# ENCLOSURE F

Ecological Assessment Whirinaki Drain EAM Environmental Consultants



# ECOLOGICAL ASSESSMENT Whirinaki Drain Whirinaki

PROJECT NO. EAM2282 REP- 01

PREPARED FOR

EVANS FAMILY TRUST

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MAY 2022

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# 1 INTRODUCTION

EAM NZ Limited (EAM) has been engaged by the Evans Family Trust (EFT) to undertake a high level (brief site visit) ecological assessment of Whirinaki Drain (hereon in referred to as the Site). The drain bisects the property at the corner of Northshore Road and SH2 and drains the hillslopes behind the PANPAC mill. As part of the planning for the development of the property the developers have requested advice on:

- The current ecological values and functioning of the drain.
- Guidance on any restoration opportunities.

EFT are proposing to develop a bare paddock at the site to provide for new housing (Figure 1 in Appendix A) and as part of this development it is anticipated that there may be some possible effects on the adjoining Whirinaki Drain.

EFT have requested a brief ecological assessment with respect to this proposal. The assessment is focussed on the ecological values at the site both in relation to the terrestrial and aquatic habitats. Out of scope of this report are any considerations around the land reclamation adjoining the Esk estuary, stormwater flows and associated engineering requirements, and flood management considerations for adjoining sites. However, where these actions are having an impact on the functioning of the drain they have been referred to.

# 2 SITE DETAILS

#### 2.1 PROPOSED SUBDIVISION SITE

The site is located at Pohutukawa Drive, Whirinaki (Figures 1 and 2; Appendix A) The proposal is effectively a greenfields development utilising an area of previously cropped land adjoining the Whirinaki Drain.

Further details of the proposed subdivision is available from the EFT planning team Development Nous Ltd (DNL).

#### 2.2 PROPOSED WORKS

The proposal involves establishing an urban style subdivision at the site on the seaward portion and retain the landward portion for horticultural uses. Acknowledging that this land use change may have an impact on the current values with the Whirinaki Drain this high-level site investigation was requested.

# 3 METHODOLOGIES

#### 3.1 HABITAT ASSESSMENT

A site visit was undertaken by EAM NZ Ltd on the 12<sup>th</sup> of May 2022. Site photos are shown in Appendix B. An experienced ecologist assessed the subject site the full extent of reach below the SH2 culvert to the edge of the current landfill site above where the drain discharges into the Esk estuary.

The assessments examined the four key ecological function groups.

• Hydraulic functions (processes associated with water storage, conveyance, flood flow retention and sediment transport).

- Biogeochemical functions (processes associated with the processing of minerals, particulates and water chemistry).
- Habitat provision functions (the type, amount, and quality of habitat for flora and fauna); and
- Native biodiversity functions (the occurrence of diverse populations of indigenous native plants and animals).

#### 3.2 AQUATIC FAUNA ASSESSMENT

Survey methodologies included the following:

• eDNA and a desktop survey were utilised to determine the fish species likely to be present in the Whirinaki Drain

Note: The full length of the stream up into the pine forest behind the PANPAC mill site was not able to be investigated due to forestry activities in the area.

### 4 RESULTS

#### 4.1 STREAM ASSESSMENT

The site is largely mechanically controlled grasses rushes and sedges adjoining the drain with reasonably recently sown pasture on the paddocks which the drain runs through. Upstream of the site the drain is fed by a further network of drainage channels around the base of the hills with flows also coming from ephemeral stream channels on the Pine dominated hillslopes. The frequent mechanical control of the vegetation in the drain and flood plain channel is a major determining factor limiting the available habitat.

The drain has been in place for at least 80 years and is essentially a linear feature from the estuary edge to the foothills that has been lowered to ensure drainage of the PANPAC mill site. This lack of topographical diversity within the linear form also significantly impacts the provision of habitat.

There is evidence of tidal influence to almost the SH2 culvert but a pair of ford/weir type structures much closer to the coast limit the movement of estuarine fauna in and out of this reach. This in combination with the frequently closed Esk River mouth restrict the drain's value as part of the estuarine system.

The Whirinaki Drain throughout the site has very poor levels of shade, and minimal overhanging vegetation. It has very low bed and bank roughness providing a minimal range of habitat for aquatic fauna. Terrestrial inputs such as leaves and branches providing both food and cover for the instream life are generally absent. The reach through the site was notable for only one Willow tree extending over the water from the true right bank which provided some habitat through cavities from the root-mat extending across the bed. with a generally uniform bed of soft muds and silts.

Where the drain is constrained downstream of the farm bridge the flow is more concentrated a narrowed channel which has increased the velocity of the flow. This increase in velocity has removed much of the fine sediment and enhanced the bed roughness through exposure of coarse woody debris and cobbles. This has improved the instream habitat through this section in contrast the rest of the survey reach

#### 4.2 TERRESTRIAL VEGETATION

No woody indigenous species of not were recorded at the site. The sedges and rushes such as *Bolboschoenus medianus*, *Schoenoplectus pungens* and, *Schoenoplectus tabernaemontani* where they are free from mechanical control extend into the wetted margin along the length of the reach giving away to Raupo, *Typha orientalis* where the saltwater influence is reduced. This is approximately 20m downstream of where the reach passes into the culvert beneath SH2

The wider site had no native vegetation reflecting its long history of agricultural use firstly to pasture and more latterly as a cropped area.

A large Willow *Salix fragilis* is present on the true right of the drain and extends across the entire channel. This is the last remaining tree of several which have been cleared from the drain for the purpose of flood management. The tree is providing habitat for birds as a perch for drinking and roosting. The understory out of the flood zone consists of a variety of indigenous and introduced plant species. Taupata *Coprosma repens*, is common under this tree but unfortunately it is competing with Ivy *Hedera helix* and Chinese Windmill palms *Trachycarpus fortunei* which have also established along with other garden escapees.

#### 4.3 AQUATIC VEGETATION

The permanently wetted portion of the reach has small growths of filamentous green algae which is generally sparse and unhealthy. It is thought that the tidal influence as well as the occasional reported discharges from the PANPAC site has had a determining impact on the instream flora. In the lower reaches turbidity is very high no doubt limiting aquatic plant growth as well.

#### 4.4 FISH

The Whirinaki Drain is feed by a network of short run ephemeral flows from the surrounding hills with permanent water typically only present in the lower reaches of the system. These flows are channelised and at times of low flow essentially ponded reaches where they reach the coastal plain.

Although no specific fish survey was undertaken, no traps were set, or spotlighting or efishing undertaken, the survey reach is largely an area of very poor-quality fish habitat. However, where the large willow provided cover a medium-large eel, visually identified as a longfin eel (*Anguilla dieffenbachii*), was seen utilising the cavities presented by the root mat. It is possible that more eels are in this small section as well as possibly utilising the interstitial spaces of the ford/weir structures. There is also likely to be fish utilising the section between the farm bridge and the willow tree as well due to the bed diversity and cover in the section.

It was not known how significant a barrier the two ford/weir structures are to other species, but the lower ford/weir was observed at the peak of the smallest high tide for the month. During this time there was approximately 0.10 m of depth over the structure. This would be sufficient depth for migratory galaxiids to access the upper reaches of the stream as the culvert beneath SH@ does not present a barrier.

#### 4.5 HBRC WHAT FISH ARE IN MY STREAM PREDICTION MODEL

The predicted Fish Distributions identified 10 fish species potentially present within the Whirinaki Drain (Table 1). Of this list, two species are considered to have a conservation status of declining. This diverse assemblage of fish species is reflective of the close proximity of the site to the coast. It should be noted that this prediction model is likely over predicting for species such as Brown Trout based on actual physical habitat present in the Drain.

TABLE 1: FISH SPECIES NOTED IN THE WHIRINAKI DRAIN TAKEN FROM THE HBRC WEBSITE AND NEARBY WILDERLAB eDNA SAMPLES.

Common Name	Scientific name	Native/Exoti	Prediction	Conservation
		С	ConfidenceLevel	Status <sup>1</sup>
Shortfin Eel	Anguilla australis	Native	Highly Likely Present	Not threatened
Longfin Eel	Anguilla dieffenbachii	Native	Highly Likely Present	At risk - Declining
Common Smelt	Retropinna retropinna	Native	Possibly Present	Not threatened
Common Bully	Gobiomorphus cotidianus	Native	Likely Present	Not threatened
Giant Bully	Gobiomorphus gobioides	Native	Possibly Present	Not threatened
Inanga	Galaxias maculatus	Native	Highly Likely Present	Declining
Redfin Bully	Gobiomorphus hubbsi	Native	Likely Present	Not threatened
Banded Kokopu	Galaxias fasciatus	Native	Likely Present	Not threatened
Koaro	Galaxias brevipinnis	Native	eDNA	Declining
Brown Trout	Salmo trutta	Exotic	Possibly Present	N/A
Gambusia	Gambusia affinis	Exotic	Possibly Present	N/A

#### 4.6 WHITEBAIT SPAWNING

No spawning was observed during the survey, but this aspect is worthy of more investigation. Spawning habitat in nearby estuaries such as the Waitangi estuary has identified streams and drains similar to the Whirinaki drain as being important spawning habitat. Whilst the riparian vegetation is not that typically associated with contemporary whitebait spawning being predominantly rushes and not softer grass forms the lack of other suitable small flows into the Esk estuary elevates the need to be mindful of this aspect of the Whirinaki Drain.

#### 4.7 AVIFAUNA

Avifauna was sparse along the length of the Whirinaki drain however the wider landscape including the Esk Estuary is an area of high bird diversity. These estuary birds were not included in the survey but it should be noted that the Whirinaki Drain is a contributing factor in this estuarine environment and could be used at times by estuarine birds. The birdlife was restricted to Kotare/Kingfisher (*Todiramphus sanctus*), White faced Heron (*Egretta novaehollandiae*), and Kahu/ Australasian Harrier (*Circus approximans*). All of the observed species are classified as not threatened. Common passerines were noted utilising the pasture component of the site but were not dependenet upon the drain or its riparian margins.

It should be noted though that this was a very little sample period, and it is highly likely that a diverse range of birds will pass through the site but perhaps not necessarily be reliant upon it.

#### 4.8 INVERTEBRATES

Invertebrates were not assessed in the scope of this investigation.

#### 4.9 HERPTOFAUNA

Reptiles and Amphibians were not assessed in the scope of this investigation.

However, given the available habitat it is unlikely that any species are utilising the area in significant numbers, if at all. It should be noted though that there is good potential habitat for skinks toward the estuary end of the site.

# 5 CONCLUSIONS

The assessed waterway is highly modified due to historic earthworks. It appears to be largely intermittent in nature in the upper reaches with a tidal influence with currently low ecological value in the lower reaches. From an ecological perspective it was not possible to determine if the drain is an extremely modified natural water course or is an entirely artificial drainage channel. There were no remanent biotic or abiotic features in the site which would indicate the drain is a historical water course. Similar streams originating from the hills behind PANPAC discharge into either a wetland which then discharges into the ocean such as the Hinekatorangi wetlands or the lagoon just north of the Te Uku Bluff which has no direct connection to the coast. It seems likely that the Whirinaki Drain was constructed to drain a similar impoundment to these other wetlands to aid in land reclamation for agricultural and then industrial purposes.

The drain in the survey reaches is best typified as an extension of the Esk estuary for most of its length up to the SH2 culvert. Outside of the scope of this report is the earthworks adjoining the Esk estuary but this activity including the ford/weir structures realignments and dredging have had a detrimental impact of the watercourse. The poor connectivity and unnatural profile of drain compromises the ability of the watercourse to function correctly. The connectivity with the flood plain has been lost due to historical earthworks which have created an incised structure preventing the establishment of a wider zone of rushes and sedges and significantly reducing the biodiversity and ecological functioning of the site.

The presence of a long fin eel beneath the sole tree form in the reach suggests that there is potential to recreate habitat in the drain to support indigenous aquatic species. But this is dependent upon restoration of the drain to provide biodiversity functions and not just a drainage function as it currently has. The site also provides a conduit currently for fish species to reach further upstream but little else in terms of biodiversity services for much of the survey reach. No shading is present currently and temperature fluctuations are likely to be significant reducing the quality of the available habitat as well.

There are no evident terrestrial ecological values in the land directly adjoining the Whirinaki Drain due its long-term agricultural use.

# 6 RECOMMENDATIONS

The site has been so heavily modified that determining suitable restoration is problematic. The drain is primarily serving the purpose for which it was created, that being the efficient conveyance of water away from the area now occupied by PANPAC and the adjoining orchards. It is therefore difficult to modify the drain to replicate a naturally functioning estuarine stream without compromising the drainage capacity or significant recontouring of the land. The drain form is inconsistent with what would typically have been present at the estuary edge. The drain can be considered as tidally influenced and there an estuarine stream extending inland at least as far as the tidal influence near the SH2 culvert. Due to the artificially incised stream and steep banks the saltmarsh which would have been representative of this zone in the estuary is essentially non-existent.

Working within the constraints of form and function of the drain it is however possible to recreate a forest type habitat along the length of the drain to the lower weir/ford. A lowland podocarp hardwood forest type similar to that present at the Waipatiki Scenic Reserve could be created and add a very underrepresented ecosystem type to the Hawkes Bay coast. The incised nature of the drain will allow species which would typically be sited further inland to be placed very close to the estuary edge and along the length of the drain. Species such as Kahikatea, *Dacrycarpus dacrydioides*, Karaka, *Corynocarpus laevigatus* and Nikau, *Rhopalostylis sapida* could be established throughout the length on the drain banks and any reserve areas which may be created. Closer to the waters edge species such as Saltmarsh ribbon wood *Plagianthus divaricatus* and harakeke *Phormium tenax* could be incorporated into the existing rushland.

Cessation of the mechanical control along the length of the drain will be needed to establish any indigenous tree cover and this will aid the reestablishment of the rush and sedge growths throughout the length of the drain. The eventual canopy closure will reduce this rush and sedge growth in the medium term and then will eventually add coarse wood debris into the water course in the longer term. The addition of coarse woody debris will create instream habitat similar to that currently provided by the individual willow tree. Fallen branches will add bed diversity and nutrients into the system necessary for recreating a functioning system.

The site currently supports very large trees surrounding the Nukurangi Pa archaeological site at the drains discharge location into the Esk estuary, so the restoration recommendation has good potential to succeed based on the health these trees. Forested banks should aid in the management of the currently eroding banks and provide some terrestrial biodiversity values currently lacking. Once established the ford/weir structures which were in part installed to reduce the scour of the bed and banks could be progressively removed as these establish which will improve connectivity especially in relation to the migratory galaxiid species.

These restoration options will need to be discussed with the HBRC works team to ensure the drainage functions of the drain are not overly compromised.

### **APPENDIX A - FIGURES**

#### FIGURE 1: SITE LOCATION



#### FIGURE 2: SURVEY SITE AERIAL



# **APPENDIX B - SITE PHOTOS**

View downstream from the SH2 culvert. Raupo in the foreground true right is replaced by more salt tolerant species after approximately 20m



SH2 culvert and small growth of Raupo. This is likely to be the limit of the tidal influence



Upstream of the farm bridge the channel is wider with low velocity flows, filled with fine sediments and very little habitat provision



The drain narrows beneath the farm bridge. The increased velocity has flushed some of the fine sediments from this section and exposed coarse woody debris and cobbles.



Good riparian cover on the true right of Whirinaki Drain from the lone willow providing shading and instream habitat.



Bank slumping on the true left of the Whirinaki Drain.





Landuse adjoining the Whirinaki Drain. Note the lack of any indigenous terrestrial habitat

Lower Weir/Ford at full tide. Note the shallow depth of water providing a small window of access for upstream migration



The upper Weir/Ford just prior to high tide. Water is moving through the interstitial space but not over this structure



Large exotic trees at the Nukurangi Pa Archaelogical site. Pine and Macrocarpa

