23 November 2020

Murni Goertz
Surface Waters Operations Engineer
Selwyn District Council

Dear Murni,

As required as a condition of Resource Consent CRC172231 (discharge of Stormwater and Land Drainage Water from the Osbornes Drain Catchment into Te Waihora/Lake Ellesmere), NIWA has completed monitoring and fish relocation in Osbornes Drain, Pump Forebay and Branch Drain.

Unlike conditions during previous surveys, the areas of interest in Osbornes Drain catchment had higher water levels (circa 600 mm) during this year's survey compared with previous years. It appeared this may have been due to a combination of several factors including low water demand, higher water levels in Te Waihora/Lake Ellesmere at present, etc. In Branch Drain, water had backed up for at least 100 m from the confluence with the pump forebay area; any flow in the drain was imperceptible under these conditions. Two fyke nets were set in Branch Drain, one facing upstream, and the other facing downstream. No electrofishing was attempted because of high water conductivity but conditions were clearly more suitable for sampling using fyke nets.

For this year's survey, 12 fine-meshed (4 mm) fyke nets were set in the area required by the consent; this included the two set in Branch Drain. As in previous years, Gee-minnow traps were not set as the fine-meshed fyke nets we used capture both small and large fish and have compartments to separate the smaller fishes from larger eels.

A total of 109 fish (all eels) were captured during the 2020 monitoring, compared with 43 fish captured during the monitoring in 2019, 83 fish caught in 2018, and 103 during 2017 (sampling was conducted at the same time each year).

This year there were 83 eels captured on the first night of sampling and 26 eels on the second night just over a week later. This year no inanga, were recorded unlike in 2019 when five fish were recorded. No common bully have been captured since the 2017 survey and no pest fish have been recorded for the past two years surveys; in the 2018 survey two pest fish species (rudd and tench) were captured. As in the 2019 survey, one longfin eel was recorded during the 2020 survey. This year's catch was comprised of 99% shortfin eels and lengths ranged from 268 to 743 mm; the longfin eel measured 418 mm.

Of the 109 eels caught, there were only 98 eels released into the Halswell Canal. During the second night of this year's survey, 11 eels died in the nets. This was very likely due to the nets being set in deeper water (due to the increase in water depth), and the nets potentially sitting in water with lower oxygen levels than has been the case during previous surveys. Future surveys need to either be conducted when the water levels are at the level of previous surveys to avoid unnecessary eel deaths or nets could be set in such a manner that they are totally submerged (however this may reduce catch rates). This may mean surveying outside the typical survey periods to avoid periods of high lake levels.

Based on this year's monitoring, there is no indication from the surveys to date that eel numbers are reducing over time as part of this annual netting programme; in my opinion, eels will continue to be present each year given the ease of access to the site. I note that the consent specifies that eel relocation should be done for the first five years of this 10-year consent, however, the 'Osborne EF Impediment and Relocation Plan' also notes that the monitoring should assess the effectiveness of impediment measures.

National Institute
of Water & Atmospheric
Research Ltd (NIWA)

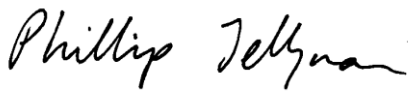
10 Kyle Street
Riccarton
Christchurch 8011
PO Box 8602
Christchurch

P: +64 3 348 8987
enquiries@niwa.co.nz
www.niwa.co.nz

In my opinion, there are very few impediments for eels to access this site and eels will continue to be replenished at the site every year (although the extent of replenishment will vary year-to-year). Thus, based on our four years of monitoring to date I would recommend prior that accumulated eels need to be relocated prior to the beginning of each irrigation season and that the data collected to date do not support stopping the work after five years.

A full breakdown of the fish captured during the monitoring is provided in Appendix A. Location data (i.e., GPS co-ordinates) of where each net was set are available upon request.

Kind regards,



Dr Phillip Jellyman
Freshwater Fisheries Scientist
Assistant Regional Manager – Christchurch

**Appendix A.** Catch data from Osbornes Drain sampling in October – November 2020.

| Date | Drain | Net number | Fish species | Number caught | Min fish size (mm) | Max fish size (mm) |
|---|---|---|---|---|---|---|
| 28/10/2020 | Sump by pump | 1 | No fish | | | |
| 28/10/2020 | Sump by pump | 2 | Shortfin eel | 3 | 402 | 560 |
| 28/10/2020 | Sump by pump | 3 | Shortfin eel | 4 | 332 | 630 |
| 28/10/2020 | Sump by pump | 4 | Shortfin eel | 7 | 418 | 603 |
| 28/10/2020 | Sump by pump | 4 | Longfin eel | 1 | | 418 |
| 28/10/2020 | Sump by pump | 5 | Shortfin eel | 22 | 270 | 653 |
| 28/10/2020 | Main drain | 6 | Shortfin eel | 10 | 360 | 611 |
| 28/10/2020 | Main drain | 7 | Shortfin eel | 3 | 380 | 405 |
| 28/10/2020 | Main drain | 8 | Shortfin eel | 5 | 340 | 522 |
| 28/10/2020 | Main drain | 9 | Shortfin eel | 8 | 320 | 725 |
| 28/10/2020 | Main drain | 10 | Shortfin eel | 9 | 295 | 743 |
| 28/10/2020 | Branch drain upstream | | Shortfin eel | 7 | 330 | 570 |
| 29/10/2020 | Branch drain downstream | | Shortfin eel | 4 | 358 | 525 |
| 5/11/2020 | Sump by pump | 1 | Shortfin eel | 1 | | 460 |
| 5/11/2020 | Sump by pump | 2 | No fish | | | |
| 5/11/2020 | Sump by pump | 3 | Shortfin eel | 3 | 330 | 645 |
| 5/11/2020 | Sump by pump | 4 | Shortfin eel | 2 | 260 | 320 |
| 5/11/2020 | Sump by pump | 5 | No fish | | | |
| 5/11/2020 | Main drain | 6 | Shortfin eel | 3 | 483 | 660 |
| 5/11/2020 | Main drain | 7 | Shortfin eel | 2 | 400 | 459 |
| 5/11/2020 | Main drain | 8 | Shortfin eel | 2 | 268 | 513 |
| 5/11/2020 | Main drain | 9 | Shortfin eel | 4 | 525 | 680 |
| 5/11/2020 | Main drain | 10 | No fish | | | |
| 5/11/2020 | Branch drain upstream | | Shortfin eel | 3 | 322 | 446 |
| 5/11/2020 | Branch drain downstream | | Shortfin eel | 6 | 308 | 508 |