

Water Management Review

South Esk – Great Lake Catchment



Key Issues

- *Threatened species*
- *Algal beds*
- *Trout fishery*
- *Exotic species*

Related WMR Technical Studies

- *Lake Augusta*
- *Arthurs Lake*

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Hydro Tasmania
THE TASMANYAN ENERGY BUSINESS

Technical Study – Great Lake Assessment

The South Esk – Great Lake Water Management Review

The Great Lake Assessment is a 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 was 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 main issue investigated under this study was the potential impact current water level management might have on the health of the algal beds in Great Lake. These algal beds provide habitat for a variety of aquatic biota, including a number of rare and threatened invertebrate and fish species.

Background and Information Gaps

Great Lake is located on the Cental Plateau in the highlands of Tasmania. The first dam was constructed between 1910 and 1915 on the Shannon River, and raised the level of the original Great Lakes. Subsequent developments further raised the water level in Great Lake and prevented the southward flow of water into the Derwent catchment. Water is now diverted north via the Great Western Tiers to generate power at the Poatina power station in the Macquarie River catchment.

A number of ecological issues are present at Great Lake. These include: the impact of water level management on algal beds that provide habitat for a diversity of aquatic biota, including a number of threatened species; fish migration issues; translocation of native and exotic fish species from nearby waters via Liawenee Canal or Arthurs Flume; and the presence of the exotic water weed *Elodea canadensis*.

While earlier studies by researchers attached to the (then) Inland Fisheries Commission investigated, characterised and documented issues relating to the Great Lake trout fishery and the algal beds (more commonly called the 'shrimp beds') that occur in the lake, many of the conclusions regarding the importance of the algal beds as habitat for endemic fauna in the lake was not supported by rigorous sampling. Furthermore, it was not known how much the beds could move with changes in lake levels, despite this being proposed as a key threatening process.

Technical Studies

Aims

The most significant issue identified for Great Lake was the status of the native *Chara* and *Nitella* sp. algal beds, which appear to play a critical role in maintaining biodiversity within this system and are thought to be critical habitat for a number of rare and threatened species. The following priorities were therefore identified;

- assess the overall distribution of *Chara* and *Nitella* algal beds and other macrophytes within Great Lake, following observations that the major beds originally described in 1987 had significantly increased in extent and moved to higher position in the lake by 1999/2000;
- assess the relative importance of the algal beds as habitats for endemic and other fish and macroinvertebrate species within the lake, including those species listed under the Tasmanian Threatened Species Protection Act 1995;
- assess the habitat requirements of key native fish and macroinvertebrate species within the lake, including listed species.

Assessment of Issues

The technical studies pertaining to Great Lake included surveys of and mapping of the algal beds, invertebrate surveys and assessment of habitat requirements of the biota utilising these algal beds. The studies showed that the algal beds do form a significant habitat for a range of macroinvertebrate taxa as well as for the threatened native fish *Paragalaxias dissimilis*. The beds contain a more diverse and abundant macroinvertebrate fauna than other benthic habitats within the lake.

The results of this study have also suggested that while the algal beds may be able to migrate vertically to adjust to water level changes in Great Lake, the rate of change in water level due to hydro-electric power generation may exceed the speed that the algal beds can migrate. This theory was based on a limited dataset, and further assessment raised the issue that health and migration of the algal beds may also be affected by turbidity (water clarity). At present there is not a sound understanding of the flora-fauna relationships which would assist in the development of an algal bed response model. Therefore, within the timeframe of this study it was not possible to draw conclusions on management options that would address the issues of concern.

Outcomes

Additional long-term data is required before the algal bed issues can be resolved. Faunal relationships also need further understanding. In response, Hydro Tasmania is committed to support a further five years of research into the Great Lake algal beds and associated faunal relationships.

Other issues, such as strategies to reduce navigational hazards associated with submerged objects; minimisation of impacts related to camping and access to the shore-line of the lake; and management of the threats posed by invasion of exotic plant and animal species cannot be fully developed until the more significant issue discussed above is resolved.