



Interpreting the report cards

Dugongs (*Dugong dugon*) are sometimes seen in the Channel Island, Elizabeth River estuary and other parts of Darwin Harbour. Better knowledge of habitat use by dugongs and other species in the harbour is a priority area for future research to help protect them from habitat loss, boat strikes and pollution. Darwin is the only known location where dugongs feed off algae and plants that grow on shallow rock reefs rather than seagrass only. Casuarina Coastal Reserve is the only known seagrass habitat in Darwin Harbour, and is a key habitat for dugongs. Seagrasses are highly vulnerable to human impacts such as pollution, and climate change. Dugongs are culturally important to Indigenous people along the coast. Photo by Scott Whiting

Introduction

This section contains information to help interpret the report cards.


Water quality

Darwin Harbour water quality (referred to as estuarine), catchment freshwater (ambient or low flow conditions) and catchment event-based monitoring and interpretation methods are presented.

Information on the assessment of water quality using water quality objectives, and the assessment of the current condition of waterways is provided. These techniques are widely used in other regions of Australia. State and regional-scale water quality guidelines, such as water quality objectives, are considered more appropriate than national guidelines. The methods used have been established under a process developed by the National Water Quality Management Strategy. Further details are available in ANZECC guidelines and related publications.

Biological indicators

The interpretation of biological indicators using an assessment system common in Australia is described in this section. The Northern Territory Government has monitored biological health from 2001–2007, so these results in the report cards provide a robust assessment, rather than for one year only.



The view from Charles Darwin National Park towards Darwin city. Charles Darwin National Park protects part of the Port Darwin wetland, one of Australia's most significant wetlands. Shell middens in the area show that Aboriginal people have used the land for thousands of years. The park area has military sites established during the development of World War II defences.

Interpreting the report cards

Ambient estuarine water quality

Water quality objectives: Water quality objectives act as a local guideline level. Water quality objectives describe the water quality needed to protect human uses and aquatic ecosystem values identified by the community (Beneficial Uses). These water quality criteria act as guideline levels and/or reference levels to help guide planning and water management to achieve and protect each of the values over time. Water quality objectives may change over time as more monitoring data becomes available.

Water quality objectives for nutrients, total suspended solids, and chlorophyll-a, were calculated from the 80th percentile of ambient water sampling from reference sites in the region. Water quality objectives for dissolved oxygen (% saturation) and pH were calculated using the 20th to 80th percentile range of ambient water sampling from reference sites in the region. Separate water quality objectives for the outer, mid and upper estuarine regions of Darwin Harbour will apply.

Water quality objectives will be formally declared under the Northern Territory legislation (*Water Act* part 7).

Current condition: The current condition for nutrients, total suspended solids, turbidity, chlorophyll-a and electrical conductivity were calculated from the median concentration of local ambient water quality data from recent years, as shown on the report cards. Dissolved oxygen (% saturation) and pH were calculated using the 20th to 80th percentile range.

Compliance: A tick indicates the current water quality condition for the indicator is equal to or better than specified by the water quality objective. A cross indicates the current condition for the indicator is outside the water quality objective.



Ambient freshwater quality

Water quality objectives: The water quality objectives for nutrients, total suspended solids, turbidity, chlorophyll-a, and electrical conductivity were calculated from the 80th percentile of ambient (low flow) water sampling data from reference sites in the region. Water quality objectives for dissolved oxygen (% saturation) and pH were calculated using the 20th to 80th percentile range of ambient water sampling data from reference sites in the region.

Current condition: The current condition for nutrients, total suspended solids, turbidity, chlorophyll-a and electrical conductivity were calculated from the median concentration of local ambient water quality sampling. Dissolved oxygen (% saturation) and pH were calculated using the 20th to 80th percentile range. The period of sampling is indicated in the report cards. The current condition is for ambient (low flow) conditions. Aquatic Health Unit monitoring sites are shown on the maps.

Compliance: A tick indicates the current condition for the indicator is equal to or better than specified by the water quality objective. A cross indicates the current condition for the indicator is worse than the water quality objective.

Event-based freshwater quality loads and event-mean concentrations

Current condition: The current water quality condition, as event mean concentration (EMC), was estimated from event-based loads for the catchment draining to the stream gauge station during storms in the 2006–07 wet season, where available. EMC is useful to help compare concentrations between catchments. Water quality samples were collected using a flow-weighted composite sampling technique. Northern Territory Government monitoring sites are shown on the maps.



Sampling for macroinvertebrates (water-bugs) to assess the biological health of streams in the Darwin Harbour region. Photo by Matt Majid

Interpretation

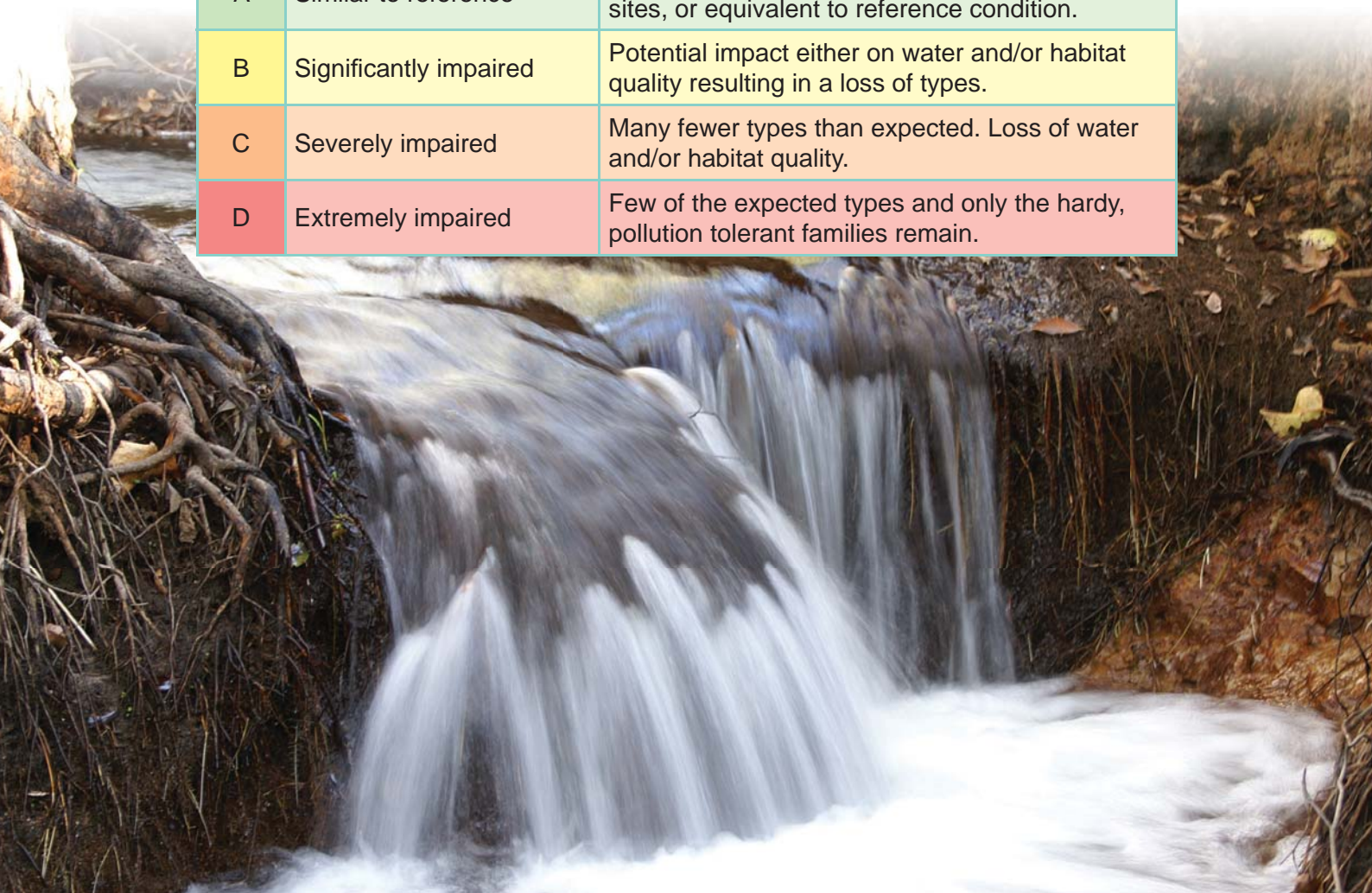
Whole catchment load for an average wet season: In addition, an estimate of the total load in an average wet season for the larger surrounding catchment area was made from load and catchment data on a generation rate per unit area basis from Skinner et al. (2009).

Biological indicators

Organisms living in streams and rivers can tell us about the condition or “health” of waterways. Diverse communities of macroinvertebrates (or water-bugs) indicate a stream in good condition, while simple communities of few water-bug types indicate a damaged or degraded stream. Water scientists regularly monitor the health of streams in the Darwin area using an assessment system known as AUSRIVAS. This stands for Australian River Assessment System, and works by comparing water-bugs present in a stream with those expected to be present in reference streams of a similar type. AUSRIVAS produces a score based on the number of types found in a sample relative to the number of types expected. To simplify interpretation of these scores a banding system has been developed. Band A means streams are equivalent to high quality reference streams; bands B, C, or D indicate that the stream is below reference condition and is degraded to varying degrees. Northern Territory Government monitoring sites are shown on the maps. The number of types of water-bug present in Darwin streams varies between 19 and 51. A total of 150 different water-bug types are used in assessment of streams in the region.

The table explains how to interpret bands from AUSRIVAS.






Band	Description	What it represents
X	More biologically diverse than reference	More types found than expected. Potential biodiversity “hot-spot” or mild organic enrichment.
A	Similar to reference	O/E scores range found at 80% of the reference sites, or equivalent to reference condition.
B	Significantly impaired	Potential impact either on water and/or habitat quality resulting in a loss of types.
C	Severely impaired	Many fewer types than expected. Loss of water and/or habitat quality.
D	Extremely impaired	Few of the expected types and only the hardy, pollution tolerant families remain.



Water quality rating

A 'water quality rating' was developed as an instantly recognisable assessment. Rating A is 'excellent water quality', through to E being 'very poor water quality'.

The water quality rating was calculated from the percentage of compliance values (see previous page) listed for ambient freshwater or marine water. Where available, the rating uses the compliance of 9 indicators for marine water, and 10 indicators for ambient freshwater. Further details are presented below. This rating method may change when other catchment and water quality assessment schemes are further developed.

Water quality rating	What the rating means	Compliance and method
	Excellent water quality	100% of indicators comply with water quality objectives
	Very good water quality	85% to <100% of indicators comply with water quality objectives
	Good or moderate water quality	50% to <85% of indicators comply with water quality objectives
	Poor water quality	30% to <50% of indicators comply with water quality objectives
	Very poor water quality	<30% of indicators comply with water quality objectives



Blue-back Blue-eye (*Pseudomugil cyanodorsalis*) is found in Howard River. Photo by Dave Wilson