

Looking after natural assets – the key to New Zealand’s resource management



Fish screen design and installation involves significant investment. Given the large capital outlay ahead for irrigators, clear expectations need to be set around how to achieve effective fish screens, alongside the provision of greater certainty that the designers and installers of fish screens can achieve long-term, affordable, and compliant screens for irrigators.

Studies have shown that most fish screens are not effective at screening fish and returning them uninjured to their source. The Regional Committee of the Canterbury Water Management Strategy formed the Fish Screen Technical Working Group to investigate this and make any findings applicable in a national context.

In late 2019 IrrigationNZ (on behalf of the New Zealand Fish Screen Technical Working Group), received a grant from the Sustainable Farming Fund to further research fish screen design criteria. The aim of the research is to provide clear and simple guidance on fish screen requirements and provide solutions and guidance on existing fish screen deficiencies.

This work is helping to develop more effective fish screen designs by getting a better understanding of fish behaviour at intakes, improving design guidance and informing the development of appropriate future consent conditions.

Bridget Zoe Pringle is the Technical Project Manager of the Fish Screen Project, we caught up with her to learn more about fish screens and her involvement with the project.



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Where are you based and what is your role?

I am based in Temuka, but generally work between Christchurch, the Upper Waitaki Catchment and South Canterbury. I am the Project Manager (Technical) for the IrrigationNZ *Adoption of Good Practice Fish Screening* project. I also work with Irricon Resource Solutions as a Senior Environmental Consultant and am a Director and Project Manager for UAV Services – an aerial data gathering company.

How did you get involved with water management/resource management, what is your background?

I grew up on a farm in North Otago where I

spent countless hours mucking around in the local river. I think this is where my interest in water and rivers originated – I find everything about water interesting and especially so in New Zealand! I am married to a mixed arable, vegetable and fruit producing farmer and water plays a massive role in our family life, both on farm and recreationally.

I hold a bachelor’s degree in Resource Studies and have worked in the field of resource management in New Zealand and the UK for over 15 years. I have experience in freshwater quantity and quality management, fisheries management, and planning/legislation processes, including preparation and presentation of submissions in hearings

and presenting expert evidence in the Environment Court.

Why is resource management important to you – specifically freshwater?

Natural resources – land, water and air, are the only reason we can exist.

Management of natural resources, now and for future generations is the core of New Zealand resource management legislation but is fraught with competing demands between human uses – economic, cultural, recreational, inherent values, and again between humans and other species – taonga species, unique fisheries, invertebrates, plants and other habitat/ecological values. There are



Intake screen with submersible pontoon.

linkages between all these values and there is always a 'knock on' effect of any resource use. Recognising and managing these effects, whilst it can be a very challenging and adversarial space to be in at times, suits my management style and inherent interest in natural sciences.

How did you get into the fish screen project and why?

I was probably approached to manage the Fish Screen Project because of my fisheries and planning background and the relationships I have with the various stakeholders. I was a member of the original Fish Screen Working Party around 2007 and managed to gain some good technical and planning knowledge via that process and in other consulting roles I have held. IrrigationNZ's Commercial Manager Julie Melhopt handles all the financial aspects of the project and we have become a good team over the last year, this support has helped me immensely in the role.

What are the hopeful outcomes of the project?

This project is a two-year national research project predominantly funded by Ministry of Primary Industries and facilitated by Environment Canterbury. The project has various stakeholders that include skills in understanding of irrigation systems, technical fish screen design and installation, biological fisheries and habitat criteria, cultural values, field and laboratory testing methodology and implementation, policy/planning/compliance and recreational values in a national context.

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What has been done so far? What is still to do?

There are several milestones and deliverables associated with the Project and as expected the group has learned a lot and adjustments have been necessary to the project schedule as new matters have arisen. The sheer number of stakeholders and respective skill sets has meant we were able to split the main Fish Screen Technical Working Group into three sub-groups – a Technical Advisory Group, a Communications Group and a Planning/Legislation Group. Note: the Fish Screen Working Group (and its sub-groups) provide recommendations and guidance and do not make regulatory decisions.

To date the following has been achieved:

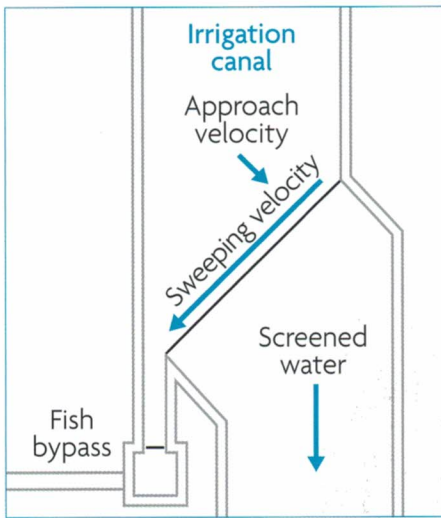
1. A Summary Status Report has been produced that identified gaps to address, compared fish screening regulations/implementation throughout New Zealand and provided updates to existing information.

2. Secured site agreements with irrigators to participate in the physical installation of Best Practice Screens for field trials.
3. Technical Options Reports for these irrigators.
4. Survey and design work for preferred options.
5. Concurrently, various laboratory (indoor and outdoor) trials looking at fish behaviour have been conducted with different fish species and reported on.
6. Held an Industry Engagement Workshop with industry (engineering and manufacturing) to discuss common issues and present findings to date.
7. Developed an online Guidance Tool (working draft) to help irrigators, designers, engineers, fishery managers and regional councils to identify appropriate locations and types of screens suitable for their scenario.
8. Ongoing updates and discussions between stakeholders, both online and written.

Why are fish screens so important? What do they aim to do?

Over the last two decades, issues relating to the management of water and the effects of water use have been a focus of central government. Statutory agencies and regional councils have particular legislative responsibilities and functions relating to fish and fish passage and irrigators must avoid, remedy or mitigate adverse effects caused by their activity.

Freshwater fisheries have suffered serious decline over this time, in particular, there has



Basic fish screen concept.

been a significant increase in the number of threatened native fish species. Many of our species are diadromous (migrate between freshwater and marine environments) which makes them particularly susceptible to becoming entrained in irrigation intakes of all sizes. As above – there is always an environmental ‘knock-on’ effect of resource use that needs to be effectively managed.

Whilst we have existing guidance with key criteria relating to effective fish screening, there remains uncertainty about the ‘what to achieve’ and ‘how to achieve it’. In an engineering and design sense the business of fish screening is much trickier than it sounds – differing species act and move in different ways, within different parts of the water

column, at different stages of their life cycle – this has become very apparent in our recent lab trials, and coupled with hydraulic issues in and around structures, consenting/compliance and the costs involved of screening (generally between a \$10,000 for a small intake right up to over \$15 million for large schemes) there is a lot at stake for both fisheries and irrigators.

An effective fish screen is an essential part of any surface water irrigation infrastructure.

What are the three main things considered when installing a fish screen?

The Guidance Tool, developed as part of this project, has been designed to help you determine the appropriate location and type of screen for your scenario. There are seven key technical criteria to consider when designing and installing a fish screen and you need to work your way through a number of considerations for each of the following criteria:

1. Location
2. Approach velocity
3. Sweep velocity
4. Fish bypass at screen
5. Connectivity of the bypass to the natural ecosystem.
6. Screening material
7. Operation and maintenance.

The Guidance Tool is available at www.irrigationnz.co.nz/KnowledgeResources/FishScreens



Fish screens come in big and small sizes.



Cylinder screen on dual pipe.

What has working on this project taught you?

This is one of the most technical projects that I have managed, with significant implications for irrigators and fisheries alike. It is not often that you get the opportunity to collate such a diverse and large number of stakeholders, some with statutory roles, some with representative roles and some with industry roles (irrigators as well as designers and manufacturers).

The stakeholders have all come from vastly different ‘starting’ points, but I have noticed a real shift in general approach, and everyone involved has been able to openly ‘dare to disagree’ and then constructively work through the issues towards the common goal. We still have a way to go, but I am looking forward to the next steps and getting some real outcomes from the project.

For further information on the fish screen project including project updates and reports produced to date please visit www.irrigationnz.co.nz/KnowledgeResources/FishScreens