

Catchment pollutant loads monitoring methods



Great Barrier Reef Report Card 2015



Australian Government



Queensland Government

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Monitoring sites

The end-of-system monitoring sites are located at the lowest point in a river or creek, predominantly where gauging stations have been established and maintained by the Department of Natural Resources and Mines. These provide data on all of the catchment upstream of the site. Sub-catchment sites are located at the lowest point in a sub-catchment (tributary) predominantly at existing gauging stations. They provide data on all of the sub-catchment upstream of the site. Both provide data to calibrate and validate catchment models.

Rainfall

Rainfall totals and rainfall decile data were obtained from the Bureau of Meteorology National Climate Centre. These data were synthesised using geographic information system tools to display total annual rainfall and annual rainfall deciles for Queensland during 1 July 2014 – 30 June 2015.

River discharge

River discharge data (the volume of water moving past a point per unit time in $\text{m}^3 \text{s}^{-1}$) for monitoring sites were extracted from the Department of Natural Resources and Mines, Surface Water Database (Hydstra). River discharge data for some monitoring sites were adjusted using a timing and flow factors based on the nearest upstream gauging station; or a combination of modelled flow and flow measured by Horizontal Acoustic Doppler Current Profiler.

Water quality sampling

Water samples were collected, stored, transported and quality assured and quality controlled in accordance with the Environmental Protection (Water) Policy Monitoring and Sampling Manual (<https://www.ehp.qld.gov.au/water/pdf/monitoring-man-2009-v2.pdf>). Water quality samples were collected using two different sampling methods: manual grab sampling and automatic grab sampling using refrigerated pump samplers. Intensive sampling (daily or every few hours) was conducted during high flow events and monthly sampling was conducted during low or base-flow (ambient) conditions.

Water quality sample analysis

Total suspended solids and nutrient analyses were undertaken by the Science Division Chemistry Centre (Dutton Park, Queensland). Queensland Health Forensic and Scientific Services Organics Laboratory (Coopers Plains, Queensland) analysed water samples for pesticides. Both laboratories are accredited for the analyses conducted by the National Association of Testing Authorities (NATA).

Loads calculation

The suitability of the generated water quality monitoring data for load calculations was assessed using a sample representivity rating. The most appropriate load calculation method (i.e. either the average load (linear interpolation of concentration) or the Beale ratio) was determined by assessing sample coverage and the representivity rating. Annual loads were calculated for total suspended solids, nutrients (i.e., total nitrogen, particulate nitrogen, dissolved organic nitrogen, oxidised nitrogen, ammonium nitrogen, total phosphorus, particulate phosphorus, dissolved organic phosphorus, and dissolved inorganic phosphorus) and pesticides (i.e., ametryn, total atrazine, total

diuron, hexazinone and tebuthiuron). Loads were calculated using the Loads Tool component of the software Water Quality Analyser versions 2.1.1.6.

Toxic loads calculation

A pesticide toxic-equivalent load (toxic load) is the calculated load of a pesticide multiplied by the relative toxicity of the pesticide compared to that of diuron (Smith et al., in review) and is expressed as an equivalent mass of diuron, i.e. diuron equivalent kg. The total toxic load is calculated by summing the toxic loads of all pesticides that have the same toxic mode of action.