Kapiti Coast District Council

Beach Renourishment Trial at Marine Parade, Paraparaumu

Interim Report No 3

The purpose of this third interim report is to briefly record the changes that have occurred to the end of March 1995 at the beach renourishment trial site at the south end of Marine Parade, Paraparaumu, and in the source area opposite Manly Street, since transport of the sand was completed during November 1994. The trial renourishment zone was 200 metres long and the sand was obtained by scraping from the inter-tidal zone on a section of the beach fronting Manly Street.

Fourteen profile sites were established for the purpose of monitoring the trial and these are shown on the two accompanying site plans. The site plans show three profile lines (141, 142 and 143) crossing the renourishment zone and four profile lines (152, 16, 18 and 181) across the area from where the sand was removed.

Each profile was surveyed across the dunes and to a point as far off-shore as could be reached by wading into the surf. To date the following surveys have been carried out:

- between 26 October and 1 November 1994 before the work commenced;
- between 25 - 28 November 1994 following completion of the work;
- between 9 - 11 January 1995 and,
- most recently on 27 and 28 March 1995.

Some of the profiles were also surveyed on 15 and 18 November 1994 to record the effects of storm action.

The results of the previous surveys measuring the changes that occurred between Oct 94 and Nov 94 (before and after the renourishment work) and between Oct 94 and Jan 95, were summarised in Interim Reports Nos. 1 and 2. In each case, plots of the cross-section profiles were produced by the Wellington Regional Council from the survey data and the volumetric changes, per metre of beach at each profile location, have been calculated.

Along the 200 metre trial renourishment site, approximately 30 m^3/m of sand was deposited for each metre of beach to give an original renourishment volume of 6000 m^3. Losses from the sand placed on the beach during deposition amounted to approximately 6% of this volume and this was mainly attributed to minor lateral spreading of the deposited sand as the profiles adjusted.

The volumetric changes that have occurred between each survey at each profile have been summarised in the table attached to this report.

The results of the March 1995 survey show some continuing loss of sand from profiles 142 and 143 although the surveys in both cases did not extend as far off- shore as on previous occasions. This may affect the reliability of the volumetric calculations. If the calculations are valid then it appears that these two profiles, located near the centre and at the northern end of

the renourishment zone, respectively, appear to have been losing sand at a rate of approximately 3 - 4 cubic metres (per metre along the beach) each month since the work was completed. Conversely, profile 141 at the southern end of the renourishment zone has accreted 8.3 m^3/m during the Jan - Mar 1995 period.

General growth of the beach at the profiles to the north and south of the trial renourishment site during the period Oct 1994 to Mar 1995 is apparent and these areas may have benefited from any movement of sand from the trial site as a new equilibrium seeks to become established. Low groynes at each end of a renourishment zone may be required during any future exercise if such lateral movement of the deposited sand is considered undesirable.

In the supply area from where the sand was removed north of the headland, there has been significant accretion, except at the northern end where there has been slight erosion.

Comment on the changes at individual profiles, during the period Jan - Mar 1995, follow:

Profile 131 300m south of the trial site. No change at dune face. 100 - 200 mm accretion on beach and evidence of sand-bar movement off-shore.

Profile 132 100 metres south of trial site. Some loss of sand from top of dune face and building at toe as slope adjusts. Accretion in inter-tidal zone of up to 200 mm and evidence of sand-bar movement shorewards.

Profile 14 Just south of the trial site. Only small accretion in profile during Jan - March 1995. It was noted that the survey did not extend as far off-shore as previous survey and this may affect volumetric calculations. Bar movement shoreward in inter-tidal zone.

Profile 141 At the south end of the trial site. Toe of dune has receded approximately 2 metres during Jan - Mar 1995 period. Very little change in beach elevation although overall volume in profile continues to grow (8.3 m^3 since Jan). Accretion of up to 0.6 metre in inter-tidal zone.

Profile 142 Centre of trial site. Toe of dune has receded approximately 1 metre at this location during period Jan - Mar 1995. Very little change in beach level down to Mean Sea Level (MSL). Seabed has dropped around 0.5 metre near Low Water Spring Tide (LWST) level. 7.803 mm^3/m lost from profile during period although the survey finished 30 metres short of Jan 95 profile and this may affect reliability of volumetric calculations.

Profile 143 North end of trial site. Toe of dune moved seawards 8 metres during replenishment and has subsequently receded 5 metres according to Mar 95 survey, including 1.6 metres since Jan 1995. Little change in beach levels. Small amount of accretion near MSL (less than 100 mm). 6.957 m^3/m lost from profile during period although survey finished 95 metres short of Jan 95 survey.

Profile 144 Just north of trial site opposite Tahi Street. Very little change in profile during period Jan - Mar 95. Some changes probable off-shore but survey stopped 95 metres short of Jan 95 profile. Profile volume increased 4.123 m^3/m during period.

Profile 20 270 metres north of trial site opposite Rua Road. Accretion during Oct -Nov 94 of 2.684 m^3/m followed by further accretion of 2.987 m^3/m during Nov 94 - Jan 95. Continuing accretion (10.074m^3/m) reported at this profile during

Jan - Mar 1995. Little change on beach but growth near LWST. Survey finished 80 metres short.

Profile 151 280 metres south of source area (35 Manly St). General lowering of beach by approx. 200 mm during Oct - Nov 94 with significant building of dune face and movement of sand to off-shore bars. Sand previously deposited on dune face has now mostly been removed. This profile has shown consistent and significant growth since October 1994 (88 m^3/m). Accretion up to 300 mm near MSL and further off-shore. Little evidence of any beach lowering except near LWST.

Profile 152 South end of source area (71 Manly St). Significant profile accretion Oct - Nov 94 (during sand removal) and little volumetric change Nov 94 - Jan 95. Modest accretion (10.195 m^3/m) during Jan - Mar 95 with 500 - 600 mm build-up near LWST indicating sand movement shoreward. Little change in beach levels. Survey finished 80 metres short of previous survey which may affect volumetric calculations.

Profile 16 Through source area opposite Nathan Street. 12.229 m^3/m depletion Oct - Nov 94 followed by 19.991 m^3/m accretion during Nov 94 - Jan 95. Further 6.782 m^3/m accretion during Jan - Mar 95. Some dune building evident. Beach accretion up to 300 mm, above high tide level. Movement of sand in off-shore bars.

Profile 18 Through source area (103 Manly St). Depletion of beach (43.858 m^3/m) during Oct - Nov 94 followed by 18.611 m^3/m accretion during Nov 94 - Jan 95. Significant accretion (40.366 m^3/m) during Jan - Mar 1995. Little change in dunes and beach above high tide but general building of profile off-shore.

Profile 181 North end of source area (131 Manly St). Profile depletion 58.141 m^3/m Oct -Nov 94 and 14.490 m^3/m Nov 94 - Jan 95. Slight overall erosion (0.862 m^3/m) during Jan - Mar 1995. Possible erosion scarp 800 mm high apparent on survey plot at dune face but little change in beach to MSL. Significant movement of sand off-shore.

Profile 182 300 metres north of source area (163 Manly St). Significant lowering of beach (up to 500 mm) above MSL with 69.581 m^3/m depletion during Oct -Nov 94. Some recovery 12.754 m^3/m during Nov 94 - Jan 95. 13.295 m^3/m erosion during Jan - Mar 1995 period. Little change in beach levels down to LWST. Movement of sand off-shore.

Indications at this stage are that around 35% of the sand deposited at the trial renourishment site may have moved elsewhere and it seems that the beaches, both to the south and to the north may be the main beneficiaries. Further surveys will be necessary to confirm this preliminary observation. In the supply zone opposite Manly Street, there are no indications to suggest that the removal of sand from this area was, in any way, harmful.

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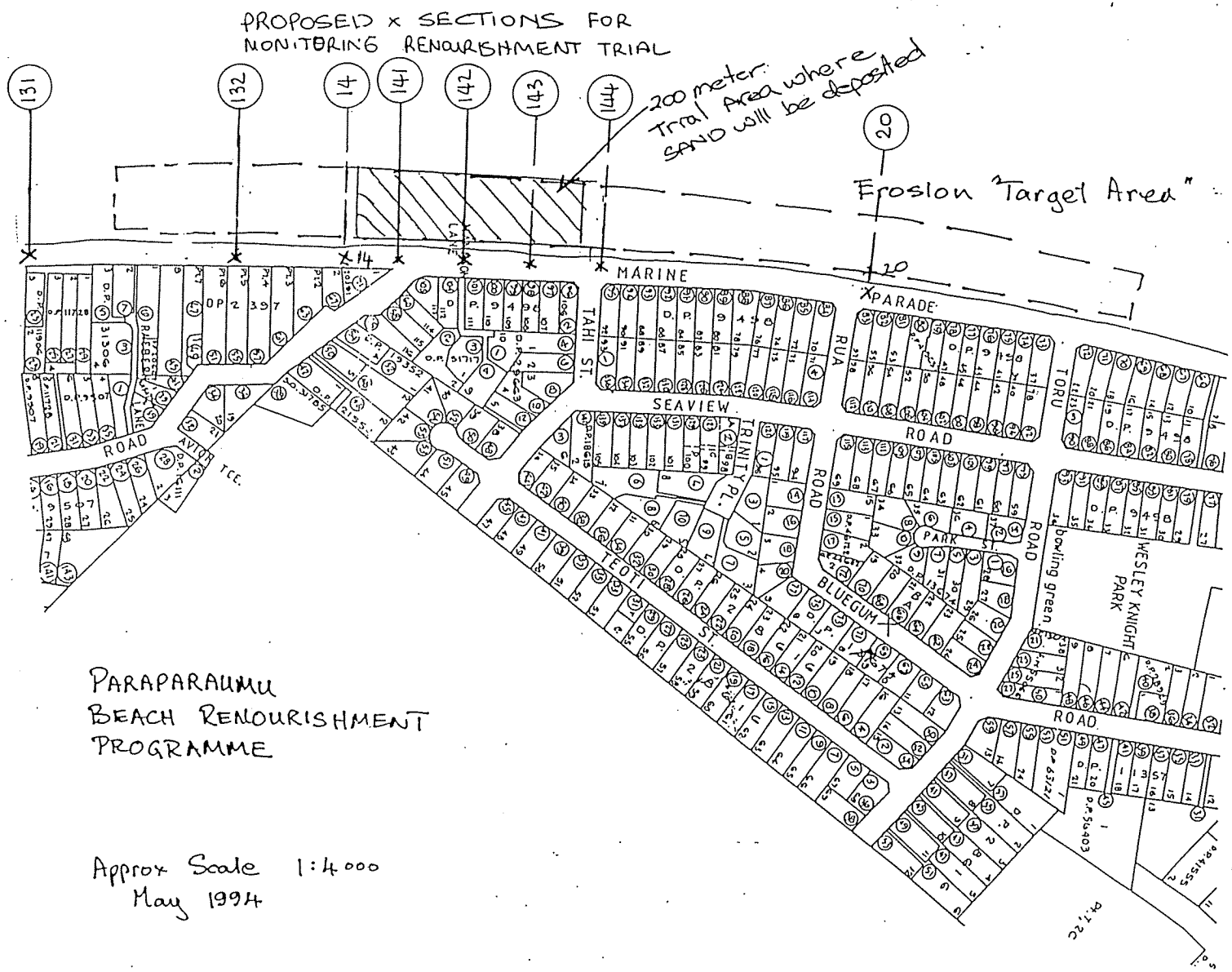
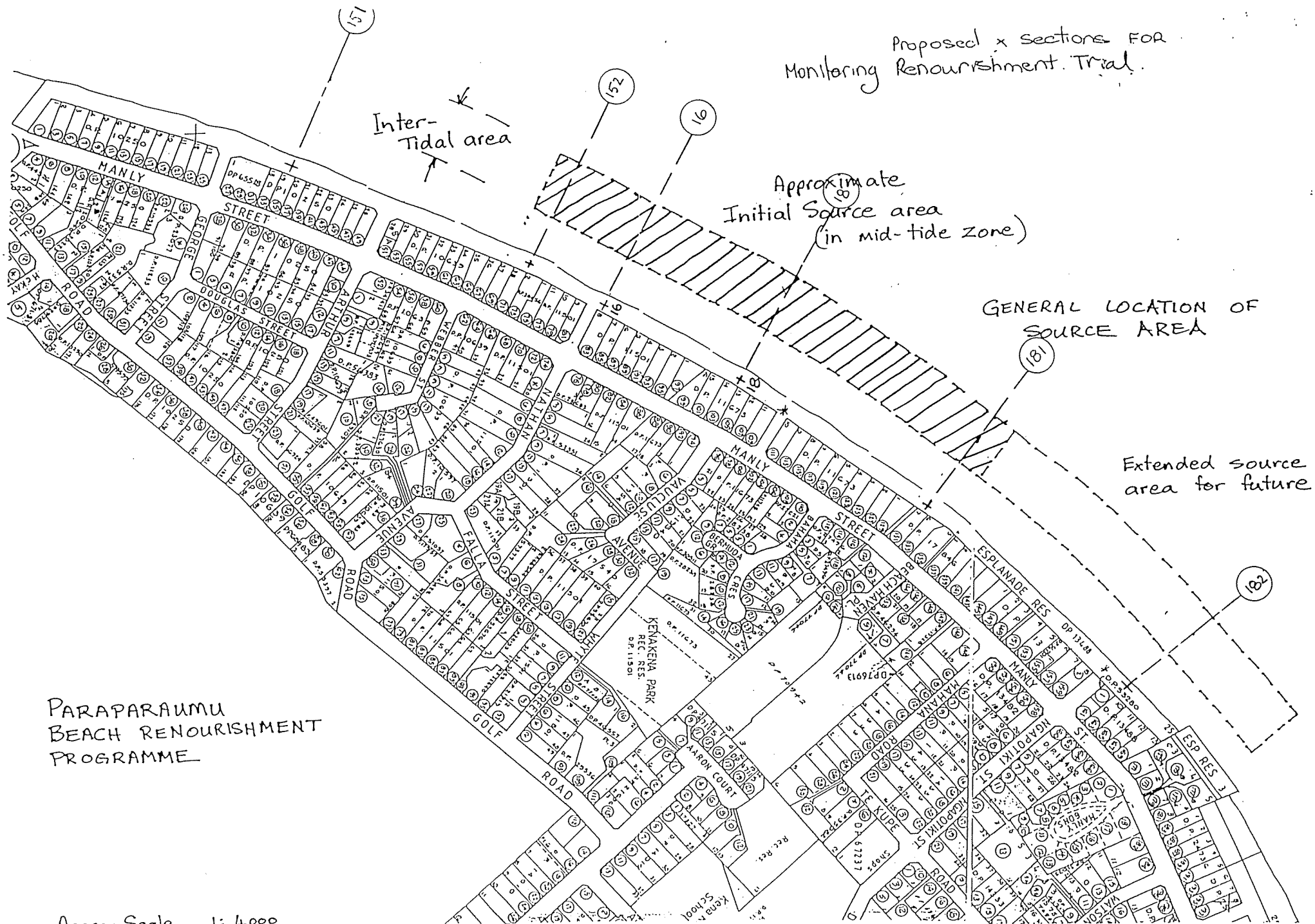


PARAPARAUMU
BEACH RENOURISHMENT
PROGRAMME

Approx Scale 1:4000
May 1994


Proposed x sections FOR Monitoring Renourishment Trial.
151
152
16
Inter-Tidal area
Approximate Initial Source area (in mid-tide zone)
18
GENERAL LOCATION OF SOURCE AREA
181
Extended source area for future
182
MANLY
STREET
GEORGE
DOUGLAS
ARTHUR
HEBBARD
NATHAN
VAUCLUS
AVENUE
FALLA
WHYTE
BERMUDA
BAHAMA
BEACH HAVEN
ESPLANADE RES
DP 13488
DP 332180
ESP RES
MAHANA
NGAPOTIKI ST
TE KUPE
ROAD
GOLF
KENAKENA PARK REC. RES. D.P. 11501
AARON COURT
Rec Res
School
PARAPARAUMU BEACH RENOURISHMENT PROGRAMME
Approx Scale 1: 4000
May 1994

Paraparaumu Beach Renourishment Trial
Beach Profile Changes

1/5/95

Profile	Oct-94 to Nov-94	Oct-94 to Jan-95	Oct-94 to Mar-95	Nov-94 to Jan-95	Nov-94 to Mar-95	Jan-95 to Mar-95		
131	2.950	1.541	8.856	-1.409	5.906	7.315		
132	3.038	3.665	10.802	0.627	7.764	7.137		
14	7.275	12.795	13.269	5.520	5.994	0.474		
141	25.488	25.953	34.276	0.465	8.788	8.323		
142	27.016	20.886	13.083	-6.130	-13.933	-7.803		
143	30.940	24.695	17.738	-6.245	-13.202	-6.957		
144	15.785	8.350	12.473	-7.435	-3.312	4.123		
20	2.684	5.671	15.745	2.987	13.061	10.074		
151	30.067	51.136	87.785	21.069	57.718	36.649		
152	46.709	44.297	54.492	-2.412	7.783	10.195		
16	-12.229	7.762	14.544	19.991	26.773	6.782		
18	-43.858	-25.247	15.119	18.611	58.977	40.366		
181	-58.141	-72.631	-73.493	-14.490	-15.352	-0.862		
182	-69.581	-56.827	-70.122	12.754	-0.541	-13.295		

Note: 1. Figures show volumetric changes in beach profile in cubic metres per metre along the beach.

2. The shaded zones represent the cut (lower) and fill (upper) zones.

3. Negative values represent loss of sand. Positive values represent accretion.