DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Tasmania

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Water Quality of Rivers in the Duck River Catchment

A Report Forming Part of the Requirements for 'State of Rivers' Reporting

PART 3i

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The Department of Primary Industries, Water and Environment

The Department of Primary Industries, Water and Environment provides leadership in the sustainable management and development of Tasmania's resources. The Mission of the Department is to advance Tasmania's prosperity through the sustainable development of our natural resources and the conservation of our natural and cultural heritage for the future.

The Water Resources Division provides a focus for water management and water development in Tasmania through a diverse range of functions including the design of policy and regulatory frameworks to ensure sustainable use of the surface water and groundwater resources; monitoring, assessment and reporting on the condition of the State's freshwater resources; facilitation of infrastructure development projects to ensure the efficient and sustainable supply of water; and implementation of the *Water Management Act 1999*, related legislation and the State Water Development Plan.

2.4 Catchment Surveys

Snapshot surveys of the entire drainage system of the Duck River catchment were undertaken in the summer (March) and winter (August) of 2000. As pointed out at the beginning of this section, this sampling technique relies upon stable hydrological conditions so that the confounding influence of rainfall distribution is avoided. The aim of the technique is to allow relative 'hotspots' of water quality deterioration to be easily mapped and highlighted. This technique is a useful tool for locating sites or reaches of streams that may require specific or targeted management measures.

River flows during the March 2000 survey were typical for the summer of that year (river flow at site DR4 = 0.6 m^3s^{-1}) and was carried out following a prolonged dry period. The winter survey was undertaken in August, about a week after a small 'fresh' (peak flow of 10 m^3s^{-1}), when baseflow of about 4 m^3s^{-1} had re-established. These hydrological conditions should be kept in mind when viewing the following figures.

While many of the sites were comprehensively sampled during routine monthly monitoring, and results from these sites was discussed in some detail in previous sections, the aim of the following maps is to give a much broader view of water quality across the catchment. The discussion will focus on those parameters not normally sampled during routine monthly monitoring at the full set of sites. Data collected on the more common physico-chemical parameters (ie turbidity, dissolved oxygen, pH, etc) will not be discussed here, as the seasonal changes in these parameters have already been illustrated in an earlier section.

2.4.1 Catchment Surveys –Nitrogen

The survey data for nitrate nitrogen (NO_3-N) highlights the markedly different conditions that exist in summer and winter (Figure 2.26 and Figure 2.27), with much higher concentrations being recorded throughout the catchment during the winter survey. This supports earlier comments that have been made regarding the 'flushing' or mobilisation of nitrates out of the soil profile and into the river system during the wet months of the year. The increase in winter NO_3-N concentration was most significant in the Deep Creek sub-catchment, where the concentration at site DR29 increased by more than an order of magnitude (summer NO_3-N = 0.016 mg/L: winter NO_3-N = 0.613 mg/L). Other very large increases in concentration were also recorded at Coventry Creek (DR3), Gaeles Creek (DR2 & DR5) and Lairds Creek (DR26).

Sites with high concentrations of NO_3-N during both surveys were Edith Creek and upper Allen Creek. Edith Creek is an area of intensive dairy farming and the high NO_3-N concentrations recorded there are likely to reflect the degree to which this activity impacts on the aquatic environment. The impact on water quality is further highlighted by the data for ammonia concentrations collected during the summer survey (Figure 2.28). As mentioned earlier, ammonia concentrations throughout the Duck catchment are much higher than have been recorded by previous 'State of Rivers' studies, and ammonia concentrations in the Edith Creek area were particularly high during the survey of March 2000.

Only the map showing the winter snapshot survey data for TN has been included in this report (Figure 2.29), as there was no substantial change between summer and winter conditions. Concentrations across all sites in both summer and winter surveys ranged between 0.6 – 1.3 mg/L. Although examination of the raw data does show that slightly higher concentrations were recorded at some sites during the higher flows of winter, it is apparent that the elevated nitrate concentrations that occurred during the summer tended to counter-balance the lack of organically derived nitrogen that is in the water column at that time. During winter, this situation is reversed, with higher organic nitrogen (in the form of suspended particulate material) and generally lower NO_3-N concentrations.

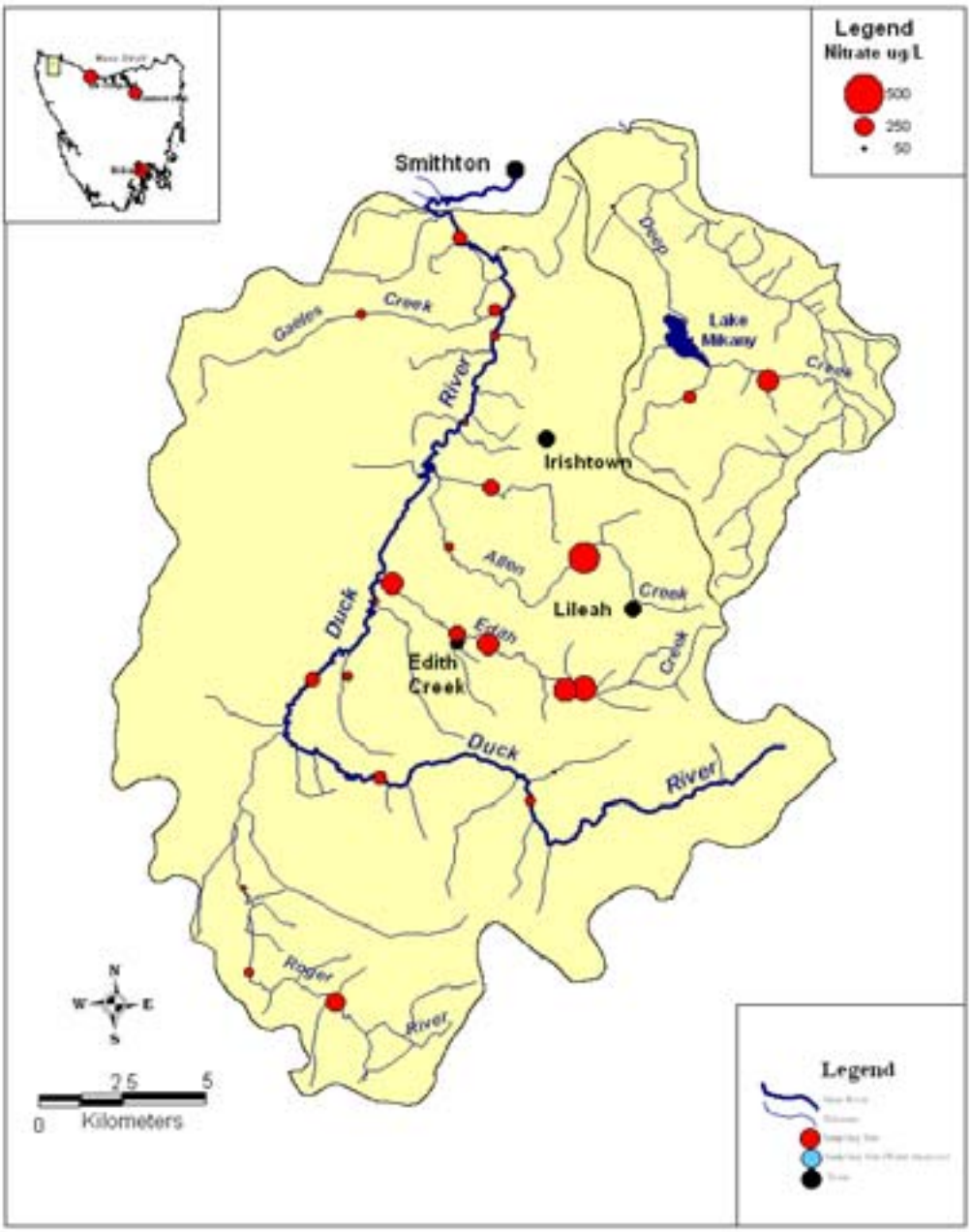

Figure 2.26: Snapshot of Nitrate-N concentrations recorded in the Duck catchment on 21 March 2000.

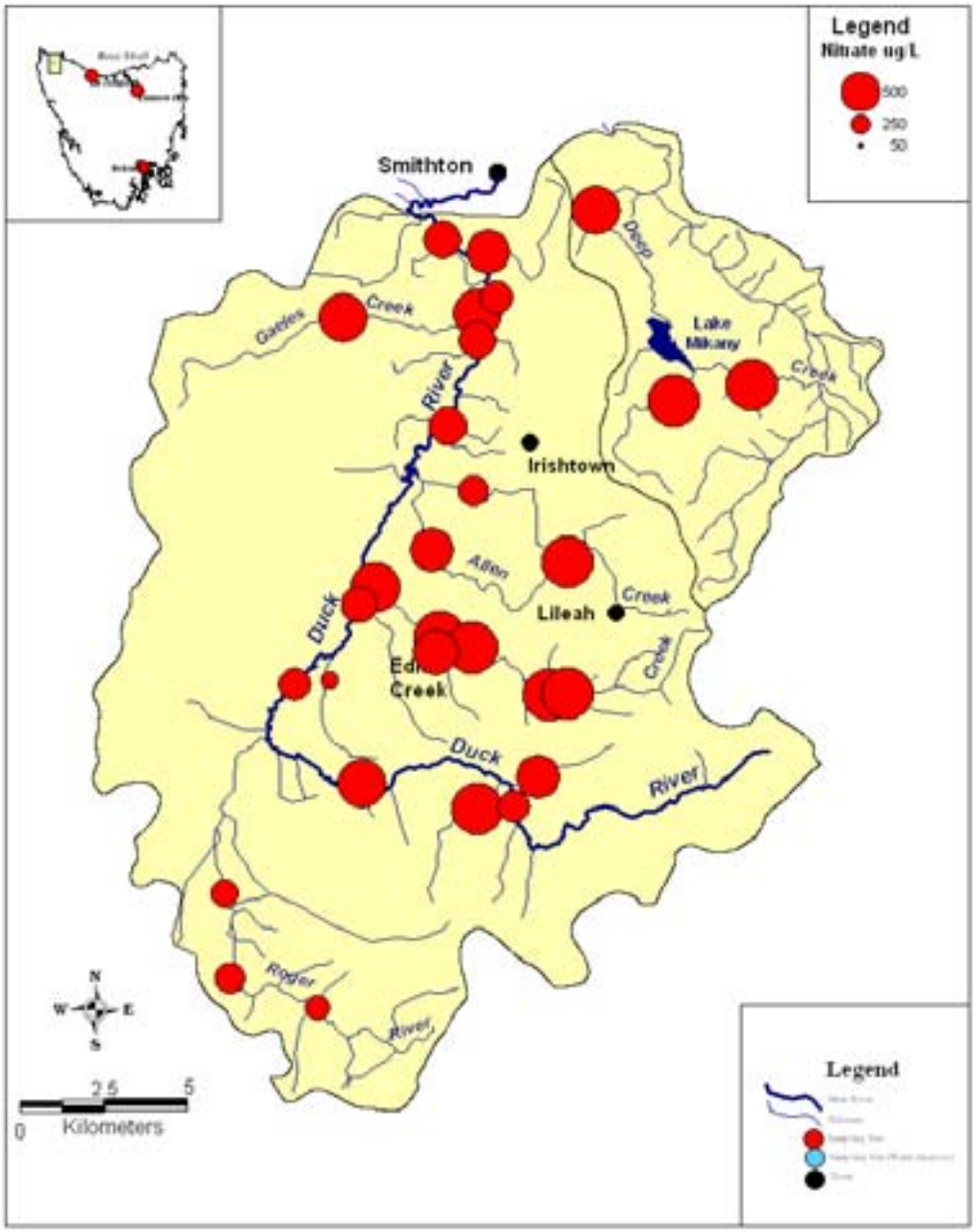

Figure 2.27: Snapshot of Nitrate-N concentrations recorded in the Duck catchment on 31 August 2000.

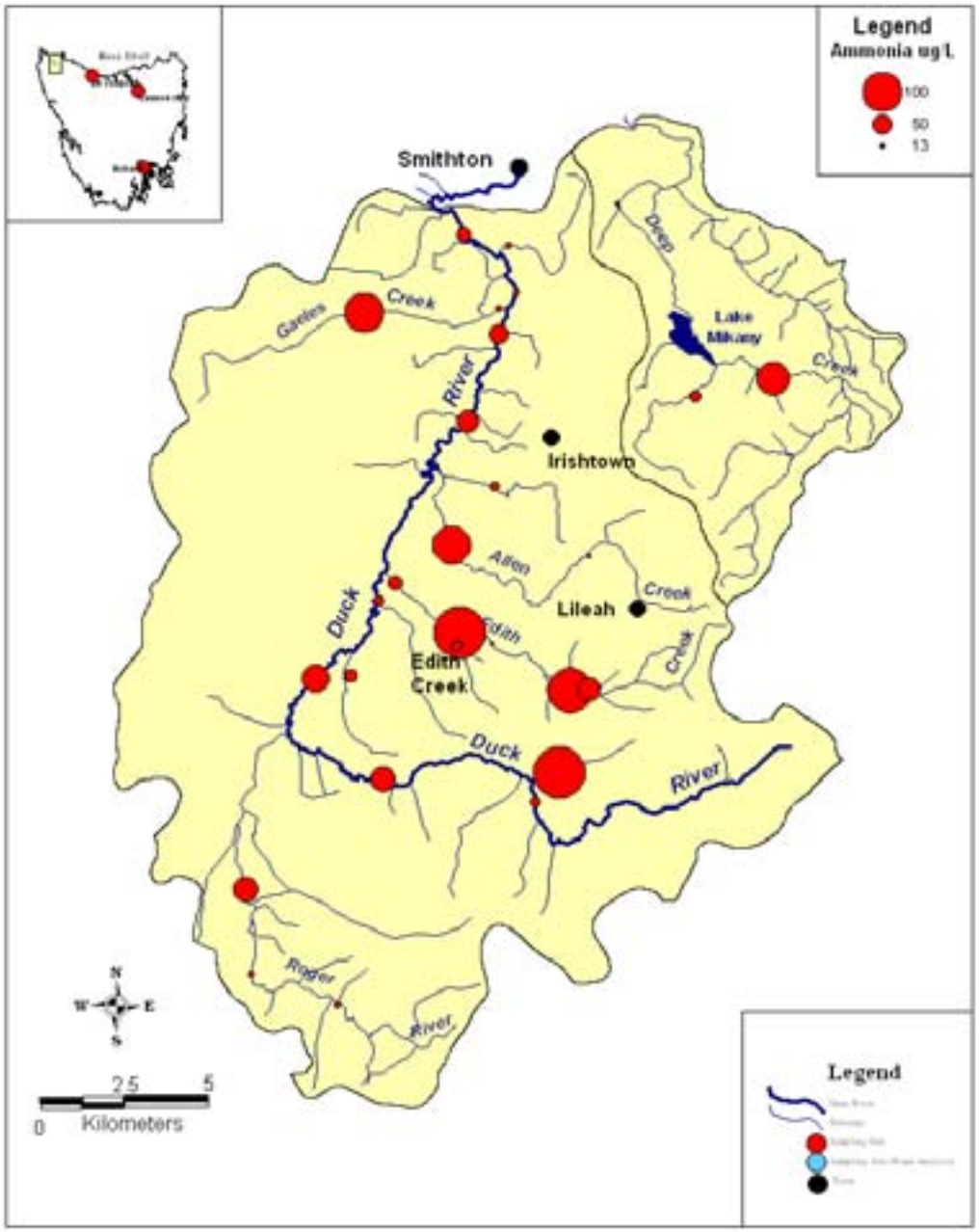

Figure 2.28: Snapshot of Ammonia-N concentrations recorded in the Duck catchment on 21 March 2000.

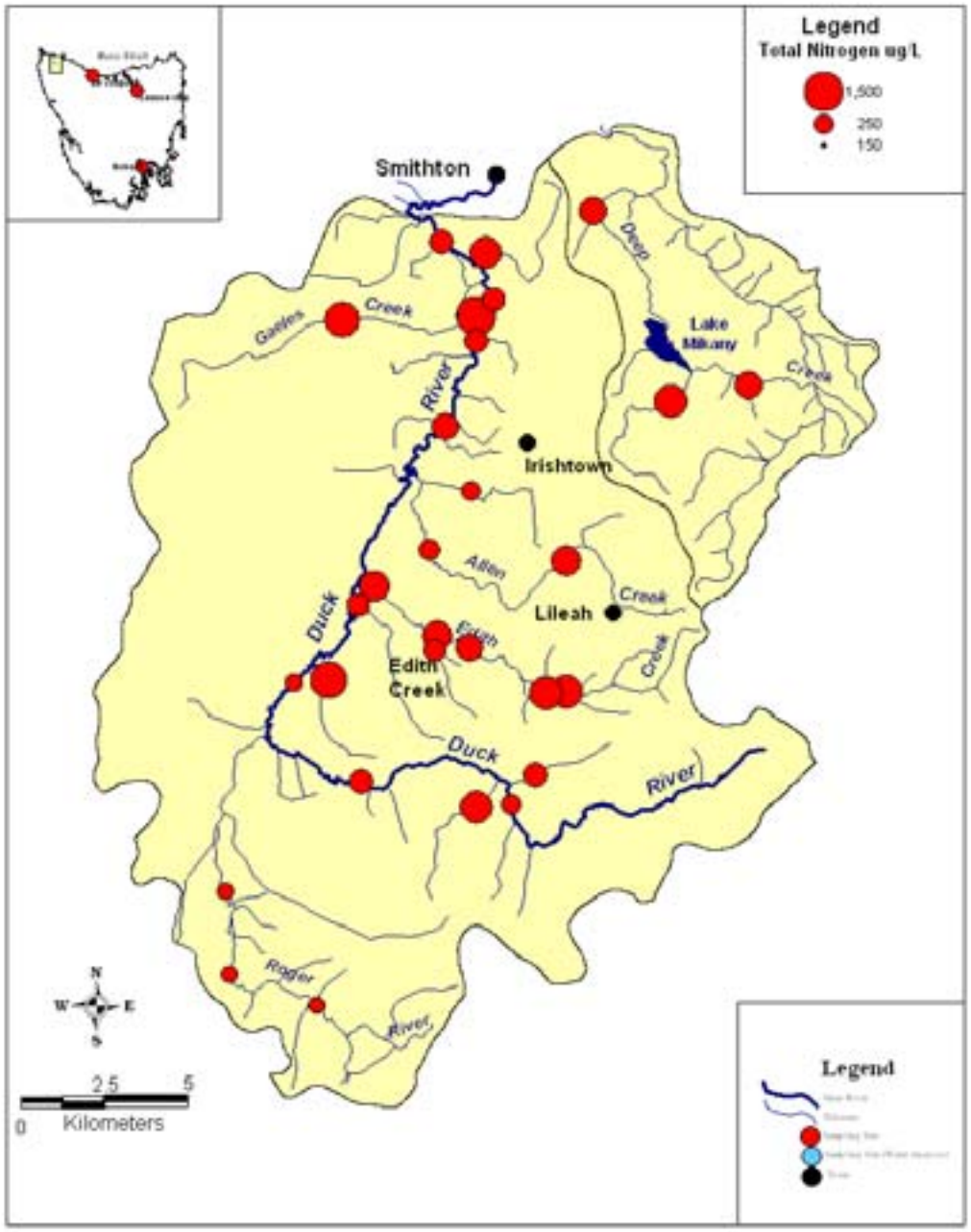

Figure 2.29: Snapshot of Total N concentrations recorded in the Duck catchment on 31 August 2000.