

- I lived at Orange for a decade and knew the river in the area of the proposal. It remains a high-quality habitat for Murray cod and trout cod and is generally protected from many of the usual stresses affecting these two threatened species.

- Trout cod are native to this reach but apparently became locally extinct following European development. But confirmed reports of their presence continued from reaches upstream, in the Turon River, and downstream in the Little River sub-catchment, as recently as the mid-1990s.

- As leader of NSW Fisheries' Freshwater Research Program in the 1980s and 1990s, I arranged for trout cod bred at the departmental hatchery at Narrandera, to be released at a number of locations in the catchment. Anecdotal information indicated that these fish survived, and substantial numbers of fish are now being reported by angling organisations in the area (see attachment below, from the December 2011 issue of the NSW Council of Freshwater Anglers' 'Freshwater Fisher').

- Murray cod are widely known to have inhabited the middle reaches of the Macquarie catchment, with waters above and below Burrendong Dam having been well populated by wild fish. The location of the water extraction proposal is recognised as a core habitat area.

- The location of the two proposed extraction points is only a short distance (a few kilometres) upstream of the upstream extent of the stored waters of Burrendong Dam, so that there is only a short reach of riverine habitat downstream that will be affected by streamflow diversion when the dam is at full storage. But it is important to note that Burrendong's storage has fluctuated greatly in recent years, so that much larger lengths of riverine habitat would be adversely affected at most times.

- A disastrous fish-kill profoundly affected cod numbers in the area followed the severe drought of the early 1980s. Fisheries scientific staff diagnosed the initiating causes of massive-scale cod mortality throughout the whole river reach as the combined impacts of severely reduced streamflows, leading to high water temperatures and crowding. The proximal causes were severe infestations of a protozoan gill parasite, *Chilodonella*, which was favoured by the crowded, warm conditions, plus further water-quality

decline following storm runoff in hot weather. Recovery of the population proceeded very slowly, and may still be incomplete even after three decades. The point is that cod species are highly susceptible to streamflow reduction, such as those that would be associated with the proposal.

I wish you success with the EDO's opposition to the pipeline proposal. If I can provide any further information, please let me know.

Regards,

John Harris