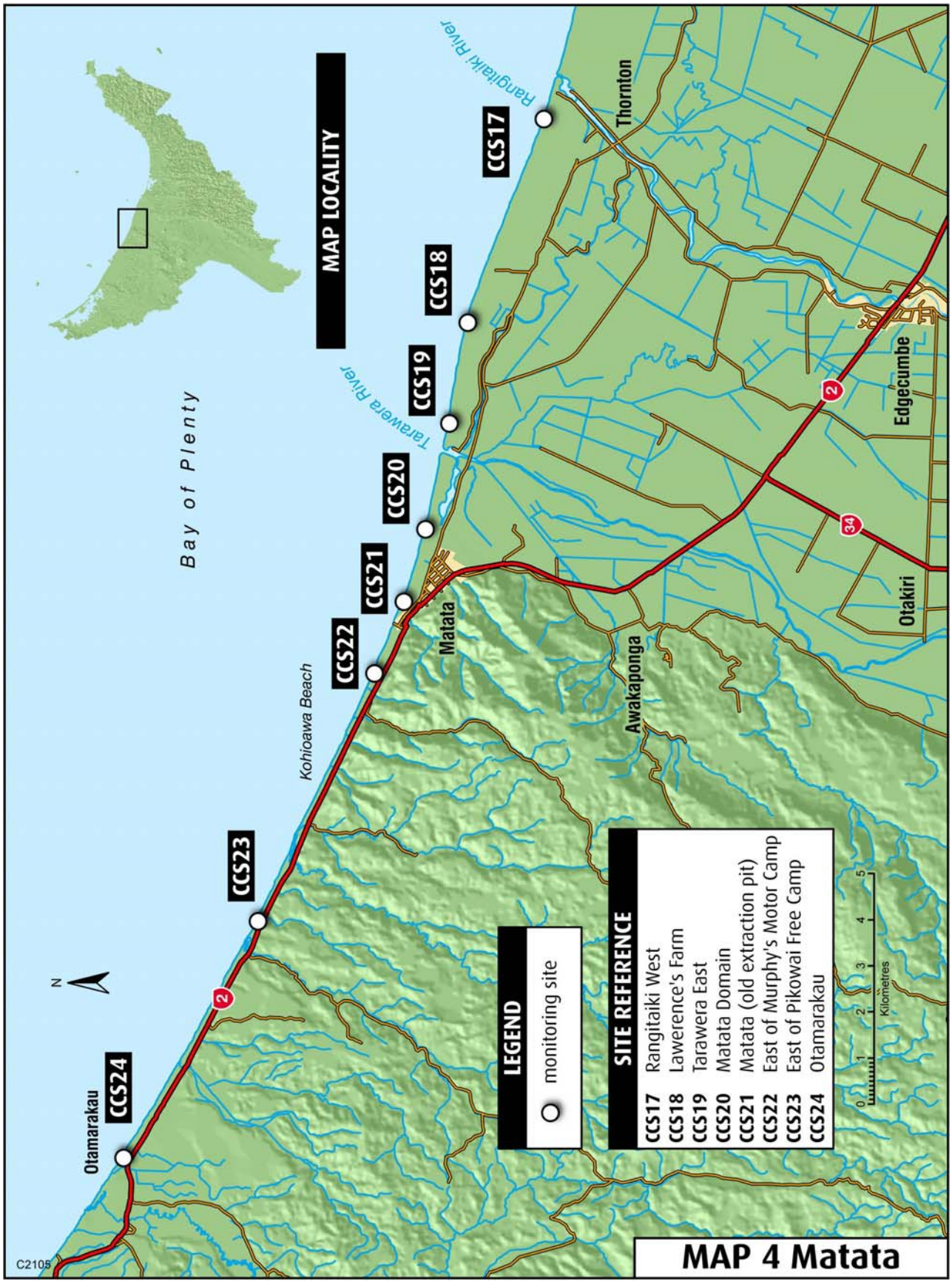
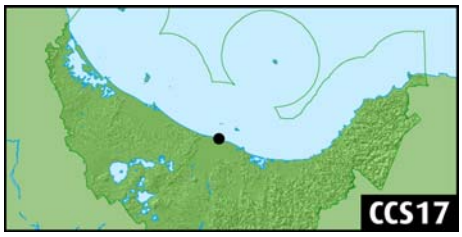
5.6 Matata Beach system



5.6.1 **Rangitaiki West (CCS 17)**



Discussion

This site is located 900m to the west of the Rangitaiki River entrance. The early photography shows a well developed berm and wide upper beach area. The 2006 photograph shows profile with no prominent berm and a moderately vegetated fore dune.

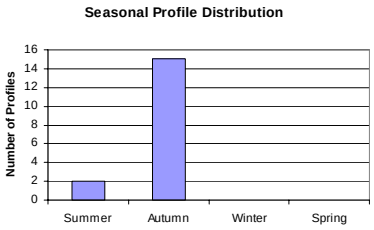
The beach profile examples show the beach to be in an erosive state at the time of the 1990 profile with a significant loss of material from the entire profile. The vertical scarp is also present at this time. The later profiles (1996 and 2006) show a rejuvenated beach profile with both vertical and horizontal accumulation of sand. The 2006 profile shows the development of incipient dunes.

The offshore profile (1992) shows that during the early period of record the material that had been lost from the onshore beach profile was deposited in a zone 100 to 200m offshore in the form of several bars. The latter two profiles (1997 and 2003) show this material has moved (onshore) and is reflected in the healthier state of the profiles of the onshore section.

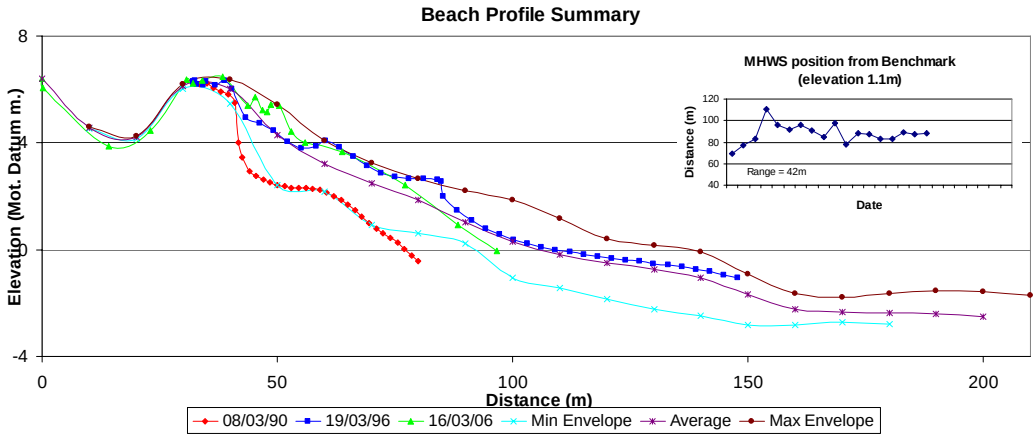
A beach state of *stable* has been determined for this site. Gibbs (1994) states that for this section of beach the long-term trend (1944-1994) of shoreline advance of approximately 50m, ranging from 40 to 62m, with short-term fluctuations of 20 to 30m was determined.

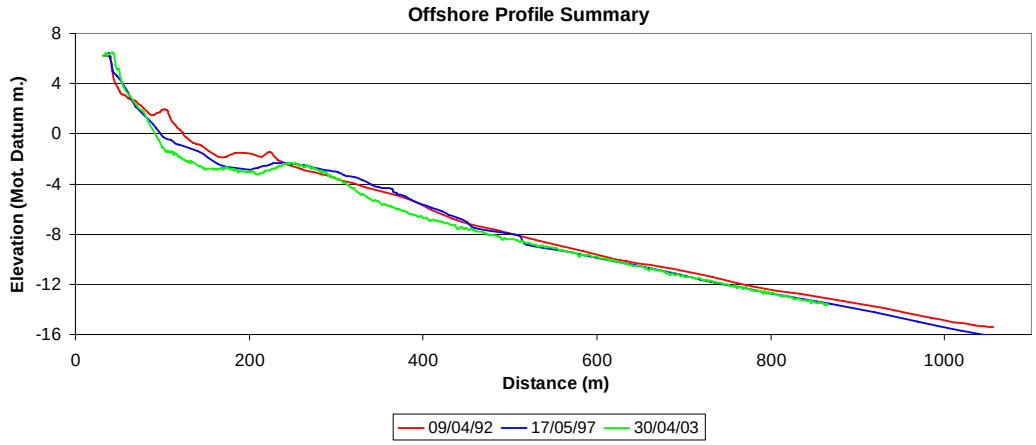
CCS 17 - Rangitaiki West

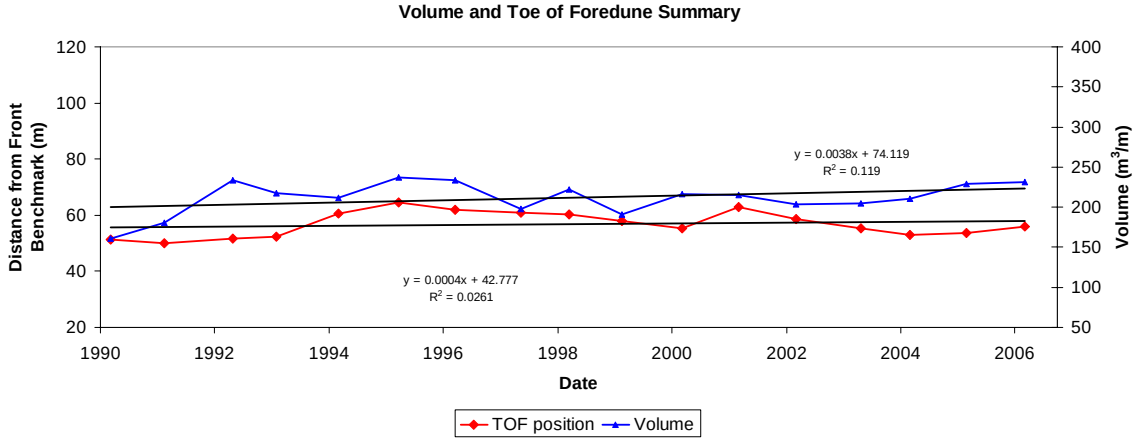
State: Stable



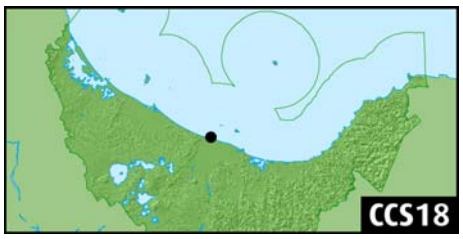
Location: NZMG 2850497E 6358840N
Period of record: 1990 – 2006
No. of profiles: 17
Morphodynamic type (Wright Short model): Transverse Bar and Rip
Volume p-level – 0.18 **TOF p-level –** 0.89







5.6.2 **Lawrences (CCS 18)**



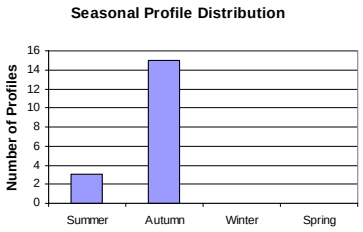
Discussion

This site is located 2.8km east of the Tarawara River entrance and on the crest of the western cuspate foreland feature. The 2006 photograph shows a well vegetated dune system, a developing (incipient) foredune has well developed *spinifex* vegetation. Aerial photography shows two well developed 4 wheel drive tracks through both the frontal and back dune system.

The profile dataset shows only slight variation in the profile shape for the period of monitoring. The MHWS shows a range of 17m of horizontal movement for this cross section. The offshore profiles show a well developed offshore bar in the zone 400-500m offshore. The point of convergence of the three measured profiles is determined at -7.5m.

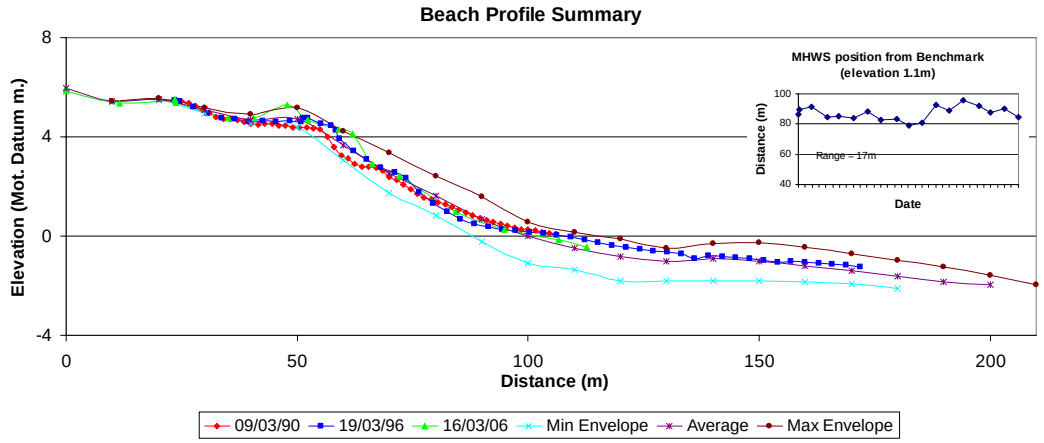
The toe of foredune and volume datasets show *stable* trends for this section. Tonkin and Taylor (2002) concluded that a conservative estimate of the current rate of shoreline advance is in the order of 1.2m/yr.

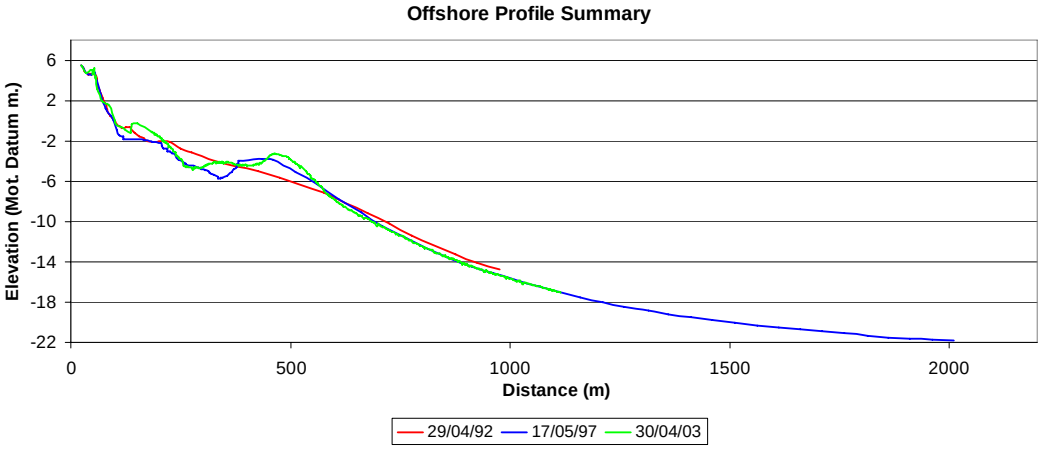
CCS 18 - Lawrences

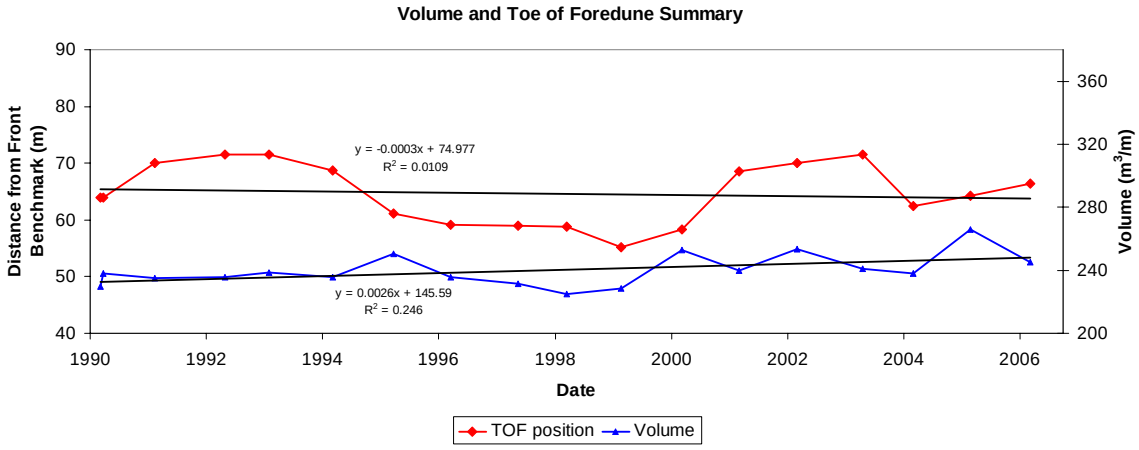


State: Stable

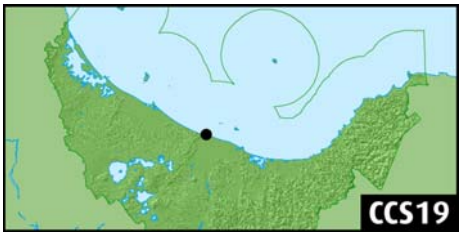
Location: NZMG 2846095E 6360481N
Period of record: 1990 – 2006
No. of profiles: 18
Morphodynamic type (Wright Short model): Transverse Bar and Rip
Volume p-level – 0.04 **TOF p-level –** 0.68







5.6.3 **Tarawera East (CCS 19)**



Discussion

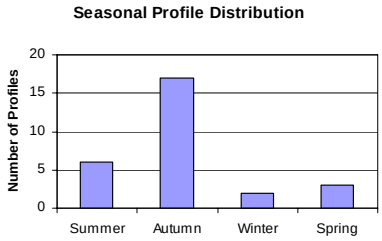
The site is located 600m to the east of the Tarawera River entrance. This section of beach is influenced by the changing position of the river mouth. The foredune width ranges from 30 to 40m. The photography shows a well vegetated frontal dune system. This site is located at a section of beach where 4 wheel drive access is common.

The beach profile records shows strong vertical development from 1990 to 2006. Even in a depleted state the profile exhibits a berm feature. The two early offshore profiles show no significant offshore bar structure present. This pattern changes in the 2003 profile with two significant deposition areas. The profiles converge at -7m and flatten further at -15m (1200m offshore) probably as a result of the deposition fan (ebb delta) generated by sediment from the Tarawera River.

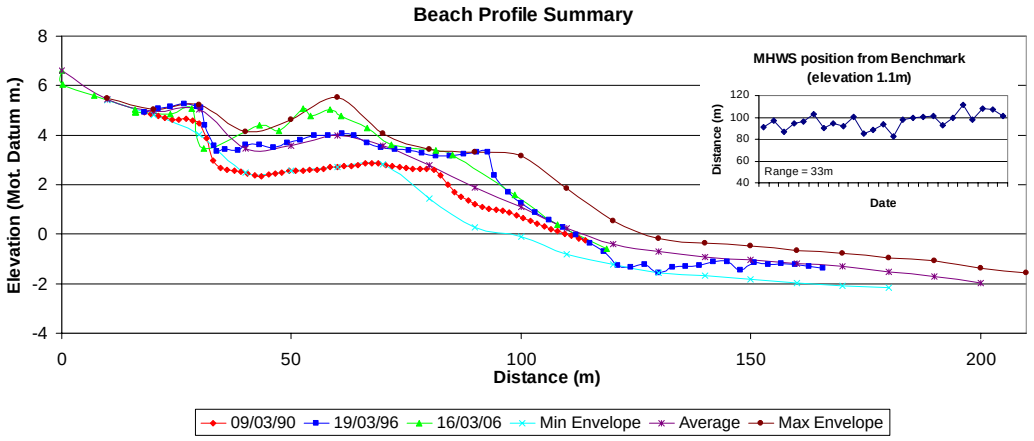
The linear regression analysis shows a significant trend in the volume record, so a state *tending towards accretion* has been defined for this period of record.

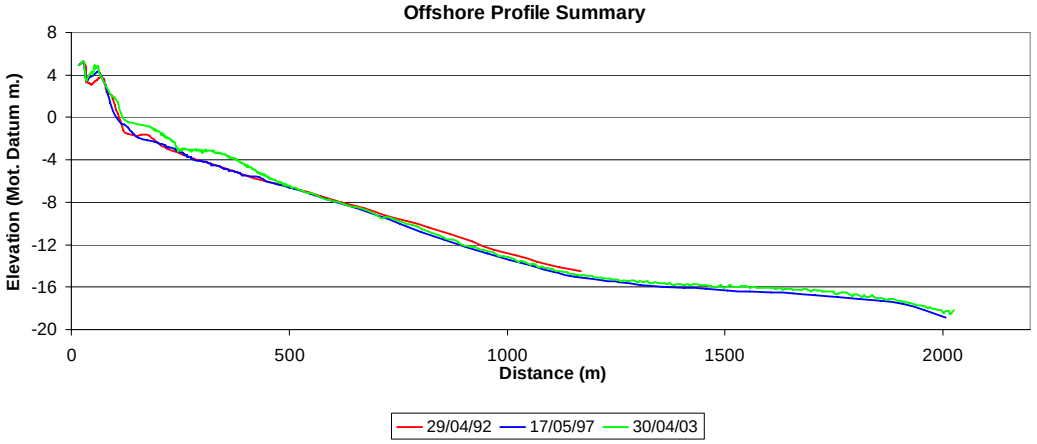
CCS 19 - Tarawera East

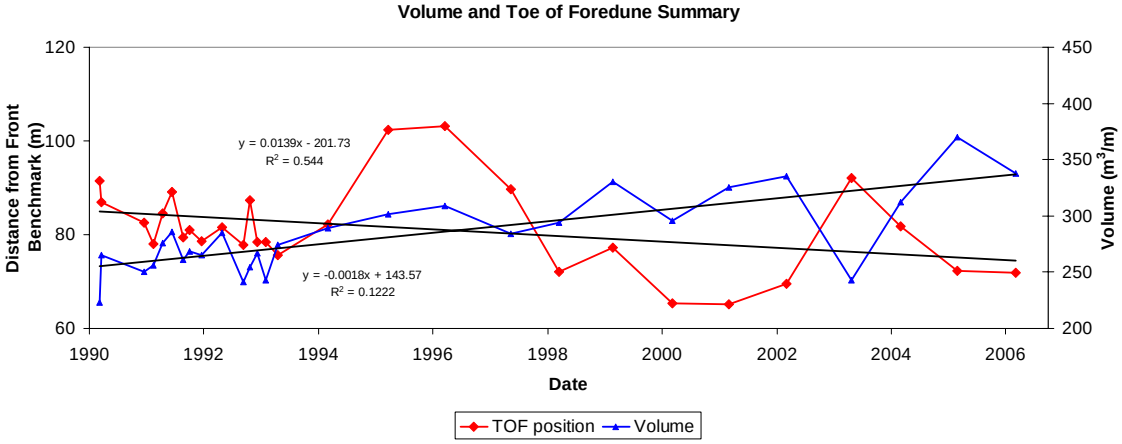
State: Accretion?



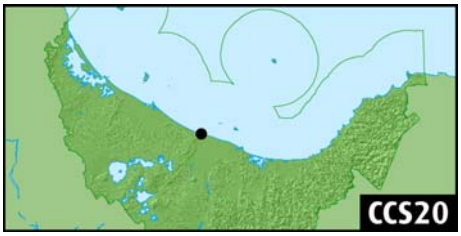
Location: NZMG 2843909E 6360878N
Period of record: 1990 – 2006
No. of profiles: 28
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.00 **TOF p-level –** 0.61







5.6.4 Matata Domain (CCS 20)

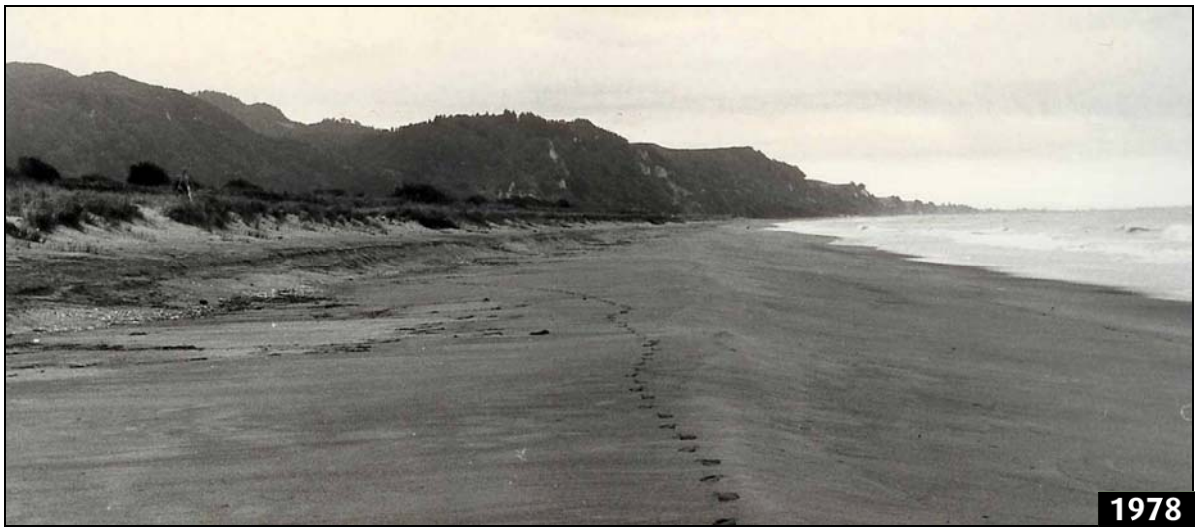


Discussion

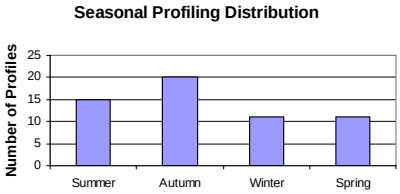
This site is located 600m to the east of the Matata Domain. The diversion of the Tarawera River mouth away from the Matata township in 1917 and the mining of approximately 6000m^3/yr of foreshore and dune sand for 20 years up to 1985 is likely to have influenced shoreline movements at Matata. The 1978 photograph shows a moderately vegetated dune with an erosional scarp in the upper beach area, a small berm feature is also present. The 2006 photograph shows similar amounts of vegetative cover and a storm debris line at the base of the frontal dune.

The profile dataset shows stability in the upper beach area. The lower beach (<3m elevation) has exhibited a wide vertical envelope (+4m) of sediment movement. The MWHS position shows a horizontal variation of 28m.

This site was profiled quarterly up to 2000 due to its inclusion in the sand mining monitoring programme. Analysis of the trends in the in the volume and toe of foredune analysis, shows that this profile site is in a *stable* state for the period on monitoring. Healy (1989) suggested that the pattern of alternating erosion and stability was due to localised wave refraction from offshore topography focusing longer period wave energy that has created a pattern of semi-permanent shallow embayments on the beach.

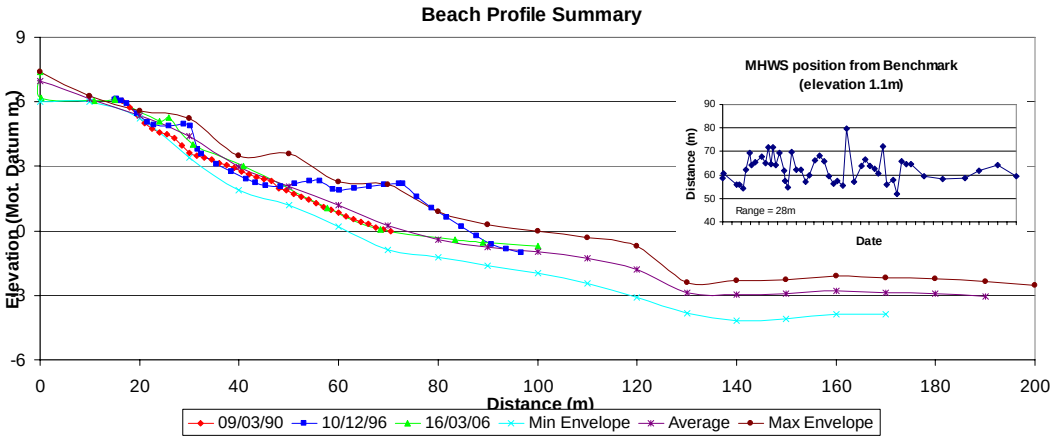


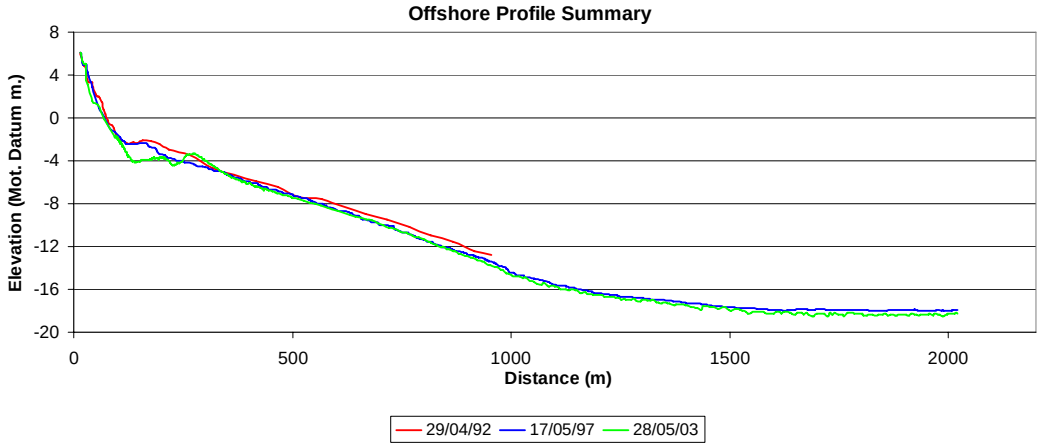
CCS 20 - Matata Domain

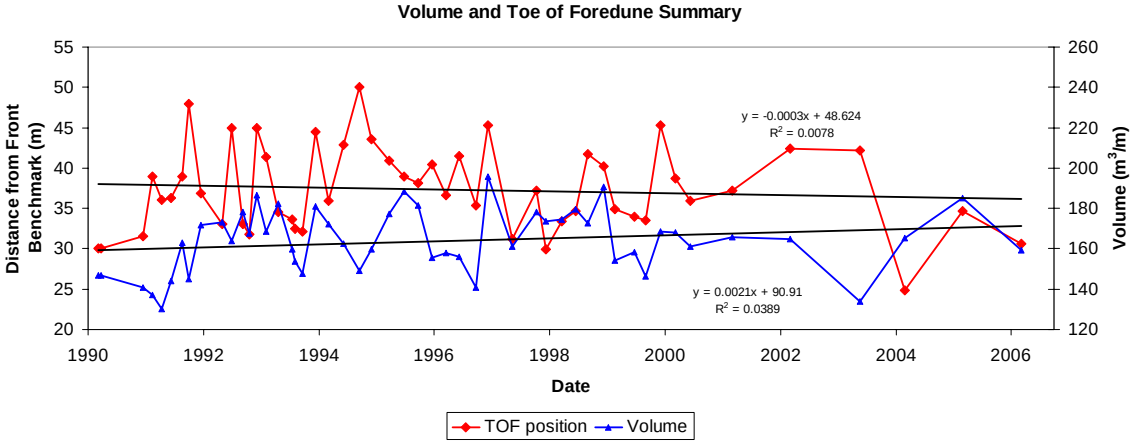


State: Stable

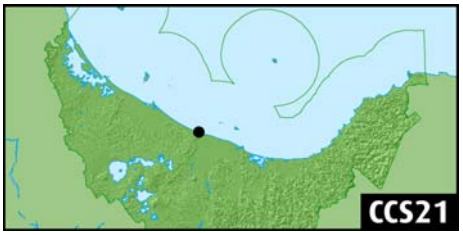
Location: NZMG 2841609E 6361400N
Period of record: 1990 – 2006
No.of profiles: 67
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.17 **TOF p-level –** 0.54







5.6.5 **Matata (old extraction pit) (CCS 21)**



Discussion

This site is located 1km to the west of the Matata Domain. This site fronts Clem Elliot Drive and the adjacent sand mining area. Healy (1977) gave the movement of 31m retreat for the period 1868 to 1977 (during this period there was a time of advance (1914-1949) which was attributed to the diversion of the Tarawera River).

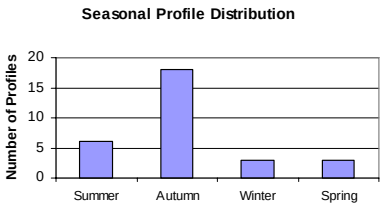
For 1978 photograph Healy states a dune description of spinifex runners encroaching onto areas of bare sand and slight dune accretion (isolated lumps). This vegetation trend is continued in the 2006 photograph with further establishment of the spinifex evident. The 2006 image also has signs of cusp development.

The beach profile record show seaward and vertical development of the upper beach area through to 2006. Below average volumes of sand are present in the three representative profiles displayed. The offshore profiles show the development of bar structures and a convergence occurring at -6m. Once again the earlier profile diverges from the more recent profiles once reaching -9m (possibly signalling an error with the sounding equipment).

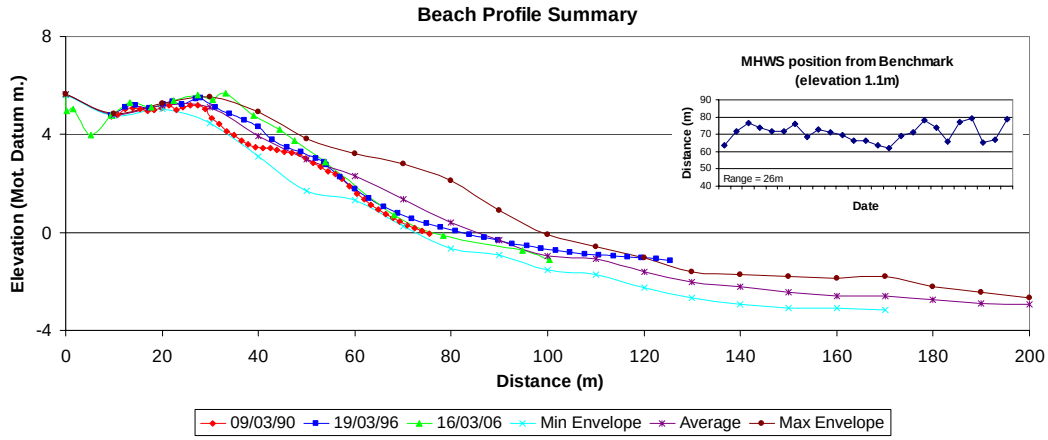
Only the volume dataset has registered a significant trend for this series of profiles hence a state condition *tending towards accretion* has been proposed for this section.

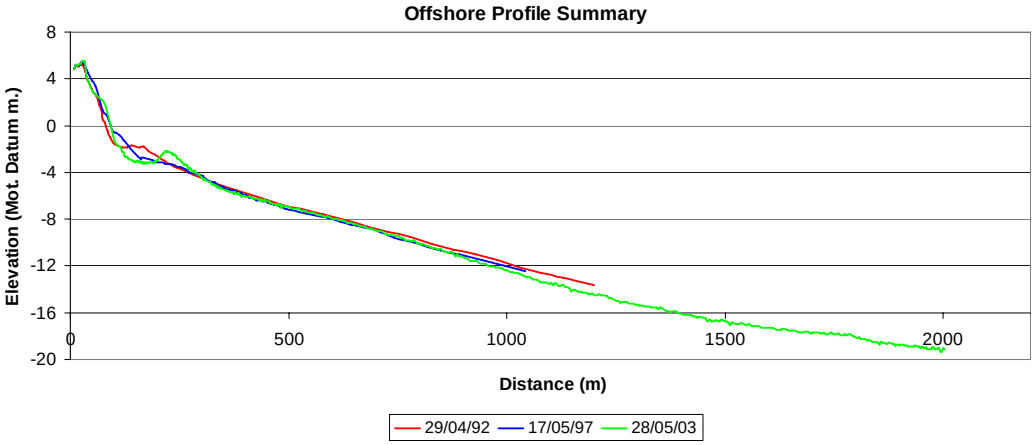
CCS 21 - Matata

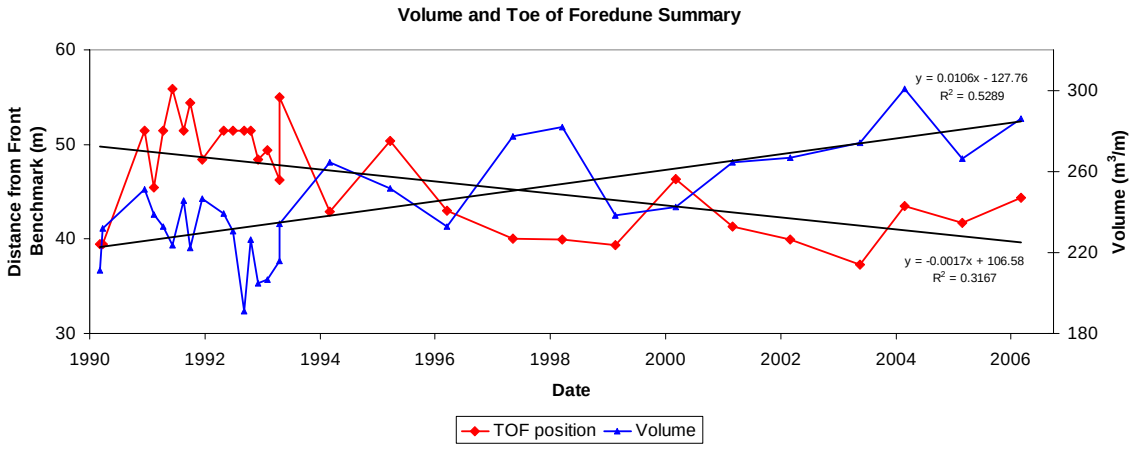
State: Accretion?



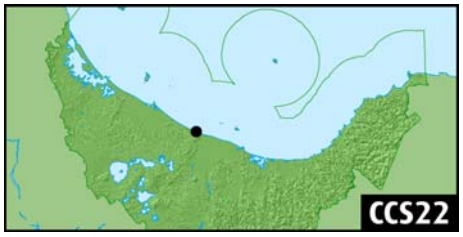
Location: NZMG 2840037E 6361867N
Period of record: 1990 – 2006
No. of profiles: 30
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.00 **TOF p-level –** 0.05







5.6.6 East of Murphy's Motor Camp (CCS 22)

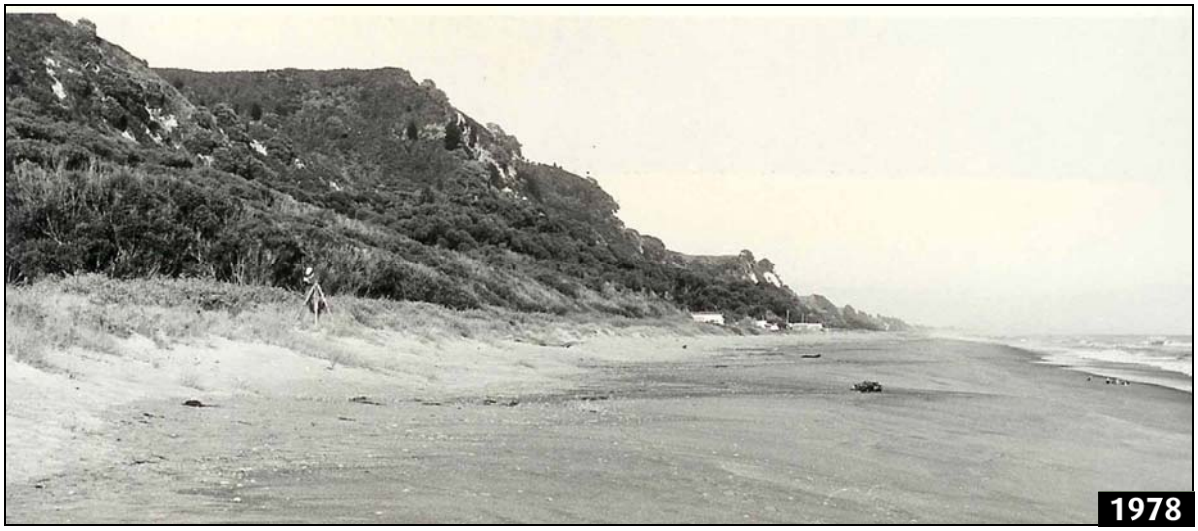


Discussion

This site is situated 500m of the east Murphys Motor Camp. The beach borders a narrow Holocene coastal plain of sand barriers. Photography shows that in both cases *spinifex* is well developed on the frontal dune. *Spinifex* runners encroach down the front of the dune. A berm is present in both photographs with a varying position due to the development of beach cusps.

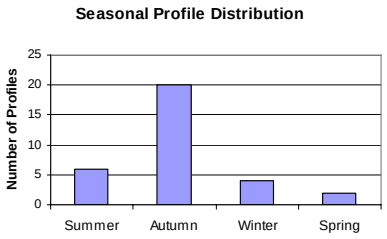
The beach profile record (1990-2006) shows a seaward movement of the frontal dune. The MHWS position fluctuates 32m horizontally. The offshore profiles exhibit offshore bar and trough development. At 2km offshore, reef structures are present, with elevation variations of several metres measured. The 1992 profile once again diverges from the other two later profiles.

The statistical analysis of both the volume and toe of foredune show no significant trends. This dynamic equilibrium pattern gives a *state of stable* for the period of record. Gibb (1994) states long-term trend (1918-1994) of dynamic equilibrium with short-term fluctuations of 15 to 20m for the stretch of beach from Matata to Mimiha Road.

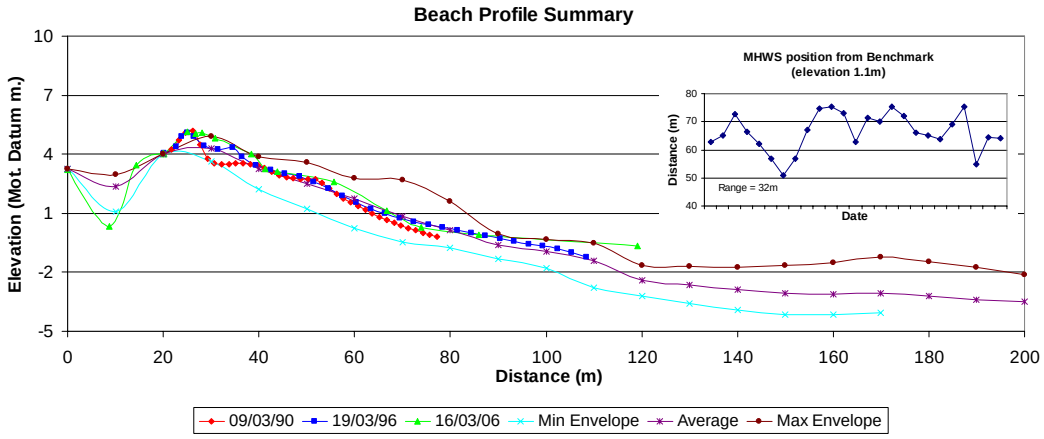


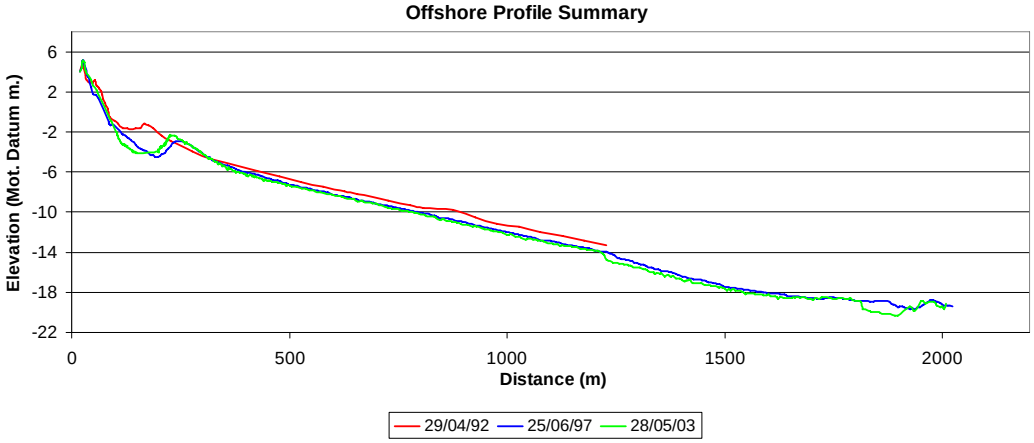
CCS 22 - East of Murphy's Motor Camp

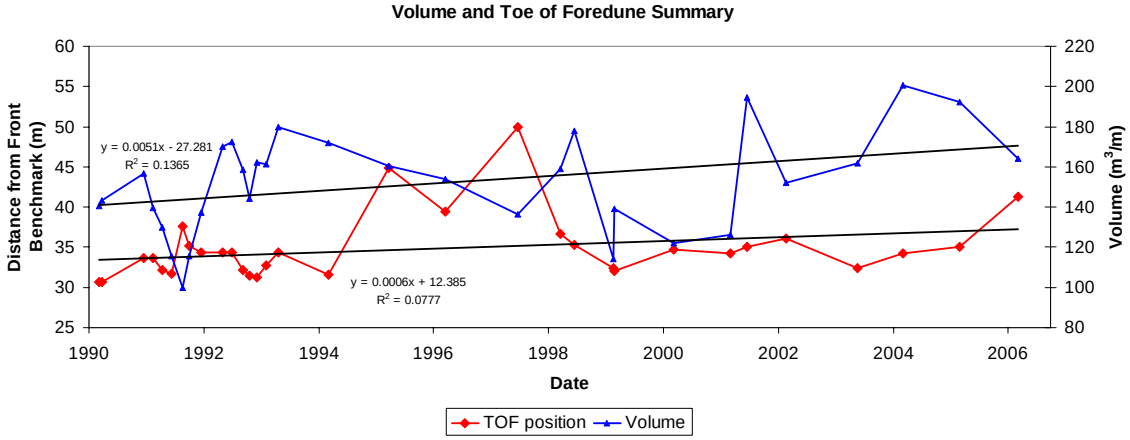
State: Stable



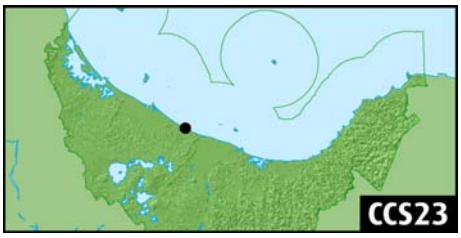
Location: NZMG 2838484E 6362506N
Period of record: 1990 – 2006
No. of profiles: 32
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.04 **TOF p-level –** 0.03







5.6.7 East of Pikowai Free Camp (CCS 23)



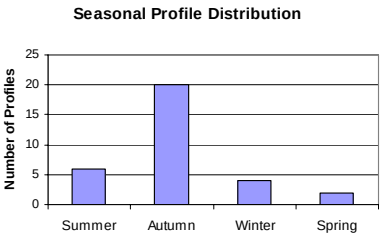
Discussion

This site is located 200m east of the Pikowai Camping Ground and 700m east of the Pikowai Stream. The 1978 photograph shows isolated dunes forming a frontal dune system. Blowout areas are present between spinifex vegetation colonising some bare areas and assisting dune accretion. The photography shows a change from a dissipative profile in 1978 to a low tide terrace configuration witnessed in 2006.

The beach profile dataset shows the formation of an incipient dune in the 1996 profile. The 2006 and 1990 profiles are aligned closely positioned slightly landward of the average for the 31 measured profiles. A berm is absent in the 2006 profile.

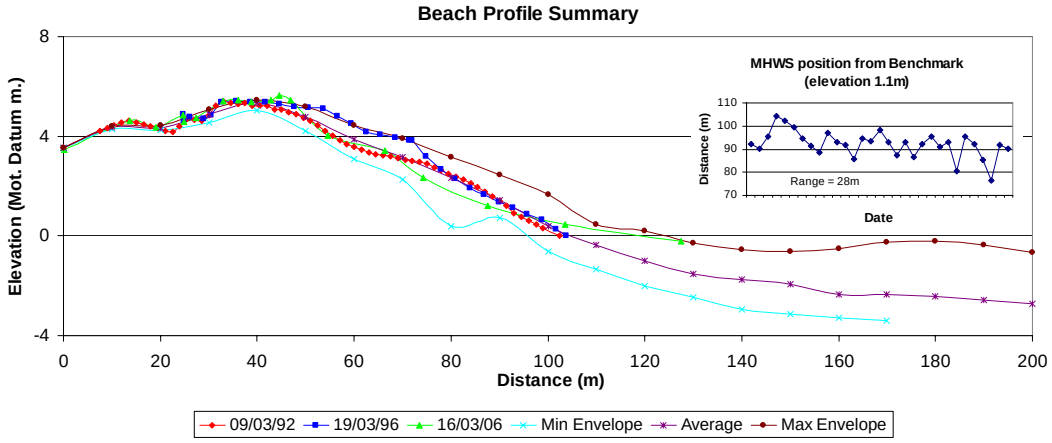
The toe of foredune dataset shows a significant negative trend. Thus giving a status tending towards erosion. A long-term trend (1918-1994) of shoreline retreat of approximately 20m ranging from 10 to 30m, with short-term fluctuations of 30 to 70m as a result of migrations of the Pikowai, Herepuru and Mimiha Streams. Advance from accretion followed cyclic stream migration and is temporary only (Gibb, 1994).

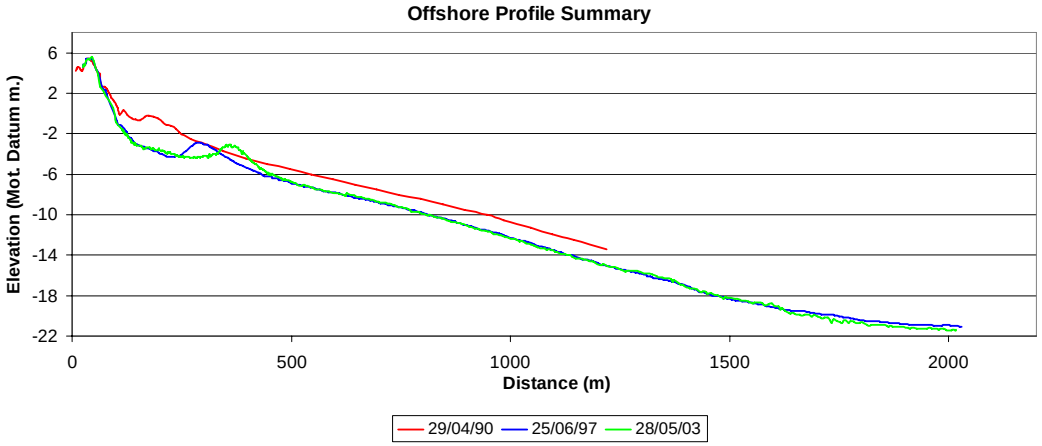
CCS 23 - East of Pikowai Free Camp

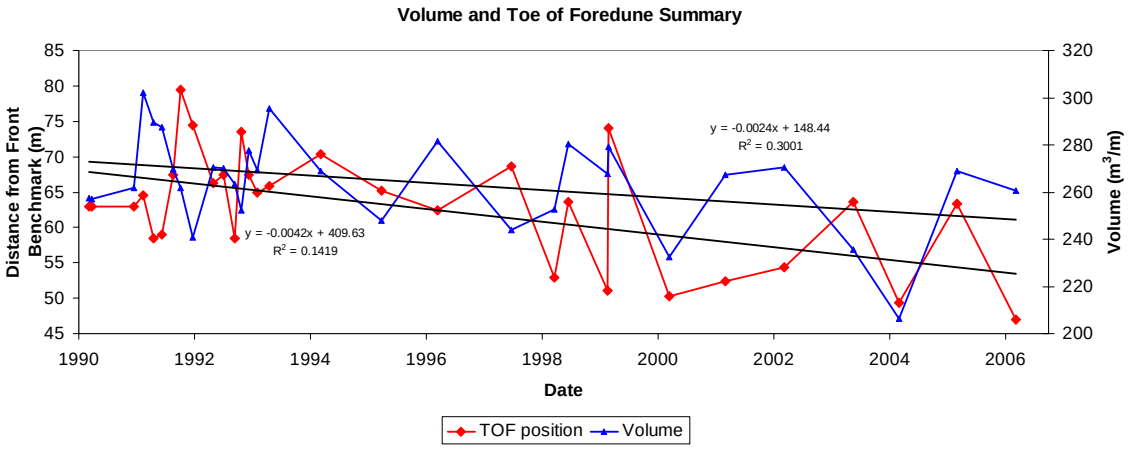


State: Erosion?

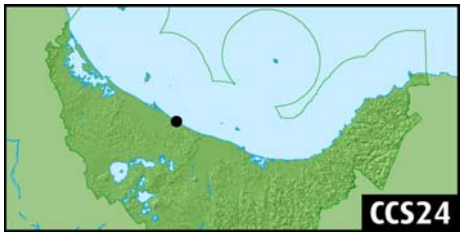
Location: NZMG 2833103E 6365020N
Period of record: 1990 – 2006
No. of profiles: 31
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.04 **TOF p-level –** 0.00







5.6.8 **Otamarakau (CCS 24)**



Discussion

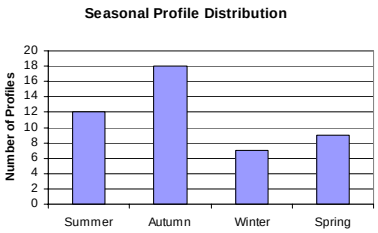
This site is located 1km to the east of where the Waitahanui Stream passes beneath the railway line. This is one of the most intensely monitored sites within the Matata beach system with 46 profiles collected. This interest is derived from the sand extraction operation undertaken by JW Paterson & Sons. Their consent (40052) for this extraction expired in 1998. This extraction occurred within 3 zones between the Waitahanui Stream and the Pikowai Stream (6km of beach) (Smith, 1997).

The beach profile record shows the loss of the frontal dune at this site. The 2006 profile shows a low dune with a slight crest present 40m from the benchmark. The 2006 photograph shows the remaining punctuated frontal dune system with some evidence of spinifex colonising the enduring mounds of sand. This area is also a beach access point for 4 wheel drive vehicles. For Pikowai to Otamarakau, Gibb (1994) stated a 6.4km-long sand beach bordering a narrow Holocene coastal plain comprising a primary sand barrier. Barrier is 30 to 50m wide and 5.4 to 6.6m above MHWS lowering to 2.25m near stream mouths. Subject to wind erosion, overtopping and inundation particularly near streams, from storm wave runup of 4 to 6m. Long-term trend (1918-1994) of shoreline retreat of approximately 25m, ranging from 10 to 35m, with short-term fluctuations of 10 to 30m increasing to 30 to 65m near stream mouths.

Analysis of the dataset shows statistically significant trends for both toe of foredune and volume highlighting a *state of erosion*.

CCS 24 - Otamarakau

State: Erosion



Location: NZMG 2827973E 6367928N
Period of record: 1990 – 2006
No. of profiles: 46
Morphodynamic type (Wright Short model): Low Tide Terrace
Volume p-level – 0.00 **TOF p-level –** 0.00