Tea Garden Creek Weir Fishway – Worn down weirs a way for fish to fare

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Key Points

- Tea Garden Weir in the Ovens River was listed as a priority barrier in the Native Fish Strategy for the Murray-Darling Basin 2003- 2013.
- A design to facilitate fish passage past the weir would support populations of important species including Murray Cod and Golden Perch.
- Provision of fish passage through the Tea Garden Weir structure would allow fish passage through the Ovens River from the Ovens – Murray River junction, through to Porepunkah.

Abstract

Fishways enable fish to bypass barriers that would otherwise prevent their movement in both an upstream and downstream direction to reach habitats for spawning, feeding or development. Tea Garden Weir in the Ovens River was listed as a priority barrier in the Native Fish Strategy for the Murray-Darling Basin 2003-2013. A design to facilitate fish passage past the weir would support populations of important species including Murray Cod and Golden Perch.

A design was prepared with input from many stakeholders to meet certain criteria, including to maintain as much of the existing structure as possible. However, it was later identified that the integrity of the weir was not adequate in supporting the integration of a fishway. Revisions to this design needed to consider the weir operational requirements, a multitude of site constraints, complex physical processes occurring in the landscape and diverse fish species.

This paper presents the learnings of this project, which ultimately resulted in the development and delivery of a full width rock ramp fishway design in early 2023, replacing the existing weir. This design allowed for fish passage to be achieved while supporting the longevity of the weir and its functionality.

This is an example of a successful fishway design that adapted to changing criteria and addressed complex conditions. It has enabled the passage of important fish species, while upgrading the integrity of an instream structure vital to the community.

Keywords

Fish passage, rock ramp fishway, Ovens River, Murray Cod.

Introduction

The North East Waterway Strategy (North East CMA, 2014) states that the Ovens River is one of two rivers listed in the Victorian River Health Strategy (2002), that requires special management because of its environmental values. The conservation value, natural water regime, and the relative intactness of much of the Ovens River system make it unique in the Murray-Darling Basin. The high priority threatened migratory fish species, Golden Perch, and Murray Cod, are found in the Ovens River up to Porepunkah, and Macquarie Perch in the Buffalo River catchment. Flat Headed Galaxias, a medium priority threatened migratory fish can be found between Porepunkah and Bright in the Ovens River. Trout Cod, a high priority endangered non-migratory fish is found in the Ovens River up to Porepunkah and in the Buffalo River (North East CMA, 2014).

The Ovens River has a long history of river management. In recent years, multiple works activities have been undertaken to address threats to river health and improve native fish populations in the river. An example of this is the selection of the Ovens River as a Demonstration Reach, involving the implementation of a wide range of co-ordinated river rehabilitation works to showcase the cumulative benefits of river rehabilitation on native fish populations.

The Native Fish Strategy for the Murray – Darling Basin 2003 – 2013 (Murray – Darling Basin Ministerial Council, 2003) listed the Tea Garden Weir in the Ovens River as one of 18 priority fish migration barriers requiring upgrade or new fish passage. Provision of fish passage through the Tea Garden Weir structure would allow fish passage through to Porepunkah via the Ovens River from the Ovens – Murray River junction.

Methods and Context

Study Site: Tea Garden Weir

The Tea Garden Weir was positioned in a complex section of floodplain, associated with the upstream section of the Deep Creek anabranch complex (Figure 1). This anabranch network threatens to capture the contemporary Ovens River channel course over a considerable length. In addition, a smaller high flow anabranch, which exits the Ovens River approximately 900m upstream of the weir also threatens to capture a reduced length of the Ovens River (Figure 1). The Markwood Levee, (located on the opposite side of the floodplain to the Deep Creek anabranch complex) is also located adjacent the weir. The levee intersects the Tea Garden Creek offtake. A penstock gate arrangement exists in the levee to regulate flows into Tea Garden Creek.

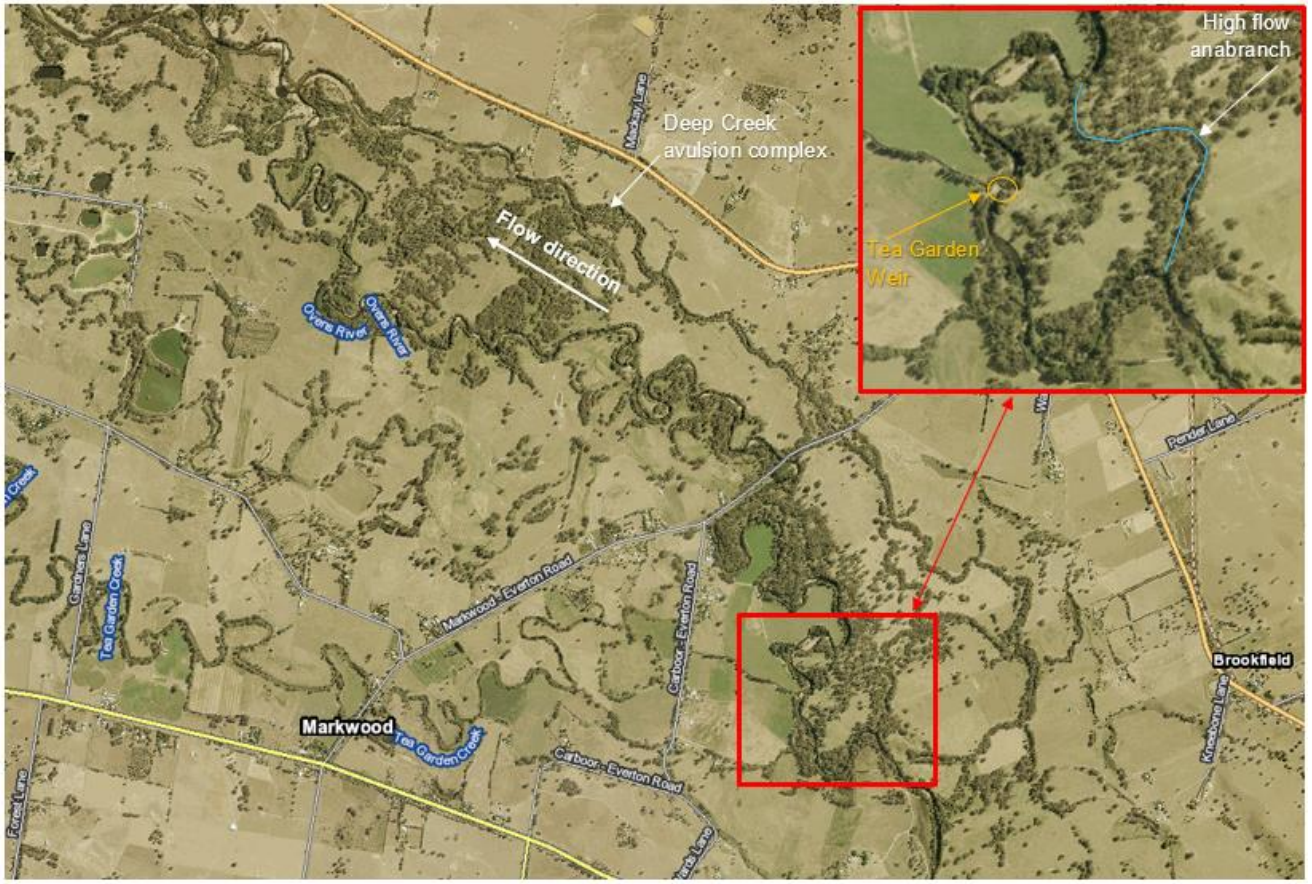

Figure 1. Site locality

The Tea Garden Creek offtake arrangement was originally constructed in 1945 to deliver water to Tea Garden Creek for irrigation and stock and domestic purposes in the Markwood and Milawa area (Figure 2). A channel was also constructed to connect the existing creek, near the Carboor-Everton Road to the offtake structure. The weir itself was subsequently constructed by the State Rivers and Water Supply Commission in 1968 (Figure 2).

The Tea Garden Weir was owned and operated by Goulburn Murray Water (GMW). The weir consisted of a permanent crest and a temporary raised crest that is seasonally installed to maintain a weir pool that facilitates flows into Tea Garden Creek. GMW undertook repairs to the weir in 2016 to improve the operational safety and structural integrity of the weir (**Error! Reference source not found.**). It was expected that these works would increase the functional life of the weir by approximately 30 years (GMW, 2016).

Figure 2. Tea Garden Creek Weir

A fishway design arrangement for the Tea Garden Creek Weir was prepared in 2017. The scope of that design included undertaking specific survey and investigations, engaging with stakeholders, and developing designs with the appropriate approvals to facilitate the leveraging of funds and construction of the preferred fishway design.

The North East Catchment Management Authority (CMA) subsequently received funding to construct the proposed Tea Garden Weir fishway in 2022 and commissioned Goulburn Murray Water (GMW) to manage the construction of the proposed Tea Garden Weir fishway. Water Technology in conjunction with Gordon Gibson Nominees were subsequently commissioned by GMW to undertake a design review. The design review was prepared to assist in determining if the 2017 Tea Garden Weir fishway design arrangement is considered an appropriate design solution with reference to additional information and learnings that have been revealed since the completion the design in 2017. The design review found that the 2017 design arrangement was not considered feasible on the basis that the long-term integrity of the combined fishway/weir arrangement relies on the integrity of the existing weir and that the existing weir is not sufficiently sound to provide this long-term integrity.

Potential alternative fishway design options, arrangements and their associated management implications which did not rely on the integrity of the existing weir, were re-investigated. The Options Analysis found that a fixed crest rock ramp fishway was the most feasible design solution based on a multi criteria analysis involving scoring each of the potential options against the following key criteria:

- Maintaining irrigation flow delivery.
- Providing safe operational arrangements.
- Providing effective fish passage.
- Minimising impacts to the physical form and function of the Ovens River.

- Constructability.
- Minimise construction costs.
- Minimise maintenance requirements.
- Minimise operation costs.

Constructed Fishway

The Tea Garden Fishway on the Ovens River at Markwood was constructed during January and March 2023 (Figure 3 and Figure 4). The works involved the replacement of the existing Tea Garden Weir with a full width rock ramp fishway arrangement. Only minor design changes occurred during the construction process. The fishway was wet-commissioned (having flowing water passing over the structure) on the 27th March 2023.

Figure 3. Looking upstream over the fishway

Figure 4. Drone image of the fishway. Flow is Left to right.

Conclusion

The Tea Garden Weir Fishway project highlighted that the determination of a replacement weir and fishway design arrangement will be dictated by any number of influences. This included (but was not limited to) the existing weir characteristics and function, vehicle and plant (construction) access, cultural heritage, environmental assets, geomorphology (e.g. stability), fish passage requirements (e.g. target fish species), surrounding land uses and construction costs. On this basis, the project required the involvement and input of several key specialists. Furthermore, the project highlighted the importance of engaging with all the relevant project stakeholders at this early stage to ensure that project goals, objectives and constraints are clearly defined.

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- Commonwealth Environmental Water Office.
- Department of Environment, Land, Water and Planning.

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