

# Chapter 1: Introduction

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## 1.1 Introduction

Environment Bay of Plenty established a coastal monitoring programme in 1990 as a part of a Natural Environment Regional Monitoring programme covering collection of varied environmental data - air quality, climate, hydrological data, surface and ground water chemistries and marine and freshwater biological data. Such information allows managers to assess the present and potential impacts of consent related activities and provides baseline environmental data. Additionally, long term trend detection using environmental baseline data will enable Council to assess the effectiveness of its own policies and plans in maintaining or enhancing the environment and in meeting its statutory obligations under the Resource Management Act.

A total of 53 sites are profiled on an annual basis within the current coastal monitoring programme. Some selected sites are monitored quarterly; others are monitored as necessary, i.e. after storm events or where a beach is considered to be of significant concern to the public due to impacts on private property.

All beaches between Waihi Beach in the west to Hikuwai Beach in the east are covered by the monitoring programme (see Figure 1.1). This monitoring covers 135 kilometres of the open coastline.

An understanding of the Bay of Plenty beach dynamics is essential for planning and resource management purposes. Exposed sandy beaches are very dynamic, showing both short and long term trends in shape, accretion and erosion patterns. Coastal developments, sand and shingle mining, dredging and dams can all affect the supply of sediment to the coastal zone, and therefore the way the beach systems behave.

## 1.2 Requirements of RMA and Regional Plans

The purpose of the Resource Management Act (1991) is to promote sustainable management of natural and physical resources. Environmental monitoring is a specific requirement of the Act. Part IV, section 35 (1&2a) directs Regional Councils to “gather such information, and or undertake or commission such research, and monitor the state of the whole or any part of the environment of its region or district to the extent that is appropriate, as is necessary to carry out effectively its functions under the Act”. These functions include those set out in sections’ 30 (1) and 104 of the Act.



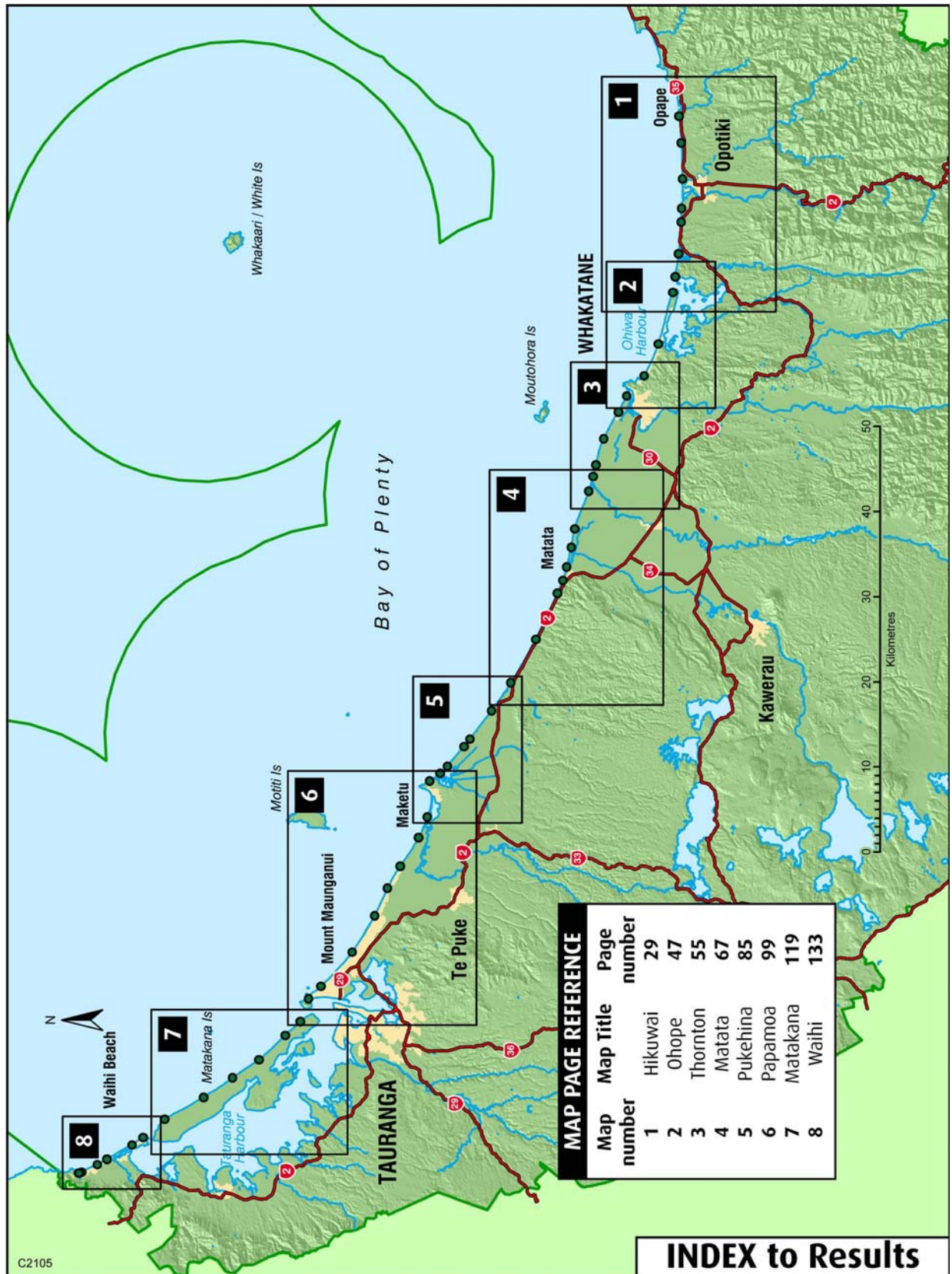


Figure 1.1 Environment Bay of Plenty beach profile monitoring sites

In July 2003 the Bay of Plenty Regional Coastal Environment Plan was made operative. The purpose of this plan is to enable Environment Bay of Plenty to promote the sustainable management of the natural and physical resources of the Bay of Plenty coastal environment. Sustainable management is defined in section 5 of the Act as:

Managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while –

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- (b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
- (c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.

Schedule 12.2 outlines plan monitoring and review, information for plan monitoring will be drawn from a range of NERMN monitoring programmes including data collection and analysis performed for this report investigating the change in the active beach system including short and long term trends.

### 1.3 Report Objectives

This report forms the assessment of the current coastal beach profile monitoring programme for the Bay of Plenty region. The *objectives* are briefly outlined below:

- Assess profile and volumetric changes in Bay of Plenty beaches between 1990 and the beginning of 2006
- To compare current trends with earlier assessments
- To provide information for a review of the current monitoring programme

These objectives will be discussed in Chapters Six and Seven.

### 1.4 Scope and Structure of Report

This report was prepared in order to summarise existing data and to discuss the changes in beach profiles and volumes over time.

Chapter One forms an introduction to the report, outlining the responsibility of Environment Bay of Plenty under the Resource Management Act to monitor the coastal zone.

Chapter Two covers the monitoring methods.

Chapter Three covers the types of coastal processes and coastal landforms present with the Bay of Plenty, and gives a brief description of the factors affecting the region's beaches.

Chapter Four covers the climatic conditions affecting the Bay of Plenty.

Chapter Five presents the results of the Environment Bay of Plenty monitoring programme for the period 1990–2006. This section describes the changes in beach profiles, beach volumes and gives an overall assessment of how the beaches have been changing during the period of monitoring. Discussion on why the beach changes have occurred and how these changes relate to prior monitoring work is also included in this chapter.

Chapter Six presents a discussion on the future direction of the monitoring programme.

Chapter Seven presents a regionwide general discussion on the state of the open coast sandy beaches for the 16 years of NERMN monitoring record.



## Chapter 2: Monitoring Methods

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### 2.1 Overview of monitoring

Environment Bay of Plenty established a coastal monitoring programme in 1990 as a part of a Natural Environment Regional Monitoring programme. The location of these sites were based on the earlier work conducted by Healy et. al. (1977).

#### 2.1.1 Benchmarks

The 53 coastal monitoring sites all consist of two well established benchmarks. The front benchmark is usually located on or about the frontal dune area, while the back benchmark is placed some distance further back into the dunes. Commonly the distance between benchmarks is approximately 50m, but does vary due to local circumstances.

During installation the benchmarks are surveyed to Moturiki Datum<sup>1</sup> so each benchmark is at a known height above mean sea level. The front benchmark is used for the regular beach profiles at the site, providing a common reference point for each profile. The back benchmark is a more permanent fixture to aid site re-establishment in the event of the loss of the front benchmark (due to erosion or human interference).

Annual inspections are carried out at each site. As a part of the inspection the front and back benchmarks are re-surveyed to account for any change in the benchmark height due to settling, slumping or uplifting.

#### 2.1.2 Profiles

To obtain a true representation of the beach form it is necessary to be able to measure the minor changes in slope present along a sandy beach profile. The spacing of observation points will often be irregular in order to define the beach shape.

The method historically employed by Environment Bay of Plenty staff to collect the beach profiles used in this report is the Emery Pole Technique (Emery, 1961). This technique provides accurate and repeatable surveys using simple and robust equipment. The equipment consists of two poles joined together by a 3m tape. The poles are 1.5m long, graduated in centimetres, with a collar and spike at one end (Figure 2.1). The poles are placed vertically in the ground with the collars at ground level at 3m spacings, or at each noticeable change in slope. The horizontal distance is measured by the attached tape, with 3m being the maximum spacing possible.

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<sup>1</sup> A region wide benchmark project is currently underway by Environment Bay of Plenty. One of the aims of this project is to improve the elevation values on benchmarks within the region. The coastal benchmarks are part of this project.

Vertical change is measured by lining the top of the lower pole against the horizon. The height differential can then be taken from the higher pole.

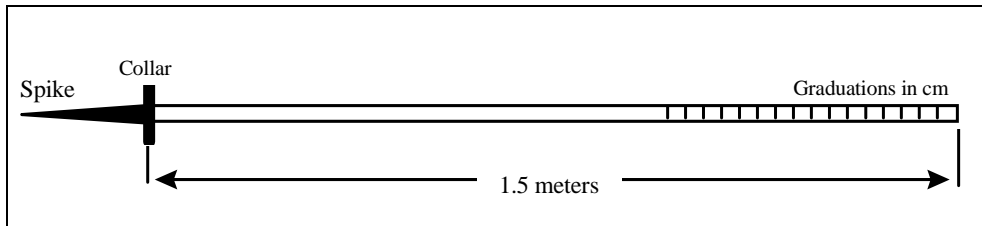


Figure 2.1 Emery Pole construction

In the case of measurement of a down slope the first pole (Pole 1) is at a higher elevation than Pole 2 (Figure 2.2). Therefore Pole 2 is sighted against the horizon with the vertical fall read from the graduations in Pole 1. Conversely on an upslope the second pole (Pole 2) is higher and hence Pole 1 is sighted against the horizon and the reading made from Pole 2 (Figure 2.3). Although the poles are graduated in centimetres an estimate is made to the nearest millimetre. The vertical difference thus recorded is entered into a level book adjacent to the horizontal distance measured.

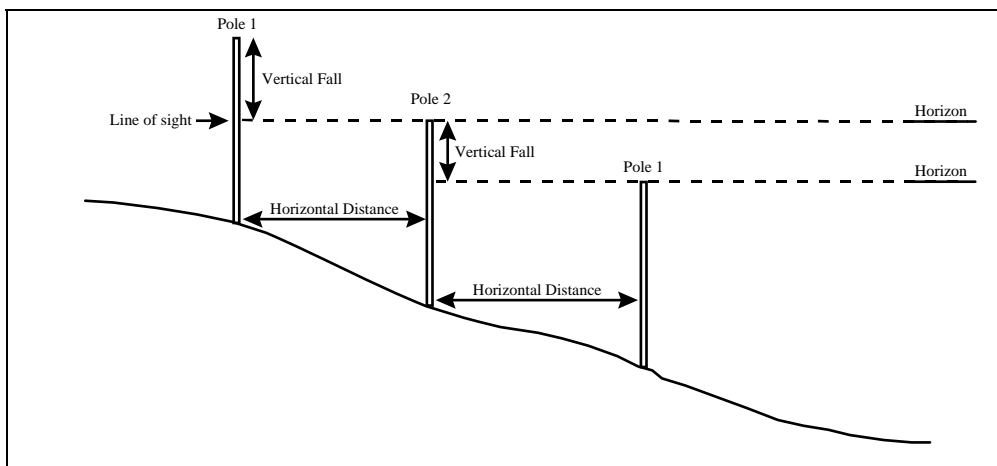


Figure 2.2 Measurement downslope using Emery Pole technique

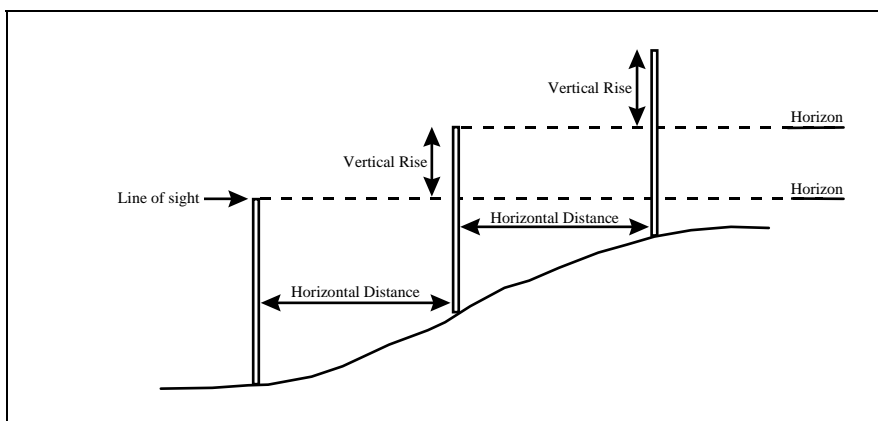


Figure 2.3 Measurement upslope using Emery Pole technique

The rises and falls measured in this way can then be related to the known height of the starting point at the front benchmark. Thus each observation can be given a height above the zero datum at a known horizontal distance from the benchmark. The results have shown good consistency of measurement over time and considering the nature of the terrain, they have accuracy consistent with second order survey techniques.

In the last several years the Emery method has been retired and a Total Station surveying instrument has been used for measuring the shape of the beach and performing the levelling checks between the two benchmarks at each site.

### **2.1.3 Other Coastal Data**

Since 1994, Environment Bay of Plenty staff have recorded distribution of vegetation at the profile site. Staff note the species present, and estimate the proportion of each species occupying a metre wide strip either side of the profile line. The horizontal distance to the seaward edge of the vegetation is noted, as is the position of the recent high water mark at the profile site. The high water mark is determined by change in sand colour, extent of debris, and by the aerated texture of the sand. This information is currently held in several registers.

