

# WHAKA INAKA : CAUSING WHITEBAIT

Providing Inaka Spawning Habitats to Restore Populations  
in the Ōpāwaho/Heathcote River & Lake Kate Sheppard

WE ♥ WHITEBAIT



AQUATIC SCIENCE &  
VISUAL COMMUNICATION

Project Leader



Te Rūnanga o NGĀI TAHU



COVER PHOTO: Juvenile inaka

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# PROJECT OVERVIEW

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The whitebait run in Christchurch is made up of one species of fish called inaka\*. Inaka only spawn in certain parts of the lower reaches of our rivers, in grasses along the bank that are covered with the incoming 'spring' high tides. Sadly, inaka spawning in Christchurch waterways has massively declined. Changes to the banks/vegetation have made past spawning habitats unsuitable. The 2011 earthquakes created further damage and a shift in the saltwater wedge (a primary habitat determinant). The reduction in spawning success here could also affect other Pegasus Bay inaka populations that are dependent on juveniles originating from these source rivers.

We will provide immediate temporary spawning habitat along 3 km of riverbanks to improve spawning success in Christchurch and dramatically improve the local

whitebait fishery. Linking with a University of Canterbury PhD research project, Whaka Inaka will help identify new potential spawning locations and assist design of long-term spawning habitat improvements and priorities for planning, alongside other earthquake remediation and community initiatives.

In partnership with Ngāi Tahu, Whaka Inaka will help improve mahinga kai values of the rivers, being a priority concern in the earthquake recovery process and a key natural resource for the local community. Conservation Volunteers NZ will assist to engage the community in the programme. This will enable community to gain insight into this species and help with the conservation of this species.



Inaka making their way upstream.

\* Inaka is the South Island dialect of inanga.

## Why Should We be Worried about Inaka Spawning?

As New Zealanders we are all familiar with whitebait; the juveniles and adults are a highly valued mahinga kai resource, and many of us now partake in the passionate pastime of whitebaiting during the season. In Christchurch the whitebait run is made up almost entirely of inaka (*Galaxias maculatus*). Inaka lay their eggs in the vegetation on gently sloping banks in the vicinity of the saltwater wedge<sup>†</sup>. They congregate in these areas and wait for a high tide during February–May to lay their eggs in the inundated grasses. When the tide recedes the eggs develop amongst the grasses, hatching out when they are covered by the spring tides a few weeks later. The young are washed out to sea where they develop before moving back into our rivers and

streams about six months later as part of the whitebait run. It is a rare thing to have such abundant natural resources in a large city, and something to be celebrated. Whitebait were once so abundant that early Pākehā settlers called it ‘cow-fish’ as it turned the rivers milky white.

Historically, the Ōtākaro/Avon River and Ōpāwaho/Heathcote River have had great spawning habitat for inaka; and the Ōtākaro/Avon River was once regarded as having the largest known spawning habitat in the National Inanga Spawning Database. It is quite likely that, historically at least, this river would have been one of the major sources of juvenile inaka within the greater Pegasus Bay area. However, spawning on these rivers has been in decline for some time

with changes to vegetation (plant succession), bank materials and form rendering much of their historical spawning habitat unsuitable. The 2011 earthquakes caused further damage to much of the remaining habitat due to siltation by liquefaction sand, bank damage, and changes in the location of the saltwater wedge (due to ground level changes from the earthquakes and bridge works altering tidal inundation of the rivers). The reduction in inaka spawning habitat and activity may be having wider-reaching effects on other inaka populations that are dependent on juveniles originating from these source rivers.



Adult inaka live in the upper reaches of rivers but come back downstream to spawn.

<sup>†</sup> The upper tidal limit in a river where freshwater meets saltwater forming a wedge of freshwater/saltwater.

## How Can We Improve Inaka Spawning Right Now?

While long-term restoration of inaka spawning habitat is ultimately required, there is a clear need for an interim measure to maintain good inaka spawning success in the rivers until these longer-term goals can be realised. The Whaka Inaka temporary spawning habitat will help maintain and improve inaka spawning success while spawning habitat recovers from the earthquakes. At the same time the Project will identify where spawning is currently located (irrespective of whether or not suitable habitat currently exists), and thus be able to help direct where long-term spawning habitat improvements can occur. In so doing, our Project will facilitate a better output for funds for long-term habitat remediation.



Spawning habitat at Lake Kate Sheppard has been badly affected by the earthquakes and sediment.



The main spawning site in the Ōpāwaho/Heathcote River downstream of the Opawa Road Bridge was coated in sediment following the Christchurch earthquakes.



Poor bank vegetation along the Ōpāwaho/Heathcote River.



Sedimentation evident in Steamwharf Stream.

Areas of Lake Kate Sheppard and Ōpāwaho/Heathcote River that could be suitable for inaka spawning, but which aren't being used due to unsuitable condition. These are the areas that we hope to provide temporary spawning habitat.

# PROJECT GOALS & BENEFITS

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## Project Goals

- » Provide immediate temporary spawning habitat to help reverse recent declines in spawning habitat and activity in Christchurch rivers.
- » Contribute to work on identifying new spawning locations along Christchurch's rivers. It will integrally link with the UC "Resilient Shorelines" research into long-term resilience of spawning habitat by implementing an on-the-ground restoration treatment based on the results of initial research, that will be used to gather additional information to predict the best strategy for long term restoration.
- » Monitor spawning use and egg survival to document how successful the initiative is. Our monitoring of spawning activity and egg survival will tell us much about the success of the bales on a much larger scale than that undertaken by UC previously. This will be useful for the ongoing and wider programme of inaka conservation here and elsewhere in New Zealand.
- » Weave different parts of the local community together and connect them to the plight of inaka, and a positive future-focused storyline, through publishing and celebrating findings using a range of innovative science communication techniques designed to ensure that the Project outputs are greater than the spawning benefits alone.

## Benefits

- » Improving the local population of a nationally 'declining' species.
- » Contributing to improving the wider east coast inaka run.
- » Improving the mahinga kai values for the Ihutai/Avon Heathcote Estuary.
- » Helping long-term initiatives that are aimed at improving permanent spawning habitat.
- » Linking the health and wellbeing of our natural resources with that of our social fabric.
- » Involvement of the local community to increase their interest and understanding of ecology in their neighbourhood.
- » A chance for local community and business to be involved in something positive.
- » Contributing to composting resources (recycling) through providing the used bales for mulch at the *Mahinga Kai Exemplar* at Lake Kate Sheppard.

# METHODS

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## How We Plan to Help Inaka Spawning

Our Project partners UC will first find out where the saltwater wedge is, and then find how high the spring tides reach up the banks.

In February 2015, we will then place 204 straw bales along 0.5 kms of river bank in the Ōtākaro/Avon River catchment and 2.6 kms of river bank in the Ōpāwaho/Heathcote River catchment.

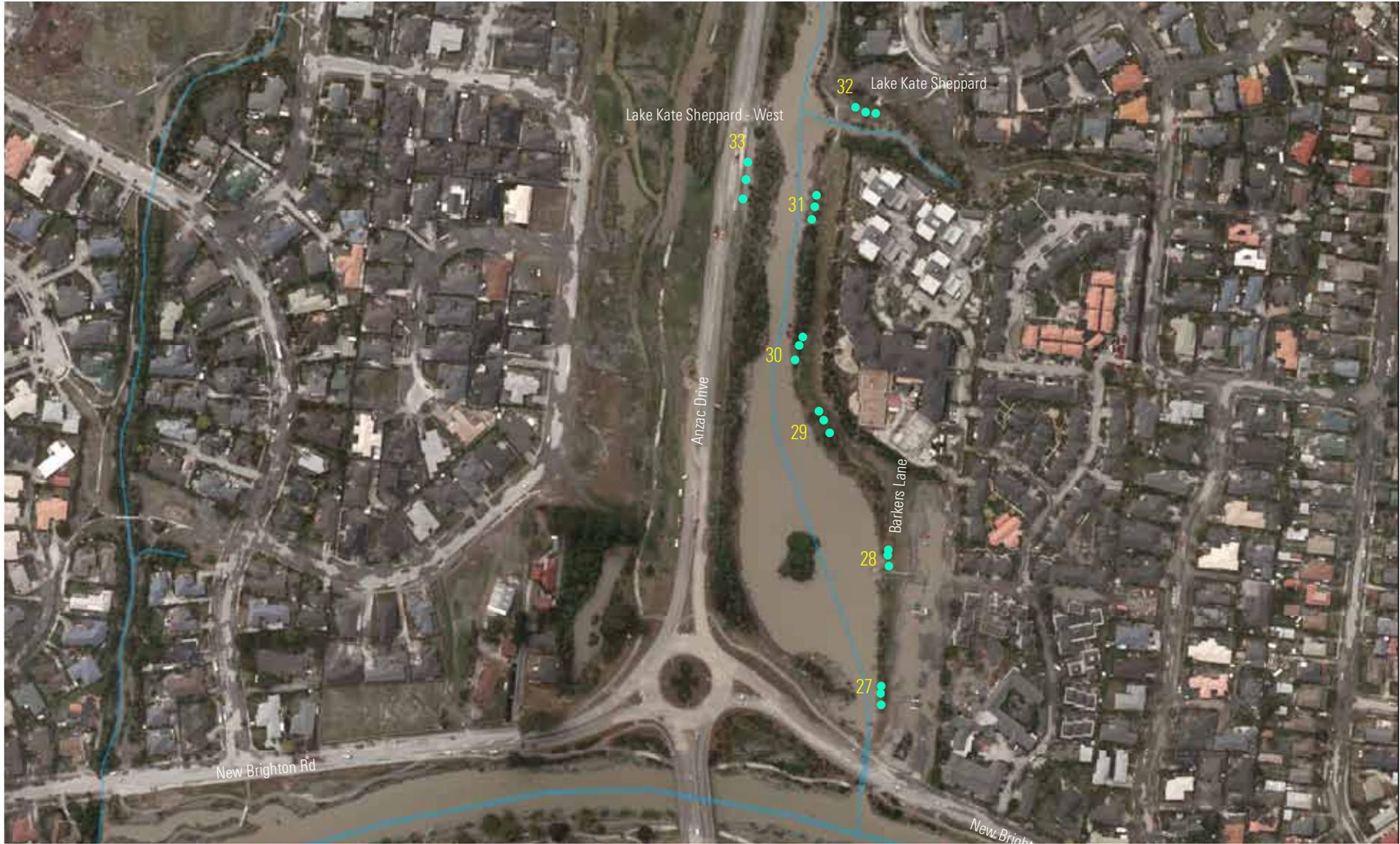
Straw bales have been found to be a perfect spawning habitat for inaka, with the small gap between two bales providing excellent protection for the tiny developing eggs. The bales will be installed in three sets of two bales per site, with about 100 m separating each site. Using good old kiwi ingenuity, each set of two bales will be secured with warratahs and fencing wire.

Once the bales are installed they need to be monitored. Monitoring inaka spawning activity and egg laying on the bale faces is a critical part of the programme. It will tell us where inaka are spawning along the river (which will guide future restoration initiatives). It will quantify the amount of spawning that the temporary habitats have provided (and so tell us how well this temporary measure works). It will also

generate invaluable data that can be used by wider research initiatives. It is essential, therefore, to undertake this project in a way that maximises the project outputs and facilitates greater long-term benefits.

Monitoring will be undertaken on a monthly basis from February to May 2016 (inclusive), at middle to low tides following a sequence of high spring tides. Each time we will check for the presence/absence of eggs on each double-bale face, and count the eggs if present. Once the spawning season is over we will analyse the results and publish our findings in a public-friendly report that will tell everyone what we found and how successful the Project was.

Throughout the Project you can find out how things are going by following the Project Facebook page, reading the media releases, and coming along to open days, or get more actively involved by helping with the installation and removal of the bales.



**LAKE KATE SHEPPARD SPAWNING HABITAT SITE LOCATIONS**

The proposed locations where the sets of straw bales are to be installed on the Ōtākaro/Avon River catchment (in Lake Kate Sheppard as part of the *Mahinga Kai Exemplar*).



**ŌPĀWAHO/HEATHCOTE RIVER SPAWNING HABITAT SITE LOCATIONS**

The proposed locations where the sets of straw bales are to be installed on the Ōpāwaho/Heathcote River.

## Programme Timeline

The following is a brief overview of timing:

| DATE OF ACTIVITY           | DESCRIPTION OF ACTIVITY   |
|----------------------------|---|
| September–October 2015     | <ul style="list-style-type: none"> <li> <b>Confirm</b> Project has sufficient funding to proceed.</li> <li> <b>Finalising programme</b> design and community engagement plan.</li> <li> <b>Preparation</b> – Establishing saltwater wedge, locate position along banks for placement of bales (related to the spring tide levels).</li> </ul>  |
| November 2015–January 2016 | <ul style="list-style-type: none"> <li> <b>Preparation</b> – Finalise location to install bales, establish installation protocols, collate equipment &amp; supplies, and establish volunteers for installation.</li> <li> <b>Public Engagement</b> – Establish Facebook page and produce media releases to increase public awareness of inaka spawning and the Project, and link to wider initiatives.</li> </ul>               |
| February 2016              | <ul style="list-style-type: none"> <li> <b>Installation</b> of bale spawning habitat. Co-ordinate and organise volunteers, prep gear etc. Install bales at the 34 sites. Aim to install all bales in one day at the end of January or beginning of February with the use of volunteers.</li> </ul>   |
| February–May 2016          | <ul style="list-style-type: none"> <li> <b>Monitoring</b> of bales and spawning activity.</li> <li> <b>Public Engagement</b> – Engage with local schools checking on bales throughout period, post on Facebook page and media releases; public day about inaka spawning. Feed information through local community groups.</li> </ul>  |
| June 2016                  | <ul style="list-style-type: none"> <li> <b>Removal</b> of temporary spawning habitat. Co-ordinate and organise volunteers, prep gear etc.</li> </ul>   |
| July–December 2016         | <ul style="list-style-type: none"> <li> <b>Reporting</b> – Data entry and collation, initial data checks, data analysis and producing public-friendly report on findings.</li> <li> <b>Public Engagement</b> – Post on Facebook page about final results, provide final report to all Project partners for loading to their web sites for public dissemination, final medial release about success of programme.</li> </ul> |

# WHO IS INVOLVED?

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**AQUATIC SCIENCE &  
VISUAL COMMUNICATION**

Project Leader

EOS Ecology ([www.eosecology.co.nz](http://www.eosecology.co.nz)) is leading the programme and is responsible for the Project initiative, study design, programme management and implementation, reporting, and approach for a collaborative and inclusive Project with critical environmental and social aims. EOS Ecology is renowned for transferring scientific knowledge into practical and novel solutions for the management of aquatic systems.

Shelley McMurtrie (Principal Aquatic Ecology Scientist) is programme leader and operational contact.



**Te Rūnanga o NGĀI TAHU**

Ngāi Tahu is our key Project partner as it is essential that the Project fully aligns with their wider plans for the long-term improvement in mahinga kai values for the area.

Te Marino Lenihan (Tangata Tiaki, Ngāi Tūahūriri; contractor to Te Rūnanga o Ngāi Tahu) has also been helping to liaise with local Ngāi Tahu hapū representatives and the Te Ihutai Ahuwhenua Trust.



This Project is directly aligned with a PhD research programme aimed to identify requirements for long-term protection and restoration of inaka spawning habitat in light of climate change.

Mike Hickford (Marine Ecology Research Group, research biologist) and Shane Orchard (Waterways Centre for Freshwater Management, PhD candidate) are providing their time to assist with parts of this programme. Through this partnership the benefits of both projects are greatly enhanced.



Conservation Volunteers New Zealand (CVNZ) is organising the volunteers for the programme.

# WHO IS SUPPORTING US

## Key Supporters

The following organisations and business have pledged in-kind support or funds to the programme:



**AQUATIC SCIENCE &  
VISUAL COMMUNICATION**



**K4**  
CULTURAL LANDSCAPE  
CONSULTANTS LTD



**Te Rūnanga o NGĀI TAHU**



Department of  
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**ravensdown**



**Rātā  
Foundation**



**Canterbury  
Water**

**Kathmandu**

**Hirepool**

**MITRE 10**

**CALTEX**  
DYERS ROAD

**city care**

## Wider Supporters

The following are organisations that support the programme in principle:

- » Avon Ōtākaro Network (AvON)
- » *Mahinga Kai Exemplar* (MKE) Project
- » Heathcote River Working Group
- » Christchurch City Council

The many volunteers needed for bale installation and removal, and the schools involved in the Predator Monitoring Module.

## TO FIND OUT MORE...

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 For more information visit our Facebook page  
– web search “facebook whaka inaka”, or

 [kirsty@eosecology.co.nz](mailto:kirsty@eosecology.co.nz), or

 Kirsty Brennan on 389 0538 x 706

if you would like to receive a copy of the full  
Whaka Inaka Project Overview, or to discuss  
how you could be involved.

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We'd  to hear from you!

