PATTLE DELAMORE PARTNERS LTD
Level 2, 134 Oxford Terrace
Christchurch Central, Christchurch 8011
PO Box 389, Christchurch 8140, New Zealand

Tel +64 3 345 7100 Mob +64 21 0220 1880
Web www.pdp.co.nz
Auckland Tauranga Wellington Christchurch

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15 December 2020

Section 53
Team Leader Catchment
Environment Southland
Cnr North Road & Price Street, Waikiwi
Invercargill 9801

Dear Section 53

STEAD STREET PUMP STATION, INVERCARGILL - FISH SURVEY

1.0 Introduction

Pattle Delamore Partners (PDP) was engaged by Environment Southland (ES) to undertake a fish survey in the main drainage channel (hereafter 'unnamed drain') above a pumping station located on Stead Street, Invercargill. The existing pump station needs to be upgraded and a new pump station is proposed to be constructed immediately to the west of the existing site. This has been identified as a 'shovel ready' project.

It is understood that the area nearby, encompassing the Invercargill Airport, was formerly part of the upper Waihopai/New River Estuary and was historically drained through the Lake Hawkins Pump Station to allow for land development. The unnamed drain originates south-west of Invercargill Airport, draining exotic pasture and wetland areas. The main channel is approximately 1.2 km long, passing through a recreational reserve for its full extent; the upstream drainage network passes through developed grazed farmland.

It is understood the pump station and wider drainage network store freshwater from stormwater events until water levels reach a certain height. When maximum height is reached, three pumps (that can each pump 600,000 L/minute) discharge water from the drain into the New River Estuary. The pumps are activated multiple times per day, dependant on the water level. The pump station is currently considered a fish passage barrier.

Prior to construction of the new pump station, ES aims to gain a better understanding of the fish species present, fish habitat available, and the ecological value of the unnamed drain.

2.0 Freshwater Fish Assessment

2.1 Desktop Assessment

A search of the New Zealand Freshwater Fish Database (NZFFD) completed on 7 December 2020 yielded records for ten freshwater fish taxa within an approximate ten-kilometre radius of the site. Records were from the Ōreti River and Waihopai River catchments, which both discharge to the Waihopai/New River Estuary. No records were available for the unnamed drain. As the Ōreti and Waihopai rivers are both hydraulically connected with the unnamed drain, as well as within close proximity, the freshwater fish

communities are potentially very similar if access is available. Results from the NZFFD search are presented in Table 1.

Nine native and one introduced taxa are recorded in the NZFFD from the Ōreti River and Waihopai River catchments. Of the native taxa, one is classified by the conservation status 'Threatened – Nationally Vulnerable', two are classified as 'At Risk – Declining', while five are classified as 'Not Threatened'. The introduced Salmonidae family (i.e., brown trout) which has been recorded within these catchments has little-to-no ecological value in New Zealand; however, it is a valued sports fish in New Zealand.

Table 1: New Zealand Freshwater Fish Database records for the Ōreti River and Waihopai River catchments.

Common name	Scientific name	Number of Records	Conservations Status
Longfin eel	*Anguilla dieffenbachii*	4	At Risk - Declining
Unidentified eel	*Anguilla spp.*	1	N/A
Torrentfish	*Cheimarrichthys fosteri*	1	At Risk - Declining
Unidentified galaxiid	*Galaxias spp.*	1	N/A
Lamprey	*Geotria australis*	1	Threatened – Nationally Vulnerable
Upland bully	*Gobiomorphus breviceps*	1	Not Threatened
Common bully	*Gobiomorphus cotidianus*	2	Not Threatened
Redfin bully	*Gobiomorphus huttoni*	1	Not Threatened
Unidentified bully	*Gobiomorphus spp.*	2	N/A
Common smelt	*Retropinna retropinna*	2	Not Threatened
Unidentified flounder	*Rhombosolea spp.*	1	Not Threatened
Unidentified salmonid	Salmonidae	1	Introduced and Naturalised
Brown trout	*Salmo trutta*	2	Introduced and Naturalised

Notes:

Data retrieved from https://niwa.co.nz/information-services/nz-freshwater-fish-database on 08 December 2020.

Records are within a 10 km radius of the unnamed drain monitoring site.

Conservation status classifications derived from 'Conservation status of New Zealand freshwater fishes, 2017[1]

[1] Dunn, N. R., Allibone, R. M., Closs, G., Crow, S., David, B. O., Goodman, J., & Rolfe, J. R. (2018). Conservation status of New Zealand freshwater fishes, 2017. Publishing Team, Department of Conversation.

2.2 Field Assessment

To determine the presence/absence of fish, as well as fish community composition in the unnamed drain, a fish survey was conducted on 4 December 2020. Seven fyke nets and six Gee Minnow traps were set throughout an approximate 350 m long reach of the main drain. A further four Gee Minnow traps were set in two of the smaller side drains. Due to the depth of the drain (approximately 1.5 m), all nets/traps were deployed from the bank. Traps were baited (cat food) before being left overnight. Fish were retrieved from the traps in the morning (set for 15 hours), identified and measured, then returned to the drain. Figure 1, attached at the end of this letter report, shows the location of the traps/nets set within the Unnamed Drain.

A summary of freshwater fish survey results is presented in Table 2.

Table 2: Freshwater fish survey results from the unnamed drainage channel, upstream of the Stead Street pump station.

Common Name	Scientific Name	Abundance	Size Range (mm)
Bullies	*Gobiomorphus spp.*	185	40-75
		35	76-100
Longfin eel	*Anguilla dieffenbachii*	3	350-550
		6	560-1200
Flounder	*Rhombosolea sp.*	1	20
Galaxiids	*Galaxias spp.*	34	40-75
		6	75-80

Notes: This catch is from a 350m stretch of the drainage network that drains the recreational reserve. The confluence of two side drains that flow into the main drain have been included in the survey area.

Across the seven fyke nets and ten Gee Minnow traps, a total of 270 fish were caught representing at least four separate, native taxonomic groups. It is noted, however, that a wide range of bully and galaxiid size classes was caught, and without anaesthetising or euthanising specimens, positive identification of juveniles was limited. The most abundant taxa caught were bully, identified in the field to predominantly include the common bully (*Gobiomorphus cotidianus*) and the 'At Risk – Naturally Uncommon' giant bully (*Gobiomorphus gobioides*). Juvenile to sub-adult galaxiids were also caught in relative abundance. The galaxiids were identified in-field to be inanga (*Galaxias maculatus*), an 'At Risk – Declining' mahinga kai species commonly known as whitebait. The 'At Risk – Declining' longfin eel (*Angiuilla dieffenbachii*) was also caught throughout the site, including primarily larger (550-1200 mm) specimens, as well as a single juvenile flounder for which species-level identification was not possible (*Rhombosolea sp.*).

3.0 Summary

There was an abundance of fish species identified in the 350m reach of the drainage network assessed. The community of fish species caught represents a subset of what is naturally found within this area, consistent with the research conducted into the New Zealand Freshwater Fish Database.

There was no clear fish passage observed onsite; however, at least three of the species (common bully, inanga, and longfin eel) identified have a migratory life-phase[2]. Importantly, longfin eel was identified in a range of size classes. Longfin eels require downstream passage to the sea to breed and complete their lifecycle[2].

Local accounts indicate that eels are common throughout the drainage network, with commercial fishermen setting traps for harvest, further accounts indicate that the drainage network can receive some recharge from the Waihopai River/New River Estuary in flood conditions, when the flood bank levels are exceeded. This anecdote may explain the presence of juvenile migratory species such as the galaxiids and bullies, and in particular, the presence of smaller size classes of the obligate migratory longfin eel in the absence of passage to the coast.

The survey conducted by PDP field staff on 4 December 2020 indicates that the unnamed drain located upstream of the Stead Street pump station comprises a valuable freshwater fish community. The taxa recorded were entirely native, highly migratory, and include both at-risk and mahinga kai species. Local reports indicate that this site is also used for commercial eel harvesting. It is therefore recommended that consideration be made towards safe coastal passage for these fish in the design and construction of the proposed new pump station.

4.0 Limitations

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Environment Southland. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared by PDP on the specific instructions of Environment Southland for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Yours faithfully

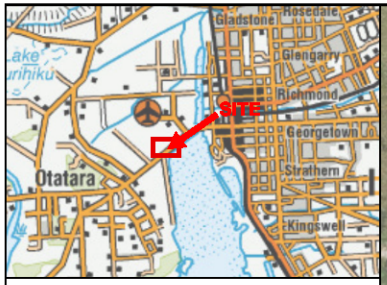
PATTLE DELAMORE PARTNERS LIMITED

Prepared by	Reviewed by
Gemma Scott	**Laura Drummond**
Environmental Scientist	Service Leader - Ecology

[2] McDowall, R. M. (1998). Driven by diadromy: its role in the historical and ecological biogeography of the New Zealand freshwater fish fauna. Italian Journal of Zoology, 65(S1), 73-85.

Approved by

Eoghan O'Neill
Technical Director – Water Infrastructure



SITE LOCATION

KEY :

Fish survey sites

- Fyke nets
- Gee Minnow traps

STEAD ST

SOURCE:
1. AERIAL IMAGERY: LINZ

SCALE : 1:2,500 (A4)

0 25 50 100
METRES

STEAD STREET DRAIN FISH SURVEY SITES (DECEMBER 2020)

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