Cobden wetlands īnanga habitat assessment and recommendations for future management

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Introduction

This short report describes an assessment of the Cobden Island floodplain area and Aromahana Lagoon shoreline, carried out in the company of Henk Stengs, Ranger, Department of Conservation, Greymouth, on 1 and 2 May 2017.

Background

Ecological restoration of Cobden wetlands commenced in 2013 with the first of four annual stages of channel excavations on Cobden Island (Figures 1 and 2). The aims were to provide restored habitat for īnanga including improved spawning habitat in areas inundated on spring high tides. Over 10,000 flaxes and other indigenous species have been planted by volunteers beside the channels in order to provide shade, habitats for indigenous birds, and for aesthetic reasons. Volunteers have also carried out the more difficult task of removing gorse and broom from waterway margins in order to ensure the establishment of riparian plant communities known to support īnanga spawning.

Figure 1. Grey River and Cobden Island floodplain, September 2011 (pre-restoration). (Henk Stengs, DOC).

Figure 2. Grey River and Cobden Island floodplain restoration site, June 2016.
(Henk Stengs, DOC).

Methods

1. Surveys of riparian vegetation (including searches for īnanga eggs) at selected sites within the network of artificial channels, and naturally occurring waterway margins of Cobden Island and the nearby Aromahana Lagoon. The primary objective was to ascertain the vegetation condition for īnanga spawning habitat and to estimate the search effort that would be required for a comprehensive survey of the restoration site.
2. Assessment of restoration progress at the site with regards to īnanga habitat.
3. High tide salinity measurements at selected sites using a hand-held meter.
4. Record findings, matters discussed and recommendations.

Findings and matters discussed

The project has made considerable progress towards its objectives. The level of weed control being maintained has been very successful and the lack of gorse, broom, and blackberry is notable considering the size of the site and high light levels. In most places a dense grass sward has developed grading into rushes and herbs in many wetter areas creating a mosaic of riparian vegetation types. Within the artificial channel network, a variety of in-stream habitats were also noted as a result of different channel widths, incision depths, shading, exposure to flood tide flows,

and sedimentation rates. With regards to īnanga spawning habitat, the project has increased the length of river/channel bank available for spawning by 7 km, with few comparable sites in New Zealand. For example, Christchurch has spawning sites spread along 15 km of river banks. Those along the Manawatu River are spread along 3.5 km.

Specific findings and recommendations:
1. It is more difficult to tell where spawning might occur in Cobden wetlands than in normal river systems because of the complex maze of channels with their multiple entry and exit points for tidal water, as well as their sheer length. This is unlike single channel rivers where it is much easier to narrow down where to search for eggs.
2. No eggs were found beside the artificial channels, but they cover a sufficiently large area to provide confidence that spawning will be occurring somewhere along their margins.
3. Information about peak water levels is lacking. This is useful for planning spawning site surveys. This could be addressed by installing 6-8 simple monitoring stations (at different locations throughout the restoration site) comprised of pegs with lengths of a tape measure attached to them. Recording peaks water heights on these will make it easier to narrow down the vertical zone in which to search for eggs during field surveys (which are done at low water and usually several days after the peak of a spring tide sequence).
4. Issues associated with the limited DOC staff time available for monitoring water levels and undertaking spawning surveys could be offset by setting up a community-based monitoring program.
5. Other useful monitoring information would be to obtain data on shoaling fish in the area, including numbers, fish lengths and girths, and behaviour as well as birds. Collecting this would also suit community volunteer activities.
6. The peak spawning month is likely to be in March or April, but this can only be ascertained by repeat surveys through the spawning season (e.g., February to May). This is the best approach to identifying the extent of spawning habitat and quantifying the level of use.
7. The bankside vegetation that has developed naturally and because of planting is of high quality with the right species present. Growth of flax for shelter is progressing nicely, but there is a lack of in-channel cover for juvenile fish. This could be rectified by adding some large pieces of heavy driftwood to form log jams.
8. Log jams would provide protection from predators and boost the fish population over and above the already good numbers of resident fish present.
9. Resident fish seen were generally of sub-adult length. They may spawn in winter.
10. The large natural channel entering the island from opposite the cranes has a high sediment load because of strong currents and sudden tidal surges. Its margins are of limited suitability for spawning. However, side channels have high potential because they generally consist of clear water, are stable and protected from strong currents, yet they remain tidal and most of them retain water at low tide.
11. The area beside the channels is remarkably free of weeds such as gorse, broom, invasive willows and blackberry, although they are still present.
12. The size of the restored area and extent of channels are such that resilience to flooding and sedimentation is assured. Similarly, its geographic spread is such that it caters for natural fluctuations in locations of the saltwater wedge.
13. Channels have been correctly positioned in relation to the saline-fresh water gradient.

14. The search for eggs on Cobden Island at the place where milt was observed on 30 March was unsuccessful. It is very likely that any resulting eggs would have already hatched.
15. Most channels retain water at low tide. This greatly enhances their habitat value for maturing adults.
16. Surveys in late February-early March 1990 yielded two spawning sites on Cobden Island (Taylor, Buckland & Kelly 1992). The northernmost of those was searched in 2017 but no eggs were found.
17. Salinity is within the range suitable for īnanga spawning (Figure 3).

Figure 3. Bottom (maximum) salinity measurements recorded 1 May 2017 on the tidal peak (3.2m high tide @ 3.11pm)

Spawning sites at Aromahana Lagoon

Freshly deposited (non-eyed) īnanga eggs were found immediately upstream of the lagoon's outlet, on the left and right banks (Figure 4). These are new records and although small in area are likely to see repeat use. They will be also be good demonstration sites to engage the public and should be monitored to ensure the condition of the vegetation is suitable. A search along the western side of Aromahana Lagoon, where there have been reports of spawning in the past, yielded no eggs. That may have been because the vegetation was in poor condition due to having been trimmed and through application of herbicide.
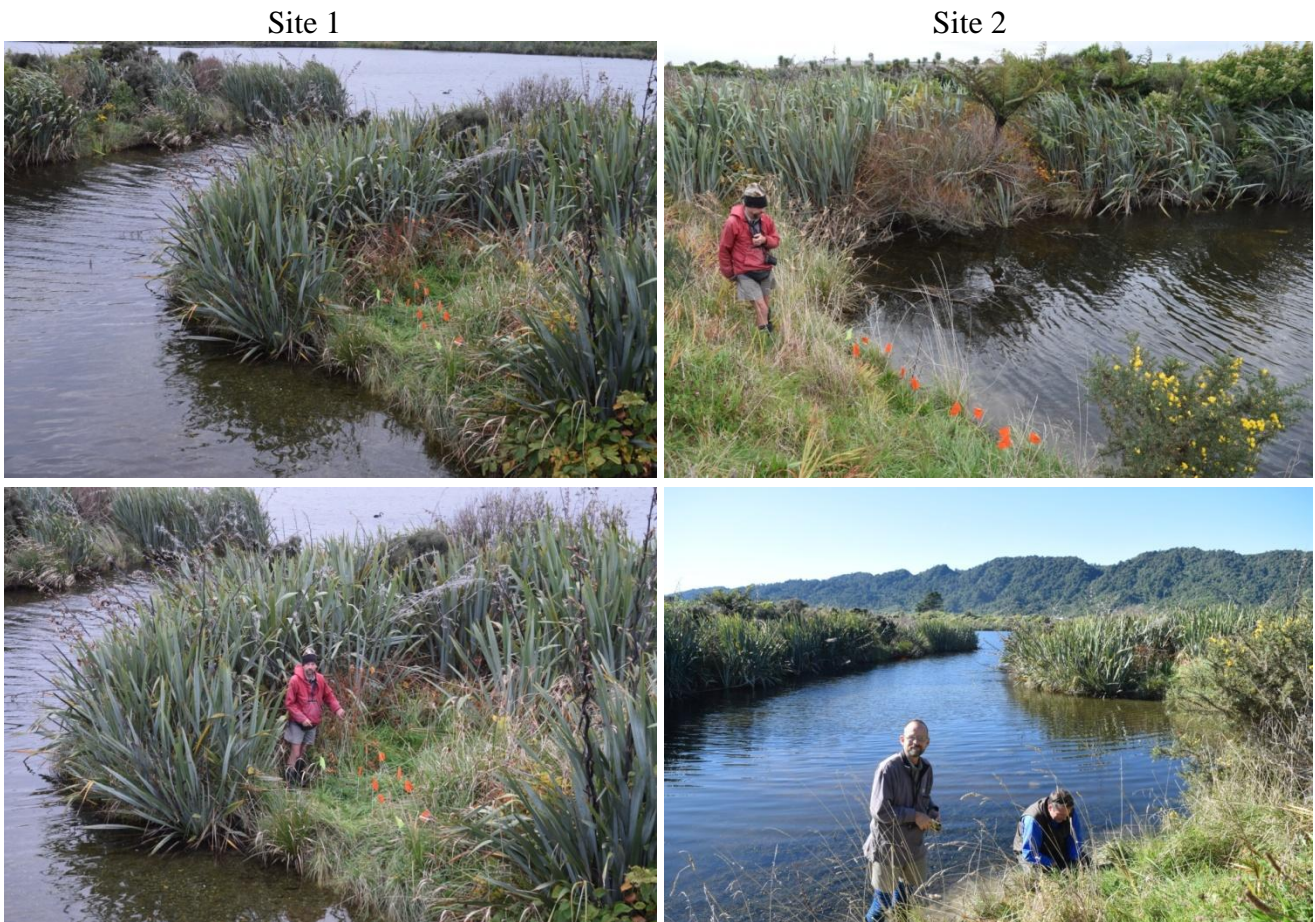
Figure 4. Location of two īnanga spawning sites near the tidal gate at Aromahana Lagoon.

Key recommendations

1. Continue volunteer-based plantings and weed control.
2. Initiate a community-based monitoring program covering spawning surveys, fish size, shoal sizes, spawning behaviour and birds.
3. Install a series of water height monitors and begin recording tidal levels during spring tides. Together with the above monitoring activities this will be useful for design of a comprehensive survey.
4. Develop a survey strategy for next spawning season to identify and ideally quantify īnanga spawning habitat in the restoration area and surrounds. A census type survey similar to Orchard & Hickford (2016) is needed to cover the site.
5. Boost habitat diversity by installing artificial log jams at appropriate places in the channel network. This will provide immediate cover and encourage scouring, slumping and other channel dynamics that are likely to improve habitat conditions for juvenile and adult fish.

References

Orchard, S. & Hickford, M. (2016). Spatial effects of the Canterbury earthquakes on īnanga spawning habitat and implications for waterways management. Waterways Centre for Freshwater Management and Marine Ecology Research Group. Christchurch: University of Canterbury. 37pp.

Taylor, M. J., Buckland, A. R., & Kelly, G. R. (1992). South Island īnanga spawning surveys, 1988-1990. New Zealand Freshwater Fisheries Report, 133. Christchurch: MAF Fisheries. 69pp.