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The Effect of a Rise in Mean Sea Level on the New Plymouth Coastline: A GIS Investigation.

A Thesis submitted in fulfilment of the requirements for the Degree of

Master of Philosophy in Geographic Information Systems

at Massey University Palmerston North New Zealand.

William Gorrie Tate

2013
Abstract

The world’s sea levels are predicted, by the international scientific community, to rise anywhere between 0.18 metres to 2.2 metres by the year 2100, 87 years away. As a large portion of the population of both the World and New Zealand live by the sea, this prediction is of concern to those in its vicinity. With such a large range in the predicted sea rise level, a range of scenarios have been investigated to determine what effect the rising sea will have on the New Plymouth Coastline, its people, its properties and its places.

This study uses a GIS, in conjunction with property and census datasets, to investigate the areas of potential inundation that should be of most concern to our planners and local authorities. Using 3D models of the coastline and seabed and by projecting the predicted sea level rise onto the 3D model, an assessment of the value of property and numbers of people potentially affected was determined. Erosion / accretion are also considered in the investigation and modelled into the coastal topography of the New Plymouth coastline.

The key findings from this research are that there are areas of high value, high importance or population that are critically exposed to moderate levels of sea rise. Infrastructure such as Port Taranaki, The CBD, New Plymouth Airport and sewage systems are all greatly affected, whilst populations in Waitara and other populations close to river mouths are also at risk from a rising sea.
“Maps are like campfires – everyone gathers around them, because they allow people to understand complex issues at a glance, and find agreement about how to help the land.”

— Sonoma Ecology Centre, GIS/IS Program Web Site
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I acknowledge the use of data from LINZ via the Koordinates Portal Namely:

- Bathyscopic Shapefile
- Spot Heights Shapefile
- Maps of NZ
- Topographical Maps series 260 P19, P20, Q19, Q20

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# Table of Contents

Front Piece .................................................................................................................. i
Abstract ......................................................................................................................... ii
Acknowledgements ....................................................................................................... iii
Table of Contents .......................................................................................................... iv
List of Figures and Tables .............................................................................................. x
List of Abbreviations .................................................................................................... xvi

Chapter 1  Introduction.................................................................................................. 1
  1.1  Research Objectives ......................................................................................... 2
  1.2  Structure of the Thesis ..................................................................................... 3
  1.3  Why this Topic .................................................................................................. 5

Chapter 2  Location .................................................................................................... 6
  2.1  Study Location .................................................................................................. 7

Chapter 3  Background ............................................................................................... 11
  3.1  Threats to those in the study area .................................................................. 12
    3.1.1  Threats to the Oakura Shoreline ............................................................. 12
  3.2  Sea Level Rise .................................................................................................. 13
  3.3  What’s at stake .................................................................................................. 16

Chapter 4  Sea Level Elements .................................................................................. 17
  4.1  Elements that make up Sea Level. ................................................................. 18
    4.1.1  Tide ........................................................................................................... 18
    4.1.2  Storm Surge .............................................................................................. 18
    4.1.3  Runup ........................................................................................................ 19
  4.2  Tides and Water Levels .................................................................................... 19
  4.3  Storm Surge ...................................................................................................... 22
  4.4  Wave Setup, Runup and Overtopping. ............................................................ 24
    4.4.1  Waves ....................................................................................................... 24
    4.4.2  Wave Set-up ............................................................................................. 25
    4.4.3  Runup ....................................................................................................... 25
    4.4.4  Overtopping .............................................................................................. 26
  4.5  Elements that lead to Flooding ........................................................................ 27
Chapter 9

9.1 New Plymouth Coastline Findings – Common Elements

9.1.1 Within the New Plymouth area there are eight Study Areas

9.1.2 Storm Surge

9.1.3 Rises in Sea Level

9.2 Oakura Findings

9.2.1 Oakura Location

9.2.2 Oakura Elevation

9.2.3 Inundation through a Rise in Sea Level without the effect of erosion

9.2.4 Inundation through a Rise in Sea Level and its effect on the Oakura Population in the year 2100 without the effect of erosion

9.2.5 Erosion of the Oakura Shoreline

9.2.6 Rise in sea level when actual erosion is considered

9.2.7 Inundation through Rise in Sea Level and its effect on the Oakura Properties in the year 2100 when erosion is considered

9.2.8 Oakura Setup / Runup

9.2.9 Oakura Ground Truthing of Model

9.2.10 Oakura - Discussion of Findings

9.3 Port Findings

9.3.1 Port Location

9.3.2 Port Elevation

9.3.3 Inundation through a Rise in Sea Level and its effect on the Port property in the year 2100 without the effect of erosion

9.3.4 Erosion of the Port Shoreline

9.3.5 Port Erosion Actual

9.3.6 Port Setup / Runup

9.3.7 Port; Ground Truthing of Model
9.3.8 Rise in Sea Level and its effect on the Port Population in the year 2100 when erosion is considered

9.3.9 Port – Discussion of Findings

9.4 Moturoa and City Findings

9.4.1 Moturoa and City Location

9.4.2 Moturoa and City Elevation

9.4.3 Inundation through a Rise in Sea Level and its effect on the Moturoa - City property in the year 2100 without the effect of erosion

9.4.4 Erosion of the Moturoa and City Shoreline

9.4.5 Moturoa and City Runup

9.4.6 Moturoa and City – Discussion of Findings

9.5 Fitzroy Findings

9.5.1 Fitzroy Location

9.5.2 Fitzroy Elevation

9.5.3 Inundation through a Rise in Sea Level without the effect of erosion

9.5.4 Rise in Sea Level with the current shoreline and its effect on the Fitzroy Properties and Population in the year 2100

9.5.5 Erosion of the Fitzroy Shoreline

9.5.6 Fitzroy Runup

9.5.7 Fitzroy Model Check

9.5.8 Fitzroy – Discussion of Findings

9.6 Bell Block Findings

9.6.1 Bell Block Location

9.6.2 Bell Block Elevation

9.6.3 Threats to the Bell Block Shoreline

9.6.4 Inundation through a Rise in Sea Level and its effect on the Bell Block Property and Population in the year 2100 without the effect of erosion

9.6.5 Erosion of the Bell Block Shoreline
9.6.6  Inundation through a rise in sea level and its effect on the Bell Block Population in the year 2100 considering the affects of erosion. ......................................................... 132
9.6.7  Bell Block Setup / Runup.................................................. 132
9.6.8  Bell Block Ground Truthing of Model ............................... 133
9.6.9  Bell Block – Discussion of Findings. .................................... 134

9.7  Airport Findings.................................................................. 135
9.7.1  Location........................................................................... 137
9.7.2  Elevation ......................................................................... 137
9.7.3  Threats to the Airport Shoreline.......................................... 137
9.7.4  Inundation through a Rise in Sea Level and its effect on the Airports Property and Population in the year 2100 without the affects of erosion. ........................................... 138
9.7.5  Airport Erosion Actual....................................................... 139
9.7.6  Rise in Sea Level and its effect on the Airport Population and Property in the year 2100 when an erosion retreat of 45m is considered ............................................................. 140
9.7.7  Airport Setup / Runup....................................................... 143
9.7.8  Airport Ground Truthing of Model ....................................... 143
9.7.9  Airport – Discussion of Findings.......................................... 143

9.8  Brixton Findings................................................................. 144
9.8.1  Location........................................................................... 144
9.8.2  Elevation ......................................................................... 145
9.8.3  Threats to the Brixton Shoreline........................................... 148
9.8.4  Inundation due to Rise in Sea Level in the Brixton Area in the year 2100......................................................... 148
9.8.5  Inundation due to Rise in Sea Level and its effect on the Property and Population in the Brixton Area in the year 2100. .................................................................................... 149
9.8.6  Brixton Erosion Historic .................................................... 150
9.8.7  Inundation due to a Rise in Sea Level and its effect on the Brixton population and properties in the year 2100, taking erosion into account. ................................................................. 152
9.8.8  Brixton Runup ................................................................. 157
9.8.9 Brixton Ground Truthing of Model ................................. 157
9.8.10 Brixton – Discussion of Finding ................................. 157

9.9 Waitara – Findings .................................................................. 158
9.9.1 Location .............................................................................. 158
9.9.2 Elevation ............................................................................. 159
9.9.3 Threats to Waitara township and Waitara River from Sea Rise ............................................................................. 162
9.9.4 Rise in Sea Level only without extreme events. .......... 164
9.9.5 Rise in Sea Level and its effect on Waitara Property and Population in the year 2100 with the shoreline remaining as it is currently ............................................................................. 166
9.9.6 Waitara Erosion Actual ......................................................... 169
9.9.7 Rise in Sea Level projected to the year 2100 and its effect through inundation on property and population in Waitara, when actual erosion is considered. .......... 169
9.9.8 Waitara Setup and Runup ........................................................ 172
9.9.9 Waitara Ground Truthing of Model ..................................... 173
9.9.10 Waitara – Discussion of Findings ...................................... 175

Chapter 10  Discussion ........................................................................... 176
Chapter 11  Conclusion ........................................................................... 181
Chapter 12  References ........................................................................... 184
Bibliography ................................................................................. 189
Appendices .................................................................................. 193
List of Figures and Tables

Map 2.1.1 :: Study area Location with New Zealand ................................................................. 8
Map 2.1.2 :: Defined study area within New Plymouth District ................................................. 9
Map 2.1.3 :: Wave collection sites, property shape file with named study sites overlain .......... 10
Figure 3.2.1:: Global mean sea level rise ..................................................................................13
Table 3.2.2:: The various climate change scenario’s and the expected increase in sea level ........14
Table 3.2.3 :: Recent scientific projections of sea level rise by 2100 ....................................... 15
Table 3.2.4 :: Recent International projections of Sea Level Rise by 2100 relevant to coastal planning 16
Figure 4.1.1:: Basic components that make up sea level. ......................................................... 18
Figure 4.2.1:: The effect of the Sun and Moon in generating tides. Illustrating the mechanism which generates both Spring and Neap Tides................................................................. 20
Figure 4.2.2 :: The relationship between the various tides and MSL (Mean Sea Level). ............ 21
Figure 4.3.1:: Plot of predicted sea level vs actual sea level and the resulting storm surge of Port Taranaki ........................................................................................................................................ 22
Figure 4.4.1:: The affect of waves being broken down as they get closer and closer to the shore. ......24
Figure 4.4.2 :: The relationship between Mean Water Level, Still Water Level, Setup and Runup. ......25
Equation 4.4.1:: Stockdon’s equation for setup and run-up for dissipative beaches where ξ < 0.30 .... 26
Figure 5.3.1:: The effect of the ocean on the different coastal types with a rising sea and how the coast will respond ........................................................................................................................................ 32
Figure 5.8.1 :: The Tidal Prism in Plan and Cross Section ............................................................ 36
Equation 5.11.1:: Formula to calculate the Coastal Hazard Zone ................................................. 39
Table 5.11.1 :: Safety Factor distances calculated for the New Plymouth Coastline (the 2009 values have been calculated by the Author) .................................................................................. 39
Equation 6.3.1:: The determination of Kt the maximum frequency factor for use in the second part of the formula ........................................................................................................................................ 43
Equation 6.3.2:: The determination of the maximum value for a chosen period factor .................. 44
Figure 6.5.1:: Significant Wave Height and its relationship with other statistics taken from a Statistical Wave Distribution ........................................................................................................................................ 45
Table 7.1.1:: Table of Coastal Hazards vs Map Type and Model Requirement ........................ 49
Figure 8.1.1:: Relationship of Datum’s to Tide Levels at Port Taranaki ....................................... 56
Figure 8.4.1:: Theoretical profile modelled into the CTM TIN ..................................................... 61
Figure 8.4.2 :: Illustration demonstrating the need to sample the land prior to creating the new eroded beach profile ...................................................................................................................................... 62
Table 8.5.1:: This is an example of an Inundation Height Build up Table. Expected extreme sea level projection for 2100 with the various elements shown that make up sea level. A different value has been calculated for each study area. .................................................................................. 64
Table 8.5.2:: The Colours used on the Flood Maps to indicate height are as follow ..................... 66
Table 9.4.2: Rise in Sea Level with the current shoreline, Property values of affected areas when inundation is projected for the year 2100 – ................................................................. 77

Table 9.2.1: Site 'A' showing inundation detail of Messenger Terrace and the two streams Wairau and Waimoku. Sea Levels include Storm Surge, Setup and Runup. ........................................... 75

Map 9.2.3: Oakura Showing the Rise in Sea Level from 0.5 to 2.0 metres only, excludes Storm Surge, Setup and Runup ............................................. 74

Map 9.2.4: Area ‘A’ showing inundation detail of Messenger Terrace and the two streams Wairau and Waimoku. Sea Levels include Storm Surge, Setup and Runup. ........................................... 75

Table 9.3.1: Rise in Sea Level with the current shoreline, Property values of affected areas when inundation is projected for the year 2100 – ................................................................. 77

Table 9.3.2: Rise in Sea Level with the current shoreline – House only values of affected areas when inundation is projected for the year 2100 ........................................................................ 78

Map 9.3.1: Port Location with named features ............................................................... 85

Map 9.3.2: Port Elevation with Place names and armoured shore .................................. 87

Map 9.3.3: Rise in Sea Level with the current shoreline – when inundation is projected for the year 2100 – Refer Table 9.3.1 ................................................................. 89

Table 9.3.1: Port; Build up of highest sea levels given different conditions and extreme events. ...... 90

Table 9.3.2: Port; The Value of Properties affected by inundation projected for 2100 – refer Map 9.3.3 ........................................................................................................ 91

Figure 9.3.1: Ground shot of Boat Ramp (photo by the author, 1st Sept 2012) ......................... 92

Figure 9.3.2: Aerial Photo of Boat Ramp (source NPDC, 2010) ........................................... 92

Map 9.4.1: Moturoa and City Location with place names .............................................. 95

Map 9.4.2: Moturoa and City Elevation and Place Names ............................................... 96

Table 9.4.1: Moturoa and City; Build up of highest sea levels given different conditions and extreme events for the Moturoa and City shoreline. ................................. 97

Map 9.4.3: Moturoa and City Shoreline – Site ‘A’ showing Rise in Sea Level with Storm Surge, Setup and Runup and properties affected................................................................. 99

Map 9.4.4: Moturoa and City Site ‘B’ at Huatoki with the current shoreline: showing Rise in Sea Level with Storm Surge and the properties affected .................................................. 101

Table 9.4.2: Property Values as a result of a Rise in Sea Level with the current shoreline - Site A....102
Table 9.4.3: Property Values as a result of a Rise in Sea Level with the current shoreline - Site B ... 102
Map 9.5.1: Location of the Fitzroy Study Area with important features ................................................. 106
Map 9.5.2: Fitzroy elevations with positions of stopbanks shown ........................................................ 107
Table 9.5.1: Fitzroy; Build up of highest sea levels given different conditions and extreme events for Fitzroy Shoreline. .................................................................................................................. 108
Map 9.5.3: Inundation levels for the different Sea Rise Levels including Storm Surge, Setup and Runup projected for the year 2100 .......................................................... 110
Table 9.5.2: The affect on properties when the existing shoreline for 2100 is Inundated and Rise in Sea Level when Storm Surge and Runup are included ................................................. 112
Table 9.5.3: The affect on houses when the existing shoreline for 2100 is Inundated by a Rise in Sea Level when Storm Surge and Runup are included. .......................................................... 113
Map 9.5.4: Site ‘C’ The Mouth of the Te Henui Stream showing the existing shoreline and the affects of inundation on properties and population with a Rise in Sea Level in the year 2100 .......... 114
Map 9.5.5: Site ‘D’ The Mouth of the Waiwhakaiho River showing areas that have the potential to be affected by Rising Sea Levels and storm extremes in the year 2100 ........................................ 115
Map 9.5.6: Fitzroy with projected erosion at a rate of 0.58m per annum for the year 2100 showing Rising Sea Levels including Storm Surge and Runup. Included are house properties that will be affected. ............................................................................................................................. 117
Table 9.5.4: Property Loss due to a 50.5 metre eroded shoreline only ........................................................ 118
Table 9.5.5: Property Loss due to Rise in Sea Level with a 50.5 metre eroded shoreline due to inundation. ............................................................................................................................. 118
Table 9.5.6: Houses only lost due to the 50.5 metre Eroded Area by Erosion ............................................ 118
Table 9.5.7: Houses only lost due to the 50.5 metre Eroded Area by Inundation ....................................... 118
Figure 9.5.1: Fitzroy stopbank and low lying housing behind the New Plymouth Walkway .................. 119
Map 9.6.1: Bell Block Location Map ........................................................................................................ 122
Map 9.6.2: Bell Block Elevation Map with Locations ................................................................................. 123
Table 9.6.1: Build up of highest sea levels given different conditions and extreme events for Bell Block shoreline. .................................................................................................................. 125
Map 9.6.3: Bellblock – Rise in Sea Level with the current shoreline when inundation is projected for the year 2100 ........................................................................................................ 126
Table 9.6.2: Bellblock - Rise in Sea Level with the current shoreline and its effect on Property east of the Mangati Stream .................................................................................................. 127
Table 9.6.3: Bellblock - Rise in Sea Level with the current shoreline and its effect on Houses east of the Mangati Stream .................................................................................................. 127
Table 9.6.4: Bellblock, Shoreline west of the Mangati Stream – The value of land affected through inundation by a Rise in Sea Level with the current shoreline .................................................. 128
Map 9.6.4: Bellblock – Rise in Sea Level with an eroded shoreline when inundation is projected for the year 2100. Erosion is calculated at a rate of 0.38 per annum. Inundation includes Storm Surge, Setup and Runup and an increasing RSL of 0.5m to 2.0m .................................................. 129

Table 9.6.5: Bell Block – The value of land and property lost to erosion by 2100 based on a retreat of 33 metres, west of the Mangati Stream .............................................................. 131

Table 9.6.6: Bell Block – The value of land and property west of the Mangati Stream affected by inundation on an eroded shore, .............................................................. 131

Figure 9.6.2: Aerial photograph of the same area as Figure 9.5.1 ........................................... 133

Figure 9.6.1: Outlet of the Mangati Stream to the ocean. Taken by the Author at High Tide. ......... 133

Map 9.7.1: Airport Study Area showing locations ................................................................. 135

Map 9.7.2: Airport Elevations ................................................................................................. 136

Table 9.7.1: Expected extreme sea level projection for 2100 with the various elements shown that make up sea level (RSL is in Brackets). ................................................................. 138

Table 9.7.2: Area of land lost to erosion at a rate of 0.51 metres per annum, projected for the year 2100 ............................................................................................................ 140

Figure 9.7.1: Aerial photograph showing a close up of the Airport cliff breaking up. The elevation above sea level at this point is 10.8m. Note the rough shoreline on the beach and in the surf. 141

Map 9.7.3: Airport erosion limit for 2100 based on 0.51m per annum and the affect of Inundation. ...................................................................................................................... 142

Map 9.8.1: Brixton Location Map .......................................................................................... 146

Map 9.8.2: Brixton Elevation Map with Locations .................................................................. 147

Table 9.8.1: Expected extreme sea level projection for 2100 with the various elements shown that make up sea level (RSL is in Brackets). ................................................................. 148

Table 9.8.2: Brixton - Value of properties inundated with the current shoreline .................... 149

Table 9.8.3: Brixton - Value of properties inundated with the current shoreline .................... 149

Table 9.8.2: Area of land lost to erosion at a rate of 0.57m per annum, projected for the year 2100. .................................................................................................................... 150

Figure 9.8.1: Cross section (profile) of Map 9.8.3 and Map 9.8.2 taken at Position 32 which is at the mouth of the Waiongana Stream ............................................................................. 151

Table 9.8.4: Brixton – Houses and people affected by inundation with an eroded shoreline ........ 152

Table 9.8.5: Brixton - Value of properties inundated with an eroded shoreline .................... 152

Figure 9.8.2: The effect of erosion will result in the loss of forest .......................................... 153

Figure 9.8.3: The mouth of the Waiongana Stream showing the inundation of Forest, Foreshore, Farmland and Buildings ................................................................. 153

Map 9.8.3: Brixton – Still Water Level Inundation due to a Rise in Sea Level with an eroded shoreline at a rate of 0.54m is projected for the year 2100 ......................................................... 155

Map 9.8.5: Waiongana Steam Mouth – Rise in Sea Level with an eroded shoreline – when inundation is projected for the year 2100 .................................................................................... 156
Map 9.8.4: Waiongana Steam Mouth – Rise in Sea Level with the current shoreline – when inundation is projected for the year 2100 ................................................................. 156

Map 9.9.1: Waitara Township and the Waitara River with the locations of Stop banks .............. 160

Map 9.9.2: Showing Waitara elevations in 1 metre increments in addition to stop banks and armoured river banks ................................................................. 161

Table 9.9.1: Expected extreme sea level projection for 2100 with the various elements that contribute to sea level (RSL is in Brackets). ......................................................... 162

Map 9.9.3: Waitara – Inundation through Sea Rise Levels of 0.5m to 2.0m only for the current shoreline without Storm Surge or Runup ................................................................. 163

Map 9.9.4: Waitara – Inundation for Sea Rise Levels of 0.5m to 2.0m for the current shoreline showing extreme Storm Surge, Setup and Runup ................................................................. 165

Table 9.9.2: Expected population and dwellings affected by Sea Level Rise with Strom Surge and Runup for various levels projected for 2100 and without any erosion. Refer Map 9.9.3 and Map 9.9.4 ................................................................. 166

Table 9.9.3: Capital and land values and land areas affected by Sea Level Rise projected for 2100 with Storm Surge and Runup for various levels and without any erosion. ................................................................. 167

Table 9.9.4: Capital and land values and land areas affected by Sea Level Rise projected for 2100 with Storm Surge and Runup for various levels and without any erosion - for areas < 3000 m². ................................................................. 167

Table 9.9.2: Population and dwellings expected to be affected by inundation on an eroded coast. Refer Map 9.9.5 ................................................................. 169

Map 9.9.5: Waitara – Inundation for Sea Rise Levels of 0.5 to 2.0 projected for the year 2100 with Storm Surge and Runup for an eroded Shoreline. The annual rate of erosion of East Waitara is 1.57m per annum and 0.81m per annum for West Waitara. ................................................................. 170

Table 9.9.3: Capital value, land value and land areas of properties that are inundated with an eroded shore; for all properties. ................................................................. 171

Table 9.9.6: Capital value, land value and land areas of properties that are inundated with an eroded shore; for properties < 3000 m². ................................................................. 171

Table 9.9.7: Capital value, land value and land areas of the buildings that have been lost only to erosion without the effects of inundation by 2100. ................................................................. 172

Table 9.9.8: Capital value, land value and land areas of the land that has been lost only to erosion without the effects of inundation by 2100 ................................................................. 172

Figure 9.9.1: A picture of the Waitara River Boat Ramp – taken at High Spring Tide by the Author 173

Figure 9.9.2: An Aerial photograph of the Waitara River Boat Ramp overlaid on a TIN, The red line denotes the edge of the concrete. ................................................................. 174

Data used in this Thesis ........................................................................................................ 194

Images used in this Thesis .................................................................................................... 195

Prediction of Storm Surge and Barometer Readings for the next 100 years ............................... 196
Scatter plot of $T_p$ in Seconds verses $H_s$ in Metres - taken from raw hindcast data (figures in red are $T_p$ values). .......................................................... 197

Projection of wave heights for the use in the calculation of Setup and Runup ................................................. 198

Historic Erosion Rates of the New Plymouth Coast. ............................................................................................... 199

Calculation of Runup and Setup using Stocktons Equation ...................................................................................... 200

Graph of capital value, in millions, of properties inundated vs sea level. ................................................................. 201
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
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