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Hutt Estuary

Intertidal Sediment Monitoring 2012/13

Prepared for Greater Wellington Regional Council March 2013

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By

Leigh Stevens and Barry Robertson

Wriggle Limited, PO Box 1622, Nelson 7040, NZ. Ph 03 545 6315, 021 417 936; 0275 417 935, www.wriggle.co.nz

HUTT ESTUARY: SEDIMENTATION RATE MONITORING SUMMARY

Figure 1. Location of intertidal sediment rate monitoring plates in the lower Hutt Estuary (see also Table 2).

SEDIMENTATION RATE CONDITION RATING

2010-2013 VERY GOOD

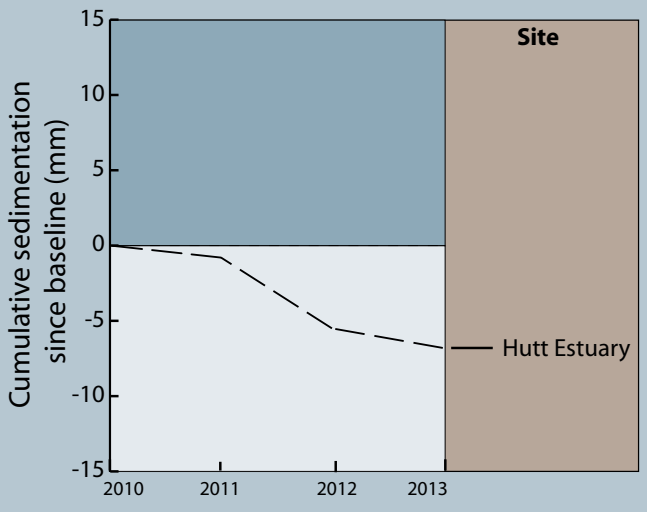

Figure 2. Cumulative change in mean sediment level over buried plates in Hutt Estuary, 2010 to 2013.

Background

Soil erosion is a major issue in New Zealand and the resulting suspended sediment impacts are of particular concern in estuaries because they act as a sink for fine sediments or muds. If fine sediment inputs exceed the assimilative capacity of an estuary, it will infill (often rapidly), displacing high value habitat (e.g. seagrass, saltmarsh). Excess mud will also commonly result in adverse conditions including reduced sediment oxygenation, production of toxic sulphides, increased nuisance macroalgal growth, and a shift towards a degraded invertebrate and plant community. Such changes greatly reduce its value for fish, birdlife and humans.

To monitor ongoing sedimentation rates, four concrete plates were buried in intertidal flats of the Hutt Estuary in 2010 (Figure 1 - see Stevens and Robertson 2011 for further details) and have been monitored annually since that time.

2010-2013 Sedimentation Rate

Table 1 presents the 2010-2013 sedimentation rate results for the four plates buried in Hutt Estuary, with summary data presented in Figures 2 and 3. To account for spatial and temporal variation in sedimentation rates from natural processes such as wind generated waves, tidal flows, and river inputs, site averages are used to estimate a mean annual sedimentation rate for the lower estuary. Mean sedimentation rates for the site range from -9 to +2mm/yr (Table 1), with the overall site mean of -3.75mm/yr, falling within the "very low" category (see condition rating on the following page).

Figure 3 shows the smallest sediment losses at plate 4, trending to the largest at plate 1. As plate 1 is located closest to the main river channel, this trend may reflect greater flood and tidal scouring of the tidal flats adjacent to the main channel. However, given the short period of monitoring to date, these initial values may reflect localised variance rather than longer-term sedimentation trends within the estuary.

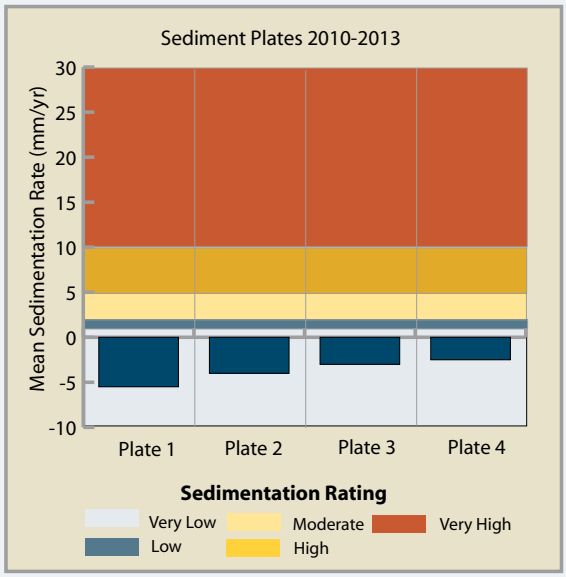

Figure 3. Mean annual change over individual plates in Hutt Estuary, 2010 to 2013.

HUTT ESTUARY: SEDIMENTATION RATE MONITORING SUMMARY

Table 1. Sediment monitoring results for Hutt Estuary, April 2010 - January 2013.

	Sediment Depth (mm)				Change (mm)			Site Mean (mm/yr)			Overall Rate (mm/yr)	2010-2012 SEDIMENTATION RATE CONDITION RATING
SITE	11 Apr 2010	15 Jan 2011	21 Feb 2012	15 Jan 2013	2010-2011	2011-2012	2012-2013	2010-2011	2011-2012	2012-2013	2010-2013	
Hutt Plate 1	257	256	247	246	-1	-9	-1	-0.8	-4.8	-2.0	**-3.75**	**VERY LOW**
Hutt Plate 2	250	248	245	242	-2	-3	-3					
Hutt Plate 3	295	297	290	289	2	-7	-1					
Hutt Plate 4	287	285	285	282	-2	0	-3					

Table 2. Location of sedimentation rate monitoring sites in Hutt Estuary.

Site	NZTM East	NZTM North	Site	NZTM East	NZTM North
Plate 1	1759101	5433548	Peg 1	1759103	5433548
Plate 2	1759097	5433548	Peg 2	1759099	5433548
Plate 3	1759093	5433548	Peg 3	1759095	5433548
Plate 4	1759089	5433548	Peg 4	1759091	5433548
			Peg 5	1759087	5433548

SEDIMENTATION RATE CONDITION RATING	
RATING	DEFINITION
Very Low	<1mm/yr
Low	1-2mm/yr
Moderate	2-5mm/yr
High	5-10mm/yr
Very High	>10mm/yr
Early Warning Trigger	Rate increasing

A likely reason for the low mean annual deposition rate measured over the past three years is regular dredging of sediments from the channel in the lower estuary.

Despite this, mud deposition in the lower estuary is evident in the previous broad scale assessment (Stevens et al., 2004) which found ~16% of the lower estuary flats dominated by surface mud (a condition rating of "poor"), while nearby fine scale sites had a high (42-51%) sediment mud content (Robertson and Stevens 2011).

As such, ongoing monitoring is recommended to measure sediment deposition and temporal change on the only significant remaining intertidal flat within the estuary.

Conclusion

Sedimentation rates over the past three years fall within the "very low" condition rating, although the estuary retains a "poor" rating in terms of overall muddiness.

Recommended Monitoring

Continue to measure sediment plate depths annually.

References

Robertson, B.M. and Stevens, L. 2010. Hutt Estuary; Fine Scale Monitoring 2009/10. Prepared for Greater Wellington Regional Council. 24p.

Robertson, B.M. and Stevens, L. 2011. Hutt Estuary; Fine Scale Monitoring 2010/11. Prepared for Greater Wellington Regional Council. 25p.

Stevens, L., Robertson, B.M., and Robertson, B. 2004. Broad Scale Habitat Mapping of Sandy Beaches and River Estuaries - Wellington Harbour and South Coast. Prepared for Greater Wellington Regional Council. 69p.

Sedimentation rate monitoring site in Hutt Estuary