Upper Derwent Catchment

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1. About the catchment

The Upper Derwent Land & Water catchment encompasses about 3,540 km² of land area in Central Tasmania between Meadowbank Dam (at ~70 mASL) and the Walls of Jerusalem National Park (elevation ~1,400 mASL). Although the more elevated northern and western sides of this catchment fall within the Tasmanian Wilderness World Heritage Area, runoff from all of the catchment is captured by a number of impoundments and used to generate hydro-electricity. Most notable amongst these are Lake King William, Lake Echo, the Bronte chain of lakes and Lake Meadowbank. These storages have been constructed on the Derwent, Nive and Dee river systems. The only major river in the catchment that has remained unregulated is the Florentine River (length 41 km).

While the World Heritage Area covers approximately 1000 km² of the catchment, hydro-electric power generation, forestry, agriculture and aquaculture are the main activities affecting land and water within the catchment. Trout fishing and bushwalking are popular and important recreational pursuits in the upper catchment around Bronte Park and Lake St Clair.
2. Streamflow & Water Allocation

No streamflow monitoring is carried out by DPIWE in this catchment. As many of the river systems within this catchment are managed as part of the hydro-electricity generating system, Hydro Tasmania operates streamflow monitoring at a number of locations.

**Total Water Allocation**

The following table shows the breakdown of water allocations in the catchment.

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Total Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation</td>
<td>31,452 ML</td>
</tr>
<tr>
<td>Stock &amp; Domestic</td>
<td>6 ML</td>
</tr>
<tr>
<td>Water Supply</td>
<td>26 ML</td>
</tr>
<tr>
<td><em>Other</em></td>
<td>59,133</td>
</tr>
</tbody>
</table>

*The majority of this figure includes non-consumptive use by aquaculture enterprises.

Of the total licensed water allocation within this catchment, 14,347 ML is stored within constructed storages and 76,270 ML is utilised directly from rivers and streams.

**Fig:** The fore-bay at Clarks Dam at Lake King William.

**Fig:** The flume delivering water from Lake Echo to Echo Power Station.
3. River Health

The Australian River Assessment System (AUSRIVAS) is a standardised national system for assessment of river condition that uses benthic macroinvertebrates.

The AUSRIVAS models predict the aquatic macroinvertebrate fauna that would be expected to occur at a site in the absence of environmental stress such as pollution, habitat degradation or flow regulation. A comparison of the macroinvertebrates expected to occur at the test site with those actually collected (O/E ratio) provides a site specific measure of the biological impairment of the test site. Further details about AUSRIVAS can be found at: www.ausrivas.canberra.edu.au/ausrivas

AUSRIVAS assessments are carried out at three locations in the Upper Derwent River catchment:
- Nive River at Lyell Highway;
- Pine River upstream of Pine Tier Lagoon; and
- Florentine River at Florentine Road.

Nive River at Lyell Highway

This site is located in the middle reaches of the Nive River, approximately 8.5 kilometres below Pine Tier Lagoon. The upper part of the reach consists of riffle/run habitat with boulder/cobble substrate, which then flows into a large pool immediately above the bridge. The surrounding land has been cleared for grazing, leaving a sparse 5 to 10 metre native riparian buffer with minor intrusion by exotic species. Stock access has contributed to bank and instream degradation. Filamentous algae has been noted on most sampling occasions.

The river is hydrologically modified. Most of the water entering Pine Tier Lagoon is diverted via the Bronte canal to Bronte Lagoon. Only spills from Pine Tier Dam reach this section of the Nive River.

This site was classed as significantly impaired by both riffle and edgewater combined season models. Taxa predicted to occur but was found to be absent from riffle samples include; Parameletidae (amphipods), Scirtidae, Psephenidae (beetles), Tipulidae, Blephaceridae, Diamesinae (fly larvae) and Austroperlidae (stoneflies). Taxa predicted to occur but absent from the edgewater sample include Sphaeriidae (pea shells) and Hydrobiosidae, Conoesucidae, calocidae, and Philorheithridae (caddisflies).

<table>
<thead>
<tr>
<th>Season</th>
<th>O/E Taxa Band</th>
<th>O/E Taxa Band</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig: Combined season AUSRIVAS O/E Taxa scores for the Nive River at Lyell Highway.

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**Pine River upstream of Pine Tier Lagoon**

The Pine River originates within the central Plateau Conservation Area. Draining the Western lakes, it flows in a southerly direction, emptying into Pine Tier Lagoon approximately 500 metres below the sampling site. The river at this point is 16-18 metres wide and consists of a riffle/ run sequence over predominantly boulder/ cobble substrate, which is exposed during periods of low flow.

Both banks above the bridge have undisturbed native vegetation consisting of ti-tree, wattle and hakea with a sparse eucalypt canopy. Below the bridge, the left bank has been cleared for grazing, leaving a narrow 5 metre riparian buffer.

Visual assessments indicate that the instream habitat is quite good, although there is evidence of stock access, which has contributed to erosion of the banks and sedimentation. Large patches of filamentous green algae have been observed on a number of occasions.

Water quality is very good with low turbidity and conductivity. Other variables were within the ranges expected for a relatively undisturbed river of this type.

AUSRIVAS assessments were all indicative of good river health. O/E values for the combined season riffle models were all 0.98 or above with the majority of values >1. Outputs for the combined season edgewater model were marginally lower but still well within Band A. The macroinvertebrate faunas in both habitats were rich and included representatives of all major macroinvertebrate groups.
Florentine River at Florentine Road

This site is in the lower reaches of the Florentine River, approximately 1.5 kilometres upstream of the confluence with the Derwent River. The river upstream of the Florentine Road crossing is 25-28 metres wide and consists of fast flowing riffles and runs over predominantly boulder/cobble substrate.

Riparian vegetation is in good condition and dominated by native species. However beyond the 40 metre riparian zone, the land is used for plantation forestry (radiata pine).

Water quality is generally good, although increased turbidity and conductivity levels have been noted on a number of occasions.

This site has been repeatedly monitored since autumn 1998. Combined season assessments of the riffle habitat have consistently classed this site as equivalent to reference (Band A) with O/E scores falling within a narrow range (0.98-1.08). O/E scores for the edgewater habitat were higher, with most values greater than 1.15 (Band X). Both habitats contain a diversity of fauna, with Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies), all of which are considered to be sensitive to disturbance.

Fig: Florentine River at Florentine Road.

<table>
<thead>
<tr>
<th>Season</th>
<th>O/E Taxa</th>
<th>Band</th>
<th>O/E Taxa</th>
<th>Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au98/ Spr98</td>
<td>1.07</td>
<td>A</td>
<td>1.19</td>
<td>X</td>
</tr>
<tr>
<td>Au99/ Spr99</td>
<td>0.99</td>
<td>A</td>
<td>1.18</td>
<td>X</td>
</tr>
<tr>
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<td>A</td>
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<td>X</td>
</tr>
<tr>
<td>Au01/ Spr01</td>
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<td>X</td>
</tr>
<tr>
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<td>X</td>
</tr>
<tr>
<td>Au03/ Spr03</td>
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<td>A</td>
<td>1.11</td>
<td>A</td>
</tr>
<tr>
<td>Spr03/ Au04</td>
<td>0.98</td>
<td>A</td>
<td>1.19</td>
<td>X</td>
</tr>
</tbody>
</table>

Fig: Combined season AUSRIVAS O/E Taxa scores for the Florentine River at Florentine Road.