Fairbridge Weir Removal Case Study, Molong Creek

The Project

Fairbridge Weir was the third and final structure removed as part of a redundant weir removal project being carried out in New South Wales. This project was undertaken as a partnership between WWFAustralia, NSW Department of Primary Industries (DPI) – Fisheries Management Branch, and the Environmental Trust of NSW.

This project aimed to increase public awareness of the environmental effects of in-stream barriers. It provided a framework to facilitate community-based weir removal projects and demonstrates the ecological benefits of improved river health.

Site Description

Fairbridge Weir was the uppermost of three structures (Fairbridge, Gamboola and Railway Weirs) situated along Molong Creek near the town of Molong, located in the Central-West region of NSW. Molong Creek is a system influenced by natural springs and is situated in the upper part of the Bell River Catchment. Fairbridge Weir was approximately 1.2m in height, 6m wide and constructed of concrete. The weir was located approximately 2km upstream of Gamboola Weir and 5km upstream of Railway Weir (Hobson & Richardson, 2004).

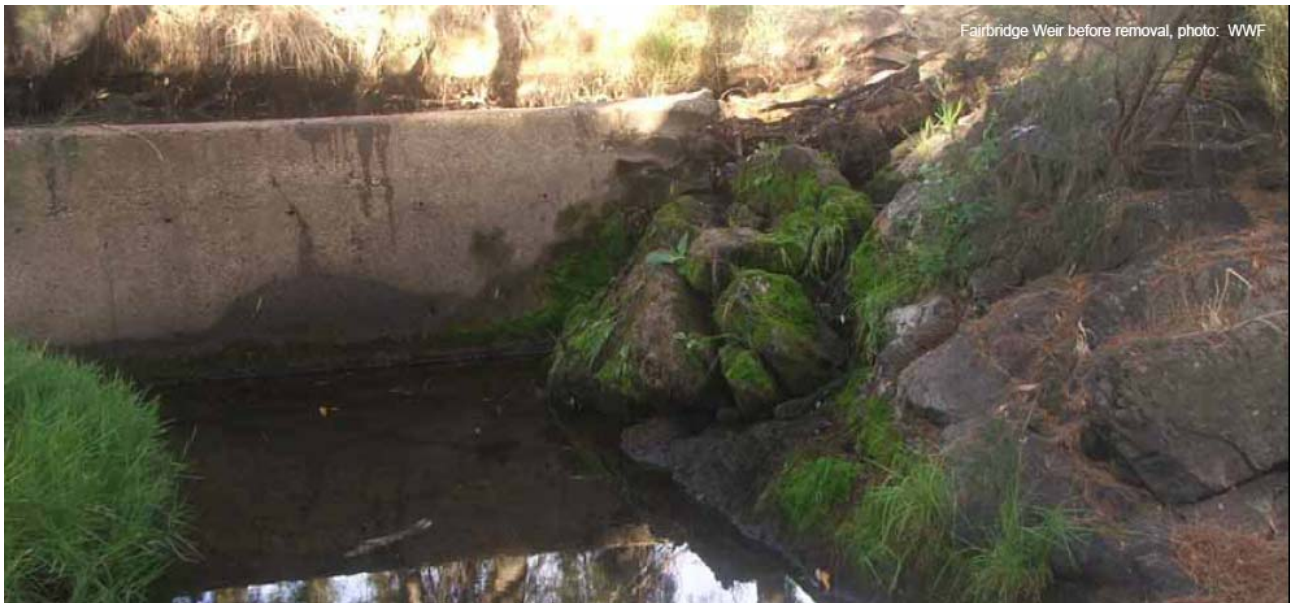
Why Remove the Weir

All three weirs on Molong Creek were acting as barriers to the free passage of water, fish and other aquatic organisms. The weirs were initially investigated for fish passage remediation including the construction of a fishway and partial or complete removal. Fairbridge Weir was an unlicensed structure with no confirmed ownership. The weir was no longer being utilised nor was it being maintained, therefore providing the opportunity for its removal.

The construction of weirs such as those on Molong Creek can detrimentally effect aquatic environments by:

- preventing sediment and nutrient transport
- favouring exotic species by reducing water quality and water level variability, creating non-flowing habitats that are not conducive for native fish and desirable for exotic species
- preventing native fish from migrating to spawn or expand their habitat
- preventing the recruitment of native fish from other areas, thus resulting in genetic isolation

The presence of one or more of these barriers can have a cumulative effect on the abundance of native fish species and may lead to local decline and even regional extinction of fish species (Harris and Gehrke 1997). These remediation works have complemented a willow removal program run by Cabonne Shire Council and further contributed to the snag replacement and weed control works currently taking place in the Molong Creek Catchment. The accumulated efforts of these habitat rehabilitation works will help to improve the health of the local fish community and the entire catchment.



Fairbridge Weir before removal, photo: WWF

The Removal Process

Step 1: Environmental Assessment Process

As NSW DPI was the 'determining authority', this department was required to consider whether the proposal was going to have any significant effect on the environment. The removal of Fairbridge Weir was subject to an environmental assessment under section 5 of the Environmental Planning and Assessment Act, 1979. A Review of Environmental Factors (REF) was developed that assessed environmental factors associated with the works, summarised the extent of community consultation and detailed the information gathered to date relating to the weirs and their environment (Hobson & Richardson, 2004). It was noted that platypus populations were present in the local area and, following expert recommendations, works were conducted prior to platypus breeding season (late August – September through to March).

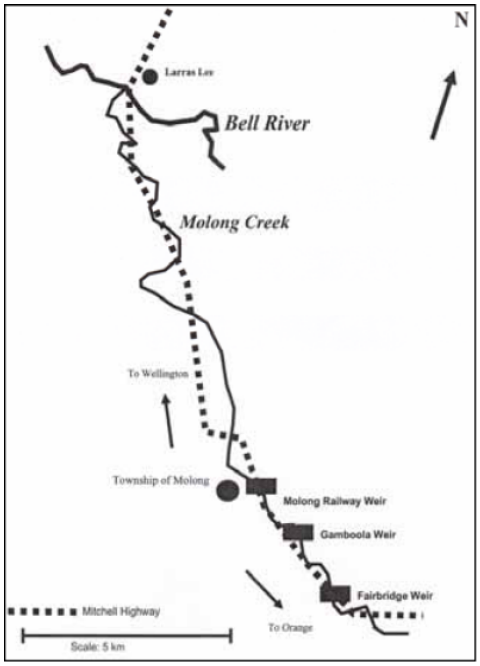


Figure 1: Location of Fairbridge Weir in relation to other weirs in the Molong Creek.

Step 2: Stakeholder Consultation

An integral part of this project was the extensive community consultation that took place. Stakeholder groups were kept informed throughout the investigative process through mail-outs, telephone and community liaison group meetings. Stakeholders were asked to provide input into the preparation of the REF, which was then advertised and distributed to local council, government agencies and contributing landholders for comment. Although none of the three weirs being investigated were being maintained, landholders and local residents cited domestic use, aesthetics and local history as reasons why the Gamboola and Railway Weirs should not be removed. The lack of support by some stakeholders towards the potential removal of Railway and Gamboola Weirs indicated that further studies would be required before any remediation works were considered for these weirs. However support was obtained from many stakeholders, including Cabonne Shire Council, for the complete removal of Fairbridge Weir.

Molong is known as the Wiradjuri people's "place of many rocks" and is recognised as an area that is extremely important to the local Aboriginal communities. Liaison with the Wellington and Orange Local Aboriginal Land Council and the NSW Department of Environment and Conservation, Cultural Heritage Branch ensured that adequate consideration and appropriate measures for the management of cultural heritage issues were employed during the removal.

Weir removal process. Photo: WWF

Step 3: Pre-removal Surveys

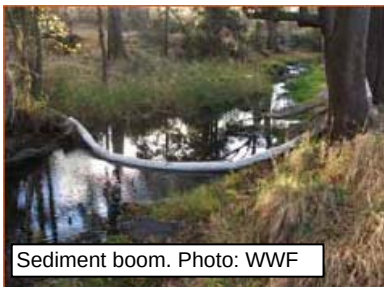
In-stream bed and water level surveys were conducted to obtain baseline data prior to the removal of Fairbridge Weir. From these surveys it was determined that following the removal of the structure the surrounding creek environment would return to a natural chain of ponds system as it existed prior to the construction of the weir. It was also determined that the platypus population were unlikely to be negatively affected by the changes, as the reinstated pond system would still provide for their habitat requirements (Grant 1991). Table 1 shows the fish species expected to be found in the Bell River and lower lying areas of Molong Creek as indicated by the NSW Rivers Survey (1997) and subsequent sampling carried out by DPI. The presence of barriers such as the weirs on Molong Creek has effectively stopped the natural movement of many fish species into the higher reaches of the catchment and has had a negative impact.

Table 1. Expected fish species within Bell River and lower lying reaches of Molong Creek and as sampled by DPI

Scientific Name	Common Name	Native/Alien Species # indicates a stocked species	Fish species sampled in Molong Creek
Ambassis agassizii	Olive perchlet	Native	
Bidyanus bidyanus	Silver perch	Native #	
Gadopsis marmoratus	River blackfish	Native	✓
Galaxias olidus	Mountain galaxias	Native	✓
Hypseleotris klunzingeri	Western carp gudgeon	Native	
Hypseleotris spp.	Gudgeon	Native	
Macquaria ambigua	Golden perch	Native #	
Philynodon graniceps	Flathead gudgeon	Native	
Retropinna semoni	Australian smelt	Native	✓
Tandanus tandanus	Freshwater catfish	Native	
Cyprinus carpio	Common carp	Alien	
Gambusia holbrooki	Gambusia	Alien	✓
Oncorhynchus mykiss	Rainbow trout	Alien #	✓
Perca fluviatilis	Redfin perch	Alien	✓

Step 4: Physical Removal

Day 1: A management plan ensured that there were minimal impacts during the works phase. A sediment/oil boom was installed downstream of the structure prior to removal, and remained in place until after the works were completed. Siphon hoses were run over the weir overnight to move water downstream and allowed the weir pool to be drawn-down prior to the commencement of works. Dewatering the weir pool assisted in preventing bank slumping upstream and prevented the collapse of any burrows being utilised by platypus. In addition pre removal draw-down reduced high water velocities associated with breaching a full weir pool, and thus reduced the potential for increased erosion and turbidity levels downstream.


Sediment boom. Photo: WWF

Day 2: Access to the site was established and a stand of willows removed. Several branches from some nearby casuarinas were also lopped to allow access for the excavator, which broke up the weir and loaded the debris onto a truck. The removal works were completed on Day 2 with all material from the structure relocated offsite.


Siphons in place. Photo: WWF

Step 5: Post Removal

The site will be visually monitored over time and it is expected that natural regeneration of native plant species will cover the exposed banks below the old water level. If required, post bed level surveys may be carried out to determine any changes to the creek bed over time.

Conclusion

The removal of Fairbridge Weir will bring associated benefits such as improved water quality, reinstatement of fish passage and the reclamation of valuable habitat for aquatic fauna throughout the Molong Creek system. NSW DPI will continue to work with Cabonne Shire Council and community stakeholders to build on the works at Fairbridge Weir by encouraging and supporting more aquatic habitat restoration works within this system.

The success of this partnership approach will promote the incorporation of redundant weir removal into other river rehabilitation projects. This project has employed a holistic approach to river rehabilitation and proven this approach to be an effective natural resource management tool.


Equipment in place. Photo: WWF

References

Grant T.R (1991). The biology and management of the Platypus (Ornithorhynchus anatinus) in NSW.

Hobson, M. & Richardson, R. (2004) Proposed removal and management of Railway Weir, Fairbridge Weir and Gamboola Weir - Molong Creek, Molong. Review of Environmental Factors.

Harris, J.H. & Gehrke, P.C. (1997), Fish and Rivers in Stress: The NSW Rivers

Budget

Activity	Description	Cost	Contributions
Geomorphic survey (consultant)	Pre removal bed and water level surveys	$1,732.50	WWF-Australia, DPI – Fisheries Management Branch, Environmental Trust of NSW
Fish survey	Electro fishing	$ 3,014.91	WWF-Australia, DPI – Fisheries Management Branch, Environmental Trust of NSW
Day 1 removal works	Sediment + oil boom + siphon + labour	In Kind	WWF-Australia, DPI – Fisheries Management Branch, Environmental Trust of NSW
Day 2 removal works	Excavator+ truck + labour including debris removal and site cleanup	$3,500	WWF-Australia, DPI – Fisheries Management Branch, Environmental Trust of NSW
Environmental assessment and community consultation	Community liaison group attendance, development of review of Environmental factors	In Kind	DPI- Fisheries Management Branch and WWF-Australia

Acknowledgements

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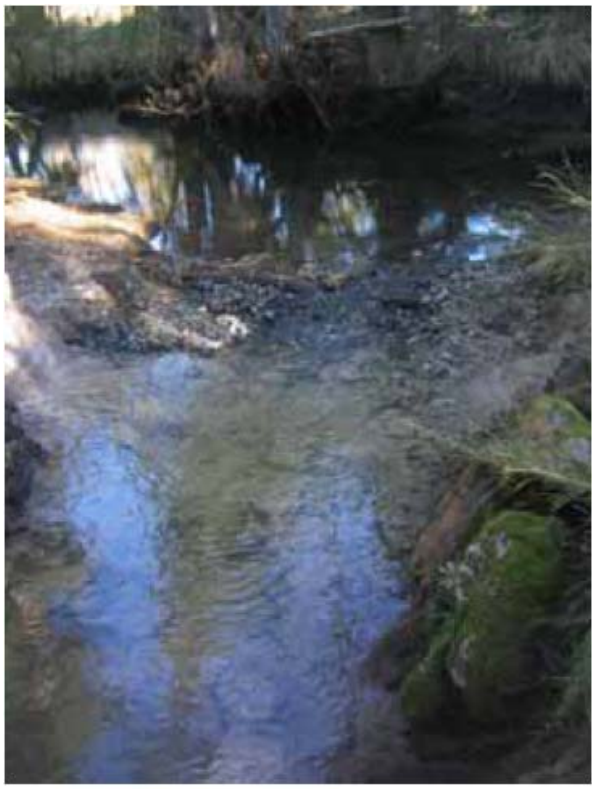

Molong Creek after Fairbridge Weir removal. Photo: WWF

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