DIFFUSE LOADS OF POLLUTANTS TO THE TAMAR RIVER ESTUARY

BACKGROUND

The Tamar Estuary and Esk Rivers (TEER) catchment area covers 10,000km$^2$ (approximately 15 percent of Tasmania, Figure 1). This large catchment area drains to the Tamar River estuary and transports pollutants from land surfaces as ‘diffuse’ catchment run-off and from point sources such as industry discharges or Sewage Treatment Plants.

In December 2015, NRM North’s Tamar Estuary and Esk Rivers (TEER) Program released the TEER Water Quality Improvement Plan. This Plan provides a comprehensive picture of water quality throughout the Tamar River estuary and its tributaries by identifying the key drivers of water quality issues and the priority actions to address these issues.

Diffuse sources are the dominant supply of flows and pollutants to the Tamar River estuary. Close to 100% of the contributions between flow and total suspended sediment loads (TSS) can be attributed to diffuse sources. For nutrients, approximately 70% of the total nitrogen (TN) and approximately 55% of total phosphorus (TP) are attributed to diffuse sources and approximately 70% of the enterococci bacteria. This is not surprising considering the large catchment area that drains to the Tamar River estuary and the large proportion of agricultural land use.

Figure 1 shows the contribution of different land uses to diffuse pollutant loads and flows from the catchment. It also shows the proportion of the total catchment area of each land use so that the contribution of each land use can be considered relative to their land area.

FIGURE 1. TAMAR CATCHMENT MAP

Dominant land uses in the greater TEER catchment by land area are greenspace (~25%), grazing (~45%) and native production forest (~20%) with other land uses covering less than 5% of the total land area each. Land uses which contribute the most flow to the Tamar River estuary are native production forest (~45%) and greenspace (~35%) with smaller but significant contributions from grazing (~5%), hardwood plantations (~5%), softwood plantations (~5%) and urban areas (~5%). The dominance of green space and native production forests in producing runoff is due to their position in the catchment. These land uses tend to occur in high slope, high rainfall areas at the top of the catchment and so produce high flows relative to their areas. This higher relative contribution of flows also leads to a greater contribution of pollutants than for well covered lower rainfall and slope areas, particularly in terms of TP and TSS.
Grazing areas represent approximately 45% of the land area of the catchment but only 4% of the total flows, due to being located in much lower rainfall areas of the catchment. Despite this small contribution of flow, these areas can represent a significant source of other pollutants, in particular enterococci. This can indicate the potential for enteric pathogens such as Campylobacter, Salmonella, Cryptosporidium, Giardia and E.coli but the extent to which these are a problem will depend on the level of shedding from infected stock. Dairy farming is a very small land use in the catchment, covering less than 1% of the land area but is estimated to contribute approximately 2% of the TN, 4% of the TP and over 20% of the enterococci load in the catchment. As was the case with grazing, dairy areas produce well below their relative land use area in flows due to their location in the catchment.

Urban areas are a very small land use in the catchment, covering only 1% of the land area. They contribute substantially higher proportions of the total load than this relative area, ranging from 14% to 18% of nutrient and sediment loads.

Cropping areas are a small land use in the catchment (3%) and produce a very small proportion of total loads (approximately 1% of nutrients and sediments). This is generally due to the lower rainfall and flows that occur in these areas.

Land cover is a significant factor that contributes to the runoff that enters the system, however slope and rainfall are also important contributing factors. High rainfall areas tend to be at the top of the catchment and hence tend to produce higher flows and potentially higher loads compared to their surface area. This helps to explain estimates of significant pollutant load contributions from land uses such as greenspace and native production forest shown in Figure 2.

While groundcover in industries such as intensive agriculture, broadacre cropping, dairy and grazing can be managed, higher flows from high rainfall forested slopes are largely ‘uncontrollable’. For activities located lower down in the catchment such as agriculture and urban land, high loads produced from smaller land areas are associated with land clearing as well as land and water management.

Although direct discharges to the Tamar River estuary from point sources such as industry and sewage treatment plants can have a significant impact on the Tamar River estuary due to their proximity to waterways, the diffuse pollutants contribute the largest loads to the Tamar. Adoption of best practice catchment management to reduce the loads of diffuse pollutants is an important focus for improving water quality in the Tamar.

The adoption of best practice catchment management includes activities such as fencing stock out of rivers, improving groundcover on grazing land, good effluent management on dairy farms, creating streamside reserves in forestry harvesting areas and improving the extent of vegetated riparian buffers on agricultural land. In urban areas, best practice methods should be a focus including increasing the adoption of water sensitive urban design to minimise stormwater issues and encouraging erosion control on development sites. The key recommendations for addressing water quality issues throughout the Tamar Estuary and Esk Rivers area are detailed in the TEER Water Quality Improvement Plan.


FURTHER INFORMATION

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