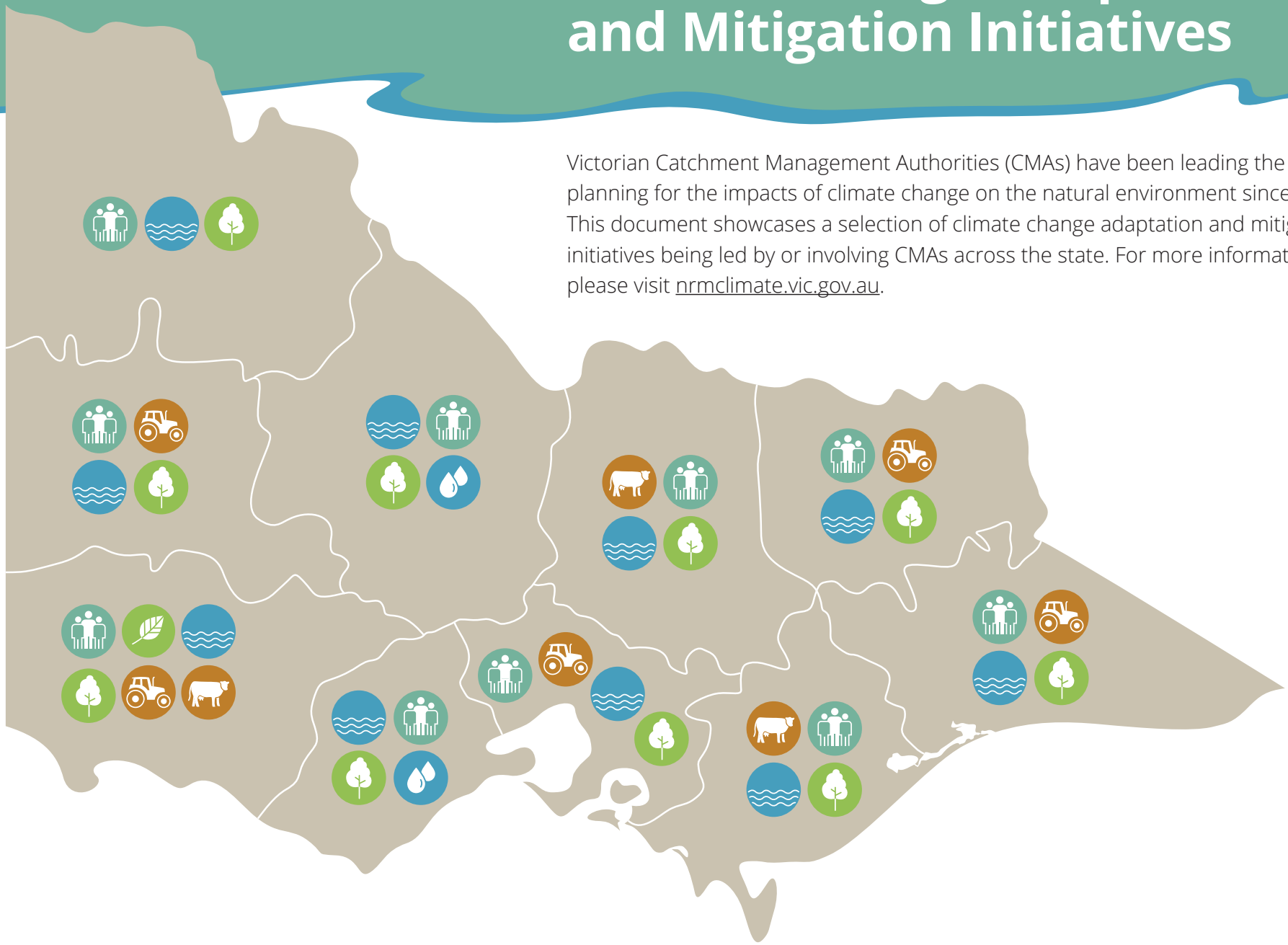
Victorian Catchment Management Authorities

Climate Change Adaptation and Mitigation Initiatives

Victorian Catchment Management Authorities (CMAs) have been leading the way in planning for the impacts of climate change on the natural environment since 2012. This document showcases a selection of climate change adaptation and mitigation initiatives being led by or involving CMAs across the state. For more information please visit nrmclimate.vic.gov.au.



Victorian CMA Climate Change Forum

Operating since 2012, this forum provides an opportunity to share ideas and information on climate change planning, mitigation and adaptation in the natural resource management sector. Members also promote active learning and encourage collaboration across all ten CMA regions.

Through this forum, Victorian CMAs have developed a list of high priority adaptation options, these include

- landscape connectivity,
- shared learning,
- local climate change adaptation planning,
- supporting carbon sequestration activities,
- building resilience of soils,
- protecting aboriginal cultural heritage,
- protecting and enhancing Victorian "blue carbon", and
- building on the partnership with key research organisations.

Statewide CMA Climate Change Coordinator

Vic Catchments identified climate change as a strategic priority in 2015 and with the support of CMA CEOs, appointed a 0.4 FTE Statewide Climate Change Coordinator. The position aims to maintain capacity of climate change adaptation expertise across all CMA regions; look for opportunities to embed the regional NRM climate change strategies/plans into Victorian and Federal Government policy; look for opportunities to implement key actions in the regional climate change strategies/plans; and advocate on behalf of all CMAs.

Climate Change Adaptation and Mitigation Planning

In 2015 Victorian CMAs released Regional Natural Resource Management (NRM) Climate Change Adaptation Strategies and Plans. These plans, developed using the latest climate change projections by the CSIRO, are the most comprehensive NRM climate change adaptation documents to date in Victoria.

Through this work the CMAs

- Developed spatial tools to assess climate change vulnerability across Victoria.
- Pioneered adaptation pathways planning in the state.
- Undertook extensive engagement with the community and key stakeholders on climate change adaptation.

The plans have determined what the future climatic impacts may be on our natural assets, how they may adapt to climate change and the management actions that need to be implemented. Priority landscapes for carbon sequestration and strategies to build landscape resilience to climate change are also identified.

The plans can be accessed through the 'Climate Ready Natural Resource Management Planning in Victoria' web portal http://www.nrmclimate.vic.gov.au/

Statewide or Multi-Regional CMA Climate Change projects

Catchment Carbon offsets

A catchment carbon offsets trial was undertaken in 2018. This project complemented Victorian government policies and strategies relating to climate change by demonstrating how it could deliver emissions reductions, climate resilience and improve catchment management outcomes. In partnership with the Victorian water sector, the catchment carbon offset (CCO) concept was designed to retain and increase carbon stocks to meet water corporations' emission reductions requirement while also providing environmental and social benefits.

Carbon abatement partnership opportunities with Traditional Owners

In 2019, Traditional Owners identified potential carbon sequestration sites that meet the objectives of the relevant Regional Catchment Strategy. Traditional Owner groups involved in the project have identified three innovative, landscape-scale abatement opportunities that have potential for delivery of large-scale carbon abatement and multiple other co-benefits.

Carbon stocks, sequestration, and emission of wetlands in south eastern Australia

It's common knowledge that trees help absorb and store carbon from the atmosphere. Research undertaken by Deakin University's Blue Carbon Lab in 2018, reveals inland wetlands are also doing their share of soaking up CO_2. Research led by Dr. Paul Carnell and published in Global Change Biology shows soils from Victoria's inland wetlands hold a carbon stock of 68 million tons – a quantity enough to offset a year's worth of emissions from a city like Geelong and worth about $6 billion AUD. As part of the study, Deakin University worked with Victoria's ten CMAs to take >1,600 soil samples from 103 different wetlands across the state.

Blue Carbon

In 2014, the Corangamite and West Gippsland CMAs identified a lack of information on the distribution and abundance of blue carbon within their catchments. Such information is critical for guiding the spatial prioritisation of conservation efforts. To address this knowledge gap, the two CMAs commissioned researchers from Deakin University to conduct their regions' first blue carbon stock assessments, focusing on sedimentary organic carbon.

The major findings of this work were that the Corangamite region has an estimated total blue carbon sediment stock of 431,502.02 tonnes and a total carbon value of $6,472,530 over the top 30 cm of sediment at $15 Mg-1 (voluntary market price). Whereas the West Gippsland region has an estimated total blue carbon stock of 1,320,765.69 tonnes and a total carbon value of $19,811,485 over the top 30 cm of sediment at $15 Mg-1.

It should be noted that because sampling was confined to the top 30 cm of sediment, the carbon estimates are highly conservative. In fact, since organic carbon is stored at depths up to several metres, the true value of these habitats is significantly greater.

South West Climate Change Portal

The South West Climate Change Portal (http://www.swclimatechange.com.au/climatechange) provides information, advice and tools for communities to manage or respond to climate change.

Victorian Coastal Wetland Restoration Program

Corangamite and West Gippsland CMAs are partners in a program of works being led by Deakin University's Blue Carbon Lab funded by the Victorian Government's Biodiversity Response Planning program.

The programs involve

- developing a wetland restoration conservation strategy
- on ground work to repair more than 100 hectares of wetlands
- work with Traditional Owners to protect Aboriginal Cultural Heritage at 16 coastal sites.

Corangamite CMA

Shifts in the region's Cool Temperate Rainforest

CSIRO carried out modelling to map the distribution of Cool Temperate Rainforest under projected changes to the region's climate. CSIRO's modelling suggests that Cool Temperate Rainforest is likely to become even more restricted by 2050 and could disappear from the Corangamite region under future scenarios.

Protecting the environment via on-farm water efficiency

The Corangamite CMA undertook a project to test the viability and effectiveness of modernised on-farm water capture technologies to meet future farming needs and achieve improved water efficiency. The project was undertaken in response to the need for more secure water flows to high-value environmental assets in the face of climate change. Activities included analysis of a range of water efficiency technologies and approaches to determine their viability in delivering on farm and catchment benefits. A communications campaign is currently underway to share the pilot project activity findings.

EstuaryWatch event monitoring data captures climate change related events

On a monthly basis Corangamite EstuaryWatch volunteers make vital observations of estuary mouth condition (including estuary height and photopoints) and water quality measurements. In addition, the monitors can record commentary on estuary events on the EstuaryWatch Victoria database http://www.estuarywatch.org.au/estuary/ccma/202#estuary_events. This presents an opportunity to capture local impacts of storm surges often informed by additional sea level and sea-state data.

The Corio Bay and Bellarine Peninsula local coastal hazard assessment

The Victorian Government, Corangamite CMA and local coastal Committees of Management have worked closely with the City of Greater Geelong and Borough of Queenscliffe to undertake a detailed local coastal hazard assessment along the coast of the Bellarine Peninsula and within Corio Bay.

The assessment analysed the potential impacts of sea level rise, as well as providing practical information for planners and coastal asset managers to make decisions at a local scale.

East Gippsland CMA

TopSoils

The TopSoils project improves agricultural practices through soil management and improving ground cover to increase climate resilience. It is building a current data set of the chemical and physical properties of East Gippsland's farming soils, to assist the identification of trends in soil characteristics and key indicators of soil asset decline.

Room to Move — A proposal to manage a changing Gippsland Lakes

'Room to Move' is a new project the East Gippsland CMA will commence in 2020. The work seeks to prepare for sea level rise in the Gippsland Lakes to protect environmental assets, cultural heritage values, community infrastructure and social value.

The project will create new habitat areas branching out from the Gippsland Lakes to allow species to move before significant sea level rise. Important sites with environmental and cultural values will be managed to ensure the protection of representative samples. The approach manages forecast and current risks with prioritisation for works guided by evidence.

Glenelg Hopkins CMA

Climate adjusted vegetation restoration guide

Greening Australia has produced a guide for vegetation restoration in the Glenelg Hopkins catchment given a climate adjusted future. The guide identifies which types of species in the catchment are likely to be lost under a climate adjusted future and should no longer be included in revegetation; which species have the potential to persist and will require assistance; and which species should continue to be established.

Farm income diversification through adaptation

A demonstration site has been established in the Southern Grampians to evaluate growing wattle species to diversify income streams to increase adaptation to climate change. This site is also exploring wattle seed as a potential food crop; the suitability of various wattle seed species across a variety of local soil types; and the suitability of wattles as stand-alone crops or within shelter belts on farm.

Regenerative farming practices – holistic planned grazing

Holistic management is a decision-making process that can be used to manage any complex system. In traditional or conventional agriculture systems the farm is a modified factory. Processes are simplified to allow decisions to be simple or, at most, complicated. This reductionist approach can lead to unintended consequences such as over grazing, bare soil and wind erosion. For holistic farmers, the farm is a modified ecosystem. Processes are assumed to be complex. Holistic management reduces risk of unintended consequences and by increasing diversity, increases ecosystem function and resilience to changing climate conditions.

The Glenelg Hopkins CMA is working with a family farm at Balmoral where they adopted holistic planning for their cattle operation in 2013. This involves short periods of grazing (hours to days), at high animal density, followed by long rest periods (greater than 3 months). Since then, the farm has seen improvement in pasture diversity for both introduced and native grasses with more perennial grasses. Native Wallaby, Kangaroo and Weeping Grass has spread from isolated patches to making up a lot of the pasture. The family believes this gives them a farming system they can readily adapt to changes in climate and note that the land and animals are looking better and are a lot healthier.

Biochar trials

Biochar is a stable, carbon-rich form of charcoal that is applied to soil. Trial sites have been established to examine the potential for biochar to increase the moisture retention capability of soils, to help compensate for extended periods of low or no rainfall. Early results indicate biochar treatments do support longer, deeper retention of moisture in soils versus control sites.

Goulburn Broken CMA

Irrigation energy calculator

Increasingly irrigators are switching from gravity fed surface irrigation to pressurised irrigation systems to gain water use efficiency. While the water savings are beneficial, this pursuit of water use efficiency has led to an increase in energy consumption through these pressurised systems. Goulburn Broken CMA developed an Energy calculator to help land managers determine how energy efficient their irrigation systems are and make changes based on these calculations.

Bogies and beyond

The community of the Strathbogie Ranges in Victoria were seeing some big changes happening around them, within their community and across the 'Bogies'. Change wasn't something that concerned them, but as a community that 'makes things happen' they weren't confident that what they were doing were necessarily the best ways forward.

Goulburn Broken CMA organised a series of four workshops to help the Strathbogie Ranges community make sense of what they were seeing and to give them the confidence to take action and make changes as needed. Firstly, the community identified what they loved about the Bogies and what the critical attributes of the natural environment

were that make the Bogies what they are today. Using climate change scenarios, a range of adaptation pathways were explored for each of the critical natural attributes. This helped the community discuss the potential transformation of some attributes they love and to identify what were the 'no-regrets' pathways. The workshops culminated in a natural resource management plan that considers possible future climate change scenarios and prioritises a range of actions that will make sure the natural features the community values can be improved.

The Strathbogie Ranges community are now involved in active working groups, noticing new patterns of change occurring and instigating action.

North Central CMA

A healthy Coliban catchment

North Central CMA and Coliban Water are working in partnership to deliver the Upper Coliban Integrated Catchment Management Plan which aims to manage the impacts of land use on water supply. It supplies the raw drinking water for more than 130,000 people and is a source of water for the region's rural customers. Existing and future development pressures, climate change and uncontrolled livestock potentially threaten the health of the upper Coliban catchment and its water security.

Loddon River native fish recovery

The Native Fish Recovery Plan project has installed deep pools in the Loddon River to provide native fish habitat in a changing climate.

North East CMA

Embedding climate change in agriculture

A five-year project is underway to support the agricultural sector to adapt to climate change. Actions include

- Developing climate mapping resources in an online spatial tool that shows the impacts of future climate on agricultural industries and commodities.
- Running weather resilience workshops to help farmers undertake climate adaptation works on farms. The workshops focus on water budgets, interpreting weather data, shade and shelter and more.
- Sponsoring three groups to participate in a series of intensive workshops to assist land managers and groups understand the commodity implications of climate change using the online mapping tools and sharing them with others.
- Supporting 'Climate Champions' to give presentations to community groups and act as climate change adaptation advocates within the region.

Port Phillip and Westernport CMA

Growing carbon in the Port Phillip and Westernport region

The Port Phillip and Westernport Catchment Management Authority (PPWCMA) in partnership with Yarra Valley Water, South East Water, City West Water, Western Water, Southern Rural Water and Melbourne Water wanted to understand whether there is an opportunity to develop a multi-benefit approach to establishing carbon offsets through the implementation of local revegetation projects in the Port Phillip and Westernport region. In April 2019, on behalf of all project partners, PPWCMA engaged South Pole Consulting to provide a carbon sequestration analysis including the potential carbon yields, the costs for implementation and the process for registering and securing credits under three identified scenarios.

Smart Farming for Westernport

Agriculture is a major industry in the Westernport region, which is seen as a future food bowl due to its proximity to Melbourne and major transport routes, and its predicted ability to remain highly productive in a changing climate. The Smart Farming for Westernport project is engaging with 220 farmers, managing 8,800 hectares of land, to increase their skills and knowledge of soil carbon, which will also benefit farm productivity, soils, water and air. Seven on-farm demonstration sites are being established, covering a range of enterprise types and trialling innovative practices. This project is increasing awareness and adoption of land management practices that improve and protect the condition of soil, biodiversity and vegetation. It will also contribute to improved soil carbon levels and nutrient balance, soil biology and a reduction in soil acidification.

West Gippsland CMA

Climate Risk in Agriculture Conference

The conference included expert presenters discussing climate forecasts, practical actions to build farm resilience, carbon farming opportunities, legal and financial risks and more. A selection of presentations from scientists, farmers and lawyers about what the climate risk is and how you can better manage the impacts is available via https://www.wgcma.vic.gov.au/for-landholders/managing-climate-risks-in-agriculture

Managing Lake Wellington

The substantial body of knowledge of the condition and management of Lake Wellington and its fringing wetlands is being consolidated and summarised to best inform management of the system to maintain ecological character, or ensure that the system transitions to a state that maximises ecological values.

Helping the future of Forest Red Gums in the West Gippsland CMA region

Modelling suggests that in the future, the central Gippsland plains environment will become more suited to the Box Ironbark vegetation community, which is currently found almost entirely north of the Great Dividing Range. There are only two known populations of Box Ironbark vegetation communities south of the divide - in the Dawson and Heyfield areas of Gippsland. These local Box Ironbark communities currently merge and co-exist with the Forest Red Gum communities, so Greening Australia is looking at the climatic conditions surrounding this area as a living reference to how the Forest Red Gum communities have adapted. Seed from these 'climate ready' drought tolerant Forest Red Gum is now being incorporated into the revegetation seed mix being planted across the Gippsland plain.

Wimmera CMA

Mitigation trials

In 2015 Wimmera CMA and Agriculture Victoria completed two farm trials with the assistance of the Australian Government's Carbon Farming Futures Program. The trials demonstrated and assessed:

- on farm practices that might reduce nitrous oxide emissions associated with broadacre cropping
- on farm technology to increase carbon sequestration in soils through the addition of composts as a replacement for chemical fertiliser in cropping systems.

The trials assessed abatement practices and management strategies to measure and demonstrate how these can reduce agricultural greenhouse gas emissions and sequestration of carbon in soil while maintaining farm productivity.

Adaptation trials

Cropping in the Wimmera/ Mallee has always been a complicated business and the regions have seen cropping systems intensifying over the last two decades. Keeping these farming systems profitable and sustainable in a variable climate is becoming increasingly difficult. Many of the big questions relating to rotations and tillage systems are difficult to address in a single season, requiring long term thinking and research.

In 1998 Agriculture Victoria established a long-term rotation trial at Longerenong in the Wimmera. The Sustainable Cropping Rotations in a Mediterranean Environment (SCRIME) trial was conducted during part of the Millennium drought and includes data from dry (millennium drought) and wetter periods.

In 2017 Agriculture Victoria, University of Melbourne, Birchip Cropping Group and Wimmera CMA partnered to analyse and showcase the results of SCRIME. The results for the dry periods provide powerful information for landholders to help make crop rotation decisions in a drying climate. The data provides results for yields, profitability and effects on soil nitrogen and carbon, allowing farmers to weigh up risks and opportunities of various cropping rotations.

For more information please contact Paula Camenzuli, Statewide Climate Change Coordinator, at the West Gippsland Catchment Management Authority on 0400 067 382 or visit nrmclimate.vic.gov.au.