Environment Canterbury Fish Screen Pilot:

Internal Summary Report & 2018/19 Fish Screen Improvement Campaign

August 2018

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Executive Summary

Introduction

- From 2004 Environment Canterbury's Regional Plans stated that all diversions or water takes that meet the appropriate criteria must have a fish screen installed which is "kept functional at all times that water is being taken" (CLWRP, 2017:305). The underlying reason is to keep fish in our waterways.

- In response to concerns regarding the state of fish screens and their effectiveness for fish passage, a campaign to improve fish screening has been identified as a priority activity for Environment Canterbury. This campaign will include compliance monitoring of fish screens for the remainder of 2017/18 and for 2018/19. To inform this programme of work, a four week pilot was conducted to inform the 2018/19 monitoring campaign.

Methodology

- The methodology used intended to assess fish screens for effectiveness against Schedule 2 of the Canterbury Land and Water Regional Plan (LWRP) which is based on the NIWA Fish Screen Guidelines. Members of the Fish Screen Technical Working Group (FSTWG) participated in a field trip and were asked to provide feedback on the monitoring procedures.

Findings

- The key finding was that updated monitoring procedures and staff training was required to ensure that fish screen compliance could be comprehensively monitored.

Limitations of pilot

- While a range of screens and intake sizes were sampled, the findings can not be extrapolated to all consent holders due to the variance of conditions on each consent and fish screen set-up. The sample did suggest the potential for greater levels of non-compliance, and that older screens in particular were unlikely to be effective in screening fish.

Monitoring Campaign Development

- The study has informed the monitoring component of the 2018/19 Fish Screen improvement programme, which will focus on 50 consents derived from a list of 150 via stakeholder input. In parallel with the monitoring work , Environment Canterbury will continue to work with and support industry to build capacity and capability in regard to fish screen design and installation.

Conclusion

- The pilot delivered its objective of informing a regional monitoring campaign, including the development of clear standard operating procedures for monitoring fish screens that can be consistently and confidently applied.

Introduction

- From 2004 the *Canterbury Land and Water Regional Plan* stated that all diversions or water takes that meet the appropriate criteria must have a fish screen installed which is “kept functional at all times that water is being taken” (CLWRP, 2017:305). The underlying reason is to keep fish in our waterways.

- In 2007 new guidelines for fish screens were developed by NIWA through a collaborative process initiated by Irrigation NZ, supported by the Sustainable Farming Fund (Ministry for Primary Industries), and these have formed the basis of consent conditions since. The guidelines represent good management practice for fish screens.

- From 2012 until 2017 the implementation and compliance focus for Environment Canterbury was on stock in waterways, dairy effluent, high-risk consents and water metering – the latter being an obligation directed from the National Water Metering Regulations. Fish screens were monitored, but at a lower level to these other priorities.

- With the shift to Audited Self-Management of consents and technology improvements associated with water metering, fish screens have emerged as a more recent priority identified by stakeholders and the broader community. Following a Council decision to prioritise fish screen monitoring, staff from Service Delivery and Regional Support groups commenced the development of a Fish Screen Compliance Monitoring campaign. This work included a four week pilot study.

Pilot

The purpose of the pilot study was to identify and sufficiently detail the required parameters to develop an effective and efficient monitoring campaign, including:

- The time and resources required to monitor fish screens (including trialling specialised equipment);

- Assessments of non-compliance;

- The time required to develop action plans to address non-compliance;

- Assessments of effectiveness against the NIWA guidelines and Schedule 2 of the LWRP;

- Staff training needs;

- Standard Operating Procedures (SOPs);

- Any Health and Safety issues.

In addition, a desk analysis of consents was undertaken to better understand the number of consents with fish screen conditions and categorise them where appropriate.

The pilot ran from 14 May – 8 June 2018, and involved five Resource Management Officers, a Technical Lead, a Senior Resource Management Officer and a Principal Advisor. The eight staff worked on the pilot part-time for the four weeks. Equipment purchased for the trial totalled $650.00 and included health and safety equipment.

Regional Overview

Across the Canterbury region there are 922 water take consents with fish screen conditions (active and S124 continuance under the Resource Management Act) covering 1107 water abstraction points.

Historic Compliance & Effectiveness

In preparation for the pilot, a review of compliance and effectiveness from 2013/14 monitoring was undertaken (Table 1).

Take Type	Screen Types	Number	Effectiveness			Consent Compliance		
			Effective	Ineffective	Could not assess	Compliant	Non-compliant	Unknown/could not determine
Pump	self-cleaning	55	51 (93%)	3	1	51	3	1
	cylindrical	65	13	48 (74%)	4	13	48	4
	other	3	1	2	0	1	2	0
	sub-total	123	65 (53%)	53 (43%)	5 (4%)	65	53	5
Open Channel	rock bund	2	1	1	0	1	1	0
	rotating drum	20	0	20 (100%)	0	0	18	2
	sub-total	22	1 (5%)	21 (95%)	0	1	19 (86%)	2 (14%)
Total		145	66 (45%)	74 (53%)	5 (2%)	66 (45%)	72 (50%)	7 (5%)

Table 1 – Scoping of 2013/14 compliance and effectiveness

- This table shows that overall, 45% of fish screens were compliant and effective.
- It also shows that when these screens were monitored, there was a correlation between compliance and effectiveness. However, this may have been a result of the monitoring methodology of the time, or that the consent conditions of the fish screens monitored allowed for their effectiveness to be determined.
- It is useful to separate between pump and open channel takes. On the whole, pump takes are smaller takes, while larger takes (potentially anything over 100l/s) will be an

open channel. The two types tend to have different types of fish screens and levels of compliance or effectiveness.

Fish Screen Technical Working Group

- The Regional Committee of the Canterbury Water Management Strategy (CWMS) has formed a Fish Screen Technical Working Group (FSTWG) to investigate technical issues. This Group will review the current good practice guidelines and may commission new research. Environment Canterbury is a member of the Technical Working Group, which is working to improve industry capability and address technical challenges.

- It is important to note that the FSTWG is not involved in the fish screen compliance monitoring campaign (as this is an Environment Canterbury responsibility). However, there may be dialogue between the two entities from time-to-time, and the FSTWG is a resource for technical guidance as required. For example, members of the FSTWG accompanied Environment Canterbury staff on a trip to review fish screen monitoring procedures on 25 June 2018.

Methodology

Schedule

The schedule of the pilot is shown in Table 2 below.

Date		Activity
4/05 – 13/05	Pre-Pilot	• 1 briefing session for officers • 1 training session for officers (indoors) • Equipment purchased
14/05 – 20/05	Pilot Wk 1	• 2 full training days for officers (in field) • First week check in/debrief
21/05 – 27/05	Pilot Wk 2	• Fish screen monitoring (mostly in pairs) • Ongoing support from Technical Lead/ Principal Advisor/ Senior Resource Management Officer
28/05 – 3/06	Pilot Wk 3	• Fish screen monitoring (mostly in pairs) • Ongoing support from Technical Lead/ Principal Advisor/ Senior Resource Management Officer
4/06 – 10/06	Pilot Wk 4	• Fish screen monitoring (mostly in pairs) • Ongoing support from Technical Lead/ Principal Advisor/ Senior Resource Management Officer • Workshop with officers
11/06 – 29/06	Post-Pilot	• Debrief with officers • H & S field visit for H & S Advisor • Field trip with stakeholders from Fish Screen Technical Working Group

Table 2 – Schedule of Pilot

Compliance & Effectiveness

Effectiveness means assessing the fish screen against Schedule 2 which in turn is an interpretation of the NIWA Fish Screen Guidelines. The seven criteria for measuring effectiveness are:

1. **Location** – Consideration given to risk of overtopping (which would make the fish screen ineffective), and the flood risk.

2. **Through Screen Velocity** – A theoretical through screen velocity is calculated using a number of measurements in lieu of being able to actually measure approach velocity. To measure approach velocity would require specialist technical equipment and advanced training. At the time of the pilot this equipment was not available, however budget has since been made available under the 2018-2028 Long-Term Plan (LTP).

   This measuring is to ensure that most fish can swim against the flow of water being taken. For that reason it should not exceed 0.12m/s, as stipulated in Schedule 2. Non-self-cleaning screens, or screens with ineffective self-cleaning mechanisms due to risk of blockage would need to achieve an approach velocity of no greater than 0.06m/s (not in Schedule 2, but important in terms of overall effectiveness at protecting fish).

Picture 1 - Officer taking measurements of screen aperture on rotating drum

3. **Sweep velocity/angle** – Sweep velocity is the velocity of the water moving across the face of the fish screen, which is important in allowing the fish to swim away from the intake. The sweep velocity should exceed the approach velocity (>0.12m/s) as stipulated in Schedule 2.
   The screen angle is the angle of the fish screen relative to the direction of the water flow. The closer a fish screen is parallel to the flow of water, the greater the sweep velocity, which avoids an over-reliance on other fish screen factors to ensure the fish are unharmed. Therefore, the screen angle should be no greater than 45 degrees to the flow of the water.

4. **Bypass entrance, sweep, flow and distance** – A number of important considerations apply to the bypass, which allows fish to return to the waterway they came from.
   This includes checking if the entrance is in line with the front of the screen, as an entrance that is upstream of the screen would be ineffective. There would also need to be good sweep velocity to the bypass and the bypass flow would have to be under 10% of the intake flow. From a structural perspective, the bypass needs to be an open channel, not a pipe, to ensure the fish are returned to the waterway unharmed.

The bypass needs to be less than 200 metres long to ensure fish are returned to the waterway as quickly as possible.

5. **Bypass connectivity** – Relates to whether the bypass reconnects to the active channel and whether that connection is an easy pathway for fish. This is difficult for consent holders who reconnect to a braided river which continuously moves.

6. **Screen aperture size**, **condition, blockage risk and seals** – This considers the actual dimensions and mechanics of the screen installed, for which there are specific requirements under Schedule 2.
   - For mesh or perforated plates to be effective at protecting fish, the maximum diameter is 3mm for mesh and 2mm for slots, therefore anything over 3mm is deemed ineffective. This is especially important if other factors such as approach or sweep velocity are considered to be unfavourable.

   The risk of blockages is considered, and the screen examined for any damage, and any repairs.

   Finally, the seals of the screen are inspected – these are the seals that run along the screen, which need to be placed correctly, in good condition and not worn, as this will make the screen ineffective. Inspection would require looking along the side of the screen, which can be difficult if it is submerged.

7. **Operation and maintenance** – This considers whether the consent holder is operating the fish screen as it was designed, and considers their maintenance schedule. It also considers whether the screen is managed by a dedicated operator and their inspection frequency. The maintenance also covers aspects of any repairs to the screen and the quality of the repairs that have been completed.

As with any monitoring, contextual consideration will be given to any extraneous variables that may have relevance when monitoring a fish screen. However, the seven effectiveness criteria represent a consistent baseline of what is expected from a functional fish screen and if any one of these criteria is not met, then the screen may be ineffective at protecting fish.

A summary of this is show of the seven effectiveness criteria is shown below, Table 3, which is extracted from the Field Officer Monitoring Sheet.

Criteria	• **Critical Factor**	**Effectiveness Grade**					
		Effective		**Ineffective – moderate** *Modification of current screen and/or better management required to achieve effectiveness*		**Ineffective – significant** *Potential rebuild of screen required to achieve effectiveness*	
1	Location – risk of overtopping	No	□			Yes	☐
	Location – flood risk	Low to Moderate	□	**High**	□		
2	Through screen velocity	**< 0.06 or 0.12 m/s**	□	**> 0.06 or 0.12 m/s** *(If this can be achieved with minor intake adjustments)*	□	**> 0.06 or 0.12 m/s** *(If this cannot be achieved with current screen at required flow)*	☐
3	Sweep velocity	Greater than approach - significant	□	Moderate	□	No or Negligible	☐
	Screen angle	between 0º and 45º	□			between 45º and 90º relative to flow direction)	☐
4	Bypass – entrance location	Inline with from of screen	□	Upstream of screen	□		
	Bypass - sweep	Good sweep velocity to bypass	□			No sweep velocity to bypass	☐
	Bypass - flow	Bypass flow > 10% of intake flow	□	Bypass flow < 10% of intake flow	□		
	Bypass – entrance type	Open channel	□	pipe	□		
	Bypass distance	< 200 metres	□			• > 200 metres	☐
5	Bypass – connectivity adequate	Yes	□	No	□		
6	Screen – aperture size	< 3mm for holes, < 2mm slot width, or < 2mm with 2km of coast.	□	> 3mm for holes, > 2mm slot width, or > 2mm with 2km of coast. (where aperture size can be confirmed and modified	□	> 3mm for holes, > 2mm slot width, or > 2mm with 2km of coast. *(novel screen where aperture size cannot be confirmed or modified)*	☐
	Screen – condition	• Effective	□	Ineffective minor / significant	□		
	Screen – blockage risk	• Effective	□	Moderate	□	Significant	☐
	Screen - seals	• Effective	□	Ineffective – minor / significant	□		
7	Operation & Maintenance	Effective	□	Ineffective – minor/significant	□		

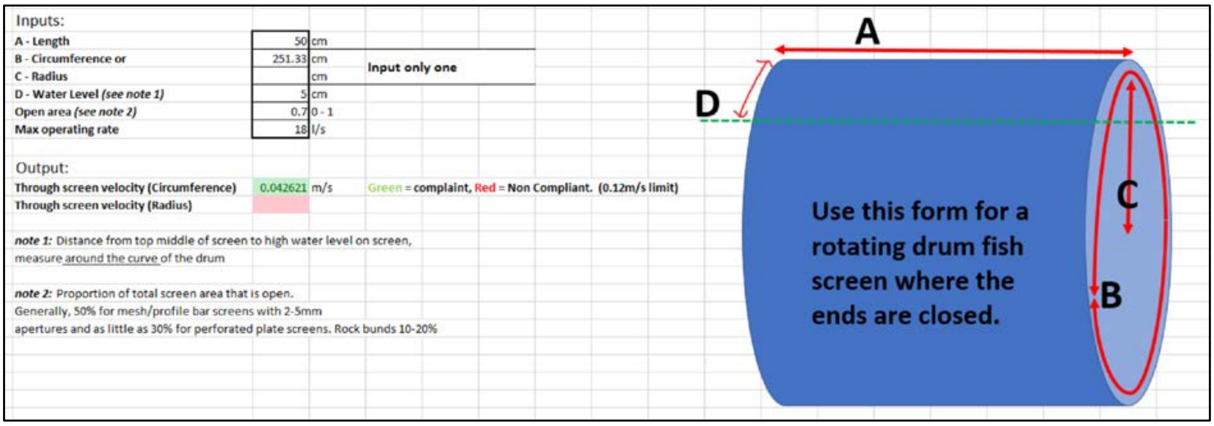
Table 3 – Effectiveness Assessment from Field Sheet

Standard Operating Procedures

- From the above effectiveness criteria, a Standard Operating Procedure (SOP) for monitoring and recording effectiveness was developed iteratively and collaboratively with the Officers involved in the pilot study. Two SOPs were developed – one for assessment of pump screens and one for open channels.

- For the purpose of the pilot, a number of other questions were added to the field sheet around consent holder awareness, staff time taken to assess and complexity to determine effectiveness. In normal circumstances, these would not be included. The monitoring field sheet was also explored with Fish Screen Technical Working Group members during the field trip (25 June 2018) with feedback considered and incorporated into the field sheet where appropriate.

- Consistency in the calculations required was also an essential part of the pilot, so a calculation tool (see Picture 3) has been developed. Officers record the measurements on-site, performing the required calculations when they return to the office.



Picture 3 – Example of the calculator tool developed

Seasonal Assessments

- One of the questions addressed by the pilot study is the extent to which fish screens can be accurately assessed for their effectiveness during winter when they are not in use. Consideration has been given to whether fish screens need two visits, one when they are not operating to assess the mechanics, and the second when they are operating, to determine accurate velocities. However, the calculation of data gathered through the tool provides a determination of effectiveness.

- It is important to note that the more significant health and safety risks of visiting fish screens during summer when they are operational. Whether or not consent holders were charged for two visits would also need consideration.

- A question was added to the pilot monitoring sheet to determine whether Officers thought a second visit was needed to fully assess the effectiveness of a screen. This is reported on in the findings section.

Health and Safety Considerations

Health and safety considerations have been a central part of the pilot study, to develop a safe Standard Operating Procedure. A risk matrix was applied as in Table 4, below, which shows that there are some risks that need to be mitigated.

Risk Type	Description	Inherent Risk		Residual Risk		Mitigation
		Consequence	Likelihood	Consequence	Likelihood	
Environment	Task affected by weather, slippery / unstable terrrain	Moderate	Foreseeable	Minor	Remote	Behavioural
Water	Irrigation channels, ranging in size and speed	Major	Probable	Moderate	Foreseeable	Behavioural
Lone / Remote Work	Work will be in rural and out of the way locations	Major	Probable	Minor	Foreseeable	Administrative
Machinery	Roatating durms (fish screens) in the water channel	Major	Possible	Minor	Foreseeable	Behavioural
Transportation	Up to 3 hours / day on rural and open road, some gravel	Major	Possible	Moderate	Foreseeable	Behavioural

Table 4 – Fish Screen Monitoring Risk Matrix

To ensure the risks have been appropriately identified and appropriate mitigations applied, an Environment Canterbury Health and Safety Advisor assessed some fish screen sites.

The following equipment was identified as shown in Table 5.

Equipment Requirements	
Task / Site Equipment ✓ Throw bag ✓ First Aid Kit ✓ SPOT -beacon	Personal Protective Equipment ✓ Warm Clothing ✓ Rain coat ✓ Hiking Boots (NOT gumboots) ✓ Lifejacket

Table 5 – Fish Screen Monitoring equipment list

Specific training that was identified was Advanced Driver Training, Water Safety Training (both standard for field officers) and Machinery Awareness.

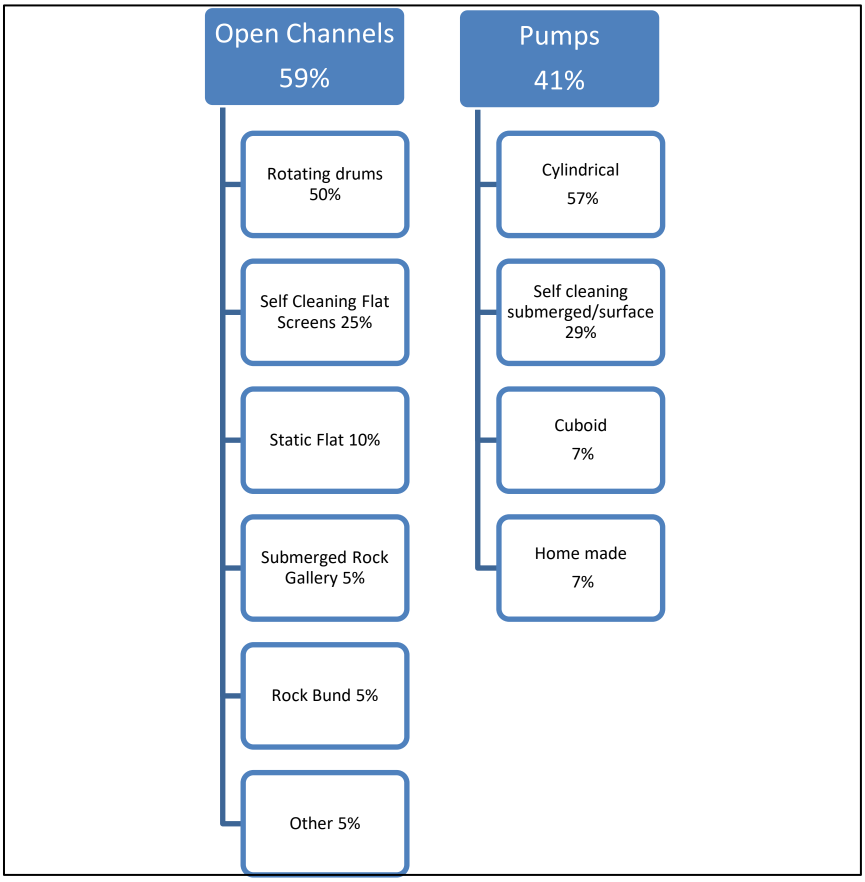
Findings

Overview

The screens selected for inclusion in the pilot were chosen to cover a wide range of technically different screen types, consented volumes, and included both pump and open channels.

While the study looked at a range of screens, it does not comprise a fully representative sample of all fish screens. For example fish screens included within the pilot were not representative of the range in consented water volumes and those with consent conditions from prior to 2008 were overrepresented.

In total, during the pilot study, 33 consents were monitored by Officers, and 35 fish screens were assessed. Of the remainder, one could not be assessed for health and safety reasons.



Picture 3 – Breakdown of Screens

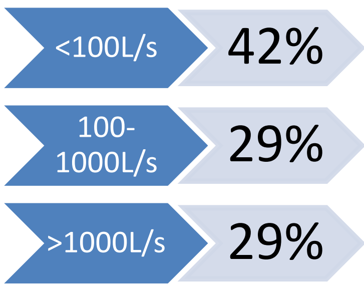
Types of Screens

The screens that were looked at can be broken down in to Open Channels and Pumps, with the breakdown of what was monitored shown in Picture 3.

There was a good variety of screens seen in the field, although it was clear that the most common type was rotating drums for open channels and cylindrical for pumps.

Size of Takes

The variance of size of takes monitored during the pilot ranged from 11l/s to 8220l/s. There was an even spread across all ranges of takes as shown in Picture 4.



Picture 4 – Range of Size of Takes Monitored

Compliance Findings

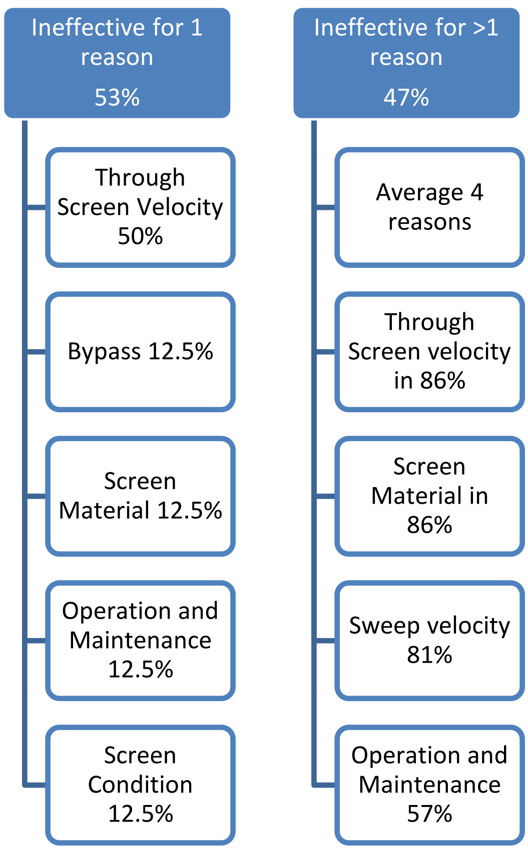
- It was clear that the majority of screens were C grade, however it is important to note this may not be indicative of all conent holders, given the limitations of the sampling methodology. There are a few points to note under the other categories.

Grade	Percentage
A	**6%**
B	**5%**
C	**83%**
D	**3%**
Unable to determine	**3%**

- The grading above was completed by Officers using FEP Audit descriptors. It is recommenended that grading descriptors for fish screens be further reviewed alongside enforcement guidelines developed for Officers.

Breakdown of Ineffectiveness

The proportion of ineffectiveness can be broken down further to look for correlations.



Picture 5 – Reasons for Ineffectiveness

Firstly, for the screens that were ineffective for one reason, half of these were ineffective for through screen velocity.

For the screens that had only one reason for ineffectiveness, and it wasn't through screen velocity (the remaining 50%), these could potentially be upgraded to become effective.

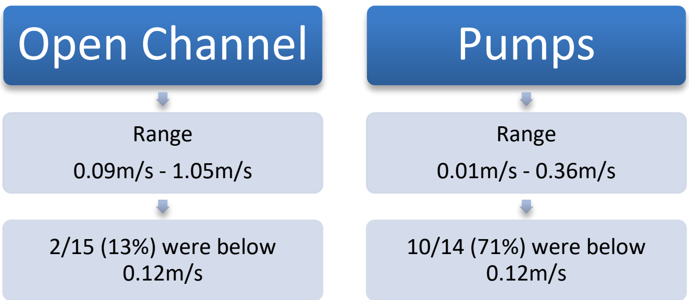
Moving on to the 47% of screens that were ineffective for more than one reason, there were an average of four reasons, however there were several which were ineffective for all seven criteria.

The most common reasons for ineffectiveness were through screen velocity, screen material, sweep velocity and operation and maintenance.

Through Screen Velocity

- As the theoretical through screen velocity was the predominant reason for ineffectiveness in both the categories of a single reason and multiple reasons for ineffectiveness, it is important to break this down further. For example, of the non-compliant screens, eight were non-compliant for through screen velocity only (three open channels, five pumps).

- The range of through screen velocities calculated were from 0.01m/s to 1.05m/s, with the NIWA guidelines stating an effective screen will have a through screen velocity of less than 0.12m/s. Where theoretical through screen velocity was calculated, 41% were below 0.12m/s and 59% exceeded this. Breaking this range down by pump and open channel gives some interesting results, as shown below.



Picture 6 – Range of Velocities

- This shows that of the pumps, 71% had effective theoretical through screen velocities, however only three of these were considered to be overall effective, meaning that they were mostly non-compliant for other reasons (such as screen aperture). For the open channels, only 13% had a theoretical through screen velocity below the recommended 0.12m/s.

Sweep Velocity

- The sweep velocity recorded during the pilot showed that the vast majority of fish screens had none, or negligible sweep velocity, as shown in Table 6 below.

Sweep Velocity:	None/Negligible	Moderate	Significant
Number	22	6	6
Percentage	65%	17%	17%

Table 6 – Sweep Velocity

Screen Aperture

- In terms of the fish screen aperture that was measured, there were 29 screens that recorded measurements. The NIWA guidelines stipulate a maximum of 3mm for mesh size as effective, and 2mm maximum for perforated sheets, however no perforated sheets were found during the pilot. There were a range of different mesh sizes seen during the pilot, ranging from 1.5mm to 8.75mm. The breakdown of these different sizes in shown in Table 7.

Size	1.5mm – 3mm	3.5mm – 8.75mm	**Breakdown by Screen Type**			
			Pump		Open Channel	
			3mm or below	>3mm	3mm or below	>3mm
Percentage	51%	49%	50%	50%	57%	43%

Table 7 – Screen Aperture Breakdown

This shows about half the screens in the pilot study complied with the NIWA guidelines.

Consent Holder Awareness

- Officers were asked to rate the consent holder's awareness of their fish screen condition, which was entirely discretionary. Responses showed that those with bigger takes tended to have slightly more awareness of their requirements and their consent conditions.

Size	No awareness	Some	Average	Good	Very aware
<100l/s		5	4	3	
100-1000L/s	2	3	3	2	
>1000			5	5	

Table 8 – Consent Hodler Awareness

Maintenance/Operations

- Similarly, the Officers were asked to make a judgement on whether the consent holders knew how to effectively maintain and operate their fish screen. There were no clear relationships or correlations found within these responses.

Resources

- We asked Officers to record the time taken to monitor the fish screens, which would assist in planning and resource allocation. The time shown here includes preparation work in office, physical monitoring and follow up in the office, which included peer review. It did not include travel time. The results confirmed there is a clear distinction between pump and open channel regarding time taken and level of complexity to monitor.

Open Channels	Pumps	Overall Average
• 3.6hrs	• 2.1hrs	• 3.2hrs

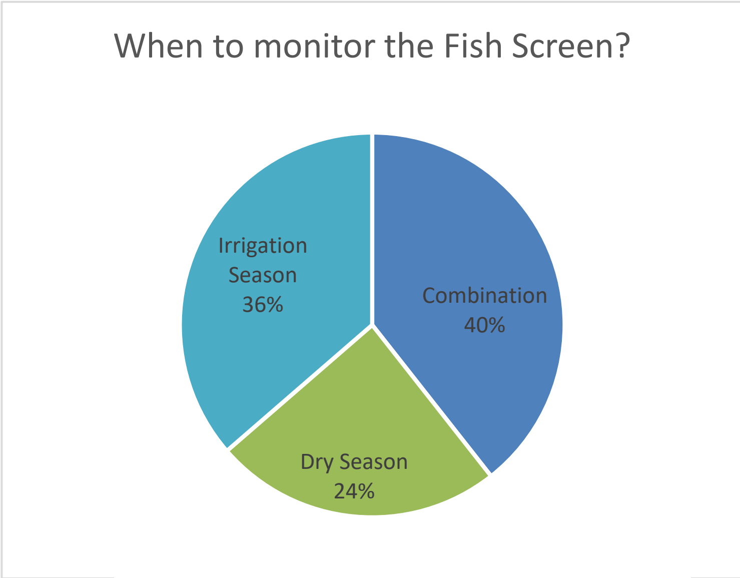
Complexity to inform training

- The level of complexity to monitor the screen was recorded which assists in developing training programmes for officers, and as expected, monitoring of fish screens located on open channels were considered more complex. However, this was a subjective recording and it can be anticipated as more screens are monitored level of confidence will increase.

Type	Easy straightforward	Fairly easy	Average	Fairly complex	Very complex
Pump		6	8		
Open Channel	1 (no screen)		8	11	1

Table 9 – Complexity to monitor

Seasonal Results



Picture 7 – When to monitor Fish Screens

- This question asked ‘when is the ideal monitoring time?’. The purpose of this question was to gauge whether we could visit just once to gain all the information required to determine compliance, or whether two visits are required (one in dry season, one in irrigation season).
- Looking at the results it became apparent that there was no clear relationship to pump or open channel.
- The breakdown of the results was evenly spread, with a slight lead for a combination.
- This is considered alongside the feedback from Officers who stated that the risks differ in the dry and irrigation season, however it is important that monitoring addresses both. In the dry season, it is possible to clearly see the infrastructure of the fish screen when it is not in operation – essential when determining its level of effectiveness. However, it is also important to see it in operation during the irrigation season which assists in determining velocities as well as seeing its functionality.

General Observations

The pilot lead to a number of key points.

Firstly, that it is technically difficult to get an effective fish screen right.

Officers also noted a number of consent holders who commented on the lack of capacity within the engineering industry, and extended timeframes for getting new fish screen designs. There was also recognition of the significant amount of time involved in resolving complex fish screens.

Development of a Fish Screen Improvement Campaign

With the intelligence learnt through the pilot, a comprehensive Fish Screen Improvement campaign for 2018/19 has been developed.

The goal of the 2018/19 campaign is to;

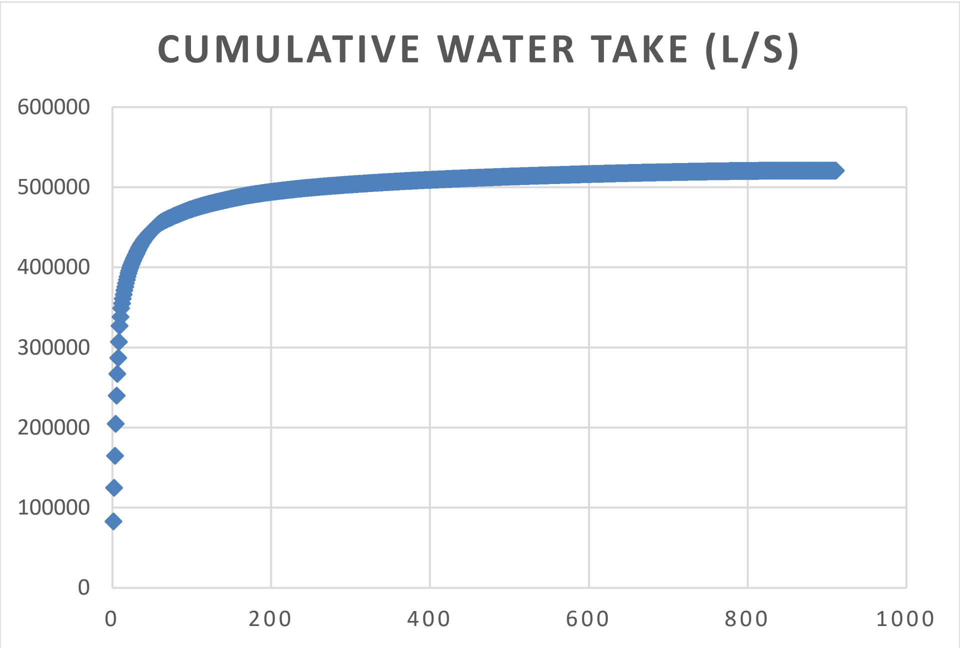
> "*To improve the standard of fish screens to ensure more fish are retained in a healthy state in our rivers".*

Key components of the campaign will be:

- communication and engagement;
- compliance monitoring, and;
- working with consent holders on action plans to resolve non-compliances.
- supporting industry to increase capacity to resolve non-compliant fish screens.

Prioritisation

Given the scale of fish screens that need to be monitored under the new Standard Operating Procedure, it is essential that a prioritisation exercise determines which sites should be visited first. Firstly, the 922 consents were diminished by excluding inactive, yet to be exercised or below 10l/s takes, which reduced the number of consents to 681 consents.



- Secondly, given that volume of take is a key factor in terms of its impact, this was then applied to assist in prioritising the remaining 681 consents. As can be seen in the graph above, 85% of the volume of water taken is by the top 50 consents.

- Alongside volume, Schedule 17 of the LWRP sites and abstractions within two kilometres of the coast were applied to the remaining 681 consents which generated a list of 150 consents as a top priority to be considered for the monitoring campaign. This list of 150 was provided to stakeholders for feedback on to inform Environment

Canterbury of their top priorities from this list, this generated the 50 consents to be monitored in the 2018/19 monitoring campaign.

Conclusions

- The purpose of the pilot was to help inform the development of the monitoring component of the fish screen improvement campaign. This pilot, an intelligence-led approach, has delivered on its aims of informing us of training needs, resources required, levels of expected non-compliance, as well as health and safety issues.

- It has also highlighted the need to support capacity and capability building within industry, though continued engagement with our stakeholders.

- The pilot has enabled the development of a Standard Operating Procedure that we have confidence in, along with equipment, tools and training for Officers which ensure consistency and gives confidence that we are systematic in our monitoring.

- The campaign, which is due to start in September, will be reviewed after the first year and will be reported to Council quarterly. Regular progress reporting will be made publicly available.

- The Fish Screen Pilot Study was a successful approach in informing a systematic monitoring programme that we can have confidence in, and this approach can be repeated for other campaign development.