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Jacobs River Estuary 2007

Macroalgal Monitoring

Prepared
for
Environment
Southland
June
2007

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By

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Cover Photo: Mats of macroalgae on tidal flats of Jacobs River estuary looking north to Aparima River mouth.

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Jacobs River Estuary 2002 aerial photograph (Les McGraw, Environment Southland)

All photos by Wriggle except where noted otherwise.

1. INTRODUCTION AND METHODS

INTRODUCTION

Figure 1 Green macroalgae, Enteromorpha sp., Jacobs River Estuary near Aparima River mouth

Developing an understanding of the condition and risks to estuarine habitats is critical to resource management in the Southland region. The present brief report summarises the results of the 2007 macroalgal monitoring for the Jacobs River Estuary, which is one of the key estuaries in the Southland Estuary long term monitoring programme (see References). The report also provides information on the 2007 estuary condition rating for macroalgae, and recommended management responses. The next monitoring is due in Feb 2008.

METHOD

Figure 2 Green macroalgae, Enteromorpha sp., Jacobs River Estuary

Broad scale mapping of the percentage cover of macroalgae throughout all the intertidal habitat of Jacobs River Estuary was undertaken on 26 February 2007 using a combination of aerial photography, together with detailed ground-truthing and digital mapping using GIS technology (ArcMap 9.2) to record the percentage cover. The procedure, originally described for use in NZ estuaries by Robertson et al. (2002), has subsequently been modified and successfully applied to various estuaries to develop a separate GIS macroalgal layer.

Mapping used rectified aerial photographs (scale 1:4,200, flown 25 Nov 2002) of the Estuary supplied by Environment Southland, both as a field guide and recording sheet (i.e. the observed percentage cover details were recorded directly onto these laminated photographs during the ground-truthing exercise). The photographs also formed the GIS base layer onto which the percentage cover information was digitised.

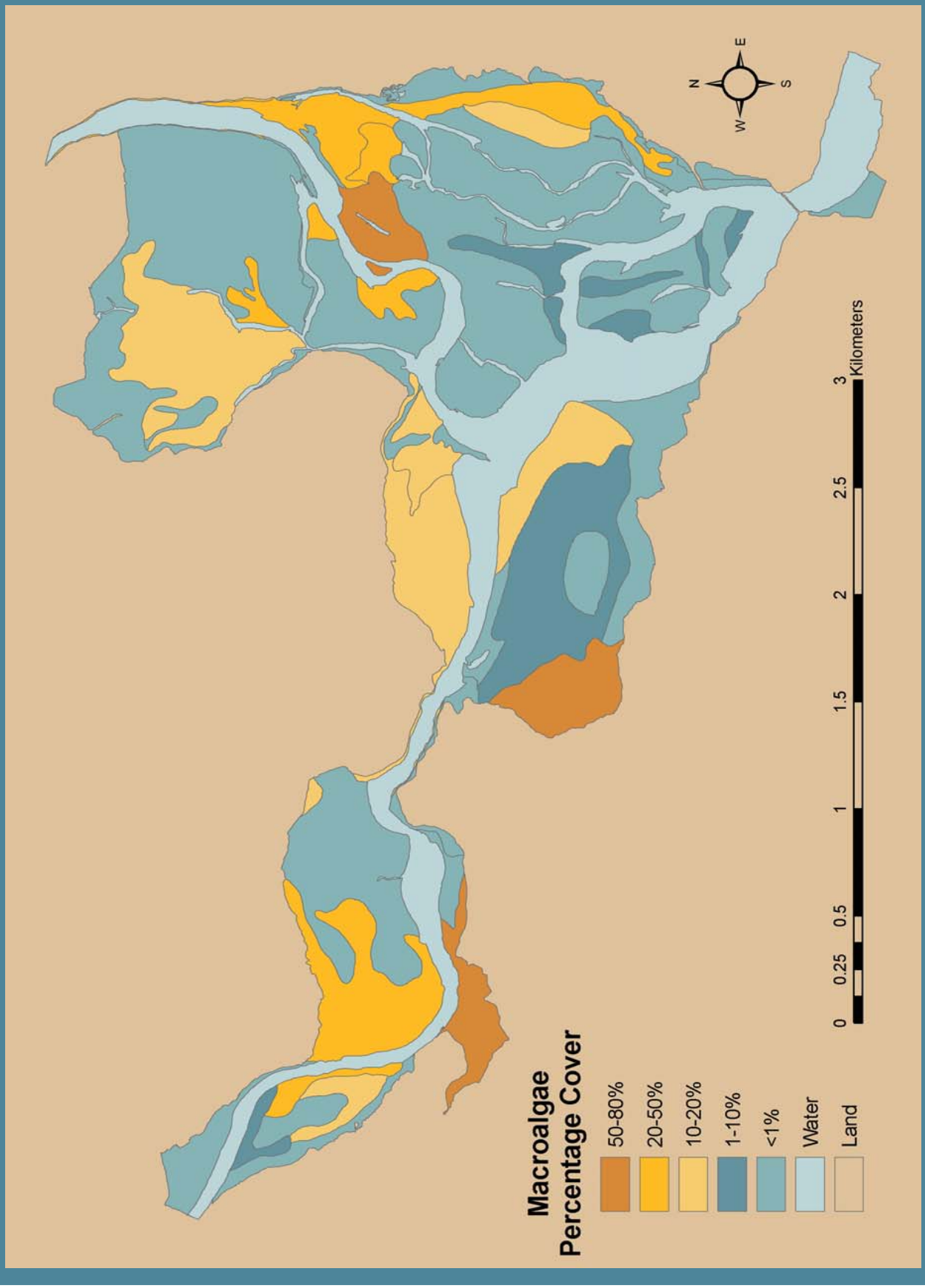
The general outputs of the broad scale mapping include GIS-based macroalgal maps showing broad percentage cover classes (Figure 3), a summary table, the 2007 estuary condition rating for macroalgae and any recommended management actions. These outputs are used to both identify and classify macroalgal cover, and to show changes in macroalgal cover over time by comparisons with repeat surveys (annually if a problem estuary or 5 yearly if not) or historical aerial photographs.

SOUTHLAND ESTUARIES MACROALGAE CONDITION RATING

Certain types of macroalgae can grow to nuisance levels in nutrient-enriched estuaries causing sediment deterioration, oxygen depletion, bad odours and adverse impacts to biota. To facilitate reporting and management, condition rating categories have been established for Southland estuaries as follows:

RATING	DEFINITION	RESPONSE
Very Good	% cover <1%. No nuisance conditions.	Monitor at 5 yr intervals after baseline established
Good	% cover 1-10% widespread. No nuisance conditions.	Monitor at 5 yr intervals after baseline established
Fair	% cover 10-50% widespread. Nuisance conditions in isolated areas.	Monitor % cover and density annually. Evaluation and Response Plan.
Poor	% cover >50% widespread. Widespread nuisance conditions.	Monitor % cover and density annually. Evaluation and Response Plan.
Early Warning Change Trigger	Trend of % cover increasing	Undertake evaluation and response plan.

FIGURE 3 MAP OF MACROALGAL COVER - JACOBS RIVER ESTUARY 2007



2. RESULTS, RATING AND MANAGEMENT

RESULTS

Figure 4 Mid Jacobs River Estuary near the Neck.

Figure 5 Shoreline of Jacobs River Estuary

The results of the macroalgal survey (Figure 3 and Table 1) indicates the following:

- macroalgal growth does occur in the estuary,
- is dominated by the green alga *Enteromorpha* sp, and the red alga *Gracilaria* sp. and,
- is restricted to certain preferred locations.

Table 1 Summary of macroalgal cover results, 26 February 2007.

% Cover Category		Area (ha)	Percentage	Species
Very low	<1%	305	43	
Low	1-10%	56	8	*Enteromorpha, Gracilaria*
Low-Mod	10-20%	96	13	*Gracilaria, Enteromorpha*
Moderate	20-50%	68	9	*Gracilaria, Enteromorpha*
High	50-80%	37	5	*Gracilaria Enteromorpha*
Very High	>80%	0	0	
Subtidal (water)		154	22	Also extensive subtidal beds.

The areas of high percentage cover (50-80% cover) tended to be on the soft muds of the poorly flushed arms on the southern side of the estuary and were associated with nuisance conditions of anoxic muds and sulphide odours. Fortunately, such high percentage cover was limited to only 5% of the total estuary area. These high cover areas receive drainage from agricultural lands bordering their margin as well as sediment and nutrients from wider afield. They also act as settling areas for algae carried in from around the estuary with the tide.

The areas of moderate percentage cover (10-50% cover) covered a much greater proportion of the estuary 22%, and tended to be situated near river mouths, sheltered areas, or along the area near Riverton exposed to the greatest wind fetch.

The areas of low and very low percentage cover (<10% cover) covered 50% of the estuary, and tended to be restricted to exposed areas with coarser sediments.

ESTUARY CONDITION RATING

Macroalgae Rating 2007	Fair

RECOMMENDED MANAGEMENT

The condition rating for the estuary fits the "fair" category, which means that monitoring should be undertaken annually for percentage cover and density. The likely cause of macroalgal growths should also be further evaluated (e.g. catchment wide nutrient inputs or localised sources), and a management response plan initiated.

3. REFERENCES

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