

Climate Variability

Climate projections for the Glenelg Hopkins Regions suggest that the weather will be hotter and drier in the coming years which will impact on land use, natural resources, the community and the biodiversity of the H11 H12 sub-catchment.

Temperature predictions suggests that there will be a greater number of hot days and few very cold days overall which is likely to have a significant impact on terrestrial habitats. The geographic range of both flora and fauna species will be altered, as will life cycle processes such as migration, flowering and breeding. The limited ability for fauna to move through the landscape will further impact upon species ability to adapt to the changes in climate. Ultimately the change in climate, will result in a decrease in the region's biodiversity and a change in the current location of species and ecological communities (GHCMA, 2015).

Rainfall in the region is predicted to decrease with an increase in the intensity of extreme rainfall events leading to less moisture in the soil and more erosion events. Less rainfall and greater temperatures are likely to cause a reduction in pasture production and persistence which could lead to changes to feed management systems. With reduced rainfall land may become more suitable for cropping and this could increase pressures from production on remnant vegetation, wetlands and waterways (GHCMA, 2015). CMA Climate Change Strategy 9 9

Rivers, floodplains and wetlands would be greatly impacted by the reduction in rainfall and subsequent runoff and stream inflow. Rivers and wetlands that rely on direct precipitation will be most affected. The region's wetlands are likely to undergo a variety of changes such as reduction in size, conversion to dry land or a shift in wetland type. Despite wetlands being very vulnerable to climate change, they are by nature a resilient ecosystem (GHCMA, 2015).

The protection and enhancement of wetlands will become increasingly important due to their carbon

sequestration potential and ability to act as 'stepping stones' for biodiversity through the catchment. Rivers are also critical for maintaining connectivity through the landscape. Riparian vegetation and refuge areas will become increasingly important with reduced stream inflow and more hot days. A reduction in water availability and possible increase in demand may intensify pressure on the region's water resources, including its rivers and groundwater (GHCMA, 2015).

Wetland at Blythdale, Streatham



Why is a blueprint needed?

The Beyond Bolac CAG was formed from a dedicated group of locals who recognised that the drying of and future management of Lake Bolac was a catchment wide problem and would require the co-operation of many individual landholders, industry bodies and government agencies from across the catchment to make a difference.

This dedicated group have been working hard over the last 10 years and have successfully achieved many strategies from the H11 & H12 Catchment Health Report. The Beyond Bolac CAG is now looking to the future and planning for the next 10 years to maximise the outcomes it can achieve.

The Norman Wettenhall Foundation landscape restoration project has enabled the Beyond Bolac CAG to review its aim, create objectives, re-connect with its many stakeholders and develop a formal Blueprint to work towards to achieve large scale landscape restoration for the H11 and H12 sub-catchment area.

What will the blueprint do?

Completing a Blueprint for the H11 and H12 sub-catchment will provide many benefits for Beyond Bolac CAG.

A Blueprint will

- Provide baseline information on the health of the catchment
- Enable the group to track change over time
- Provide an opportunity to
 - review the strategic plan for the group and key issues to focus on
 - re-connect with stakeholders and receive valuable feedback
 - make strategic decisions on where to invest funding and resources
 - view past projects and future projects visually using GIS mapping tools
- Assist the group to apply for future funding, and;
- Inspire community and stakeholders to take action on environmental and sustainability challenges facing the catchment



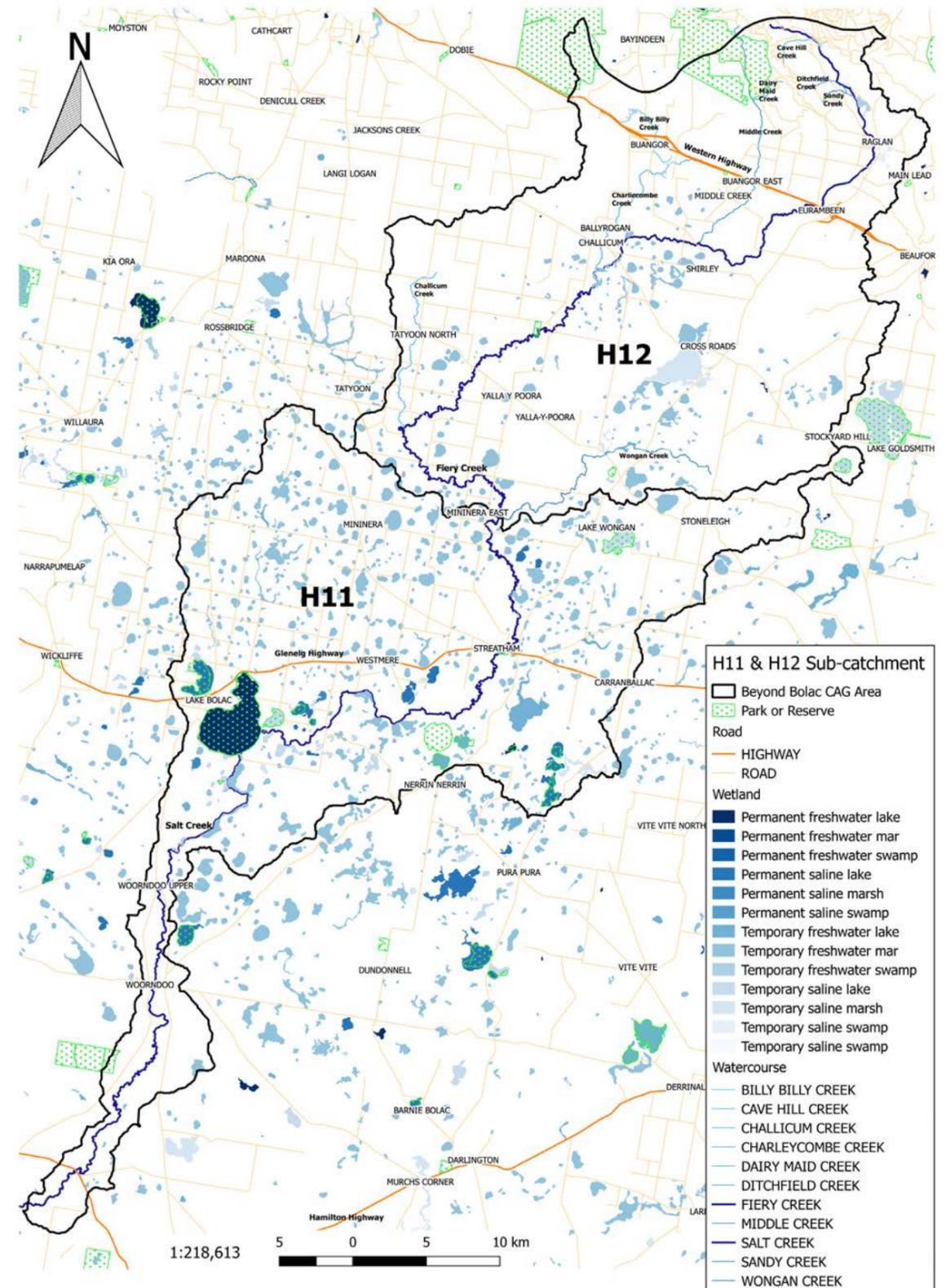
First Committee receiving start up funding from Beth Mellick, Executive Director, The Norman Wettenhall Foundation

BiodiversityMaps

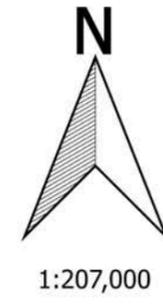
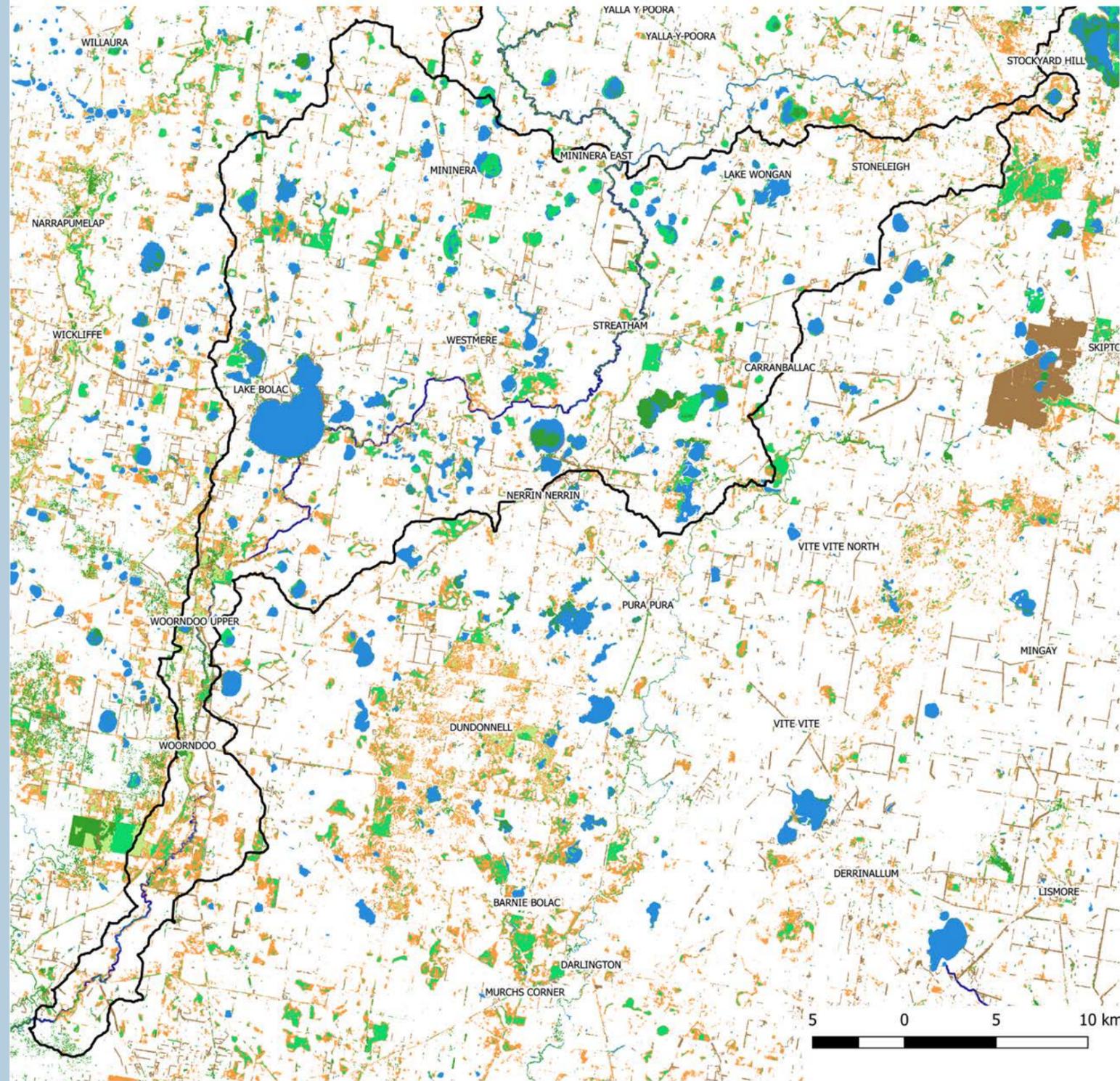
The Biodiversity maps provided within the document will assist Beyond Bolac CAG make strategic decisions for the H11 H12 sub-catchment. They visually represent the biodiversity information for the sub-catchment and are a quick reference tool for the group to use when applying for funding, holding discussions with stakeholders or assisting land managers develop projects. The maps included are all available within a GIS program called Q-GIS, which will enable Beyond Bolac CAG to use the maps more effectively. Map users can zoom into specific areas and see much greater detail and data layers can be viewed altogether or singularly or a couple at the same time which can support greater analysis of the data. The data has been sourced from the State Government of Victoria and will need to be updated as new data layers are released

Map 1 The Beyond Bolac Catchment Action Group Area

The Beyond Bolac CAG area covers approximately 168,000 ha and stretches from Hexham in the south to Raglan and Buangor in the north. The area corresponds to the sub-catchment of H11 & H12 of the Upper Hopkins River Basin. The Fiery and Salt Creeks are the major waterways of this sub-catchment, with Lake Bolac being a major lake. Fiery Creek flows into Lake Bolac from the north, and the overflow from Lake Bolac enters Salt Creek and flows south to the Hopkins River. There are numerous other permanent and temporary lakes and wetlands dotted across this landscape.

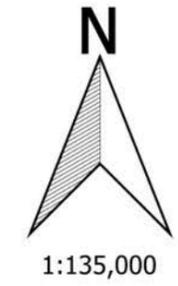
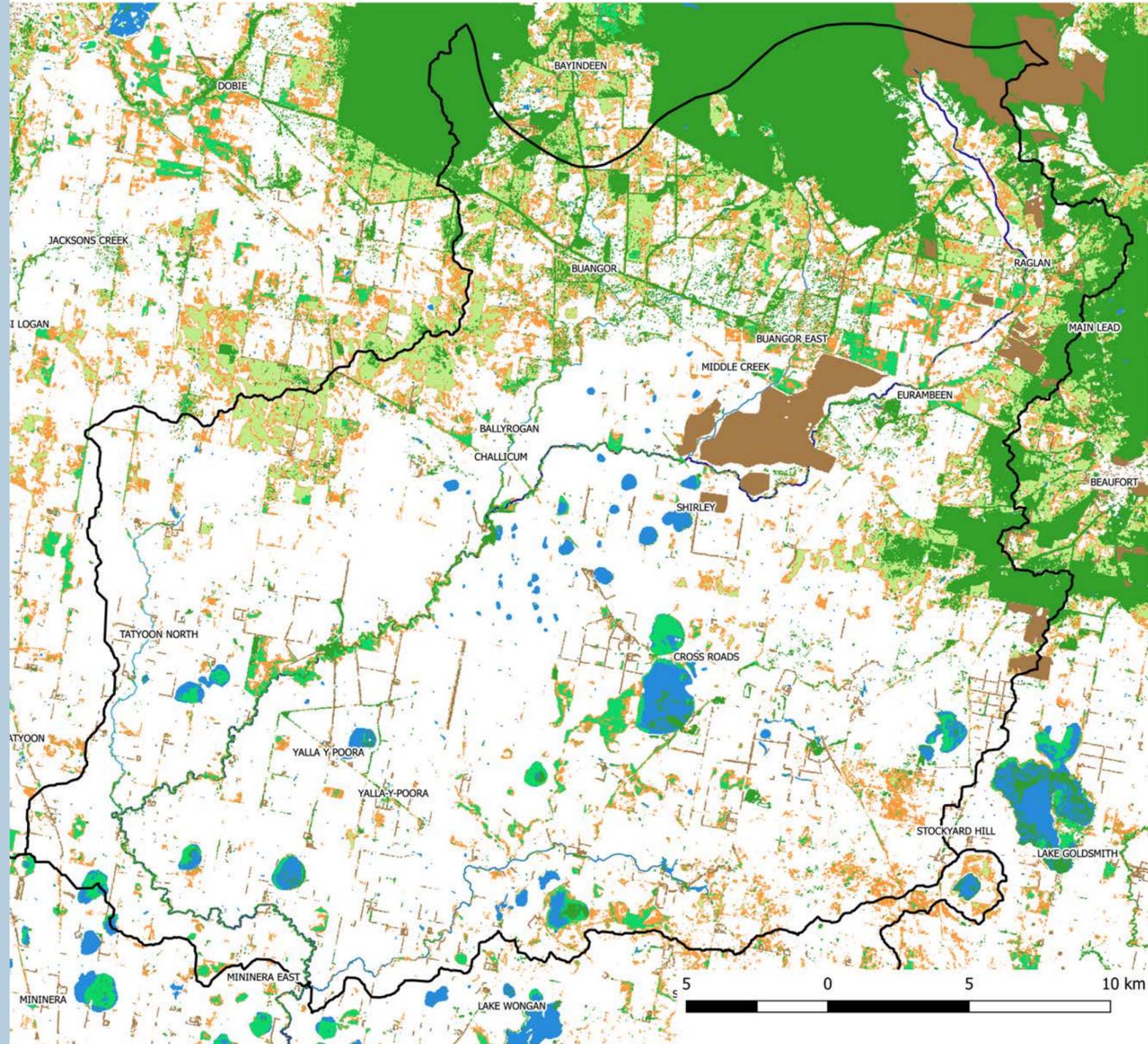


This map shows the most current extent of native vegetation and major water-based habitat across the H11 H12 sub-catchment. The dataset categorises the landscape into native woody, native grassy and major native wetland cover together with probability ratings, ranging from “highly likely native vegetation cover” through to “unlikely to support native vegetation”. It is a combination of a number of spatial datasets such as tree cover, rainfall and temperature together with time-series LANDSAT imagery and ground-truthed site data. For the H11 H12 sub-catchment, this maps shows that native vegetation is highly likely to be present mainly in public parks or reserves as well as along the Fiery Creek, particularly in the north and some parts of Salt Creek. It also shows that there are a number of patches across the catchment which could possibly be native vegetation.



- Modelled Native Vegetation Extent H11**
- Beyond Bolac CAG Area
 - Native Vegetation**
 - Exotic woody vegetation
 - Highly likely native vegetation - grassy
 - Highly likely native vegetation - structurally modified
 - Highly likely native vegetation - woody
 - Possibly native vegetation
 - Wetland habitat
 - Watercourse**
 - CHALLICUM CREEK
 - FIERY CREEK
 - SALT CREEK
 - WONGAN CREEK

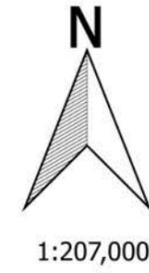
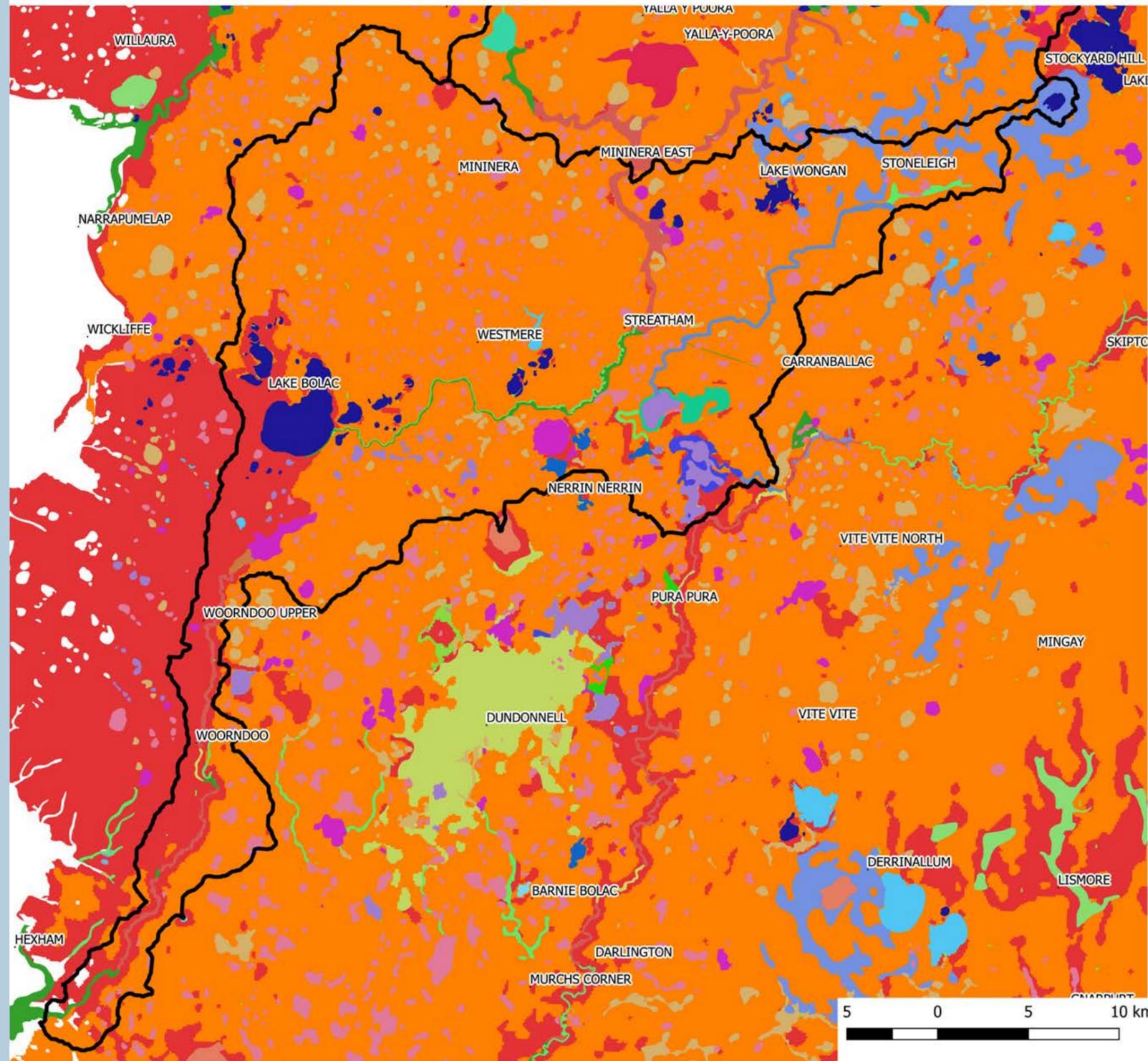
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Modelled Native Vegetation Extent H12

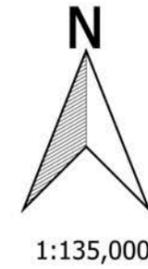
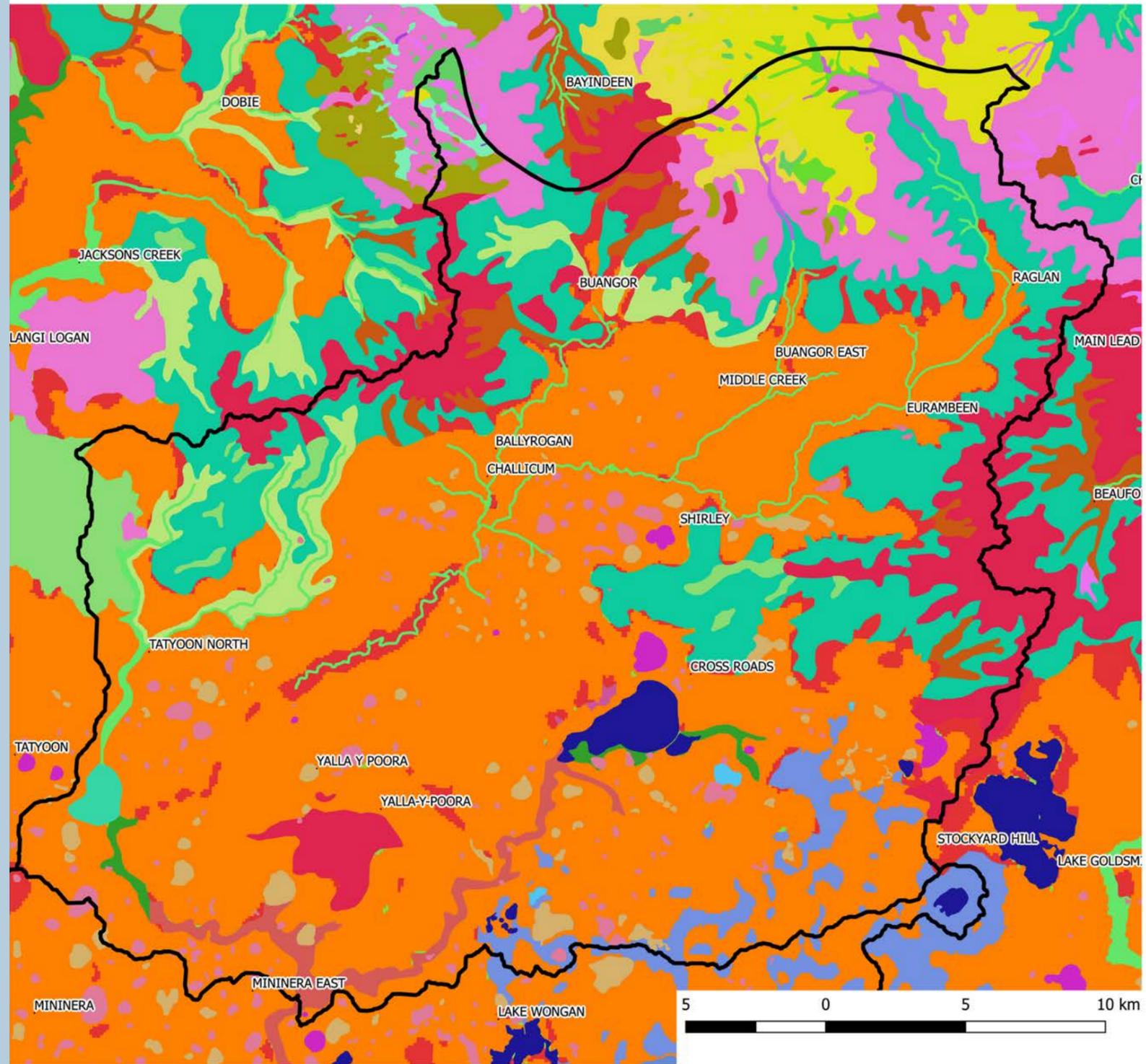
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- Native Vegetation**
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 - Possibly native vegetation
 - Wetland habitat
- Watercourse**
 - BILLY BILLY CREEK
 - CAVE HILL CREEK
 - CHALLICUM CREEK
 - CHARLEYCOMBE CREEK
 - DAIRY MAID CREEK
 - FIERY CREEK
 - MIDDLE CREEK
 - SANDY CREEK
 - WONGAN CREEK

This map shows the estimated modelled extent of vegetation at EVC level prior to European settlement. It is based on field data, environmental spatial data (soils, rainfall, topography etc.) and historical records such as Parish plans. For the H11 H12 sub-catchment, prior to European Settlement, it is believed that there were a total of 56 different EVC's which existed and supported a large variety of plants and animals.



- Pre 1750 Native Vegetation EVC H11
- ▭ Beyond Bolac Catchment Action Area
 - Pre 1750 Native Vegetation EVC
 - Aquatic Herbland/Plains Sedgy Wetland Mosaic
 - Brackish Drainage-line Aggregate
 - Brackish Lake Aggregate
 - Brackish Wetland
 - Creekline Grassy Woodland
 - Creekline Tussock Grassland
 - Floodplain Riparian Woodland
 - Floodplain Riparian Woodland/Plains Grassy Woodland Mosaic
 - Freshwater Lake Aggregate
 - Freshwater Lignum Shrubland
 - Grassy Woodland
 - Grey Clay Drainage-line Aggregate
 - Heathy Dry Forest
 - Lignum-Cane Grass Swamp
 - Plains Grassland
 - Plains Grassland/Plains Grassy Woodland Mosaic
 - Plains Grassland/Stony Knoll Shrubland Mosaic
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Grassy Woodland/Stony Knoll Shrubland Mosaic
 - Plains Sedgy Wetland
 - Plains Sedgy Woodland
 - Plains Swampy Woodland
 - Riparian Woodland
 - Riparian Woodland/Escarpment Shrubland Mosaic
 - Saline Lake Aggregate
 - Scoria Cone Woodland
 - Stony Knoll Shrubland
 - Stony Knoll Shrubland/Plains Grassy Woodland/Plains Grassy Wetland Mosaic
 - Stony Rises Woodland
 - Water Body - Fresh
 - Water body - salt
 - Wetland Formation

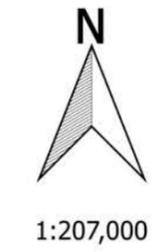
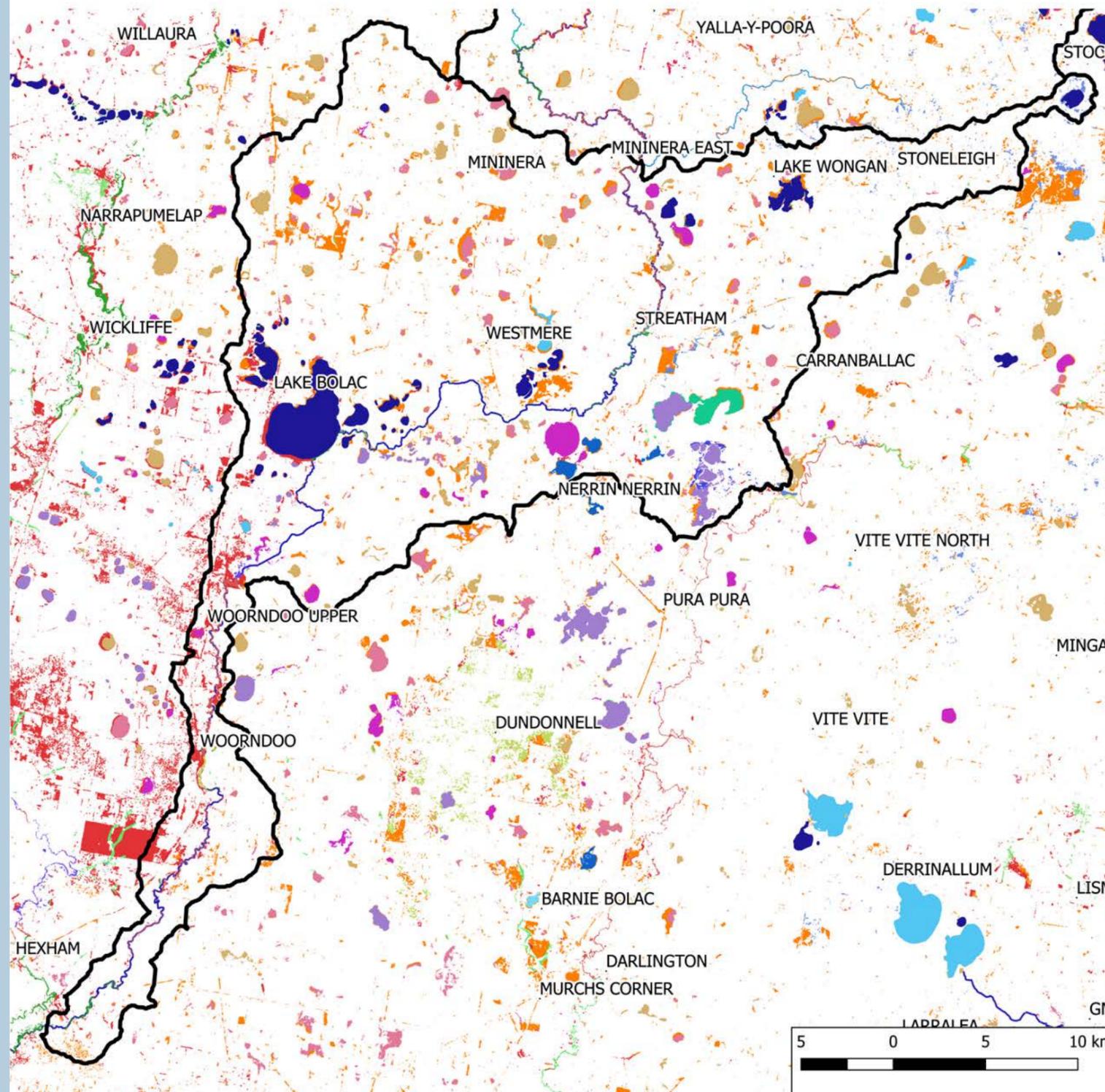
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Pre 1750 Native Vegetation EVC H12

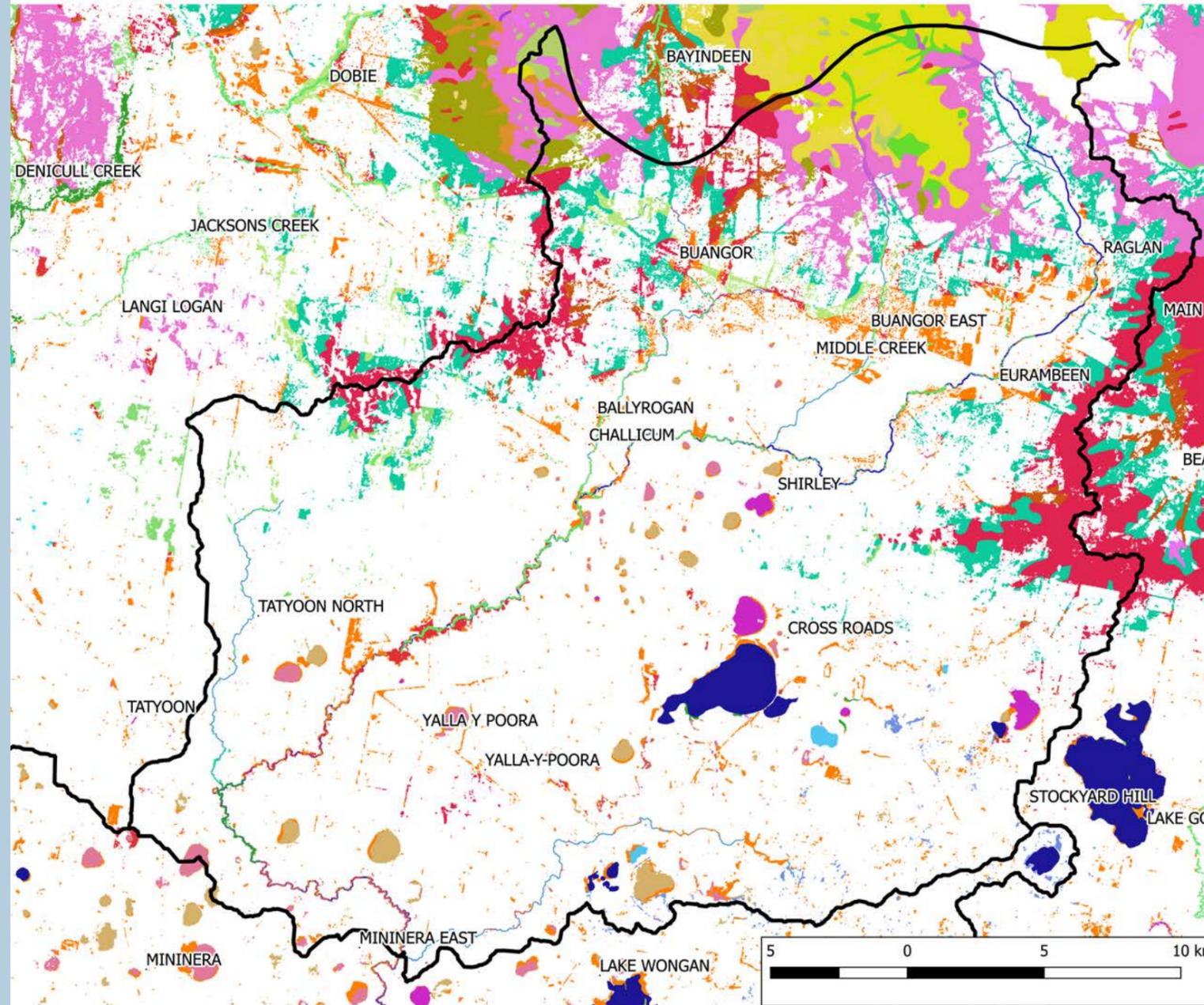
- ▭ Beyond Bolac Catchment Action Area
- Pre 1750 Native Vegetation EVC
- Alluvial Terraces Herb-rich Woodland
- Alluvial Terraces Herb-rich Woodland/Plains Grassy Woodland Complex
- Aquatic Herbland/Plains Sedgy Wetland Mosaic
- Brackish Drainage-line Aggregate
- Creekline Grassy Woodland
- Damp Sands Herb-rich Woodland
- Floodplain Riparian Woodland
- Granitic Hills Woodland
- Grassy Dry Forest
- Grassy Woodland
- Grassy Woodland/Heathy Dry Forest Complex
- Heathy Dry Forest
- Heathy Woodland
- Herb-rich Foothill Forest
- Hills Herb-rich Woodland
- Plains Grassland
- Plains Grassland/Plains Grassy Woodland Mosaic
- Plains Grassy Wetland
- Plains Grassy Woodland
- Plains Sedgy Wetland
- Plains Sedgy Woodland
- Riparian Forest
- Riparian Woodland
- Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic
- Rocky Outcrop Shrubland/Rocky Outcrop Herbland/Grassy Dry Forest Complex
- Seasonally Inundated Shrubby Woodland
- Sedgy Riparian Woodland
- Stony Rises Woodland
- Valley Grassy Forest
- Water Body - Fresh
- Water body - salt
- Wet Forest
- Wetland Formation

This map shows the most current estimated extent of vegetation at EVC level from expert analysis and interpretation of statistical and spatial information undertaken in 2005. This map shows a total of 67 different EVC's existing in 2005.



- 2005 Modelled Native Vegetation EVC H12**
- ▭ Catchment Boundary
 - NV2005_EVCBCS
 - Alluvial Terraces Herb-rich Woodland
 - Alluvial Terraces Herb-rich Woodland/Plains Grassy Woodland Complex
 - Aquatic Herbland/Plains Sedgy Wetland Mosaic
 - Brackish Drainage-line Aggregate
 - Creeklime Grassy Woodland
 - Damp Sands Herb-rich Woodland
 - Floodplain Riparian Woodland
 - Granitic Hills Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Grassy Woodland/Heathy Dry Forest Complex
 - Heathy Dry Forest
 - Heathy Woodland
 - Herb-rich Foothill Forest
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassland/Plains Grassy Woodland Mosaic
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Plains Sedgy Woodland
 - Riparian Forest
 - Riparian Woodland
 - Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic
 - Rocky Outcrop Shrubland/Rocky Outcrop Herbland/Grassy Dry Forest Complex
 - Seasonally Inundated Shrubby Woodland
 - Sedgy Riparian Woodland
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 - Valley Grassy Forest
 - Water Body - Fresh
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 - Wet Forest
 - Wetland Formation
 - Watercourse
 - BILLY BILLY CREEK
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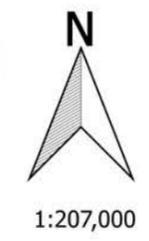
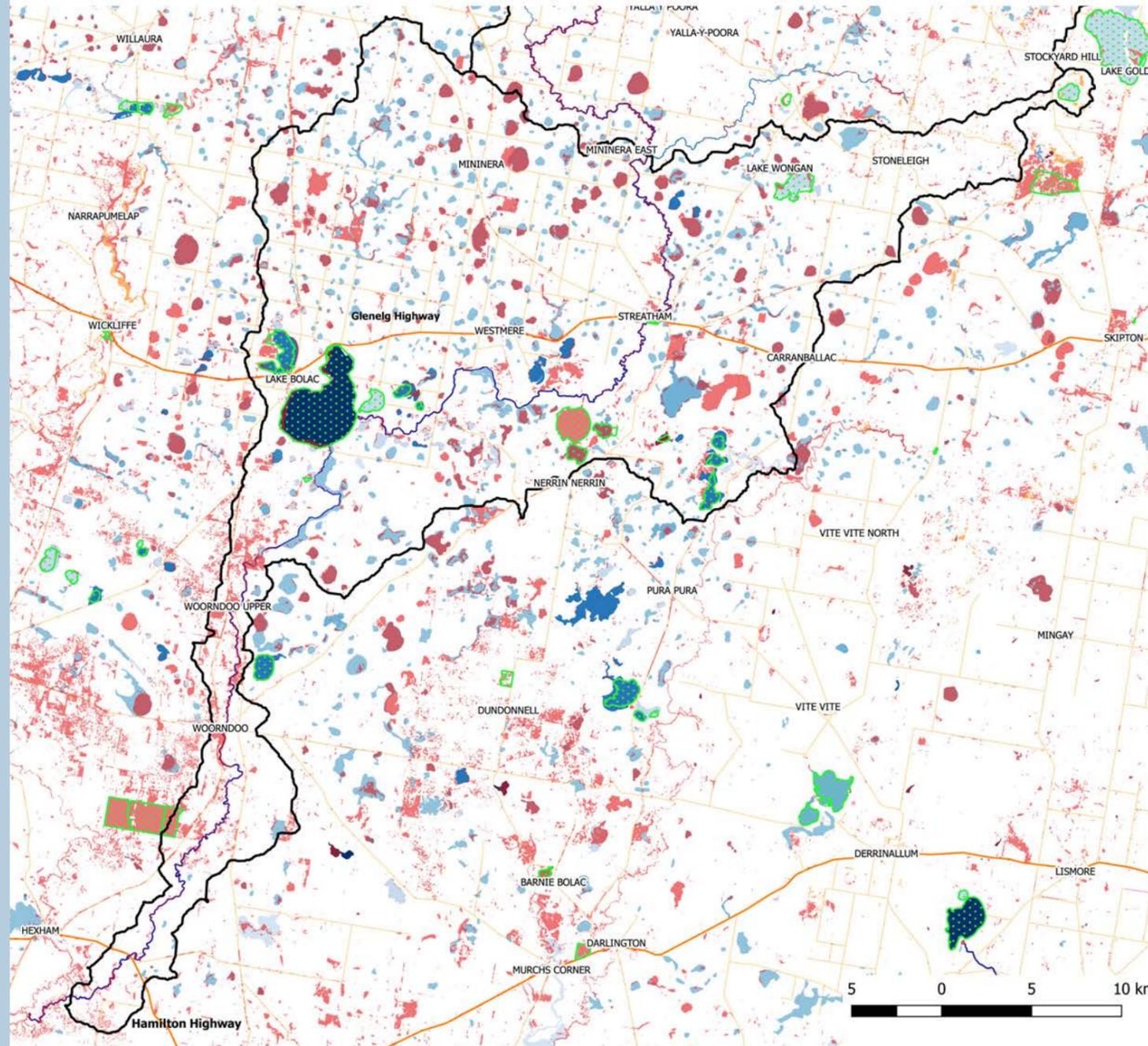
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- Heathy Woodland
- Herb-rich Foothill Forest
- Hills Herb-rich Woodland
- Plains Grassland
- Plains Grassland/Plains Grassy Woodland Mosaic
- Plains Grassy Wetland
- Plains Grassy Woodland
- Plains Sedgy Wetland
- Plains Sedgy Woodland
- Riparian Forest
- Riparian Woodland
- Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic
- Rocky Outcrop Shrubland/Rocky Outcrop Herbland/Grassy Dry Forest Complex
- Seasonally Inundated Shrubby Woodland
- Sedgy Riparian Woodland
- Stony Rises Woodland
- Valley Grassy Forest
- Water Body - Fresh
- Water body - salt
- Wet Forest
- Wetland Formation
- Watercourse**
- BILLY BILLY CREEK
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- CHARLEYCOMBE CREEK
- DAIRY MAID CREEK
- DITCHFIELD CREEK
- FIERY CREEK
- MIDDLE CREEK
- SANDY CREEK
- WONGAN CREEK

This map shows the Bioregional Conservation status of the EVC's which currently exist across the catchment. The combination of EVC and bioregion is used to determine the bioregional conservation status (BCS) of an EVC. This is a measure of the current extent and quality for each EVC, when compared to it's original (pre-1750) extent and condition. Each EVC is categorised as either being endangered, vulnerable or depleted.

This map is derived from a combination of the Victorian bioregions, pre-1750 EVCs, native vegetation extent and the vegetation quality datasets from the Victorian Government. Throughout the H11 sub-catchment, all the EVC's present have been classed as endangered or vulnerable, in the far north of H12 sub catchment there are some large areas of depleted EVC's.

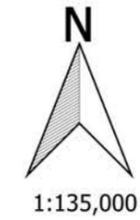
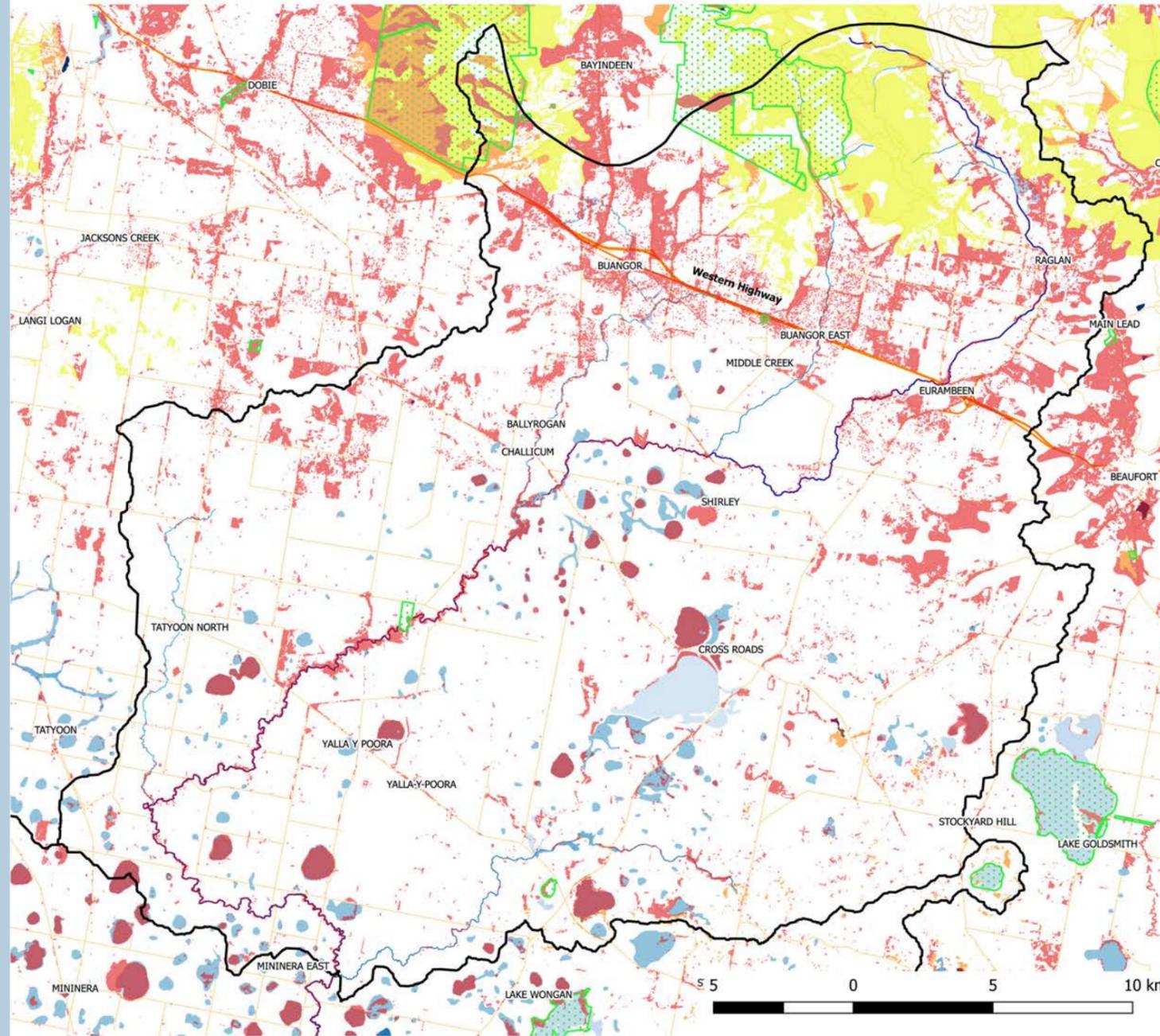


2005 EVC Bioregional Conservation Significance H11

- Beyond Bolac Catchment Action Group Area
- ▨ Parks or Reserves
- NV2005_EVCBCS
- Endangered
- Vulnerable
- Wetland
- Permanent freshwater lake
- Permanent freshwater mar
- Permanent freshwater swamp
- Permanent saline lake
- Permanent saline marsh
- Permanent saline swamp
- Temporary freshwater lake
- Temporary freshwater mar
- Temporary freshwater swamp
- Temporary saline lake
- Temporary saline marsh
- Temporary saline swamp
- Watercourse
- CHALLICUM CREEK
- FIERY CREEK
- SALT CREEK
- WONGAN CREEK
- Road
- HIGHWAY
- ROAD

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2005 EVC Bioregional Conservation Significance H12

- Beyond Bolac Catchment Action Group Area
- Parks or Reserves
- NV2005_EVCBCS
 - Endangered
 - Vulnerable
 - Depleted
- Wetland
 - Permanent freshwater lake
 - Permanent freshwater swamp
 - Permanent saline lake
 - Temporary freshwater lake
 - Temporary freshwater mar
 - Temporary freshwater swamp
 - Temporary saline lake
 - Temporary saline marsh
 - Temporary saline swamp
- Watercourse
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 - CHARLEYCOMBE CREEK
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 - DITCHFIELD CREEK
 - FIERY CREEK
 - MIDDLE CREEK
 - SANDY CREEK
 - WONGAN CREEK
- Road
 - HIGHWAY
 - ROAD