# Results of Fish Monitoring Survey – Waiwhetu Stream, Above and Below St Ronans Ave Weir 19 February 2022

#### 1. Introduction

The ninth survey as part of our Citizens Science fish monitoring project was undertaken on 18/19 February 2022. Five FWS volunteers helped set the nets on Friday night. Eight FWS volunteers assisted with retrieving the nets and identifying and counting fish on Saturday morning.

The original objectives of the fish monitoring were to determine:

- whether the St Ronans Ave weir acts as a barrier to fish passage; and
- whether modifications to the weir over time improve the ability of fish to negotiate the weir.

The first question has now been definitively answered - yes, the weir does act as a barrier to fish passage. We do not have a definitive answer to the second question but we suspect that the addition of the floating fish ramp in February 2018 has had no effect. In view of this, the survey objectives have expanded to monitoring fish population trends more generally over time.

There are two 150 m long monitoring reaches - one below the St Ronans Ave weir and the other one upstream of the weir. Fyke nets were set at three sites in each reach on the Friday night. The nets were retrieved on Saturday morning and the captured fish identified, counted and carefully released back to the stream.

The streamflow was 210 litres/sec from the Whites Line East gauge at 0840 hours at the start of the survey on Saturday morning. The water temperature was measured to be 16.3 °C at the start (Site 1) while the pH of the water was determined to be 6.5 (higher than in previous years).

The streamflow was higher than in the three previous February surveys – 54 l/s in February 2018, 90 l/s in February 2019, 25-35 l/s in February 2020 and 122 l/s in February 2021.

The water temperature (16.3 °C) was similar to the temperature in February 2021 (16.0 °C) but lower than in February 2020 (18.3 °C) and in February 2019 (18.2-17.5 °C – drop due to southerly change).

This report presents the results of the fish identification and count for the February 2022 survey. The monitoring sites are numbered from downstream to upstream. Sites 1-3 are below the weir (upstream of the Birdwood Road Bridge to about 30 m below the weir). Sites 4-6 are above the weir (from just downstream of the private bridge to about 10 m downstream of the Rossiter Ave Bridge).

## 2. Survey Results

The fish species identified to be present in the stream from this survey included:

- short-fin eel
- inanga
- giant bully
- giant kokopu
- shrimps
- koura

On the weekend before this survey, the stream experienced two consecutive floods, the first one on 12 February peaking at  $6.1 \text{ m}^3$ /s and the second one on 13 February peaking at 14.8 m<sup>3</sup>/s. The stream flow at the

time of the survey was therefore higher than it would normally be for this time of year. There is a possibility that the recent flood activity could have affected the results of the survey.

Figure 1 shows a graph of the number of non-inanga species excluding koura captured downstream of the weir over time since February 2018 while Figure 2 shows a similar graph of the same species upstream of the weir. Key points are:

- We captured 18 short-finned eels (10 downstream of the weir and 8 upstream). This compares with 19 in February 2021, 120 in February 2020, 84 in February 2019 and 39 in February 2018. It also compares with 7 short-finned eels in the preceding November 2021 survey.
- The number of short-finned eels captured included 1 tiny one and 1 small one at Site 2 downstream of the weir.
- We captured 3 long-finned eels (1 downstream of the weir and 2 upstream). This compares with 0 in February 2021, 11 in February 2020, 44 in February 2019 and 10 in February 2018. It matches the same number we caught in the preceding November 2021 survey, except that 2 were downstream and 1 upstream of the weir.
- We captured only 2 giant bullies<sup>1</sup> (both downstream of the weir). This compares with 9 in February 2021, 2 in February 2020, 5 in February 2019 and 10 in February 2018. It also compares with 5 giant bullies in the preceding November 2021 survey.
- We captured 2 giant kokopu at Site 4 upstream of the weir (one large and one medium size). This was a pleasant surprise as we previously used to regularly capture 2-3 giant kokopu at this site up until February 2020. However, in subsequent surveys there was an absence of giant kokopu captured at this site. We did capture 1 or 2 giant kokopu at site 3 downstream of the weir in the December 2020 and February 2021 surveys but none in November 2021. eDNA testing in September 2021 indicated a strong presence of giant kokopu from a sample at net site 1 but not at any other sites.
- We captured 1 small koura (about 30 mm long) at Site 1. The size of the specimen suggests they are breeding in the stream. Previously we have captured larger sized koura at our macro-invertebrate survey sites about 400 m downstream.

Figure 3 shows the numbers of inanga captured across all surveys downstream and upstream of the weir (sites 1-3 and sites 4-6 respectively). Key points are:

- For the first time ever, we captured more inanga upstream of the weir (49) than downstream (41). This gives a total of only 90 fish. Whether the two preceding floods impacted the numbers of fish this time is uncertain.
- However the numbers are low compared with other previous February surveys with a significant decline since the first survey in February 2018. In February 2018, we captured 1130 fish (1085 downstream and 45 upstream). In February 2019, we captured 1035 fish (865 downstream and 170 upstream). In February 2020, we captured 363 fish (330 downstream and 33 upstream). In February 2021, we captured 209 fish (178 downstream and 31 upstream).
- The number of inanga is also lower than in November 2021 when we captured a total of 241 fish (232 downstream of the weir and 19 upstream). Normally we capture more fish in our February survey than in the preceding November survey.

<sup>&</sup>lt;sup>1</sup> We have reclassified some fish as giant bullies from previous surveys which were formerly identified as common bullies. It is difficult to distinguish between the two species – the best means of identification is to count the number of spines on the front dorsal fin (giant bullies have 6 spines on this fin while common bullies have 7 spines). Since we have learned how to distinguish between the two species, we have observed than most of our fish are giant bullies and very few are common bullies.

• The fish captured in the February 2022 survey were predominantly medium sized (61% downstream of the weir and 71% upstream), with lesser numbers of large fish (27% downstream of the weir and 22% upstream) and small fish (12% downstream of the weir and 6% upstream).

## 3. Figures

Figures A1-A8 in Appendix A show selected photographs from the February 2022 survey.

- Figure A1 shows the net being deployed at Site 1 on the evening of 18 February.
- Figure A2 shows the net in position at Site 6 on the evening of 18 February.
- Figure A3 shows the small koura captured at Site 1.
- Figure A4 shows several large short-finned eels captured at Site 2.
- Figure A5 shows the tiny eel captured at Site 2.
- Figure A6 shows a couple of medium-sized giant bullies capture at Site 3.
- Figure A7 shows some of the inanga captured at Site 3.
- Figure A8 shows the large giant bully captured at Site 4.

#### 4. Summary

In summary:

- Eels continue to be present in low numbers compared to previous years.
- The number of giant bullies captured was also low compared to most previous years.
- Giant kokopu have returned to Site 4 upstream of the weir.
- We captured a koura for the first time with the small size suggesting they are breeding in the stream.
- The numbers of inanga continue to decline.



Species count (excluding inanga) downstream of weir - all surveys

Figure 1: Number of fish captured over time (excluding inanga) downstream of weir – all surveys



Species count (excluding inanga) upstream of weir - all surveys

Figure 2: Number of fish captured over time (excluding inanga) upstream of weir – all surveys



Figure 3: Number of inanga captured upstream and downstream of the weir over time – all surveys



Inanga count by size - Feb 2022

Figure 4: Size distribution of inanga across each net site

## Table 1 – Total fish count by species

| Species       | Site No. | Total Count |
|---------------|----------|-------------|
| Short-fin eel | 1        | 3           |
|               | 2        | 5           |
|               | 3        | 2           |
|               | 4        | 6           |
|               | 5        | 1           |
|               | 6        | 1           |
| Long-fin eel  | 1        | 0           |
|               | 2        | 1           |
|               | 3        | 0           |
|               | 4        | 0           |
|               | 5        | 2           |
|               | 6        | 0           |
| Giant bully   | 1        | 0           |
|               | 2        | 0           |
|               | 3        | 2           |
|               | 4        | 0           |
|               | 5        | 0           |
|               | 6        | 0           |
| Common bully  | 1        | 0           |
|               | 2        | 0           |
|               | 3        | 0           |
|               | 4        | 0           |
|               | 5        | 0           |
|               | 6        | 0           |
| Inanga        | 1        | 8           |
|               | 2        | 18          |
|               | 3        | 15          |
|               | 4        | 40          |
|               | 5        | 8           |
|               | 6        | 1           |
| Giant kokopu  | 1        | 0           |
|               | 2        | 0           |
|               | 3        | 0           |
|               | 4        | 2           |
|               | 5        | 0           |
|               | 6        | 0           |
| Shrimps       | 1        | 0           |
|               | 2        | 2           |
|               | 3        | 1           |
|               | 4        | 0           |
|               | 5        | 1           |
|               | 6        | 0           |

#### Table 2 – Size distribution of short-fin eels

| Size   | Site No.    | Count           |
|--------|-------------|-----------------|
| Small  | 1           | 0               |
|        | 2           | 1 (plus 1 tiny) |
|        | 3           | 0               |
|        | 4           | 0               |
|        | 5           | 0               |
|        | 6           | 0               |
|        | Total Count | 1 (plus 1 tiny) |
| Medium | 1           | 2               |
|        | 2           | 0               |
|        | 3           | 1               |
|        | 4           | 3               |
|        | 5           | 0               |
|        | 6           | 0               |
|        | Total Count | 6               |
| Large  | 1           | 1               |
|        | 2           | 3               |
|        | 3           | 1               |
|        | 4           | 3               |
|        | 5           | 1               |
|        | 6           | 1               |
|        | Total Count | 10              |

## Table 3 – Size distribution of long-fin eels

| Size   | Site No.    | Count |
|--------|-------------|-------|
| Small  | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |
| Medium | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |
| Large  | 1           | 0     |
|        | 2           | 1     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 2     |
|        | 6           | 0     |
|        | Total Count | 3     |

# Table 4 – Size distribution of giant bullies

| Size   | Site No.    | Count |
|--------|-------------|-------|
| Small  | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |
| Medium | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 2     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 2     |
| Large  | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |

## Table 5 – Size distribution of giant kokopu

| Size   | Site No.    | Count |
|--------|-------------|-------|
| Small  | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |
| Medium | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 1     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 1     |
| Large  | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 1     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 1     |

## Table 5 – Size distribution of inanga

| Size   | Site No.    | Count |
|--------|-------------|-------|
| Tiny   | 1           | 0     |
|        | 2           | 0     |
|        | 3           | 0     |
|        | 4           | 0     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 0     |
| Small  | 1           | 0     |
|        | 2           | 5     |
|        | 3           | 0     |
|        | 4           | 3     |
|        | 5           | 0     |
|        | 6           | 0     |
|        | Total Count | 8     |
| Medium | 1           | 2     |
|        | 2           | 10    |
|        | 3           | 13    |
|        | 4           | 31    |
|        | 5           | 4     |
|        | 6           | 0     |
|        | Total Count | 60    |
| Large  | 1           | 6     |
|        | 2           | 3     |
|        | 3           | 2     |
|        | 4           | 6     |
|        | 5           | 4     |
|        | 6           | 1     |
|        | Total Count | 22    |

## **APPENDIX A - Photographs**



Figure A1 – Deploying net at Site 1 below St Ronans Ave weir (Friday evening 18 February)



Figure A2 – Net set at Site 6 above St Ronans Ave weir (Friday evening 18 February)



Figure A3 – Small koura (≈ 30 mm) captured at Site 1 downstream of St Ronans Ave weir



Figure A4 – Large short-fin eels captured at Site 2 downstream of St Ronans Ave weir



Figure A5 – Tiny eel captured at Site 2 downstream of St Ronans Ave weir



Figure A6 – Medium size giant bullies captured at Site 3 downstream of St Ronans Ave weir



Figure A7 – Inanga captured at Site 3 downstream of St Ronans Ave weir



Figure A8 – Large giant kokopu captured at Site 4 upstream of St Ronans Ave weir