



Pump infrastructure

impacts on fish entrainment

Fish entrainment is the situation where river and channel pumps remove fish from natural waterways and these fish are unable to return to the river, impacting the long-term resilience and health of aquatic ecosystems within our inland river systems. Research has shown that fish entrainment can be a significant issue with certain pump characteristics such as the location of the intake, the types of fish species that inhabit the local waterway, and the typical condition of the waterway. Fish larvae, juveniles of larger species and small species of fish such as gudgeon are at most risk. Many of these small species are crucial to the overall health of the river ecosystem, including being a food source for larger fish.

These fish and their larvae are small, so the impact may not be noticeable on farm. You may not see or smell significant numbers of dead fish in irrigation infrastructure or farm dams, but that alone does not mean that fish have not been entrained. Bodies such as NSW DPI have programs of work for restocking endangered fish such as the Olive Perchlet. Irrigators can help improve the success of these programs by considering the opportunities to reduce the risk of fish entrainment at their properties. Improving the health of rivers and aquatic species requires the implementation of a range of riparian best management practices and a coordinated effort between all stakeholders.

Some species such as adult Olive Perchlet and adult Spangled Perch are more at risk because they seem to actively swim into pump inlets, possibly seeking routes to off-stream wetlands. Fewer fish are entrained in cooler months (winter and early spring) than in the warmer months (summer and early autumn).

Research undertaken by QDAF and funded by CRDC indicates that fish entrainment risk is influenced by a number of factors. This can help irrigators to understand the priority sites to introduce mitigation methods.

The presence in your local river system of susceptible fish species is the first starting point for identifying risk.

Within bank natural flows are higher impact for some species compared to regulated flow because they are migrating on natural flow events.

For most species there is not much difference between natural and allocated flow. Overbank flood flows have the lowest impact because fish are spread out and usually in backwaters and vegetation above the pump intakes.

It is also important to consider the overall volume of water pumped by a pump each year.

Position of pump intake - order of risk

Bankside shallow intake

Mid-channel deep intake

Offtake shallow intake on diversion channel

Least risk

Most risk

Bankside deep intake

There is a tendency for most species for number of fish entrained per day to increase with pump size. Gravity fed diversions seem to have the highest impact.



Where to next

- More research into how different species, flow and infrastructure impact on fish entrainment is required to increase scientific rigour of the results. There have been consistent trends across most species apparent from the current research even if not all statistically significant.

- CRDC, FRDC, NSW DPI & NSW Recreational Trust are collaborating on new research to evaluate the economic and environmental return on investment of modern fish screens on different irrigation infrastructure types.

Incentive programs and more information

- A range of incentive programs are being introduced to assist irrigators to install mitigation measures such as fish screens. To learn more about what could be available in your region, contact your nearest Regional Extension Officer or CottonInfo Technical Lead for Natural Resource Management, Stacey Vogel: stacey.vogel@crdc.com.au or 0428 266 712

- For information on fish entrainment research, contact Michael Hutchinson (DAF QLD): michael.hutchinson@daf.qld.gov.au or 0472 816 851