

Water Management Review

South Esk – Great Lake Catchment



Key Issues

- *Threatened species*
- *Trout fishery*
- *Recreational use*

Related Studies

- *Upper Lake River*
- *Woods Lake*
- *Great Lake*

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Technical Study – Arthurs Lake Assessment

The South Esk – Great Lake Water Management Review

The Arthurs 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 that were 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 Arthurs Lake study were the presence of two endemic threatened fish species, the Saddled galaxias (*Galaxias tanycephalus*) and the Arthurs paragalaxias (*Paragalaxias mesotes*), and management of lake levels to improve the conditions for recreational fishing.

Background and Information Gaps

Arthurs Lake is located on the upper Lake River in central Tasmania. Water from the upper catchment is retained by Arthurs Dam and then pumped into Great Lake, via the Arthurs Flume and Todds Corner Power Station.

Water quality in Arthurs Lake is good, typical of the highland lakes in the area. The lake forms a significant portion of the range of two endemic native fish species, the Saddled galaxias (*Galaxias tanycephalus*) and the Arthurs paragalaxias (*Paragalaxias mesotes*). The recorded distribution of both species are restricted to Woods and Arthurs Lakes. Because of this, these species are listed as 'Endangered' under the Tasmanian Threatened Species Protection Act 1995. *Galaxias tanycephalus* is also listed under Commonwealth threatened species legislation and *Paragalaxias mesotes* has recently been nominated for listing.

Arthurs Lake also supports a large, self-sustaining population of the exotic brown trout (*Salmo trutta*) and a smaller population of the exotic rainbow trout (*Oncorhynchus mykiss*). It is by far the most popular recreational trout fishery in Tasmania. In 1993, Hydro Tasmania agreed to raise the minimum operating level of Arthurs Lake by five metres to support the trout fishery. This agreement has been supported by the fishing community in the past. The Inland Fisheries Service (IFS) has recently proposed that the minimum level be raised a further metre to improve the angling experience and boating access in Arthurs Lake. This would further reduce the operating range for this lake from 4.82 to 3.82 metres.

Technical Studies

Aims

- To determine the habitat preferences and relative abundance of the threatened fish species.
- To assess the implications of fixing or changing the minimum lake level and entering into an agreement on lake level management with the Inland Fisheries Service.

Assessment of Issues

The threatened fish species *G. tanycephalus* (Saddled galaxias) and *P. mesotes* (Arthurs paragalaxias) were sampled in Arthurs Lake, and the data was analysed in conjunction with existing data from an ongoing IFS monitoring program. The data showed that the current lake level management regime appears to be maintaining the native fish populations, as both Saddled galaxias and Arthurs paragalaxias appear to be successfully spawning within Arthurs Lake. Although previous work has indicated that rocky shore habitat is important for both native fish species, from the sampling that was carried out during this study (and similar sampling from the Woods Lake study) it appears that aquatic plant habitat may also be important to both these species. What role each of these habitats plays in ensuring their long-term survival was beyond the scope of this present study.

There are some constraints to Hydro Tasmania's ability to increase the minimum level of Arthurs Lake. An increase in the minimum lake level increases the risk of spill. The capacities of the Arthurs Flume pumping system and Arthurs Dam siphons are fixed, so the risk of spill cannot be reduced through modification of their operation without major capital expenditure.

The biological benefits of increasing the lake level are unclear. There is little justification for increasing the current minimum lake level agreement for managing the threatened species, as the current operation of the lake seems to be adequate in sustaining galaxiid populations. Boating access to all parts of the lake would improve. In relation to the minimum lake level being altered for recreational angling, Hydro Tasmania has been advised by the fishery regulator, the Inland Fisheries Service, that an increase in the minimum operating level would be desirable.

Outcomes

In response to the issues raised, Hydro Tasmania will endeavour to maintain Arthurs Lake levels above a minimum of 949 metres above sea level particularly during the fishing season. Hydro Tasmania will be able to maintain water levels in Arthurs Lake above 949 mASL once Basslink is completed and subject to Great Lake being above 1029.8 mASL. At all other times the system will be operated to avoid where possible allowing the lake to go below this level.