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Business Isolation Report

He Pou a Rangi – Climate Change Commission

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Version Summary

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The data analysis and risk models presented in this Urban Intelligence report were generated using our Resilience Explorer® platform, a climate risk assessment tool that brings together different datasets into one comprehensive system.

Through the platform's advanced modelling capabilities, Urban Intelligence processed infrastructure records, historical hazard data, and business demographic information to create detailed climate projections across the national and Territorial Authority scale. The Resilience Explorer® platform's ability to combine diverse data sources and generate evidence-based risk assessments provides the insights needed for practical climate adaptation and resilience planning.

This analytical approach demonstrates how digital tools can turn complex climate data into clear, actionable information that helps communities and organisations prepare for climate change.

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Executive Summary

Coastal flooding poses an increasing risk to Aotearoa New Zealand's communities and the businesses and infrastructure that support them. In addition to damage associated with direct exposure, coastal flood events can disrupt access to and within communities, resulting in cascading economic and social impacts. For businesses, this can mean compromised access to markets, suppliers, their customer base, staff, and resources. This in turn has implications for business continuity and income-earning potential, and the wider health of local economies.

This report provides insights at the national and Territorial Authority (TA) level into how many businesses may become isolated as a result of coastal flooding, and the sectors most affected. By identifying potential isolation at the national and TA level, this analysis identifies which areas and sectors may be disproportionately at risk from coastal flooding, both under present-day conditions and future sea-level rise scenarios. This establishes an evidence base to inform a wider national assessment of coastal flood risk and provide insights for adaptation planning processes. This includes the ability to use evidence from this analysis as baseline data for ongoing risk and adaptation monitoring.

Coastal flooding is assessed using a 1% Annual Exceedance Probability (AEP) event under various sea-level rise (SLR) scenarios (present-day conditions, 0.2m SLR, 0.5m SLR, 1.0m SLR). A 1% AEP event, often referred to as a '100-year flood', has a 1% chance of occurring or being exceeded in any given year. This means there is more than a 1-in-4 chance of experiencing at least one such event in a 30-year period.

Identifying the extent and type of businesses that may experience physical isolation due to coastal flooding is important for understanding which areas are at heightened risk of economic and social disruption, both under present-day and future conditions. To estimate the extent of business isolation in Aotearoa New Zealand, we combine national-scale coastal flood hazard data, property-level business information, and transport network analysis to determine whether businesses retain access to essential destinations under a 1% AEP coastal flood event. Noting that a business as described here refers to an employer location or single premises at a specific geographic location. Businesses and their associated employment and industry classifications are attributed to individual properties, and the road network is modified to reflect disruptions arising from coastal flooding under present-day conditions and three increments of sea-level rise (0.2m, 0.5m, and 1.0m). Routing analysis is then used to determine whether businesses remain connected to essential services, indicating potential flood-related isolation. More specifically, a business is considered isolated when it has no road access to fire stations, hospitals and schools, which act as a proxy for disruption in the broader transport network. By extension, this leads to business continuity challenges.

The following subsections outline key trends regarding potential business isolation at the national and TA scale using both the total number of businesses likely to be affected and the ANZSIC sector to which those businesses are connected.

Business Isolation Trends Across Aotearoa New Zealand

Under present-day conditions, over 15,500 businesses (3.2% of all New Zealand businesses) are potentially isolated during a 1% AEP coastal flood event. This rises substantially with sea-level rise to 22,500 businesses (4.6%) at 0.2m, 28,900 (5.9%) at 0.5m, and 44,400 (9.0%) at 1.0m.

- **While the increase in business isolation is nationwide, some TAs are disproportionately affected, indicating greater potential for localised economic disruption and impact.** A group of 13 TAs consistently ranks among the top 10 across all sea-level rise increments: Kaipara District, Thames-Coromandel District, Ōpōtiki District, Nelson City, Buller District, Napier City, Western Bay of Plenty District, Far North District, Hauraki District, Tauranga City, Westland District, Dunedin City, and Lower Hutt City. Of these, six (Kaipara District, Hauraki District, Ōpōtiki District, Napier City, Nelson City, Tauranga City) consistently appear in the top 10 for each increment, with Buller District consistently in the top five and Thames-Coromandel District always in the top two.

- **By 1.0m of sea-level rise, seven TAs have more than 30% (or 1 in 3) of local businesses potentially isolated:** Kaipara District, Thames-Coromandel District, Ōpōtiki District, Nelson City, Buller District, Napier City, and Hauraki District. Thames-Coromandel District is the most severely affected, with the proportion of isolated businesses rising from 20.9% under present-day conditions to 52.1% at 1.0m. Importantly, both Hauraki District and Thames-Coromandel District have more than 30% of local businesses potentially isolated at 0.2m of sea-level rise.
- **Hauraki District, Napier City, Dunedin City and Lower Hutt City show at least one notable step-change between increments.** For example, Hauraki District jumps from 6.9% to 30.3% between present day conditions and 0.2m of sea-level rise. Napier City rises from 23.8% to 37.1% between 0.5m and 1.0m. Dunedin City increases from 5.1% to 22.7% between 0.5m and 1.0m, entering the top 10 for the first time at that increment, alongside Lower Hutt City, which does not feature in the top 20 until 1.0m of sea-level rise.

Business Isolation Trends by Sector Across Aotearoa New Zealand

Across all the ANZSIC sectors at the national scale (see Appendix for description of sectors), the percentage of potentially isolated businesses increases with each sea-level rise increment, with some variation in both the magnitude and timing of impacts. Even the lowest-ranked sector (Agriculture, Forestry and Fishing) is still likely to experience economic disruption to 7.3% of businesses as a result of a 1% AEP flood event with 1.0m of sea-level rise. Trends include:

- **The Arts and Recreation Services sector is the most affected by a 1% AEP coastal flood event at present day (4.3% of all businesses in that sector), but is overtaken by Electricity, Gas, Water and Waste Services from 0.5m onwards.** By 1.0m, Electricity, Gas, Water and Waste Services has the highest proportion of businesses potentially isolated of any sector at 13.1%, increasing from 3.2% in 7th position at present-day sea levels.
- **Four sectors show more notable increases in relative rankings across sea-level rise increments, rather than gradual progression:** Electricity, Gas, Water and Waste Services (3.2% under present-day conditions to 13.1% at 1.0m SLR), Manufacturing (2.8% to 10.8%), Transport, Postal and Warehousing (2.7% to 10.5%), and Wholesale Trade, which remains in 18th or 19th position until 1.0m, when it shifts to 8th with 9.3% of businesses potentially isolated. In contrast, Public Administration and Safety and Construction remain consistently among the 10 most-affected sectors across all increments, while Retail Trade, Information Media and Telecommunications, and Other Services consistently have the lowest percentage of potentially isolated businesses throughout.
- **The Agriculture, Forestry and Fishing sector is the second highest ranked sector for potential business isolation at present day (3.8%) but falls to the lowest-ranked sector by 1.0m (7.3%)** as other sectors increase. Despite this decline in relative ranking, the total number of potentially isolated businesses is considerable, with 2,278 businesses (3.8%) affected under present-day conditions and 4,319 businesses (7.3%) at 1.0m of sea-level rise. Although this study did not explore any details regarding these businesses, it is likely that many could be small owner-operated farms.
- **The Rental, Hiring and Real Estate Services sector has the highest total number of potentially isolated businesses,** and these numbers increase from approximately 3,400 businesses (3.5%) at present-day sea level to over 9,000 (9.2%) at 1.0m.

Business Isolation by Sector at the Territorial Authority

The sector composition of potentially isolated businesses varies across the 13 most-affected TAs, though two sectors, Agriculture, Forestry and Fishing and Rental, Hiring and Real Estate Services, are consistently among the most represented across most TAs and sea-level rise increments.

- **Potentially isolated Agriculture, Forestry and Fishing sector business dominates in the Districts TAs.** In Hauraki District it accounts for 47% of all potentially isolated businesses at present day, remaining around 44–46% across all increments. It is also the top sector in Kaipara District (26%), Western Bay of Plenty District (32%), Far North District (24%), Ōpōtiki District (29%), Buller District (22%), and Westland District (33%) under present-day conditions, and remains so across other sea-level rise

increments. The exception is Westland District, where Agriculture, Forestry and Fishing declines to 16% at 0.5m as Retail Trade and Accommodation and Food Services each rise to 13%.

- **Rental, Hiring and Real Estate Services is the most potentially affected sector in all the urban TAs except Napier City**, for example at present day for Nelson City (20%), Tauranga City (23%), Dunedin City (20%), and Lower Hutt City (34%).
- **In Lower Hutt City, Rental, Hiring and Real Estate Services and Professional, Scientific and Technical Services together account for 66% of all potentially isolated businesses at present day**, though their combined share reduces as more sectors become affected at higher sea-level rise increments. By 1.0m, Construction (10%), Wholesale Trade (8%), and Manufacturing (8%) all become more prominent.
- **The sector composition of potentially isolated businesses is generally stable across sea-level rise increments, with the two or three highest-ranked sectors remaining consistent in most TAs.** The most notable shifts occur in Dunedin City, where Agriculture, Forestry and Fishing drops from 22% at 0.5m to just 7% at 1.0m as exposure spreads more broadly across sectors, and in Napier City, where Rental, Hiring and Real Estate Services overtakes Construction as the most affected sector by 1.0m.

Implications and Future Directions

Coastal flooding events currently could, and will likely continue, to affect the ability of businesses to function, generating flow-on economic consequences at the national and local scale.

At the national scale, approximately 1-in-10 businesses could experience continuity challenges with 1.0m of sea-level rise. However, certain TAs may face greater economic disruptions, with seven TAs likely to have more than 1-in-3 businesses isolated at 1.0m of sea-level rise. This signals a significant level of potential economic impact ahead.

Economic disruption via business isolation is not a temporally distant problem, as the impacts could begin to exacerbate by 0.2m of sea-level rise.

Any economic disruption has cascading implications for the communities in which affected businesses are located. Although these have not been considered in this report, they are likely to include the ability of people to earn an income, the ability to access goods and services, and the longer-term viability of some businesses in their current location.

Local business interruptions may also have wider implications if the affected businesses are a critical part of a supply or value chain on which businesses in another area depend - for example, parts or products that are used in the manufacturing of other goods, or delivery of services.

The importance of the impacts on each sector from this analysis can be extrapolated, but warrant further investigation. For some of the impacted sectors (e.g. Agriculture, Forestry and Fishing sector), although the total proportion of businesses affected is relatively small, the total number of individual businesses is high. Many of those impacted could be small owner-operated businesses, which contribute to the wellbeing of the regional economy. Other sectors, such as the Electricity, Gas, Water and Waste Services sector, may provide essential services to other businesses and the community more generally. Isolation of this type of business may then affect the ability of others to function, e.g. loss of power means businesses that could otherwise remain open have to close until services are restored.

Overall, this report can be used to assist planning to support business continuity and the wider economic wellbeing of communities across Aotearoa New Zealand. It can also be used by TAs or business sectors to further explore the local risk to underpin council or sector-driven adaptation planning.

Additional work could build on the insights provided in this analysis, for example, economic analysis regarding the potential impact of isolation from supply and value chains on GDP, or exploring business isolation from smaller, more frequent coastal inundation events.

While the focus of this analysis is on coastal flooding, business isolation also arises due to other hazards (e.g. floods, landslides, storms) that may occur simultaneously or in short succession, compounding the overall

effects of isolation for businesses, communities and economies. Future work could explore isolation associated with multiple hazards to provide a more whole-of-community climate risk perspective.

01

Introduction



1. | Introduction

He Pou a Rangi Climate Change Commission seeks to strengthen the national evidence base on the risks that current and future coastal flooding poses to the isolation of businesses. Coastal flooding, or coastal inundation, refers to the submersion of land by the sea. Its impacts can range from minor nuisance events through to severe storm surges capable of damaging homes, flooding roads, disrupting businesses, and cutting off residents. Such events may isolate businesses from the critical services and transportation networks they require to function, resulting in economic impacts even if the businesses themselves are not directly exposed. In turn, local GDP and employment may be affected, especially if isolation is prolonged or occurs regularly.

This report provides a nation-wide and Territorial Authority scale analysis of potential business isolation resulting from coastal floods (1% Annual Exceedance Probability) at present-day sea levels, 0.2m, 0.5m and 1.0 m of sea-level rise. Results from this analysis will inform the Second National Adaptation Plan Progress Assessment (NAPPA), due in 2026. The NAPPA evaluates the implementation and effectiveness of the National Adaptation Plan (NAP) on a two-yearly basis, with the first report delivered in August 2024. The Commission's assessment framework examines whether the NAP is adequately addressing the most significant climate risks and key adaptation challenges. It also tracks progress toward the NAP's 20 objectives and develops national metrics that offer a broader picture of progress over time.

Data on the number and location of businesses isolated due to coastal flooding can be monitored over time to determine if adaptation actions are reducing risk to businesses and, by extension, risks to the economy and social outcomes. This report also supports the Commission's ongoing development of key national adaptation metrics and future national, regional, district, city or sector-based risk assessments.

1.1 | Conceptual Definition of Isolation

Isolation in this analysis is defined as a loss of road connectivity between a property and the wider transport network due to flood impacts.

A business is considered isolated if no viable driving route exists between the property and a set of essential destination types once flooded roads are removed from the network. In this case, the essential destinations considered are fire stations, hospitals, and primary and secondary schools. These facilities act as proxies for broader access to essential services as they are often colocated with other centres of activity.

Importantly, isolation represents system-level transport disruption, not business-specific supply chain failure. If a property retains access to at least one of the three described destinations, it is assumed to maintain some level of connectivity to the wider network, even if normal operations are disrupted.

This definition of isolation is consistent with that used to undertake social isolation analysis in the Social Vulnerability Assessment previously undertaken for He Pou a Rangi Climate Change Commission [1], ensuring comparability across social and economic impact assessments.

1.2 | Cascading Impacts of Business Isolation

The isolation of businesses due to a transport network failure has short- and long-term flow-on implications for the community in which the business is located and at the regional and national scale. These may include (but are not limited to) [2];

- A disruption to people or other businesses who use the goods and services of the affected business. Access may affect everyday life or have more serious impacts on wellbeing, for example, if access to essential goods is compromised.
- An inability to produce goods and services for sale because a building cannot be accessed by employees or service deliveries, which leads to a loss of income. At the local scale, this could lead to a temporary reduction in economic activity, which will affect the community as a whole.
- A reduction in the ability to earn an income for individuals and business owners impacts their own spending, which reinforces a local reduction in economic activity.

- If people's everyday lives or businesses are affected, they may choose to relocate to another community, which results in a loss of local business and employment opportunities.
- The overall desirability of a regularly affected community as a place to live and do business may reduce over time due to a combination of fewer opportunities and the potential for ongoing disruption.

The implications are likely to escalate as the length of time isolated or frequency of isolation increases. This report provides the foundational data on which more qualitative implications can be considered.

1.3 | Report Structure

The following section describes in detail the methods used to understand business isolation, followed by a presentation of the key results of the analysis. The key results provided in this report cover the total number of businesses potentially isolated to coastal flooding:

- Total number of businesses potentially isolated and exposed to coastal flooding at the national scale.
- Proportion of businesses potentially isolated, by sector, at the national scale.
- Proportion of businesses potentially isolated at the TA scale.
- Proportion of businesses potentially isolated, by sector at the TA scale.

The report summarises key trends, data limitations within which the results should be considered, implications of the results, and areas for future analysis.

02

Method



2. | Method

To estimate the extent of business isolation in Aotearoa New Zealand, we combine national-scale coastal flood hazard data, property-level business information, and transport network analysis to determine whether businesses retain access to essential destinations under a 1% Annual Exceedance Probability (AEP) coastal flood event. Employers are represented as business locations associated with physical properties.

The analysis proceeds in four steps:

1. Coastal flood hazard extents are defined for present-day conditions and three increments of sea-level rise (0.2 m, 0.5 m, and 1.0 m).
2. Businesses and their associated employment and industry classifications are attributed to individual properties.
3. The road network is modified to reflect flood-induced disruptions.
4. Routing analysis is used to determine whether businesses remain connected to essential services.

Results are aggregated to the territorial authority (TA) level and reported by industry sector (ANZSIC 2006 divisions). This analysis extends the isolation methodology developed for the previous Social Vulnerability Assessment to quantify the number and types of businesses that may become physically isolated due to coastal flooding.

2.1 | Coastal Flood Hazard

Coastal flood hazard extents are derived from national-scale extreme sea-level datasets produced by Earth Sciences New Zealand [3]. These datasets represent the spatial extent of inundation associated with a 1% AEP coastal flood event, incorporating the combined effects of tides, storm surge, and wave setup.

Hazard extents are evaluated for four sea-level conditions: present day (0.0 m) and three increments of sea-level rise (0.2 m, 0.5 m, and 1.0 m). Each scenario represents the extent of inundation under a 1% AEP event occurring at the specified background sea level, rather than a projection of mean sea level alone. This approach enables consistent comparison of how extreme coastal flood risk evolves with rising sea levels.

A 1% AEP event, commonly referred to as a “1-in-100-year” event, has a greater than 63% probability of occurring at least once over a 100-year period, and more than a 1-in-4 probability of occurring at least once within a 30-year timeframe. Such events are therefore relevant for long-lived assets and business locations, which are likely to experience at least one extreme coastal flood during their operational lifetime. Using this standard also aligns with national risk assessment practices and provides a consistent basis for comparing results across regions.

The hazard data are generated using a static “bathtub” modelling approach, in which areas below the modelled water level and hydraulically connected to the coast are classified as inundated. As a result, the dataset represents flood extent (inundated vs not inundated) rather than depth. In this analysis, any intersection between the hazard extent and an asset or road segment is therefore treated as indicating potential disruption. While this assumption simplifies complex coastal processes, it provides a consistent and nationally scalable representation of extreme flood exposure suitable for comparative analysis.

2.2 | Business Representation

Businesses are represented in this analysis as employer locations (single premises) associated with individual physical properties at a specific geographic location. This enables economic activity to be spatially aligned with both the flood hazard and the transport network, which together determine exposure and isolation.

Property-level data are drawn from a nationally integrated dataset developed for this analysis, which combines multiple authoritative national sources, including Land Information New Zealand (LINZ) property and valuation data and Statistics New Zealand geographic and business datasets (Table 1).

Properties are classified as employment locations using the property category field from the LINZ District Valuation Roll. This classification is defined under the Rating Valuations Rules 2008 and documented in LINZS30300, and is applied consistently by Territorial Authorities across New Zealand. The classification is carried through unchanged in this analysis. Employment properties include commercial (C), industrial (I), utilities (U), civic and institutional (O), mining (M), and primary production land uses, including arable (A), dairy (D), forestry (F), horticulture (H), pastoral (P), and specialist livestock (S). Residential properties are excluded, along with vacant properties (identified where the second character of the property category is "V"), to ensure that only active sites of economic activity are included.

This approach captures both urban and rural employment locations, reflecting the full range of business activity across Aotearoa New Zealand. While the property classification does not directly encode industry sectors, it provides a nationally consistent and statutorily defined basis for identifying where economic activity occurs. These properties are subsequently attributed with business counts and industry classifications, enabling analysis of exposure and isolation at both site and aggregated scales.

Table 1 Data sources used in the analysis

Component	Dataset	Source	Description / Role
Property geometry	Unit of Property	LINZ	Defines parcel boundaries and the spatial location of properties
Property classification & valuation	District Valuation Roll	LINZ	Provides property_category and land-use classification used to identify employment properties
Building footprints	Building Outlines	LINZ	Used to spatially align built structures with properties
Address points	Address Data	LINZ	Supports geolocation and matching of assets
Statistical boundaries	SA1 (2023)	Stats NZ	Enables linkage between properties and statistical datasets
Business counts & employment	Business Demography (Feb 2024)	Stats NZ	Provides business counts by ANZSIC at SA1 level
Demographic data	Census	Stats NZ	Used for contextual analysis (not core to isolation metric)
Coastal flood hazard	Extreme sea level datasets	Earth Sciences NZ (NIWA)	Provides 1% AEP flood extents under sea-level rise scenarios
Schools	NZ Facilities	Toitū Te Whenua Land Information New Zealand	Essential service proxy for isolation
Hospitals	NZ Facilities	Toitū Te Whenua Land Information New Zealand	Essential service proxy for isolation
Fire Stations	Fire Stations	Fire and Emergency NZ	Essential service proxy for isolation
Road network	OpenStreetMap	OSM	Provides a transport network for routing and isolation analysis

2.3 | Employment and Sector Attribution

To quantify the number of businesses at each property, and to identify their industry sectors, we integrate national business demography data with the property dataset described above.

Business counts are sourced from the Statistics New Zealand Business Demography dataset (February 2024; Table 1), which reports business locations at the Statistical Area 1 (SA1) level by ANZSIC 2006 division (see Appendix for a description of ANZSIC divisions) [4]. While providing national coverage, these data are not spatially resolved to individual properties, requiring redistribution to align business activity with the property-level analysis.

To assign these data to properties, we apply a dasymetric redistribution approach. Within each SA1, business counts for each ANZSIC division are allocated across eligible employment properties only, as defined in Section 2.2 [5]. This ensures that business activity is assigned to locations where it can plausibly occur, rather than being distributed across all land within an SA1, which may include residential, vacant, or uninhabited areas. SA1s made up only of residential properties were excluded from the evaluation.

Eligibility is determined using an intersection between ANZSIC divisions and property categories. For example, retail and service sectors are allocated to commercial properties, manufacturing to industrial properties, and primary industries to rural production land uses. For each SA1–sector combination, total business counts are divided evenly among eligible properties, ensuring that aggregated totals are preserved.

This process results in estimated (fractional) business counts at the property level that sum to the original SA1 totals. These values should be interpreted as a modelled spatial distribution of business activity, rather than direct observations at that scale. While this approach introduces uncertainty, particularly where property-level proxies do not fully capture the true distribution of businesses, it provides a consistent and nationally scalable method for aligning aggregated economic data with spatial hazard and network analyses.

The resulting employment attributes are stored at the property level and include business counts by ANZSIC division. This enables subsequent analysis of exposure and isolation to be reported at both aggregate and sectoral levels.

2.4 | Transport Network Disruption

To assess how coastal flooding affects access between businesses and essential services, the national road network is modified to reflect flood-induced disruptions.

The road network is derived from OpenStreetMap (OSM) data, which provides a representation of publicly accessible roads across Aotearoa New Zealand. For each sea-level rise scenario, road segments that intersect the coastal flood hazard extent are identified and removed from the network [6]. This produces a scenario-specific transport network in which flood-affected roads are assumed to be impassable.

Because the hazard dataset represents flood extent (inundated vs not inundated) rather than depth, any intersection between a road segment and the hazard extent is treated as indicating potential disruption. This assumption reflects a conservative interpretation of network performance under extreme coastal flooding, where even shallow inundation may render roads unsafe or unusable.

Bridges are excluded from this intersection process. Flood extents often extend beneath bridge structures without overtopping the deck, and in the absence of elevation or depth information, it is not possible to determine whether bridges are functionally impaired. Including bridges as inundated would therefore risk systematically overestimating network disruption.

In addition to modifying the transport network, destination locations (e.g. essential services) that fall within the flood extent are treated as unavailable for routing. This ensures that routing outcomes reflect both network disruption and loss of access to affected destinations.

The resulting disrupted network forms the basis for routing analysis, enabling evaluation of whether businesses remain connected to essential services under each flood scenario.

2.5 | Definition of Isolation

Business isolation is defined as the loss of all routable access between a business location and essential service destinations under a given flood scenario. A business is classified as isolated when no viable path exists through the disrupted transport network to any of the specified destination types.

Three destination types are used as proxies for essential services: hospitals, fire stations, and primary and secondary schools. These represent access to healthcare, emergency response, and community services, and are selected because they are available as nationally consistent datasets, enabling standardised comparison across regions.

Under this definition, a business is not considered isolated if it can reach at least one of these destination types. Isolation, therefore, represents a threshold at which transport disruption is sufficiently severe that the business is effectively disconnected from the wider system, with no remaining access to key service nodes.

Isolation is evaluated using routing on the disrupted network, such that both road failure (e.g. flooded roads) and destination failure (e.g. inundated facilities) contribute to loss of access. Businesses located within the flood extent are also classified as isolated, as their premises are assumed to be non-functional.

The metric is binary (connected vs not connected), providing a clear and consistent measure of when businesses are effectively cut off from essential services. While it does not capture partial disruption (e.g. increased travel times) or business-specific dependencies (e.g. ports, suppliers, or customers), it provides a robust and scalable indicator of system-level disruption arising from loss of transport connectivity.

2.6 | Routing

Routing analysis is used to determine whether businesses retain access to essential service destinations under each flood scenario. For each scenario-specific transport network, shortest-path routing is performed between each business location and the set of destination types.

Routing is implemented using the Open Source Routing Machine (OSRM), which computes routes across the OpenStreetMap-based road network. For each business location, routes are evaluated to all available destinations across the defined destination types (hospitals, fire stations, and primary and secondary schools). A destination is considered reachable if a valid path exists through the disrupted network.

A business is considered connected if at least one destination is reachable. If no route exists to any destination, the business is classified as isolated. Connectivity therefore reflects the presence or absence of any remaining routable path to essential service locations.

Routing outcomes reflect both network disruption and destination availability. Destinations located within the flood extent are excluded and treated as unavailable. Similarly, road segments intersecting the hazard are removed from the network, and any routes requiring those segments are considered unreachable. This ensures that isolation captures the combined effects of transport network failure and direct hazard impacts.

2.7 | Aggregation and Reporting

Following routing analysis, isolation and exposure results are summarised to support national and Territorial Authority (TA)-level reporting.

Isolation status is determined at the property level for each sea-level rise scenario, and associated business counts are aggregated accordingly. Results are summarised to produce the total number of businesses affected, as well as breakdowns by industry sector using ANZSIC 2006 divisions.

Geographic aggregation is undertaken by linking each property to its corresponding territorial authority using Statistics New Zealand SA1-TA concordance data (Table 1). This enables consistent reporting across administrative boundaries relevant to planning and policy. Results are therefore presented at the national level and for each TA, enabling comparison of the scale and distribution of business isolation across regions.

Sector-level analysis is undertaken by grouping business counts according to ANZSIC divisions. This allows identification of which sectors are most affected under each scenario, and how the composition of impacts varies across TAs. Where required for presentation, smaller contributing sectors may be aggregated to improve interpretability.

Results are reported separately for each sea-level rise scenario (0.0 m, 0.2 m, 0.5 m, and 1.0 m), enabling comparison of how business isolation evolves with increasing coastal flood risk. In addition to isolation, results on direct exposure (i.e. businesses located within the flood extent) are also reported to distinguish between disruption due to inundation and disruption due to loss of access.

All outputs are structured to support reproducibility and public release, including tabular summaries at the TA level and spatial datasets in common open formats.

2.8 | Limitations

The methodology is designed to provide a nationally consistent measure of business isolation, aligned with the social isolation analysis in the previous Social Vulnerability Assessment [1] through the use of a common definition, destination types (hospitals, fire stations, and primary and secondary schools), and routing approach. This enables direct comparison across social and economic domains and supports integrated risk assessment.

The isolation metric captures loss of physical access resulting from disruption to the transport network. However, it does not represent all forms of disruption. In particular, it does not capture partial impacts such as increased travel times, reduced network efficiency, or delays to the movement of goods and services. It also does not account for business-specific dependencies (e.g. access to ports, suppliers, or customers) or functional disruption due to the failure of other infrastructure systems, such as electricity or telecommunications.

Business and employment data are derived from national datasets and redistributed to properties using land-use proxies. While this preserves official totals, it introduces uncertainty at the property level, particularly where property classifications do not fully reflect the true distribution of businesses. In addition, the analysis captures only businesses with fixed, identifiable premises. Businesses without a fixed location (e.g. mobile or home-based operations) are not represented, meaning absolute counts should be interpreted as a lower bound. Relative comparisons between sectors and territorial authorities are considered more robust.

Overall, the results should be interpreted as an indicator of system-level disruption arising from loss of transport connectivity. They provide a consistent and scalable basis for identifying where businesses are likely to be cut off from essential services, and for comparing the relative scale and distribution of impacts across regions and sectors.

03

Key Results



3. | Key Results

The results are organised into four sections: business isolation at the national scale; business isolation by sector at the national scale; business isolation at the TA scale; and business isolation by sector at the TA scale. Together, they provide an overview of the geographical distribution of isolation risk across Aotearoa New Zealand and the sectors which may be disproportionately affected.

3.1 | Business Exposure and Isolation at the National Scale

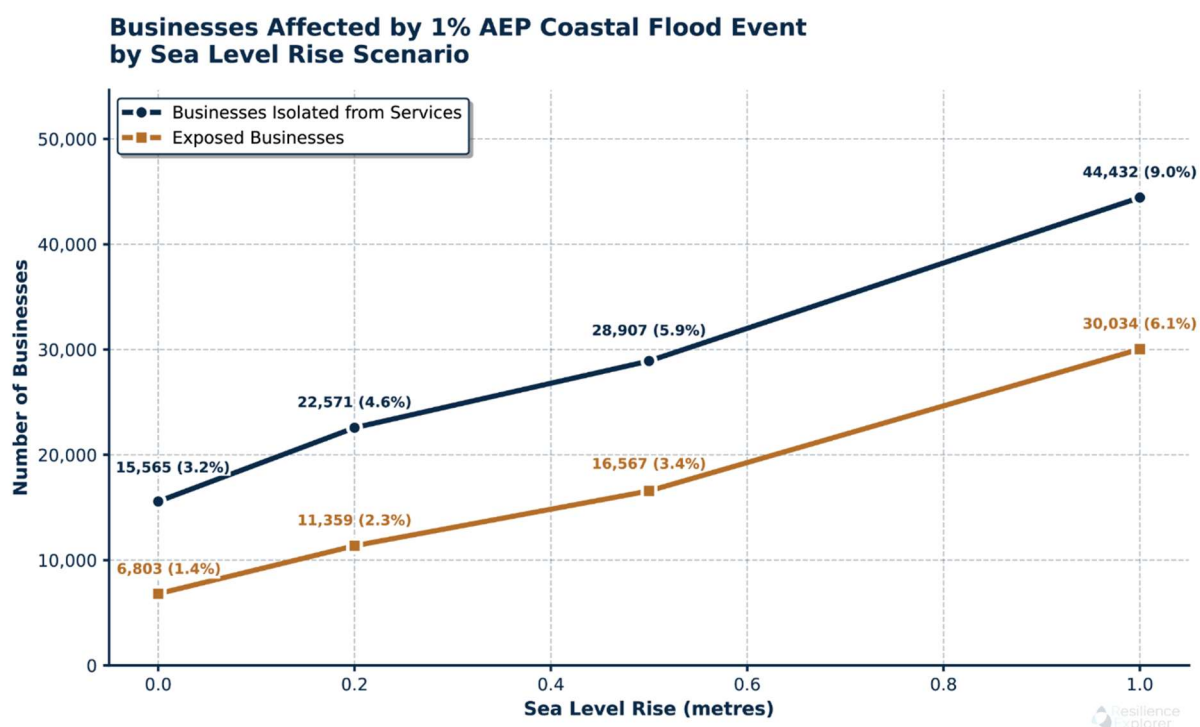


Figure 1 Total businesses exposed and isolated under various increments of sea-level rise.

Under present-day conditions (0.0m SLR), approximately 6,800 businesses (1.4% of all businesses) are potentially directly exposed to a 1% AEP coastal flood (Figure 1). Over time, this increases to more than 11,300 at 0.2m SLR (2.3%), 16,500 at 0.5m SLR (3.4%), and 30,000 at 1.0m SLR (6.1% of all businesses).

Figure 1 also shows the total number of businesses potentially isolated during a 1% AEP coastal flood. Over 15,500 businesses are potentially isolated under present-day conditions, which represents approximately 3.2% of all businesses. This number increases with sea-level rise, to more than 22,500 potentially isolated at 0.2m SLR (4.6%), 28,900 at 0.5m SLR (5.9%), and 44,400 at 1.0m SLR (9%).

3.2 | Business Isolation by Sector at the National Scale

This section presents, at the national scale, the total number of businesses potentially isolated by a 1% AEP coastal flood under present day conditions and three different increments of sea-level rise, by ANZSIC sector category. Figure 2 presents both the total numbers of businesses potentially isolated and the proportion of each sector's total businesses that they represent. The sectors are ranked according to the percentage of each sector's total businesses that are potentially isolated at 1.0m of sea-level rise.

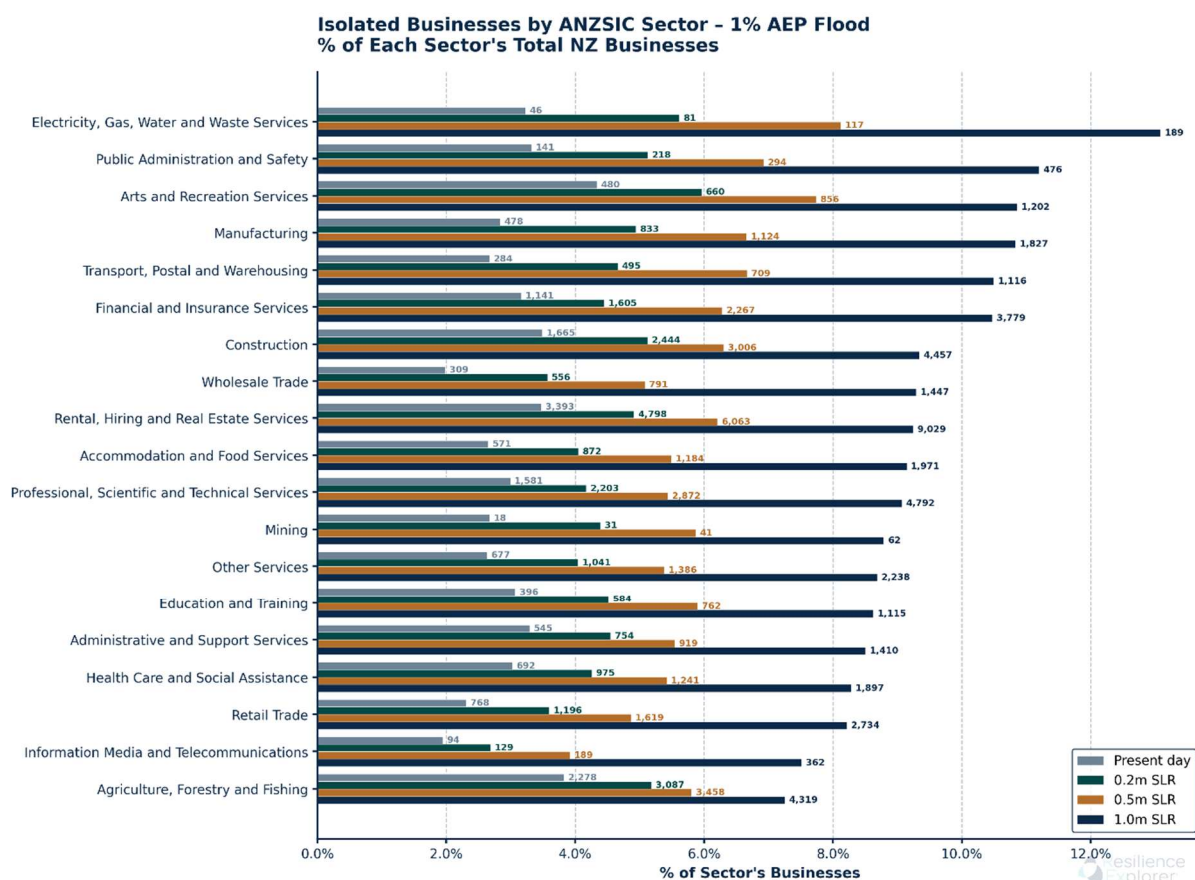


Figure 2 Total businesses isolated at various increments of sea-level rise, by ANZSIC sector ranked by the total number of businesses isolated at 1.0m sea-level rise.

Three insights are provided in Figure 2:

1. Changes in the percentage of businesses that are potentially isolated across different sea-level rise increments (bars bundled by sector).
2. The percentage of each sector's businesses that are potentially isolated, relative to other sectors, at each sea-level rise scenario (bars colour-coded by SLR scenario).
3. The total number of potentially affected businesses by sector (presented at the end of each bar).

3.2.1 | National Scale Sector Isolation for Present-Day Sea Levels

At the national scale, the Arts and Recreation Services sector has the highest proportion of businesses potentially isolated due to a 1% AEP coastal flood event under present-day conditions (4.3% of all Arts and Recreation Services businesses, approximately 480 businesses) (see also Table 2). This is followed by Agriculture, Forestry and Fishing with 3.8% of business (2,278 in total), Construction with 3.5% of business (1,665 in total), Rental, Hiring and Real Estate Services (3.5% or 3,393 businesses), and Public Administration and Safety with 3.3% of business affected (141 businesses).

When looking at the total number of businesses potentially isolated by a 1% AEP coastal flood event (rather than a proportion of the total), Rental, Hiring and Real Estate Services has the highest number of individual business affected (3,393), followed by Agriculture, Forestry and Fishing (2,278), Construction (1,665), Professional, Scientific and Technical Services (1,581) and Financial and Insurance Services (1,141) (Table 2).

3.2.2 | National Scale Sector Isolation at 0.2m of Sea-Level Rise

At 0.2m SLR, the Arts and Recreation Services sector continues to have the highest proportion of businesses potentially isolated by a 1% AEP coastal flood, at 6% (660 businesses). The next sector with the highest percentage of business isolated is the Electricity, Gas, Water and Waste Services with 5.6% (81) of total businesses, followed by Agriculture, Forestry and Fishing (5.2% or 3,087 businesses), Public Administration and Safety (5.1% or 218 businesses), and Construction (5.1% or 2,444 businesses) (Table 2).

The order of the sectors with the highest number of individual business properties potentially isolated by a 1% AEP coastal flood with 0.2m of sea-level rise is the same as for present-day sea levels (Table 2). However, the number of businesses affected increases for each sector;

- Rental, Hiring and Real Estate Services - 4,799 buildings.
- Agriculture, Forestry and Fishing - 3,087 buildings.
- Construction - 2,444 buildings.
- Professional, Scientific and Technical Services - 2,204 buildings.
- Financial and Insurance Services - 1,605 buildings.

3.2.3 | National Scale Sector Isolation at 0.5m of Sea-Level Rise

At 0.5m of sea-level rise, the sector with the highest proportion of businesses potentially isolated by a 1% AEP coastal flood event is Electricity, Gas, Water and Waste Services, with 8.1%, or 118 businesses affected. This is followed by Arts and Recreation Services (7.7% or 857 businesses), Public Administration and Safety (6.9% or 295 businesses), Transport, Postal and Warehousing (6.7% or 709 businesses), and Manufacturing, with 6.7% or 1,124 businesses potentially affected.

In terms of the total number of businesses per sector that are potentially isolated, the sectors with the highest numbers remain in the same order as in previous increments of sea-level rise (Table 2). Overall, the number of businesses per sector increases compared to 0.2m SLR;

- Rental, Hiring and Real Estate Services - 6,063 buildings.
- Agriculture, Forestry and Fishing - 3,458 buildings.
- Construction - 3,006 buildings.
- Professional, Scientific and Technical Services - 2,872 buildings.
- Financial and Insurance Services - 2,267 buildings.

3.2.4 | National Scale Sector Isolation at 1.0m of Sea-Level Rise

At 1.0m of sea-level rise, the Electricity, Gas, Water and Waste Services sector continues to have the highest proportion of businesses potentially isolated at 13.1% of all businesses (189 businesses). This is followed by Public Administration and Safety (11.2% or 477 businesses), Arts and Recreation Services (10.9% or 1,202 businesses), Manufacturing (10.8% or 1,828 businesses), and Transport, Postal and Warehousing, with 10.5% (1,117) businesses potentially isolated as a result of a 1% AEP coastal flood event (Table 2).

Although Rental, Hiring and Real Estate Services still has the highest total number of businesses potentially isolated by a 1% AEP coastal flood event at 1.0m of sea-level rise (9,029), Professional, Scientific and Technical Services becomes the sector with the second highest number of businesses affected (4,792) (Table 2). The Construction sector continues to have the third highest number of businesses affected (4,457); however, Agriculture, Forestry and Fishing lowers to fourth in relative terms with 4,319 businesses impacted.

Financial and Insurance Services remains the fifth most affected sector in terms of the total number of businesses isolated (3,779).

3.2.5 | Relative Business Isolation by Sector at the National Scale

All sectors nearly double the total number of businesses (Table 3) and the percentage of businesses in the sector (Table 2) that are potentially isolated with increasing increments of sea-level rise. For present-day sea-level rise (0.0m) with a 1% AEP coastal flood event, the percentage of businesses potentially isolated across the sectors ranges from 1.9% of businesses in the Information Media and Telecommunications sector to 4.3% in Arts and Recreation Services. By 1.0m of sea-level rise, the range is between 7.3% of businesses in the Agriculture, Forestry & Fishing sector and 13.1% in Electricity, Gas, Water & Waste Services. Changes in the relative potential for business isolation across sectors are a mix of gradual, progressive, and stepwise increases, depending on the sector.

Table 2 The percentage of businesses potentially isolated due to a 1% AEP coastal flood event at present-day sea levels, 0.2m, 0.5m, and 1.0m of sea-level rise by ANZSIC Sector Classification. A red arrow indicates the percentage of businesses has increased for a particular sector over time relative to other sectors, and a yellow arrow indicates the percentage has decreased for a sector relative to other sectors.

Present Day (0.0m)	0.2m Sea-Level Rise	0.5m Sea-Level Rise	1.0m Sea-Level Rise
Arts and Recreation Services 4.3%	Arts and Recreation Services 6.0%	Electricity, Gas, Water and Waste Services 8.1% ↑	Electricity, Gas, Water and Waste Services 13.1%
Agriculture, Forestry and Fishing 3.8%	Electricity, Gas, Water and Waste Services 5.6% ↑	Arts and Recreation Services 7.7% ↓	Public Administration and Safety 11.2% ↑
Construction 3.5%	Agriculture, Forestry and Fishing 5.2% ↓	Public Administration and Safety 6.9% ↑	Arts and Recreation Services 10.9% ↓
Rental, Hiring and Real Estate Services 3.5%	Public Administration and Safety 5.1% ↑	Transport, Postal and Warehousing 6.7% ↑	Manufacturing 10.8% ↑
Public Administration and Safety 3.3%	Construction 5.1% ↓	Manufacturing 6.7% ↑	Transport, Postal and Warehousing 10.5% ↓
Administrative and Support Services 3.3%	Manufacturing 4.9% ↑	Construction 6.3% ↓	Financial and Insurance Services 10.5% ↑
Electricity, Gas, Water and Waste Services 3.2%	Rental, Hiring and Real Estate Services 4.9% ↓	Financial and Insurance Services 6.3% ↑	Construction 9.3% ↓
Financial and Insurance Services 3.2%	Transport, Postal and Warehousing 4.7% ↑	Rental, Hiring and Real Estate Services 6.2% ↓	Wholesale Trade 9.3% ↑
Education and Training 3.1%	Administrative and Support Services 4.6% ↓	Education and Training 5.9% ↑	Rental, Hiring and Real Estate Services 9.2% ↓
Health Care and Social Assistance 3.0%	Education and Training 4.5% ↓	Mining 5.9% ↑	Accommodation and Food Services 9.1% ↑
Professional, Scientific and Technical Services 3.0%	Financial and Insurance Services 4.5% ↓	Agriculture, Forestry and Fishing 5.8% ↓	Professional, Scientific and Technical Services 9.1% ↑
Manufacturing 2.8%	Mining 4.4% ↑	Administrative and Support Services 5.6% ↓	Mining 8.8% ↓
Transport, Postal and Warehousing 2.7%	Health Care and Social Assistance 4.3% ↓	Accommodation and Food Services 5.5% ↑	Other Services 8.7% ↑

Mining 2.7%	Professional, Scientific and Technical Services 4.2% ↓	Professional, Scientific and Technical Services 5.4%	Education and Training 8.6% ↓
Accommodation and Food Services 2.7%	Accommodation and Food Services 4.1%	Health Care and Social Assistance 5.4% ↓	Administrative and Support Services 8.5% ↓
Other Services 2.6%	Other Services 4.0%	Other Services 5.4%	Health Care and Social Assistance 8.3% ↓
Retail Trade 2.3%	Retail Trade 3.6%	Wholesale Trade 5.0% ↑	Retail Trade 8.2% ↑
Wholesale Trade 2.0%	Wholesale Trade 3.6%	Retail Trade 4.8% ↓	Information Media and Telecommunications 7.5% ↑
Information Media and Telecommunications 1.9%	Information Media and Telecommunications 2.7%	Information Media and Telecommunications 3.9%	Agriculture, Forestry and Fishing 7.3% ↓

General trends include:

Two sectors are consistently among the three sectors with the highest percentages of potentially isolated businesses from 0.2m of sea-level rise: Arts and Recreation Services, and Electricity, Gas, Water and Waste Services.

- The Arts and Recreation Services sector starts as the most at-risk sector at 4.3% (present day) and remains prominent across all scenarios, though it is overtaken by Electricity, Gas, Water and Waste Services at 0.5m of sea-level rise.
- At 0.5m and 1.0m of sea-level rise, the Electricity, Gas, Water and Waste Services sector has the highest proportion of businesses potentially isolated due to a 1% AEP coastal flood event, with 8.1% and 13.1% isolated, respectively. This is the largest increase among all sectors.

Four sectors increase their relative rankings more rapidly than others as sea levels rise, indicating different timing of impacts across sectors. These sectors are: Manufacturing; Transport, Postal and Warehousing; Electricity, Gas, Water and Waste Services; and Wholesale Trade.

- The Electricity, Gas, Water and Waste Services sector moves from a rank of 7th (3.2%) to 2nd (5.6%) at 0.2m of sea-level rise. At both 0.5m and 1.0m, this sector becomes the most affected sector.
- Wholesale Trade is ranked 18th or 19th (2.0% and 3.6% respectively) until 1.0m of sea-level rise, when the sector shifts to 8th position with 9.3% of businesses in the sector potentially isolated.
- Manufacturing moves steadily up the rankings from 12th position under present-day sea levels (2.8%) to 6th position at 0.2m of sea-level rise (4.9%), 5th position at 0.5m (6.7%), and into 4th position at 1.0m sea-level rise (10.8%).
- Transport, Postal and Warehousing is ranked 14th under present-day conditions (2.7% of businesses), but moves to 8th position (4.7%) at 0.2m, increasing further with 0.5m to 4th position (6.7%), and remaining in the 5 highest ranked sectors at 1.0m (10.8% of businesses).

Sectors with steady, less rapid increases in the percentage of potentially isolated businesses across the four sea-level rise increments fall roughly into three groups:

- Sectors that remain in the five or six most affected sectors (Public Administration and Safety, and Construction).
- Sectors that remain approximately in the middle of the rankings (Rental, Hiring and Real Estate Services; Financial and Insurance Services; Education and Training; Mining; and Accommodation and Food Services).
- Sectors that remain relatively low in the ranking (lowest 5-6 positions) (Retail Trade, Other Services, and Information Media and Telecommunications).

The Agriculture, Forestry and Fishing sector shows a notable change in relative ranking across different sea-level rise increments, beginning as the sector with the second-highest proportion of businesses potentially isolated (3.8%, or 2,278 businesses). By 1.0m of sea-level rise, it has the lowest percentage (7.3% or 4,319 businesses) as each increment of sea-level rise shows a consistent relative drop in ranking. However, at the present sea level, the Agriculture, Forestry and Fishing Sector has the second highest total number of businesses potentially isolated due to a 1% AEP coastal flood event (2,278). Although this drops to the fourth-highest number of businesses by 1.0m of sea-level rise, it remains a considerable number of likely owner-operated businesses.

Table 3 The five ANZSIC sector categories with the highest total number of businesses potentially isolated due to a 1% AEP coastal flood event at present-day sea levels, and 0.2m, 0.5m, and 1.0m of sea-level rise. A red arrow indicates the number has increased for a particular sector relative to other sectors, and a yellow arrow indicates the number has decreased for a sector relative to others.

Present Day (0.0m)	0.2m Sea-Level Rise	0.5m Sea-Level Rise	1.0m Sea-Level Rise
Rental, Hiring and Real Estate Services (3,393)	Rental, Hiring and Real Estate Services (4,799)	Rental, Hiring and Real Estate Services (6,063)	Rental, Hiring and Real Estate Services (9,029)
Agriculture, Forestry and Fishing (2,278)	Agriculture, Forestry and Fishing (3,087)	Agriculture, Forestry and Fishing (3,458)	Professional, Scientific and Technical Services (4,792) ↑
Construction (1,665)	Construction (2,444)	Construction (3,006)	Construction (4,457)
Professional, Scientific and Technical Services (1,581)	Professional, Scientific and Technical Services (2,204)	Professional, Scientific and Technical Services (2,872)	Agriculture, Forestry and Fishing (4,319) ↓
Financial and Insurance Services (1,141)	Financial and Insurance Services (1,605)	Financial and Insurance Services (2,267)	Financial and Insurance Services (3,779)

The sectors with the highest actual number of total businesses potentially isolated (Table 3) show where, even if the impacts on the wider sector may be low in proportional terms, the impact on individual businesses and in different TAs may be greater.

Most notably, Rental, Hiring and Real Estate Services is ranked 9th in terms of the most affected sectors based on the proportion of all businesses in the sector at 1.0m of sea-level rise, with 9.2% of its businesses at risk of isolation. However, the actual number of individual businesses affected is high, and increases notably from approximately 3,393 businesses under present-day conditions to 9,029 businesses at 1.0m of sea-level rise.

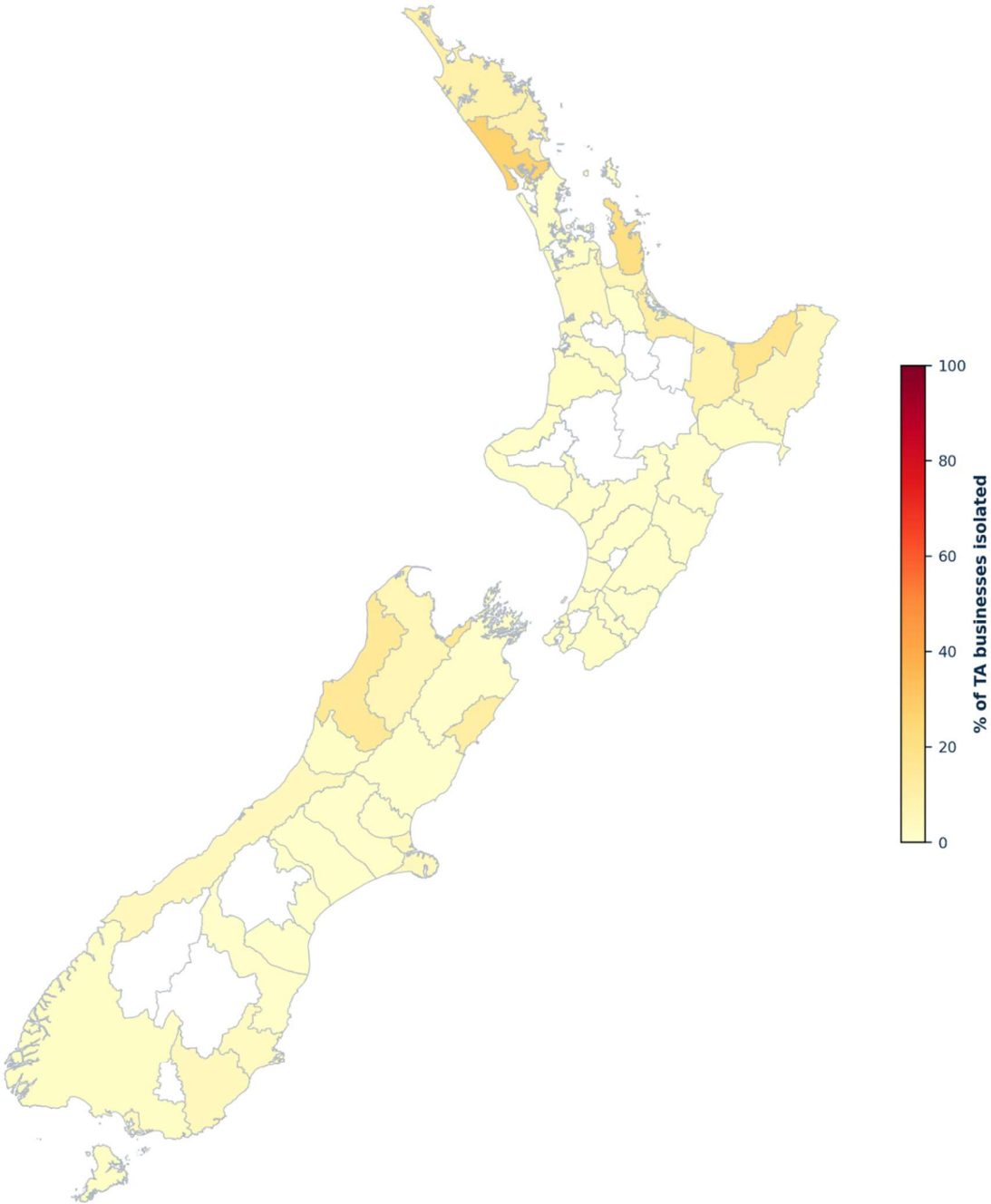
3.3 | Business Isolation by Territorial Authority

The distribution of businesses potentially isolated by a 1% AEP coastal flood event is not uniform across Aotearoa New Zealand and changes with rising seas. Results in this section are presented based on the percentage of businesses within a TA that could be isolated rather than the total number of businesses in that TA. This is to avoid larger centres dominating the results. Although larger centres (e.g. Auckland, Wellington, or Christchurch) are likely to have a greater overall number of potentially isolated businesses, the impacts on the local economy are likely to be higher in those TAs where a greater proportion of businesses are affected. Although our analysis focuses on the TAs with the highest percentage of businesses isolated, the raw data has been provided to He Pou a Rangi Climate Change Commission as a CSV file to allow for further analysis of isolation by total number of businesses at risk.

3.3.1 | Present-Day Isolation by Territorial Authority

Isolation risk to businesses associated with a 1% AEP coastal flood event across Aotearoa New Zealand, under present-day conditions, is illustrated in Figure 3. Darker colours indicate those TAs with a higher percentage of their total businesses potentially isolated. All coastal TAs have some businesses that are potentially isolated by a present-day 1% AEP event.

**Business Isolation Risk - 1% AEP Flood
Present day**



Resilience
Explorer

Figure 3 Spatial distribution of potentially isolated businesses due to a 1% AEP coastal flood event at present-day sea levels, by Territorial Authority.

Overall, Kaipara District has the highest percentage of businesses potentially isolated by a 1% AEP coastal flood event (26.9%, or approximately 998) (Figure 4). Next highest is Thames-Coromandel District with 20.9% of the total businesses isolated (approximately 936), followed by Ōpōtiki District (17.5%, or 192 businesses), Nelson City (15.4%, or 780 businesses), and Buller District (14.6%, or 160 businesses).

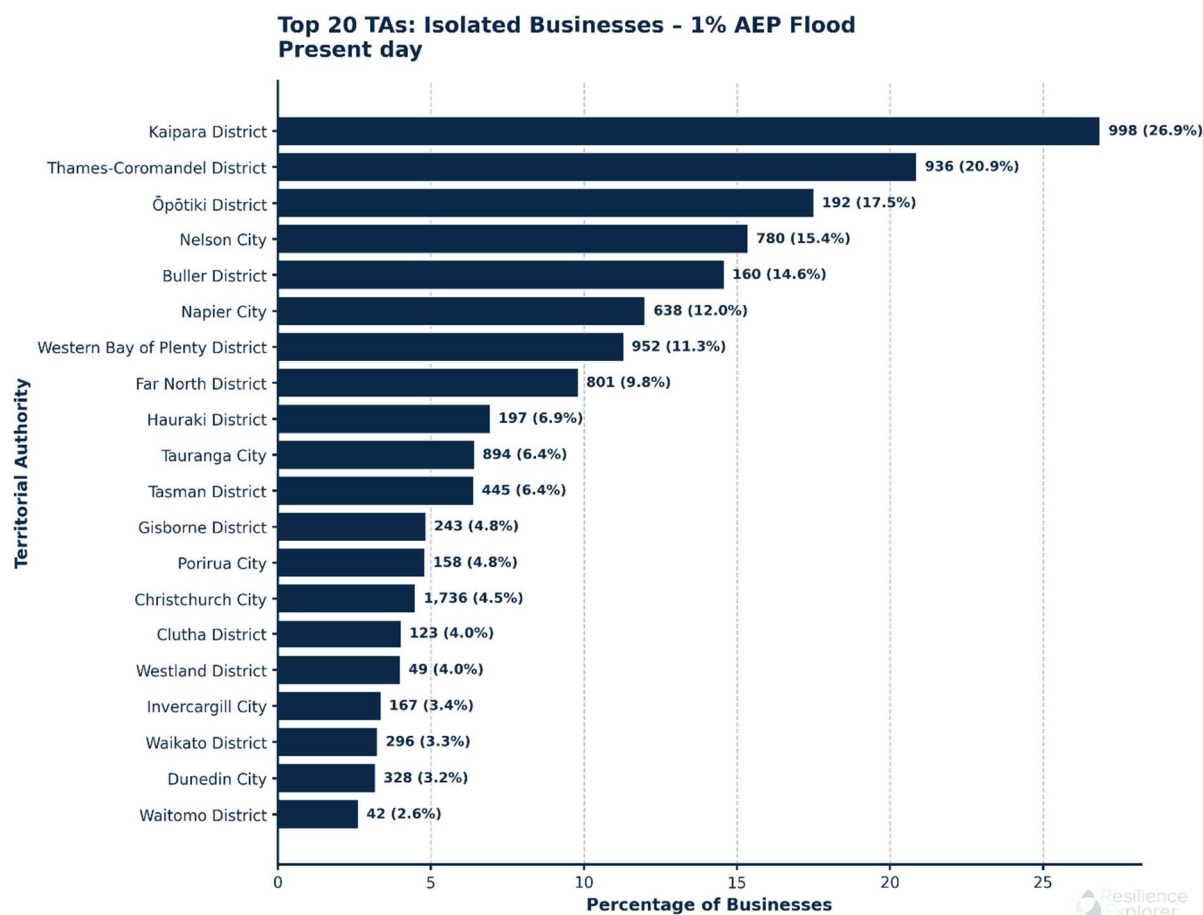
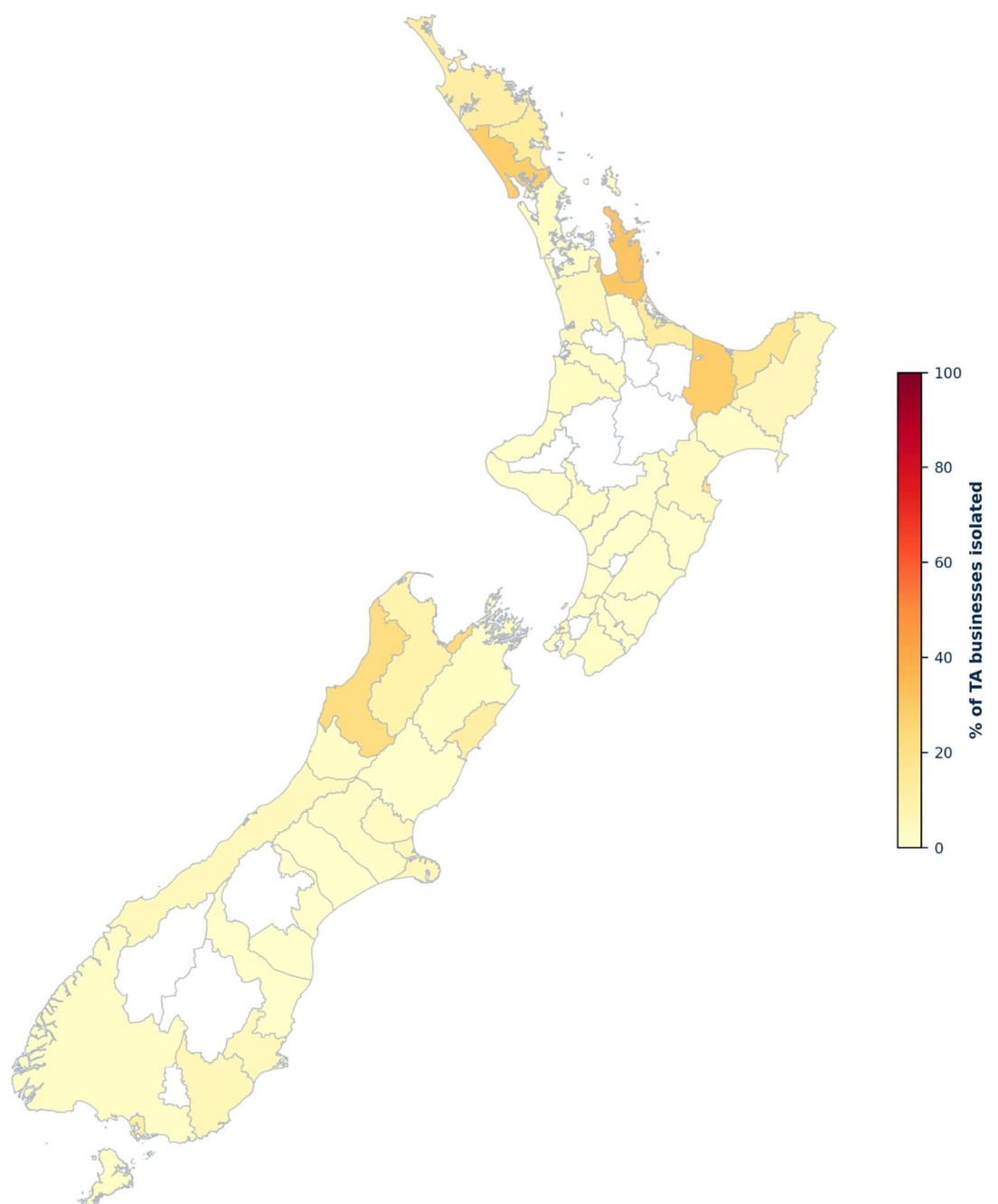


Figure 4 The 20 TAs with the highest percentage of all businesses potentially isolated due to a 1% AEP coastal flood event under present-day conditions. Each bar shows the number of businesses isolated and the percentage of the total number of businesses registered in the TA that this represents.

3.3.2 | Business Isolation by Territorial Authority at 0.2m Sea-Level Rise

Figure 5 shows the business isolation risk associated with coastal flooding across Aotearoa New Zealand with 0.2m of sea-level rise. Similar to present-day conditions, all coastal TAs have some businesses that are potentially isolated by a 1% AEP event.

**Business Isolation Risk - 1% AEP Flood
0.2m SLR**



Resilience
Explorer

Figure 5 Spatial distribution of potentially isolated businesses by a 1% AEP coastal flood event with 0.2m of sea-level rise, by Territorial Authority.

For example, at 0.2m of sea-level rise, approximately 31.2% or 1,401 of the businesses in Thames-Coromandel District could be isolated by a 1% AEP coastal flood event (Figure 6). Hauraki District has the next highest percentage of businesses potentially isolated at 30.3% (861 businesses) followed by Kaipara District (28.3% or 1,053 businesses), Nelson City (22.9% or 1,166 businesses), and Buller District (21.7% or 238 businesses).

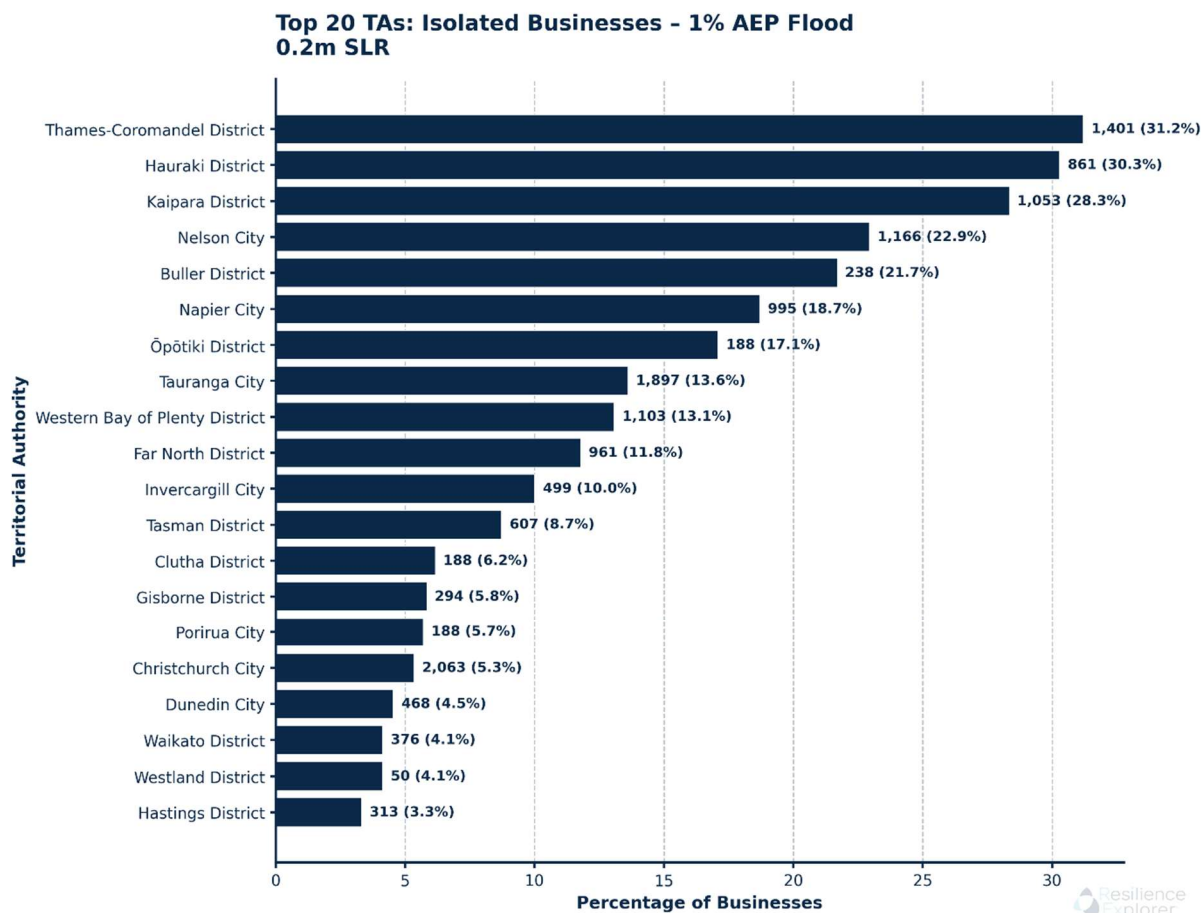


Figure 6 The 20 TAs with the highest percentage of all businesses potentially isolated due to a 1% AEP coastal flood event at 0.2m SLR. Each bar shows the number of businesses isolated and the percentage of the total number of businesses registered in the TA that this represents.

3.3.3 | Business Isolation by Territorial Authority at 0.5m Sea-Level Rise

At 0.5m of sea-level rise (Figure 7) it remains that all coastal TAs have some businesses that are potentially isolated by a 1% AEP event, though some TAs are affected more than others.

**Business Isolation Risk - 1% AEP Flood
0.5m SLR**

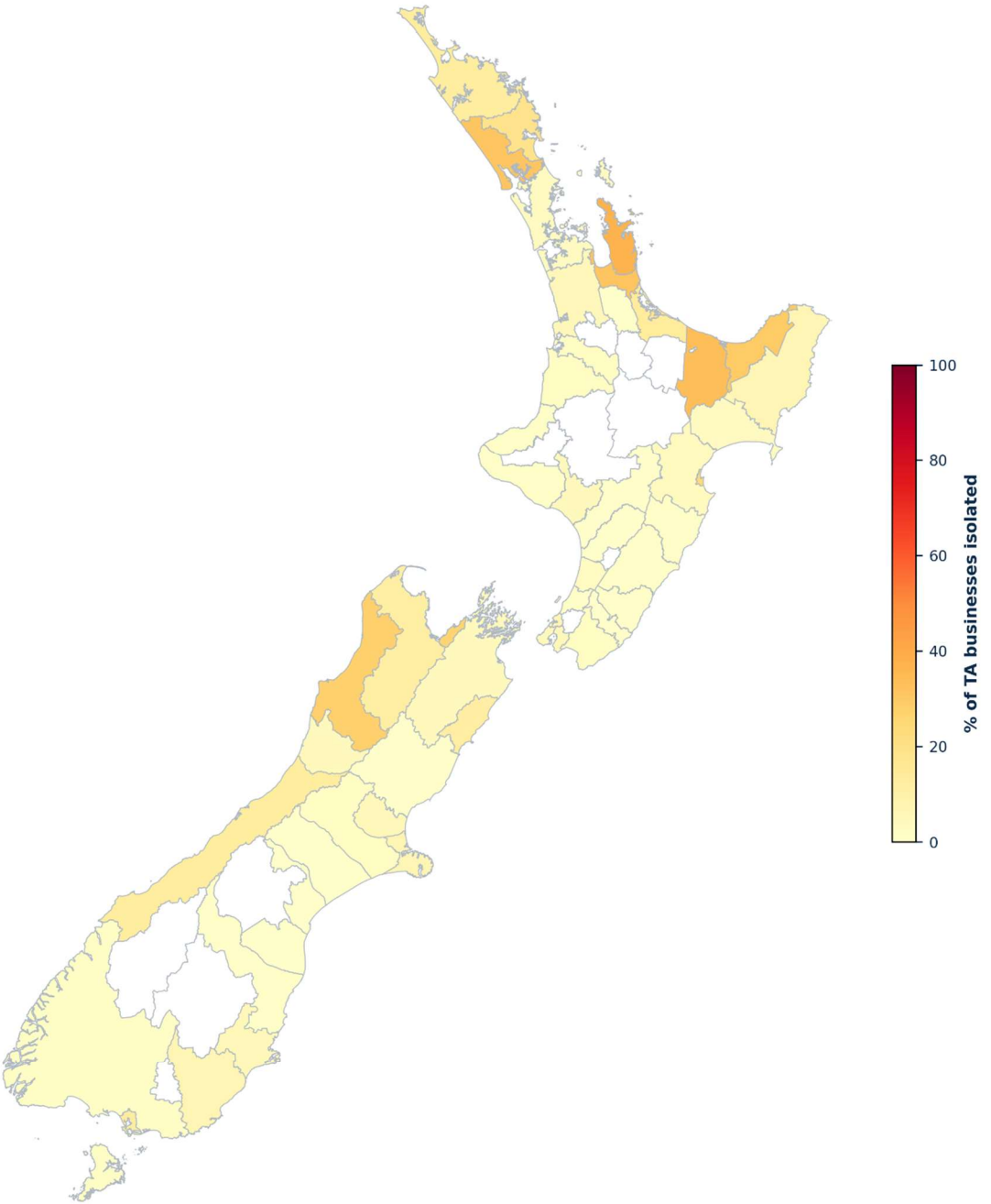


Figure 7 Spatial distribution of potentially isolated businesses by a 1% AEP coastal flood event with 0.5m of sea-level rise, by Territorial Authority.

For example, a 1% AEP coastal flood event could isolate 37% of businesses in Thames-Coromandel District (1,659), 31.6% of businesses in Hauraki District (899), 31% of business in Kaipara District (1,150), 29.5% of businesses in Ōpōtiki District (324), and 27.5% of business in Buller District (302) (Figure 8).

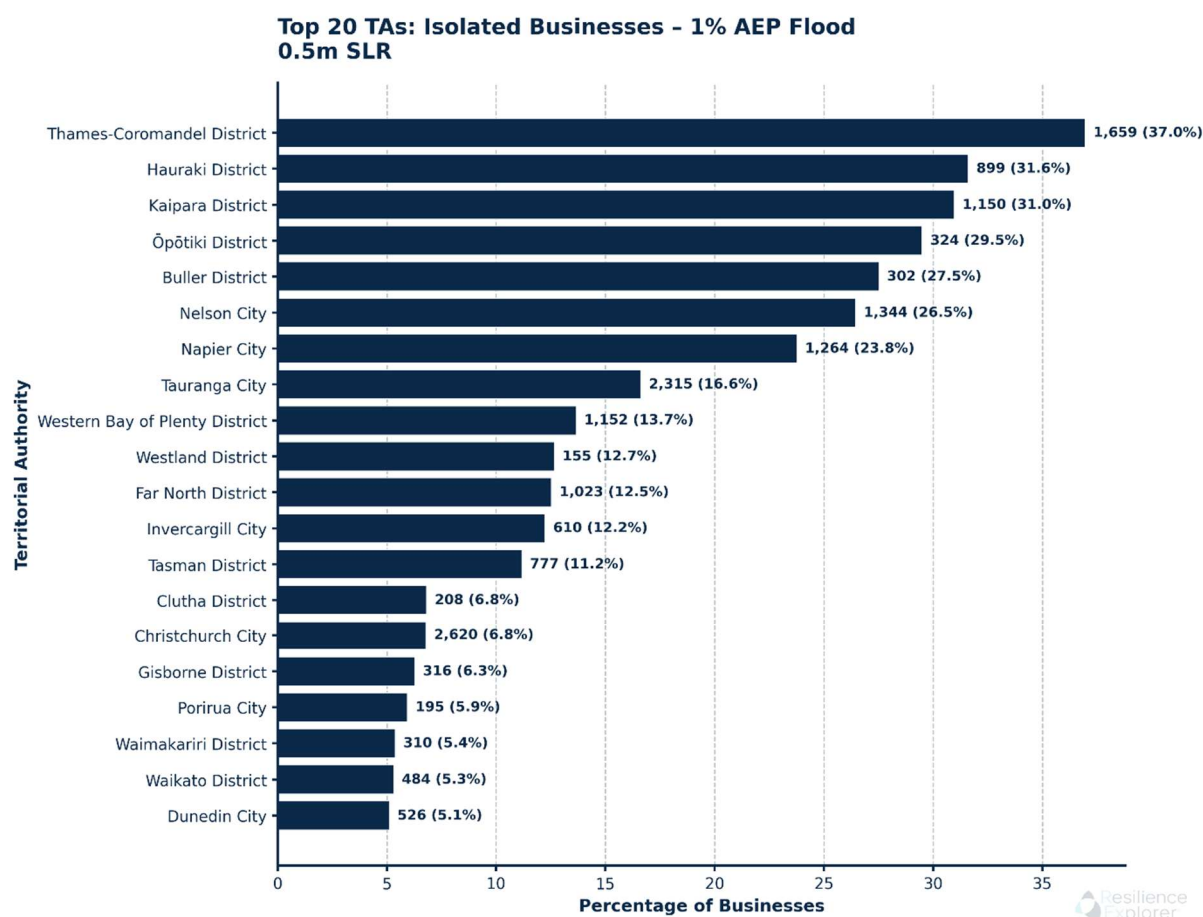
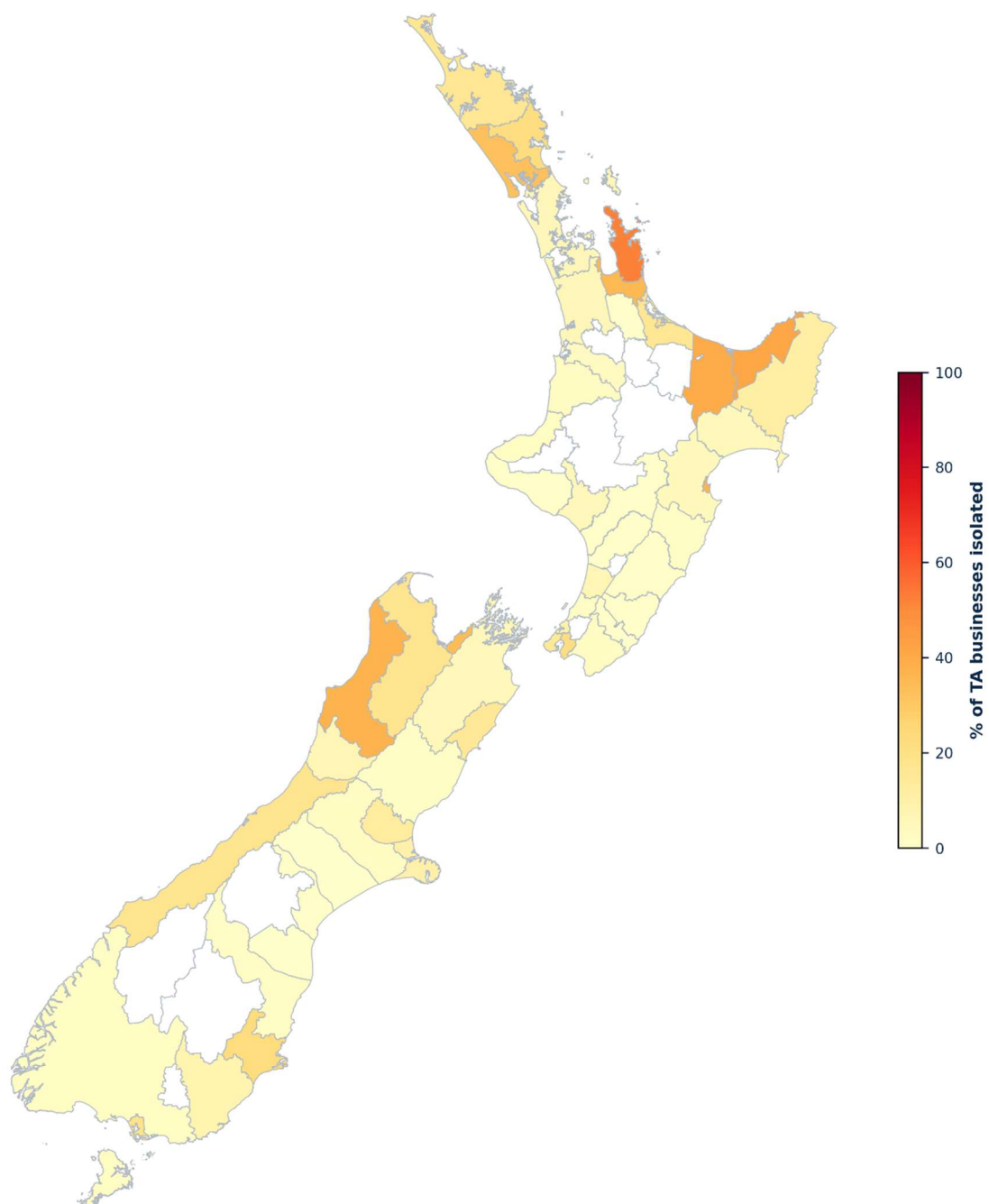


Figure 8 The 20 TAs with the highest percentage of all businesses potentially isolated due to a 1% AEP coastal flood event at 0.5m SLR. Each bar shows the number of businesses isolated and the percentage of the total number of businesses registered in the TA that this represents.

3.3.4 | Business Isolation by Territorial Authority at 1.0m Sea-Level Rise

The risk of business isolation associated with a 1% AEP event across Aotearoa New Zealand at 1.0m of sea-level rise is illustrated in Figure 9. As with previous sea-level rise increments, all coastal TAs have some businesses that are potentially isolated, but clear areas of higher impact are emerging.

Business Isolation Risk - 1% AEP Flood 1.0m SLR



Resilience
Explorer

Figure 9 Spatial distribution of potentially isolated businesses by a 1% AEP coastal flood event with 1.0m of sea-level rise, by Territorial Authority.

For example, at 1.0m of sea-level rise, a 1% AEP coastal flood event will potentially isolate more than half of the businesses in Thames-Coromandel District (52.1% or 2,338 businesses) (Figure 10). The next most potentially affected district is Ōpōtiki with 41.1% of businesses isolated (452), followed by Napier City (37.1% or 1,972 businesses), Buller District (37% or 406 businesses) and Hauraki District with 35.2% or 1,002 businesses affected.

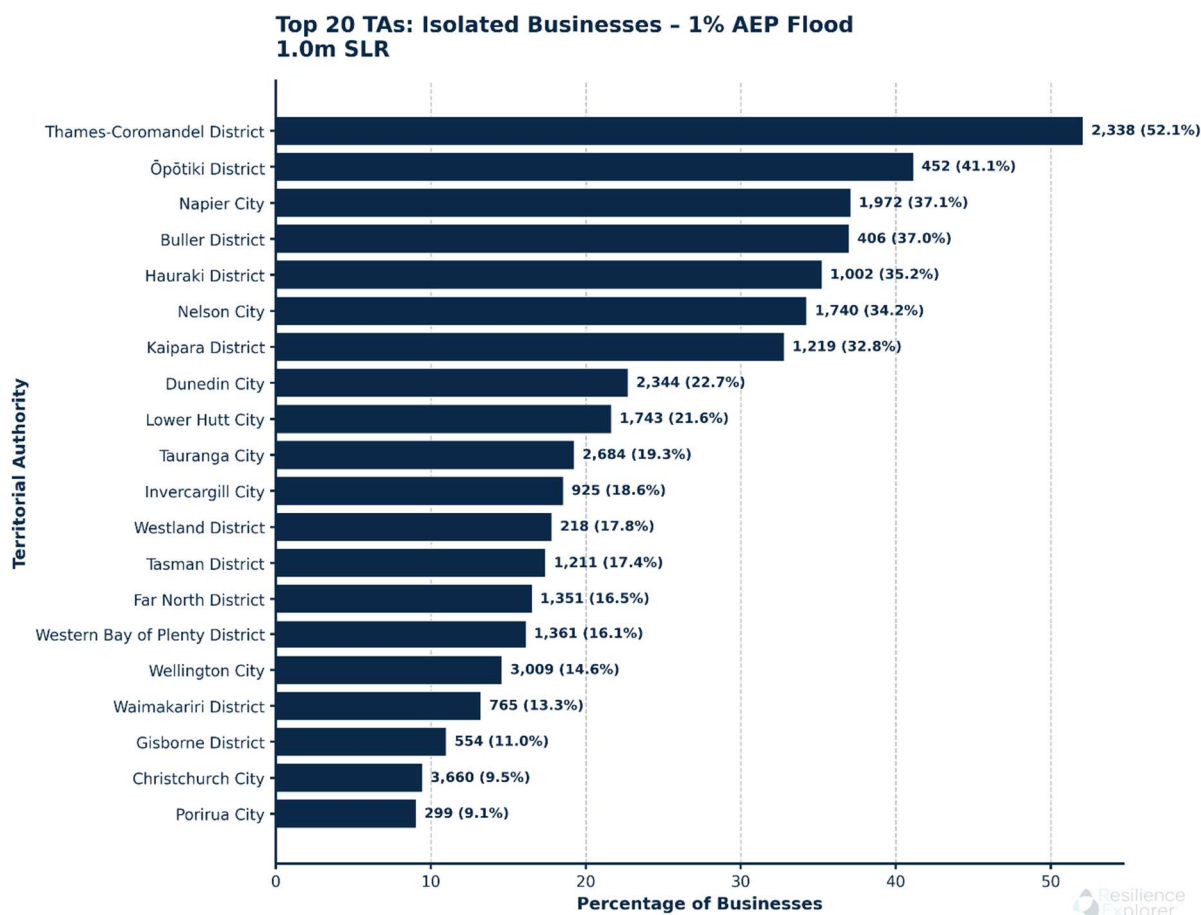


Figure 10 The 20 TAs with the highest percentage of all businesses potentially isolated due to a 1% AEP coastal flood event at 1.0m SLR. Each bar shows the number of businesses isolated and the percentage of the total number of businesses registered in the TA that this represents.

3.3.5 | Relative Business Isolation by Territorial Authority

All of the TAs presented in this section are likely to experience an increase in the total number of isolated businesses as sea levels rise from the present day to 1.0m. Noting that in total 24 different TAs feature in the list of the 20 highest percentages of businesses potentially isolated for at least one sea-level rise increment.

In terms of the relative changes across these TAs, several trends emerge with regards to which TAs have the highest percentage of their businesses at risk of isolation (Table 4). Notable trends include:

- Thames-Coromandel District consistently has either the highest or second-highest percentage of businesses that are potentially isolated across all sea-level rise increments. Notably, the proportion at risk increases progressively from 20.9% to 52.1% as sea levels rise from the present day to 1.0m.
- Buller District is consistently ranked amongst the highest five TAs.
- Kaipara District, Hauraki District, Ōpōtiki District, Napier City, Nelson City, and Tauranga City are consistently in the highest 10 affected TAs across all increments of sea-level rise.

- The 10 highest percentage ranks across the different sea-level rise increments are filled by 13 TAs, which shift slightly relative to each other. These are: Kaipara District; Thames-Coromandel District; Ōpōtiki District; Nelson City; Buller District; Napier City; Western Bay of Plenty District; Far North District; Hauraki District; Tauranga City; Westland District; Dunedin City; and Lower Hutt City. This shows that the TAs affected are relatively consistent, but with a few variations: Westland features at 0.5m only and Dunedin and Lower Hutt City enter the highest 10 at 1.0m sea-level rise.
- By 1.0m sea-level rise, 7 TAs have more than 30% of their local businesses potentially isolated: Kaipara District; Thames-Coromandel District; Ōpōtiki District; Nelson City; Buller District; Napier City; and Hauraki District.

Notable increases in the percentage of isolated businesses between sea-level rise increments include:

- Hauraki District increases from 6.9% with present day sea levels to 30.3% with 0.2m of sea-level rise.
- Napier City increases from 23.8% to 37.1 % between 0.5m and 1.0m.
- Dunedin City increases from 5.1% to 22.7% between 0.5m and 1.0m.

At 1.0m, Dunedin City moves into the 8 highest ranked TAs and Lower Hutt City appears at 9th. Although Dunedin City does feature in the 20 highest ranked TAs for earlier increments, Lower Hutt City does not.

Table 4 The percentage of businesses potentially isolated due to a 1% AEP coastal flood event at present-day sea levels, 0.2m, 0.5m, and 1.0m of sea-level rise. A red arrow indicates the percentage has increased for a particular TA relative to other TAs, and a yellow arrow indicates the percentage has decreased for a TA relative to other TAs.

Present Day (0.0m)	0.2m Sea-Level Rise	0.5m Sea-Level Rise	1.0m Sea-Level Rise
Kaipara District (26.9%)	Thames-Coromandel District (31.2%) ↑	Thames-Coromandel District (37.0%)	Thames-Coromandel District (52.1%)
Thames-Coromandel District (20.9%)	Hauraki District (30.3%) ↑	Hauraki District (31.6%)	Ōpōtiki District (41.1%) ↑
Ōpōtiki District (17.5%)	Kaipara District (28.3%) ↓	Kaipara District (31.0%)	Napier City (37.1%) ↑
Nelson City (15.4%)	Nelson City (22.9%)	Ōpōtiki District (29.5%) ↑	Buller District (37.0%) ↑
Buller District (14.6%)	Buller District (21.7%)	Buller District (27.5%)	Hauraki District (35.2%) ↓
Napier City (12.0%)	Napier City (18.7%)	Nelson City (26.5%) ↓	Nelson City (34.2%)
Western Bay of Plenty District (11.3%)	Ōpōtiki District (17.1%) ↓	Napier City (23.8%) ↓	Kaipara District (32.8%) ↓
Far North District (9.8%)	Tauranga City (13.6%) ↑	Tauranga City (16.6%)	Dunedin City (22.7%) ↑
Hauraki District (6.9%)	Western Bay of Plenty District (13.1%) ↓	Western Bay of Plenty District (13.7%)	Lower Hutt City (21.6%) ↑
Tauranga City (6.4%)	Far North District (11.8%) ↓	Westland District (12.7%) ↑	Tauranga City (19.3%) ↓
Tasman District (6.4%)	Invercargill City (10%) ↑	Far North District (12.5%) ↓	Invercargill City (18.6%) ↑
Gisborne District (4.8%)	Tasman District (8.7%) ↓	Invercargill City (12.2%) ↓	Westland District (17.8%) ↓

Porirua City (4.8%)	Clutha District (6.2%) ↑	Tasman District (11.2%) ↓	Tasman District (17.4%)
Christchurch City (4.5%)	Gisborne District (5.8%) ↓	Clutha District (6.8%) ↑	Far North District (16.5%) ↓
Clutha District (4.0%)	Porirua City (5.7%) ↓	Christchurch City (6.8%) ↑	Western Bay of Plenty District (16.1%) ↓
Westland District (4.0%)	Christchurch City (5.3%) ↓	Gisborne District (6.3%) ↓	Wellington City (14.6%) ↑
Invercargill City (3.4%)	Dunedin City (4.5%) ↑	Porirua City (5.9%) ↓	Waimakariri District (13.3%) ↑
Waikato District (3.3%)	Waikato District (4.1%)	Waimakariri District (5.4%) ↑	Gisborne District (11.0%) ↓
Dunedin City (3.2%)	Westland District (4.1%) ↓	Waikato District (5.3%) ↓	Christchurch City (9.5%) ↓
Waitomo District (2.6%) ↑	Hastings District (3.3%) ↑	Dunedin City (5.1%) ↓	Porirua City (9.1%) ↓

3.4 | Business Isolation by Sector at the Territorial Authority Level

This section focuses on the TAs, which are classified as having the highest proportion of businesses at risk of isolation due to a 1% AEP event, providing a detailed breakdown of businesses affected by sector type at different sea-level rise increments. The 13 TAs included in this section each rank within the top 10 at-risk TAs in Table 4 in at least one of the considered scenarios (present-day, 0.2m SLR, 0.5m SLR, 1.0m SLR). TAs are discussed in approximately the order they appear in Table 4. For each sea-level rise scenario, any individual ANZSIC sector that contributes less than 5% of isolated businesses is bundled into an "Other" category. This is distinct from the ANZSIC division S "Other Services".

3.4.1 | Kaipara District

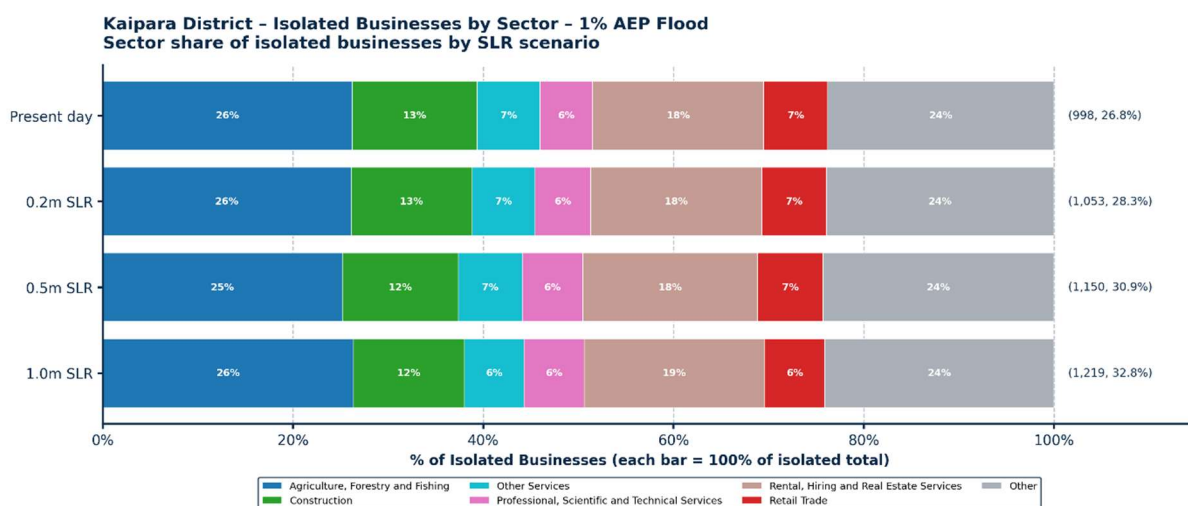


Figure 11 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Kaipara District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Kaipara District).

Figure 11 shows the total isolated businesses by sector within Kaipara District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Agriculture, Forestry and Fishing have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (26% of isolated businesses across all sectors). This represents approximately 260 businesses. The sectors with the next highest proportion of potentially isolated businesses are Rental, Hiring and Real Estate Services (18% of isolated businesses), Construction (13%), and both Retail Trade and Other Services (both 7% of isolated businesses).

This split remains consistent as sea levels rise. Agriculture, Forestry and Fishing remains the sector with the highest proportion of businesses affected, with slight discrepancies due to rounding (26% at 0.2m SLR, 25% at 0.5m SLR, and 26% at 1.0m SLR). Similarly, Rental, Hiring and Real Estate Services remains the sector with the second highest proportion of potentially isolated businesses (18% at 0.2m and 0.5m SLR, and 19% at 1.0m SLR), followed by Construction (13% at 0.2m SLR, 12% at 0.5m and 1.0m SLR), and Retail Trade and Other Services (both 7% at 0.2m and 0.5m SLR, and 6% at 1.0m SLR).

3.4.2 | Thames-Coromandel District

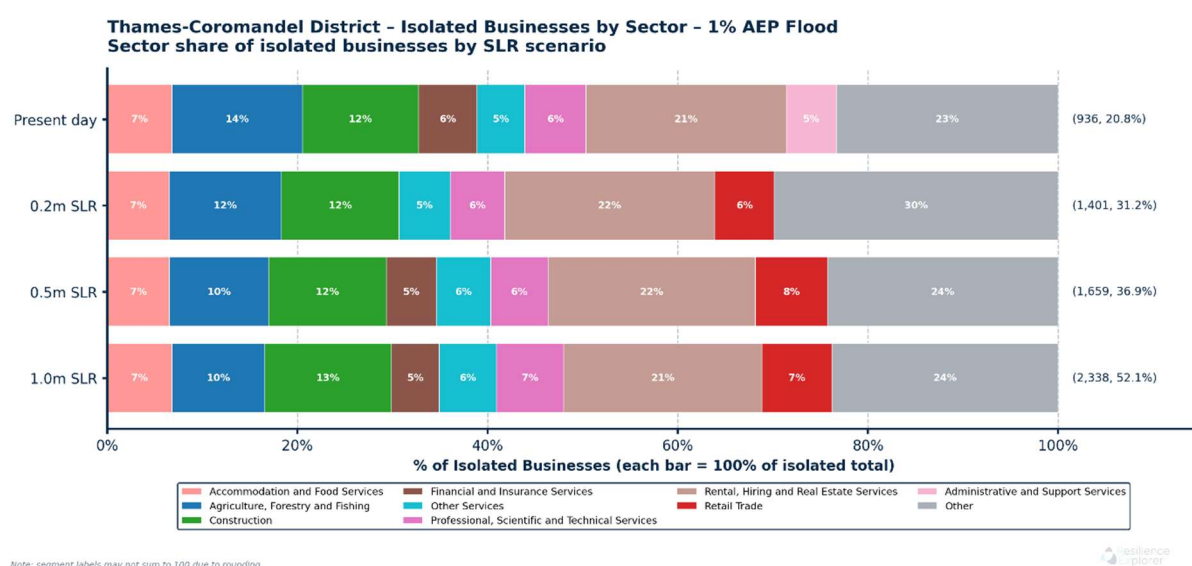


Figure 12 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Thames-Coromandel District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Thames-Coromandel District).

Figure 12 shows the total isolated businesses by sector within Thames-Coromandel District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Rental, Hiring and Real Estate Services have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (21% of isolated businesses across all sectors). This represents approximately 197 businesses. The sectors with the next highest proportion of potentially isolated businesses are Agriculture, Forestry and Fishing (14% of isolated businesses), Construction (12%), and Accommodation and Food Services (7% of isolated businesses).

This split remains fairly consistent with increasing increments of sea-level rise. Rental, Hiring and Real Estate Services remain the sector with the highest proportion of businesses affected (22% at 0.2m and 0.5m SLR, and 21% at 1.0m SLR). At 0.2m SLR, the Agriculture, Forestry and Fishing sector and Construction sectors each account for 12% of isolated businesses. This changes, with Construction having a slightly higher proportion of businesses affected at 0.5m SLR than Agriculture, Forestry and Fishing (12%, compared to 10%), and at 1.0m SLR (13%, compared to 10%). From 0.2m SLR, Retail Trade businesses see a notable increase to 6% of isolated businesses at 0.2m SLR, 8% at 0.5m, and 7% at 1.0m SLR.

3.4.3 | Hauraki District

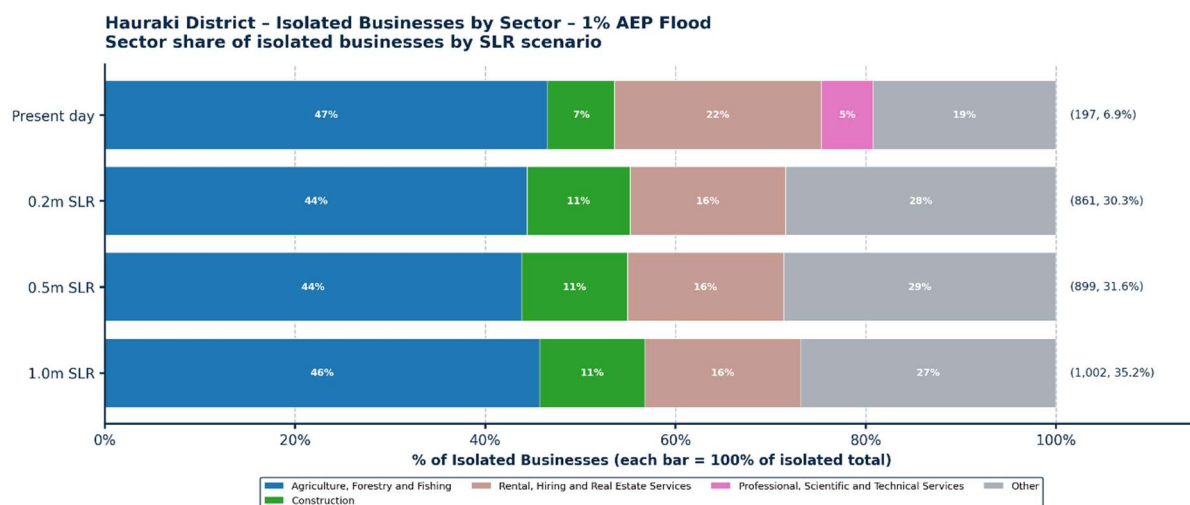


Figure 13 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Hauraki District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Hauraki District).

Figure 13 shows the total isolated businesses by sector within Hauraki District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Agriculture, Forestry and Fishing represent a significant proportion of potentially isolated businesses during a 1% AEP coastal flood (47% of all isolated businesses). This equates to approximately 93 businesses. The sectors with the next highest proportion of potentially isolated businesses are Rental, Hiring and Real Estate Services (22%) and Construction (7%).

This split remains consistent - Agriculture, Forestry and Fishing continues to have the highest proportion of businesses affected (44% at 0.2m and 0.5m SLR, and 46% at 1.0m SLR). Similarly, Rental, Hiring and Real Estate Services remains the sector with the second highest proportion of potentially isolated businesses, albeit somewhat reduced in relative terms (16% at 0.2m, 0.5m, and 1.0m SLR). This is followed once more by Construction, which sees a slight increase in relative terms (11% at 0.2m, 0.5m, and 1.0m SLR).

3.4.4 | Ōpōtiki District

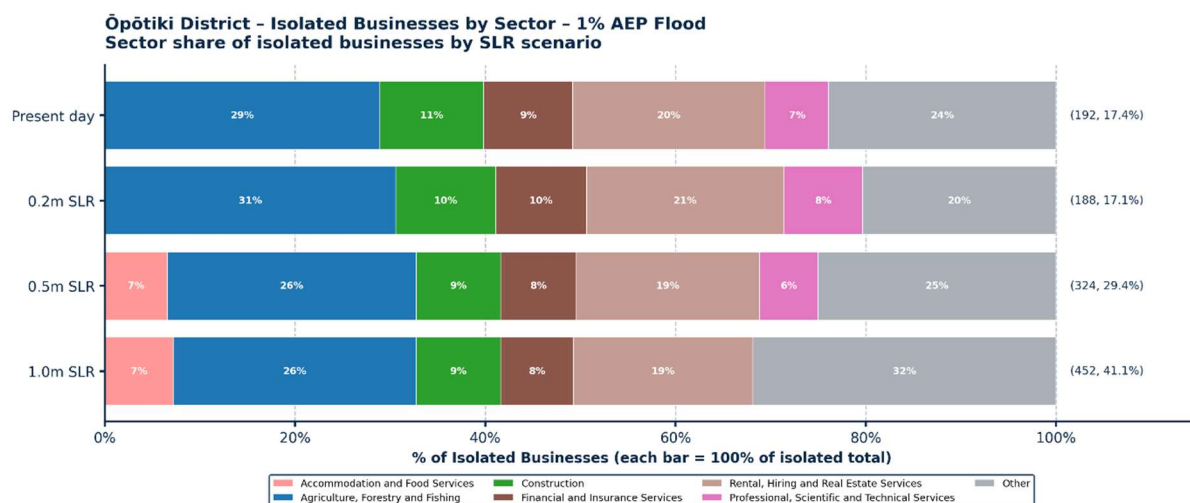


Figure 14 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Ōpōtiki District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Ōpōtiki District).

Figure 14 shows the total isolated businesses by sector within Ōpōtiki District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Agriculture, Forestry and Fishing have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (29% of all isolated businesses). This represents approximately 56 businesses. The sectors with the next highest proportion of potentially isolated businesses are Rental, Hiring and Real Estate Services (20%), Construction (11%), and Financial and Insurance Services (9%).

This split remains consistent as sea levels rise. Agriculture, Forestry and Fishing continues to have the highest proportion of businesses affected, though this declines at higher levels of sea-level rise (31% at 0.2m SLR, lowering to 26% at 0.5m and 1.0m SLR). Similarly, Rental, Hiring and Real Estate Services remains the sector with the second highest proportion of potentially isolated businesses (21% at 0.2m, and 19% at 0.5m and 1.0m SLR). This is followed by Construction (10% at 0.2m, and 9% at 0.5m and 1.0m SLR) and Financial and Insurance Services (10% at 0.2m, and 8% at 0.5m and 1.0m SLR). Of note, Accommodation and Food Services rises to approximately 7% of isolated businesses at 0.5 and 1.0m of sea-level rise.

3.4.5 | Napier City

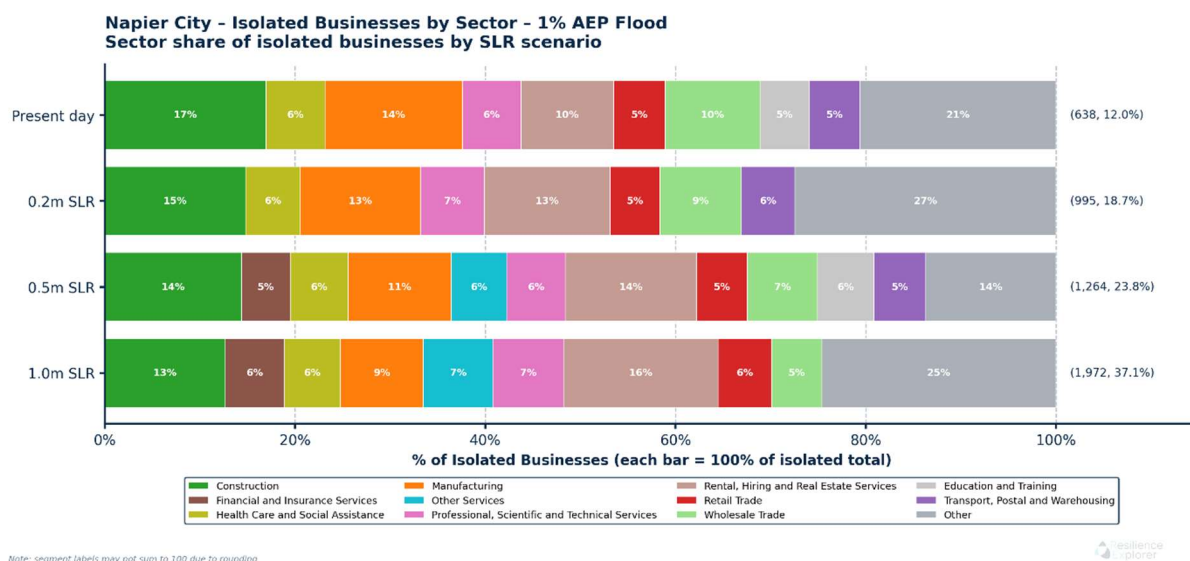


Figure 15 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Napier City. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Napier City).

Figure 15 shows the total isolated businesses by sector within Napier City, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Construction has the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (17% of all isolated businesses). This represents approximately 109 businesses. The sectors with the next highest proportion of potentially isolated businesses are Manufacturing (14%), and both Rental, Hiring and Real Estate Services and Wholesale Trade (each representing 10% of isolated businesses).

At 0.2m SLR, Construction continues to have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (15%). This is followed by Manufacturing (13%), Rental, Hiring and Real Estate Services (13%), and Wholesale Trade (9%).

This trend changes slightly at 0.5m SLR, with both Construction and Rental, Hiring and Real Estate Services having the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (each 14% of all isolated businesses). These are followed by Manufacturing (11%) and Wholesale Trade (7%).

At 1.0m SLR, Rental, Hiring and Real Estate Services becomes the sector with the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (16% of all isolated businesses). The sectors with the next highest proportion of potentially isolated businesses are Construction (13%), Manufacturing (9%) and both Professional, Scientific and Technical Services and Other Services (each 7%).

3.4.6 | Nelson City

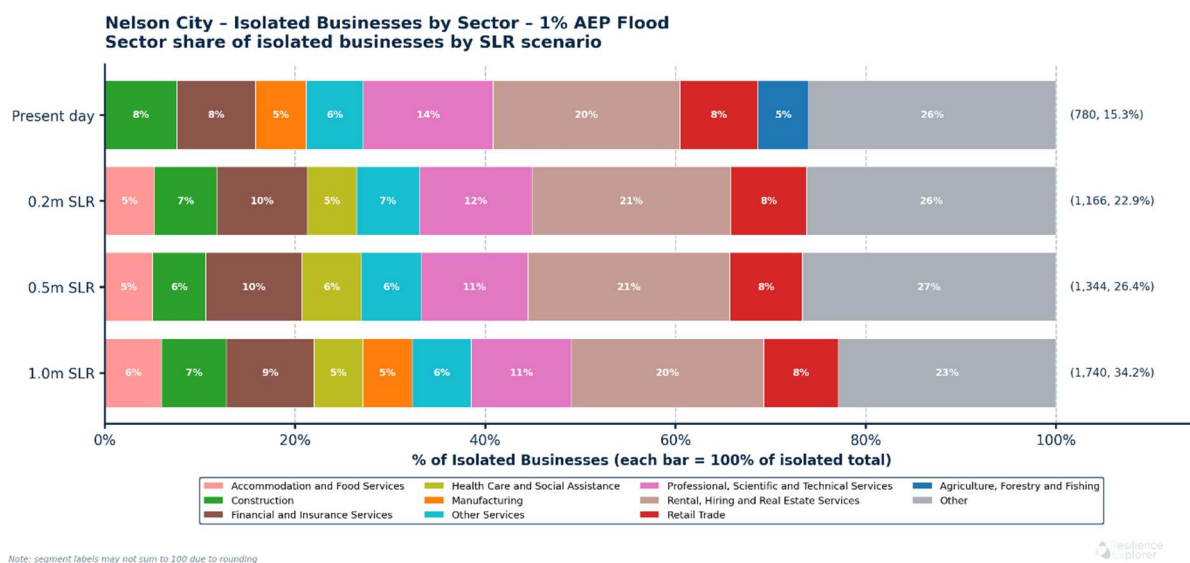


Figure 16 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Nelson City. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Nelson City).

Figure 16 shows the total isolated businesses by sector within Nelson City, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

At present-day sea levels, Rental, Hiring and Real Estate Services has the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (20% of all isolated businesses, approximately 156 businesses). The sectors with the next highest proportion of potentially isolated businesses are Professional, Scientific and Technical Services (14%), and Construction, Financial and Insurance Services, and Retail Trade (each representing 8% of isolated businesses).

This split remains fairly consistent with rising sea levels. Rental, Hiring and Real Estate Services remains the sector with the highest proportion of businesses affected (21% at 0.2m and 0.5m SLR, and 20% at 1.0m SLR). Similarly, Professional, Scientific and Technical Services remains the sector with the second highest proportion of potentially isolated businesses (12% at 0.2m SLR, and 11% at 0.5m and 1.0m SLR), followed by Financial and Insurance Services (10% at 0.2m and 0.5m SLR, and 9% at 1.0m SLR) and Retail Trade (8% at all three sea-level rise increments).

3.4.7 | Buller District

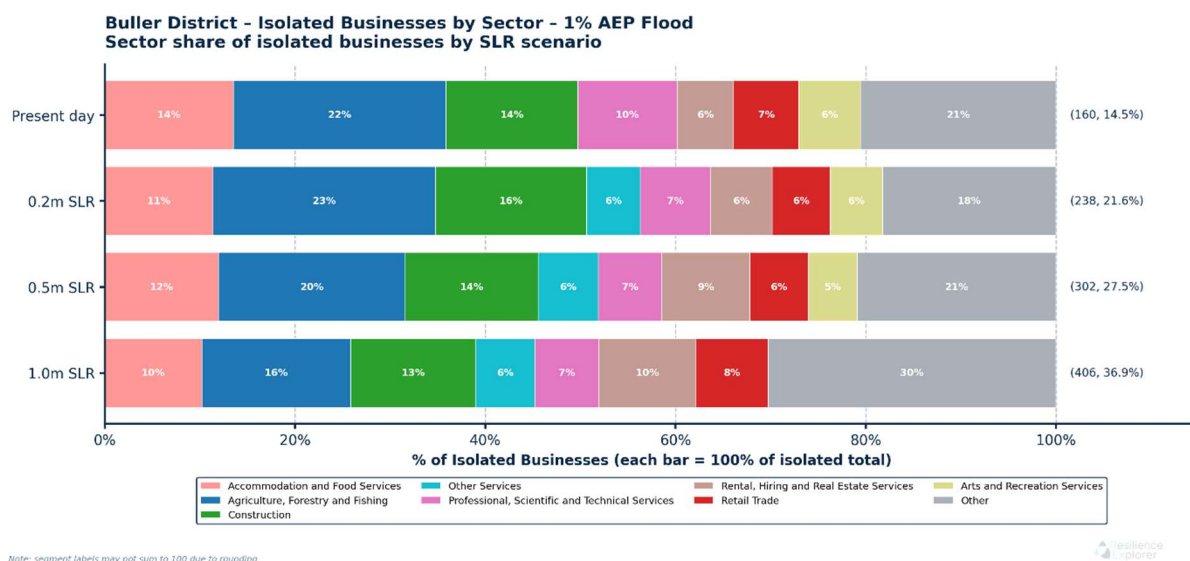


Figure 17 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Buller District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Buller District).

Figure 17 shows the total isolated businesses by sector within Buller District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Agriculture, Forestry and Fishing have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (22% of all isolated businesses). This represents approximately 35 businesses. The sectors with the next highest proportion of potentially isolated businesses are both Accommodation and Food Services and Construction (each representing 14% of isolated businesses), and Professional, Scientific and Technical Services (10%).

This split remains fairly consistent with higher sea levels. Agriculture, Forestry and Fishing remains the sector with the highest proportion of businesses affected (23% at 0.2m SLR, 20% at 0.5m SLR, and 16% at 1.0m SLR). Construction becomes the sector with the second highest proportion of potentially isolated businesses (16% at 0.2m SLR, 14% at 0.5m SLR, and 13% at 1.0m SLR), followed by Accommodation and Food Services (11% at 0.2m SLR, 12% at 0.5m SLR, and 10% at 1.0m SLR).

At 0.2m SLR, Professional, Scientific and Technical Services has the fourth highest proportion of potentially isolated businesses (7%), though this changes to Rental, Hiring and Real Estate Services at 0.5m SLR (9%) and 1.0m SLR (10%, becoming equal to Accommodation and Food Services).

3.4.8 | Western Bay of Plenty District

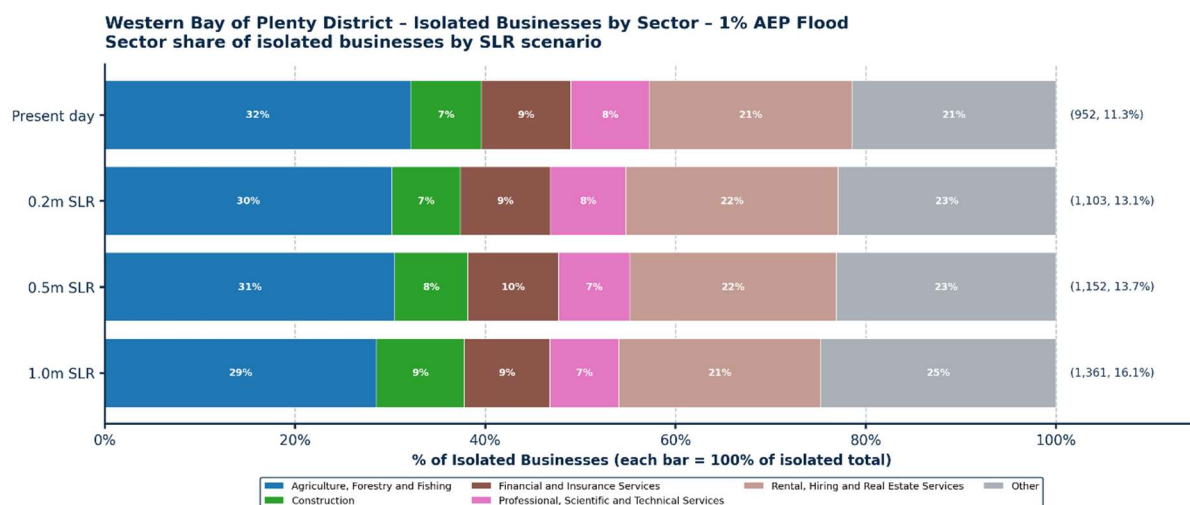


Figure 18 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Western Bay of Plenty District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Western Bay of Plenty District).

Figure 18 shows the total isolated businesses by sector within Western Bay of Plenty District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Agriculture, Forestry and Fishing has the highest proportion of potentially isolated businesses during a 1% AEP coastal flood under present-day conditions (32% of all isolated businesses, approximately 305 businesses). The sectors with the next highest proportion of potentially isolated businesses are Rental, Hiring and Real Estate Services (21%), Financial and Insurance Services (9%), Professional, Scientific and Technical Services (8%), and Construction (7%).

This split remains more or less consistent across the 3 increments of sea-level rise. Agriculture, Forestry and Fishing remains the sector with the highest proportion of businesses affected (30% at 0.2m SLR, 31% at 0.5m SLR, and 29% at 1.0m SLR). Similarly, Rental, Hiring and Real Estate Services remains the sector with the second highest proportion of potentially isolated businesses (22% at 0.2m and 0.5m SLR, and 21% at 1.0m SLR), followed by Financial and Insurance Services (9% at 0.2m SLR, 10% at 0.5m SLR, and 9% at 1.0m SLR). Construction increases slightly over time (7% at 0.2m SLR, 8% at 0.5m SLR, and 9% at 1.0m SLR).

3.4.9 | Far North District

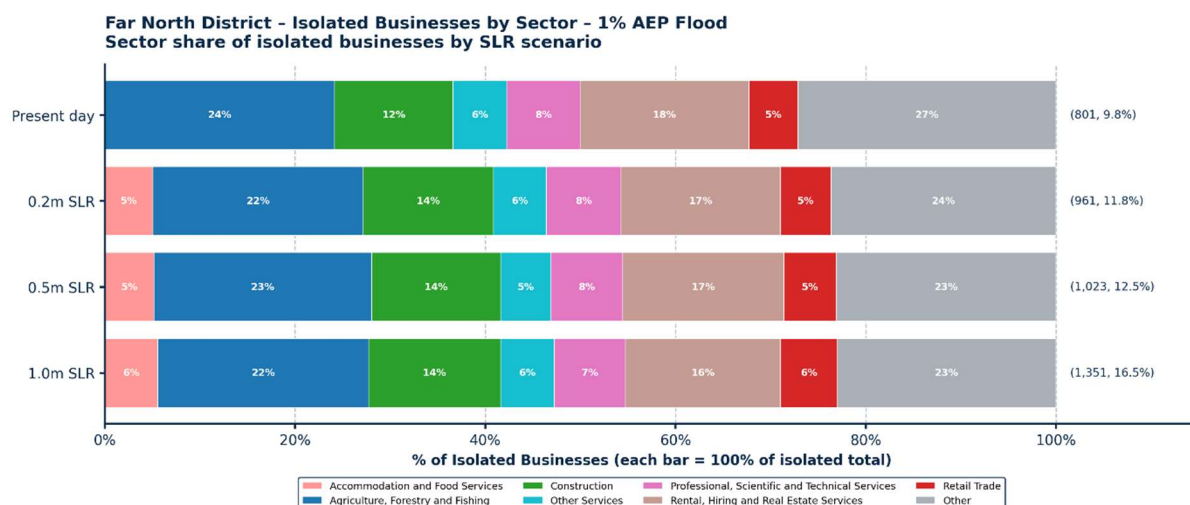


Figure 19 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Far North District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Far North District).

Figure 19 shows the total isolated businesses by sector within Far North District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Agriculture, Forestry and Fishing have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood under present-day conditions (24% of all isolated businesses, approximately 193 businesses). This is followed by Rental, Hiring and Real Estate Services (18% of isolated businesses), Construction (12%), and Professional, Scientific and Technical Services (8%).

This split remains consistent as sea levels increase. Agriculture, Forestry and Fishing remains the sector with the highest proportion of businesses affected (22% at 0.2m SLR, 23% at 0.5m SLR, and 22% at 1.0m SLR). Similarly, Rental, Hiring and Real Estate Services remains the sector with the second highest proportion of potentially isolated businesses (17% at 0.2m and 0.5m SLR, and 16% at 1.0m SLR), followed by Construction (14% at all sea-level rise increments) and Professional, Scientific and Technical Services (8% at 0.2m and 0.5m SLR, and 7% at 1.0m SLR).

3.4.10 | Tauranga City

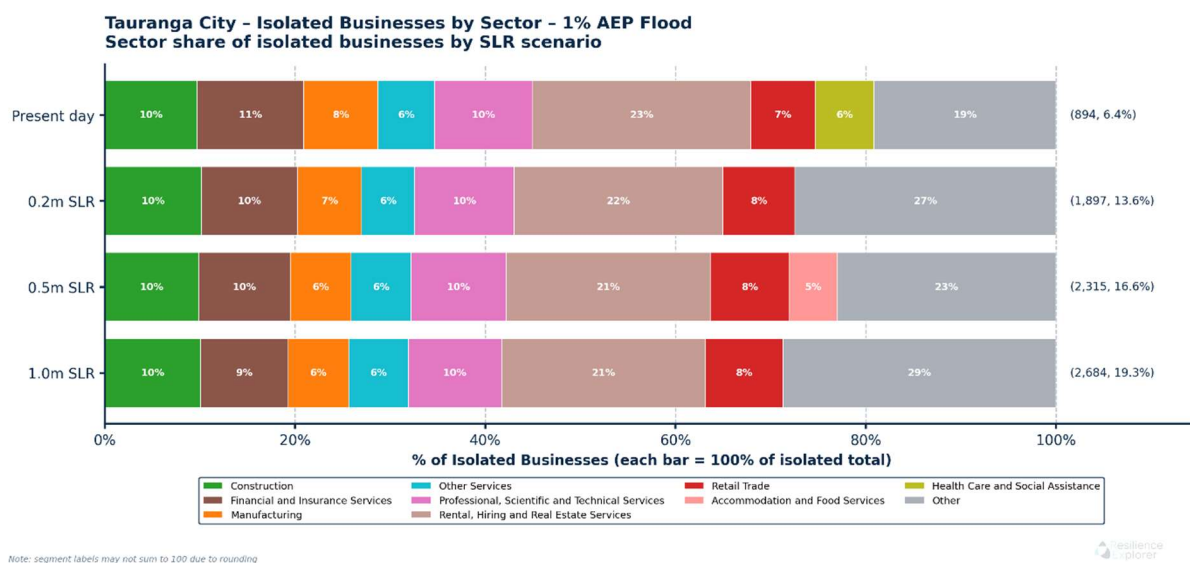


Figure 20 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Tauranga City. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Tauranga City).

Figure 20 shows the total isolated businesses by sector within Tauranga City, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Rental, Hiring and Real Estate Services have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (23% of all isolated businesses). This represents approximately 206 businesses. The sectors with the next highest proportion of potentially isolated businesses are Financial and Insurance Services (11%) and both Construction and Professional, Scientific and Technical Services (10% each).

As sea levels rise, this split essentially remains consistent. Rental, Hiring and Real Estate Services remain the sector with the highest proportion of businesses affected (22% at 0.2m SLR, and 21% at 0.5m and 1.0m SLR). Construction and Professional, Scientific and Technical Services each account for 10% of potentially isolated businesses across all sea-level rise increments. Financial and Insurance Services constitutes 10% of potentially isolated businesses at 0.2m and 0.5m SLR, and 9% at 1.0m.

3.4.11 | Dunedin City

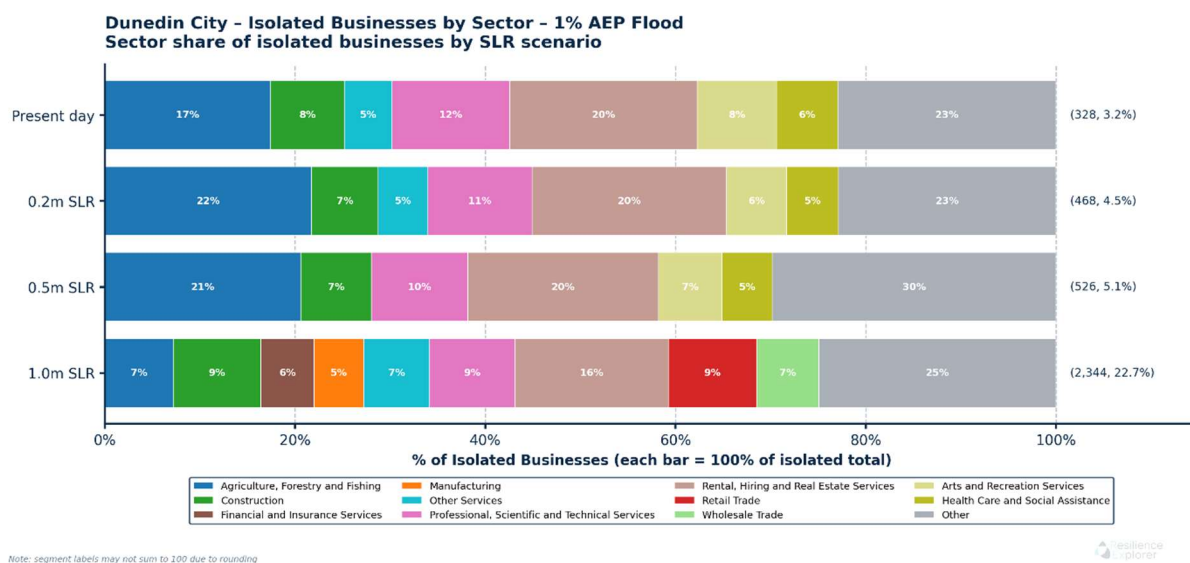


Figure 21 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Dunedin City. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Dunedin City).

Figure 21 shows the total isolated businesses by sector within Dunedin City, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Rental, Hiring and Real Estate Services have the highest proportion of potentially isolated businesses during a 1% AEP coastal flood, under present-day conditions (20% of all isolated businesses). This represents approximately 66 businesses. The sectors with the next highest proportion of potentially isolated businesses are Agriculture, Forestry and Fishing (17%), Professional, Scientific and Technical Services (12%), and both Construction and Arts and Recreation Services (each 8%).

The relative order of affected sectors changes as sea levels rise. At 0.2m and 0.5m SLR, Agriculture, Forestry, and Fishing becomes the sector with the highest proportion of potentially isolated businesses (22% and 21% respectively), followed by Rental, Hiring and Real Estate Services (20% at both 0.2m and 0.5m SLR). Professional, Scientific and Technical Services makes up 11% of potentially isolated businesses at 0.2m SLR and 10% at 0.5m, followed by Construction (7%).

At 1.0m SLR, there is a notable change in the proportion of sector types, as more sectors have 5% or more of their businesses classified as being affected. Agriculture, Forestry and Fishing drops right down to 7% of all potentially isolated businesses, while Rental, Hiring and Real Estate Services once more becomes the sector with the highest proportion (16%). This is followed by Construction, Retail Trade, and Professional, Scientific and Technical Services (9% each).

3.4.12 | Lower Hutt City

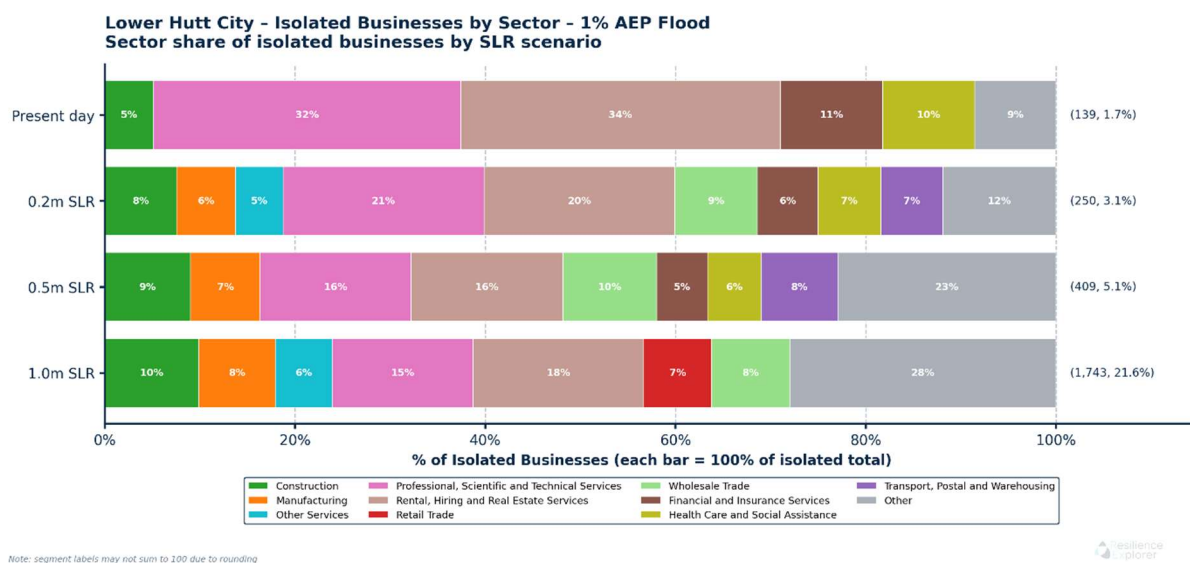


Figure 22 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Lower Hutt City. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Lower Hutt City).

Figure 22 shows the total isolated businesses by sector within Lower Hutt City, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Rental, Hiring and Real Estate Services and Professional, Scientific and Technical Services have by far the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (34% and 32% of all isolated businesses). This represents approximately 48 and 45 businesses, respectively. The sectors with the next highest proportion of potentially isolated businesses are Financial and Insurance Services (11%) and Health Care and Social Assistance (10%).

Over time, a larger number of sectors have approximately 5% or more of their businesses at risk of isolation. At all three sea-level rise increments, Rental, Hiring and Real Estate Services and Professional, Scientific and Technical Services remain the sectors with the highest proportion of potentially isolated businesses, albeit reduced in relative terms (20% and 21% at 0.2m SLR, 16% each at 0.5m SLR, and 18% and 15% at 1.0m SLR, respectively).

There is some variation in the proportion of other sectors affected. At 0.2m and 0.5m SLR, Wholesale Trade becomes the sector with the third largest proportion of potentially isolated businesses (9% and 10% respectively), followed by Construction (8% and 9%). At 1.0m SLR, Construction becomes the third most at-risk sector (10% of potentially isolated businesses), followed by both Wholesale Trade and Manufacturing (both 8%).

3.4.13 | Westland District

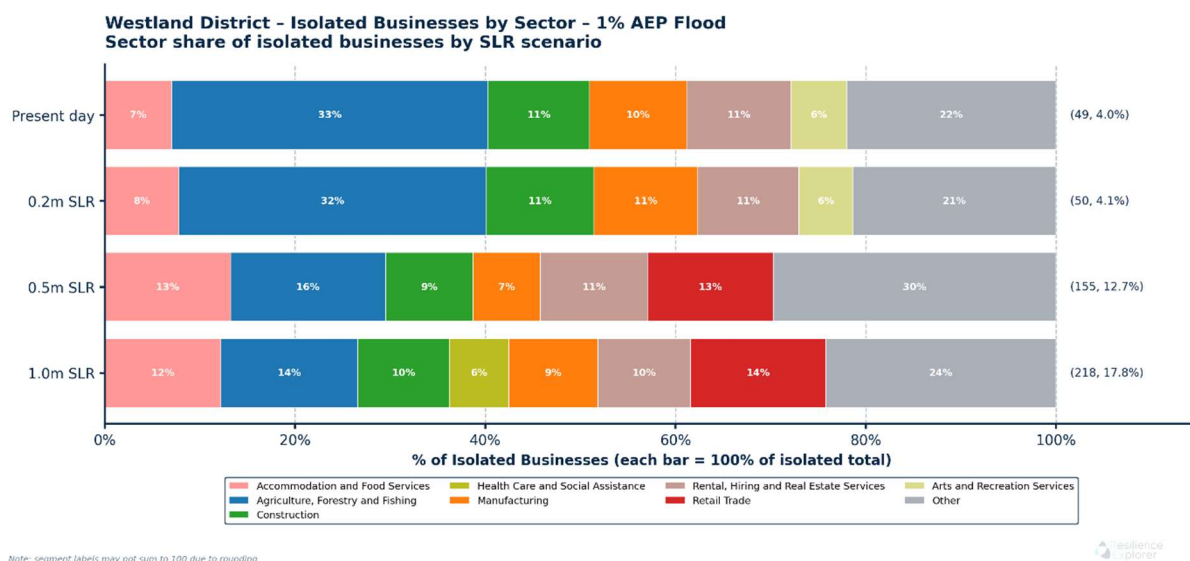


Figure 23 Percentage of isolated businesses by sector as a proportion of all isolated businesses in Westland District. The values provided in brackets represent the total number of businesses isolated (actual number and as a % of all businesses in Westland District).

Figure 23 shows the total isolated businesses by sector within Westland District, both under present-day conditions (0.0m SLR) and over three future sea-level rise scenarios (0.2m, 0.5m, 1.0m).

Under present-day conditions, Agriculture, Forestry and Fishing have by far the highest proportion of potentially isolated businesses during a 1% AEP coastal flood (33% of all isolated businesses). This represents approximately 17 businesses. The sectors with the next highest proportion of potentially isolated businesses are Construction and Rental, Hiring and Real Estate Services (both 11%) and Manufacturing (10%).

At 0.2m SLR, these splits remain essentially the same with Agriculture, Forestry and Fishing constituting 32% of potentially isolated businesses, followed by Construction, Manufacturing, and Rental, Hiring and Real Estate Services (each 11%).

At higher increments of sea-level rise, a larger number of sectors have approximately 5% or more of their businesses at risk of isolation. At 0.5m SLR, Agriculture, Forestry and Fishing drops down to 16% of all potentially isolated businesses, followed closely by Retail Trade and Accommodation and Food Services, which each jump to 13%. They are followed by Rental, Hiring and Real Estate Services at 11% of potentially isolated businesses.

At 1.0m SLR, Agriculture, Forestry and Fishing and Retail Trade have the highest proportion of affected businesses (14% each). This represents approximately 31 businesses each. They are followed by Accommodation and Food Services (12%) and both Rental, Hiring and Real Estate Services and Construction (10% each).

3.4.14 | Relative Business Isolation by Sector at the Territorial Authority Level

Similar to the total number of businesses potentially isolated by a 1% AEP coastal flooding event, the potential isolation of businesses by sector is not distributed evenly across the country. Our analysis focuses on the TAs which were identified as having the highest percentage of potentially isolated businesses at each sea-level rise increment. Looking at the 10 highest-ranked TAs across each of the four sea-level rise scenarios (0.0m, 0.2m, 0.5m, 1.0m), this totals 13 individual TAs, which we identify as being disproportionately affected by business isolation.

Of the 13 TAs with the highest proportion of businesses at risk of isolation, those whose proportion of sectors remains largely unchanged over time are:

- Far North District
- Hauraki District
- Kaipara District
- Tauranga City
- Western Bay of Plenty

The TAs which see the most notable change in composition of affected sectors are Dunedin City (which changes most notably by 1.0m SLR), Napier City (which changes most notably at 0.5m SLR), and Nelson City and Lower Hutt City (which both change most notably by 0.2m SLR). These changes indicate an extension of flood risk into different locations with different sector profiles by the time a specific sea-level rise increment is reached, compared to other TAs whose sector composition remains more static.

The sector composition of potentially isolated businesses varies across the 13 most-affected TAs, though two sectors are consistently among the most represented across the majority of TAs and sea-level rise increments: Agriculture, Forestry and Fishing, and Rental, Hiring and Real Estate Services.

The sectors which commonly rank amongst the second, third and fourth most at-risk of isolation across the TAs are relatively consistent, with Construction, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, and Retail Trade generally the next most affected sectors.

For District TAs, the sector with the highest proportion of businesses at risk across all sea-level rise scenarios is Agriculture, Forestry and Fishing in all but Thames-Coromandel District (where Rental, Hiring and Real Estate Services is most at risk).

In contrast, the most affected sector in all City-level TAs is generally Rental, Hiring and Real Estate Services. The exceptions are: Construction is the most affected in Napier City until 1.0m SLR; Professional, Scientific and Technical Services is the most affected in Lower Hutt City at 0.2m and 0.5m SLR; and Agriculture, Forestry and Fishing is the most affected sector in Dunedin City at 0.2m and 0.5m SLR.

04

Summary and Conclusions



4. | Summary and Conclusions

The total number of businesses potentially isolated during a 1% AEP coastal flood increases as sea levels rise. Under present-day conditions, over 15,500 businesses or 3.2% of all businesses in Aotearoa New Zealand are potentially isolated. This number increases with sea-level rise, to more than 22,500 isolated at 0.2m SLR (4.6%), 28,900 at 0.5m SLR (5.9%), and 44,400 at 1.0m SLR (9%). However, some TAs are disproportionately represented, indicating potentially greater economic impact and disruption in these areas.

- **Thames Coromandel and Hauraki Districts could have more than 30% of local businesses potentially isolated with a 1% AEP event at 0.2m sea-level rise.** Kaipara District may reach 30% of businesses potentially isolated with 0.5m of sea-level rise.
- **By 1.0m of sea-level rise, seven TAs have more than 30% of local businesses potentially isolated.** These are Thames-Coromandel District, Ōpōtiki District, Napier City, Buller District, Hauraki District, Nelson City, and Kaipara District.
- **Thames-Coromandel District consistently has either the highest or second-highest percentage** of businesses potentially isolated across all sea-level rise increments, with the proportion rising progressively from 20.9% at present day to 52.1% at 1.0m.
- **Across all increments of sea-level rise, a group of 13 TAs remains represented in the ten highest-ranked areas:** Kaipara District, Thames-Coromandel District, Ōpōtiki District, Nelson City, Buller District, Napier City, Western Bay of Plenty District, Far North District, Hauraki District, Tauranga City, Westland District, Dunedin City, and Lower Hutt City. Of these, six TAs appear in the top 10 across every increment (Kaipara District, Hauraki District, Ōpōtiki District, Napier City, Nelson City, and Tauranga City), and Buller District is consistently within the top five. The Thames-Coromandel District is always in the top two most affected TAs.
- **The composition of the 10 highest-ranked TAs is relatively stable, but with some notable shifts at higher levels of sea-level rise.** Westland District appears only at the 0.5m increment, while Dunedin City and Lower Hutt City enter the top 10 at 1.0m. Although Dunedin features in the 20 highest-ranked TAs at earlier increments, Lower Hutt City does not until the 1.0m scenario, when it ranks ninth.
- **Several TAs show particularly notable increases between increments.** Hauraki District rises from 6.9% at present day sea levels to 30.3% at 0.2m, a jump of over 23 percentage points. Napier City increases from 23.8% to 37.1% between the 0.5m and 1.0m increments. Dunedin City increases from 5.1% at 0.5m to 22.7% at 1.0m, a rise of 17.6 percentage points, which drives its entry into the 10 highest-ranked TAs at that increment.

In terms of sectors, both the total number and proportion of businesses potentially isolated in each sector increase with each sea-level rise increment. By 1.0m of sea-level rise, all sectors approach (or exceed) double their present-day percentages (isolated businesses as a proportion of all businesses). Under present-day conditions, the proportion of potentially isolated businesses ranges from 1.9% (Information Media and Telecommunications) to 4.3% (Arts and Recreation Services). By 1.0m, this range increases to between 7.3% (Agriculture, Forestry and Fishing) and 13.1% (Electricity, Gas, Water and Waste Services). Even the lowest-ranked sector, Agriculture, Forestry and Fishing, is still likely to experience economic disruption at 1.0m of sea-level rise, with 7.3% of its businesses potentially affected.

While all sectors show an overall increase, the relative ranking of sectors shifts considerably across the four increments, indicating that the timing of economic disruption may differ across the sectors:

- **The Arts and Recreation Services sector has the highest proportion of potentially isolated businesses at present day (4.3%), but is overtaken by Electricity, Gas, Water and Waste Services from 0.5m sea-level rise onwards.** By 1.0m, Electricity, Gas, Water and Waste Services has the highest proportion of any sector at risk at 13.1%, having risen from 3.2% in 7th position for present-day sea levels. At 0.2m, this sector moves from 7th to 2nd position (5.6% of businesses potentially isolated), before becoming the most affected sector at both 0.5m (8.1%) and 1.0m (13.1%).

- Four sectors show more notable increases in relative rankings across sea-level rise increments, indicating a step-change in potential isolation.** For example, the Electricity, Gas, Water and Waste Services as described above. Manufacturing also moves steadily up the rankings from 12th position at present day (2.8%) through 6th at 0.2m (4.9%), 5th at 0.5m (6.7%), and 4th at 1.0m (10.8%). Transport, Postal and Warehousing begins in 14th position at present day (2.7%), rising to 8th at 0.2m (4.7%), 4th at 0.5m (6.7%), and remaining in the top five at 1.0m (10.5%). Wholesale Trade shows the most abrupt shift, remaining in 18th or 19th position at present day (2.0%) and 0.2m (3.6%), before jumping to 8th position at 1.0m with 9.3% of businesses in the sector potentially isolated. In contrast, some sectors show steady increases without dramatic shifts in relative ranking. Public Administration and Safety and Construction remain consistently among the 10 most-affected sectors across all increments. Rental, Hiring and Real Estate, Financial and Insurance Services, Education and Training, Mining, and Accommodation and Food Services remain roughly in the middle of the rankings throughout. Retail Trade, Information Media and Telecommunications, and Other Services remain among the least affected sectors across all increments.
- The Agriculture, Forestry and Fishing sector presents a distinctive trend, starting as the second highest-ranked sector at present-day sea levels (3.8%), but moving progressively to the lowest-ranked sector by 1.0m (7.3%)** as other sectors increase relatively more. Despite this relative drop in rank, the total number of potentially isolated businesses remains considerable, rising from 2,278 under present-day conditions to 4,319 at 1.0m of sea-level rise. It is important to note that many of these businesses are likely to be owner-operated businesses (e.g. farms) for whom isolation during a flood event could have significant economic consequences.
- The Rental, Hiring and Real Estate Services sector has the highest total number of businesses potentially isolated across all sea-level rise increments,** although its ranking according to the proportion of its businesses potentially affected places it only 9th at 1.0m. The total number of potentially isolated businesses in this sector increases from approximately 3,400 (3.5%) under present-day conditions to over 9,000 (9.2%) at 1.0m. This scale of increase highlights that percentage rankings alone do not fully capture the potential economic impact, and that sectors with large total business numbers can face substantial absolute losses even where their proportional exposure appears more moderate.

4.1 | Implications and Future Analysis

This report provides a first-pass national assessment of potential business isolation resulting from 1% AEP coastal flooding across Aotearoa New Zealand. By examining exposure at both the national and TA level, the analysis identifies which areas and sectors may be disproportionately affected, both under present-day conditions and across a range of future increments of sea-level rise. In doing so, it establishes an evidence base to inform wider national assessments of coastal flood risk and to support adaptation planning processes at multiple scales. The findings also provide baseline data that can be drawn upon for ongoing risk monitoring and adaptation tracking as sea levels continue to rise.

Economic disruption via business isolation associated with a 1% AEP coastal storm is not a temporally distant problem. There are over 15,000 businesses potentially isolated under present day sea levels and the impacts could begin to exacerbate by 0.2m of sea-level rise. At the national scale, approximately 1-in-10 businesses could experience continuity challenges with 1.0m of sea-level rise. As a result, impacts on regional and national GDP are likely.

The economic impacts of isolation will not be evenly distributed across the country. Certain TAs and sectors face considerably greater isolation-related business interruption than others, and the scale of potential isolation increases substantially with each increment of sea-level rise. Seven TAs are likely to have more than 1-in-3 businesses isolated at 1.0m of sea-level rise. This signals a significant level of potential economic impact ahead.

This uneven distribution has implications not only for the businesses directly affected, but for the wider economic wellbeing and resilience of the communities that depend on them. Disruption to supply chains, access to services, and local employment can compound the direct impacts of flooding, particularly in areas where a high proportion of businesses are potentially isolated and where many of those businesses are likely to be small or owner-operated. Although the cascading implications of business isolation have not been

considered in this report, they are likely to include the ability of people to earn an income, the ability to access goods and services, and the longer-term viability of some businesses in their current location.

Local business interruptions may also have regional or national implications if the affected businesses are a critical part of a supply or value chain on which businesses in another area depend - for example, parts or products that are used in the manufacturing of other goods, or delivery of services.

All of the sectors are likely to be affected by business isolation to varying degrees, and the importance of the impacts on each sector from this analysis can be extrapolated, but warrant further, more detailed investigation. For some of the impacted sectors (e.g. Agriculture, Forestry and Fishing sector), although the total proportion of businesses affected is relatively small, the total number of individual businesses is high. Many of those impacted could be small owner-operated businesses, which contribute to the wellbeing of the regional economy. Other sectors, such as the Electricity, Gas, Water and Waste Services sector, may provide essential services to other businesses and the community more generally. Isolation of this type of business may then affect the ability of others to function, e.g. loss of power or water means businesses that could otherwise remain open have to close until services are restored. Given that over 13% of businesses in the Electricity, Gas, Water and Waste Services sector could be isolated by a 1% AEP coastal flooding event with 1.0m of sea-level rise, this sector could be one of the first to be explored in greater detail.

The findings of this analysis are intended to be of practical value to a range of users. Territorial Authorities and industry sectors could draw on this analysis to further explore local risk profiles and underpin council or sector-led adaptation planning. At a national level, the analysis contributes to a growing evidence base on the economic dimensions of coastal flood risk in Aotearoa New Zealand.

Additional work building on this assessment could include economic analysis of the potential impacts of isolation on supply and value chains, and the broader implications for GDP. Integrating this type of business exposure data with infrastructure vulnerability assessments and socioeconomic indicators would further strengthen the evidence available to support long-term coastal adaptation decisions.

The focus of this project is on a 1% AEP coastal flood event and does not capture potential cascading risk or the cumulative impacts of more frequent, lower-intensity events. Moreover, the 1% return period does not reflect potential changes in event frequency as the climate warms. Altered storm patterns and intensities could make what is currently a 1% AEP event occur more often in the future. Assessing isolation against more frequent events would highlight where regular service disruption could impose significant burdens on local businesses and sectors.

05

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5. | References

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06

Glossary



6. | Glossary

Term	Definition
Adaptation	The process of adjustment to actual or possible climate change and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.
AEP	Annual Exceedance Probability. The probability that an event of a certain size or greater will occur in a given year.
ANZSIC	Australian and New Zealand Standard Industrial Classification, developed for use in the compilation and analysis of industry statistics in Australia and New Zealand.
Dasymetric modelling	A spatial analysis technique that redistributes aggregate business demographic data (available at Statistical Area 1) to more precise locations based on spatial information about where business activity takes place, based on the location of non-residential property.
Exposure	The state or condition of being subjected to or encountering a risk source, which can occur in a binary manner where one is either exposed or not, or in a continuous manner where the level or intensity of exposure varies.
Hazard	A type of risk source generated from a natural or human-induced event or trend that has the potential to cause consequences.
Isolation	The state of property temporarily or permanently losing access to essential services (e.g. schools, hospitals, fire stations) due to hazard/change impacts on the transportation network or other essential infrastructure e.g. power supply.
NAP	National Adaptation Plan
NAPPA	National Adaptation Plan Progress Assessment
NCCRA	National Climate Change Risk Assessment
Risk	The potential for and severity of consequences on things we value in the presence of uncertainty. Risk exists when there is uncertainty about how something we care about might be affected, recognising that different individuals and communities may have diverse priorities and objectives.
Scenario	A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither predictions nor forecasts, but rather are used to provide a view of the implications of developments and actions.

07

Appendix



7. | Appendix

ANZSIC 2006 Division and subdivision codes, titles, and definitions

A Agriculture, Forestry and Fishing

01 Agriculture

02 Aquaculture

03 Forestry and Logging

04 Fishing, Hunting and Trapping

05 Agriculture, Forestry and Fishing Support Services

The Agriculture, Forestry and Fishing Division includes units mainly engaged in growing crops, raising animals, growing and harvesting timber, and harvesting fish and other animals from farms or their natural habitats. The division makes a distinction between two basic activities: production and support services to production. Included as production activities are horticulture, livestock production, aquaculture, forestry and logging, and fishing, hunting and trapping.

The term 'agriculture' is used broadly to refer to both the growing and cultivation of horticultural and other crops (excluding forestry), and the controlled breeding, raising or farming of animals (excluding aquaculture).

Aquacultural activities include the controlled breeding, raising or farming of fish, molluscs and crustaceans.

Forestry and logging activities include growing, maintaining and harvesting forests, as well as gathering forest products.

Fishing, hunting and trapping includes gathering or catching marine life such as fish or shellfish, or other animals, from their uncontrolled natural environments in water or on land.

Also included in the division are units engaged in providing support services to the units engaged in production activities.

B Mining

06 Coal Mining

07 Oil and Gas Extraction

08 Metal Ore Mining

09 Non-Metallic Mineral Mining and Quarrying

10 Exploration and Other Mining Support Services

The Mining Division includes units that mainly extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas. The term mining is used in the broad sense to include underground or open cut mining; dredging; quarrying; well operations or

evaporation pans; recovery from ore dumps or tailings as well as beneficiation activities (i.e. preparing, including crushing, screening, washing and flotation) and other preparation work customarily performed at the mine site, or as a part of mining activity.

The Mining Division distinguishes two basic activities: mine operation and mining support activities.

Mine operation includes units operating mines, quarries, or oil and gas wells on their own account, or for others on a contract or fee basis, as well as mining sites under development.

Mining support activities include units that perform mining services on a contract or fee basis, and exploration (except geophysical surveying).

Units in the Mining Division are grouped and classified according to the natural resource mined or to be mined. Industries include units that extract natural resources, and/or those that beneficiate the mineral mined. Beneficiation is the process whereby the extracted material is reduced to particles that can be separated into mineral and waste, the former suitable for further processing or direct use. The operations that take place in beneficiation are primarily mechanical, such as grinding, washing, magnetic separation, and centrifugal separation. In contrast, manufacturing operations primarily use chemical and electro-chemical processes, such as electrolysis and distillation.

C Manufacturing

11 Food Product Manufacturing

12 Beverage and Tobacco Product Manufacturing

13 Textile, Leather, Clothing and Footwear Manufacturing

14 Wood Product Manufacturing

15 Pulp, Paper and Converted Paper Product Manufacturing

16 Printing (including the Reproduction of Recorded Media)

17 Petroleum and Coal Product Manufacturing

18 Basic Chemical and Chemical Product Manufacturing

19 Polymer Product and Rubber Product Manufacturing

20 Non-Metallic Mineral Product Manufacturing

21 Primary Metal and Metal Product Manufacturing

22 Fabricated Metal Product Manufacturing

23 Transport Equipment Manufacturing

24 Machinery and Equipment Manufacturing

25 Furniture and Other Manufacturing

The Manufacturing Division includes units mainly engaged in the physical or chemical transformation of materials, substances or components into new products (except agriculture and construction). The materials, substances or components transformed by units in this division are raw materials that are products of agriculture, forestry, fishing and mining, or products of other manufacturing units.

Units in the Manufacturing Division are often described as plants, factories or mills and characteristically use power-driven machines and other materials-handling equipment. However, units that transform materials, substances or components into new products by hand, or in the unit's home, are also included. Activities undertaken by units incidental to their manufacturing activity, such as selling directly to the consumer products manufactured on the same premises from which they are sold, such as bakeries and custom tailors, are also included in the division. If, in addition to self-produced products, other products that are not manufactured by the same unit are also sold, the rules for the treatment of mixed activities have to be applied and units classified according to their predominant activity.

Assembly of the component parts of manufactured products, either self-produced or purchased from other units, is considered manufacturing. For example, assembly of self-manufactured prefabricated components at a construction site is considered manufacturing, as the assembly is incidental to the manufacturing activity. Conversely, when undertaken as a primary activity, the on-site assembly of components manufactured by others is considered to be construction.

The boundaries between the Manufacturing Division and other divisions in ANZSIC can sometimes be unclear. The units in the Manufacturing Division are engaged in the transformation of materials into new products. Their output is a new product. However, the definition of what constitutes a 'new product' can be somewhat subjective. As clarification, the following activities are examples of manufacturing activities included in the Manufacturing Division in ANZSIC 2006:

- Milk bottling and pasteurising;
- Both processing and canning or bottling;
- Fresh fish packaging (including oyster shucking, fish filleting);
- Printing and related support activities;
- Ready-mixed concrete production;
- Leather tanning and dressing;
- Grinding of lenses to prescription;
- Wood preserving and treatment;
- Electroplating, plating, metal heat treating, and polishing;
- Fabricating signs and advertising displays;
- Tyre retreading;
- Ship, boat, railway rolling stock and aircraft repair and maintenance; and
- Substantial alteration, renovation or reconstruction of goods such as transport equipment.

There are some other activities that are often considered 'manufacturing', but for ANZSIC, these are classified in another division. These activities include:

- Logging and production of crops or livestock (included in the Agriculture, Forestry and Fishing Division);
- Construction of structures and fabricating operations performed at the site of construction by contractors (included in the Construction Division);
- Publishing and the combined activity of publishing and printing (included in the Information Media and Communications Division); and
- Beneficiation (included in the Mining Division).

The subdivisions in the Manufacturing Division generally reflect distinct production processes related to material inputs, production equipment and employee skills.

D Electricity, Gas, Water and Waste Services

26 Electricity Supply

27 Gas Supply

28 Water Supply, Sewerage and Drainage Services

29 Waste Collection, Treatment and Disposal Services

The Electricity, Gas, Water and Waste Services Division comprises units engaged in the provision of electricity; gas through mains systems; water; drainage; and sewage services. This division also includes units mainly engaged in the collection, treatment and disposal of waste materials; remediation of contaminated materials (including land); and materials recovery activities.

Electricity supply activities include the generation, transmission and distribution of electricity and the on-selling of electricity via power distribution systems operated by others.

Gas supply includes the distribution of gas, such as natural gas or liquefied petroleum gas, through mains systems.

Water supply includes the storage, treatment and distribution of water; drainage services include the operation of drainage systems; and sewage services include the collection, treatment and disposal of waste through sewer systems and sewage treatment facilities.

E Construction

30 Building Construction

31 Heavy and Civil Engineering Construction

32 Construction Services

The Construction Division includes units mainly engaged in the construction of buildings and other structures, additions, alterations, reconstruction, installation, and maintenance and repairs of buildings and other structures.

Units engaged in demolition or wrecking of buildings and other structures, and clearing of building sites are included in Division E Construction. It also includes units engaged in blasting, test drilling, landfill, levelling, earthmoving, excavating, land drainage and other land preparation.

F Wholesale Trade

33 Basic Material Wholesaling

34 Machinery and Equipment Wholesaling

35 Motor Vehicle and Motor Vehicle Parts Wholesaling

36 Grocery, Liquor and Tobacco Product Wholesaling

37 Other Goods Wholesaling

38 Commission-Based Wholesaling

The Wholesale Trade Division includes units mainly engaged in the purchase and onselling, the commission-based buying, and the commission-based selling of goods, without significant transformation, to businesses. Units are classified to the Wholesale Trade Division in the first instance if they buy goods and then onsell them (including on a commission basis) to businesses.

Wholesalers' premises are usually a warehouse or office with little or no display of their goods, large storage facilities, and are not generally located or designed to attract a high proportion of walk-in customers. Wholesaling is often characterised by high value and/or bulk volume transactions, and customers are generally reached through trade-specific contacts.

The Wholesale Trade Division distinguishes two types of wholesalers:

- merchant wholesalers who take title to the goods they sell, including import/export merchants; and
- units whose main activity is the commission-based buying and/or the commission-based selling of goods, acting as wholesale agents or brokers, or business to business electronic markets, both of whom arrange the sale of goods on behalf of others for a commission or fee without taking title to the goods.

A unit which sells to both businesses and the general public will be classified to the Wholesale Trade Division if it operates from premises such as warehouses or offices with little or no display of goods, has large storage facilities, and is not generally located or designed to attract a high proportion of walk-in customers.

For units that have goods manufactured for them on commission and then sell those goods, the following treatment guidelines are to be followed:

- units that own the material inputs and own the final outputs, but have the production done by others will be included in the Manufacturing Division;
- units that do not own the material inputs but own the final outputs and have the production done by others will not be included in the Manufacturing Division (these may be included in Wholesale Trade or other divisions); and
- units that do not own the material inputs, do not own the final outputs but undertake the production for others will be included in the Manufacturing Division.

As a result, units that have goods manufactured for them on commission will be included in the Wholesale Trade Division where they do not own the material inputs to the manufacturing process, but take title to the outputs and sell them in the manner prescribed above for typical wholesaling units.

G Retail Trade

39 Motor Vehicle and Motor Vehicle Parts Retailing

40 Fuel Retailing

41 Food Retailing

42 Other Store-Based Retailing

43 Non-Store Retailing and Retail Commission-Based Buying and/or Selling

The Retail Trade Division includes units mainly engaged in the purchase and/or onselling, the commission-based buying, and the commission-based selling of goods, without significant transformation, to the general public. The Retail Trade Division also includes units that purchase and

onsell goods to the general public using non-traditional means, including the internet. Units are classified to the Retail Trade Division in the first instance if they buy finished goods and then onsell them (including on a commission basis) to the general public.

Retail units generally operate from premises located and designed to attract a high volume of walk-in customers, have an extensive display of goods, and/or use mass media advertising designed to attract customers. The display and advertising of goods may be physical or electronic.

Physical display and advertising includes shops, printed catalogues, billboards and print advertisements. Electronic display and advertising includes catalogues, internet websites, television and radio advertisements and infomercials. While non-store retailers, by definition, do not possess the physical characteristics of traditional retail units with a physical shop-front location, these units share the requisite function of the purchasing and onselling of goods to the general public, and are therefore included in this division.

A unit which sells to both businesses and the general public will be classified to the Retail Trade Division if it operates from shop-front premises, arranges and displays stock to attract a high proportion of walk-in customers and utilises mass media advertising to attract customers.

H Accommodation and Food Services

44 Accommodation

45 Food and Beverage Services

The Accommodation and Food Services Division includes units mainly engaged in providing short-term accommodation for visitors. Also included are units mainly engaged in providing food and beverage services, such as the preparation and serving of meals and the serving of alcoholic beverages for consumption by customers, both on and off-site.

I Transport, Postal and Warehousing

46 Road Transport

47 Rail Transport

48 Water Transport

49 Air and Space Transport

50 Other Transport

51 Postal and Courier Pick-up and Delivery Services

52 Transport Support Services

53 Warehousing and Storage Services

The Transport, Postal and Warehousing Division includes units mainly engaged in providing transportation of passengers and freight by road, rail, water or air. Other transportation activities such as postal services, pipeline transport and scenic and sightseeing transport are included in this division.

Units mainly engaged in providing goods warehousing and storage activities are also included.

The division also includes units mainly engaged in providing support services for the transportation of passengers and freight. These activities include stevedoring services, harbour services, navigation services, airport operations and customs agency services.

J Information Media and Telecommunications

54 Publishing (except Internet and Music Publishing)

55 Motion Picture and Sound Recording Activities

56 Broadcasting (except Internet)

57 Internet Publishing and Broadcasting

58 Telecommunications Services

59 Internet Service Providers, Web Search Portals and Data Processing Services

60 Library and Other Information Services

The Information Media and Telecommunications Division includes units mainly engaged in:

- creating, enhancing and storing information products in media that allows for their dissemination;
- transmitting information products using analogue and digital signals (via electronic, wireless, optical and other means); and
- providing transmission services and/or operating the infrastructure to enable the transmission and storage of information and information products.

Information products are defined as those which are not necessarily tangible, and, unlike traditional goods, are not associated with a particular form. The value of the information products is embedded in their content rather than in the format in which they are distributed. For example, a movie can be screened at a cinema, telecast on television or copied to video for sale or rental. The division includes some activities that primarily create, enhance and disseminate information products, subject to copyright.

It is the intangible nature of the information products which determines their unique dissemination process, which may include via a broadcast, electronic means, or physical form. They do not usually require direct contact between the supplier/producer and the consumer, which distinguishes them from distribution activities included in the Wholesale Trade and Retail Trade Divisions.

Excluded from the division are units mainly engaged in:

- the mass storage or duplication of information products such as printing newspapers, CDs, DVDs, etc. (Manufacturing Division);
 - purchasing and on-selling information products in their tangible form (Wholesale Trade and Retail Trade Divisions);
 - providing specialised computer services such as programming and systems design services, graphic design services and advertising services, as well as gathering, tabulating and presenting marketing and opinion data (Professional, Scientific and Technical Services Division);
 - providing a range of creative artistic activities such as the creation of an artistic original (e.g. a painting), or the provision of a live musical performance by a group or artist (Arts and Recreation Services Division); and
-

- units undertaking a range of activities such as directing, acting, writing and performing (Arts and Recreation Services Division).

K Financial and Insurance Services

62 Finance

63 Insurance and Superannuation Funds

64 Auxiliary Finance and Insurance Services

The Financial and Insurance Services Division includes units mainly engaged in financial transactions involving the creation, liquidation, or change in ownership of financial assets, and/or in facilitating financial transactions.

The range of activities include raising funds by taking deposits and/or issuing securities and, in the process, incurring liabilities; units investing their own funds in a range of financial assets; pooling risk by underwriting insurance and annuities; separately constituted funds engaged in the provision of retirement incomes; and specialised services facilitating or supporting financial intermediation, insurance and employee benefit programs.

Also included in this division are central banking, monetary control and the regulation of financial activities.

L Rental, Hiring and Real Estate Services

66 Rental and Hiring Services (except Real Estate)

67 Property Operators and Real Estate Services

The Rental, Hiring and Real Estate Services Division includes units mainly engaged in renting, hiring, or otherwise allowing the use of tangible or intangible assets (except copyrights), and units providing related services.

The assets may be tangible, as in the case of real estate and equipment, or intangible, as in the case with patents and trademarks.

The division also includes units engaged in providing real estate services such as selling, renting and/or buying real estate for others, managing real estate for others and appraising real estate.

M Professional, Scientific and Technical Services

69 Professional, Scientific and Technical Services (Except Computer System Design and Related Services)

70 Computer System Design and Related Services

The Professional, Scientific and Technical Services Division includes units mainly engaged in providing professional, scientific and technical services. Units engaged in providing these services apply common processes where labour inputs are integral to the production or service delivery. Units in this division specialise and sell their expertise. In most cases, equipment and materials are not major inputs. The activities undertaken generally require a high level of expertise and training and formal (usually tertiary level) qualifications.

These services include scientific research, architecture, engineering, computer systems design, law, accountancy, advertising, market research, management and other consultancy, veterinary science and professional photography.

Excluded are units mainly engaged in providing health care and social assistance services, which are included in Division Q Health Care and Social Assistance.

N Administrative and Support Services

72 Administrative Services

73 Building Cleaning, Pest Control and Other Support Services

The Administrative and Support Services Division includes units mainly engaged in performing routine support activities for the day-to-day operations of other businesses or organisations.

Units providing administrative support services are mainly engaged in activities such as office administration; hiring and placing personnel for others; preparing documents; taking orders for clients by telephone; providing credit reporting or collecting services; and arranging travel and travel tours.

Units providing other types of support services are mainly engaged in activities such as building and other cleaning services; pest control services; gardening services; and packaging products for others.

The activities undertaken by units in this division are often integral parts of the activities of units found in all sectors of the economy. Recent trends have moved more towards the outsourcing of such non-core activities. The units classified in this division specialise in one or more of these activities and can, therefore, provide services to a variety of clients.

O Public Administration and Safety

75 Public Administration

76 Defence

77 Public Order, Safety and Regulatory Services

The Public Administration and Safety Division includes units mainly engaged in Central, State or Local Government legislative, executive and judicial activities; in providing physical, social, economic and general public safety and security services; and in enforcing regulations. Also included are units of military defence, government representation and international government organisations.

Central, State or Local Government legislative, executive and judicial activities include the setting of policy; the oversight of government programs; collecting revenue to fund government programs; creating statute laws and by-laws; creating case law through the judicial processes of civil, criminal and other courts; and distributing public funds.

The provision of physical, social, economic and general public safety and security services, and enforcing regulations, includes units that provide police services; investigation and security services; fire protection and other emergency services; correctional and detention services; regulatory services; border control; and other public order and safety services.

Also included are units of military defence, government representation and international government organisations.

Government ownership is not a criterion for classification to this industry division. Government units producing 'private sector like' goods and services are classified to the same industry as private sector

units engaged in similar activities. Private sector units engaged in public administration or military defence are classified to the Public Administration and Safety Division. Units that engage in a combination of public administration and service delivery activities are to be classified to this division.

P Education and Training

80 Preschool and School Education

81 Tertiary Education

82 Adult, Community and Other Education

The Education and Training Division includes units mainly engaged in the provision and support of education and training, except those engaged in the training of animals e.g. dog obedience training, horse training.

Education may be provided in a range of settings, such as educational institutions, the workplace, or the home. Generally, instruction is delivered through face-to-face interaction between teachers/instructors and students, although other means and mediums of delivery, such as by correspondence, radio, television or the internet, may be used.

Education and training is delivered by teachers or instructors who explain, tell or demonstrate a wide variety of subjects. The commonality of processes involved, such as the labour inputs of teachers and instructors, and their subject matter knowledge and teaching expertise, uniquely distinguishes this industry from other industries.

Education support services include a range of support services which assist in the provision of education, such as curriculum setting and examination marking.

Q Health Care and Social Assistance

84 Hospitals

85 Medical and Other Health Care Services

86 Residential Care Services

87 Social Assistance Services

The Health Care and Social Assistance Division includes units mainly engaged in providing human health care and social assistance. Units engaged in providing these services apply common processes, where the labour inputs of practitioners with the requisite expertise and qualifications are integral to production or service delivery.

R Arts and Recreation Services

89 Heritage Activities

90 Creative and Performing Arts Activities

91 Sport and Recreation Activities

92 Gambling Activities

The Arts and Recreation Services Division includes units mainly engaged in the preservation and exhibition of objects and sites of historical, cultural or educational interest; the production of original artistic works and/or participation in live performances, events, or exhibits intended for public viewing; and the operation of facilities or the provision of services that enable patrons to participate in sporting or recreational activities, or to pursue amusement interests.

This division excludes units that are involved in the production, or production and distribution of motion pictures, videos, television programs or television and video commercials. These units are included in the Information Media and Telecommunications Division.

S Other Services

94 Repair and Maintenance

95 Personal and Other Services

96 Private Households Employing Staff and Undifferentiated Goods- and Service-Producing Activities of Households for Own Use

The Other Services Division includes a broad range of personal services; religious, civic, professional and other interest group services; selected repair and maintenance activities; and private households employing staff. Units in this division are mainly engaged in providing a range of personal care services, such as hair, beauty and diet and weight management services; providing death care services; promoting or administering religious events or activities; or promoting and defending the interests of their members.

Also included are units mainly engaged in repairing and/or maintaining equipment and machinery (except ships, boats, aircraft, or railway rolling stock) or other items (except buildings); as well as units of private households that engage in employing workers on or about the premises in activities primarily concerned with the operation of households.

The Other Services Division excludes units mainly engaged in providing buildings or dwellings repair and maintenance services (included in the Construction or Administrative and Support Services Divisions as appropriate), and units mainly engaged in providing repair and maintenance services of books, ships, boats, aircraft or railway rolling stock (included in the Manufacturing Division).

Complied verbatim from: Australian Bureau of Statistics. (2013). Division and subdivision codes and titles - Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (Revision 2.0). Available at: <https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-industrial-classification-anzsic/2006-revision-2-0/numbering-system-and-titles/division-and-subdivision-codes-and-titles>; Australian Bureau of Statistics. (2013). Division definitions - Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (Revision 2.0). Available at: <https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-industrial-classification-anzsic/2006-revision-2-0/division-definitions>



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