels of E.coli, high turbidity and low clarity are recorded (LAWA, 2019).

5.1.1 Benthic Ecology

The infaunal community has moderate species diversity, richness, and evenness. The infaunal assemblage is characterised by *Edwardsia sp.* (anthozoan anemone), *Scolecopelides sp.* (spionid polychaete), crane-fly (Erioptera) larvae, and *Nicon aestuariensis* (nereid polychaete) (Smith, 2009). The epifaunal community is almost solely comprised of *Amphibola crenata* (mud snail) (Smith, 2009), although cockles, crabs and sea lettuce were also observed during the site visit.

5.1.2 Fish:

The Pōrangahau Estuary is of National Importance and has been classified as having outstanding fisheries values on the basis that it contains a diverse fish assemblage, biologically important fish habitat, a nationally important non-salmonid fishery (including traditional Māori fisheries) and is a particularly good example of an estuarine fish habitat (Harper, 2018).

It also has significant cultural values for mahinga kai sites and the estuary continues to be an important source of flatfish, kahawai, eels and whitebait for tāngata whenua for whitebait, flounder, mullet and kahawai. It has a valued eel fishery but is not significant for trout (Reed & Ide, 2012).

5.1.3 Avifauna:

The estuary is an important feeding and wintering area for migratory waders and contains the largest concentrations of wrybill and banded dotterel (78% in 1992) in Hawke's Bay. Caspian Terns, eastern bar-tailed godwits, and knots also use the estuary (Harper, 2018). eBird records for the wider Pōrangahau Estuary area identify a diversity of bird species present, with the most abundant species shown in Table 1.

Table 1. Most Abundant native bird species of conservation importance recorded within a 1km radius of the site between 2010-2020 (eBird Basic Dataset, 2020).

Common name	Scientific name	Conservation status
White-fronted Terns	<i>Sterna striata</i>	At Risk -Declining
Bar-tailed Godwit	<i>Limosa lapponica</i>	At Risk - Declining
Black-billed Gulls	<i>Chroicocephalus bulleri</i>	Nationally Critical
South Island Oystercatchers	<i>Haematopus finschi</i>	At Risk - Declining
Double-banded Plovers	<i>Charadrius bicinctus</i>	Nationally vulnerable

Conservation status assigned according to (Robertson et al., 2017)

The adjacent dune provides important feeding and roosting area for several migratory bird and the estuary provides the only known breeding site in the region for Caspian terns (Smith, 2009).

5.1.4 Ecological significance

An Area of Significant Conservation Value (ASCVs) was identified by the Department of Conservation and is adopted as Significant Conservation Area 1 (SCA 1) and an Outstanding Water Body (Pōrangahau Estuary) within the Hawkes Bay Regional Coastal Environment Plan (Harper, 2018). The area extends along the coast and up to the coastal marine boundary alongside the Discharge Property (Figure 1). The SCA is as a nationally significant wildlife and fisheries habitat and supports nationally significant dune vegetation types. The estuary, adjacent dune systems and wetlands have been identified as a recommended area for protection within the Eastern Hawke's Bay Ecological District.

5.1.5 Overall Ecological Values

The ecological value of the Pōrangahau estuary is assessed as Very High based on high ratings for rarity/distinctiveness (ecologically significant for native fishery and threatened avifauna) and

representativeness (Significant Conservation Area), and moderate ratings for ecological context, diversity and pattern.



Figure 2A: Unnamed tributary discharge point at the Discharge Property. Figure 2B: Muddy substrate showing typical benthic ecology.



Figure 3A: Pōrangahau River from true left bank at the Discharge Property showing estuarine vegetation.



Figure 3B: Pōrangahau River looking toward estuary taken from true left bank.

6 Ecological Impacts

6.1 Zone of influence

The zone of influence is the spatial extent within which potential effects are likely to occur. For the purposes of this assessment, the lower estuarine reaches of the Pōrangahau River are considered the Zone of Influence (ZOI) where nutrient inputs are likely to have the greatest influence on the estuarine ecosystems and species.

6.2 Potential effects

Potential ecological effects on the Pōrangahau Estuary pertain to changes in water quality and type of discharge arising from the irrigation to land. There are no direct effects (physical habitat loss, ecotoxicity or injury/mortality) on estuarine ecology resulting from the diffuse discharge of nutrients.

Potential indirect effects pertain to the degradation of estuarine ecosystem health due to discharge of land-derived nutrients via ground and surface water. The following consequential ecological effects may arise:

1. Algal blooms (phytoplankton and / or macroalgae) leading to hypoxia.
2. Degradation of benthic ecosystems.
3. Degradation of benthic food resources for avifauna.

6.3 Level of effects

Estuarine systems are highly productive with nutrient cycling a key ecosystem function and as such, water and sediment quality are important to maintain nutrient balance and subsequently ecosystem health.

The magnitude of ecological effects relies on the predicted change from baseline water quality due to the discharge from the Discharge Property irrigation. The Pōrangahau treated wastewater water quality assessment (Beca, 2021:P:D.25) takes into account the existing point source Pōrangahau treated wastewater discharge and nutrient management at the Discharge Property to determine a baseline nutrient mass load to the river. The existing Te Paerahi wastewater discharge is not hydrologically connected to the Pōrangahau Estuary i.e. nutrient loss from the land based discharge goes into the marine environment rather than into the river. It is however factored into the overarching water quality baseline assessment as a contributor to the wider Pōrangahau catchment.

Water quality modelling has shown no significant change in nutrient mass loads within the Pōrangahau catchment across all three stages of the upgrade (Beca, 2021 P:D 25). The water quality report takes a conservative approach whereby the uptake of nutrients via soil, pasture and associated biological processes has not been allowed for and presents a 'worst-case' scenario for possible nutrient mass loading into the estuary. Furthermore, the relative contribution from the proposed land discharge is very small in comparison to wider catchment-derived sediment and nutrient inputs into the estuary.

Although quantitative nutrient loss via land cannot be comprehensively calculated, it is reasonable to assume that a substantial reduction in phosphorus and some reduction in nitrogen will occur naturally (LEI, 2021: P:D10). The implementation of coastal and riparian irrigation setbacks further reduces the risk of nutrient loss into waterways and ultimately the estuary. The project also includes a monitored irrigation scheme that reduces the risk of over-irrigation and can be adapted to seasonal ground conditions. Farm management practices also contribute to a reduction in nutrient loss include the fencing and planting of riparian and coastal margins and stocking rates for livestock.

Given the 'neutral' water quality assessment along with the project design components listed above, it is anticipated that the current baseline ecological condition of the estuary will be unchanged by the proposal

resulting in a negligible magnitude of potential adverse effects. This includes potential adverse effects on estuarine benthic invertebrates, foraging resources for coastal avifauna and the risk of algal blooms.

The overall level of adverse ecological effect, considering the very high ecological values of the estuary, is assessed as **low** for all potential adverse effects identified in this report.

7 Conclusion and Recommendations

The overall ecological effects on coastal ecology are assessed as low. This assessment is based on the water quality assessment across the three stages of upgrade that demonstrates that there is no significant increase in nutrients discharged in the Pōrangahau estuary and that in the long-term, a reduction in nutrient mass loads discharged via land into the estuary (when compared to the existing surface water discharges) is highly likely.

An adaptive monitoring and management programme is recommended in the Water Quality Report to track performance of the irrigation scheme and the farm management practices (setbacks and riparian/coastal restoration). It is recommended that appropriate trigger levels should be developed and required as consent conditions to avoid potential adverse effects on estuarine ecology as follows:

- Monitoring of freshwater indicators for the Discharge Property waterways and adaptive management triggers as set out in the Water Quality Assessment (Beca, 2021: P:D.25).
- Fencing and planting of riparian and coastal margins.

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