

SECCCA Enhancing
Community Resilience

SECCCA-wide Outputs: Findings and Guidance

Paper 4

Final

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Cover photo: Flooding in Heidelberg, Melbourne

SECCCA and Spatial Vision respectfully acknowledge the Traditional Owners of the lands on which we work, and pay respect to their Elders, past, present and future. We appreciate and acknowledge the advice and guidance of the Bunurong Land Council in assisting with the consideration of potential climate change impacts on First Nations communities, which for this study began with a focus on the Frankston Local Government Area.

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1 Summary

The Enhancing Community Resilience project aims to help prepare communities in the South East Councils Climate Change Alliance (SECCCA) region for current and future changes to the climate by improving community preparedness through practical actions, tools, and resources. The project focused on empowering project participants with information and access to new or improved services, enabling them to make decisions to prepare for climate change.

To assist the selection of communities to work with and focus on resilience-building activities, an assessment of key sub-populations across the SECCCA region was undertaken to highlight pockets of high vulnerability. This report presents the high-level vulnerability findings for each of the nine sub-populations: older people (>55, >65, >85), non-English-speaking backgrounds (NESB – established communities, recent arrivals in the past 5 years, recent arrivals in the past 1 year, those on bridging visas), single mothers, low income, high care, homeless, youth (aged 15-19, aged 20-24, aged 15-24), and First Nations (high care, aged >55, aged >65).

The table below presents an overview of the LGA-level summaries of vulnerability ranks and the key climate variables for each sub-population. High vulnerabilities and changes in climate parameters are shown in dark red; low vulnerabilities and changes in climate parameters are shown in dark green.

		Bass Coast		Greater Dandenong		Mornington Peninsula		Port Phillip		Bayside		Kingston
		Cardinia	Casey	Frankston	Dandenong	Peninsula	Phillip	Bayside	Kingston			
Sub-population Vulnerability Ranking: 0 (lowest) - 10 (highest)	Age 55 Over - Rank	6.3	4.6	5.3	5.2	6.1	4.7	5.3	4.1	6.0		
	Age 65 Over - Rank	5.5	4.2	5.0	4.5	5.4	4.0	4.9	4.0	5.5		
	Age 85 Over - Rank	3.8	3.1	3.2	3.4	3.9	3.5	4.1	4.0	4.4		
	Single Mothers - Rank	8.7	6.2	5.2	6.1	3.5	6.3	3.0	3.1	4.4		
	High Care - Rank	7.3	5.3	5.0	5.6	5.3	5.3	5.2	3.7	5.9		
	Homeless - Rank	8.3	6.4	5.5	5.9	5.2	8.7	3.4	3.5	4.3		
	NESB Established - Rank	7.4	4.8	5.2	5.2	7.2	5.0	3.8	4.3	6.3		
	NESB Recent Arrivals in the past 5Y - Rank	7.4	5.0	5.4	4.9	7.3	4.7	4.2	4.4	5.9		
	NESB Recent Arrivals in the past 1Y - Rank	9.1	4.4	5.2	6.0	6.6	5.9	4.0	4.9	6.2		
	Bridging VISA - Rank		2.6	4.5	5.9	6.9		2.0		3.8		
	Youth 15 to 19 - Rank	5.4	5.0	7.2	5.2	7.6	3.5	5.8	4.1	5.8		
	Youth 20 to 24 - Rank	5.9	5.0	7.2	5.4	7.6	3.7	6.8	3.8	5.7		
	Youth 15 to 24 - Rank	6.2	5.0	7.2	5.3	7.7	3.4	6.8	3.8	5.7		
	Low Income - Rank	5.8	3.4	4.4	6.0	5.3	6.9	5.4	6.8	8.0		
	First Nations High Care - Rank	7.4	5.2	5.1	5.8	6.0	5.7	5.7	4.3	6.0		
	First Nations Age 55 and Over - Rank	7.9	5.9	7.0	6.5	8.0	6.0	8.8		6.0		
	First Nations Age 65 and Over - Rank	6.9	6.5	7.4	5.8	7.0	5.2	7.8		5.3		
Climate Variables	Maximum Temperature - Change from Baseline (%)	9.9%	11.5%	11.1%	10.4%	10.6%	10.2%	9.7%	9.3%	10.1%		
	Extreme Temperature at 1% AEP - Change from Baseline (%)	5.9%	6.4%	6.4%	6.3%	6.5%	5.6%	5.7%	5.2%	6.1%		
	Heat Health at 30C (Days) - Change from Baseline (%)	554.3%	532.6%	418.0%	398.0%	353.0%	401.6%	262.9%	298.0%	325.2%		
	Total Annual Rainfall - Change from Baseline (%)	-8.7%	-5.5%	-6.9%	-8.4%	-8.0%	-7.1%	-1.4%	-3.9%	-6.9%		
	Extreme Rainfall at 1% AEP - Change from Baseline (%)	5.8%	13.6%	6.3%	1.1%	2.1%	11.5%	16.7%	10.6%	5.0%		
	Sea Level Rise at 82cm with 1% AEP Storm Event - Coverage (%)	6.4%	1.3%	0.9%	4.3%	0.1%	2.7%	20.0%	0.9%	18.8%		
	Flood Extent in 1/100 yr Event - Coverage (%)	7.3%	17.6%	13.8%	9.7%	5.6%	7.1%	34.4%	8.7%	20.7%		
	Combined Flooding and Storm Event (SLR 82cm, 1% AEP) - Coverage (%)	9.0%	17.6%	14.0%	11.1%	5.7%	7.1%	40.9%	9.4%	32.2%		
	Fire - Bushfire Management Overlay Cover (%)	17.8%	21.7%	2.5%	13.2%	0.0%	15.6%	0.0%	0.0%	0.0%		

Table 1. LGA-level overview of sub-populations and climate variables

A range of insights can be identified from Table 1. For example, it shows that the average vulnerability of people from NESB who have recently arrived in the last 1 year is ranked highest for Bass Coast, relative to other SECCCA councils. In addition, Bass Coast is expected to see an increase in heat health days (average temperature over 30°C) of over 554 per cent by 2050 from the current climate baseline.

While Table 1 identifies both the LGA-level vulnerability rankings of each sub-population and the climate variables occurring in the LGAs, it does not show the intersection at a suburb or Statistical Area Level 1 (SA1) level that may provide insight into highly vulnerable pockets at a smaller scale across each LGA. This information is provided in the more detailed LGA tables generated (see example for Bayside in Section 10).

This assessment of vulnerability constitutes Stage 2 of the Enhancing Community Resilience project. It involves both a SECCCA-wide evaluation (the findings of which are presented in this report), and four focused case studies that apply the SECCCA-wide information at a more detailed level. This report is Paper 4 of the Stage 2 component.

2 Document purpose

This report contains a brief overview of the outputs prepared and findings from the South East Councils Climate Change Alliance (SECCCA) evaluation. It also provides high-level guidance on how the outputs can be used to identify where there are likely to be groups or sub-populations in the community that are more vulnerable to events.

Section 4 of this report presents mapping of anticipated climate changes expected across the SECCCA region for the key climate variables of interest – heat, flooding and inundation, and fire. These maps are presented upfront to provide a climate context for the reader when reviewing the sub-population vulnerability findings (Sections 6–10).

This report also presents, for each sub-population:

1. the vulnerability rankings, climate hazard exposure factors and key asset serviceability summaries
2. key observations highlighting councils with the greatest vulnerabilities, and Local Government Areas (LGAs) with significant climate change ratings for each climate variable
3. priority linkage table identifying the councils with the highest vulnerability rankings for the sub-population, and the climate variables most likely to impact on the sub-population
4. priority suburbs with the highest vulnerability rankings for each council
5. SECCCA-wide mapping of sub-population vulnerability rankings at an SA1 level.

The final section of the report (Section 11) presents a worked example of how the LGA summary information can be further examined at the suburb level.

This document, referenced as Paper 4, should be read in conjunction with the SECCCA-wide outputs that are provided in the form of Microsoft (MS) Excel tables, PDF maps, and spatial data, as well as the additional papers developed as part of this project to gain deeper understandings of the various components of the project:

Paper 1 – Definitions and approaches: Outlines and introduces the key terms and definitions, and the proposed conceptual framework by which community vulnerability and resilience to climate change are to be assessed.

Paper 2 – Vulnerable populations: Describes the vulnerable groups within the community, identified by SECCCA councils, to be of concern in relation to the likely impacts of climate change.

Paper 3 – Methods and application: Outlines the process used to identify and assess the vulnerability of sub-populations in the community to climate change. This report provides a detailed explanation of how inputs into the vulnerability assessment method, such as the role of community assets, can be used as an entry point for the building of community resilience.

Paper 5 – Case studies: Presents the findings of four case studies that apply the SECCCA-wide information for four separate geographic areas where each case study considers a different climate-change-related event.

3 Project background

Climate change is significantly increasing risks, such as fires, floods, coastal erosion and heat waves, to local communities throughout Australia. Preparing communities for current and future changes to the climate is a critical task and requires protection of life, property and wellbeing. Proactively preparing communities to act prior, during and after disasters builds community resilience to future impacts and minimises risks and their consequences.

The Enhancing Community Resilience Project will help prepare communities in the SECCCA region for current and future changes to the climate, by improving community preparedness through practical actions, tools and resources. Project participants will be empowered with information and access to new or improved services, enabling them to make individual decisions to prepare for climate change.

Leveraging the outputs of the SECCCA Asset Vulnerability Assessment Project, the project will also assess the vulnerability of the SECCCA region's community to climate change.

Working with SECCCA council members and climate science experts, the project will identify and visualise the community services, demographics, locations, and communities that are exposed to the impacts of climate change. Councils' community planners are integral in understanding vulnerability across communities, including cohorts such as aged care, disability, those with non-English-speaking backgrounds (NESB) and youth.

A further stage of the project will develop, deliver and evaluate interventions to build community resilience to climate risk by working with expert community development practitioners, councils, emergency services, and communities.

The project outcomes and approach will be converted into a practical Toolkit for councils and communities that can be applied in other regions throughout Australia to build community resilience to climate change in these areas. This Toolkit will be developed using a parallel evaluation and collation of lessons learned throughout the project.

For further background information on this project, refer to *Paper 1 – Definitions and Approaches: Appendix A*.



4 SECCCA-wide outputs

SECCCA councils identified the following nine sub-populations in the community to be of greatest concern in relation to anticipated climate change impacts and events:

- older people
- NESB – recent arrivals
- NESB – established communities
- high level of care individuals
- single mothers
- homeless/insecure housing
- youth
- low income
- First Nations.

The section will focus on older people as an example of how a workflow has been applied and how findings were derived. It will provide a more detailed description of how to interpret the data than the other sub-population sections. This has been undertaken to avoid unnecessary duplication.

The distribution of these sub-populations across the SECCCA region was identified using 2021 census data, and a vulnerability rating was assigned to these sub-populations on the basis of sensitivity and capacity factors. This process, including the factors applied, is presented in Paper 3 – *Methods and application*.

The process also identifies the approach adopted to seek First Nations People's input. This involved arranging discussions and seeking advice from council staff working with First Nations People and representatives of the Bunurong Land Council. The analysis was originally focused on Frankston, as Frankston City Council identified this analysis to be included as part of the project. However, as Cardinia Shire Council includes Wurundjeri Country, it is recommended that Cardinia Shire Council consult with their local Indigenous representatives prior to making any plans to progress any planning or projects based on this information.

The vulnerability assessment process was applied to the Australian Bureau of Statistics (ABS) SA1 geography, and the results were summarised at both the suburb and LGA levels. The following sections present the high-level findings for each of the nine vulnerable sub-populations at an LGA level. The MS Excel tables accompanying this report include results at the SA1, suburb and LGA levels.

The findings in this report are presented together with summary climate change impact and event information. This same climate change information is available at the SA1, suburb and LGA levels in the MS Excel tables accompanying this report.

Vulnerability ranking (rank) values

The vulnerability ranking (rank) values assigned are from 0.1 to 10, where 0.1 is the lowest vulnerability score, and 10 the highest vulnerability score. The scores have been normalised across the SECCCA region via a Natural Breaks (Jenks) classification system,¹ and hence are an indicator of *relative* vulnerability across all nine SECCCA councils.

The total number of individuals included within each vulnerable sub-population group (such as aged 55 and over) is also identified along with the vulnerability ranking.

A colour ramp, which assigns colours to values, has been included to support visualisation of the findings. Dark green identifies the lowest values (rank and population count) and red the highest values. This colour ramp has been applied independently to each row of the report tables.

A set of supporting maps that presents the vulnerability ranking assigned to each vulnerable sub-population at the SA1 level is also provided in this report and as a separate JPG map. This map series uses the same colour rank.

Climate change impacts and events

Anticipated climate change impacts and events across the SECCCA region are also included in this report and in the accompanying data tables and maps.

The climate change impacts and events are presented in the form of change from the current baseline. Key climate change variables of interest have been broadly grouped under heat, flooding and inundation – including anticipated sea-level rise and fire. An explanation of these climate change variables is provided in Paper 3 – *Methods and application*.

A colour ramp has again been applied to support visualisation of climate change from baseline findings, where dark green identifies the lowest and red the highest percentage change. This colour ramp has again been applied independently to each row of the report tables.

A set of supporting maps that presents anticipated climate change impacts and events across the SECCCA region is also provided in this report and as separate JPG maps. This map series uses the same colour rank.

Services and Assets

The assessment process used to assign a vulnerability ranking to vulnerable sub-populations considers selected community assets that provide a service to communities. Community assets are also considered in the four geographic community case studies that apply the SECCCA-wide information at a more detailed level.

¹ Natural Breaks (Jenks) classifies classes based on natural groupings inherent in the data, where class breaks (i.e. between vulnerability rankings 1 and 2, or 3 and 4) are determined by grouping similar values together and maximising differences between classes. This classification was applied to the vulnerability rankings to indicate a hierarchy and relative vulnerability. The spatial and tabular data provided to clients contains the non-ranked vulnerability scorings, to which the councils can apply their own classification method if they wish. For more information on Natural Breaks (Jenks), see de Smith et al., 2009.

The total number of such assets at the SA1, suburb and LGA levels is also presented in the summary tables in this report and in the MS Excel tables that accompany this report. A colour ramp has also been used to visualise these results, where dark green identifies the lowest values (rank and asset numbers) and red the highest values. This colour ramp has again been applied independently to each row of the report tables.

SECCCA-wide vulnerable sub-population findings

The following sections present the findings of the SECCCA-wide vulnerable sub-population assessment in a summary table, where the results for each LGA include the:

- average vulnerability ranking and population count for each vulnerable sub-population
- average anticipated climate change in the form of change from current baseline for key climate change variables of interest broadly grouped under heat, flooding and inundation, and fire
- total number of selected community assets that provide a service to communities. The nine vulnerable sub-populations previously identified are grouped into five sets, with each report section presenting the findings for each set.

Each of these report sections includes the summary table described above. This summary table is followed by a list of the suburbs within each LGA that are assessed to have the highest vulnerability ranking in relation to each vulnerable sub-population. This list of suburbs identifies those that have the highest three vulnerability rankings. More than three suburbs are identified in some instances where they share the same ranking, although only a total of seven suburbs per LGA are shown.

The summary table and list of suburbs in an LGA with the highest vulnerability ranking provide a guide to the information that can be further examined in the MS Excel tables and maps that accompany this report.

An example of how the LGA summary information can be further examined at the suburb level is presented in a separate section, which looks specifically at Bayside LGA.

In selecting the vulnerable sub-population of greatest concern, councils identified the climate hazards that are most likely to impact these populations. Table 2 presents the hazards of concern to each council in relation to each sub-population.

Table 2. Council priority links of vulnerable sub-population to hazard of concern.

Community sub-population	Flood and inundation (including sea-level rise)	Fire	Storm	Heat
Older people	●	●	●	●
NESB – recent arrivals	●	●		●
NESB – established communities		●		●
High level of care individuals	●	●		●
Single mothers	●			●
Homeless/insecure housing	●		●	●
Youth		●		
Low income	●	●	●	●
First Nations	●	●	●	●
Geographic communities	●	●	●	●

How to read and interpret the summary tables – worked example for Bass Coast

Figure 1 provides a visual example of how to read and understand the information presented in the tables within the following sections, and some examples of insights that can be gained.

The example in Figure 1 focuses on older people, presenting summarised information at an LGA scale. Examples of reading the table to discover key insights that focus on Bass Coast could include the following (corresponding to the purple numbers and outlines in Figure 1)

1. Those aged 55 and over in Bass Coast are more vulnerable on average (with a vulnerability ranking of 6.1) than other councils within SECCCA. This insight is visually supported by being coloured the deepest shade of red in the row.²
2. Although those aged 55 and over are the most vulnerable in Bass Coast, there are fewer than 25,000 people in this age bracket within Bass Coast. This is the lowest population of people within this age bracket across SECCCA. In comparison, Casey has more than three times this population. This insight is visually aided by the green shading of the Bass Coast population value and red shading of the Casey population value.
3. The occurrence of heat waves (3 or more days >35°C) is expected to increase by 455.7 per cent by 2050 across Bass Coast (under an ACCESS 1.0 General Circulation Model (GCM) and RCP 8.5 high carbon emission scenario). This is the highest increase across SECCCA, and is visually supported by the value in the row being shaded a deep red.
4. There are only three libraries in Bass Coast that the general public can access, for example for respite in a heat wave. Note that the green-red colour ramps for the services and assets counts are not indicative of positive or negative connotations as a result of MS Excel conditional formatting restraints.

A few key considerations to remember when reviewing these tables:

- rows under the *Heat, Flooding and inundation, Fire* and *Services and assets* sub-headings are independent of the vulnerability scores (e.g. number 3 in Table 1 does not indicate the vulnerabilities of the sub-populations to the heat wave climate hazard – rather, it is simply stating the percentage average increase of heat waves to 2050 across the different LGAs)
- blank/white sections indicate that there is no corresponding feature within the LGA
- colour ramping for *Services and assets* rows identifies higher numbers as red and lower numbers as green.

² Note: While the population of people aged 55 and over in Bass Coast is lower than that of other SECCCA councils, it may be of significance to Bass Coast Shire Council that, regardless of having a lower comparative population, this sub-population is still highly vulnerable. Bass Coast Shire may wish to review the suburb-level or SA1-level summaries to determine where pockets of higher vulnerability people aged 55 and over are located to then focus on resilience-building activities.

Table 3. Example of reading tables in Section 5. Purple numbers and outlined boxes correspond with the possible insights gained textually described in the list above.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
Age 55 Over (Rank)	6.1	3.9	4.6	5.1	4.8	5.7	5.5	4.6	4.8
Age 65 Over (Rank)	5.3	3.7	4.2	4.9	4.3	5.3	5.2	4.0	4.5
Age 85 Over (Rank)	3.7	3.8	3.0	3.1	3.3	3.9	4.0	3.5	3.8
Age 55 Over (Population)	24,266	40,465	29,310	76,773	40,080	42,227	48,541	72,259	26,635
Age 65 Over (Population)	15,216	24,490	16,370	39,915	23,081	25,255	29,279	47,801	14,499
Age 85 Over (Population)	1,319	4,070	1,494	3,797	2,876	3,354	4,321	6,137	1,653
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Precipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
Ambulance (Count)	3	1	4	5	3	5	4	7	4
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Public Transport - Bus Stop (Count)		543	288	1 154	620	841	824	807	234
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Aged Care and Residences (Count)	18	53	48	53	32	46	56	50	13
Health - Doctor (Count)	4	11	7	16	8	13	17	1	9
Health - Pharmacy (Count)	3	13	6	26	25	37	22	17	22

5 Anticipated climate change impacts

This section provides maps of anticipated climate change impacts and events across the SECCCA region.

Climate change impacts and events are presented as a change from the current baseline. Key climate change variables of interest have been broadly grouped under heat, flooding and inundation, and fire. An explanation of these climate change variables is provided in Paper 3 – *Methods and application*.

These maps can be referenced when viewing the various vulnerable sub-population findings in relation to vulnerability rank, and associated climate change from baseline rating.

A set of supporting maps that presents the vulnerability ranking assigned to each vulnerable sub-population at the SA1 level is provided separately. This map series uses the same colour rank as the tables presented in this report.

Heat health (Figure 2), heat waves (Figure 3), extreme temperature (Figure 4) and extreme rainfall (Figure 5) all use the ACCESS 1.0 climate model under an RCP 8.5 emissions scenario (sourced from the Victorian Climate Projections 2019 (VCP19) project). The change from a current baseline is mapped to the 2050 likely future and all likely changes are averaged by SA1 region.

Sea-level rise (Figure 6) is mapped to an 82 cm level coupled with a storm tide forcing (Victorian Coastal Inundation Dataset from the Department of Energy, Environment and Climate Action (DEECA)). Flooding (Figure 7) is mapped to a 1-in-100-year flood likely extent scenario (sourced from state government, water authorities and councils).

Fire risk (Figure 8) is mapped by presenting the bushfire management overlay from planning overlays.

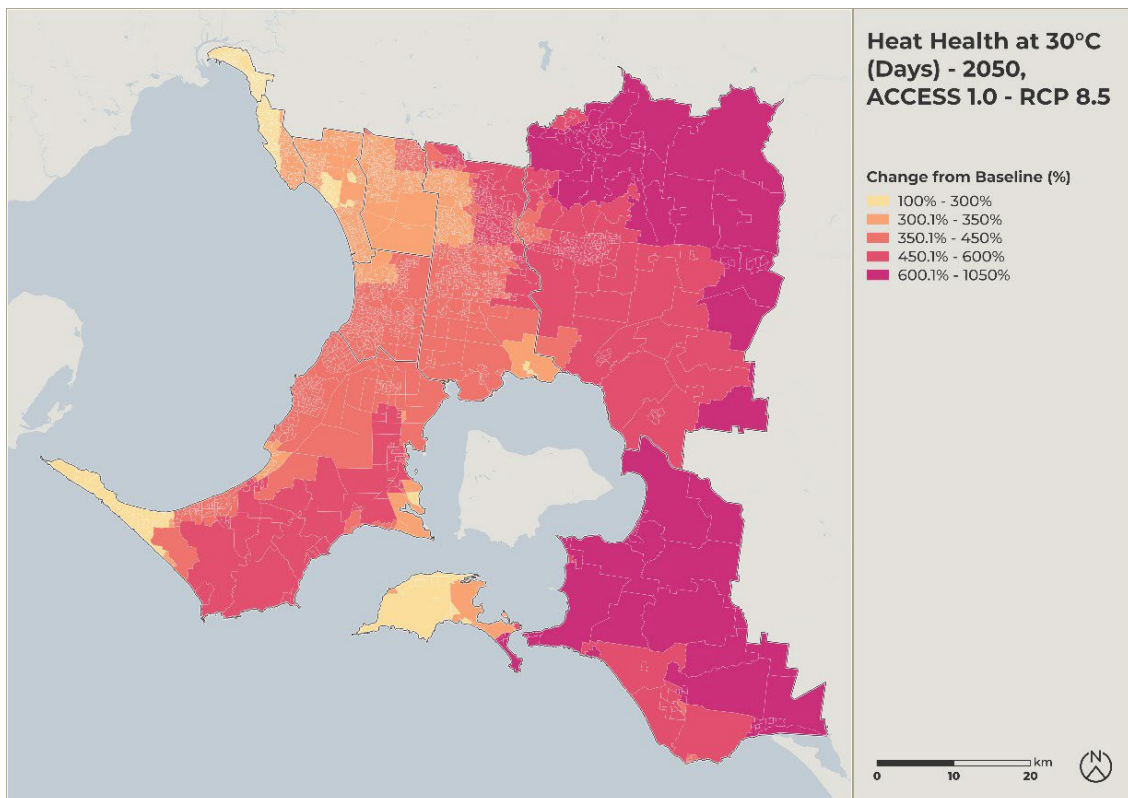


Figure 2. Heat health at 30°C for the SECCCA region. Change from a current baseline to 2050 using an ACCESS 1.0 GCM and an RCP 8.5 emissions scenario.

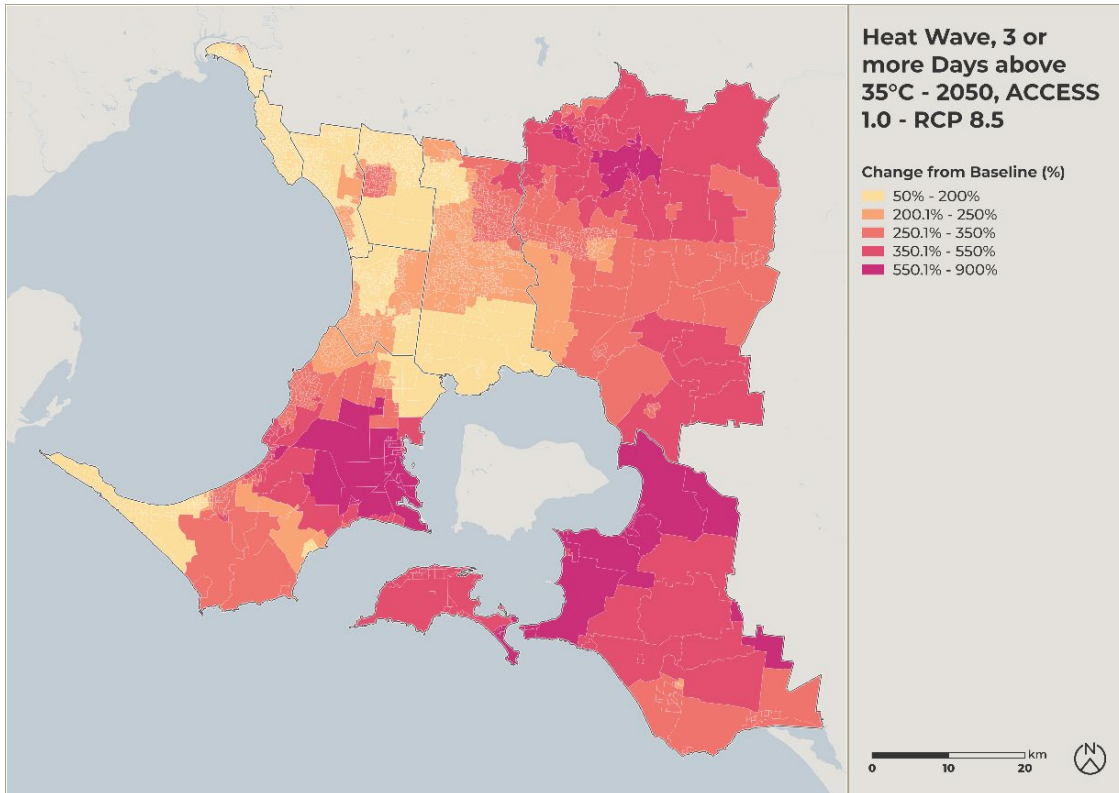


Figure 3. Heat waves (3 or more days above 35°C) for the SECCCA region. Change from a current baseline to 2050 using an ACCESS 1.0 GCM and an RCP 8.5 emissions scenario.

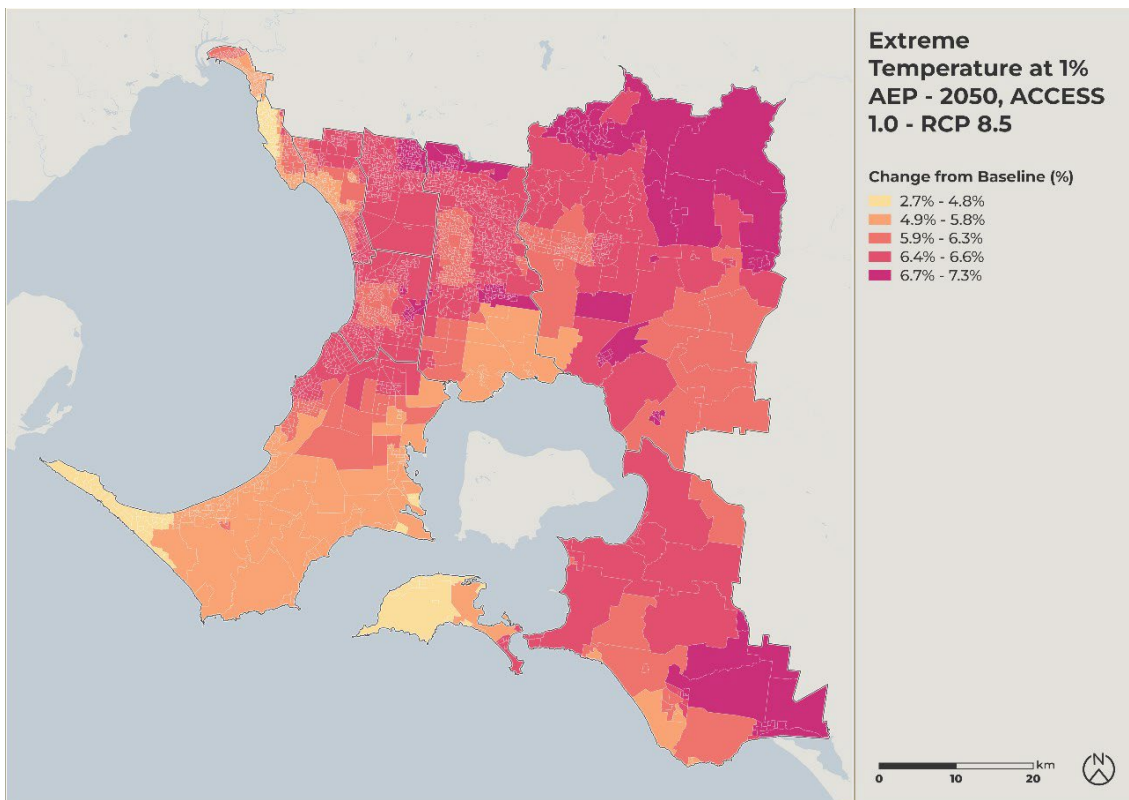


Figure 4. Extreme temperature at a 1 per cent annual exceedance probability (AEP) in the SECCCA region. Change from a current baseline to 2050 using an ACCESS 1.0 GCM and an RCP 8.5 emissions scenario.

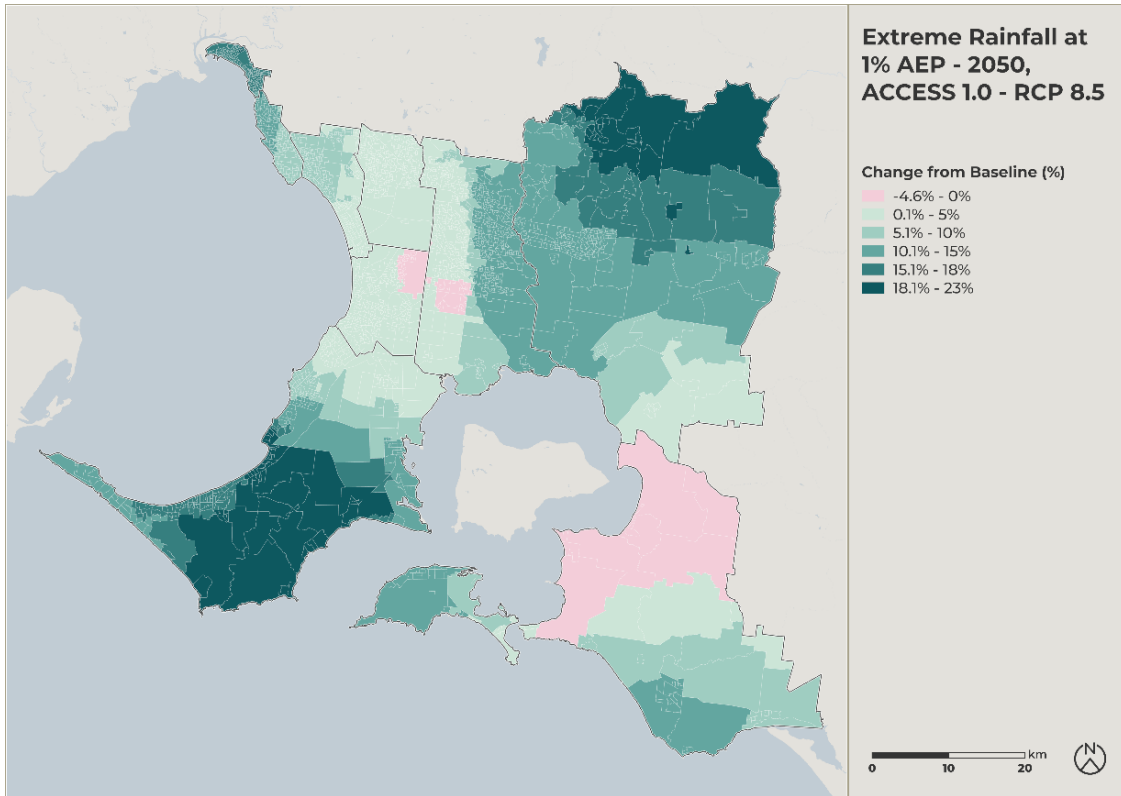


Figure 5. Extreme rainfall at a 1 per cent AEP in the SECCCA region. Change from a current baseline to 2050 using an ACCESS 1.0 GCM and an RCP 8.5 emissions scenario.

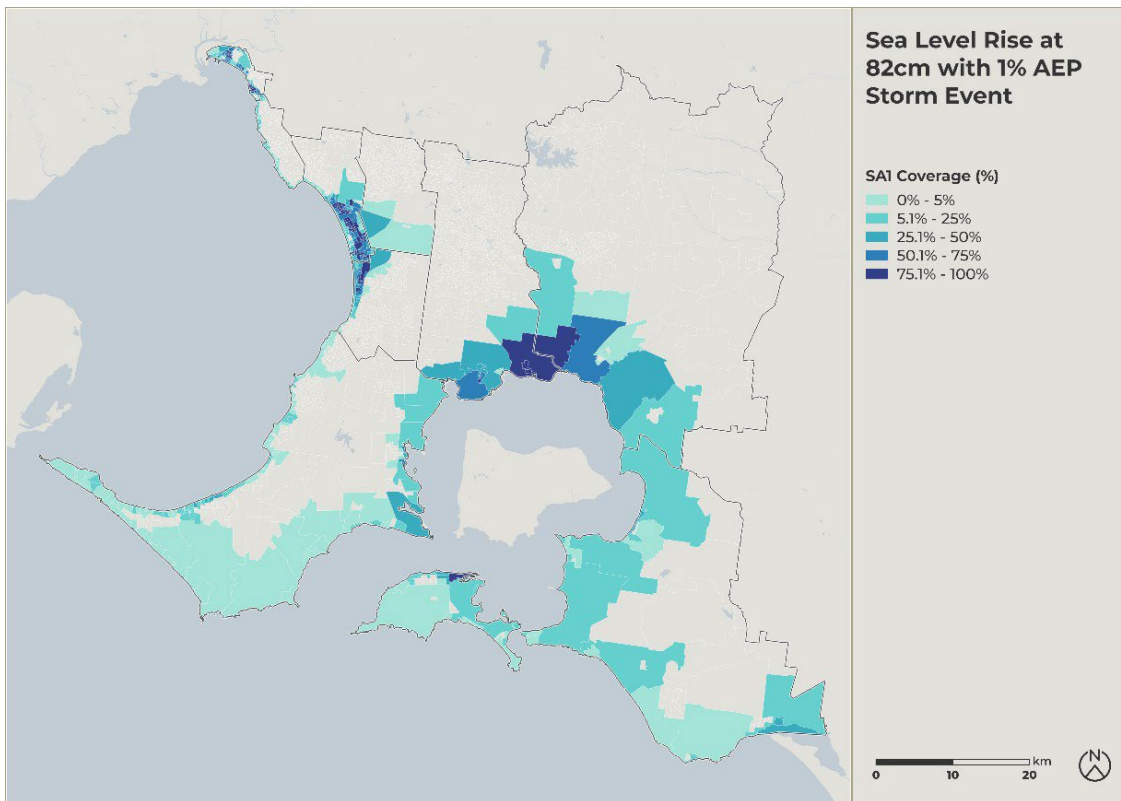


Figure 6. Sea-level rise at 82 cm coupled with a 1 per cent AEP storm tide event in the SECCCA region. Percentage coverage by SA1.

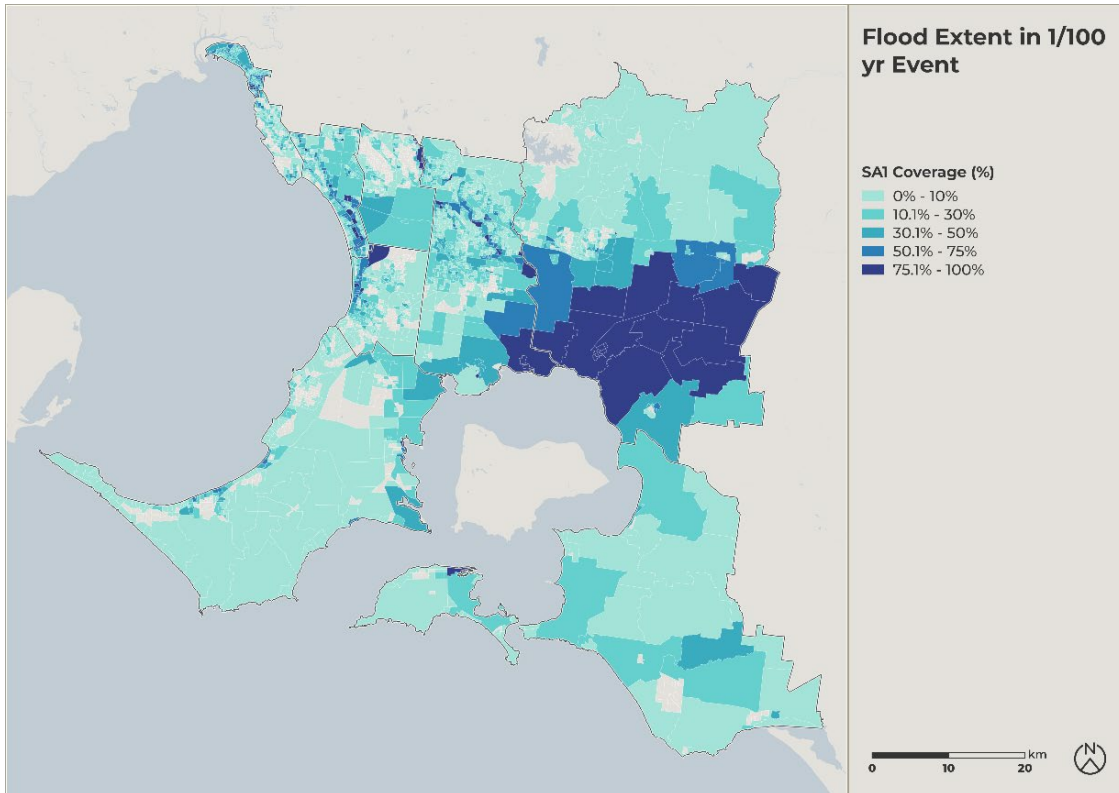


Figure 7. Flood extent in a 1-in-100-year event scenario for the SECCCA region. Percentage coverage by SA1.

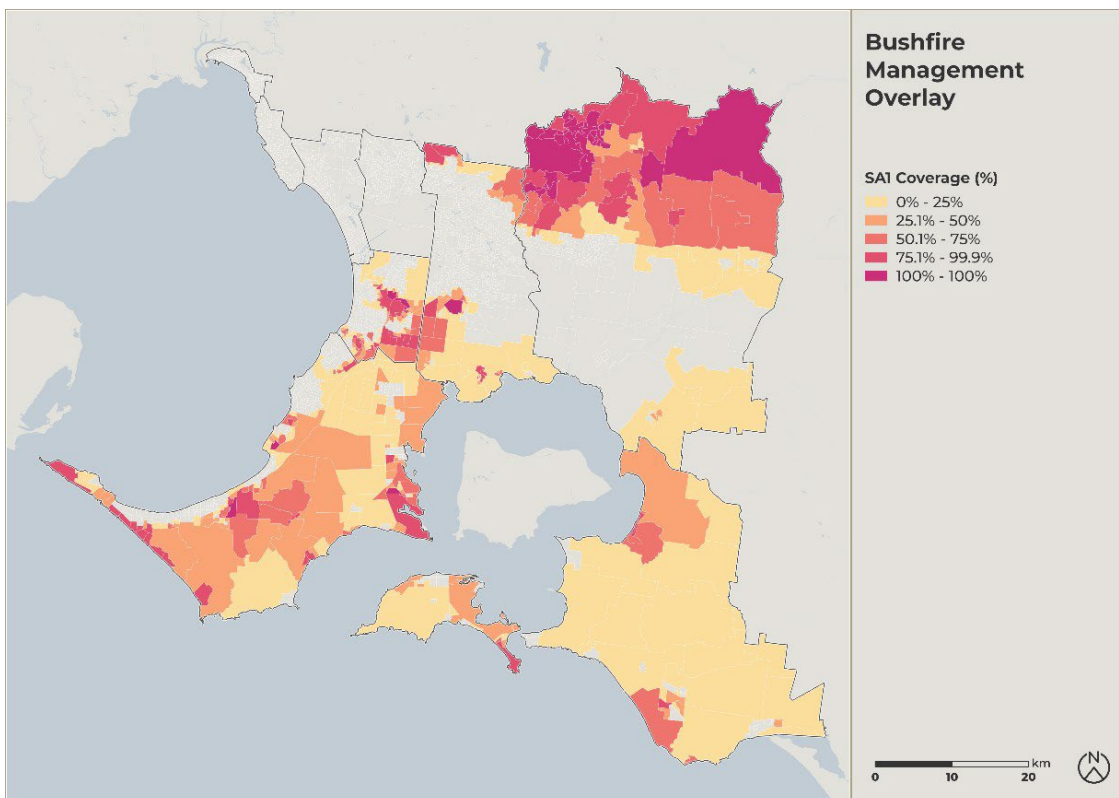


Figure 8. Bushfire management overlay in the SECCCA region. Percentage coverage by SA1.

6 Older people

6.1 SECCCA-wide vulnerable sub-population summaries

Table 3 presents SECCCA-wide summarised vulnerability rankings for older people populations. This summary table provides the average vulnerability ranking for an LGA, together with the population counts for each sub-population.

The assigned vulnerability ranking is independent of the population count for the relevant vulnerable sub-population.

Presented below this summary table are each of the climatic variables or flooding factors. These are expressed in terms of percentage change from a current baseline into 2050, or as a percentage coverage per area. This future timepoint is based on the ACCESS 1.0 GCM under an RCP 8.5 emissions scenario. For the flood and inundation scenario, the impacted area assumes:

- sea-level rise – an 82 cm sea-level rise scenario with a 1% AEP storm tide modelled forcing
- flooding – 1 per cent AEP flooding scenario.

For fire risk, the impacted area applies the current (2023) bushfire management overlay.

In relation to flooding and inundation, a dryness index (expressed in terms of the standard precipitation index) has also been incorporated to identify areas that are likely to experience the impacts associated with significant drought or periods of dryness.

The last section in the table is services and assets for each council, presented as counts of assets.

Table 3. Older people vulnerability, climate factors and key assets summary table by council area.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
Age 55 Over (Rank)	6.1	3.9	4.6	5.1	4.8	5.7	5.5	4.6	4.8
Age 65 Over (Rank)	5.3	3.7	4.2	4.9	4.3	5.3	5.2	4.0	4.5
Age 85 Over (Rank)	3.7	3.8	3.0	3.1	3.3	3.9	4.0	3.5	3.8
Age 55 Over (Population)	24,266	40,465	29,310	76,773	40,080	42,227	48,541	72,259	26,635
Age 65 Over (Population)	15,216	24,490	16,370	39,915	23,081	25,255	29,279	47,801	14,499
Age 85 Over (Population)	1,319	4,070	1,494	3,797	2,876	3,354	4,321	6,137	1,653
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Precipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
Ambulance (Count)	3	1	4	5	3	5	4	7	4
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Public Transport - Bus Stop (Count)		543	288	1,154	620	841	824	807	234
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Aged Care and Residences (Count)	18	53	48	53	32	46	56	50	13
Health - Doctor (Count)	4	11	7	16	8	13	17	1	9
Health - Pharmacy (Count)	3	13	6	26	25	37	22	17	22

Key observations for SECCCA-region older populations are outlined below. The highest vulnerability rankings (as displayed in shades of red, where the darker red identifies the greatest vulnerability) are found in:

- Bass Coast
- Greater Dandenong
- Kingston
- Casey.

Significant climate change ratings for each climate variable (again, displayed in shades of red, where the darker red identifies the greatest change from the baseline climate) are noted for:

- heat
 - Bass Coast, Cardinia, Casey, Greater Dandenong
- dryness (expressed in terms of the standard precipitation index)
 - Bayside, Greater Dandenong, Kingston, Frankston
- flooding and inundation (including sea-level rise)
 - Kingston, Port Phillip, Bass Coast
- fire
 - Cardinia, Bass Coast, Mornington Peninsula, Frankston.

Table 4 provides a priority linkage table between the identified highest vulnerability rankings for councils for this sub-population and which climate variable is most likely to impact on that vulnerable population.

Table 4. Highest vulnerability rankings for older people by council in combination with significant climate change rating.

Highest vulnerability ranking LGA	Heat	Dryness	Flooding and Inundation	Fire
Bass Coast	●		●	●
Greater Dandenong	●	●		
Kingston		●	●	
Casey	●			

Suburb-level priorities within each council are presented in Table 5. This table presents the three suburbs within each council region with the highest vulnerability ranking for each of the vulnerable sub-populations. Multiple suburbs that share one of the three highest vulnerability values are also included.

Table 5 presents a greater level of detail than that presented in Table 3, which provides only council-level summaries. For instance, in the council summaries, an area will have a range of vulnerability rankings within the council boundary. While averaging the value obscures this range, those higher-ranked locations can be clearly identified by looking at the top three suburbs.

Table 5. Suburbs by council with the three highest vulnerability rankings for vulnerable older people sub-populations.

Age 55 Over		Age 65 Over		Age 85 Over	
Suburb	Rank	Suburb	Rank	Suburb	Rank
Bass Coast					
Coronet Bay	9.0	Wimbledon Heights	10.0	South Dudley	8.0
Jam Jerrup	9.0	Jam Jerrup	9.0	Silverleaves	7.0
Lang Lang	9.0	Lang Lang	9.0	Coronet Bay	6.3
Pioneer Bay	9.0	Pioneer Bay	9.0		
South Dudley	9.0	South Dudley	9.0		
Sunset Strip	9.0	Sunset Strip	9.0		
Wimbledon Heights	9.0	Woodleigh	9.0		
Woodleigh	9.0				
Bayside					
Hampton East	8.3	Hampton East	8.7	Hampton East	7.3
Cheltenham	6.9	Cheltenham	6.5	Cheltenham	5.3
Highett	6.5	Highett	6.5	Black Rock	5.2
Cardinia					
Catani	9.0	Catani	9.0	Longwarry	8.0
Mount Burnett	9.0	Mount Burnett	9.0	Tynong	8.0
Longwarry	8.0	Bayles	8.0	Mount Burnett	7.0
Pakenham South	8.0	Cora Lynn	8.0		
Rythdale	8.0	Yannathan	8.0		
Yannathan	8.0				
Casey					
Eumemmerring	9.8	Eumemmerring	9.3	Harkaway	8.0
Junction Village	8.5	Junction Village	8.0	Eumemmerring	7.8
Warneet	8.0	Devon Meadows	7.2	Cannons Creek	5.5
Frankston					
Frankston North	9.8	Frankston North	9.0	Frankston North	6.6
Skye	6.2	Skye	6.0	Sandhurst	4.7
Sandhurst	5.7	Sandhurst	4.8	Skye	4.0
Greater Dandenong					
Bangholme	7.3	Bangholme	7.0	Bangholme	5.0
Dandenong	7.1	Dandenong South	6.7	Springvale	4.6
Dandenong South	7.0	Dandenong	6.3	Noble Park	4.4
Kingston					
Oakleigh South	9.0	Oakleigh South	8.8	Highett	7.6
Clayton South	8.9	Clayton South	8.3	Clayton South	7.3
Highett	8.4	Highett	8.0	Oakleigh South	7.2
Mornington Peninsula					
Baxter	8.4	Baxter	7.2	Boneo	9.0
Arthurs Seat	8.0	Crib Point	7.1	Arthurs Seat	8.0
Crib Point	7.9	Arthurs Seat	7.0	Cape Schanck	6.5
		Boneo	7.0	Moorooduc	6.5
Port Phillip					
Balaclava	8.3	Balaclava	7.9	Middle Park	6.3
St Kilda East	8.2	Ripponlea	7.8	St Kilda East	5.5
Ripponlea	7.5	St Kilda East	7.7	Ripponlea	5.3

6.2 SECCCA-wide vulnerable sub-population maps

Figure 9 to Figure 11 present the spatial distribution of vulnerability in older people across the SECCCA region. These maps provide a detailed view (at the ABS SA1 geography, and hence at a more detailed level than a suburb) of how potential vulnerabilities vary across an individual council and between councils.

The highest vulnerability rankings are again displayed in shades of red, where the darker red identifies the greatest vulnerability. The maps show how these vulnerabilities may cluster in population hubs. They provide a more detailed view (in terms of geography) of the suburbs identified with the highest vulnerability rankings in the previous table.

Note that greyed-out or translucent SA1 areas indicate that no one from the sub-population lives in the area. Hence, as there are progressively fewer people aged above the thresholds of 55, 65 and 85, the three subsequent maps increased in greyed-out SA1 areas.

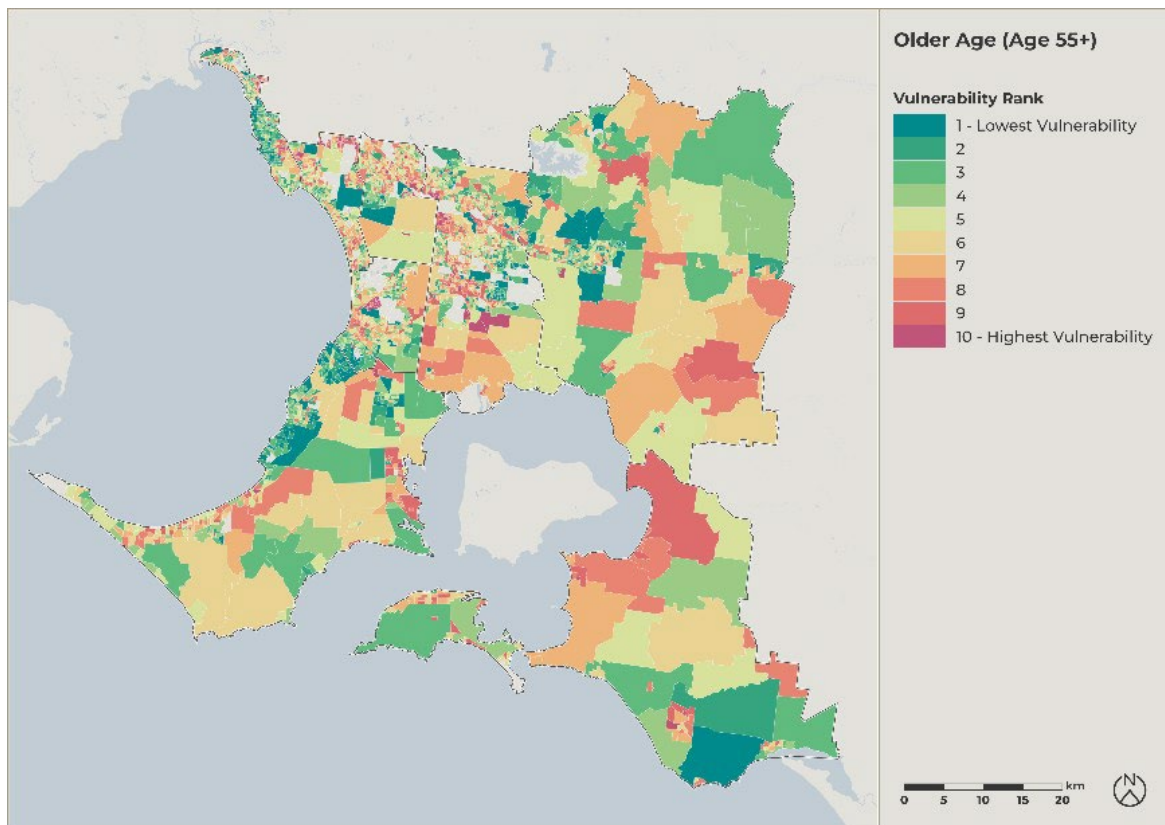


Figure 9. Older people aged 55 and over. Vulnerability by SA1.

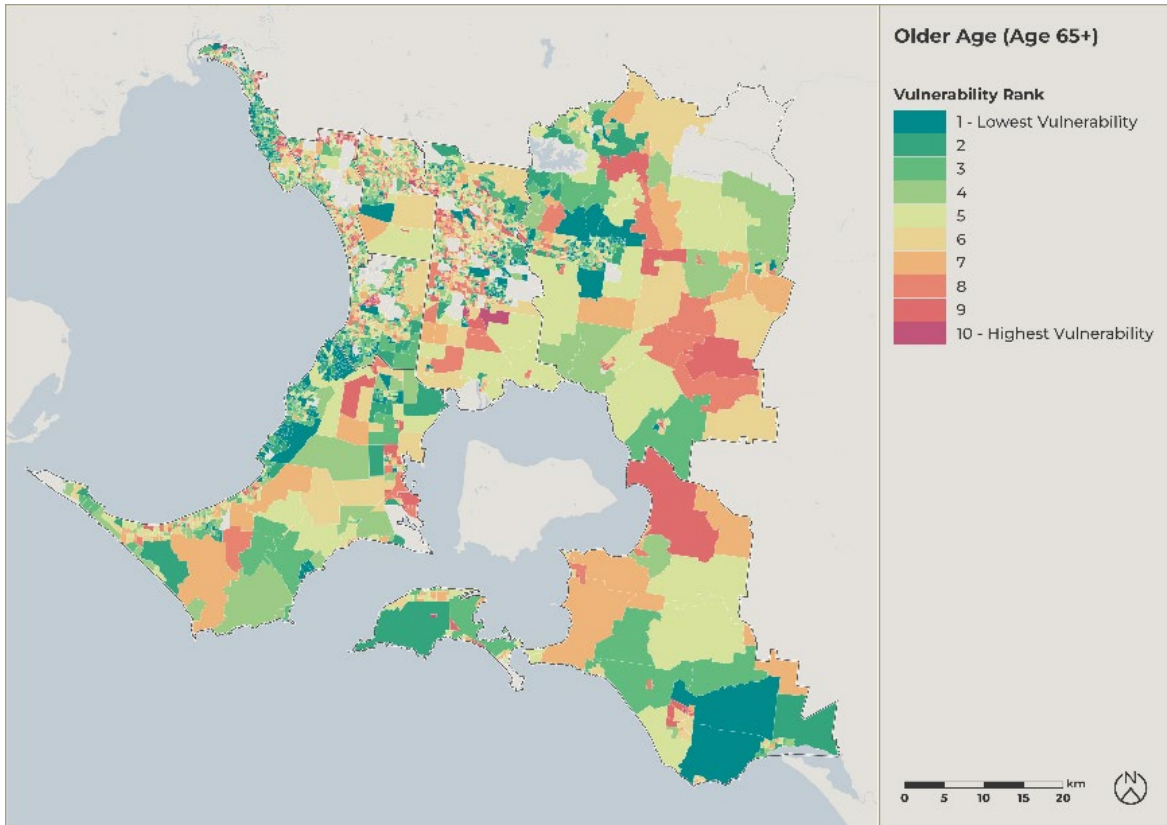


Figure 10. Older people aged 65 and over. Vulnerability by SA1.

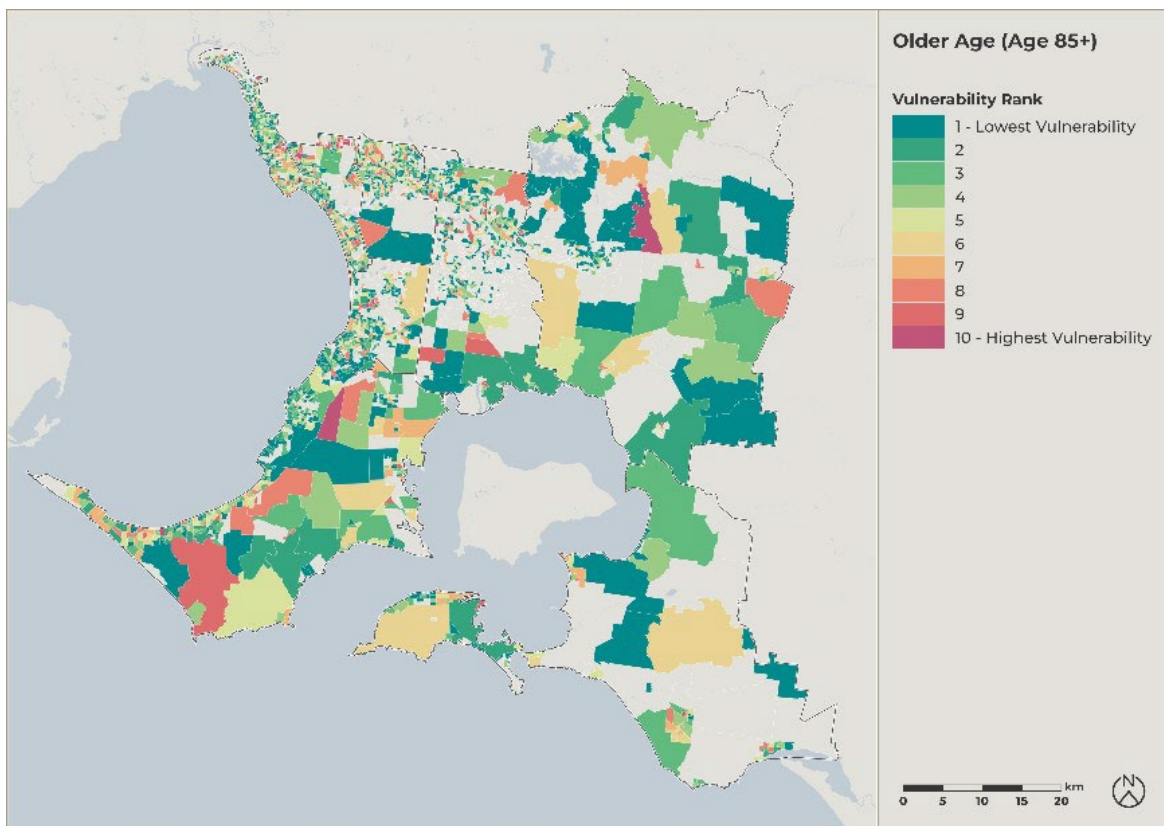


Figure 11. Older people aged 85 and over. Vulnerability by SA1.

7 Non-English-speaking background

7.1 SECCCA-wide vulnerable sub-population summaries

Table 6 presents SECCCA-wide summarised vulnerability ranks for non-English-speaking background (NESB) populations. This summary table provides the average vulnerability ranking for an LGA together with the population counts for each sub-population.

Refer to Section 4 (older people) for a more detailed description of the data being presented in this section.

Table 6. NESB vulnerability, climate factors and key assets summary table by council area.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
NESB Established (Rank)	6.8	4.1	4.7	5.0	4.9	6.5	5.8	4.8	3.6
NESB Recent Arrivals in the past 5Y (Rank)	7.2	4.3	4.8	5.2	4.8	6.5	5.8	4.5	4.2
NESB Recent Arrivals in the past 1Y (Rank)	4.6	4.6	4.1	5.0	5.8	6.1	6.2	5.5	3.9
NESB Bridging VISA (Rank)			2.6	4.5	5.9	5.9	3.8		2.0
NESB Established - (Population)	7,082	26,706	24,110	128,683	26,460	72,015	42,487	27,805	25,726
NESB Recent Arrivals in the past 5Y - (Population)	327	4,321	3,982	24,293	2,444	19,017	6,627	1,450	9,813
NESB Recent Arrivals in the past 1Y - (Population)	38	653	368	2,689	275	2,017	600	195	1,155
NESB Bridging VISA (Population) (postcode)			1,014	16,646	350	64,392	336		517
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Percipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
SES (Count)	4		2	1	1	1	2	3	2
Ambulance (Count)	3	1	4	5	3	5	4	7	4
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Neighbourhood Safe Place (Count)	6		3	7				13	1
Life Saving Club (Count)	5	6			2		7	10	5
Public Transport - Train Station (Count)		6	4						3
Public Transport - Tram Stop (Count)		10		6	4	5	13	9	
Public Transport - Bus Stop (Count)		543	288	1,154	620	841	824	807	234
Schools or Universities (Count)	71	92	106	216	115	132	100	128	77
Places of Worship (Count)	19	30	34	30	20	32	27	20	38
Child Care, Kindergartens or MCHC (Count)	25	110	110	278	115	121	133	152	79
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Aged Care and Residences (Count)	18	53	48	53	32	46	56	50	13
Sporting Facility (Count)	223	225	283	495	168	185	219	545	195
Health - Doctor (Count)	4	11	7	16	8	13	17	1	9
Health - Pharmacy (Count)	3	13	6	26	25	37	22	17	22

Key observations for SECCCA-region NESB populations are outlined below. The highest vulnerability rankings (as displayed in shades of red, where the darker red identifies the greatest vulnerability) are found in:

- Bass Coast
- Greater Dandenong
- Kingston
- Frankston
- Mornington Peninsula
- Casey.

Significant climate change ratings for each climate variable are noted for:

- heat
 - Bass Coast, Cardinia, Casey, Greater Dandenong
- dryness
 - Bayside, Greater Dandenong, Kingston, Frankston
- flooding and inundation
 - Kingston, Port Phillip, Bass Coast
- fire
 - Cardinia, Bass Coast, Mornington Peninsula, Frankston.

Table 7 provides a priority linkage table between the identified highest vulnerability rankings for councils and which climate variable is most likely to impact on that vulnerable population.

Table 7. Highest vulnerability rankings for NESB populations by council in combination with significant climate change rating.

Highest vulnerability ranking LGA	Heat	Dryness	Flooding and inundation	Fire
Bass Coast	●		●	●
Greater Dandenong	●	●		
Kingston		●	●	
Frankston		●		●
Mornington Peninsula	●			●
Casey	●			

Suburb-level priorities within each council are presented in Table 8.

Table 8. Suburbs by council with the three highest vulnerability rankings for vulnerable NESB sub-populations.

NESB Established		NESB Recent Arrivals in the past 5Y		NESB Recent Arrivals in the past 1Y		NESB Bridging VISA	
Suburb	Rank	Suburb	Rank	Suburb	Rank	Suburb	Rank
Bass Coast							
Jam Jerrup	10.0	Smiths Beach	9.0	South Dudley	10.0		
Lang Lang	10.0	St Clair	9.0	Surf Beach	10.0		
Woodleigh	10.0	Wattle Bank	9.0	Cowes	9.7		
Bayside							
Hampton East	7.9	Hampton East	7.6	Hampton East	8.0		
Highbett	5.7	Brighton East	5.5	Highbett	6.3		
Brighton East	5.3	Cheltenham	5.2	Brighton East	5.8		
Cardinia							
Caldermeade	9.0	Yannathan	10.0	Yannathan	10.0	Pakenham	2.6
Cardinia	9.0	Bayles	8.0	Garfield	6.0		
Koo Wee Rup North	9.0	Officer South	7.5	Tynong	6.0		
Monomeith	9.0						
Casey							
Eumemmerring	9.5	Eumemmerring	9.3	Eumemmerring	9.0	Eumemmerring	9.0
Warneet	8.0	Junction Village	8.0	Hallam	7.4	Doveton	6.4
Hallam	7.8	Hallam	7.6	Beaconsfield	7.0	Hallam	6.1
Frankston							
Frankston North	8.6	Frankston North	8.1	Frankston North	8.5	Sandhurst	6.0
Langwarrin South	6.5	Seaford	5.9	Seaford	7.2	Skye	5.5
Seaford	6.2	Sandhurst	5.3	Langwarrin	7.0		
Greater Dandenong							
Bangholme	9.3	Dandenong South	9.0	Dandenong North	7.7	Dandenong North	9.6
Dandenong South	8.7	Noble Park	8.7	Noble Park	7.7	Dandenong	9.0
Noble Park North	8.6	Noble Park North	7.5	Noble Park North	6.8	Noble Park	7.9
Kingston							
Clarinda	8.4	Clayton South	8.3	Chelsea Heights	8.5	Clayton South	3.8
Oakleigh South	8.3	Oakleigh South	7.5	Aspendale	8.0	Clarinda	3.7
Clayton South	7.8	Moorabbin Airport	7.0	Edithvale	8.0		
Mornington Peninsula							
Capel Sound	8.8	Capel Sound	8.7	Capel Sound	10.0		
Boneo	8.0	Tootgarook	8.5	Rosebud	9.5		
Safety Beach	7.9	Bittern	7.0	Fingal	8.0		
		Fingal	7.0	McCrae	8.0		
		Moorooduc	7.0				
Port Phillip							
Windsor	8.0	Windsor	9.0	St Kilda West	7.8	St Kilda West	6.5
St Kilda West	6.1	St Kilda West	7.4	Windsor	7.0	St Kilda	1.6
Middle Park	5.3	Southbank	7.0	Middle Park	6.5	Balaclava	1.5
						Elwood	1.5

7.2 SECCCA-wide vulnerable sub-population maps

Figure 12 to Figure 15 present the spatial distribution of vulnerability in NESB populations across the SECCCA region.

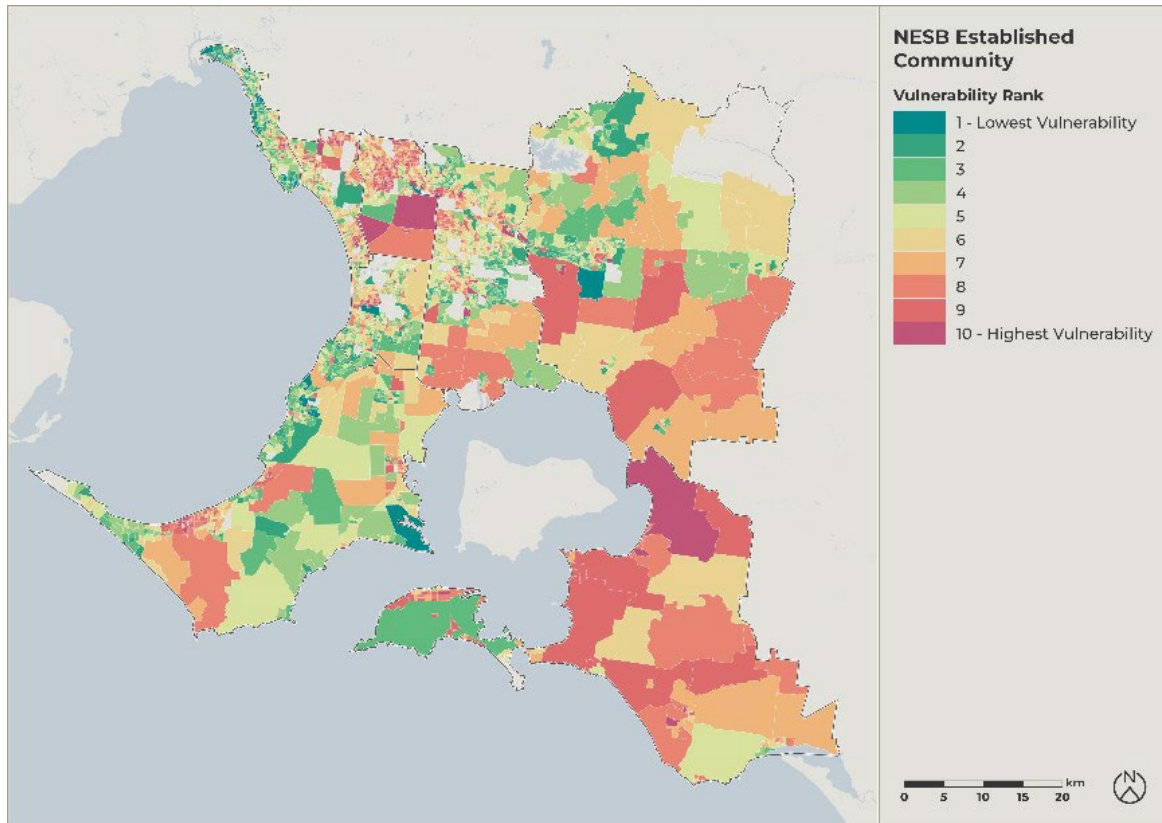


Figure 12. NESB – established communities. Vulnerability by SA1.

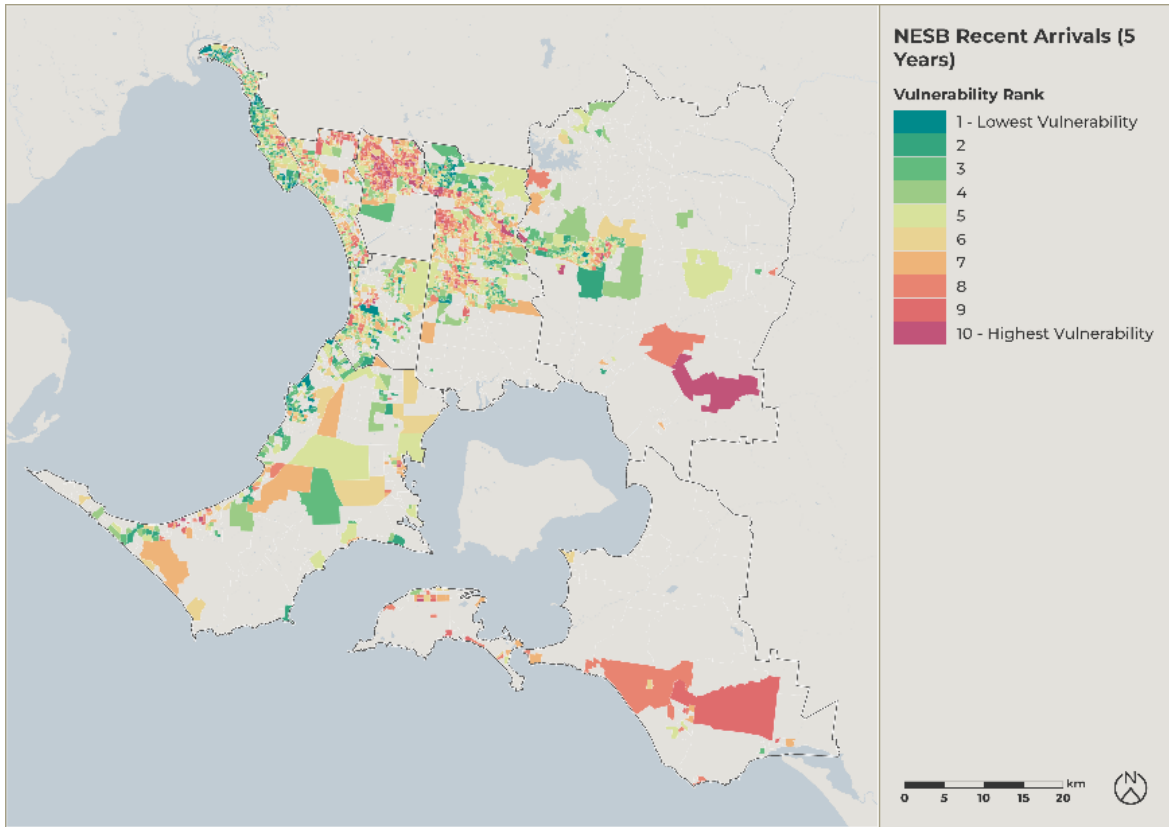


Figure 13. NESB – recent arrival in the past 5 years. Vulnerability by SA1.

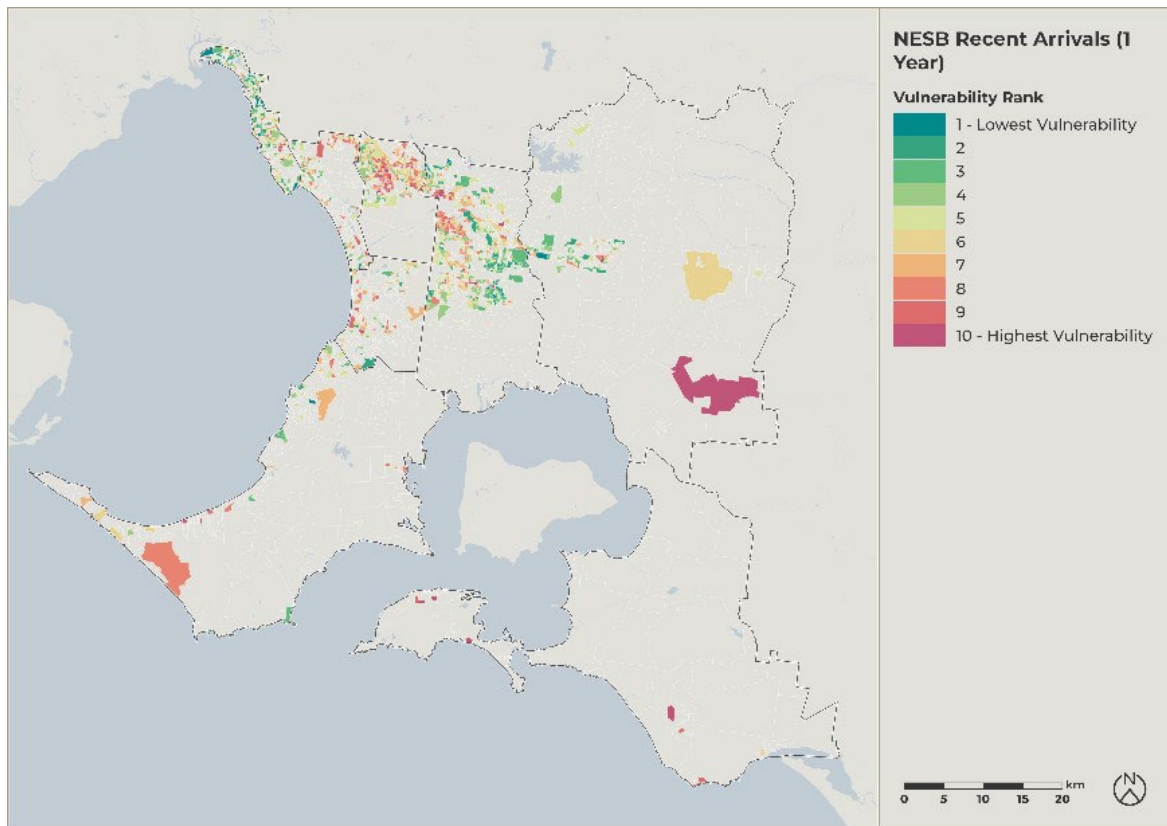


Figure 14. NESB – recent arrival in the past 1 year. Vulnerability by SA1.

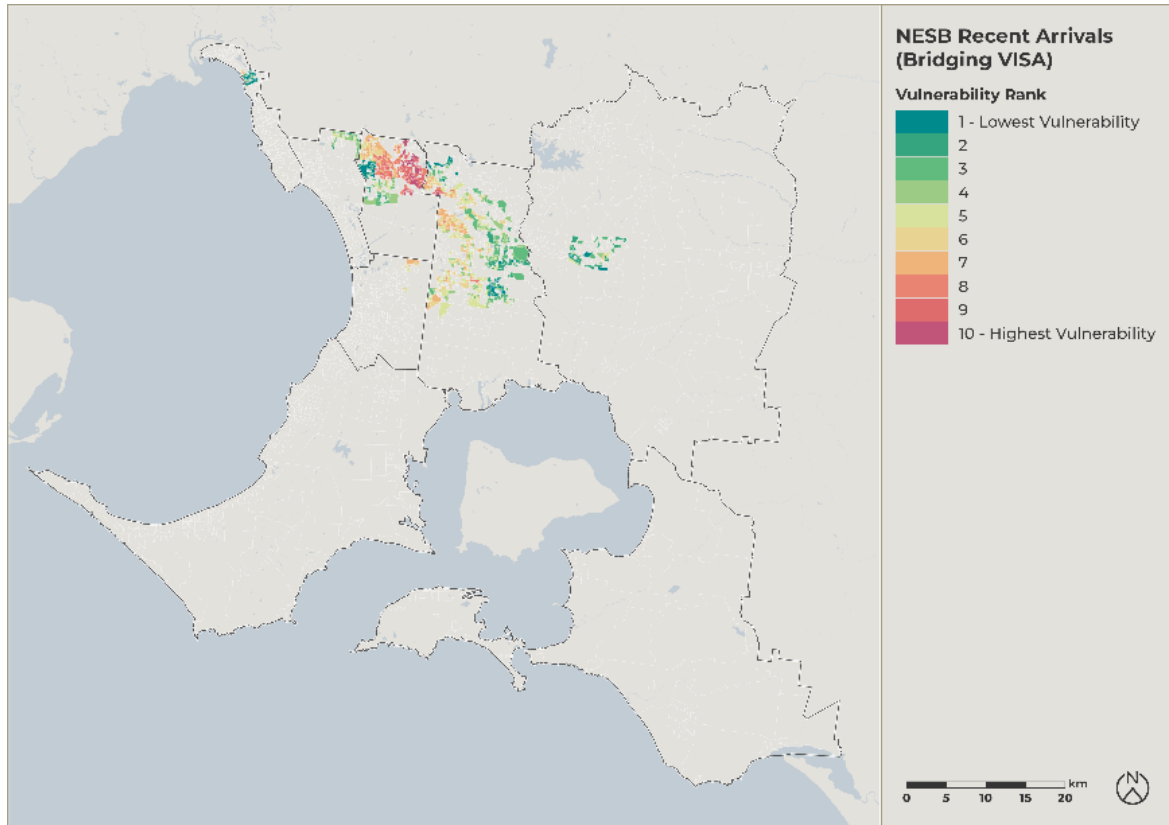


Figure 15. NESB – those on bridging visas. Vulnerability by SA1.

8 Single mothers, low income, high care and homeless

8.1 SECCA-wide vulnerable sub-population summaries

Table 9 presents SECCA-wide summarised vulnerability ranks for single mothers, low income, high care and homeless populations. This summary table provides the average vulnerability ranking for an LGA together with the population counts for each sub-population. These sub-populations have been grouped together for convenience for the purposes of presenting findings.

Refer to Section 4 (older people) for a more detailed description of the data being presented in this section.

Table 9. Single mothers, low income,³ high care and homeless vulnerability, climate factors and key assets summary table by council area.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
Single Mothers (Rank)	6.2	3.1	6.2	5.1	5.9	3.6	4.4	6.2	3.0
High Care (Rank)	6.7	3.1	5.2	4.8	5.3	5.1	5.7	5.0	4.9
Homeless (Rank)	7.4	3.3	6.4	5.4	5.7	5.2	4.2	6.2	3.4
Low Income (Rank)	5.7	6.3	3.4	4.4	5.6	5.3	7.2	6.5	5.3
Single Mothers - (Population)	1,319	2,809	3,798	10,609	5,636	5,779	4,786	4,890	2,077
High Care - (Population)	2,930	4,431	4,292	14,309	6,957	9,710	7,477	8,792	2,801
Rented Public - (Population)	294	1,115	242	1,453	1,339	1,820	1,103	916	2,487
Mean Annual Income Percentile Bracket	36.3%	60.4%	47.3%	47.1%	43.4%	39.5%	48.8%	45.2%	52.4%
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Precipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
SES (Count)	4		2	1	1	1	2	3	2
Ambulance (Count)	3	1	4	5	3	5	4	7	4
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Neighbourhood Safe Place (Count)	6		3	7				13	1
Life Saving Club (Count)	5	6			2		7	10	5
Public Transport - Train Station (Count)		6	4	6	4	5	13	9	3
Public Transport - Tram Stop (Count)		10							191
Public Transport - Bus Stop (Count)		543	288	1,154	620	841	824	807	234
Schools or Universities (Count)	71	92	106	216	115	132	100	128	77
Places of Worship (Count)	19	30	34	30	20	32	27	20	38
Child Care, Kindergartens or MCHC (Count)	25	110	110	278	115	121	133	152	79
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Aged Care and Residences (Count)	18	53	48	53	32	46	56	50	13
Sporting Facility (Count)	223	225	283	495	168	185	219	545	195
Health - Doctor (Count)	4	11	7	16	8	13	17	1	9
Health - Pharmacy (Count)	3	13	6	26	25	37	22	17	22

³ Low income does not have population values as this data is not available from the sources used. As such, Mean Annual Income Bracket (MAIB) has been presented instead. This measure looks across all of Australia for the range of incomes (from \$0 to \$100,000+) and then normalises it to find the decile brackets. Therefore, the first quartile includes those that are earning the lowest 20 per cent of the total population. An example of incorporating this measure is as follows: people in Bass Coast are generally lower-income (in the 36.3 per cent MAIB percentile), and also have high vulnerabilities of those who are homeless (rank 7.4).

Key observations for SECCCA-region single mothers, low income, high care and homeless populations are outlined below. The highest vulnerability rankings are found in:

- Bass Coast
- Kingston
- Mornington Peninsula
- Cardinia
- Frankston
- Greater Dandenong
- Casey.

Significant climate change ratings for each climate variable are noted for:

- heat
 - Bass Coast, Cardinia, Casey, Greater Dandenong
- dryness
 - Bayside, Greater Dandenong, Kingston, Frankston
- flooding and inundation
 - Kingston, Port Phillip, Bass Coast
- fire
 - Cardinia, Bass Coast, Mornington Peninsula, Frankston.

Table 10 provides a priority linkage table between the identified highest vulnerability rankings for councils and which climate variable is most likely to impact on that vulnerable population.

Table 10. Highest vulnerability rankings for single mothers, low income, high care and homeless populations by council in combination with significant climate change rating.

Highest vulnerability ranking LGA	Heat	Dryness	Flooding and inundation	Fire
Bass Coast	●		●	●
Kingston		●	●	
Mornington Peninsula	●			●
Cardinia	●			●
Frankston		●		●
Greater Dandenong	●	●		
Casey	●			

Suburb-level priorities within each council are presented in Table 11.

Table 11. Suburbs by council with the three highest vulnerability rankings for vulnerable single mothers, low income, high care and homeless sub-populations.

Single Mothers		High Care		Homeless		Low Income	
Suburb	Rank	Suburb	Rank	Suburb	Rank	Suburb	Rank
Bass Coast							
Coronet Bay	10.0	Jam Jerrup	10.0	Cowes	9.0	Coronet Bay	8.3
Glen Forbes	10.0	Lang Lang	10.0	Wonthaggi	8.9	Jam Jerrup	8.0
Pioneer Bay	10.0	Sunset Strip	10.0	North Wonthaggi	8.2	Lang Lang	8.0
St Clair	10.0	Woodleigh	10.0			Wimbledon Heights	8.0
Sunderland Bay	10.0					Woodleigh	8.0
Sunset Strip	10.0						
Tenby Point	10.0						
Wattle Bank	10.0						
Wimbledon Heights	10.0						
Bayside							
Hampton East	7.2	Hampton East	7.8	Hampton East	4.8	Black Rock	8.8
Highett	5.3	Highett	5.5	Highett	3.7	Hampton East	8.4
Cheltenham	3.5	Hampton	4.7	Sandringham	3.7	Brighton East	7.7
Cardinia							
Koo Wee Rup North	10.0	Longwarry	9.0	Bunyip	9.0	Koo Wee Rup North	8.0
Catani	9.0	Caldermeade	8.0	Beaconsfield	7.0	Yannathan	8.0
Maryknoll	9.0	Monomeith	8.0	Emerald	7.0	Heath Hill	7.0
		Mount Burnett	8.0	Koo Wee Rup	7.0	Iona	7.0
		Officer South	8.0	Lang Lang	7.0	Lang Lang East	7.0
		Pakenham South	8.0			Modella	7.0
		Rythdale	8.0			Nyora	7.0
		Yannathan	8.0			Vervale	7.0
Casey							
Junction Village	9.7	Eumemmerring	8.5	Junction Village	10.0	Eumemmerring	8.5
Warneet	8.5	Warneet	8.3	Cranbourne	6.6	Cannons Creek	7.0
Beaconsfield	8.0	Junction Village	8.0	Eumemmerring	6.3	Devon Meadows	7.0
Frankston							
Frankston North	9.4	Frankston North	8.9	Frankston North	8.9	Frankston North	9.6
Skye	7.1	Seaford	7.3	Seaford	6.4	Skye	6.1
Langwarrin	6.9	Carrum Downs	5.8	Langwarrin	5.7	Langwarrin	6.0
Greater Dandenong							
Bangholme	7.0	Bangholme	9.5	Noble Park North	6.0	Bangholme	8.5
Noble Park North	4.4	Dandenong South	9.0	Dandenong North	5.8	Springvale South	7.7
Dandenong North	4.2	Noble Park North	6.9	Noble Park	5.3	Noble Park North	6.9
Kingston							
Chelsea Heights	7.1	Oakleigh South	7.4	Clarinda	6.8	Chelsea Heights	9.4
Waterways	6.8	Edithvale	7.2	Bonbeach	6.0	Bonbeach	9.3
Bonbeach	6.8	Bonbeach	7.2	Chelsea Heights	6.0	Highett	8.9
Morrington Peninsula							
Merricks Beach	10.0	Merricks Beach	9.0	Baxter	10.0	Merricks Beach	10.0
McCrae	9.4	Capel Sound	8.7	Crib Point	10.0	Capel Sound	9.3
Merricks North	9.0	Fingal	8.0	McCrae	10.0	McCrae	8.8
Point Leo	9.0	Merricks	8.0				
Port Phillip							
Ripponlea	5.8	St Kilda West	9.0	Windsor	8.0	St Kilda West	8.0
Southbank	4.0	Windsor	9.0	Melbourne	5.5	Middle Park	7.9
St Kilda East	4.0	Southbank	8.0	Albert Park	5.3	Albert Park	7.6

8.2 SECCCA-wide vulnerable sub-population maps

Figure 16 to Figure 19 present the spatial distribution of vulnerability in single mothers, low income, high care, and homeless populations across the SECCCA region.

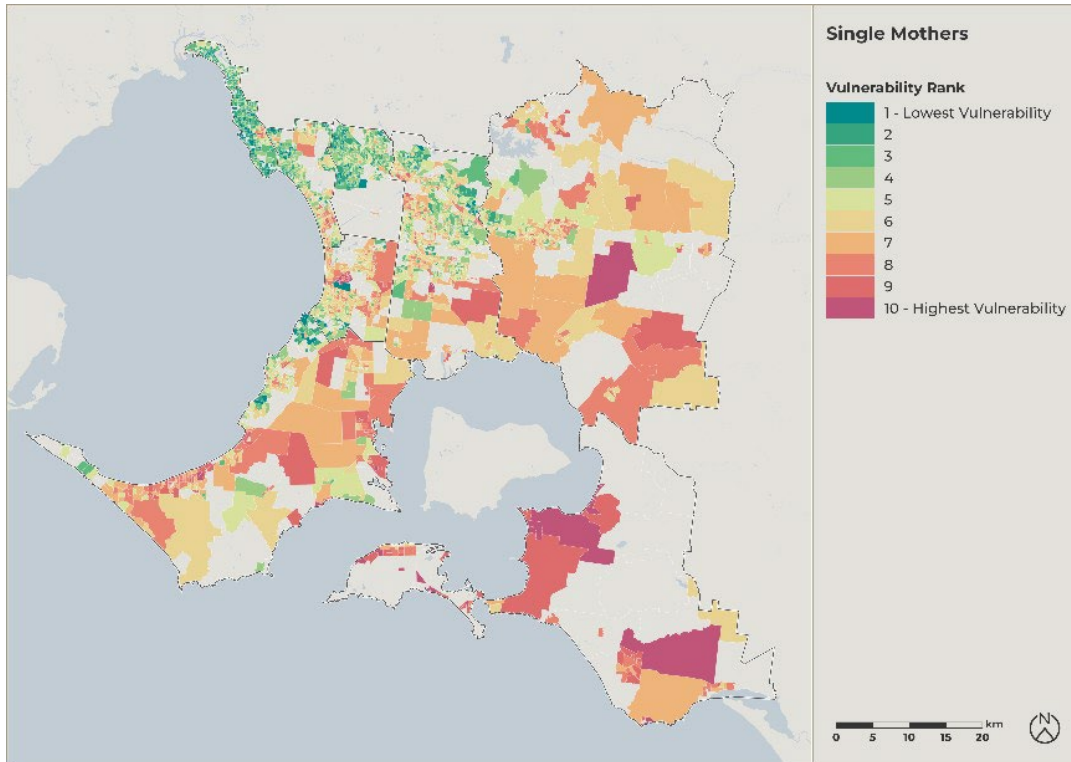


Figure 16. Single mothers. Vulnerability by SA1.

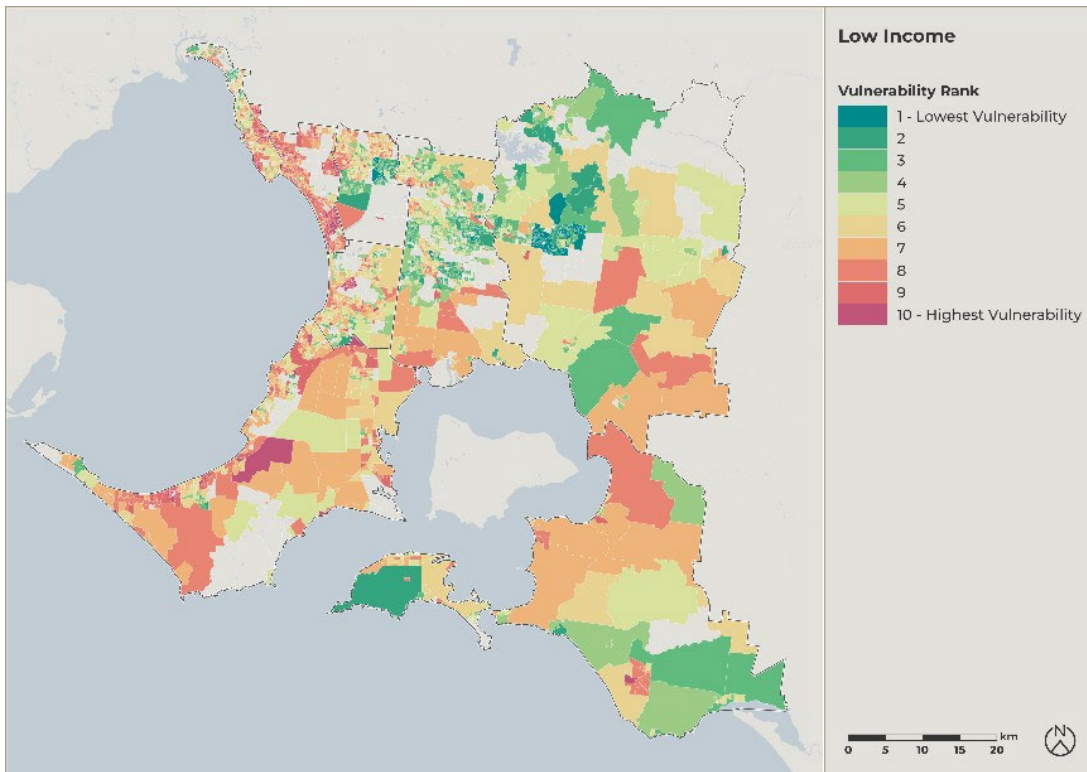


Figure 17. Those on low income. Vulnerability by SA1.

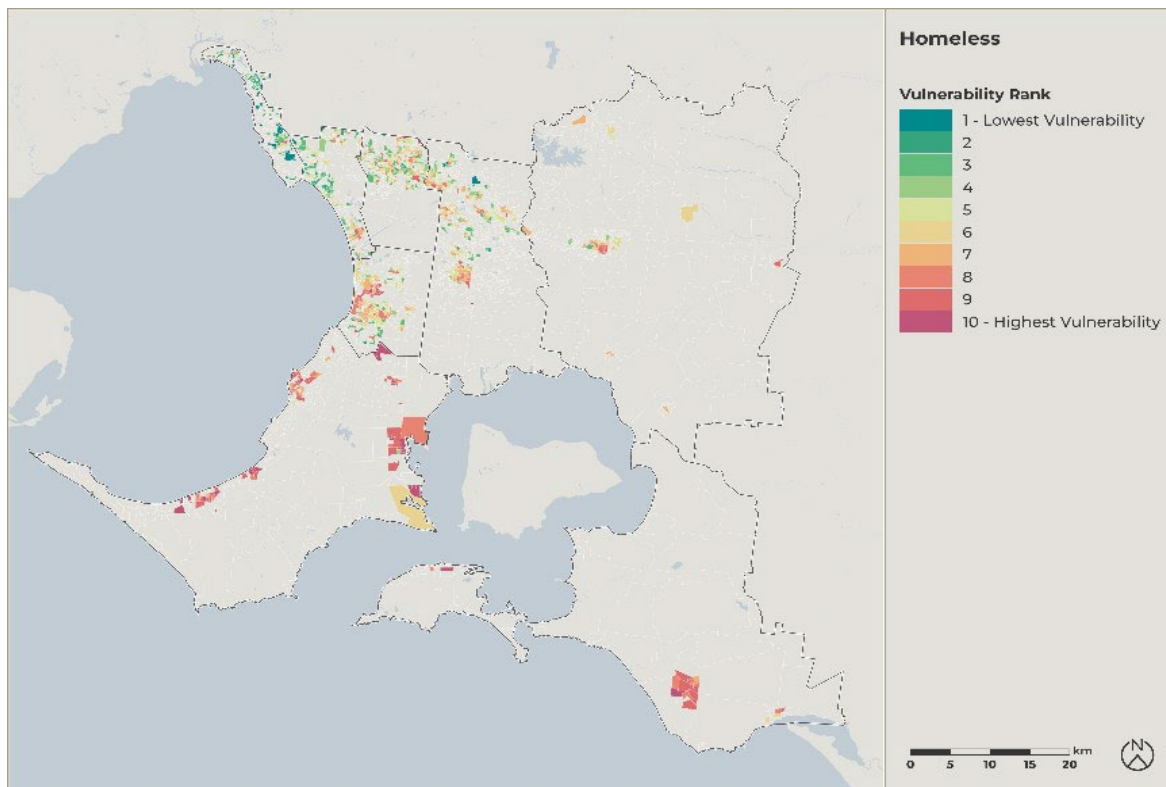


Figure 18. Homeless and those in insecure housing. Vulnerability by SA1.

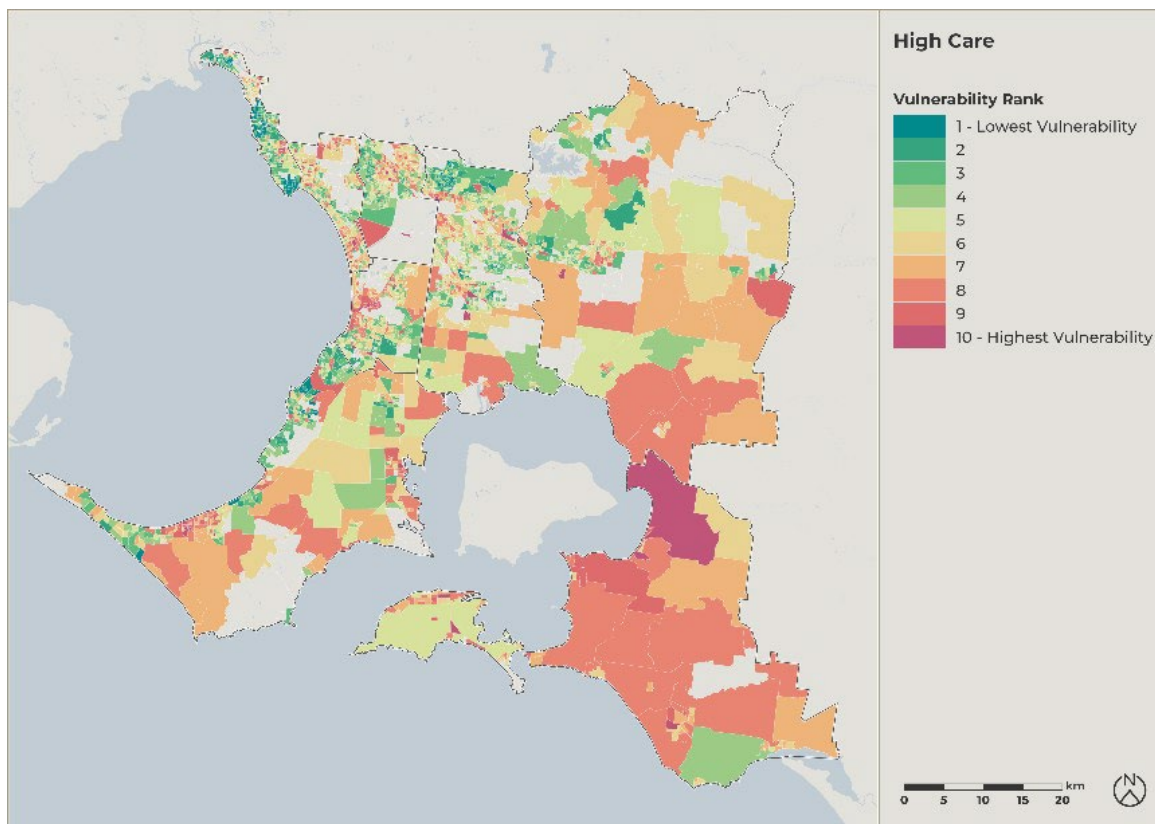


Figure 19. People requiring assistance or a high level of care and those with disabilities. Vulnerability by SA1.

9 Youth

9.1 SECCCA-wide vulnerable sub-population summaries

Table 12 below presents SECCCA-wide summarised vulnerability ranks for youth populations.

This summary table provides the average vulnerability ranking for an LGA together with the population counts for each sub-population.

Refer to Section 4 (older people) for a more detailed description of the data being presented in this section.

Table 12. Youth vulnerability, climate factors and key assets summary table by council area.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
Youth 15 to 19 (Rank)	5.4	4.0	5.0	6.4	5.1	7.0	5.8	3.5	5.6
Youth 20 to 24 (Rank)	5.9	3.8	5.0	6.2	5.1	6.8	5.7	3.7	6.0
Youth 15 to 24 (Rank)	5.7	3.8	4.9	6.2	5.0	6.7	5.7	3.4	6.2
Age 15 to 19 (Population)	2,513	8,111	8,062	23,640	7,850	8,711	8,470	9,955	3,470
Age 20 to 24 (Population)	2,028	5,890	7,729	24,563	7,664	11,648	8,359	7,822	5,995
Age 15 to 24 (Population)	4,541	14,001	15,791	48,203	15,514	20,359	16,829	17,777	9,465
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Precipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Neighbourhood Safe Place (Count)	6		3	7				13	1
Life Saving Club (Count)	5	6			2		7	10	5
Public Transport - Train Station (Count)		6	4	6	4	5	13	9	3
Public Transport - Tram Stop (Count)		10							191
Public Transport - Bus Stop (Count)		543	288	1,154	620	841	824	807	234
Schools or Universities (Count)	71	92	106	216	115	132	100	128	77
Places of Worship (Count)	19	30	34	30	20	32	27	20	38
Child Care, Kindergartens or MCHC (Count)	25	110	110	278	115	121	133	152	79
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Sporting Facility (Count)	223	225	283	495	168	185	219	545	195

Key observations for SECCCA-region youth are outlined below. The highest vulnerability rankings are found in:

- Greater Dandenong
- Casey
- Port Phillip
- Bass Coast
- Kingston
- Frankston
- Cardinia.

Significant climate change ratings for each climate variable are noted for:

- heat
 - Bass Coast, Cardinia, Casey, Greater Dandenong
- dryness
 - Bayside, Greater Dandenong, Kingston, Frankston
- flooding and inundation
 - Kingston, Port Phillip, Bass Coast
- fire
 - Cardinia, Bass Coast, Mornington Peninsula, Frankston.

Table 13 provides a priority linkage table between the identified highest vulnerability rankings for councils and which climate variable is most likely to impact on that vulnerable population.

Table 13. Highest vulnerability rankings for youth populations by council in combination with significant climate change rating.

Highest vulnerability ranking LGA	Heat	Dryness	Flooding and inundation	Fire
Greater Dandenong	●	●		
Casey	●			
Port Phillip	●		●	
Bass Coast	●		●	●
Kingston		●	●	
Frankston		●		●
Cardinia	●			●

Suburb-level priorities within each council are presented in Table 14.

Table 14. Suburbs by council with the three highest vulnerability rankings for youth sub-populations.

Youth 15 to 19		Youth 20 to 24		Youth 15 to 24	
Suburb	Rank	Suburb	Rank	Suburb	Rank
Bass Coast					
Kongwak	9.0	Jam Jerrup	9.0	Jam Jerrup	10.0
Outtrim	9.0	Lang Lang	9.0	Lang Lang	10.0
Archies Creek	8.0	Wimbledon Heights	9.0	Wimbledon Heights	10.0
Glen Alvie	8.0	Woodleigh	9.0	Woodleigh	10.0
Ryanston	8.0				
Sunset Strip	8.0				
West Creek	8.0				
Bayside					
Hampton East	6.0	Hampton East	6.1	Hampton East	6.0
Brighton East	5.5	Highett	5.9	Highett	6.0
Highett	5.4	Brighton East	5.1	Brighton East	5.1
Cardinia					
Cardinia	8.0	Cardinia	9.0	Officer South	9.5
Catani	8.0	Iona	9.0	Cardinia	9.0
Iona	8.0	Koo Wee Rup North	9.0	Catani	9.0
Koo Wee Rup North	8.0	Modella	9.0	Mount Burnett	9.0
Maryknoll	8.0	Mount Burnett	9.0	Tynong North	9.0
Modella	8.0	Officer South	9.0		
Mount Burnett	8.0	Tynong North	9.0		
Officer South	8.0	Vervale	9.0		
Tynong North	8.0				
Vervale	8.0				
Casey					
Eumemmerring	9.5	Eumemmerring	9.5	Eumemmerring	9.5
Beaconsfield	9.0	Lysterfield South	9.0	Lysterfield South	9.0
Lysterfield South	9.0	Hallam	8.7	Hallam	8.8
Frankston					
Sandhurst	8.4	Sandhurst	8.6	Sandhurst	9.1
Skye	8.3	Skye	8.5	Skye	8.6
Carrum Downs	6.8	Frankston North	8.1	Frankston North	7.8
Greater Dandenong					
Springvale South	8.8	Bangholme	10.0	Bangholme	10.0
Noble Park North	8.6	Noble Park North	9.0	Noble Park North	9.4
Noble Park	8.2	Springvale South	8.9	Springvale South	9.1
Kingston					
Waterways	7.7	Chelsea Heights	7.0	Highett	7.0
Clayton South	7.5	Clayton South	6.9	Chelsea Heights	6.9
Aspendale Gardens	7.4	Highett	6.8	Clayton South	6.9
Mornington Peninsula					
Merricks	8.0	Merricks Beach	9.0	Merricks Beach	10.0
Cape Schanck	7.0	Merricks	8.0	Merricks	8.0
Merricks Beach	7.0	Fingal	7.0	Cape Schanck	7.0
		Red Hill South	7.0	Fingal	7.0
Port Phillip					
Ripponlea	8.5	Balaclava	9.1	Ripponlea	9.5
Southbank	8.0	Ripponlea	9.0	Windsor	9.5
Balaclava	7.9	Southbank	9.0	Balaclava	9.3
		Windsor	9.0		

9.2 SECCCA-wide vulnerable sub-population maps

Figure 20 to Figure 22 present the spatial distribution of vulnerability in youth populations across the SECCCA region.

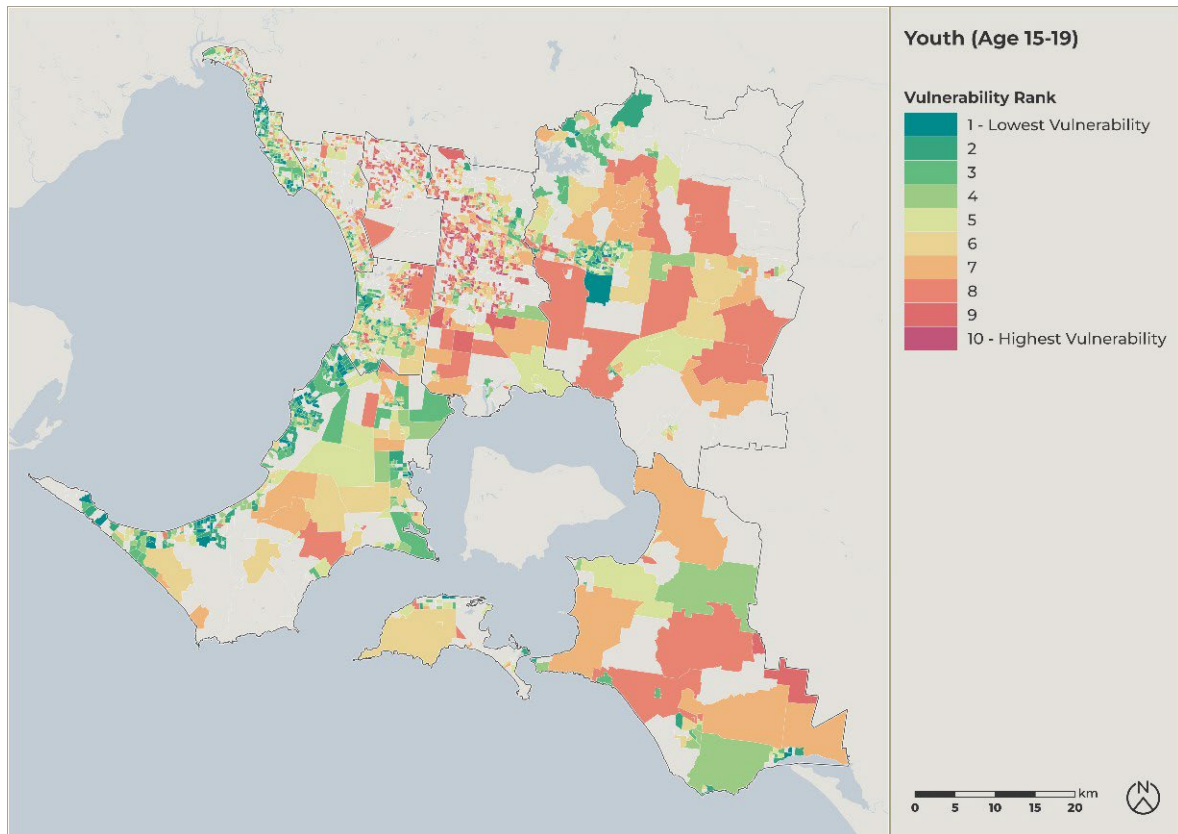


Figure 20. Youth aged between 15 and 19. Vulnerability by SA1.

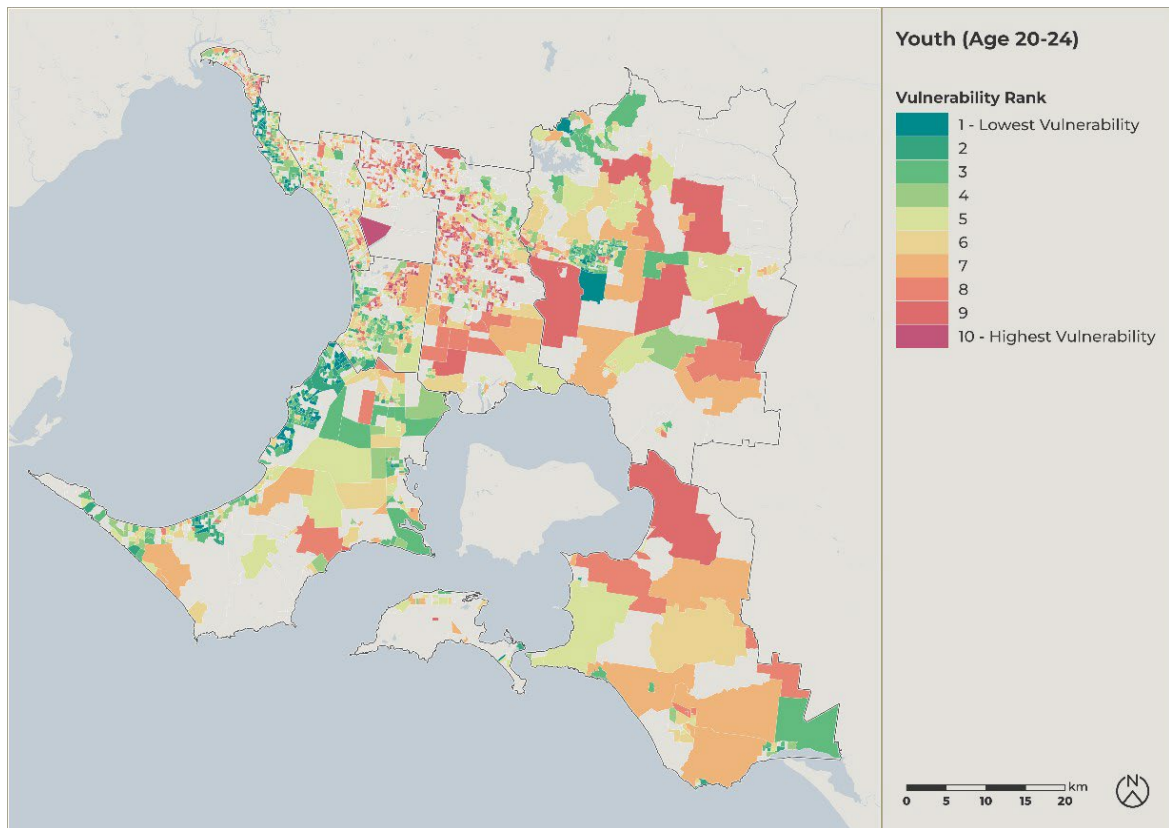


Figure 21. Youth aged between 20 and 24. Vulnerability by SA1.

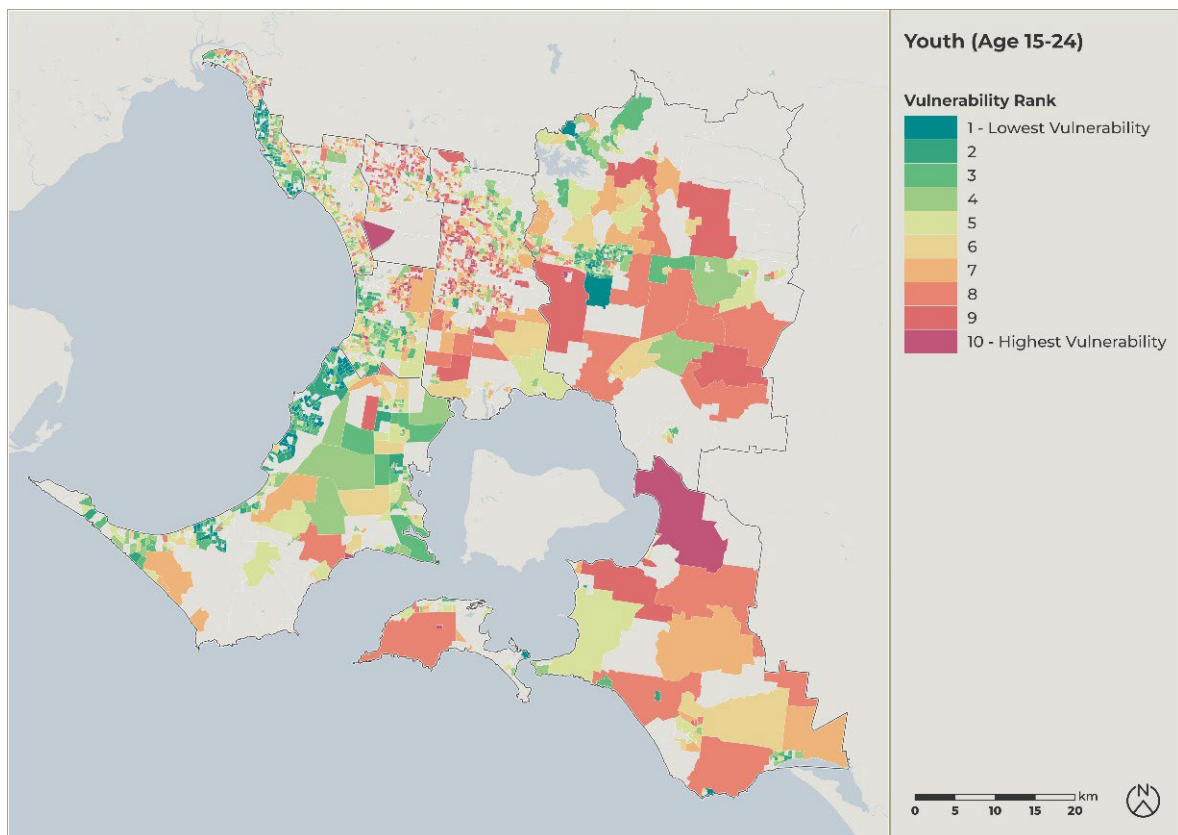


Figure 22. Youth aged between 15 and 24. Vulnerability by SA1.

10 First Nations

10.1 SECCCA-wide vulnerable sub-population summaries

Table 15 below presents SECCCA-wide summarised vulnerability ranks for First Nations populations. This summary table provides the average vulnerability ranking for an LGA together with the population counts for each sub-population.

Based on discussions held with the Bunurong Land Council and First Nations council liaison officers, in addition to the total number of First Nations people, those requiring a high level of care, and those aged 55 and over and 65 and over, were also identified based on increased levels of vulnerability.

Refer to Section 4 (older people) for a more detailed description of the data being presented in this section.

Table 15. First Nations vulnerability, climate factors and key assets summary table by council area.

	Bass Coast	Bayside	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Port Phillip
Vulnerable Population									
First Nations High Care (Rank)	6.8	4.1	5.2	5.1	5.6	5.7	5.9	5.5	5.7
First Nations Age 55 and Over (Rank)	7.9		5.9	5.5	5.9	5.8	6.0	5.3	5.2
First Nations Age 65 and Over (Rank)	6.9		6.5	5.6	5.8	7.0	5.3	5.2	6.0
First Nations - Total (Population)	583	229	1,138	2,048	1,623	509	557	1,666	345
Age 55 and Over - First Nations Total (Population)	23		26	29	61	15	13	48	27
Age 65 and Over - First Nations Total (Population)	23		13	19	22	15	13	31	21
Heat									
Minimum Temperature (Change from Baseline - %)	14.8%	14.7%	17.9%	16.5%	15.1%	16.2%	15.5%	14.0%	15.2%
Maximum Temperature (Change from Baseline - %)	9.9%	9.3%	11.5%	11.1%	10.4%	10.6%	10.1%	10.2%	9.7%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.9%	5.2%	6.4%	6.4%	6.3%	6.5%	6.1%	5.6%	5.7%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	455.7%	170.3%	330.6%	233.9%	203.9%	196.7%	190.7%	316.9%	156.3%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	147.3%	88.4%	139.2%	124.0%	109.2%	110.7%	100.5%	132.3%	90.9%
Heat Health at 30C (Days) (Change from Baseline - %)	554.3%	298.0%	532.6%	418.0%	398.0%	353.0%	325.2%	401.6%	262.9%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-8.7%	-3.9%	-5.5%	-6.9%	-8.4%	-8.0%	-6.9%	-7.1%	-1.4%
Standard Precipitation Index (Change from Baseline - %)	32.1%	84.4%	42.3%	49.2%	46.6%	79.1%	79.9%	49.3%	68.8%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	5.8%	10.6%	13.6%	6.3%	1.1%	2.1%	5.0%	11.5%	16.7%
Sea Level Rise at 82cm (Coverage - %)	2.6%	0.2%	0.1%	0.1%	0.6%	0.0%	2.8%	0.8%	1.2%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	6.1%	0.9%	1.1%	0.8%	3.9%	0.1%	16.8%	2.7%	17.4%
Flood Extent in 1/100 yr Event (Coverage - %)	7.1%	8.2%	11.7%	12.7%	8.5%	5.4%	19.5%	6.8%	32.4%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	8.5%	9.0%	11.7%	12.9%	9.9%	5.5%	29.3%	6.9%	36.6%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	17.8%	0.0%	21.7%	2.5%	13.2%	0.0%	0.0%	15.6%	0.0%
Services and Assets									
Ambulance (Count)	3	1	4	5	3	5	4	7	4
Fire Station (Count)	20		22	12	4	4	5	25	2
Hospital (Count)	5	7	2	5	6	8	4	7	1
Police Station (Count)	4	1	5	3	2	2	4	6	5
Neighbourhood Safe Place (Count)	6		3	7				13	1
Public Transport - Train Station (Count)		6	4	6	4	5	13	9	3
Public Transport - Tram Stop (Count)		10							191
Public Transport - Bus Stop (Count)		548	288	1,154	620	841	824	807	234
Schools or Universities (Count)	71	92	106	216	115	132	100	128	77
Places of Worship (Count)	19	30	34	30	20	32	27	20	38
Child Care, Kindergartens or MCHC (Count)	25	110	110	278	115	121	133	152	79
Library (Count)	3	6	3	9	3	5	10	4	6
Community Centres and Halls (Count)	31	41	52	58	33	32	47	69	47
Health - Doctor (Count)	4	11	7	16	8	13	17	1	9
Health - Pharmacy (Count)	3	13	6	26	25	37	22	17	22

Key observations for the SECCCA region First Nations populations are outlined below. The highest vulnerability rankings are found in:

- Greater Dandenong
- Casey
- Port Phillip
- Bass Coast
- Kingston
- Frankston
- Cardinia.

The assigned vulnerability ranking is independent of the population count for the relevant vulnerable sub-population.

Significant climate change ratings for each climate variable are noted for:

- heat
 - Bass Coast, Cardinia, Casey, Greater Dandenong
- dryness
 - Bayside, Greater Dandenong, Kingston, Frankston
- flooding and inundation
 - Kingston, Port Phillip, Bass Coast
- fire
 - Cardinia, Bass Coast, Mornington Peninsula, Frankston.

Table 16 provides a priority linkage table between the identified highest vulnerability rankings for councils and which climate variable is most likely to impact on that vulnerable population.

Table 16. Highest vulnerability rankings for First Nation populations by council in combination with significant climate change rating.

Highest vulnerability ranking LGA	Heat	Dryness	Flooding and Inundation	Fire
Bass Coast	●		●	●
Greater Dandenong	●	●		
Cardinia	●			●
Kingston		●	●	
Port Phillip	●		●	
Frankston		●		●
Casey	●			

Suburb-level priorities within each council are presented in Table 17.

Table 17. Suburbs by council with the three highest vulnerability rankings for First Nations sub-populations.

First Nations High Care		First Nations Age 55 and Over		First Nations Age 65 and Over	
Suburb	Rank	Suburb	Rank	Suburb	Rank
Bass Coast					
Sunset Strip	10.0	Grantville	8.3	Grantville	7.3
Glen Forbes	9.0	Corinella	8.0	Corinella	7.0
Grantville	9.0	Glen Forbes	8.0	Glen Forbes	7.0
Tenby Point	9.0	Tenby Point	8.0	Tenby Point	7.0
Wimbledon Heights	9.0				
Bayside					
Hampton East	8.0				
Highett	5.6				
Cheltenham	5.3				
Cardinia					
Caldermeade	8.0	Koo Wee Rup	9.0	Koo Wee Rup	9.0
Monomeith	8.0	Officer	9.0	Officer	9.0
Cardinia	7.0	Nar Nar Goon North	6.0	Nar Nar Goon North	7.0
Cora Lynn	7.0				
Iona	7.0				
Koo Wee Rup North	7.0				
Lang Lang	7.0				
Modella	7.0				
Nangana	7.0				
Officer South	7.0				
Vervale	7.0				
Casey					
Warneet	8.5	Eumemmerring	10.0	Eumemmerring	10.0
Eumemmerring	8.0	Hampton Park	9.0	Devon Meadows	8.0
Junction Village	8.0	Devon Meadows	8.0	Doveton	7.5
Frankston					
Frankston North	8.8	Frankston North	10.0	Langwarrin	7.0
Seaford	7.4	Skye	8.0	Skye	7.0
Skye	6.0	Langwarrin	7.4	Frankston South	5.0
Greater Dandenong					
Bangholme	10.0	Bangholme	10.0	Bangholme	9.0
Dandenong South	9.0	Noble Park	9.0	Noble Park	8.0
Noble Park	7.2	Springvale South	9.0	Springvale South	8.0
Kingston					
Heatherton	9.0	Bonbeach	7.0	Bonbeach	7.0
Bonbeach	8.2	Mentone	6.0	Mentone	5.0
Edithvale	7.5	Mordialloc	5.0	Mordialloc	4.0
Mornington Peninsula					
Capel Sound	8.6	Crib Point	8.0	Crib Point	8.0
Fingal	8.0	Hastings	7.8	Boneo	7.0
Merricks	8.0	Somerville	7.0	Cape Schanck	7.0
Red Hill South	8.0				
Port Phillip					
St Kilda West	9.0	Port Melbourne	10.0	Albert Park	9.0
Melbourne	7.7	Albert Park	9.0	Port Melbourne	7.5
Balaclava	7.5	St Kilda	8.3	St Kilda	7.5

10.2 SECCCA-wide vulnerable sub-population maps

Figure 23 to Figure 25 present the spatial distribution of vulnerability in First Nations populations across the SECCCA region.

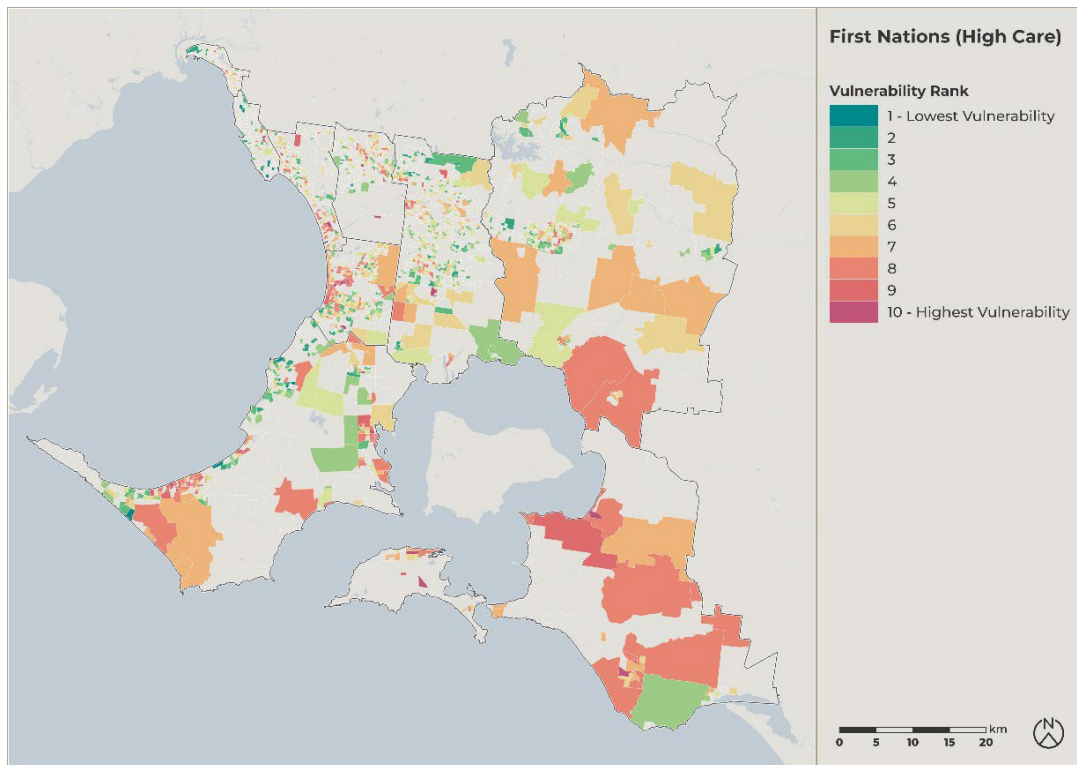


Figure 23. First Nations populations requiring assistance or a high level of care and those with disabilities. Vulnerability by SA1.

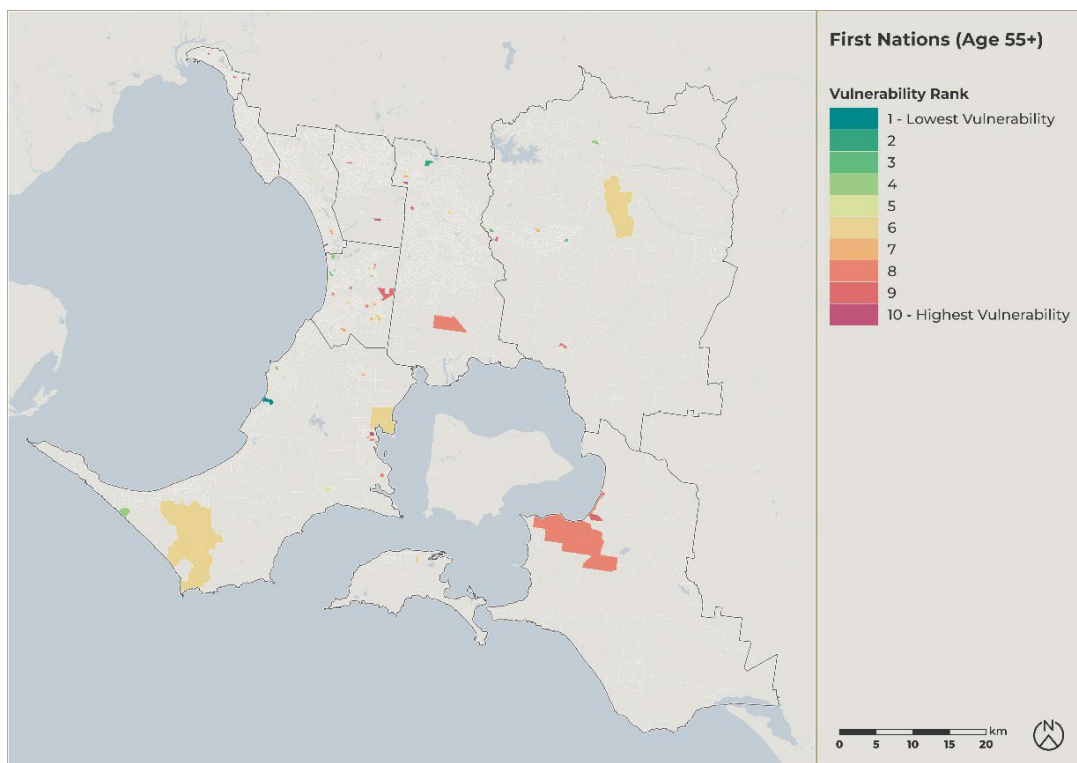


Figure 24. First Nations populations aged 55 and over. Vulnerability by SA1.

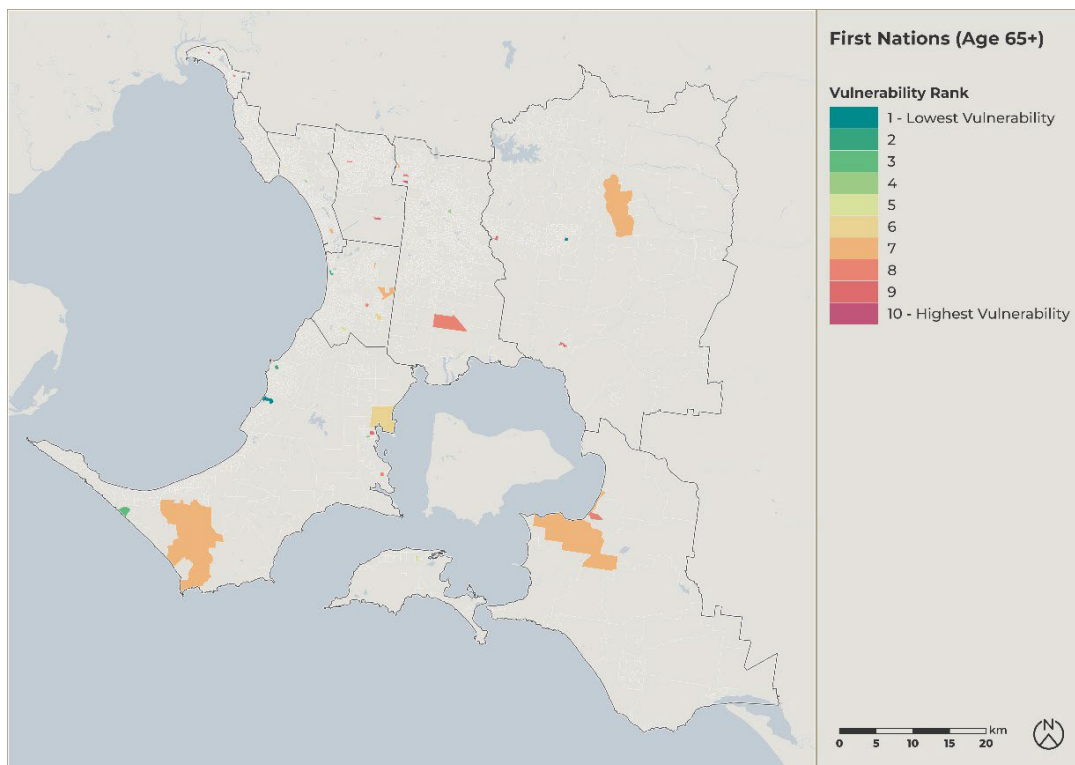


Figure 25. First Nations populations aged 65 and over. Vulnerability by SA1.

11. Council example – older people in Bayside

This section provides an example of how the LGA summary information can be further examined at the suburb level. This section looks specifically at Bayside LGA and older people as a vulnerable sub-population. However, the example can be applied to any council with combinations of vulnerable sub-population, climate variables, and services and assets.

Table 3 shows that, in Bayside, vulnerability rankings across the three older cohorts are lower than in other LGAs. In Table 5, there was a breakdown of Bayside by top-ranked suburbs. This indicated that there is considerable variability across suburbs. When averaging by council, this variability is lost, so a deeper dive into the council area provides a more nuanced view of vulnerability. This same view applies to climate change ratings.

The summary in Table 18 identifies that the suburbs with the highest vulnerability ranking are in:

- Cheltenham
- Hampton East
- Highett
- Black Rock.

Table 18. Older people vulnerability, climate factors and key assets summary table by suburb in Bayside LGA.

	Beaumaris	Black Rock	Brighton	Brighton East	Cheltenham	Hampton	Hampton East	Highett	Sandringham
Vulnerable Population									
Age 55 Over (Rank)	4.1	5.3	2.8	3.6	6.9	3.7	6.5	5.9	3.0
Age 65 Over (Rank)	3.9	5.5	2.6	3.4	6.5	3.0	5.1	6.5	3.1
Age 85 Over (Rank)	4.9	5.2	2.9	3.1	5.3	3.6	4.5	5.1	3.7
Age 55 Over (Population)	5,225	2,748	10,834	6,131	1,725	4,972	1,954	2,196	4,680
Age 65 Over (Population)	3,157	1,719	6,924	3,708	1,049	2,724	1,102	1,253	2,854
Age 85 Over (Population)	417	253	1,280	717	174	289	152	196	592
Heat									
Minimum Temperature (Change from Baseline - %)	15.2%	15.1%	14.1%	14.7%	15.6%	14.4%	15.6%	15.6%	14.7%
Maximum Temperature (Change from Baseline - %)	9.8%	9.6%	8.5%	9.1%	10.2%	9.0%	10.2%	10.2%	9.3%
Extreme Temperature at 1% AEP (Change from Baseline - %)	5.7%	5.6%	4.4%	5.2%	6.3%	4.9%	6.3%	6.3%	5.2%
Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	187.8%	190.2%	137.5%	151.2%	199.4%	180.2%	200.0%	200.0%	187.5%
Maximum Temperature above 35 (Days) (Change from Baseline - %)	95.1%	93.2%	78.6%	86.9%	100.2%	85.0%	100.5%	100.5%	89.1%
Heat Health at 30C (Days) (Change from Baseline - %)	318.0%	318.0%	254.9%	284.8%	344.9%	299.0%	345.5%	345.5%	310.2%
Flooding and Inundation									
Total Annual Rainfall (Change from Baseline - %)	-5.3%	-4.5%	-3.0%	-3.5%	-4.5%	-3.8%	-4.4%	-4.4%	-4.0%
Standard Precipitation Index (Change from Baseline - %)	89.1%	90.1%	73.2%	80.3%	95.9%	85.4%	96.3%	96.3%	88.7%
Extreme Rainfall at 1% AEP (Change from Baseline - %)	7.8%	9.2%	12.9%	11.3%	9.5%	10.2%	9.6%	9.6%	9.9%
Sea Level Rise at 82cm (Coverage - %)	0.2%	0.6%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.4%
Sea Level Rise at 82cm with 1% AEP Storm Event (Coverage - %)	1.0%	1.5%	2.0%	0.0%	0.0%	0.3%	0.0%	0.0%	1.2%
Flood Extent in 1/100 yr Event (Coverage - %)	11.0%	0.0%	9.9%	7.3%	1.6%	7.8%	11.2%	12.5%	5.7%
Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)	12.0%	1.6%	11.5%	7.3%	1.6%	8.1%	11.2%	12.5%	6.8%
Fire									
Fire - Bushfire Management Overlay (Coverage - %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Services and Assets									
Ambulance (Count)				1					
Fire Station (Count)									
Hospital (Count)			3			1			3
Police Station (Count)									1
Public Transport - Bus Stop (Count)	72	27	123	62	40	80	34	44	61
Library (Count)	1		2	1		1			1
Community Centres and Halls (Count)	6	6	6	1	3	6	2	3	8
Aged Care and Residences (Count)	3		19	7	1	4	2	4	13
Health - Doctor (Count)	1		3	2			2	1	2
Health - Pharmacy (Count)	3	2	4			1	2		1

In contrast to Table 3, vulnerability rankings in Table 2 were 3.9, 3.7 and 3.8, respectively for ages over 55, 65 and 85. Table 2 shows that individual suburbs can exhibit high vulnerability values above the council average.

Table 2 also identifies that three suburbs (Cheltenham, Hampton East and Highett) have the most significant increase in heat-related climate change across the LGA. These suburbs are also identified to be impacted by significant dryness (expressed in terms of the Standard Precipitation Index (SPI) rating).

Further, while Brighton may have a high aged population and high level of potential flooding and inundation, the vulnerability rankings are quite low. Focus for flooding and inundation should be placed on Hampton East and Highett, which experience high flooding event coverages linked to high vulnerability rankings.

Some of these summarised findings, by top three ranked suburbs and vulnerability rankings, are presented in Table 19.

Table 19. Top three suburbs in Bayside for older people vulnerability linked to key heat and flooding climate factors.

Suburb	Rank	Age 55 Over (Population)	Heat Wave, 3 or more Days above 35 (Days) (Change from Baseline - %)	Heat Health at 30C (Days) (Change from Baseline - %)	Combined Flooding and Storm Event (SLR 82cm, 1% AEP) (Coverage - %)
Age 55 Over					
Hampton East	8.3	1,725	200.0%	345.5%	13.6%
Cheltenham	6.9	1,954	199.4%	344.9%	1.4%
Highett	6.5	2,196	200.0%	345.5%	12.4%
Age 65 Over					
Hampton East	8.7	1,049	200.0%	345.5%	13.6%
Cheltenham	6.5	1,102	199.4%	344.9%	1.4%
Highett	6.5	1,253	200.0%	345.5%	12.4%
Age 85 Over					
Hampton East	7.3	152	200.0%	345.5%	13.6%
Cheltenham	5.3	174	199.4%	344.9%	1.4%
Black Rock	5.2	253	190.2%	318.0%	1.6%

The spatial distribution of vulnerability within Bayside for older people aged over 55, 65 and 85 is shown in Figure 26 to Figure 28. These provide further detail of location and clustering of vulnerable populations in a region.

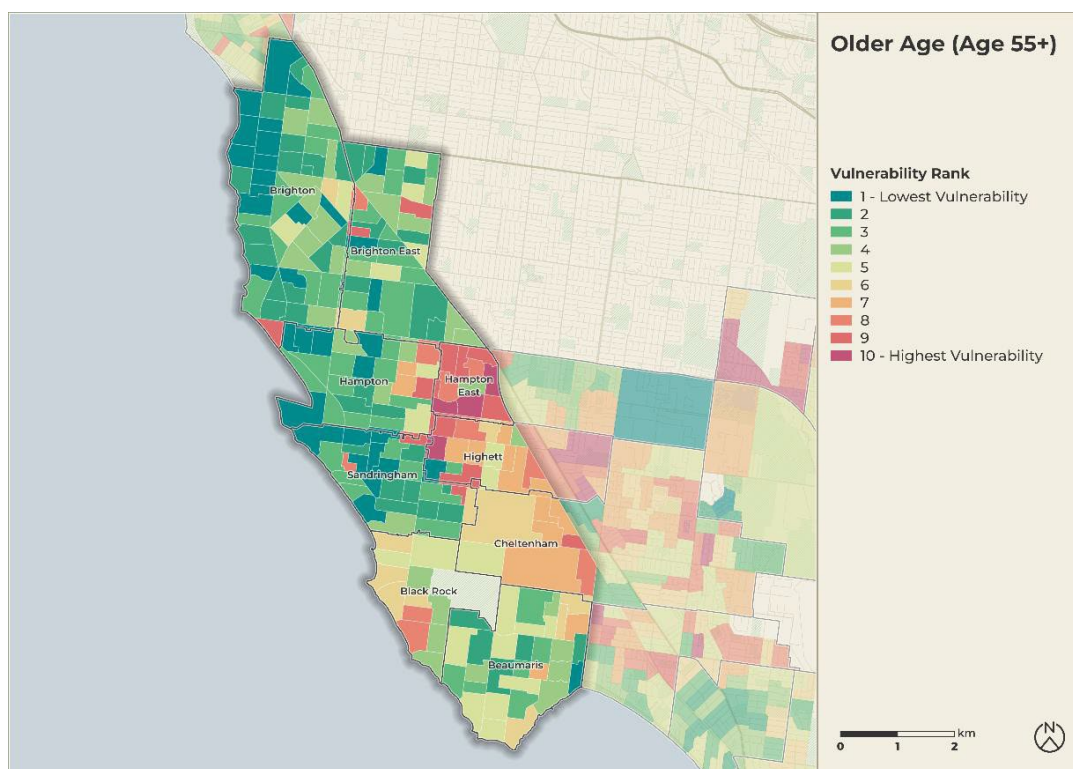


Figure 26. Older people aged 55 and over in Bayside. Vulnerability by SA1.

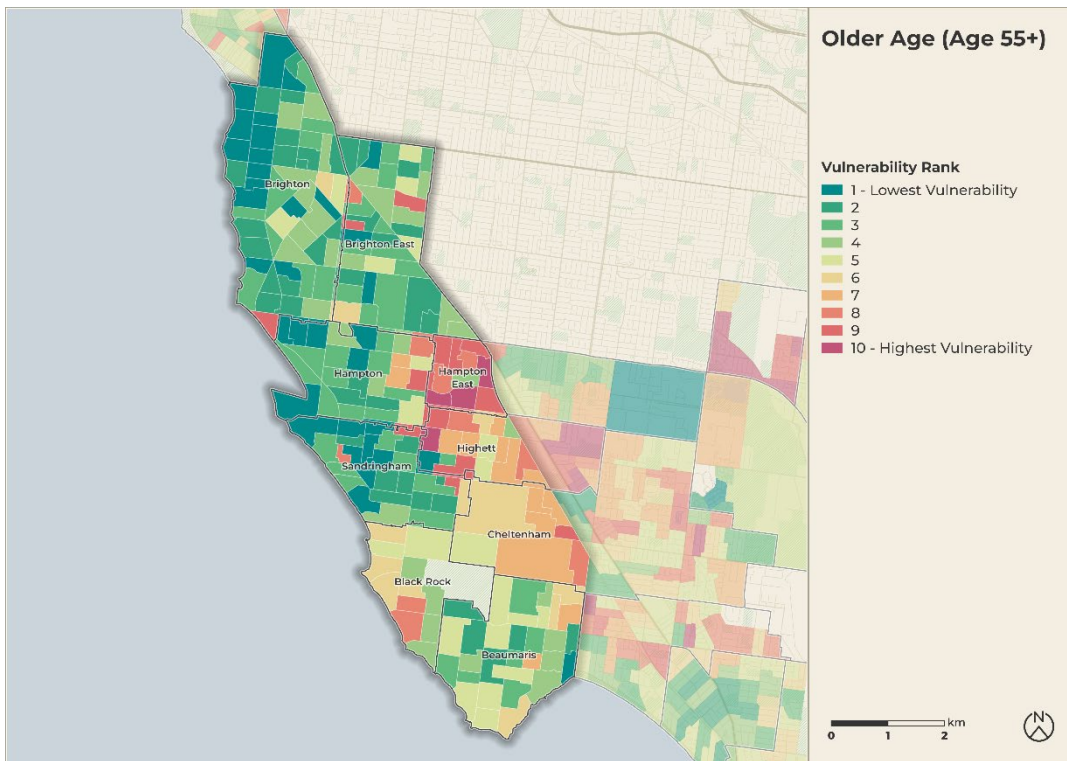


Figure 27. Older people aged 65 and over in Bayside. Vulnerability by SA1.

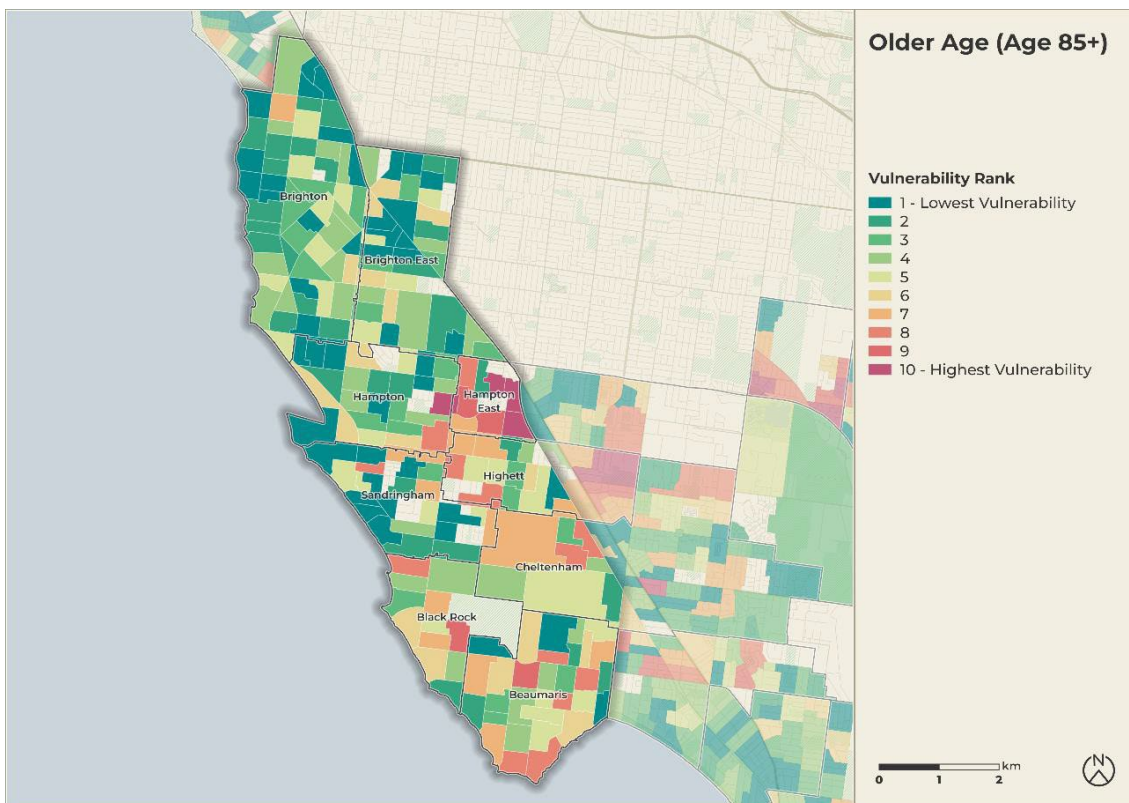


Figure 28. Older people aged 85 and over in Bayside. Vulnerability by SA1.

This council-based example is provided to show how LGA staff and other users can interact with the SECCCA-wide outputs prepared as part of this project. It aims to provide high-level guidance on how the outputs can be used to identify where there are likely to be groups or sub-populations in the community that are more vulnerable to climate-related events.

This SECCCA-wide output document should be read in conjunction with the SECCCA-wide outputs that are provided in the form of MS Excel tables, PDF maps, and spatial data.

These SECCCA-wide outputs have been used as a key input into the case studies that apply this information at a more detailed level. The outputs from these case studies, which focus on heat, inundation and flooding, and wildfire climate change examples, are presented in Paper 5 – *Case studies*.

Appendix A – Acronyms

ABS	Australian Bureau of Statistics
AEP	annual exceedance probability
DEECA	Department of Energy, Environment and Climate Action
GCM	General Circulation Model
LGA	local government area
MAIB	Mean Annual Income Bracket
MS	Microsoft
NESB	non-English-speaking background
SA1	ABS Statistical Area Level 1
SECCCA	South East Councils Climate Change Alliance
SPI	Standard Precipitation Index
VCP19	Victorian Climate Projections 2019

