5.0 RIVER FLOWS

The natural pattern of river flow underpins the health of rivers and their floodplains. However, flows in rivers and across floodplains can be affected by catchment activities in several ways, for example, by the construction of dams and weirs, pumping water from rivers and aquifers, drainage works and changes in land-use.

River flows are highly seasonal in the Darwin Harbour region, as elsewhere in the wet/dry tropics, with the vast majority of flow during the wet season months from January to March. The Darwin Harbour region has two types of rivers and streams categorised according to their pattern of flow. Flow can be either seasonal or perennial. Seasonal streams only flow during the wet season, typically starting to flow in December-January and stopping in May-June-July. In the dry season these rivers become a series of disconnected pools, which then dry out completely. Most rivers and streams in the Darwin region flow seasonally.

Figure 5.1 Winnellie industrial area. Urbanisation increases the amount of freshwater that flows into Darwin Harbour

Perennial rivers and streams flow throughout the year. In the dry season, flow is supplied from groundwater. In the Darwin Harbour region examples of perennial flow water courses are Howard River and Berry Creek downstream of Berry Springs.

Dams modify the flow in rivers and creeks. The Darwin region has one large dam, Darwin River Dam, which is located in the upper parts of the Blackmore River catchment. The dam supplies drinking water to Darwin, Palmerston and the Litchfield area. One effect of the dam is to reduce wet season flows to the Blackmore River estuary. In the dry season, a small amount of water is released from the dam to maintain some flow in the Darwin River for users downstream.

Water pumped from the ground is common in rural areas. There are in excess of 2500 bores throughout the region. This water is used for drinking, domestic purposes and agriculture. Since groundwater contributes to river flow, especially during the dry season, excessive pumping could reduce dry season flows, though there is no evidence of this currently.

Other catchment activities also have the potential to affect flow and so the health of rivers and lagoons. Currently, water is pumped from the region's rivers, though the volume is insignificant when compared to the total volume flowing into the harbour. Drainage works that prevent flooding have reduced the extent of flooding in some lagoons in the rural area. The effect of this on aquatic plants and animals has not been monitored.

Figure 5.2 Freshwater flows quickly to Darwin Harbour along drains.

The greatest impact on the river flows of the Darwin region is the change from eucalypt woodland to urban land-use. Roads, carparks, shopping centres and buildings increase the area of impervious land, with the result that water cannot soak into the ground and, instead, flows to rivers and drains. Urbanisation can double or triple the amount of water running off the land. It also reduces the area of temporary water storage contained in floodplains and wetlands, and reduces the time it takes for water to reach the harbour. Another impact of urbanisation is to increase the number of storm flow events during the wet season, which results in more scouring of urban streams compared to rural streams.

The impact of increased run-off from urban areas to the harbour, however, is localised because only about 2% of the catchment is urban. In addition to urban land-use, another source of water to the harbour is the release of treated sewage from the city's four treatment plants. This sewage from households in the Darwin, Palmerston and Litchfield area originates mostly from Darwin River dam and so represents a diversion of water from the Blackmore River catchment to other parts of the region.

Conclusion

Overall, river flow in the Darwin Harbour region is mainly natural, except in urban and some rural areas. The main reasons for the natural flow is that apart from Darwin River, dams do not block the streams and rivers of the region, diversion of surface waters is minimal and current water demands are modest.

Further Reading

Working Group of the Darwin Harbour Advisory Committee. (2003) Management Issues for the Darwin Harbour Region (Water allocation, Wetlands). Department of Infrastructure, Planning and Environment. Natural Resource Management Division. Darwin, NT.

Haig, T. and Townsend, S. (2003) An understanding of the groundwater and surface water hydrology of the Darwin Harbour Plan of Management area. In "Proceedings: Darwin Harbour Region: Current knowledge and future needs' (Ed. Working Group for the Darwin Harbour Advisory Committee) pp122-149.