Tropical Water Quality Hub

National **Environmental Science** Programme

Project 3.2.1 Deriving ecologically relevant load targets to meet desired ecosystem condition for the Great Barrier Reef: A case study for seagrass meadows in the Burdekin region

Project Summary

This project will derive ecologically relevant targets (ERTs) for catchment-derived sediments that are discharged into the Great Barrier Reef i.e. sediment loads. The ERTs are used to assign catchment management targets for reducing sediment washing off the land into rivers. The ERTs will be developed by first defining seagrass desired state targets and then calculating ERTs for terrestrially sourced sediment loads to meet the seagrass desired state targets. Historic and new data collections will be used for setting seagrass desired state where data is available. The eReefs (RECOM) model is a new and powerful tool that will be used to derive ERTs in the Burdekin basin. This will be combined with statistical models to test ERTs using historical seagrass and water quality data.

Problem

Sediments discharged from river basins into the Great Barrier Reef make the water turbid and brown. These sediments stay in the inshore regions long after they enter, which maintains turbid water throughout the year. Sunlight cannot penetrate through turbid water and the seagrass meadows are unable to photosynthesise enough to grow. Around the Burdekin Basin, large sediment loads and turbid water have historically caused seagrass loss. Therefore, it is necessary to reduce the amount of sediment washing down rivers. The amount of sediment reduction required to protect seagrass meadows needs to be thoroughly assessed.

How Research Addresses Problem

Sediment load reduction targets from the Burdekin Basin will be set to a level that will protect seagrass meadow desired state in Cleveland Bay. The sediment load targets will therefore be ecologically relevant targets (ERTs). The project will develop water quality guidelines and ERTs for end of catchment sediment load reductions by:

1. Defining seagrass desired state (i.e. seagrass health and resilience targets);
2. Calculating long-term water quality guidelines to meet seagrass desired state; and,
3. Calculating ecologically-relevant targets (ERTs) for terrestrially sourced sediment loads.

Green Turtle swimming through a seagrass meadow

Photo: C. Collier

Sediment-laden floodwaters discharging into the Great Barrier Reef

Photo: D. Tracey

Seagrass desired state is an ecological condition target. Once the target is set, it can be used as a benchmark to assess how well seagrass meadows are being protected. In some locations, seagrass desired state will be defined using detailed historical information on seagrass abundance and species diversity. In Cleveland Bay, historical data provides the information needed to set very specific desired state targets. In most locations, however, there is little or no historical data on the condition of seagrass meadows. In these locations, expert judgement will be combined with information on local site characteristics (e.g. sediment type, exposure to wind and currents) to set desired state targets throughout the GBR.

Sediment load reduction targets from the Burdekin Basin will be set to a level that will protect seagrass desired state in Cleveland Bay. The sediment load targets will therefore be ecologically relevant targets (ERTs). Pollutant load targets have previously been set for all basins in the GBR for the Reef Water Quality Protection Plan using eReefs, the powerful GBR model. The targets were developed at a coarse-scale using short-term light thresholds but were not set against desired state targets or consider species diversity. This project will address this gap by developing ERTs for the Burdekin Basin to meet seagrass desired state targets in Cleveland Bay.