PART B – Fish Passage in Tahbilk Wetlands

Report to the Department of Sustainability and Environment

Kingfisher Research

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1. Introduction

The Victorian Department of Sustainability and Environment (DSE), Tahbilk Pty Ltd and the Goulburn-Broken CMA (GBCMA) are considering works to improve fish passage in the Tahbilk wetlands. DSE requested Kingfisher Research to inspect selected sites and provide advice on fish passage in conjunction with a simultaneous plan for invasive fish control. The sites were inspected on 27 February 2008.

2. Tahbilk fish community

The Tahbilk wetlands are permanent, though at present there is no flow exchange from the adjacent Goulburn River through the inlet or outlet channels. These channels have in-filled with sediment and are now heavily colonised by a variety of invasive plants.

The fish ecology of the system in regard to exchange from the Goulburn River is not well understood; though it is likely that medium/large golden perch and Murray cod (100-800 mm long) and various small-bodied fishes (20-50 mm long) would move into the wetlands when the infrequent high flows enable access. The Tahbilk lagoon fish community would likely contain additional fish species if passage were restored with the Goulburn River system. This might include river blackfish and flat-headed galaxias.

At present the Tahbilk lagoon fish community includes two threatened fishes: freshwater catfish and Murray-Darling rainbowfish. More fish community data is contained in McGuckin (2002) and Part A of this report (Clunie et al. (2008).

Within the Tahbilk lagoon fish movement is considerably restricted by three low-level road crossings which effectively divide the wetlands. The first barrier is on the private road near the Tahbilk Wetlands Café and provides vehicular road access to the winery. This crossing has three pipe culverts and is unlikely to provide effective fish passage though non-native carp and gambusia (mosquitofish) appear to move through (Figure 1).

The two other sites, Bell's and O'Neil's crossings, are low-level barriers for stock access (Figure 2 & 3). Modification of the road crossings is required for effective dispersal of fish and turtles throughout the wetlands and for access to the Goulburn River. Additionally, modification of the crossings might also serve as a collection point for non-native common carp which are relatively abundant.

3. Objective

The initial ecological objective is to enhance movements of small and large native fish (20 – 800 mm long) within the Tahbilk lagoon.

Figure 1. Pipe culvert beneath the main Tahbilk road crossing.

Figure 2. O'Neil's crossing, a private stock route at Tahbilk lagoon.

Figure 3. Bell's crossing in the Tahbilk lagoon.

4. Recommendations

1. Consider options for re-instating small volumes of flow from the Goulburn River into/out of the Tahbilk system.
2. Remove or replace the three existing crossings with full stream-width open bottom multi-box culverts. Alternatively, full-width bottomless arch culverts can also be used.

5. Culvert design

The culverts should conform to the current design standards for fish passage which include: maintaining the natural stream depth, width and cross-sectional area, the invert of the culvert entrance and exit should be lower (c. 30 cm) than the stream bed, the slope of the culvert should match the average natural geology and natural stream flow should be maintained. Baffles or roughness units could be considered within the culvert and the culvert length should not exceed 6 m. Due to low water velocities the Tahbilk culverts should not scour at the entrance or base but these aspects require monitoring. In summary the culvert should not modify any hydraulic aspect of the lagoon and re-create similar habitat within. In addition, the crossings should be suitable for public vehicles. A concept is shown in Figures 4 & 5.

6. Maintenance

Accumulation of debris within culverts can change hydraulic conditions and limit fish movement. It is suggested that a fortnightly visual inspection of the culverts be carried out, and immediately after a flow event. Large woody debris and other plant matter should be removed, small rocks and light sediment can remain.

7. Carp control

Culvert crossings where water and fish are concentrated are excellent locations for carp screens, or for trapping and removal points. A concept design will be presented as part of the forthcoming Tahbilk pest fish management plan, however new culverts should incorporate specific design arrangements for carp removal. These include a deepened site with an underlying concrete pad for a carp cage, an anchoring arrangement and a small cleared site for crane/truck access.

8. Fish community monitoring

New culverts are an opportunity to monitor and display the passage and ecology of Tahbilk lagoon fish populations, particularly catfish. Opportunities for researchers and operators to collect and PIT tag fish, and install automated readers should be investigated.

9. Fish passage in Tahbilk wetlands

Fish passage within Tahbilk lagoon is a high ecological priority as the area contains high wetland values and an important remnant catfish population. Wetland systems along the Goulburn River contain excellent habitat for native fish and rehabilitation will contribute to a holistic passage plan for the system.

Figure 4. A box culvert with flow deflectors for enhancing passage of small fish. The debris was from a high flow event.

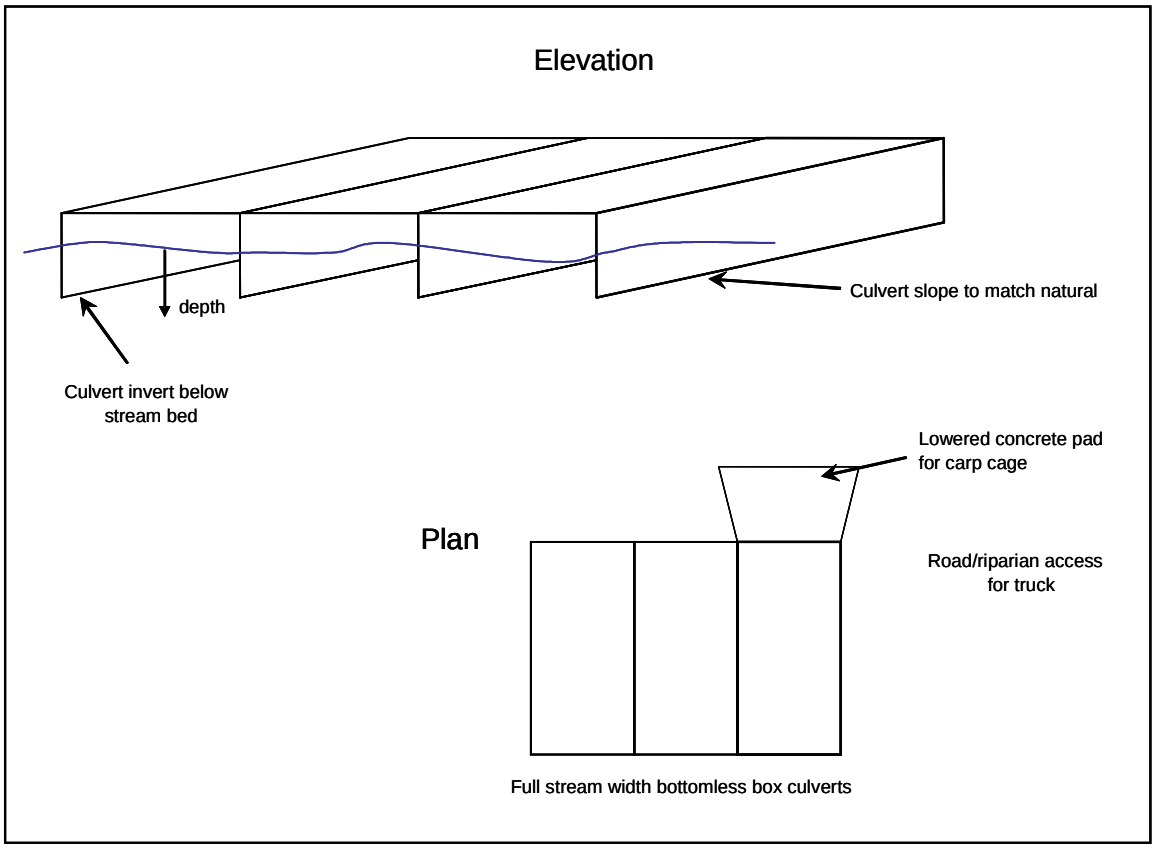

Figure 5. A concept of culverts for Tahbilk road crossings which do not modify natural stream hydraulics.