



Report 05.172
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Committee Landcare
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Waikanae River Gravel Analysis

1. Purpose

The purpose of this report is to:

- Advise the Landcare Committee of the initial results of the 2004 cross-section survey on the Waikanae River.
- Outline the issues raised by the analysis.
- Seek the Committee's endorsement of the proposed extraction volume over the next five years.

2. Significance of the decision

The matters in this report do not trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the Local Government Act 2002.

3. Background

A monitoring requirement of the Waikanae Floodplain Management Plan (WFMP) is that the Council survey river cross-sections, at approximately five yearly intervals. The cross section survey extends from the mouth to the Kapiti Coast District Council (KCDC) water treatment plant weir, and its purpose is to monitor bed level changes. These cross-sections were initially surveyed in 1991 and subsequently in 1995, 1999 and 2004. The results of the 1999 survey were reported to this Committee in June 2000 (Report 00.475). The levels from the latest survey (2004) have now been analysed and are reported below. This report summarises the survey results, highlights the issues raised, and outlines the proposed actions.

4. Summary of survey results

A comparison of the 1991, 1995, 1999 and 2004 cross section surveys has been undertaken. A full technical report (GW/FP-G-05/37) containing the detailed analysis of the results is currently being prepared. A copy of this report will be

available to Councillors through the Manager, Flood Protection when complete.

Attachment 1 to this report shows the gravel volume and bed level changes between sections from the mouth to the water treatment weir. **Attachment 2** shows the general location of the cross-sections.

The results show a continuation of the general trend of aggradation from the mouth to Jim Cooke Park (JCP) (section 300) and degradation above this point. This is much the same trend as was observed after the 1995 and 1999 survey.

The results show an overall net increase of gravel in the survey reach below Jim Cooke Park of 33,000m³ between 1999 and 2004 and a decrease in the volume of gravel above Jim Cooke Park of 10,000m³. Since the initial survey in 1991, the volume of gravel build up downstream of Jim Cooke Park is in the order of 83,000m³ despite the extraction of 38,000m³ of gravel in that period.

The volume of gravel degradation above Jim Cooke Park is significantly less than occurred in the period 1995-1999 indicating that the bank protection works and bed level controls installed following the October 1998 floods have reduced the gravel supply from the reach. In the 1995 – 1999 period approximately 40,000m³ of gravel was degraded from the area whereas only 10,000m³ degraded from the area in the period 1999-2004.

A total of 15 of the 59 sections were resurveyed immediately following the January 2005 floods. This resurvey showed there was significant gravel movement that can be attributed to the single flood event. In the downstream reach some mean bed levels increased by approximately 300-400mm. No significant changes were noted in the upstream reach above Jim Cooke Park most likely due to the fact that only a few cross sections were resurveyed in this reach. However post flood inspections showed a substantial length of bank erosion between Section 500 and 510 just below the water treatment plant and that the foundations of the SH1 to Maple Lane works have been exposed and will need reconstruction.

5. Issues raised by the survey results

The aggradation below JCP is continuing at a significant rate and causing concern to residents in that reach. Our analysis has shown that the loss of flood capacity in major floods is not that significant but that there is a measurable loss in the smaller 10-40 year return period events. The gravel is also migrating further downstream into the Scientific Reserve where the bed of the river has traditionally been sand based. This gravel will influence the behaviour of the mouth during flood events.

Extraction is considered the only viable way of addressing the gravel accumulation in the lower reaches in the short to medium term. Greater control of vegetation cover in the upper catchment may help in the longer term but more analysis of the erosion areas would have to be undertaken to ascertain what benefit this would have. During the January 2005, storm bush covered catchments eroded as well as pasture land, however the relative areas have not

yet been assessed. It needs to be acknowledged that erosion from the upper catchment and deposition in the lower reaches is a natural process. Additionally unless the lower reaches of the river are allowed more room to meander, and deposit gravels over a wide area ongoing extraction will be required.

The degradation above JCP is also continuing and will continue into the future. No extraction is undertaken in this reach. The degradation is a result of the increased erosion capacity of the river now that is confined to a single channel and flood flows no longer spread over the floodplain. Additional bed level control structures and bank protection measures are likely to be required to minimise further lateral erosion in the future.

6. The proposed new extraction programme

6.1 The current policy

The Waikanae Floodplain Management Plan recommends that material be extracted from the river at approximately the same rate as it is accumulating. This is in an attempt to maintain overall bed levels at the status quo (the 1991 surveyed levels). Outcome **3.3.4 Gravel Extraction** of the plan states:

“Review the amount available for annual extraction on the basis of the results of the river cross section surveys and an inspection of the river condition. (The amount of gravel extracted over the longer term, will depend on the findings of five yearly bed level analysis). The aim is to ensure that the total gravel balance below the KCDC water treatment plant is maintained at the status quo.”

6.2 Our proposed approach over the next five years

The current ongoing annual extraction volume is set at 3000m³. This is authorised under resource consent Wellington.

In addition to the annual extraction, a separate resource consent (WGN 020106) was obtained to extract a further 35,000m³, over five years, from the lower Waikanae River to remove the gravel build-up that occurred following the 1998 floods. The 35,000m³ is planned to be completed by May 2006.

Our analysis of the survey results, as set out in Section 3, shows that the ongoing annual extraction volume should be increased to 9000m³ per year in the lower river to maintain the flood capacity. These calculations are based on removing the ongoing build-up of gravel from Section 40 (the coastal marine boundary and the limit of the river covered by the Operations and Maintenance consent) to cross section 300.

It should be noted that the current effective annual extraction rate (under both resource consents) is about 10,000m³ per year.

6.3 Work required to implement the increased extraction rate

Preparatory work required to implement the increased extraction will include:

- Completing the survey analysis technical report, including possible peer review.
- Confirm the reach of the river over which the extraction will actually take place. It is expected that the extraction will generally be within the reach from Section 220 to Section 70. By extracting in this reach we should minimise the requirement to work in the coastal marine area.
- Apply for an amendment to our operations and maintenance resource consent to enable extraction from below water level. The current consent only enables extraction from dry beaches (100mm above normal water level) which will only cover about half the proposed extraction reach. The methodology proposed for extracting below water will be similar to that contained in the one off consent (WGN 020106) we already have to extract the 35,000m³ following the 1998 flood.
- Supply the results of the survey to the Department of Conservation and discuss with them the implications. If appropriate, seek their approval to proceed with extraction in the tidal reach of the Waikanae River. This approval would be sought as part of an overall agreement to undertake river management works in the Scientific Reserve.

7. Other proposed actions

In the longer term we should investigate further the source of the gravel that is accumulating in the lower river, and the transport processes that gets it there. We also should consider options for mitigating the degradation that is occurring above Jim Cooke Park.

Accordingly we think that the 10 year WFMP plan review programmed for 2006/07 should include:

- (a) A study of the impacts of the erosion in the upper catchment following the January 2005 flood to determine what benefits would be gained from greater controls on vegetation cover in the upper catchment.
- (b) Reconsider the river training approach above Jim Cooke Park to determine whether more bed controls structures may be required to minimise bed level degradation.

8. Communication opportunities

A press release will be prepared once we have completed the technical report outlining:

1. Results of the gravel survey.
2. Issues that have arisen.

3. The proposed change to the annual extraction volumes.

9. Recommendations

That the Committee:

1. *receive the report.*
2. *note the contents of the report.*
3. *endorse the proposed new extraction programme set out in sections 6 and 7 of this report.*

Report prepared by:

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Attachment 1: Summary of Volume Changes 1991-2004 and 1999-2004

Attachment 2: Locality Plan of Cross-sections