

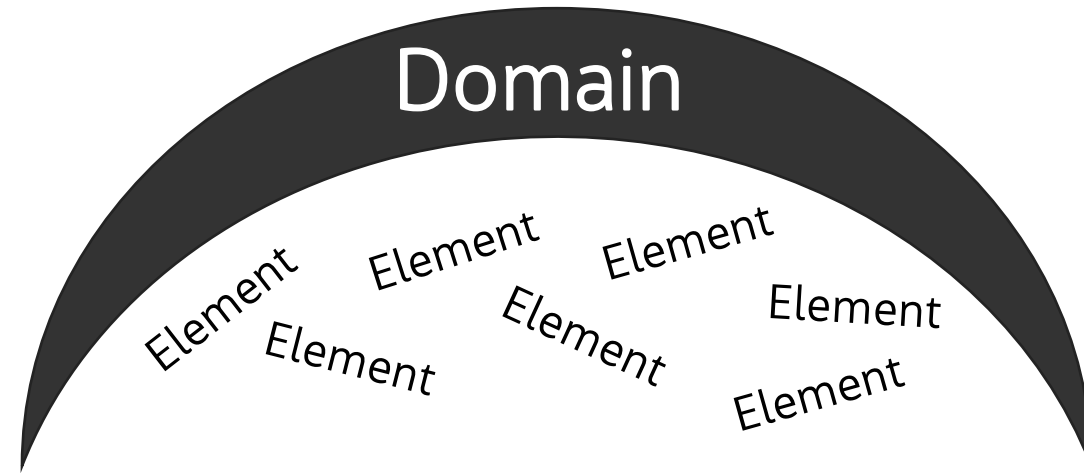
Central Adaptation Area Risk Assessment

CAP Workshop 29 June 2023

Agenda

- Risk Assessment Re-cap: Purpose and process
- Risk Assessment Results – By Domain
 - Built Environment
 - Ecological
 - Natural Character
 - Human
- Summary by timeframe

Terminology

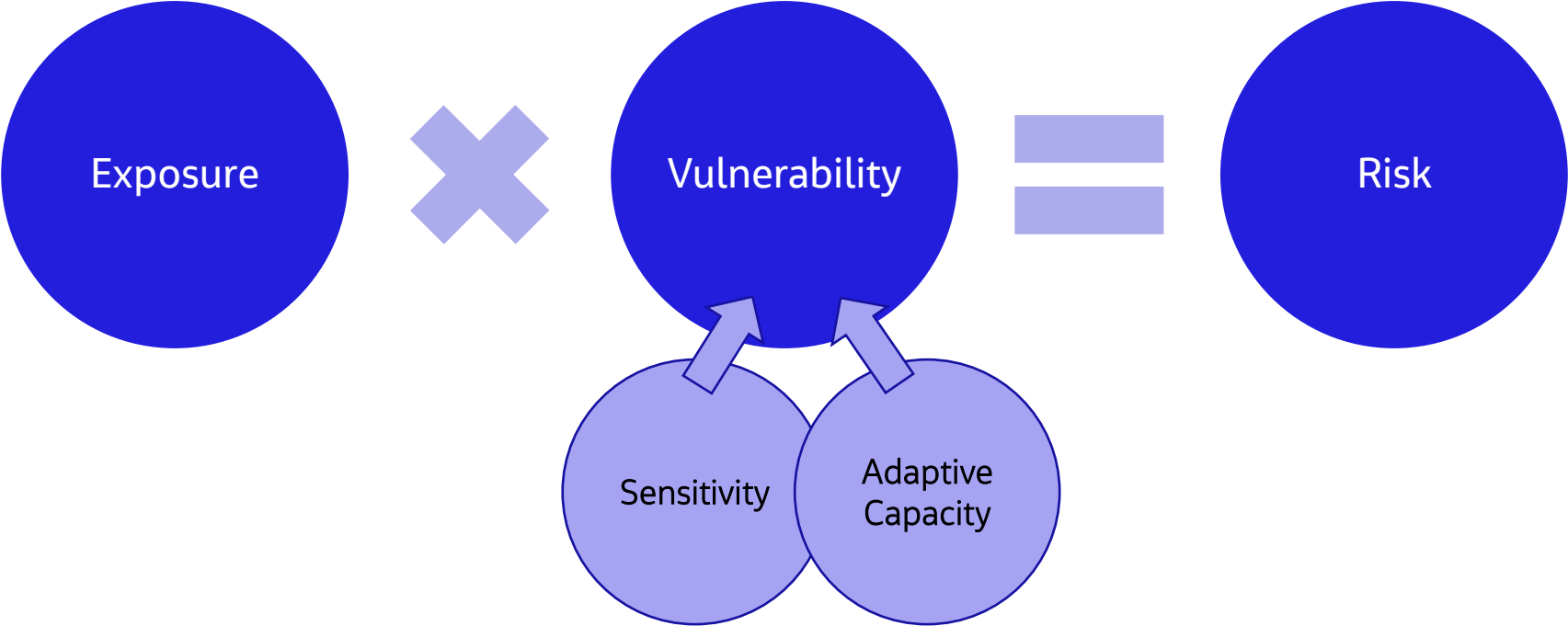


Domain	Element
Built Environment	e.g. Roads, Property, Water Supply
Ecological	e.g. Wetlands, dunes, nesting sites
Natural Character	e.g. Areas of high natural character
Human	e.g. Daily routines, health, displacement
Cultural	Still to be completed with Iwi input.

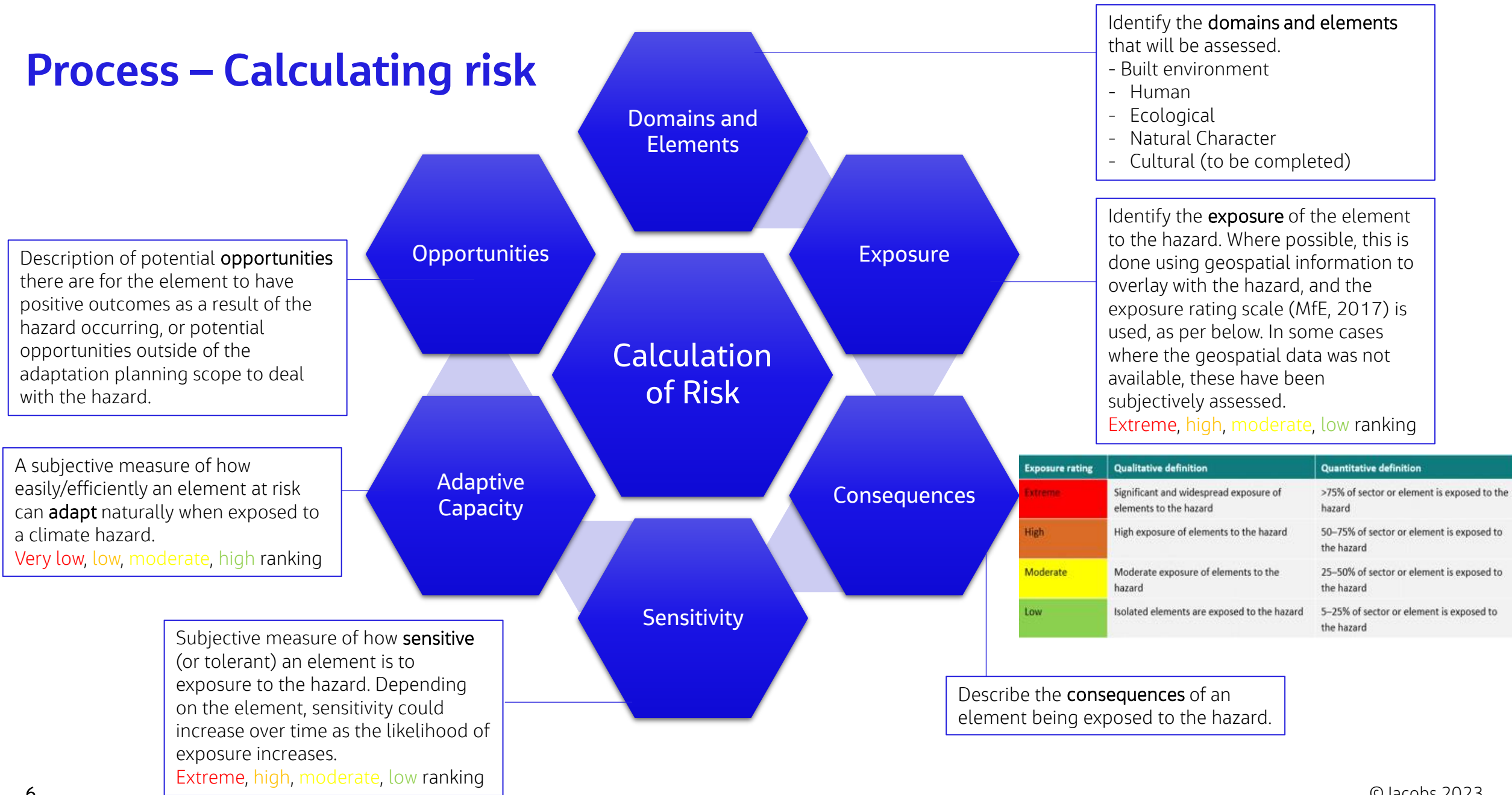
Purpose

What is a risk assessment?	Why do we need one?	What is it not?
<p>A systematic way to assess the potential risks that may impact a person, activity, or asset from a hazard over time.</p> <p>It considers:</p> <ul style="list-style-type: none">- How exposed is an element to the hazard?- What are the consequences of the element being exposed?- And therefore, how sensitive is the element to being exposed?- Can the element naturally adapt with the hazard? <p>It is a snapshot of what a 'do nothing' scenario may look like in the future. It looks at the CAA as a whole unit.</p> <p>It provides a 'baseline' that throughout the TK process we can use to assess our pathways against – e.g. do our pathways achieve what we need?</p> <p>It is based on the data we have available now, and can be built on in the future.</p>	<ul style="list-style-type: none">• To understand what is in the Central Adaptation Area (CAA), and what is at risk to coastal erosion and inundation - now and in the future with SLR.• To understand when elements may become at risk.• To help us determine where we should focus our efforts to reduce risks in the future.• To help inform our objectives (what are we trying to achieve).	<ul style="list-style-type: none">• Domains aren't prioritised – That is for the CAP to decide in your objectives.• It does not include economics or governance Domains– it is based on the information we have available to date.• It is not a broad climate change risk assessment, it only deals with coastal erosion and coastal inundation information available at this stage (e.g does not include AWA fluvial/pluvial-groundwater flooding).• This is not an extensive risk assessment – does not include every single council asset. It recognises the key infrastructure and values of the district and uses available data to assess the risk.• It is not going to solve all our problems today! – This will show us what is at risk. In our next few workshops we will be determining how best to reduce the risks in the future.

Process – Calculating Risk



Process – Calculating risk

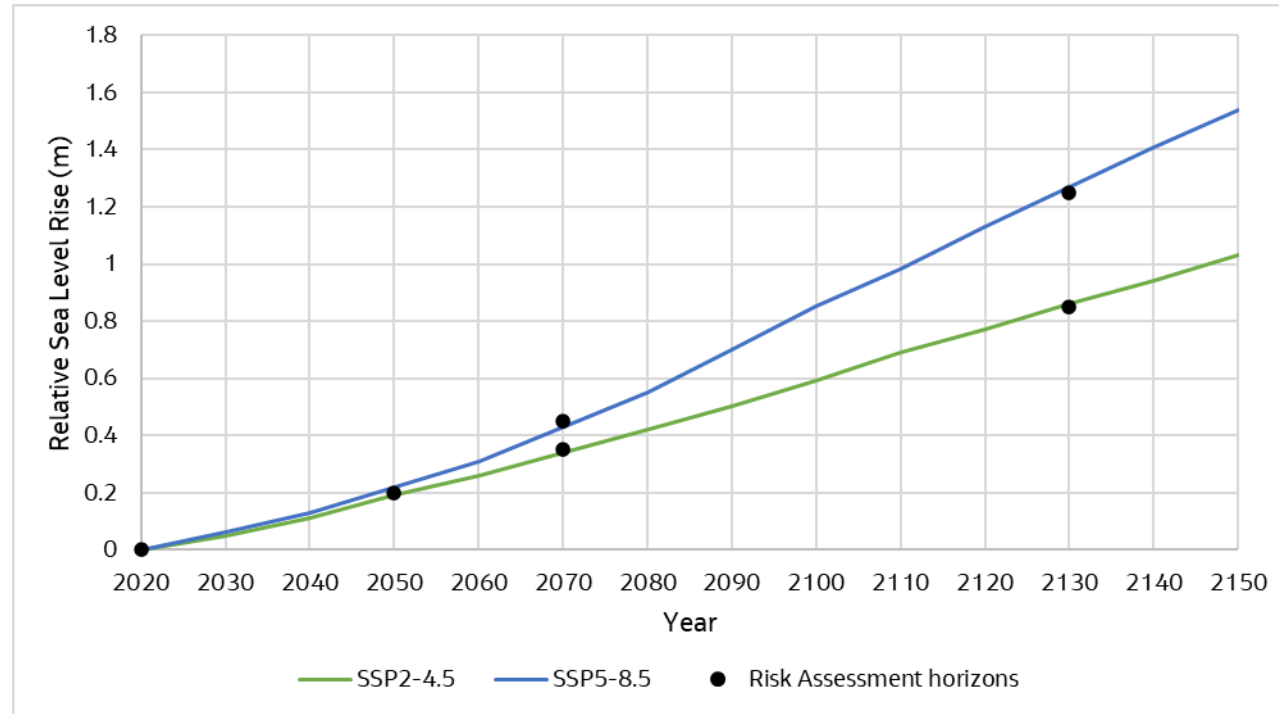


Process - Risk Ranking

		Exposure			
		Low (L)	Moderate (M)	High (H)	Extreme (E)
Vulnerability	Extreme (4)	Moderate	High	Extreme	Extreme
	High (3)	Low	Moderate	High	Extreme
	Moderate (2)	Low	Moderate	Moderate	High
	Low (1)	Low	Low	Moderate	High

From: Ministry for the Environment. 2021. *He kupu ārahi mō te aromatawai tūraru huringa āhuarangi ā-rohe / A guide to local climate change risk assessments*. Wellington: Ministry for the Environment.

Process – Likelihoods and Scenarios



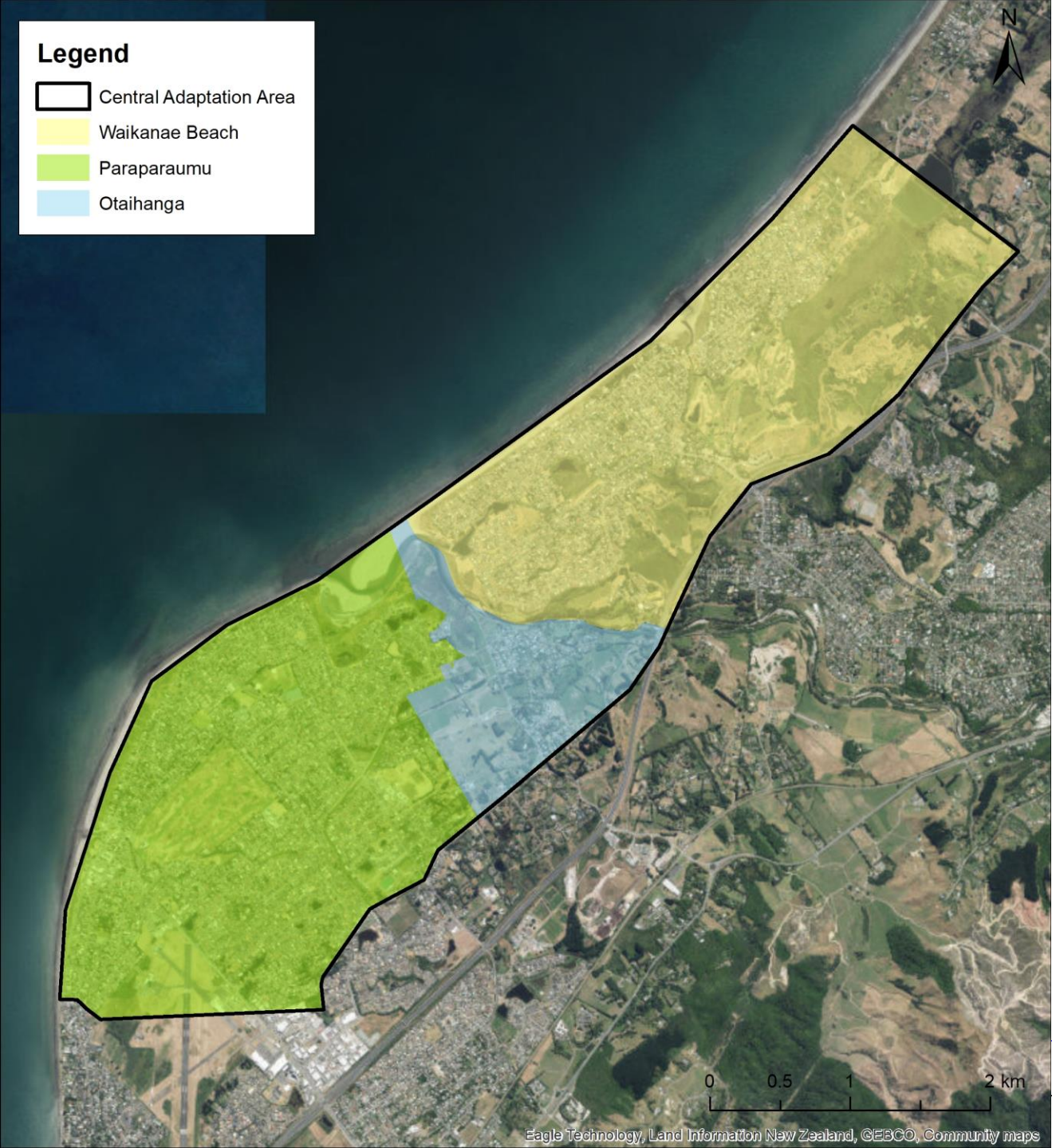
Timeframe	Sea level rise scenario	Erosion Hazard Probability Used	Inundation Hazard Probability Used
Present Day	0m RSLR	10% Probability of shoreline exceeding landward limit of mapped extent (e.g. P10)	1% Annual Exceedance Probability storm event
2050 (30 years)	0.2 m RSLR (SSP2-4.5 & SSP5-8.5)		
2070 (50 years)	0.35 m RSLR (SSP2-4.5)		
	0.45 m RSLR (SSP5-8.5)		
2130 (110 years)	0.85 m RSLR (SSP2-4.5)		
	1.25 m RSLR (SSP5-8.5)		

Central Adaptation Area Risk Assessment Results

Central Adaptation Area

Legend

- Central Adaptation Area
- Waikanae Beach
- Paraparaumu
- Otaihanga

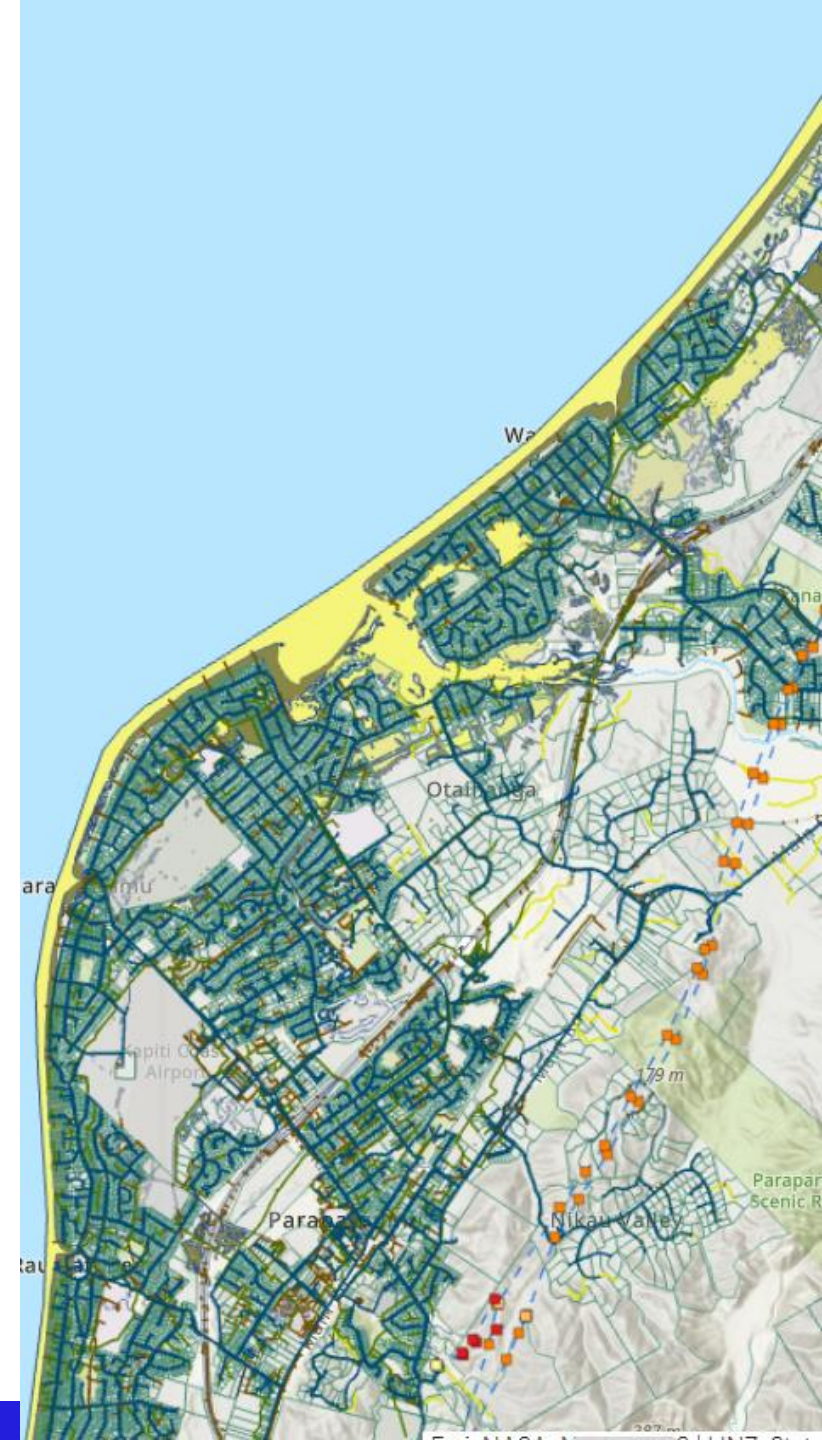


Built Environment Domain

The built environment encompasses assets, infrastructure and property that provide a service or critical function to the livelihood of the community.

Elements assessed:

- Private property
- Roads and bridges
- Wastewater services (pump stations, pipes)
- Water supply services (pipes, bores, treatment plants, pump stations)
- Stormwater services (pipes, outfalls, pump stations)
- Electrical supply and transmission (overhead and underground transmission lines)
- Natural gas supply



Built Environment Domain - Risk

Climate Change Scenario	Coastal Erosion						Coastal Inundation					
	Both		SSP2-4.5		SSP5-8.5		Both		SSP2-4.5		SSP5-8.5	
	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Built Environment												
Properties - Whole Adaptation Area	L	M	M	M	M	M	L	L	L	L	L	M
Properties - Waikanae Beach	L	M	M	M	M	E	L	L	L	M	L	M
Properties - Otaihanga	L	L	L	L	L	L	L	M	M	M	M	E
Properties - Paraparaumu	L	L	M	M	M	H	L	L	L	L	L	M
Water Supply Infrastructure	L	L	L	L	L	M	L	L	L	L	L	M
Wastewater Infrastructure	M	M	M	M	M	M	L	L	L	M	L	M
Stormwater Infrastructure	L	L	M	M	M	H	L	L	M	M	M	M
Roads and Bridges	L	L	L	L	L	M	L	M	M	E	H	E
Electrical Transmission and supply infrastructure	L	M	M	M	M	M	L	L	L	M	L	M
Natural gas supply mains	L	M	M	M	M	M	L	L	L	L	L	L

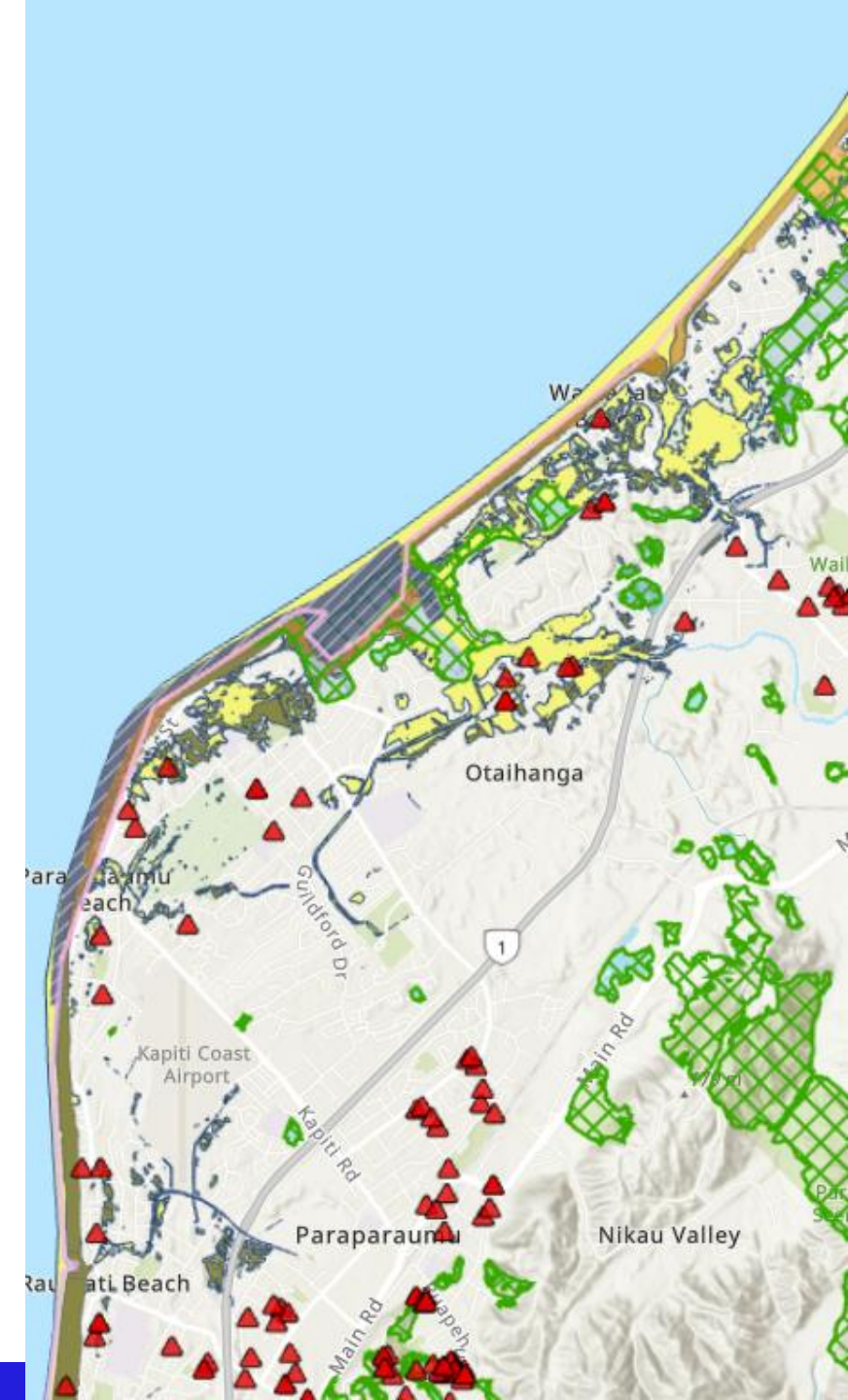
*For coastal erosion this is based on the number of beachfront properties impacted; For coastal inundation this is based on a broader settlement footprint.

Ecological Domain

The ecological domain encompasses the natural flora and fauna of the district.

Elements assessed:

- Dunes
- Ecological Sites
- Wetlands
- Significant Bird Habitat Sites
- Key Indigenous Trees



Ecological Domain - Risk

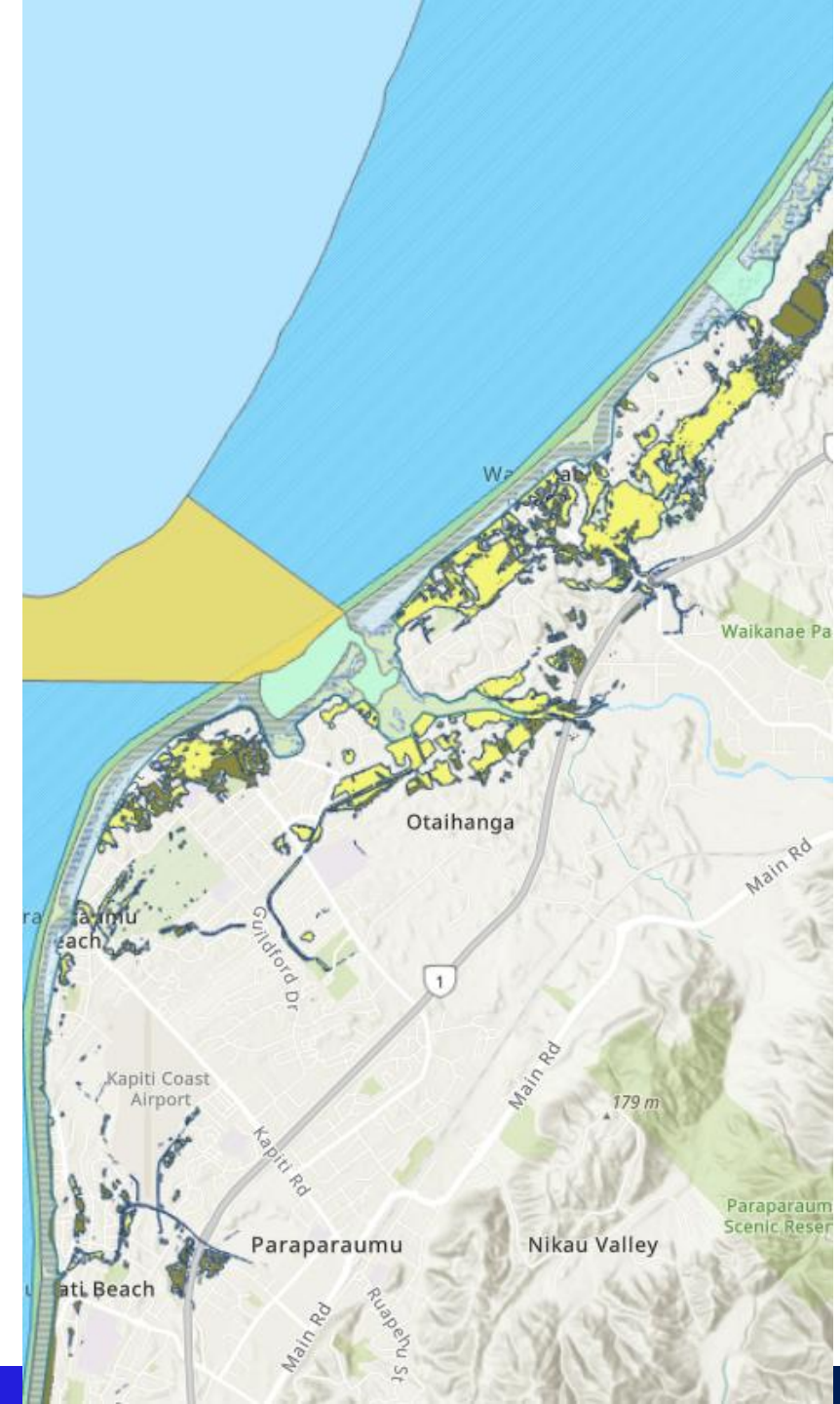
SLR Scenario	Coastal Erosion						Coastal Inundation					
	Both		SSP2-4.5		SSP5-8.5		Both		SSP2-4.5		SSP5-8.5	
	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Element												
Dunes	L	M	M	H	H	E	L	L	L	L	L	L
Ecological Sites	L	L	L	L	L	L	M	M	H	E	H	E
Wetlands	L	L	L	L	L	L	M	H	H	H	H	H
Significant Bird Habitat	L	L	M	M	M	M	H	H	H	H	H	H
Key Indigenous Trees	L	L	L	L	L	L	L	L	L	L	L	L

Natural Character Domain

Natural character is the 'naturalness' or degree or modification of an area, as well as an areas distinct combination of natural characteristics and qualities.

Elements assessed:

- Coastal Terrestrial Area 2: Paraparaumu and Waikanae
- Peka Peka Dunes (Pharazyn Reserve) (High Natural Character)
- Waikanae Estuary (High Natural Character)



Natural Character - Risk

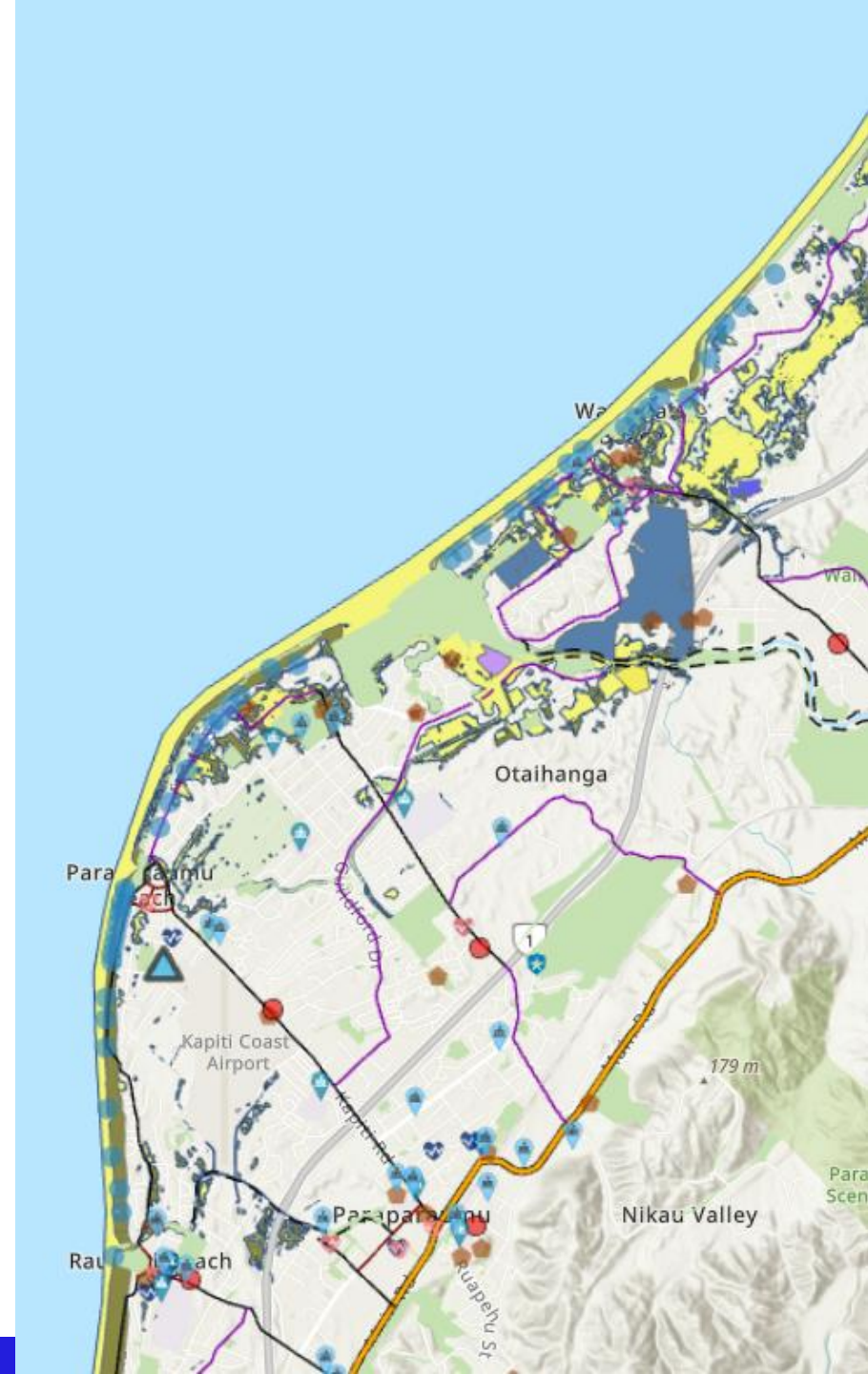
SLR Scenario		Coastal Erosion						Coastal Inundation					
		Both		SSP2-4.5		SSP5-8.5		Both		SSP2-4.5		SSP5-8.5	
Element		Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
CTA2: Waikanae and Paraparaumu (Coastal Terrestrial Area)		M	M	H	H	H	H	M	M	M	M	M	M
Peka Peka Dunes (Pharazyn Reserve) (High Natural Character)		L	L	L	L	L	L	M	M	M	M	M	M
Waikanae Estuary (High Natural Character)		M	M	M	M	M	M	M	M	H	H	H	H

Human Domain

The human domain encompasses individual and community health and wellbeing, and disruptions to everyday life.

Elements assessed:

- Displacement
- Inequities
- Health
- Daily Routines



Human Domain - Risk

SLR Scenario	Coastal Erosion						Coastal Inundation					
	Both		SSP2-4.5		SSP5-8.5		Both		SSP2-4.5		SSP5-8.5	
	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Displacement	L	L	L	M	M	M	L	M	M	H	M	H
Inequities	L	L	L	L	L	M	L	M	M	H	H	E
Health	L	L	M	M	M	M	L	M	M	E	H	E
Daily Routines	L	L	M	M	M	M	L	L	M	M	M	H

Summary by timeframe

Elements	Coastal Flood Hazard								Coastal Erosion Hazard							
	SSP2-4.5				SSP5-8.5				SSP2-4.5				SSP5-8.5			
	Risk				Risk				Risk				Risk			
	Present	2050	2070	2130	Present	2050	2070	2130	Present	2050	2070	2130	Present	2050	2070	2130
Built Environment																
Properties	L	L	L	L	L	L	L	M	L	M	M	M	L	M	M	M
Properties (Waikanae)	L	L	L	M	L	L	L	M	L	M	M	M	L	M	M	E
Properties (Otaihanga)	L	M	M	M	L	M	M	E	L	L	L	L	L	L	L	L
Properties (Paraparaumu)	L	L	L	L	L	L	L	M	L	L	M	M	L	L	M	H
Water Supply Infrastructure	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	M
Wastewater Infrastructure	L	L	L	M	L	L	L	M	M	M	M	M	M	M	M	M
Stormwater Infrastructure	L	L	M	M	L	L	M	M	L	L	M	M	L	L	M	H
Roads and Bridges	L	M	M	E	L	M	H	E	L	L	L	L	L	L	L	M
Electrical transmission and supply infrastructure	L	L	L	M	L	L	L	M	L	M	M	M	L	M	M	M
Natural gas supply mains	L	L	L	L	L	L	L	L	L	M	M	M	L	M	M	M
Ecological																
Dunes	L	L	L	L	L	L	L	L	L	M	M	H	L	M	H	E
Ecological Sites	M	M	H	E	M	M	H	E	L	L	L	L	L	L	L	L
Wetlands	M	H	H	H	M	H	H	H	L	L	L	L	L	L	L	L
Significant bird habitat	H	H	H	H	H	H	H	H	L	L	M	M	L	L	M	M
Key indigenous trees	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Human																
Displacement	L	M	M	H	L	M	M	H	L	L	L	M	L	L	M	M
Inequities	L	M	M	H	L	M	H	E	L	L	L	L	L	L	L	M
Health	L	M	M	E	L	M	H	E	L	L	M	M	L	L	M	M
Daily Routines	L	L	M	M	L	L	M	H	L	L	M	M	L	L	M	M
Natural Character																
CTA2: Paraparaumu and Waikanae	M	M	M	M	M	M	M	M	M	M	H	H	M	M	H	H
Peka Peka Dunes (South) - High Natural Character	M	M	M	M	M	M	M	M	L	L	L	L	L	L	L	L
Waikanae Estuary - High Natural Character	M	H	H	H	M	H	H	H	M	M	M	M	M	M	M	M

Summary – Present Day & 2050

Elements	Coastal Flood Hazard		Coastal Erosion Hazard	
	SSP2-4.5		SSP2-4.5	
	Risk		Risk	
	Present	2050	Present	2050
Built Environment				
Properties	L	L	L	M
Properties (Waikanae)	L	L	L	M
Properties (Otaihanga)	L	M	L	L
Properties (Paraparaumu)	L	L	L	L
Water Supply Infrastructure	L	L	L	L
Wastewater Infrastructure	L	L	M	M
Stormwater Infrastructure	L	L	L	L
Roads and Bridges	L	M	L	L
Electrical transmission and supply infrastructure	L	L	L	M
Natural gas supply mains	L	L	L	M
Ecological				
Dunes	L	L	L	M
Ecological Sites	M	M	L	L
Wetlands	M	H	L	L
Significant bird habitat	H	H	L	L
Key indigenous trees	L	L	L	L
Human				
Displacement	L	M	L	L
Inequities	L	M	L	L
Health	L	M	L	L
Daily Routines	L	L	L	L
Natural Character				
CTA2: Paraparaumu and Waikanae	M	M	M	M
Peka Peka Dunes (South) - High Natural Character	M	M	L	L
Waikanae Estuary - High Natural Character	M	H	M	M



Summary - 2070

Elements	Coastal Flood Hazard		Coastal Erosion Hazard	
	SSP2-4.5	SSP5-8.5	SSP2-4.5	SSP5-8.5
	Risk	Risk	Risk	Risk
	2070	2070	2070	2070
Built Environment				
Properties	L	L	M	M
Properties (Waikanae)	L	L	M	M
Properties (Otaihanga)	M	M	L	L
Properties (Paraparaumu)	L	L	M	M
Water Supply Infrastructure	L	L	L	L
Wastewater Infrastructure	L	L	M	M
Stormwater Infrastructure	M	M	M	M
→ Roads and Bridges	M	H	L	L
Electrical transmission and supply infrastructure	L	L	M	M
Natural gas supply mains	L	L	M	M
Ecological				
→ Dunes	L	L	M	H
→ Ecological Sites	H	H	L	L
→ Wetlands	H	H	L	L
→ Significant bird habitat	H	H	M	M
Key indigenous trees	L	L	L	L
Human				
Displacement	M	M	L	M
→ Inequities	M	H	L	L
→ Health	M	H	M	M
Daily Routines	M	M	M	M
Natural Character				
→ CTA2: Paraparaumu and Waikanae	M	M	H	H
→ Peka Peka Dunes (South) - High Natural Character	M	M	L	L
→ Waikanae Estuary - High Natural Character	H	H	M	M

Summary - 2130

Elements	Coastal Flood Hazard		Coastal Erosion Hazard	
	SSP2-4.5	SSP5-8.5	SSP2-4.5	SSP5-8.5
	Risk	Risk	Risk	Risk
	2130	2130	2130	2130
Built Environment				
Properties	L	M	M	M
→ Properties (Waikanae)	M	M	M	E
→ Properties (Otaihanga)	M	E	L	L
→ Properties (Paraparaumu)	L	M	M	H
Water Supply Infrastructure	L	M	L	M
Wastewater Infrastructure	M	M	M	M
→ Stormwater Infrastructure	M	M	M	H
→ Roads and Bridges	E	E	L	M
Electrical transmission and supply infrastructure	M	M	M	M
Natural gas supply mains	L	L	M	M
Ecological				
→ Dunes	L	L	H	E
→ Ecological Sites	E	E	L	L
→ Wetlands	H	H	L	L
→ Significant bird habitat	H	H	M	M
Key indigenous trees	L	L	L	L
Human				
→ Displacement	H	E	M	M
→ Inequities	H	E	L	M
→ Health	E	E	M	M
→ Daily Routines	M	H	M	M
Natural Character				
→ CTA2: Paraparaumu and Waikanae	M	M	H	H
→ Peka Peka Dunes (South) - High Natural Character	M	M	L	L
→ Waikanae Estuary - High Natural Character	H	H	M	M

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