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Report to the Rural Services and Wairarapa Committee
from Graham Sevicke-Jones, Section Leader, Resource Investigations

Motuwaireka Lagoon Hydraulic Study

1. Purpose

To report to the Committee on the results of a study on the Motuwaireka lagoon hydraulics.

2. Background

The Motuwaireka lagoon has been subject to a number of investigations since the 1970's, principally concerns have been expressed over the poor water quality and the general environs. Previous reports concentrated on the water quality with the view to identifying the source of the contamination and consequent remediation.

During these previous investigations a number of questions arose which has necessitated additional surveys being undertaken. The appraisal of the lagoon hydraulics was one such question; this was seen as pertinent in determining the course of action for restoration of the lagoon environment and improvement of the water quality.

3. Study Objectives

- To define the hydraulics of the backwater lagoon and identify possible measures to upgrade and maintain its water quality
- To investigate the feasibility and benefits of targeted deepening of the lagoon outlet to the sea during summer, and examine any associated water quality improvements that may accrue through increased salinity and/or improved flushing of the lagoon and backwater

4. Methods

G & E Williams Consultants were contracted to undertake this work in February. Information on the stream and its estuary was obtained through:

- A site visit

- Discussions with Regional Council staff, and local residents
- Earlier reports and data on water quality
- A series of aerial photographs from 1944 to 2000
- Site survey of the beach area, main lagoon and backwater lagoon, by Technical Services staff.

Hydraulic modelling was then carried out using the HEC-RAS computer programme

5. Results & Discussion

A copy of the report is attached (Appendix 1).

The principal conclusions reached in the report are:

5.1 *Backwater Lagoon*

- A deepening of the tributary backwater lagoon would alter the conditions of the lagoon by creating deeper water and remove accumulated silt, sludge and rubbish. This would give rise to some beneficial improvements in the water quality following the initial disturbance period.
- No significant change in hydraulic conditions would occur, due to the flow control exercised by the road culvert (the road culvert may also increase the rate of sediment deposition in the lagoon as the upstream lagoon invert is deeper than the culvert) and poor tidal flow exchanges.
- Installation of a sediment trap at the top of the lagoon would benefit in reducing the rate of accumulation of sediment.

5.2 *Main Lagoon*

- The main lagoon has narrowed considerably over the last 50 years. The nature of the main lagoon has been affected over time by the retarding of natural bend migration through planting and natural processes.
- Direct openings to the sea from the lagoon reach would be relatively short lived with a high bed level and small channel size developing. Direct impacts on the lagoon are more likely through sea wave intrusion.
- Periodic openings to the sea may generate more saline conditions on a semi-permanent basis providing an improved water quality. However, if the openings are short lived then the reverse may hold true (i.e. a reduction in water quality through the generation of scum and vegetative mats as a result of vegetation die-off brought about by salinity changes).
- Direct openings, if successful, would be moved northward by coastal action, requiring frequent re-establishment.

- If a direct opening was to be undertaken, then the cut should follow a curve that fits the natural form of mouth openings. However, due to coastal action the cost of establishing a direct opening may be more than the excavation of a single cut.

6. Discussion

6.1 *Backwater Lagoon*

Cleaning and desludging of the backwater has been recommended in several reports and is supported by the hydraulic study. Desirably this should proceed, preferably before the summer holiday period. There will be an initial odour discharge and the material will need to have rubbish removed by hand, once it has dried. The desludging has the support of both neighbouring property owners and is physically achievable.

The initial estimated cost of this work is \$4000 including the cost of a consent. The Riversdale Ratepayers Association are willing to work with the digger to remove fallen branches and other vegetation to provide digger access. How this work is to be funded needs discussion with the District Council and the property owners.

Further to the report, creation of a riparian zone of long grass and shrubby vegetation immediately upstream of the backwater lagoon would improve water quality by filtering runoff and removing silt and debris. This may be approached as a co-operative project between the Council, the landowner and the Ratepayers Association.

The merits of installing a sediment trap at the head of the backwater lagoon needs further consideration. This should be left until the effect of desludging and the riparian zone have been ascertained.

There is no Annual Plan funding provision for any of these works.

6.2 *Main Lagoon*

The study does not support a regular direct opening of the lagoon or a periodic deepening of its outlet channel. However, there appears to be merit in developing a direct channel when the stream is in heavy flood. This would allow removal of silt and may give increased flushing of the backwater.

This activity is permitted under the Regional Freshwater Plan to reduce flooding when the stream mouth closes.

There is some local support to pursue this when the circumstances permit. There is local concern however that the main lagoon would benefit from mechanical cleaning, before this stream mouth cutting occurs.

It is considered that this work is secondary to the need to improve the longstanding problem of poor water quality in the backwater lagoon. At this stage the requirements for stream cutting should be conveyed to the Ratepayers Association and the District Council.

7. Communication

The full report will be provided to Masterton District Council, the local ratepayers association and Riversdale sewerage scheme steering group. This report will also be made available to the Wairarapa newspapers.

8. Recommendation

It is recommended that the Committee:

- (a) *Receive the Consultant's report and provide copies to interested parties.*
- (b) *Accept the recommendations to improve the water quality of the backwater lagoon by desludging and cleaning the channel.*
- (c) *Accept previous recommendations to establish a riparian zone above the head of the lagoon.*
- (d) *Meet and discuss funding and cost sharing options for achieving this work with the Masterton District Council, affected landowners and the Riversdale Ratepayers Association.*
- (e) *Defer consideration of a silt trap until the effect of items (b) and (c) have been ascertained.*
- (f) *Decline an involvement in beach cutting, cleaning and other works associated with the main lagoon.*
- (g) *Inform the Ratepayers Advisory Committee and the Masterton District Council of the conditions under which beach cutting is a permitted activity.*

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