STAFF REPORT

TO: Environment and Planning Subcommittee

FROM: Robert Smith, Environmental Information Manager

REFERENCE: R452

SUBJECT: **COASTAL AND ESTUARINE MONITORING - EP06/08/06** – Report Prepared for 2 August 2006 Meeting

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1. PURPOSE

This report is to update the committee on some of the TDC's coastal and estuarine monitoring programme for the last year and outline this year's projects.

2. BACKGROUND

Each year depending on the project, we can allocate between $20,000 and $40,000 for coastal and estuarine monitoring through a range of projects. These cover state of the environment coastal monitoring, SOE estuarine survey and opportunistic projects in the coastal area involving external research providers. In the past the programme has organised baseline surveys of the Waimea, Ruataniwha and Motueka estuarine areas.

3. WORK COMPLETED FOR THE 05/06 FINANCIAL YEAR

Coastal Process Article

At the end of the 04/05 year we engaged NIWA to produce a summary document covering the generalised oceanic processes operating within Tasman and Golden Bay, titled "*Oceanography in Tasman and Golden Bays".* This was to enable us to provide information on the bay processes following public requests for this type of information. The document has been placed on the TDC website and is a good source of summary process information for the community. It can be found at (http://www.tasman.govt.nz/index.php?OceanographyinTasmanandGoldenBays).

We used NIWA as we were aware that they have been operating in the coastal area for some time but we had not been able to view any of the output from their research programmes. By asking for the summary we are getting the information before it is published and has allowed access to the overview information some years before it would make its way to general release.

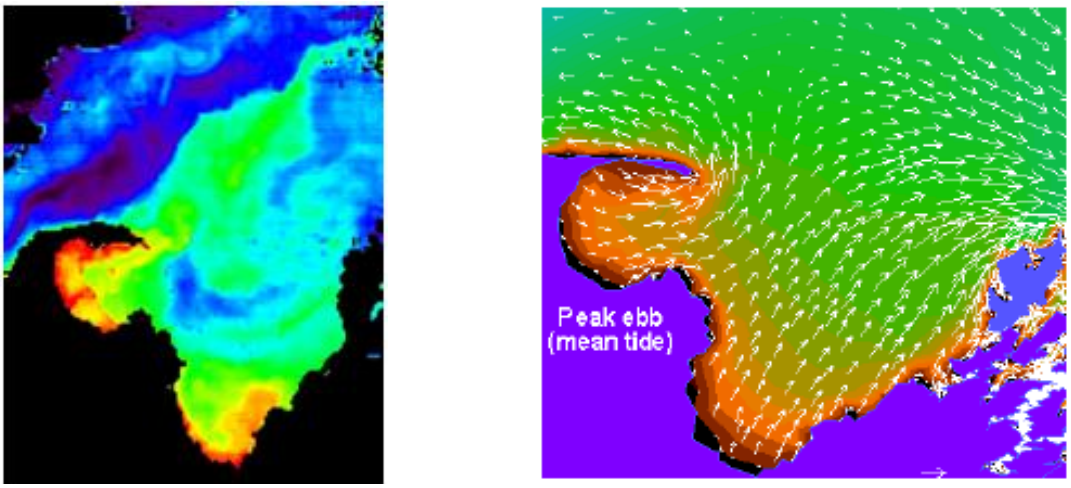

Figure 1. Examples of the output contained within the NIWA report on coastal processes. The picture on the left shows chlorophyll levels as measured from a satellite. The right hand picture shows the modelled ebb tide direction of flow.

Tarakoe

A baseline harbour survey was undertaken in 2005 within Tarakoe harbour. This survey was timed to follow the completion of works on the new marina and looked at the bed and structures within the Harbour. This was undertaken to establish the enrichment status of the substrate and determine what species of animal were present within and upon the seafloor or structures. The survey was undertaken to allow a baseline condition to be established before significant changes in use or development of the harbour occur. Due to staff changes at Cawthron we are still awaiting this report but they have confirmed that when surveyed the invasive sea squirt *Didemnum* was not present. So this allows independent confirmation that it is a very recent introduction.

Moutere Broad Scale Mapping

During the year 04/05 the Moutere inlet was photographed as a component of the TDC annual updating process of our aerial photography record. These photos were used by Cawthron to map the broad scale habitats of the Inlet (Figure 2). This information is to be available through our website in time and will be used by staff to monitor change in the estuary and its margins for planning and monitoring purposes. This is the fourth of our major estuaries to be surveyed in this way. As outlined later in this report we hope to review the estuarine monitoring programme this financial year to re-assess the process and priorities for survey.

The main points noted from the report are fairly obvious but are important as a starting point from which we can assess change and determine the any potential impacts from new developments within the catchment e.g. large scale subdivision.

1. Un-vegetated habitat was dominated by firm muddy sand (66%). Soft muddy sand and firm sand were also common.
2. Estuarine vegetation was dominated by rushland (51%) and herbfield (34%).
3. Extensive modification of the estuary margin with roads encircling 46% of the margin.

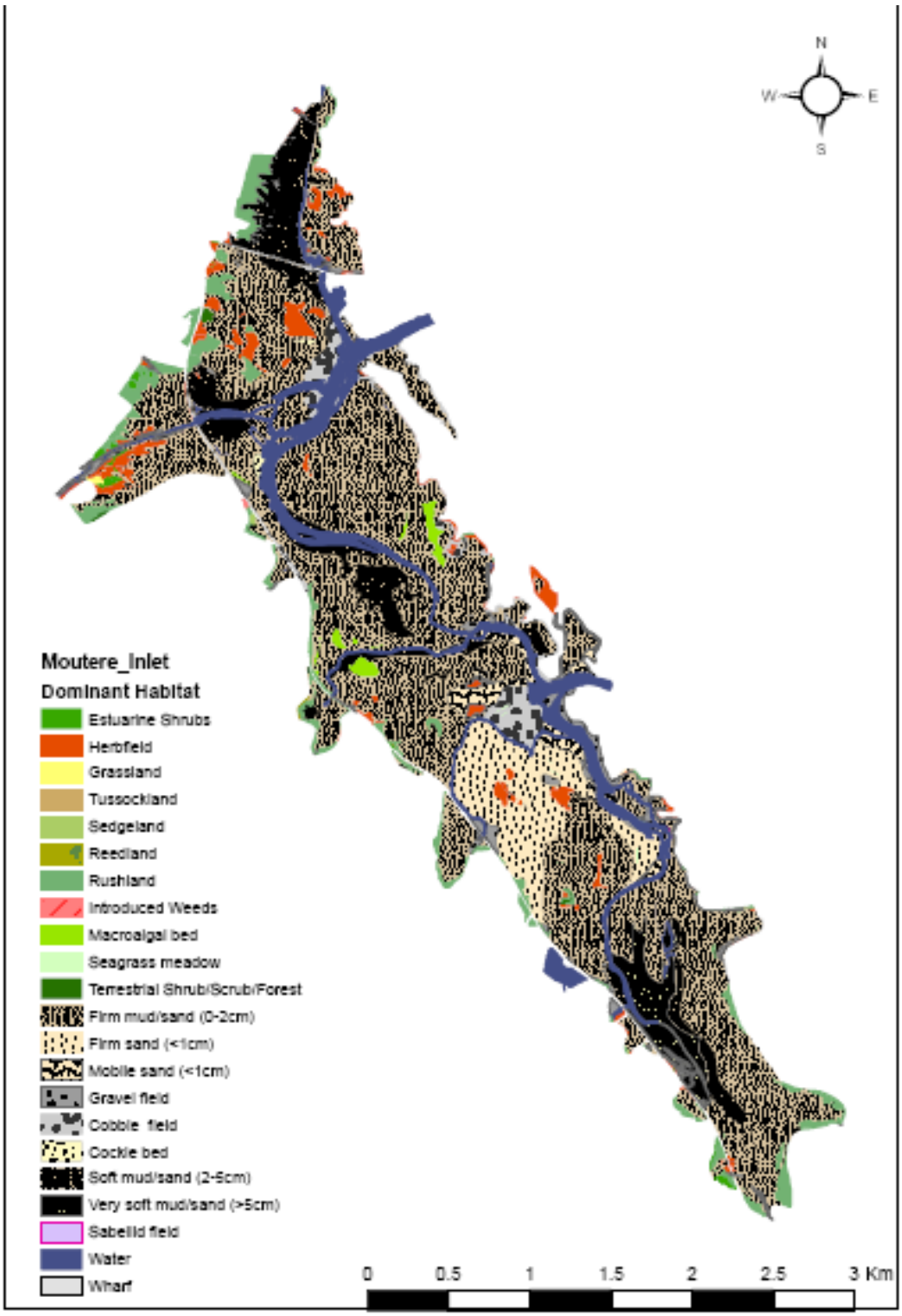

Figure 2 Broad structural habitat (vegetation and substrates) of Moutere Inlet, 2006.

Moutere Fine-Scale Benthic Baseline

Early 2006 Cawthron completed the field work for the fine-scale benthic baseline survey of the Moutere Inlet. This sampling followed the same methodology as the previous estuaries and is also applied nationally for estuarine monitoring. The objective was to establish a baseline condition from which future sampling can determine if there is change occurring for the better or worse. There has been consent monitoring work in the inlet in the past but this project established new sites that are representative of the wider area and not focused on those potentially effected areas. This information will be available as a comparison dataset for any consent monitoring work in the future. The general finding was that the Moutere Inlet ecosystem is in a relatively healthy and functional condition.

There is an indication of low to moderate levels of enrichment as demonstrated by animal communities, but core profiles showed no signs of oxygen depletion (an indication of possible problems). Sediment cadmium, chromium, copper, lead and zinc concentrations were below guideline levels. As is often the case in the Tasman Bay estuaries nickel concentrations were elevated. This is a natural phenomenon due to the catchment and can led to some biological effects, but not that we have any control over.

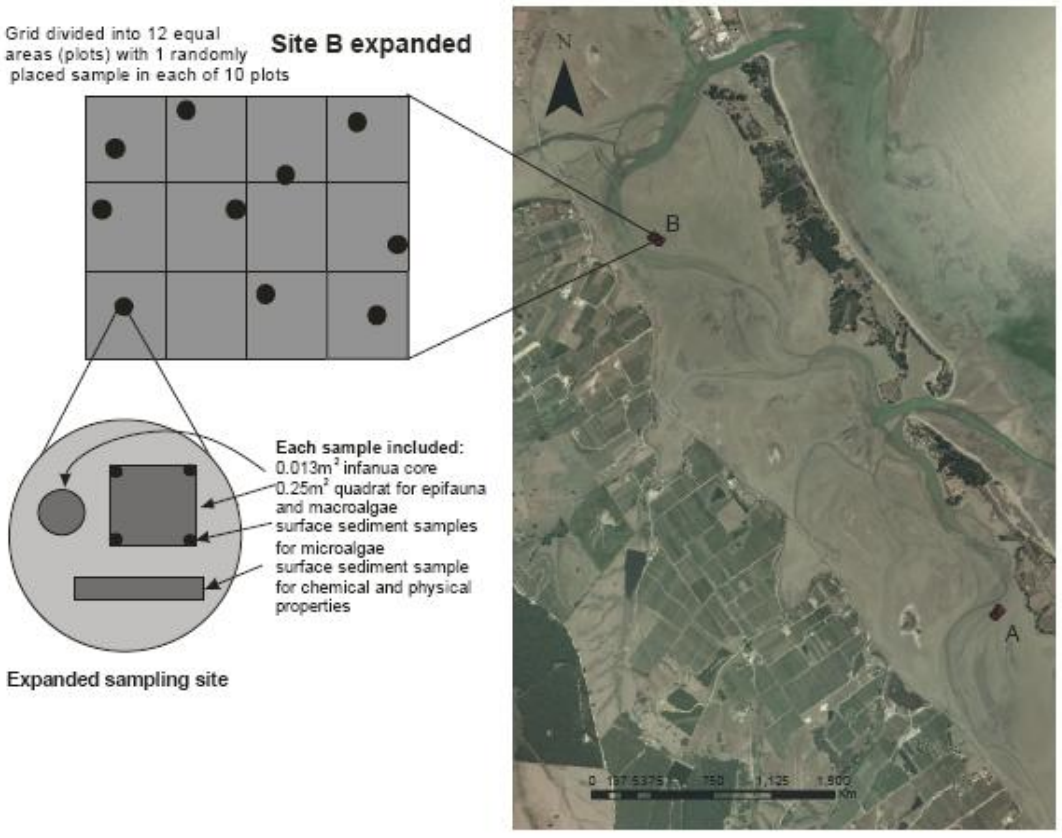

Figure 3 Aerial photograph of Moutere Inlet showing locations of the study sites and the sampling strategy (modified from Robertson et al. 2002).

Envirolink Tools Project

This year in collaboration with NIWA we advanced an Envirolink Tools project to try and secure a $150k projects to develop a fine scale current model for Tasman and Golden Bay. This could be used for modelling various activities from land use effects to aquaculture impacts within the bays. This project was knocked out in the final round but we are hopeful that we can resubmit components of it again this year to get some of the proposed work occurring within the bay. I believe that if we are able to get a better current model for the bays we will be a desirable place for further FRST programme work by the CRI's.

Envirolink Project

We used the Envirolink fund to have NIWA generate a report for us, "An analysis of the historical impacts and composition of the benthic environment of Tasman and Golden Bays". This is a stand alone report and gives a good summary of the fishery history providing detail on some of the potential impacts from land use and fishing methods on the ecology of the Bay. We will have a copy of this report on the web site in due course.

Coastal Monitoring

For most of last year Cawthron have maintained a real time monitoring buoy in the area off the Motueka River between the proposed AMA's. This site is anticipated to become a long term monitoring site for use in aquaculture monitoring and is being partially funded through the ICM programme as it contributes to the integrated research programme being run on the Motueka River. We have contributed to this programme by paying for a baseline survey to establish the initial conditions for the site. We will look to assist as and when possible through the ongoing monitoring of the benthic environment as the site changes following the exclusion of trawling. This information will give us the background benthic conditions for the AMA's. The consent monitoring of the AMA's will be able to be compared to this control site to determine if there are any impacts from aquaculture.

We have been in discussion with NIWA for quite some time to see if we can combine with one of their programmes to establish a similar site within Golden Bay. To date this has not led to any collaboration but we are hopeful that in the near future we can establish a site or sites that will be of use for SOE and aquaculture monitoring.

The primary driver for this initiative is the findings from the Firth of Thames that the more data available before large scale aquaculture starts the easier and more robustly any changes can be determined.

4. WORK PLANNED FOR THE 2006 / 2007 FINANCIAL YEAR

Waimea Fine Scale

The first baseline survey of the Waimea estuary was undertaken in 2000. This year in coordination with monitoring requirement for the NRSBU, both the TDC and NCC (and NRSBU) are combining resources to pay for a resurvey of the estuary. This started last month and will be completed by June 2007. Combining resources saves us around 50% of the costs associated and gives the re-survey more relevance as it

allows the detailed monitoring required by NRSBU to be placed within the context of the larger estuarine environment.

Waimea Broad Scale Mapping

As outlined above this is also to occur this year and the estuary will be flown within the next month or two and will provide images to enhance the TDC photographic coverage of the area north of Richmond. This project is being contributed to by NRSBU and NCC as well as the TDC.

Envirolink Medium Advice Grant

We are in discussion with NCC and Cawthron to develop a joint bid to the Envirolink fund to apply for a medium advice grant ($5-$20K) to allow a programme review for estuary monitoring within the wider Golden Bay and Tasman Bay area. This will be used to assess the programme to date and suggest deficiencies or savings that can be made. It will also be used to identify any areas that need to be included or can be excluded from any future survey work.

Envirolink Small Advice Grant

As well as the application above we will continue to use the Envirolink project to provide advice or tools for which we do not have the capacity to contribute to. Examples under consideration are: Farewell Spit sea level impacts, Response options to shoreline change; Coastal hazard assessment methodology; and Sea level rise and coastal settlements;

Moutere Historical Layers

The project work for establishing the historic broad scale habitat layers started last month to allow the indicative layers to be established for the 1947 and 1985 years from which we have good photographic coverage of the Moutere Inlet. This work is to establish the extent of change within the estuary and its margin over the sixty year period. Although we cannot be definite about the exact extent of change we do get a good representation. This work is to be completed by December this year to allow it to be incorporated into the Envirolink project, should that be successful in gaining funds. These historical layers have already been completed for the Motueka delta (ICM programme) and the Ruataniwha and Waimea estuaries.

Aquaculture Monitoring Needs

We will continue to work with NIWA and Cawthron to establish cost effective baseline monitoring programmes within the bays to allow us to gain baseline information before aquaculture starts in earnest. It is anticipated that once the AMA's are up and running much of the baseline monitoring will be coordinated within the consent monitoring. This is why we are spending the time to work with the research providers to ensure that the monitoring sites chosen are able to be used as control sites for the aquaculture programme.

5. RECOMMENDATION

That this report is received.

Robert Smith
Environmental Information Manager

APPENDIX 1

EnviroLink Tools for Environmental Management:

'Regional Coastal Currents'

- high resolution, regionally based, coastal hydrodynamic modelling

Purpose:
To enable Councils to address regional management issues in their coastal waters with high resolution hydrodynamic modelling tools. The proposal provides new tools to improve TDC's capability to carry out operational responsibilities in their marine area. This would then be rolled out around the country in subsequent years using future Envirolink funding.

Benefits:
Councils face multiple management challenges in their marine area that are solvable using the coastal hydrodynamic modelling capability. These tools will enable direct prediction of coastal currents, affecting search and rescue, dispersal of point and diffuse source contaminants, transport of bioinvasives and tidal and storm surge water levels (including tsunami).

More complex applications, which are impossible to tackle without the underpinning regional hydrodynamic modelling capability, include problems associated with sediment transport, and water quality threats including catchment and municipal runoff, outfall dispersals and AMA impacts.

Initial Approach:
The marine area within the Golden Bay / Tasman Bay will be modelled using existing NIWA EEZ-scale ocean models, which are extended inshore from the open ocean and shelf, using NIWA-based modelling platforms (ROMS, RiCOM). This provides a customisable tool, based on existing NIWA capability, enabling us to realise the benefits of high resolution regional-scale models of hydrodynamics of inshore, coastal and shelf waters of the Tasman region. The models can be scaled up and down, to resolve hydrodynamics required to address local problems and issues. The proposal would necessarily include field deployments of instrumentation required to understand the basic physics of the region and to verify the modelling, construction of a customisable regional modelling tool, and its documentation.

Indicative Cost:
In TDC's region there exists preliminary modelling and verification information from previous and ongoing NIWA research, which will reduce implementation costs for regional coastal current modelling. In areas where no or little initial modelling and verification information exists (for example Pegasus Bay and Banks Peninsula) costs will be higher. An upper estimate of cost, including the elements of verification, modelling and reporting, is likely to be $150,000 to $200,000 per region.

NIWA believes that one to two regional models could be developed per year, by trialing the approach at TDC we would be able to pass on the lessons we have learned in developing such a tool to other councils.