ReportCard Methods

October, 2005 | **Report Card 2005**

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Freshwater monitoring is carried out twice a year, during spring and autumn, at 127 representative sites across South East Queensland. Five indicator types are used to assess the health of freshwater ecosystems: physical and chemical, nutrient cycling, ecosystem processes, and communities of both aquatic macroinvertebrates and fish.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates (insects, crustaceans, snails, etc.) are common, widespread and easily sampled. They vary in sensitivity to disturbance and reflect environmental conditions, and thus stream health, over time. Sampling methods used are based on those used for the Queensland AusRivAS (Australian River Assessment System) program.

The three indices used are:

- Number of macroinvertebrate taxa
- PET richness (number of stonefly, mayfly and caddisfly families
- Average SIGNAL score

Fish

Fish communities reflect a range of environmental disturbances and provide a measure of stream condition due to their mobility, long life and position near the top of the food chain. Sampling of fish is carried out using a combination of electrofishing and seine netting.

The three indices used are:

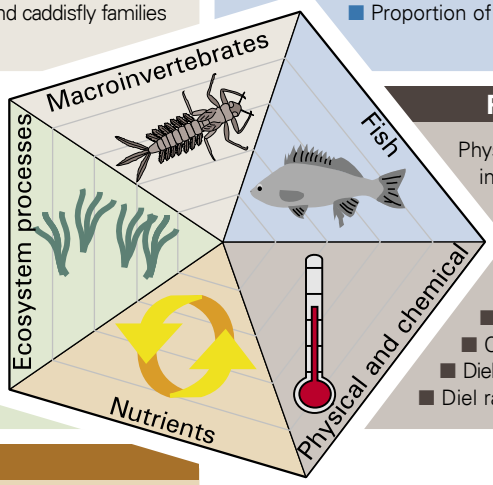
- Proportion of native species expected
- Ratio of observed to expected species
- Proportion of alien fish

Ecosystem Processes

Measuring the rate of production reflects the vigour or 'pulse' of a stream and indicates if it is healthy or unhealthy. This is determined by measuring the amount of dissolved oxygen produced or consumed by algae and microbes.

The four indices used are:

- Growth rate of algae
- Ratio of ^{13}C to ^{12}C stable isotopes
- Respiration (R_{24})
- Gross Primary Production (GPP)



Physical and Chemical

Physical and chemical measures are important for monitoring direct changes in water quality and aiding in the interpretation of other measures of stream health.

The six indices used are:

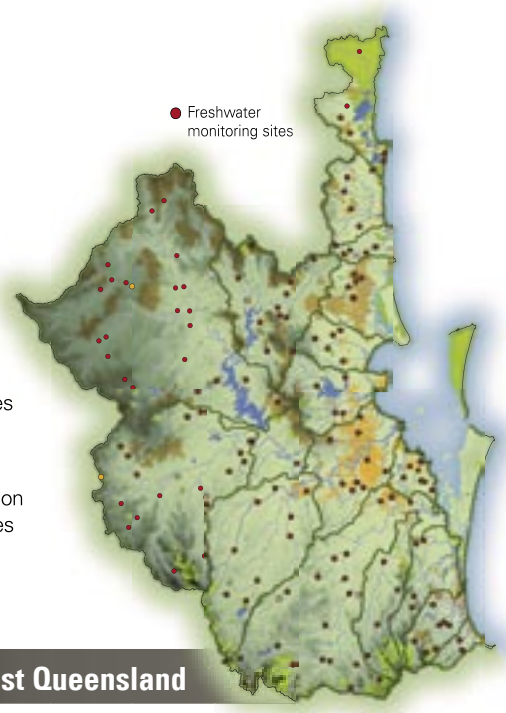
- pH
- Conductivity
- Diel (24hr) range and maximum temperature
- Diel range and minimum dissolved oxygen

Nutrients

This describes the processing of nitrogen within a stream and the sensitivity of the stream to the input of nutrients.

The two indices used are:

- Ratio of ^{15}N to ^{14}N stable isotopes
- Algal bioassay



Freshwater Report Card Generation

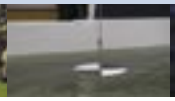
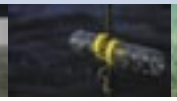
1. Results for each site are assessed against regional Ecosystem Health Guidelines for the corresponding stream type and standardised scores (ranging between 0 and 1) are derived.
2. The standardised scores for each of the indices within each indicator type are averaged to produce five summary scores per site.
3. The indicator scores for all sites within a reporting area are averaged to produce five summary scores per reporting area.
4. The values for each reporting area are then averaged across seasons (spring and autumn).
5. The values for the five indicator types are then averaged to give a single value for each reporting area.
6. Catchments are then ranked based on these scores and Report Card grades are assigned.

Report Card 2005 for the waterways of South East Queensland

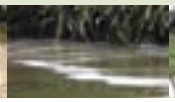
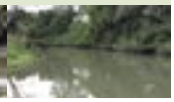
Report Card Methods

Parameters used for Ecosystem Health Index (EHI)

EHI Moreton Bay Indicators

Total nitrogen	Chlorophyll *a*	Secchi depth	$\delta^{15}N$ mapping	*Lyngbya*
				
83 sites monthly	83 sites monthly	83 sites monthly	83 sites annually	Fortnightly during blooms

EHI Estuarine Indicators

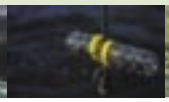
Total nitrogen	Chlorophyll *a*	Turbidity	Total phosphorus	Dissolved oxygen
				
165 sites monthly	165 sites monthly	165 sites monthly	165 sites monthly	165 sites monthly

Parameters used for Biological Health Rating (BHR)

BHR Moreton Bay Indicators

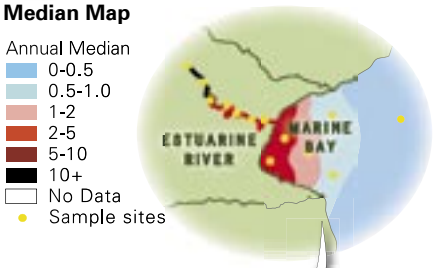
Seagrass distribution	Seagrass depth range	Coral cover
		
Baywide 3 yearly	17 sites biannually	5 sites annually

BHR Estuarine Indicators

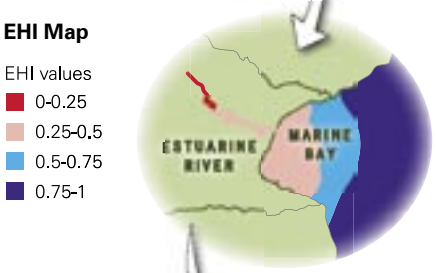
Nutrient plots	$\delta^{15}N$ mapping	Riparian condition
		
Biannually	165 sites annually	Annually

Estuarine and Marine Report Card Generation

Median Map



EHI Map



From a total of 248 estuarine and marine sites, maps are produced for each indicator which show the median values for each site from the reporting year.

Compliance scores are then calculated for each indicator as the proportion of the reporting zone that complies with the Water Quality Objectives, 0 representing non-compliance and 1 representing total compliance.

An Ecosystem Health Index (EHI) for the reporting zone is calculated by averaging the compliance scores for each indicator.

The Biological Health Rating (BHR) assesses those indicators measured by the EHMP without established objectives. The BHR ranges between 0 and 1 for each zone, with 1 representing an unmodified and healthy ecosystem and 0 representing a highly modified and unhealthy ecosystem.

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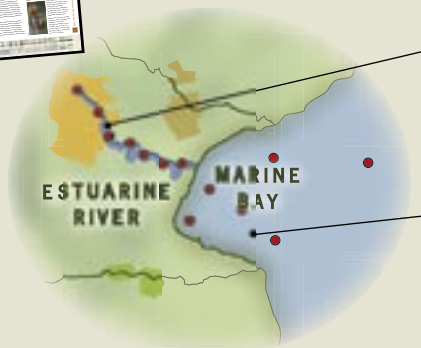

C **Estuarine River**

- Fair water quality with several indicators non-compliant for part of the year

B **Marine Bay**

- Good water quality, non-compliance for one or more indicators during the year

A single EHI value and a single BHR value are calculated for each waterway by averaging the indicator ratings. These two values are combined together with expert opinion to provide a single value used to assign a Report Card Grade.

HEALTHY WATERWAYS
Because we're all in the same boat

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