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Waikanae River Estuary

Intertidal Macroalgal Monitoring 2009/10

Prepared for Greater Wellington Regional Council May 2010

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By

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Contents

Figures and Tables

Intertidal flats, lower Waikanae River Estuary.

1. INTRODUCTION AND METHODS

INTRODUCTION

Macroalgae is an important feature of estuaries, contributing to their high productivity and biodiversity. However, when high nutrient inputs combine with suitable growing conditions, nuisance blooms of rapidly growing algae (e.g. *Ulva* (sea lettuce), *Gracilaria*, *Enteromorpha*) can occur. At nuisance levels such growths can deprive seagrass of light causing its eventual decline, while decaying macroalgae can accumulate on shorelines causing localised depletion of sediment oxygen, and nuisance odours.

This brief report summarises the 2010 intertidal macroalgal monitoring results for Waikanae River Estuary, one of the key estuaries in the Greater Wellington Regional Council (GWRC) long term estuary monitoring programme. The report describes the intertidal macroalgal cover of the estuary in January 2010, and uses a macroalgal coefficient (described below) developed for Wellington's estuaries to rate the condition of the estuary, and recommend monitoring and management actions. The next monitoring in Waikanae River Estuary is due in January 2011.

METHODS

Broad scale mapping of the percentage cover of macroalgae throughout all the intertidal habitat of Waikanae River Estuary was undertaken in January 2010 using a combination of aerial photography, ground-truthing, and ArcMap 9.3 GIS-based digital mapping. 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 (e.g. Stevens and Robertson 2008, 2009).

Rectified aerial photographs of the estuary (2007 Kapiti Coast District Council ~0.15 metre per pixel) were used as base maps. Experienced coastal scientists then recorded the percentage cover of macroalgae directly onto laminated photos during field assessment of macroalgal cover. The field maps were then used to create a GIS layer from which the percentage cover information was subsequently calculated.

The report outputs are used to both identify and classify macroalgal cover, and to show changes in macroalgal cover over time by comparisons with previous surveys (annually if a problem estuary, or 5 yearly if not). The current report presents the 2010 percentage cover of macroalgae within the estuary as a GIS-based map (Figure 1), and a summary table of the dominant species and percentage cover classes (Table 1).

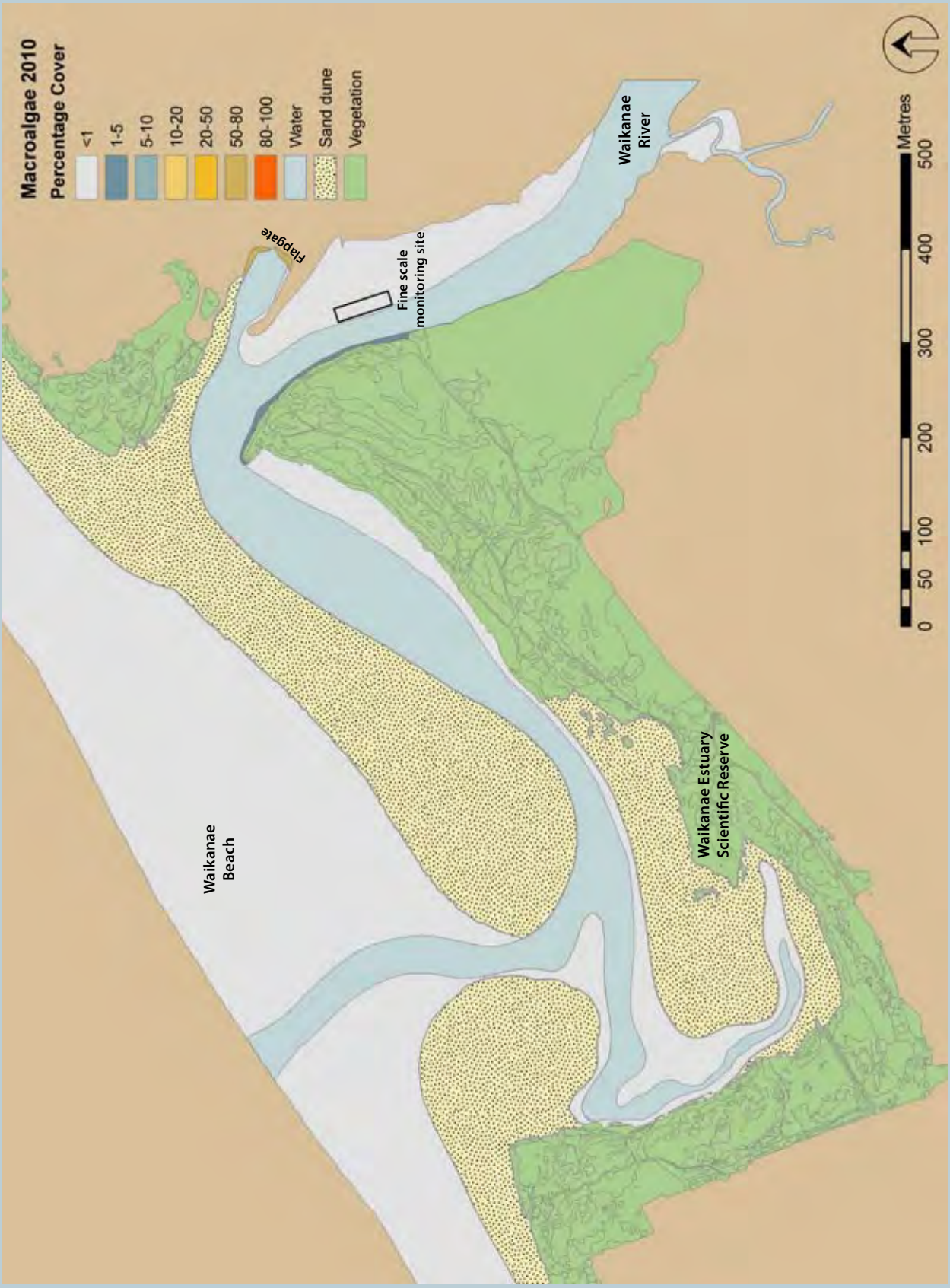
WELLINGTON ESTUARIES: MACROALGAE CONDITION RATING

A continuous index (the macroalgae coefficient - MC) has been developed to rate macroalgal condition based on the percentage cover of macroalgae in defined categories using the following equation: ***MC=((0 x %macroalgal cover <1%)+(0.5 x %cover 1-5%)+(1 x %cover 5-10%)+(3 x %cover 10-20%)+(4.5 x %cover 20-50%)+(6 x %cover 50-80%)+(7.5 x %cover >80%))/100.*** Overriding the MC is the presence of either nuisance conditions within the estuary, or where >5% of the intertidal area has macroalgal cover >50%. In these situations the estuary is given a minimum rating of FAIR and should be monitored annually with an Evaluation & Response Plan initiated.

MACROALGAE CONDITION RATING

RATING	DEFINITION (+Macroalgae Coefficient)	RECOMMENDED RESPONSE
Over-riding rating: Fair	Nuisance conditions exist, or >50% cover over >5% of estuary	Monitor yearly. Initiate Evaluation & Response Plan
Very Good	Very Low (0.0 - 0.2)	Monitor at 5 year intervals after baseline established
Good	Low (0.2 - 0.8)	Monitor at 5 year intervals after baseline established
	Low Low-Moderate (0.8 - 1.5)	Monitor at 5 year intervals after baseline established
Fair	Low-Moderate (1.5 - 2.2)	Monitor yearly. Initiate Evaluation & Response Plan
	Moderate (2.2 - 4.5)	Monitor yearly. Initiate Evaluation & Response Plan
Poor	High (4.5 - 7.0)	Monitor yearly. Initiate Evaluation & Response Plan
	Very High (>7.0)	Monitor yearly. Initiate Evaluation & Response Plan
Early Warning Trigger	Trend of increasing Macroalgae Coefficient	Initiate Evaluation and Response Plan

FIGURE 1. MAP OF INTERTIDAL MACROALGAL COVER - WAIKANAE ESTUARY, JAN. 2010



2. RESULTS, RATING AND MANAGEMENT

RESULTS

MACROALGAL COVER CONDITION RATING
VERY GOOD

Figure 1 and Table 1 summarise the results of intertidal macroalgal mapping within Waikanae River Estuary. Overall, the vast majority of the intertidal area (97.5%) had no macroalgae growth. The only place macroalgae was observed was a sparse growth of *Enteromorpha* on boulders along the lower true left bank of the Waikanae Estuary, and small accumulations of *Enteromorpha* in the embayment near the flapgate. Nuisance conditions were not present and the Macroalgae Coefficient (MC) for the estuary was 0.05, a condition rating of "very low".

Table 1. Summary of macroalgal cover results, January 2010.

MACROALGAE	Waikanae River Estuary		
Percentage Cover	Ha	%	Dominant species
<1%	5.4	97.5	-
1-5%	0.1	1.8	*Enteromorpha*
5-10%	0	0	
10-20%	0	0	
20-50%	0	0	
50-80%	0.04	0.7	*Enteromorpha*
>80%	0	0	
TOTAL	**5.5**	**100.0**	

One notable feature of the lower estuary where it flows behind the frontal dune on the beach is the extensive accumulations of driftwood and organic material along the high tide line (Figure 2). These accumulations appear to be frequently moved by the tide and consequently do not appear to be causing problems such as anoxic or sulphide rich sediments.

Figure 2. Driftwood and organic material accumulating along the high tide line in the lower estuary.

CONCLUSION

Macroalgal cover had a condition rating of "very low", with no localised nuisance conditions (no rotting macroalgae or poorly oxygenated and sulphide rich sediments).

RECOMMENDED MANAGEMENT

A quick check of macroalgal growth should be made at the same time fine scale monitoring is undertaken to ensure growths have not increased or nuisance conditions developed.

REFERENCES

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