Key Issues

- *Threatened species*
- *Water quality*
- *Irrigation supply*

Related Studies

- *Upper Lake River*
- *Lake River*
- *Arthurs Lake*

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Technical Study – Woods Lake Assessment

The South Esk – Great Lake Water Management Review

The Woods Lake Assessment is part of Hydro Tasmania's South Esk – Great Lake Water Management Review (SEGL WMR). The WMR program examines Hydro Tasmania's water management practices in each of its catchments. This assessment is one of 12 studies in the SEGL catchment. The studies were carried out following extensive identification of aquatic environment and water management issues, involving consultation with stakeholders throughout the catchment. The issues identified are documented in two reports: *Environmental Review: Great Lake – South Esk Catchment* and *Community Consultation Report: Great Lake – South Esk Water Management Review*. The outcomes from the technical studies will ultimately be incorporated into an Aquatic Environment Management Program for Hydro Tasmania.

Issues Investigated

The issues investigated as part of the Woods Lake study were the status and the environmental requirements of two endemic threatened fish species, the Saddled galaxias (*Galaxias tanycephalus*) and the Arthurs paragalaxias (*Paragalaxias mesotes*), and periodic water quality deterioration related to water levels in the lake.

Background and Information Gaps

Woods Lake, located in the highlands of central Tasmania, is managed by Hydro Tasmania as an irrigation supply storage for downstream users on the Lake and Macquarie rivers. The original impoundment was created in 1911 by the construction of a levee, and in 1962 was expanded by the construction of the Woods Lake Dam. Irrigators on the Lake River have a statutory right to irrigation water and this water is normally sourced from Woods Lake. The lake also provides a small but productive recreational trout fishery, which has a relatively good catch rate.

A history of turbidity problems has seen Woods Lake subject to considerable water quality monitoring since 1989. Its relatively shallow bathymetry makes the lake susceptible to wind-generated sediment resuspension, which is the primary cause of the high turbidity peaks that have been recorded there. Woods Lake also has relatively high background concentrations of nutrients that have driven algal blooms in the past. These have tended to coincide with extended periods of high turbidity, particularly during the early 1990's. An informal minimum operating level was implemented by Hydro Tasmania in 1996 in an attempt to limit sediment resuspension, and this has resulted in an improvement in average turbidity levels in the lake. Correspondingly, while nutrient levels remain elevated compared to other hydro storages, no lake-wide algal blooms have been recorded since the turbidity problem was addressed.

Woods Lake forms a significant part of the range of two endemic fish species, the Saddled galaxias (*Galaxias tanycephalus*) and the Arthurs paragalaxias (*Paragalaxias mesotes*). Both species share a distribution restricted to Woods and Arthurs Lakes. Because of this restricted distribution, these species are listed as 'Endangered' under the Tasmanian Threatened Species Protection Act 1995. *G. tanycephalus* is also listed under the Commonwealth Environmental Protection (Biodiversity Conservation) Act 1999, and *P. mesotes* has recently been nominated for listing.

There is currently a lack of knowledge regarding the life cycles and habitat preferences for these fish, particularly the Arthurs paragalaxias, which has not been recorded in Woods Lake since the mid 1990s. It is therefore not known whether current management of the lake is having an effect on these species, either beneficial or otherwise.

Technical Studies

Aims

Of the concerns raised for Woods Lake, it was felt that issues relating to threatened fish species required further study before effective strategies could be developed for their management in Woods Lake. The aim of the technical study was therefore to collect information on the habitat preferences and population statistics of threatened fish species in the lake in order to:

- guide management of the lake so that Hydro Tasmania's obligations under State and Commonwealth threatened species legislation are complied with; and
- support recovery actions outlined in Recovery Plans for these species,

whilst continuing to meet statutory obligations regarding supply of irrigation water.

Assessment of Issues

The threatened fish species *G. tanycephalus* (Saddled galaxias) and *P. mesotes* (Arthurs paragalaxias) were sampled in Woods Lake using fine mesh, fyke nets fitted with trout/platypus exclusion screens. The data collected in this manner was analysed in conjunction with existing data from an ongoing Inland Fisheries Service monitoring program. The data showed that Woods Lake currently supports a healthy population of Saddled galaxias, and indicated that environmental and spawning conditions in Woods Lake have been suitable for this species since at least 1997. The Arthurs paragalaxias, however, was not observed or captured during the study, and this species was last noted in Woods Lake around 1995. While the absence of Arthurs paragalaxias from samples collected during this study does not confirm its absence from Woods Lake, it does indicate that if the species is present, it is there in very low numbers.

Surveys of the bathymetry (morphology of the lake bottom) and habitat types were also carried out for Woods Lake to provide an indication of threatened species habitat availability. The depth and substrate data from the bathymetric survey reinforced existing knowledge, indicating a relatively shallow, bowl-shaped lake with a predominantly muddy bottom and rocky shallows around parts of the shoreline. A survey of aquatic plant beds and an evaluation of shoreline and littoral habitats revealed six distinct shoreline and littoral habitat areas around the lake, with plant beds occurring mainly in shallow mud-bottomed areas.

While the current 'informal' lake level management regime appears to benefit the Saddled galaxias population, the principal factors responsible for the decline in the Arthurs paraglaxias in Woods Lake are still unknown. The impacts of low lake levels on water quality in Woods Lake are well documented, and while the threat that low lake levels present to long-term survival of native fish species in terms of habitat loss or degradation is considered an issue, at present the level of threat this poses is unknown. The threat posed by introduced trout is also considered a major issue, but as yet is unquantified. Any increased threat to these species, particularly Arthurs paragalaxias, is highly undesirable given the extremely limited distribution and conservation status of both species under Commonwealth and State legislation.

Although substantial additional information has been collected during this study, there are still significant knowledge gaps, particularly with regard to the life cycle of the Arthurs paragalaxias. Until more knowledge is gained regarding the environmental conditions required for fish spawning, egg incubation times, habitat preferences and diet for different life history stages, there are considerable limitations on the development and implementation of appropriate galaxiid habitat management strategies for Woods Lake.

Outcomes

To avoid the lake level being drawn down to depths where turbidity levels have been shown to increase, Hydro Tasmania commits to maintain the minimum operating level for Woods Lake at 735.4 metres above sea level, and will support further research into native fish species through the provision of date and field assistance. Hydro Tasmania as part of this commitment will review its alarm systems for the lake, to ensure that system operators are aware when lake levels are approaching this minimum and adjust system operation accordingly.