

Water Management Review

South Esk – Great Lake Catchment



Key Issues

- Environmental flows
- Water quality
- Irrigation water supply

Related WMR Technical Studies

- Woods Lake
- Upper Lake River

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Technical Study – Lake River Assessment

The South Esk – Great Lake Water Management Review

The Lake River 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 Identified

Two main issues were identified for study on the Lake River. These were periodic deterioration in water quality and the provision of water for the environment. The security of supply for irrigation water in the lower Lake River was also raised through the consultation process.

Background and Information Gaps

The upper catchment of the Lake River has been dammed by the construction of the Arthurs and Woods Lake dams, the latter impoundment now regulating flows in the river down as far as its confluence with the Macquarie River. The creation of Arthurs Lake, and the diversion of water into the Great Lake catchment has resulted in a 75% reduction in water yield to the Lake River catchment.

Although the section of the catchment immediately below Woods Lake is forested and there is limited abstraction of water, this area is currently subject to seasonally intensive logging activity. Further downstream, the catchment is primarily used for agriculture, and irrigation is a major use of water from the Lake River. Water released from Woods Lake currently supports riparian irrigation activities down as far as the confluence with Brumbys Creek. Releases to meet this irrigation demand have resulted in a modified seasonal pattern of flow in the river, with enhanced flows in the upper sections of the river during the summer months (November to April). In the lower section of the river, a complicated series of diversion canals and extraction pumps divert water from the river for irrigation and stock watering purposes.

For downstream water users, the water quality in the Lake River periodically becomes an issue. The baseline turbidity (and to a lesser extent nutrient concentrations) in the Lake River tend to reflect the conditions in Woods Lake. The lake has a history of turbidity problems and has relatively high background nutrient levels. Water quality has improved in Woods Lake since 1996 when Hydro Tasmania raised the minimum lake level to reduce turbidity (see Woods Lake study).

The provision of environmental flows is a State-wide issue in relation to the COAG water reforms initiated in the mid-1990s, and while biological sampling has clearly shown that current patterns of flow in the lower Lake River are not impacting on ecosystem health, an investigation of the environmental flow requirements for the Lake River was undertaken.

Technical Studies

Aims

The aims of this study were therefore to:

- investigate the causes of poor water quality in the lower Lake River; and
- undertake surveys to derive options for providing water for the environment.

For the purposes of this study, the environmental flow assessment was only undertaken on the stretch of river between Woods Lake and the Cressy Road, as the river downstream from this has been highly modified as a result of extensive willow removal and instream works. This approach is consistent with the standard Instream Flow Incremental Methodology (IFIM). It should be noted that the issue of water allocation from the Lake River was not considered as part of the WMR, and is being addressed through another process.

Assessment of Issues

Water quality information for the Lake River reported in earlier studies, and complemented by the additional data collected during this project, supports conclusions that baseline turbidity (and to a lesser extent, nutrient concentrations) are driven largely by conditions in Woods Lake. The elevated turbidity levels that have been recorded in the lower Lake River, and has caused concern to downstream users, appears to be driven by local rainfall events causing runoff from the catchment immediately below Woods Lake, where logging activities were seen to have a marked impact on turbidity in the river and in smaller tributaries. While the removal of trees may have other long-term impacts on water quality and flow in the Lake River, it appears that it is the activities relating to road and culvert construction that are responsible for the apparent increase in sediment delivery to the river. This issue would benefit from further investigation, but was not considered within the scope of this study.

For Hydro Tasmania, the management issue related to its operations is to ensure that water provided to the Lake River from Woods Lake is of a quality that will meet any water quality objectives for the Lake River. Although these WQO's have not yet been determined for the Lake River, it is anticipated that they will take into consideration the historic elevated turbidity levels in Woods Lake, and will thus maintain the existing protected environmental values (PEVs). Hydro Tasmania has committed to maintaining a minimum lake level in Woods Lake that is effective in reducing turbidity as far as is practicable (see Woods Lake study).

Investigations were carried out to determine the environmental water requirements for the Lake River between Woods Lake and the Cressy Road, using two separate techniques. One technique utilised a hydrological 'natural flow' model, while the other utilised the IFIM method for determining biologically relevant environmental water requirements. Each of these methods yielded different options for supplying environmental water to the lower Lake River. This prompted a re-evaluation of the objectives of an environmental flow release to the lower Lake River.

Summer minimum flows are presently maintained by irrigation releases from Woods Lake. During winter periods, a minimum flow is provided by seepage from the dam and local catchment pick-up. This appears to provide adequate water to maintain aquatic health, as biological sampling data indicated that the Lake River between Woods Lake and the Cressy Road is presently in a healthy state.

Outcomes

Hydro Tasmania does not propose to commit to a change to current operations and the existing flow regime will therefore be continued.