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Grampians Region Climate Adaptation Strategy Scorecard Update

Final Report

Department of Energy, Environment and Climate Action

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Executive Summary

The Grampians Region Climate Adaptation Strategy scorecard is designed to measure progress against strategy outcomes using a set of indicators first developed in 2021. This report represents the second assessment of these indicators. The most up-to-date data available as of May 2023 have been used as the basis for the scorecard update and this report. The table below shows the direction of change of each indicator since 2021.

Table ES-1: Summary of the direction of change of the scorecard indicators over the past two years. Green, plus symbol = positive change; yellow = neutral or no change; red, minus symbol = negative change. NA = change cannot be determined due to lack of comparable data.

INDICATOR	ASSESSMENT	2021	2023
D. Extent of ecosystem protection	Overall average % change of area protected for Interim Biogeographic Regionalisation for Australia (IBRA) regions in the Grampians.	+	+
	Average condition assessment of biodiversity for the 11 Local Government Areas (LGAs) that are within each Catchment Management Authority (CMA).	NEUTRAL	-
E. Overall environmental score	A composite measure of inundation, stream flows, hot days, tree cover, vegetation condition, exposed soil and vegetation growth).	+	+
F. Percentage of water released for environment	Overall % change of water released for the environment in catchments in the Grampians region	+	+
H. Average energy efficiency of housing stock	Overall average change for energy star ratings of dwellings in the Grampians.	+	+
I. Solar PV installations and capacity	Overall average % change of photovoltaic installations	NA	+
J. Percentage of waste recycle	Overall average % change of waste recycle (waste diversion) for the Grampians	-	-
K. Solar battery and water heaters	Overall % change of battery installations in the State	+	+
	Overall % change of solar water heaters installed in the Grampians	+	-
L. Annual water use per capita	Overall % change of water usage (industrial + residential) in the Grampians adjusted for population	+	-
N. Sustainable land management practices reporting	Average condition assessment of land health for the 11 LGAs that are within each CMAs	NEUTRAL	NEUTRAL
O. Soil moisture	Overall average % change of soil moisture for the Grampians	+	+
S. Councils with environmentally sustainable design policies in Planning Scheme	Number of councils with environmentally sustainable design policies in their planning scheme	+	NEUTRAL

INDICATOR	ASSESSMENT	2021	2023
T. Victorian Energy Efficiency Certificates	Overall % change of number of VEECs generated in the Grampians region	+	+

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Dja Dja Wurrung, Eastern Maar, Gunditjmara, Wadawurrung, Wurundjeri and Wotjobaluk (Jaadwa, Jadawadjali, Jupagulk, Wergaia and Wotjobaluk) peoples as the Traditional Owners of the Country on which this project has been conducted. We recognise their continuing connection to land, waters and culture and pay our respects to their Elders past and present, and we acknowledge emerging leaders. Moreover, we express gratitude for the knowledge and insight that Traditional Owners and other Aboriginal and Torres Strait Islander people contribute to our shared work in Australia.

We pay respects to all Aboriginal and Torres Strait Islander communities. We recognise that Australia was founded on the genocide and dispossession of First Nations people and acknowledge that sovereignty was not ceded in this country. We embrace the spirit of reconciliation, working towards self-determination, equity of outcomes, and an equal voice for Australia's First People.

1 Introduction

1.1 OVERVIEW

The Grampians Region Climate Adaptation Strategy (GRCAS) guides climate change adaptation across the Grampians region from 2021-2025. This community-led strategy was developed collaboratively over two years by members of the Regional Climate Adaptation Group (RCAG). The RCAG members represented community, farmers, businesses, universities, agencies, and local and state government. This collaboration ensured that diverse climate aspirations, interests and concerns were reflected in the final strategy.

The GRCAS aims to encourage community cohesion and coordination to tackle the challenge of climate change adaptation. The strategy acknowledges that on a global scale, future climate scenarios and outcomes are uncertain, however local community has the power to determine how they deal with this uncertainty. The strategy represents the work of the community to align their approach and manage their response to this global uncertainty.

The GRCAS is organised into eight key themes: agriculture; biodiversity; economy; heat; health and wellbeing; fire; storms and flooding; and water. Each strategic theme outlines the main opportunities and barriers for climate change adaptation and identifies adaptation actions already underway and key agencies involved. The strategy uses a system of goals, outcomes and indicators to guide adaptation measures across the themes. Goals – *'where we want to go'* – are focussed on a 2030-2035 horizon, while the outcomes – *'what we aim to achieve'* – have a 5-year timeframe, within the life of the strategy.

The indicators measure progress across the key themes – measurable data that tell the story of adaptation in the region and the successes and challenges. In total, there are 25 diverse indicators included in the GRCAS, and these are listed alphabetically as indicator a) – y) in the strategy. They include case studies, financial data, community participation data, and a range of environmental and resource use data. Some examples include case studies of projects incorporating Traditional Owner-led land and waterway management practices; amount of funds and in-kind support leveraged for climate change adaptation programs; participation in sustainable land management programs; and average annual water use per capita.

1.2 THE SCORECARD

A scorecard is used to record changes in 12 out of the 25 strategy indicators of climate change adaptation across the Grampians region. The scorecard focusses on the indicators that measure environmental and resource use data, for example housing energy efficiency, extent of ecosystem protection, solar photovoltaic capacity, soil moisture and percentage of waste diverted. The first version of the scorecard was finalised in July 2021 and was developed by the Federation University Business School and the Department of Energy, Environment and Climate Action (DEECA). The scorecard uses publicly available and regularly updated datasets from sources including Catchment Management Authorities, local councils and the Australian Government.

The GRCAS scorecard has now been renewed to include the most up-to-date data available as of May 2023. This report describes the changes to the indicators observed since the commencement of the scorecard, and interprets the trends and directions of change observed in the data. Most sources list data by Local Government Area (LGA), by postcode, or by catchment area. All datasets were updated with the exception of one section of Indicator D, which had not been updated as of May 2023.

2 Scorecard Indicators

2.1 INDICATOR D: EXTENT OF ECOSYSTEM PROTECTION AND RESTORATION

Key finding: The direction of change for this indicator since the 2021 scorecard update is negative.

INDICATOR	ASSESSMENT	2021	2023
D. Extent of ecosystem protection	Overall average % change of area protected for Interim Biogeographic Regionalisation for Australia (IBRA) regions in the Grampians.	+	+
	Average condition assessment of biodiversity for the 11 Local Government Areas (LGAs) that are within each Catchment Management Authority (CMA).	NEUTRAL	-

Indicator D uses five sources to assess the extent of ecosystem protection and restoration across the Grampians region:

1. The area protected as a percentage, using Interim Biogeographic Regionalisation for Australia (IBRA) subregions;
2. An average trend and condition assessment of biodiversity within each catchment area that overlaps with the Grampians region;
3. The number and area of Ecological Vegetation Classes protected via new Trust for Nature conservation covenants across the region;
4. The percentage of EVCs represented in protected areas; and
5. The percentage area of native vegetation in IBRA subregions in the Grampians.

Part one of indicator D uses the Collaborative Australian Protected Area Database (CAPAD) to record the percentage of area protected of each IBRA subregion present in the Grampians region. This dataset is normally updated every two years, and the most recent data available was from 2022. Overall, there was a slight increase to the area protected in the IBRA subregions that overlap with the Grampians region. It should be noted that the IBRA subregions extend outside the Grampians region, and as such the data are not specific to the Grampians region. The average area protected throughout the IBRA subregions that overlap with the Grampians region for 2022 was 21.87%, representing an increase of 0.07% since 2020. The Grampians subregion saw the greatest increase at 0.2%. All IBRA subregions saw small increases to area protected, except the Murray Mallee. The recorded area protected in the Murray Mallee declined by 0.01%, however such a small decrease may have been due to data calculation methods rather or a rounding error and is negligible.

Part two of indicator D assesses the state of biodiversity across the Grampians region. This assessment comes from annual reporting by each Catchment Management Authority located within the Grampians region. CMAs provide a detailed description of the state of biodiversity, along with an assessment of the condition and trend. The trend is determined by each CMA using a combination of qualitative and quantitative information.

For 2021/2022, the average trend for biodiversity across the Grampians region was neutral, and the average condition was poor to moderate. Both positive and negative themes emerged from the CMA annual reports, which are summarised in Table 2-1 below. Note that half of the LGA of Moorabool is within the Melbourne Water catchment area, which incorporated Port Phillip and Westernport CMA in 2022. The Melbourne Water catchment area mostly encompasses Greater Melbourne, so it was left out of the average trend and condition calculations. However, relevant assessment comments were retained.

Table 2-1: Assessment of themes observed in CMA biodiversity trend and condition reporting.

THEMES		CMA
Positive	Favourable climatic conditions during the past three years have aided revegetation and biodiversity works.	North Central, Wimmera, Mallee CMAs.
	Small-medium scale targeted works to protect specific threatened species or restore priority habitat have had positive outcomes.	North Central, Wimmera, Corangamite, Mallee CMAs.
Negative	Biodiversity protection is significantly hampered by legislative and regulatory barriers, ineffective management tools, and/or inconsistent funding and implementation.	Glenelg Hopkins, Wimmera CMAs.
	Increasing pressures from urban expansion, habitat fragmentation, the spread of invasive species, and/or climate change are contributing to concerning trends in biodiversity.	Melbourne Water, Corangamite, Glenelg Hopkins CMAs.

Key quotations from the annual reports are included below:

- *“Many significant regional biodiversity assets are not monitored or actively managed, placing them at serious risk. For example, the Fat-tailed dunnart (*Sminthopsis crassicaudata*) thought to be common and widespread in the Wimmera and Victoria, is under consideration for threatened species listing after recent survey efforts captured relatively few individuals and failed to locate individuals at sites with historically robust populations¹.” (Wimmera CMA)*
- *“The Corangamite CMA and other organisations undertake work to manage biodiversity and are achieving a positive trend in native vegetation extent; however, the overall hectares are still very small in relation to the extent of cleared land and impacted biodiversity².” (Corangamite CMA)*
- *“The overall condition of our threatened species and communities is considered to be poor on the basis of the proportion of both the Flora and Fauna Guarantee Act (FFG) and Environment Protection and Biodiversity Conversation Act (EPBC) Threatened list which are recorded as occurring in the Mallee (i.e. FFG = 20% of species and EPBC = 6% of species / 12% of communities). This assessment is further supported by species/community specific studies that identify the significant influence of external factors (e.g. climate variability and large bushfire events) on the long-term viability of these species/communities, regardless of management³.” (Mallee CMA)*
- *“Recent (2017–21) assessments of the region’s natural landscapes (13,987 km²) identify a five percent average increase in vegetation growth from the long-term (2000–21) average, and a 3.5 percent improvement in condition. Significant variation in these indicators is however evident over the five-year period, reflecting annual climatic conditions³.” (Mallee CMA)*

¹ Wimmera Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Horsham.

² Corangamite Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Colac.

³ Mallee Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Mildura.



Figure 2-1: View of the Grampians (Gariwerd) National Park (iStock).

Part three uses Trust for Nature data to report on the number and area of new conservation covenants established across the region each financial year. Conservation covenants are permanent, legally binding agreements to protect native vegetation on private land, voluntarily agreed to by landholders. Covenants restrict activities such as grazing, land clearing and planting non-native vegetation, and persist even when land is sold. The data for hectares of new area protected via conservation covenants each year since scorecard reporting commenced is shown in Table 2-2 below. The 2020/2021 financial year showed the greatest improvement in new protected area established under covenant since the scorecard commenced, with a total of 1,370 ha. The total area protected under covenant in 2021/2022 was less than the previous year, at 1,029 ha.

Table 2-2: Area protected via new Trust for Nature conservation covenants per year in hectares.

YEAR	TOTAL AREA PROTECTED (HA)
2017/2018	1,058
2018/2019	910
2019/2020	1,015
2020/2021	1,370
2021/2022	1,029

Total hectares protected by IBRA subregion over the consecutive scorecard reports shows wide variation between subregions, shown in Figure 2-2 below. Between the years of 2017 – 2022, 1,373 ha were protected under covenant in the Central Victorian Uplands subregion, while only 147 ha in the Victorian Volcanic Plain (VVP). These subregions both dominate the south-eastern part of the Grampians region, however it should be noted that they extend well beyond the Grampians region and the data apply to the area protected across the whole subregions.

The VVP has been subjected to extensive land clearing, and many of the EVCs it contains are severely underrepresented when it comes to protected land⁴. The VVP contains remnants of Grassy Eucalypt Woodland – a nationally threatened ecological community under the *Environment Protection and Biodiversity Act 1999* (EPBC), and at the time of last reporting, 93% of this community was located on private land, and only 0.1% was protected on land with a covenant⁴. The VVP, Glenelg Plain, Wimmera, and Dundas Tablelands subregions contain a high proportion of EVCs underrepresented in protected areas⁴. This information may assist in the prioritising of underrepresented EVCs for future protection and restoration programs, for example, through incentives or covenant-based rebate schemes, which have been enacted in several LGAs across Victoria.

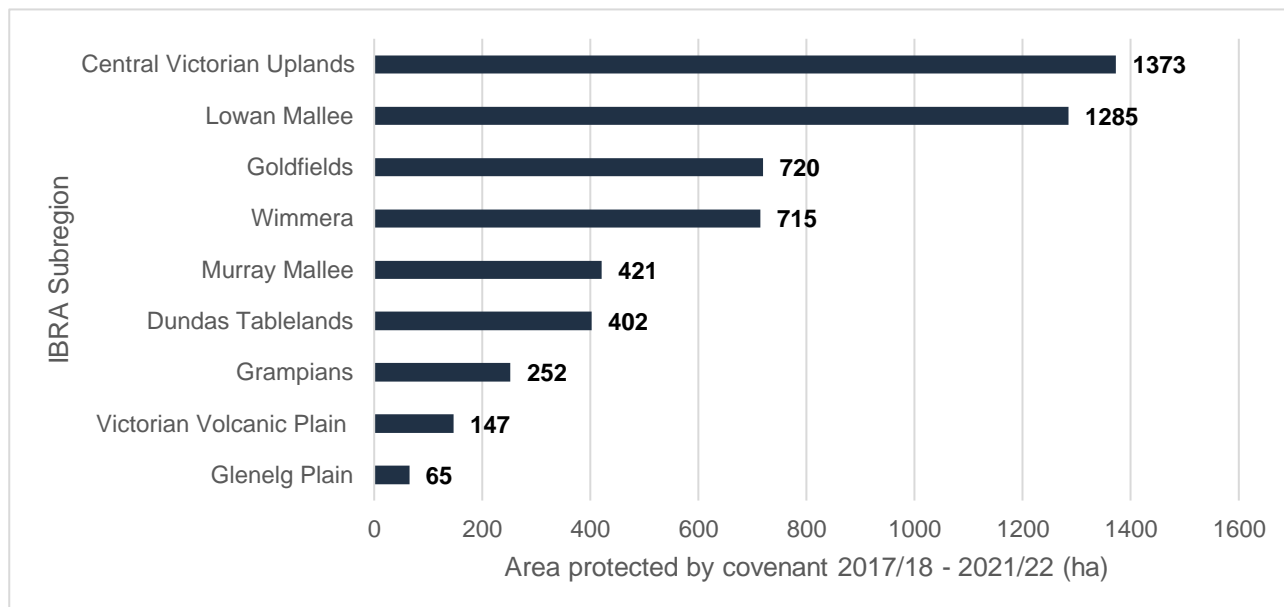


Figure 2-2: Total hectares protected by Trust for Nature conservation covenants from 2017/2018 to 2021/2022 in each IBRA subregion listed on the scorecard.

Part four records the percentage of Ecological Vegetation Classes (EVCs) represented in protected areas, either on public or private land. This data was sourced from Trust for Nature’s Statewide Conservation Plan 2021-2030. On average, the percentage of EVCs represented in protected areas decreased by 6% for the nine IBRA subregions that overlap with the Grampians region since the last reporting period. The reason for this marked decrease across the Grampians region is not known, however it is consistent with the state wide trend. Trust for Nature reported in 2013 that 24% of Victoria’s subregional EVCs were unrepresented in protected areas⁴. In 2021, this number had increased to 29%⁵.

This trend seems inconsistent with the data provided by the other parts of this indicator, which show that overall area protected across IBRA subregions overlapping with the Grampians region has increased slightly (part one), and that the area protected under conservation covenants has increased (part three). Trust for Nature were approached to provide comment on this change and notified RMCG that they had used an alternative EVC dataset for the 2021 report. They had also introduced some changes to their methods of mapping private land, which may have influenced the data. These changes may have affected the ability to accurately compare the 2013 and 2021 datasets, and the results from this part of the indicator should be interpreted with caution.

⁴ Trust for Nature 2013, Trust for Nature’s Statewide Conservation Plan for Private Land in Victoria, Trust for Nature, Melbourne, viewed on 23 March 2023, <<https://trustfornature.org.au/wp-content/uploads/2020/11/Trust-for-Nature-Statewide-Conservation-Plan.pdf>>.

⁵ Trust for Nature 2022, Trust for Nature’s Statewide Conservation Plan 2021-2030, Trust for Nature, Melbourne, viewed on 27 March 2023, <https://trustfornature.org.au/wp-content/uploads/2023/03/Statewide-Conservation-Plan_mar23.pdf>.

Part five of indicator D records the percentage of area of native vegetation in each IBRA subregion within the Grampians region. On average, there was a 4.5% increase in native vegetation extent since the last scorecard update. Native vegetation extent increased in all subregions with the exception of Lowan Mallee.

The strongest increase was observed in the Victorian Volcanic Plain subregion, which recorded a native vegetation extent of 23.7%⁶. The latest data available for this section was from 2016 and utilised an alternative source to the last scorecard update. Trust for Nature had not released an update to the original source since 2013. These results may be taken with caution, as there may have been variations in data collection or reporting methods between sources. More recent and consistent data can be used to update this section once Trust for Nature releases an update to the original source.

2.2 INDICATOR E: OVERALL ENVIRONMENT SCORE

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
E. Overall environment score	A composite measure of inundation, stream flows, hot days, tree cover, vegetation condition, exposed soil and vegetation growth).	+	+

Indicator E records the overall environment score for each LGA in the Grampians region, as determined in the annual Australia's Environment Report published by the Australian National University. The score rates environmental condition out of ten, based on the combined factors of streamflow, inundation, leaf area, vegetation growth, soil protection, tree cover and the number of hot days.

The average environmental condition score for the 11 LGAs in the Grampians region rose to 9.1 out of ten for 2022. All 11 LGAs experienced an increase in their condition score for 2022 when compared to both 2021 and the average of the previous three years. Hepburn and Northern Grampians had the highest scores at 9.6, while West Wimmera and Golden Plains had the lowest at 8.6. Overall, the average increase in environmental condition score for 2022 was 2.9 points when compared with the average score for 2019-2021. The Grampians region is lagging slightly behind the state average score of 9.8, yet most LGAs are ahead of the national average of 8.7⁷.

The key factor influencing the increase to environmental condition across the Grampians region was the favourable climatic conditions experienced throughout the last three years. At a national level, average rainfall and stream flows were both at their highest since 2011⁷. Hot days in 2022 (days exceeding 35°C) were below the 2000-2021 average, and weather patterns and cloud cover contributed to the lowest average national temperatures since 2012⁷. These climatic conditions had beneficial impacts for soil moisture levels and soil coverage, contributing to the increase in scores. Low fire levels and increased water availability also led to improvements in vegetation condition and tree cover⁷. It should be noted that the score is a general measure of environmental condition across large areas, and does not take into account measures of biodiversity, which have continued to decline over consecutive reporting periods.

⁶ Victorian Environmental Assessment Council 2016, Statewide Assessment of Public Land Discussion Paper, Victorian State Government, Melbourne

⁷ Fenner School of Environment and Society 2023, Australia's Environment 2022 Report, Australian National University, Canberra, viewed on 28 March 2023, <<https://www.wenfo.org/aer/about/#gallery>>.

2.3 INDICATOR F: PERCENTAGE OF WATER RELEASED FOR THE ENVIRONMENT

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
F. Percentage of water released for environment	Overall % change of water released for the environment in catchments in the Grampians region	+	+

Overall total water released for the environment in the Grampians region throughout the 2021/2022 financial year was 91,715 ML as reported by the Victorian Environmental Water Holder (VEWH) in their annual 'Reflections' publication. This quantity represents a 33.05% increase above averages obtained over 2018 – 2021. Climatic conditions varied strongly across Victoria between 1 July 2021 and 30 June 2022, with some parts of the state experiencing very wet conditions, while some parts of western Victoria remained dry. This variation was evident in water systems across the Grampians region⁸.

According to Bureau of Meteorology (BOM) climate updates throughout 2021 and 2022, the key climate drivers active during this time were successive La Niña events, a positive Southern Annular Mode and negative Indian Ocean Dipole, which combined to produce above-average rainfall for large parts of south-eastern Australia over 2021 and 2022. In addition, climate change continues to impact Australia's climate, with an observed increase in high intensity short duration rainfall events^{9,10}.

Above-average rainfall filled many reservoirs across Victoria and caused some to spill⁸. Increased natural river flows and spills fulfilled and exceeded many of the planned environmental water targets for the year. This provided many environmental benefits, including flushing of pollutants and salt through water systems, and improving aquatic habitat for fauna and flora⁸.

The systems that saw the greatest increases to environmental water in 2021/2022 were the Campaspe and Loddon systems (50.0% and 39.1% above the 2018/2019 – 2020/2021 average respectively). The Glenelg and Wimmera systems were slightly above the three-year average at increases of 8.1% and 4.3% respectively. VEWH reporting stated that the flows in the Wimmera and Glenelg systems were in line with very dry conditions, and that water was used sparingly to maintain low flows and prevent the drying of refuge pools⁸. The Wimmera-Mallee wetlands system was subject to the same very dry conditions, which saw environmental water down -4.0% on the three-year average. Environmental water flows in the Barwon and Moorabool systems were slightly down on the previous three-year average, however VEWH reporting states that Barwon River flows were sufficiently high to allow diversion of water into the ecologically significant lower Barwon wetlands⁸.

To summarise the environmental flows for 2021-2022, VEWH Co-CEO Beth Ashworth said:

“Recent wet conditions have provided a boost for improving and maintaining waterway health in many Victorian regions. This watering year, higher natural flows in many areas combined with some selective environmental flows have seen many threatened native animal and plant species successfully breed and grow⁸.”

⁸ Victorian Environmental Water Holder 2022, *Reflections: Water for the Environment in Victoria 2021-22*, Victorian State Government, Victoria.

⁹ Bureau of Meteorology 2021, *Tracking Australia's climate and water resources through 2021*, viewed 14 March 2023, <<http://www.bom.gov.au/climate/updates/articles/a040.shtml>>.

¹⁰ Bureau of Meteorology 2022, *Tracking Australia's climate and water resources through 2022*, viewed 14 March 2023, <<http://www.bom.gov.au/climate/updates/articles/a042.shtml>>.

The first scorecard update used data from 2019/2020 and showed an increase in environmental flows of 1.7% above the previous three-year average. The much higher flows observed in many systems throughout 2021/2022 had many environmental benefits. This indicator is likely to be strongly affected by periodic climate drivers and is sensitive to change. The BOM has declared an end to the triple La Niña event and a transition to an El Niño WATCH status, suggesting that there is approximately a 50% chance that an El Niño event may develop later in 2023, which may bring reduced rainfall and drier conditions to south-eastern Australia¹¹. This has the potential to impact environmental water flows in coming years.

2.4 INDICATOR H: AVERAGE ENERGY EFFICIENCY OF HOUSING STOCK

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
H. Average energy efficiency of housing stock	Overall average change for energy star ratings of dwellings in the Grampians.	+	+

The National Construction Code (NCC) stipulates that all new dwellings, along with major renovations, must meet certain energy efficiency requirements to reduce greenhouse gas emissions¹². The Nationwide House Energy Rating Scheme (NatHERS) provides energy star rating assessments and certificates for dwellings. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) tracks the number of dwellings, both new and existing, which have been issued energy efficiency certificates, along with the average star rating of these dwellings. Changes to star ratings over time for the 11 Local Government Areas (LGAs) comprising the Grampians region have been used to track progress toward energy efficiency. Energy star ratings are expressed as a score out of ten. Changes to the NCC in 2022 will require all new dwellings to attain a minimum energy efficiency rating of seven stars out of ten. Prior to this, the minimum requirement was six stars.

Overall star ratings for all dwellings with certificates within the Grampians region increased from 5.8 in 2019 to 6.0 stars as of the latest complete update to the data in February 2023. The average energy star rating for new dwellings in the region is 6.3 stars. Energy star ratings for all dwellings increased by an average of 0.08 across the 11 LGAs. The number of dwellings with certificates increased 41.0% since the last scorecard update. Overall, the number of dwellings has been increasing at a relatively linear rate since commencement of the scorecard, seen below in Figure 2-3. The average score of dwellings is expected to increase in coming years, as the changes to the NCC to increase minimum energy efficiency requirements to seven stars come into effect.

¹¹ Bureau of Meteorology 2023, *ENSO Forecast: an alert system for the El Niño-Southern Oscillation*, Australian Government, viewed 14 March 2023, <<http://www.bom.gov.au/climate/enso/outlook/#tabs=ENSO-Forecast>>.

¹² Commonwealth Scientific and Industrial Research Organisation 2023, *Energy Rating*, viewed 14 March 2023, <<https://ahd.csiro.au/dashboards/energy-rating/>>.

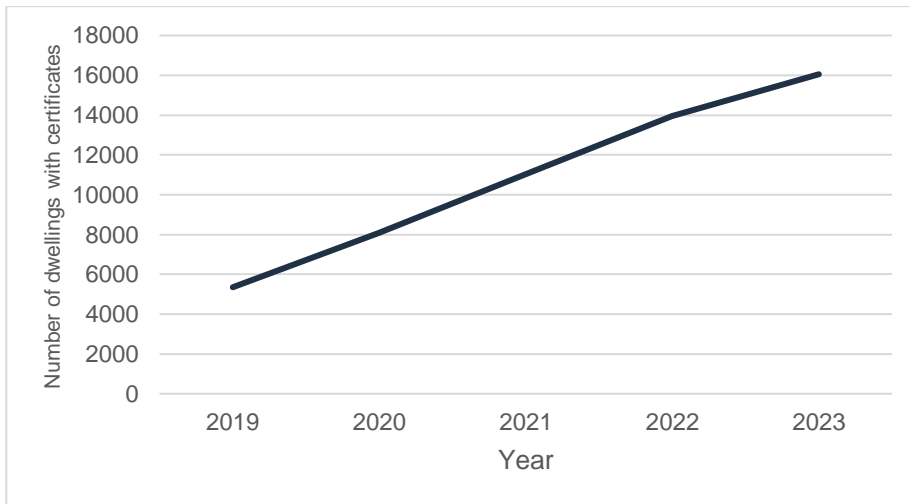


Figure 2-3: Increase to total number of dwellings with energy efficiency certificates each year since 2019, recorded in April each year.

2.5 INDICATOR I: SOLAR PHOTOVOLTAIC ENERGY INSTALLATIONS AND CAPACITY

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
I. Solar PV installations and capacity	Overall average % change of photovoltaic installations	NA	+

Indicator I tracks changes to solar photovoltaic (PV) energy installations and capacity across the Grampians region by collecting data on the percentage of dwellings with solar PV installations within each of the 11 LGAs along with estimated PV capacity in kilowatts. As of March 2023, 30.1% of dwellings in the region had solar PV installations, representing an increase of 3.7% since the last scorecard update in 2021. Golden Plains LGA had the highest percentage at 37.2% of dwellings, while Ballarat had the lowest at 19.5% of dwellings. The LGA with the highest rate of increase was Pyrenees, which increased the percentage of dwellings with solar PV installations by 4.7% between reporting in 2021 and 2023.

Photovoltaic capacity increased from a total of approximately 146 MW in 2021 to 203 MW in 2023. The average increase in PV capacity among the 11 LGAs was 34.3%, representing a strong positive increase to household renewable energy for the region. According to the Australian Renewable Energy Agency, even minor improvements to the efficiency of solar PV cell technology can translate into large gains in PV capacity, and Australia is a global leader in solar research and development¹³. The increase to PV capacity demonstrates that the Grampians region is tracking positively towards the outcome of more efficient and sustainable use of energy, and future increases to solar PV efficiency may aid this progress.

¹³ Australian Renewable Energy Agency 2023, *Solar PV R&D*, Australian Government, viewed 14 March 2023, <<https://arena.gov.au/renewable-energy/solar-pv-rd/>>.

2.6 INDICATOR J: PERCENTAGE OF WASTE DIVERSION

Key finding: The direction of change for this indicator since the 2021 scorecard update is negative.

INDICATOR	ASSESSMENT	2021	2023
J. Percentage of waste recycle	Overall average % change of waste recycle (waste diversion) for the Grampians	–	–

Waste diversion refers to reducing waste sent to landfill by diverting it into recycling and circular use schemes. Waste diversion is calculated by each LGA as the weight of recyclables and green organics collected from kerbside bins as a percentage of overall waste. The average waste diverted across the 11 LGAs comprising the Grampians region was 29.3% for the 2021/2022 financial year. There was an average decrease in -0.15% amongst the LGAs when 2021/2022 figures were compared with the previous three-year average. Ballarat LGA reported the greatest percentage of waste diverted at 41.5%, however this figure represented a decrease from the three-year average of 44.4%. Yarriambiack LGA reported the lowest percentage at 16.0%, down from the three-year average of 21.6%.

Overall, waste diversion is on a decreasing trend for the Grampians region when the past four years are considered. The scorecard data indicate that waste diversion percentages have experienced an unstable pattern of increase and decrease since reporting commenced. The previous scorecard update also showed a decreasing trend in waste diversion, and while the average waste diversion for the region has increased between scorecard updates, attention is required to improve the trajectory of this indicator. Victoria has an ambitious goal of 80% of waste to be diverted from landfill by 2030, with an interim target of 72% by 2025¹⁴. The Grampians region is not yet on track to meet the interim target, and progress must be made to reduce the amount of waste being sent to landfill.

2.7 INDICATOR K: SOLAR INSTALLATIONS; BATTERY AND SOLAR POWERED WATER HEATERS

Key finding: The direction of change for this indicator since the 2021 scorecard update is mixed positive and negative.

INDICATOR	ASSESSMENT	2021	2023
K. Solar battery and water heaters	Overall % change of battery installations in the State	+	+
	Overall % change of solar water heaters installed in the Grampians	+	–

Indicator K considers two types of solar installations – solar PV with concurrent battery storage and solar-powered water heaters. Data for solar PV with concurrent battery storage installations are only available at state level, so may not directly reflect the uptake of this technology in the Grampians region. There were 5,362 solar PV with concurrent battery storage systems installed in 2022 for the whole of Victoria. This represents an increase of 197.9% over the average of 1,800 systems per year from 2018 – 2021. Data at LGA level would assist in refining this indicator and ensuring figures were tracked for the Grampians region specifically.

¹⁴ Department of Energy, Environment and Climate Action (formerly DELWP) 2020, *Recycling Victoria: A new economy*, Victorian State Government, Victoria.

There were 658 solar-powered water heaters installed in 2022 across the region. This figure is -29.7% below average when compared to annual figures obtained from 2001 – 2021. Overall, significantly less solar-powered water heaters were installed across the Grampians region in 2022. Available data reports the total number of installations per year by postcode. A more informative measure could be the percentage of dwellings with a solar-powered water heater, similar to indicator I. If data such as these are located, modifications to the scorecard could provide more insight into progress towards the outcome of more efficient and sustainable energy for the region. As is, the available data indicate that the uptake of solar-powered water heaters across the region is slowing, and measures may be considered to encourage new and existing dwellings to incorporate this technology to reduce greenhouse gas emissions for the Grampians region.

2.8 INDICATOR L: ANNUAL WATER USE PER CAPITA

Key finding: The direction of change for this indicator since the 2021 scorecard update is negative.

INDICATOR	ASSESSMENT	2021	2023
L. Annual water use per capita	Overall % change of water usage (industrial + residential) in the Grampians adjusted for population	+	-

Indicator L calculates overall residential water use per capita in the Grampians region and overall total water use change (residential, municipal, industrial and concessional) adjusted for population. It is important to note that the first scorecard update used data from the Western Water Annual Report for 2019/2020 to record water use for the Bacchus Marsh district. Western Water joined with City West Water in 2021 to become Greater Western Water and reporting formats have since changed. Water use has not been reported by district for the Bacchus Marsh district or Moorabool LGA since the last scorecard update, and as such this data could not be included in this scorecard update. To provide a basis for comparison, water use for the Bacchus Marsh district for 2020 has been removed for this update.

For 2021/2022, residential water use per capita was 61,644 L, or approximately 169 L per day per person. This represents a slight decrease from the last scorecard update using 2019/2020 data, where residential water use per capita was 62,741 L. The Victorian Government currently has a voluntary water saving initiative called Target 150, encouraging Melbourne’s residents to limit their daily use to 150 L per day¹⁵. For 2022, residents in the Grampians region used more water than those in Melbourne, which used an average of 157 L per day per person.

Overall total water use for 2021/2022 in the Grampians region has increased by 2.37% when compared to the average of the previous five years. Overall total water use looks at water consumption across residential, municipal, industrial and concessional uses and is adjusted for population. The last scorecard update for 2019/2020 showed declining water use when compared to the previous five-year average. Overall water use adjusted for population varied widely among localities, with some showing strong improvements in water use and others showing markedly increased use. Six localities had reduced their water use by over 20% compared to the previous five-year average – Buangor, Amphitheatre, Learmonth, Elmhurst, Wickliffe and Nhill. Amphitheatre made the strongest reduction at -36.2%, adjusted for population. Six localities had increased their water use in 2022 by more than 20% compared to the previous five-year average – Dimboola, Waubra, Daylesford, Avoca, Westmere and Clunes. Daylesford and Avoca had increased water use by more than 50%.

A possible reason underlying the increase to water use is the fact that Victoria has, on the whole, received above average rainfall over the past three years, owing to successive La Niña climatic events.

¹⁵ Greater Western Water 2023, *Target 150*, viewed 21 March 2023, <<https://www.gww.com.au/water-waste/saving-water/target-150>>.

Most major water storages across Victoria are close to full capacity, and regional water storages are at a combined capacity of about 97%¹⁶. This has meant that water restrictions have not been in place throughout the summers of 2021, 2022 and 2023, aside from permanent water saving rules. Public awareness of the wet climatic conditions, along with a lack of water restrictions, may have contributed to the increases in residential water use per capita and overall total water use.

2.9 INDICATOR N: SUSTAINABLE LAND MANAGEMENT PRACTICES REPORTING

Key finding: The direction of change for this indicator since the 2021 scorecard update is neutral.

INDICATOR	ASSESSMENT	2021	2023
N. Sustainable land management practices reporting	Average condition assessment of land health for the 11 LGAs that are within each CMAs	NEUTRAL	NEUTRAL

Indicator N reports on sustainable land management practices across the five catchment areas that comprise the Grampians region. This assessment is sourced from CMA annual reports, which describe in detail the state of land health and management practices occurring throughout the year and determine trend and condition rating for land health. The trend is determined by each CMA using a combination of qualitative and quantitative information.

The average trend for 2021/2022 across the Grampians region was neutral, and the average condition was moderate. This has not changed since the last scorecard update. Recurrent themes arose from the notes provided in each CMA annual report which are summarised in table 2-3 below. Note that half of the LGA of Moorabool is within the Melbourne Water catchment area, which incorporated the Port Phillip and Westernport CMA in 2022. The Melbourne Water catchment area mostly encompasses Greater Melbourne, so it was left out of the average trend and condition calculations, however relevant assessment comments were retained.

Table 2-3: Assessment of themes observed in CMA sustainable land management practices trend and condition reporting.

THEMES		CMA
Positive	Successive La Niña events brought above average rainfall, positively impacting soil moisture and ground coverage.	North Central, Wimmera, Corangamite, Glenelg Hopkins CMAs.
	Sustainable agricultural practices are occurring, such as restoration work, stubble retention, no-till cropping and rotational grazing.	North Central, Wimmera CMAs.
Negative	Climate change continues to pose challenges to land management and contribute to a decline in environmental condition.	Melbourne Water, Corangamite CMA.
	Land use changes, for example those arising from urban development, increases in dryland cropping and plantations, are negatively impacting the extent of native vegetation and/or productive agricultural land.	Melbourne Water, Corangamite, Glenelg Hopkins CMAs.

¹⁶ Department of Energy, Environment and Climate Action 2023, *Victorian Annual Water Outlook: covering the period February to November 2023*, Victorian State Government, Victoria, viewed 15 March 2023, <https://www.water.vic.gov.au/__data/assets/pdf_file/0032/618890/DEECA-AnnualWaterOutlook_2022-23.pdf>.

Selected quotations from the descriptions provided by each CMA are included below:

- “Additional protection and restoration work is building momentum of good management and sustainable agriculture practices¹⁷.” (North Central CMA)
- “We observed relatively low levels of exposed soils vulnerable to erosion. Groundcover management practices such as stubble retention, no-till cropping and rotational grazing, continued to be practised by most Wimmera land managers¹⁸.” (Wimmera CMA)
- “Land use changes are seeing a concerning decrease in native vegetation types and an increase in dryland cropping and hardwood plantations¹⁹.” (Corangamite CMA)

2.10 INDICATOR O: SOIL MOISTURE

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
O. Soil moisture	Overall average % change of soil moisture for the Grampians	+	+

Indicator O reports on soil moisture levels in the 11 LGAs comprising the Grampians region. Average soil moisture for the 11 LGAs in the Grampians region for 2022 was 492.5 mm, representing an increase of 4.4% above 2021 levels and 9.4% over the average for 2019-2021. All LGAs experienced an increase to soil moisture for 2022 when compared to the 2019-2021 average. The highest increase was observed in Hindmarsh, which recorded 2022 soil moisture levels 15.7% above the previous three-year average. Significant increases were also observed in Horsham (+14.2%), Yarriambiack (+13.2%), Northern Grampians and Pyrenees (both +10.5%). Like other indicators, the primary factor affecting this improvement was wetter than average climatic conditions throughout the state over successive years. Above average rainfall and lower average temperatures for many parts of Victoria saw improvements to soil moisture and soil coverage²⁰.

2.11 INDICATOR S: NUMBER OF COUNCILS WITH ENVIRONMENTALLY SUSTAINABLE DESIGN POLICIES IN THEIR PLANNING SCHEME

Key finding: The direction of change for this indicator since the 2021 scorecard update is neutral.

INDICATOR	ASSESSMENT	2021	2023
S. Councils with environmentally sustainable design policies in Planning Scheme	Number of councils with environmentally sustainable design policies in their planning scheme	+	NEUTRAL

¹⁷ North Central Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Huntly.

¹⁸ Wimmera Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Horsham.

¹⁹ Corangamite Catchment Management Authority 2022, *Annual Report 2021-2022*, Victorian State Government, Colac.

²⁰ Fenner School of Environment and Society 2023, *Australia's Environment 2022 Report*, Australian National University, Canberra, viewed on 28 March 2023, <<https://www.wenfo.org/aer/about/#gallery>>.

Indicator S reviews the Planning Schemes of each of the 11 LGAs within the Grampians region and assesses them for environmentally sustainable design policies. No change has occurred since the last scorecard update in 2021. All councils possess the following environmentally sustainable design policies:

- Plan for coastal inundation and erosion caused by climate change (plan for sea level rise no less than 0.8m by 2100)²¹
- Support adaptation of the agricultural sector to respond to the potential risks arising from climate change.
- Provide urban environments that are more resilient to the effects of climate change.
- Minimising greenhouse gas emissions.
- The design of buildings to provide for solar access (north facing).
- Protecting and creating new connections between remnant vegetation and areas of high biodiversity value.
- Greening the urban area as an urban forest to improve biodiversity, manage heat, improve amenity and enhance rural identity.

Critically, working with Aboriginal stakeholders to deal with the impacts of climate change on Indigenous sites and cultural heritage is lacking from all Planning Schemes with the exception of Ballarat, and this has remained the same since the last scorecard update in 2021. While the protection and conservation of sites of Indigenous cultural heritage significance is included in the policies of all councils in the region, the critical factor of direct involvement of Indigenous peoples in climate change impact management is lacking.

The 2021 national State of the Environment report states that climate change is significantly impacting Australia's globally significant Indigenous heritage, and that the impact on Indigenous peoples is disproportionate²². The report also states that Indigenous Australians are systematically denied the right to speak for and make decisions concerning their heritage, and that there is a critical need for a rights-based approach to Indigenous heritage management at all levels of government²³. It is important that Indigenous Australians be involved in broader natural heritage and environmental management practice.

In 2022, the United Nations Human Rights Committee found the lack of protection of Indigenous cultural heritage against the impacts of climate change constituted a violation of the rights of Indigenous Torres Strait Islander peoples to enjoy their culture, requesting that compensation be paid, and efforts made to engage Traditional Owners in meaningful consultation on climate change. Considering climate change is impacting all parts of Australia, this example highlights the need for action on the involvement of Indigenous peoples in climate change decision-making in the Grampians region.

The National First Peoples Gathering on Climate Change in 2021 made the following statement about Indigenous peoples' involvement in caring for Country and climate change, stating that:

"When Country is healthy, we are healthy. Our knowledge systems are interconnected with our environment and it relies on the health of Country. This knowledge is held by our Elders and passed on to the next generation. Solutions to climate change can be found in the landscapes and within our knowledge systems. Aboriginal and Torres Strait Islander peoples have the tools, knowledge, and practices to effectively contribute to the fight against climate change²⁴."

²¹ The Grampians region is not located along any coastline; however this policy was included in the original indicator and has been retained for consistency.

²² Janke, T, Cumpston, Z, Hill, R, Woodward, E, Harkness, P, von Gavel, S & Morrison, J 2021, *Australia State of the environment 2021: Indigenous: Climate Change*, Australian Government Department of Agriculture, Water and the Environment, Canberra, viewed 16 March 2023, <<https://soe.dceew.gov.au/indigenous/pressures/climate-change>>.

²³ McConnell, A, Janke, T, Cumpston, Z & Cresswell, ID 2021, *Australia State of the environment 2021: Heritage: Key findings*, Australian Government Department of Agriculture, Water and the Environment, Canberra, viewed 16 March 2023, <<https://soe.dceew.gov.au/heritage/key-findings>>.

²⁴ Morgan-Bulled, D, McNeair, B, Delaney, D, Deshong, S, Gilbert, J, Mosby, H, Nea, IDP, Puntoriero, J, Wilson, J, Fourmile, G, Singleton, G & Bullio, R 2021, *National First Peoples gathering on climate change: workshop report*, Earth Systems and Climate Change Hub Report No. 29, Earth Systems Climate Change Hub, Canberra.

2.12 INDICATOR T: VICTORIAN ENERGY EFFICIENCY CERTIFICATES

Key finding: The direction of change for this indicator since the 2021 scorecard update is positive.

INDICATOR	ASSESSMENT	2021	2023
T. Victorian Energy Efficiency Certificates	Overall % change of number of VEECs generated in the Grampians region	+	+

Indicator T records the number of Victorian Energy Efficiency Certificates (VEECs) created in the Grampians region per financial year. VEECs are electronic certificates generated when specific energy efficiency activities are undertaken, with each certificate representing one tonne of greenhouse gas emissions reduction. VEECs are recorded for the Grampians region in both residential and business categories. For the 2021/2022 financial year, 480,385 VEECs were created within the Grampians region, representing a total increase of 51.4% above the average of the previous three years. Business VEECS increased by 52.9% above average, while residential VEECS declined slightly, falling -1.5% below average.

Activities that create VEECS have changed since the last scorecard update, with several activities being revoked. Reports from the Essential Services Commission state that in the several years prior to 2021, lighting upgrade activities dominated certificate creation, comprising 89% of total VEECs in 2020. Lighting upgrades also dominated activities in 2021, however increases to water heating activities, in-home displays and low flow shower fittings were also noted²⁵.

The scorecard records the number of VEECs created rather than the number of activities undertaken. It is however interesting to note that while residential activities make up the majority of upgrades state-wide, the split between VEECs created has been close to 50/50 between business and residential in recent years. This is because business upgrades are normally undertaken at a larger scale than residential upgrades, meaning that a larger quantity of VEECs are generated on average for business activities than residential ones²⁵. It is also worth noting that regional households are overrepresented in the number of residential upgrades state-wide, indicating positive progress in Victorian regions toward retrofitting existing built environments for improved climate change resilience.

²⁵ Essential Services Commission 2022, *Victorian Energy Upgrades Performance Report 2021*, viewed 15 March 2023, <<https://www.esc.vic.gov.au/sites/default/files/documents/VEU-performance-report-2021-20220623.pdf>>.

3 Conclusion

Climatic conditions in the three years prior to this scorecard update have been beneficial to climate adaptation efforts. Above average rainfall in the region had favourable impacts on environmental condition, water levels, soil moisture and ground coverage, and assisted biodiversity and revegetation efforts. However, with the BOM advising that the La Niña period has ended and may be followed by drier conditions, continued work and attention will be required across the region to ensure that gains made throughout the last three years are maintained and that adaptation continues to improve.

Positive progress has been made in the adoption of renewable energy technologies across the Grampians region since the last scorecard update. Solar PV system installations and capacity have increased greatly, and the average energy efficiency of dwellings also continues to increase. The generation of VEECs has strongly risen, representing a large volume of greenhouse gas emissions reductions. By contrast, waste diversion has shown poor performance throughout consecutive scorecard updates and lags behind the trajectory required to meet the 72% waste diversion by 2025 target established by the Victorian State Government. This is an area of community-level climate adaptation that requires improvement.

The state of biodiversity and ecosystem protection is complex across the Grampians region when the scorecard indicators are considered. Several CMAs in the region noted positive change arising from targeted, small-medium scale works to protect threatened species or restore priority habitat. Favourable rainfall and improved stream flows in many water systems saw benefits to aquatic habitat quality as well as terrestrial ecosystems. However, continued degradation of native vegetation arising from land use changes, climate variability and invasive species has seen the condition of biodiversity in the region downgraded from neutral to poor-moderate over consecutive scorecard updates. This assessment is based on reporting by CMAs within the Grampians region.

Areas protected under new conservation covenant have increased since the last scorecard update. The 2020/2021 financial year saw the strongest increase to new areas protected when compared to the previous four years. Protected areas are most extensive in the Lowan Mallee and Central Victorian Uplands IBRA subregions. However, some EVCs and IBRA subregions continue to be inadequately protected especially the underrepresented EVCs of the Victorian Volcanic Plain, Glenelg Plain and Dundas Tablelands. Future environmental protection and restoration initiatives could focus on priority regions to help increase the representation of endangered EVCs in protected areas.



Figure 3-1: Grampians (Gariwerd) National Park and surrounding agricultural land (iStock).

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