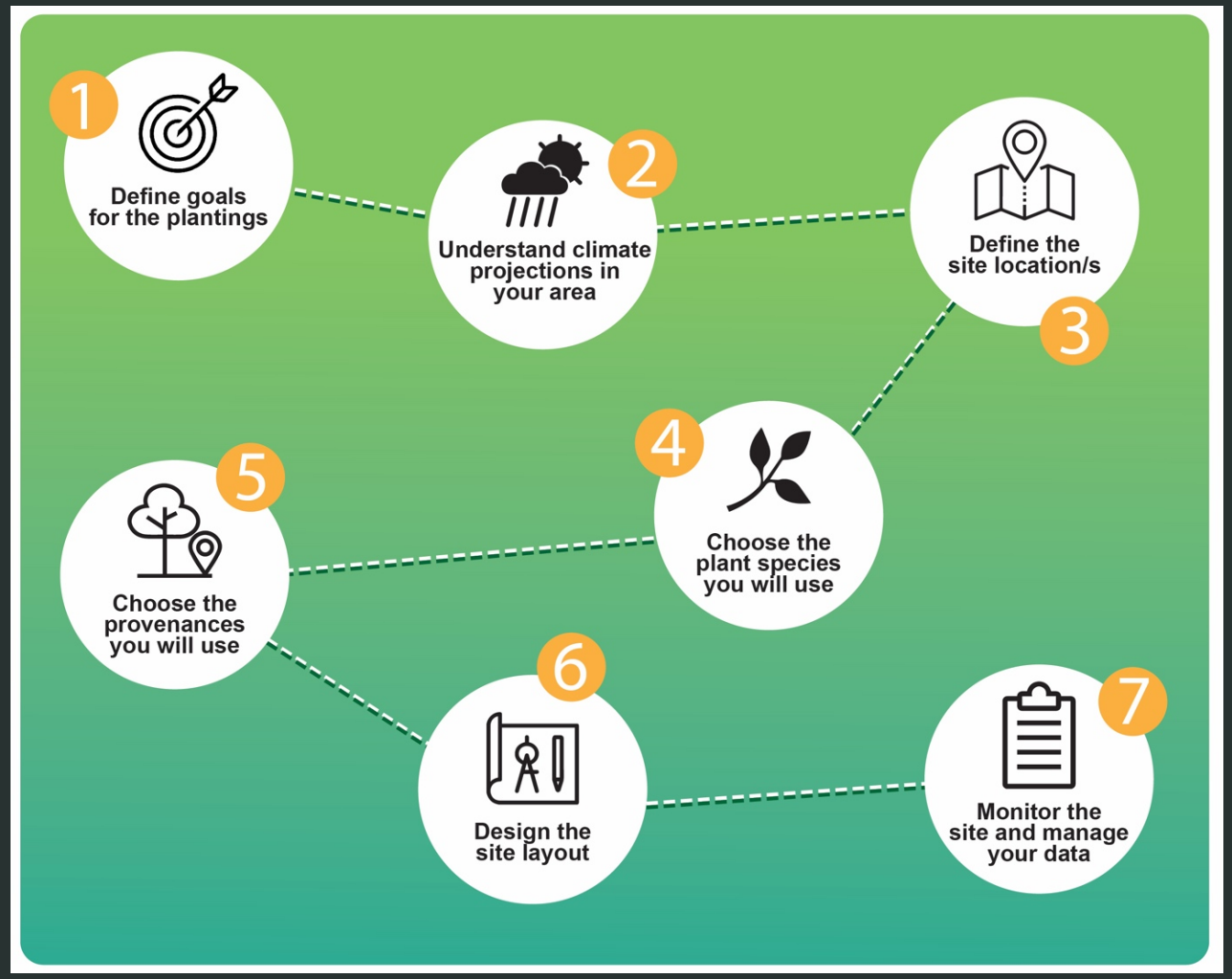
Establishing Victoria's Ecological Infrastructure: Guidelines for Building Climate Future Plots



A 7-step process for organisations and community groups to plan, establish and monitor Climate Future Plots

Establishing Victoria's Ecological Infrastructure: Guidelines for Building Climate Future Plots

1. Define goals for the plantings

Why do you want to create Climate Future Plots?

Revegetate using new plant genetics to restore a cleared or fragmented landscape

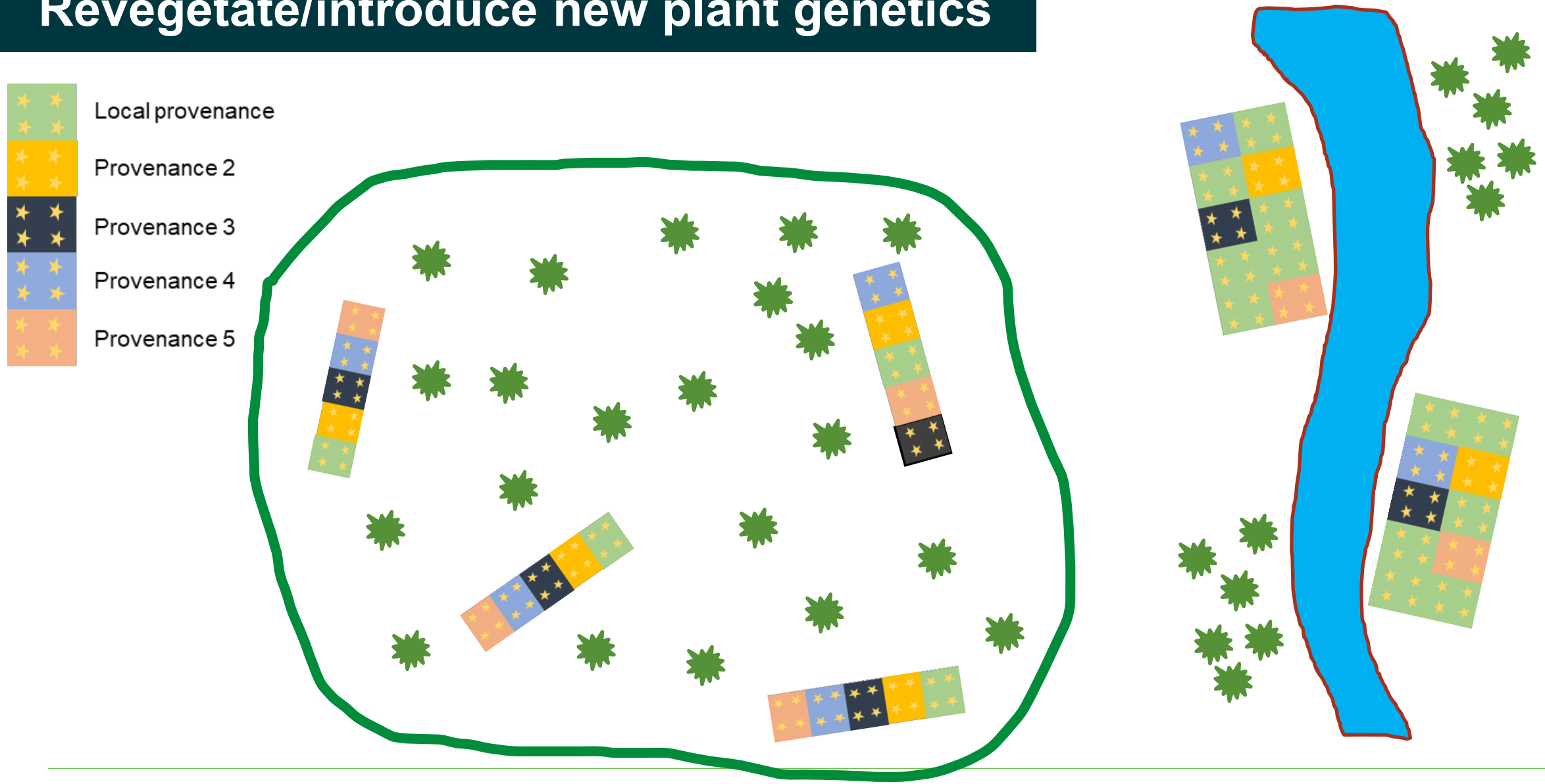
Goal: To increase the area of climate resilient habitat by planting a variety of species from local areas plus climate adjusted provenances (range of locations that are currently similar to predicted future climates)

Introduce new plant genetics into remnant vegetation to future proof it from the changing climate

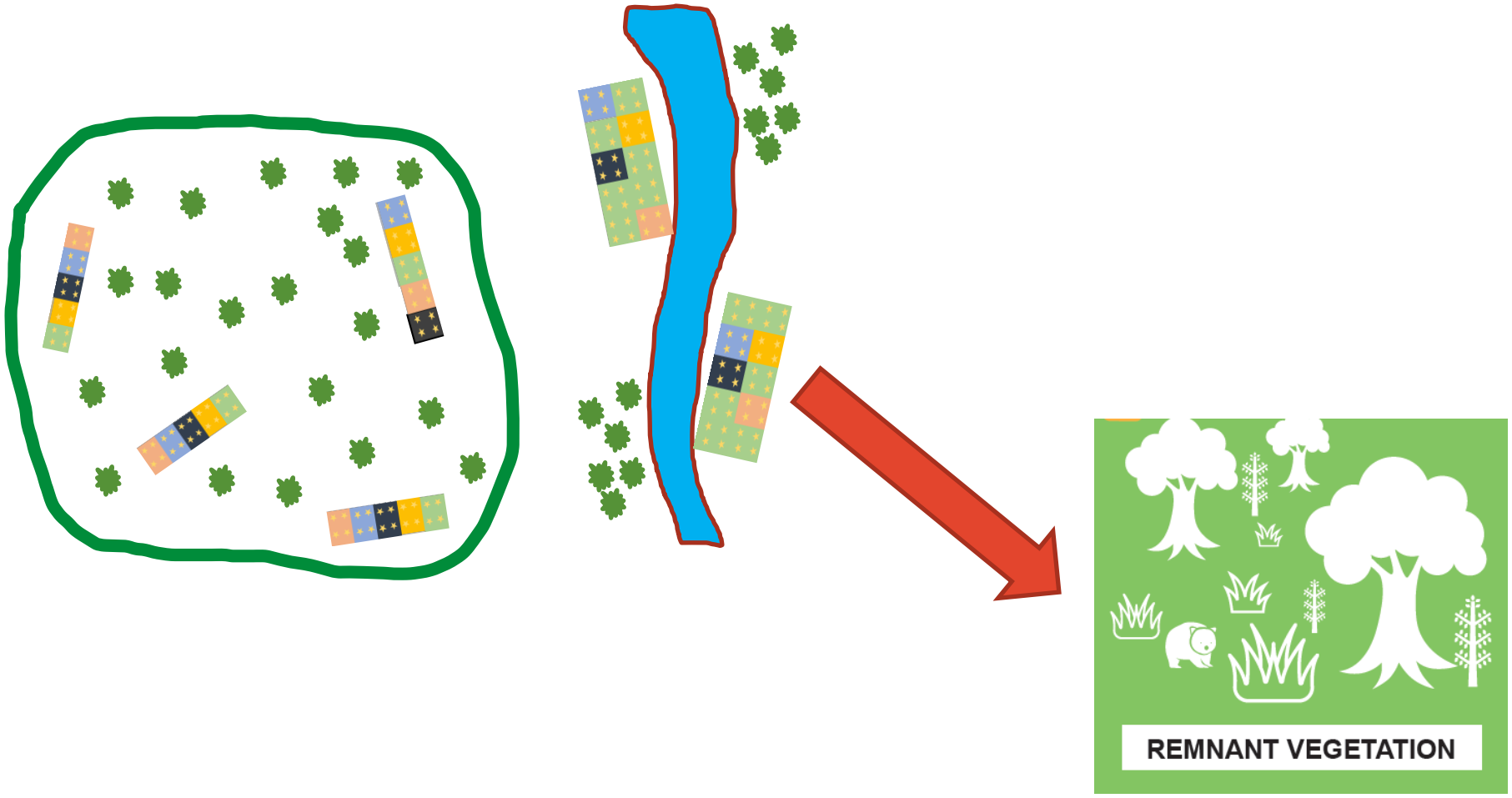
Goal: To make existing vegetation (potentially within reserves and/or national parks) more resilient to climate change by enhancing gene flow into these areas from planted sites.

- This should be undertaken within a genetic risk management framework that incorporates taxonomic, biological, geographic and planting variables (Byrne et al 2011)

Revegetate/introduce new plant genetics



Revegetate/introduce new plant genetics



Produce ‘climate ready’ seeds from an area designed to be a seed production area (SPA)

Appendix 5 in Guidelines page

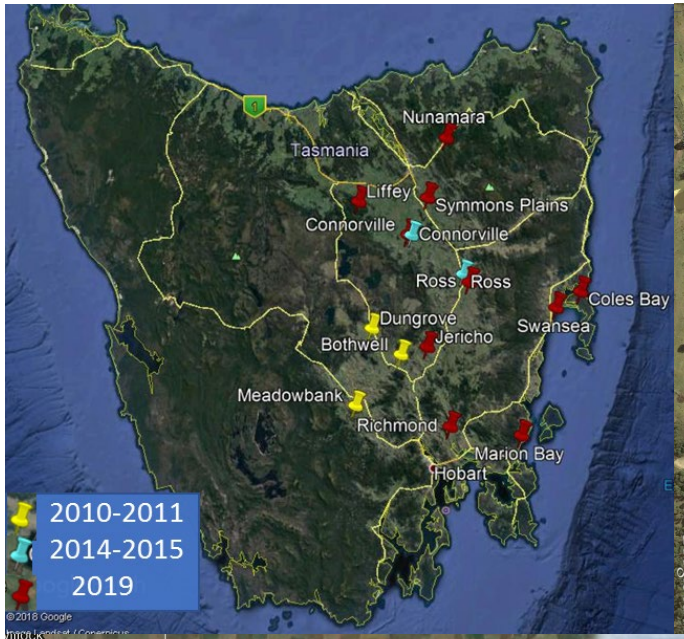
Goal: To establish nursery sites where climate adapted seed can be grown and collected

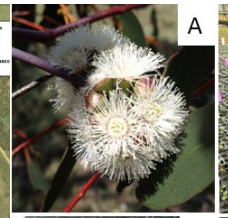
- See Appendix 5 in the guidelines for a list of potential climate effects on seed availability/viability

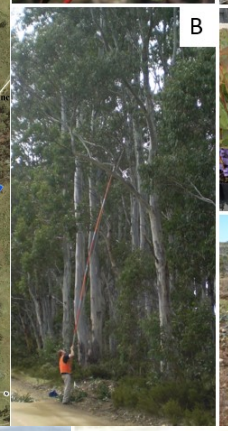
Research how plant survival, growth, reproduction, genetics change over time and between provenances and species

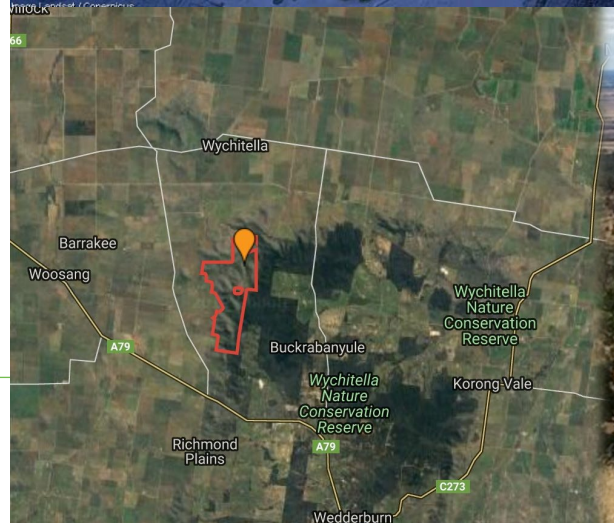
Goal: to undertake research activities in an experimental setting

➢ Examples in:
- Tasmania with 15 sites with 50+ provenance & species trials UTAS/GA
- NE Victoria – Nardoo Hills site Bush Heritage Australia & Greenfleet 2019









Greening Australia

Things to consider

Budget: Different plot types require different levels of investment and expertise

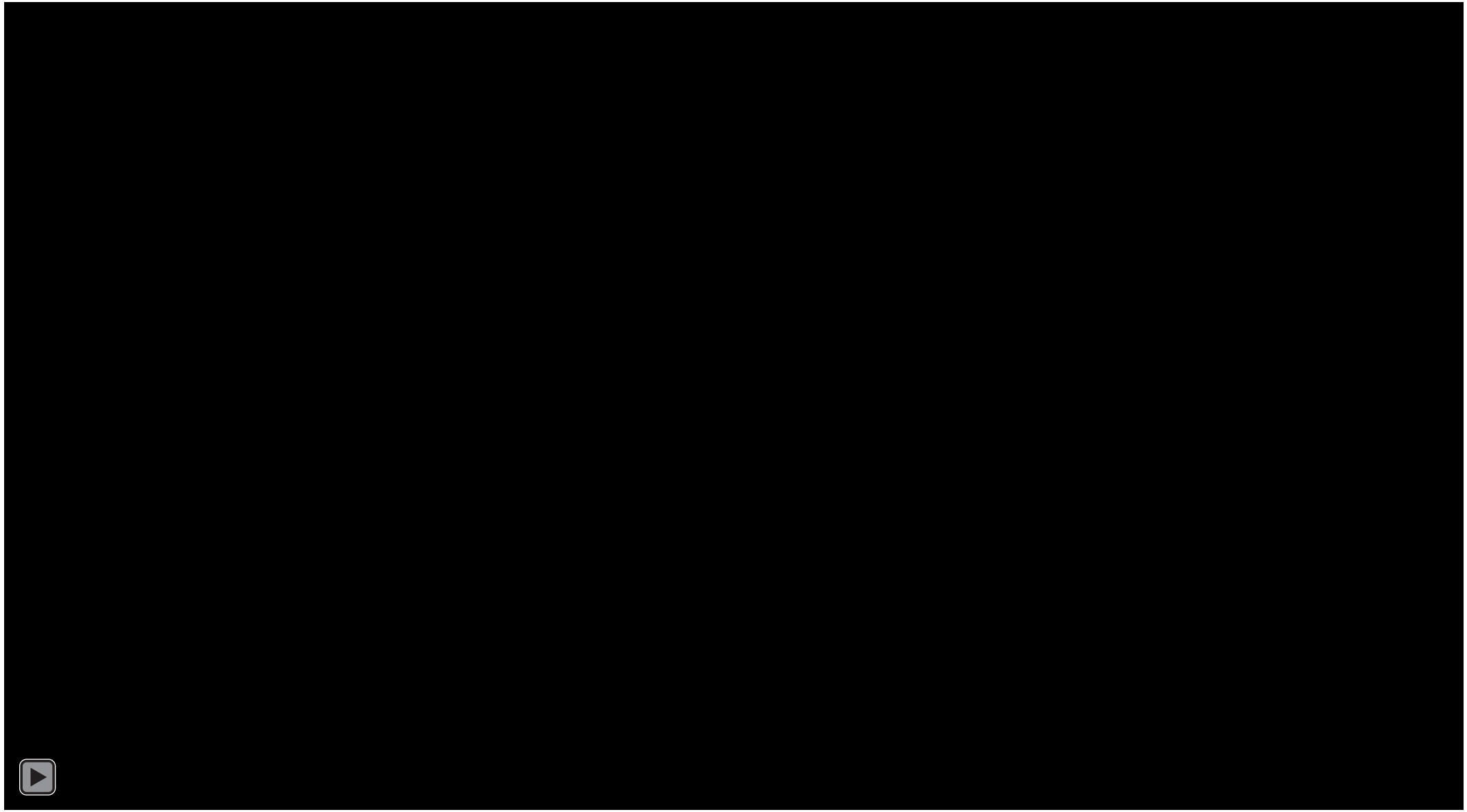
Time and effort required: different levels of monitoring and management expertise

Legislative issues: detailed assessments are required in reserves and parks

2. Understand climate projections in your area

Climate Analogues

- “Areas that experience similar climatic conditions, but which may be separated in space or time (that is, with past or future climates)” [7].
- To define climate analogues, you need to locate areas in Australia where the current climate is similar to the projected future climate at your site.
- If you know how the climate may change, you will be able to choose locations that have similar climate variables now in order to source appropriate plant genetics.
- CSIRO *Climate Change in Australia* provides a tool called ‘Analogues Explorer’



Steps to identify climate analogues

Box 1 in Guidelines page 14

1. Go to *Climate Change in Australia* website – 'Projections and Data' tab and select the 'Climate Analogues' tool www.climatechangeinaustralia.gov.au/en/climate-projections/climate-analogues/analogues-explorer
2. Open the 'Select Locality' tab and choose your location (or the nearest town to your location).
3. In the 'Preset Scenarios' section, under 'Emissions Scenario' choose *RCP 8.5*. Under 'Description' choose *Maximum Consensus*.
4. To determine what your *Intermediate* seed provenances will be, in 'Time Period' choose 2050. For *Long Distance* provenances, choose 2090.
5. Look at the 'Configure Data' to see what the temperature and rainfall change will be.
6. Look in the 'Analogue Towns' box to identify your analogue town/s.

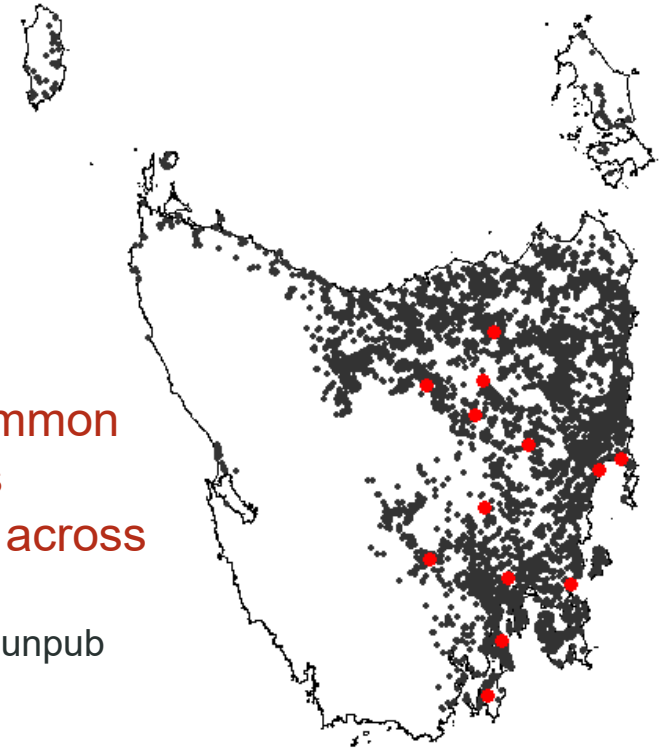
3. Define the site location/s

Where to establish plots?

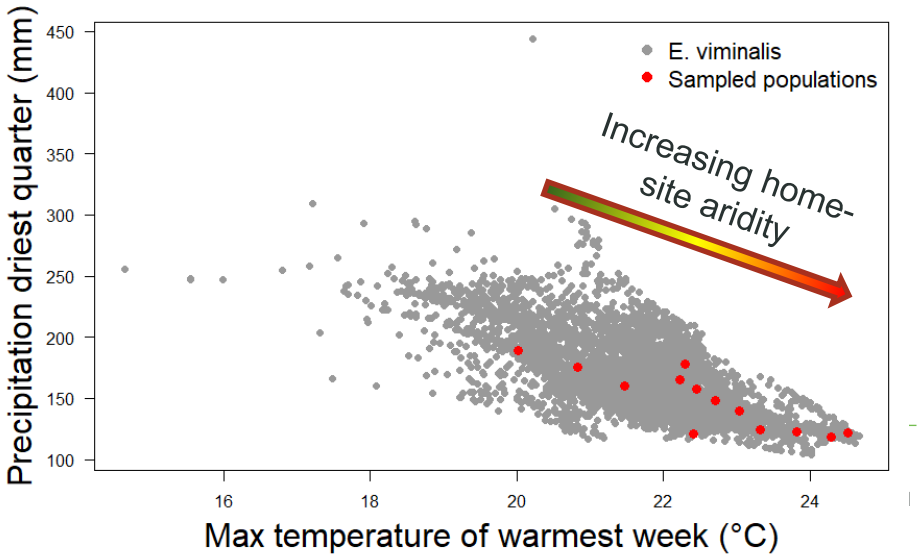
Eucalyptus viminalis

Depends on goals, scale and questions being asked:

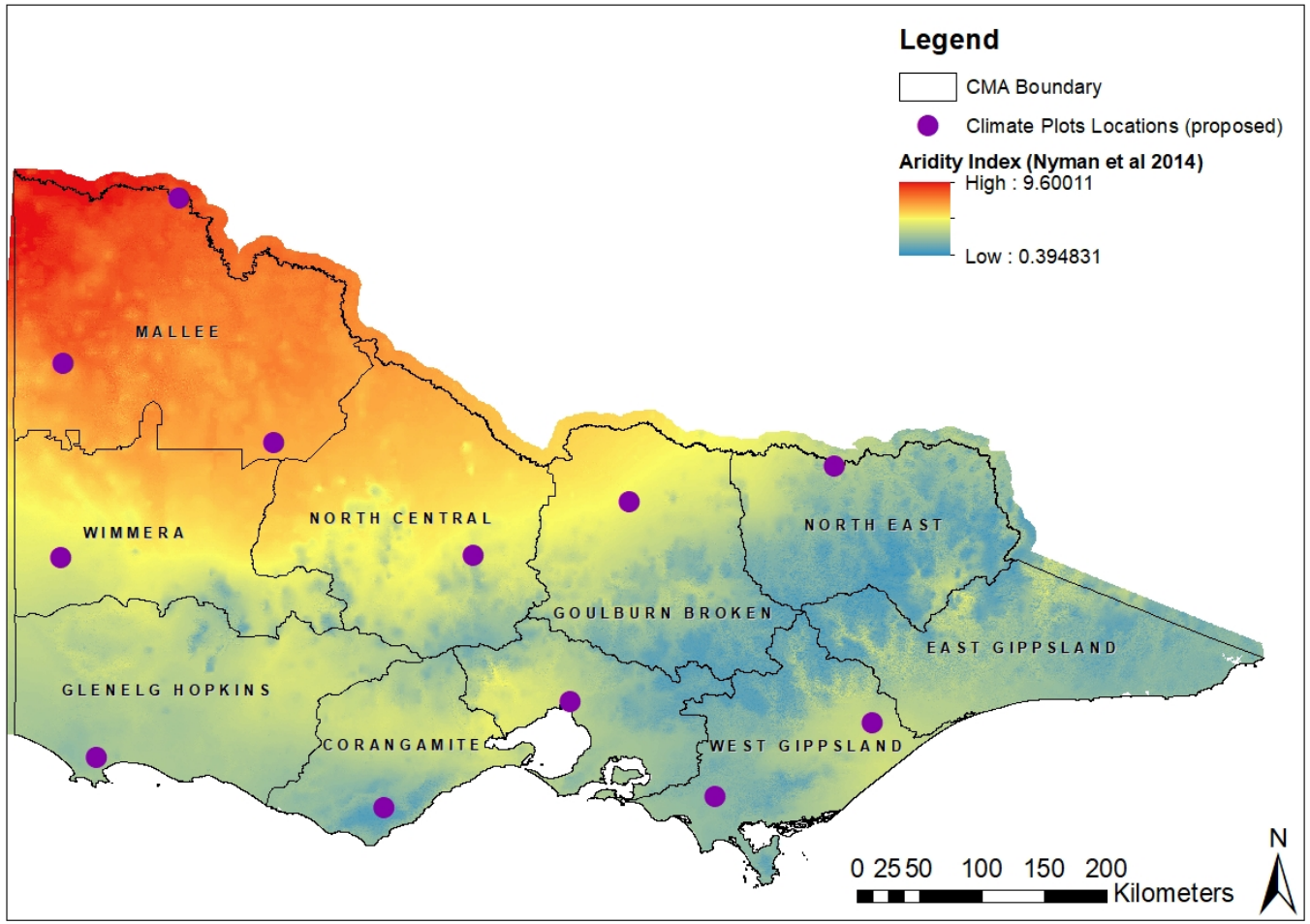
- Single revegetation site – local questions
- Multiple sites across a physical gradient (e.g alpine) – local to regional scales
- Reciprocal plantings across a climate gradient with genetic material from multiple locations planted back into each of the same locations – local, regional and larger scale understanding of genetic/environment interactions



11 reciprocal common garden trial sites
13 provenances across distribution
Harrison *et al* (2019) unpub



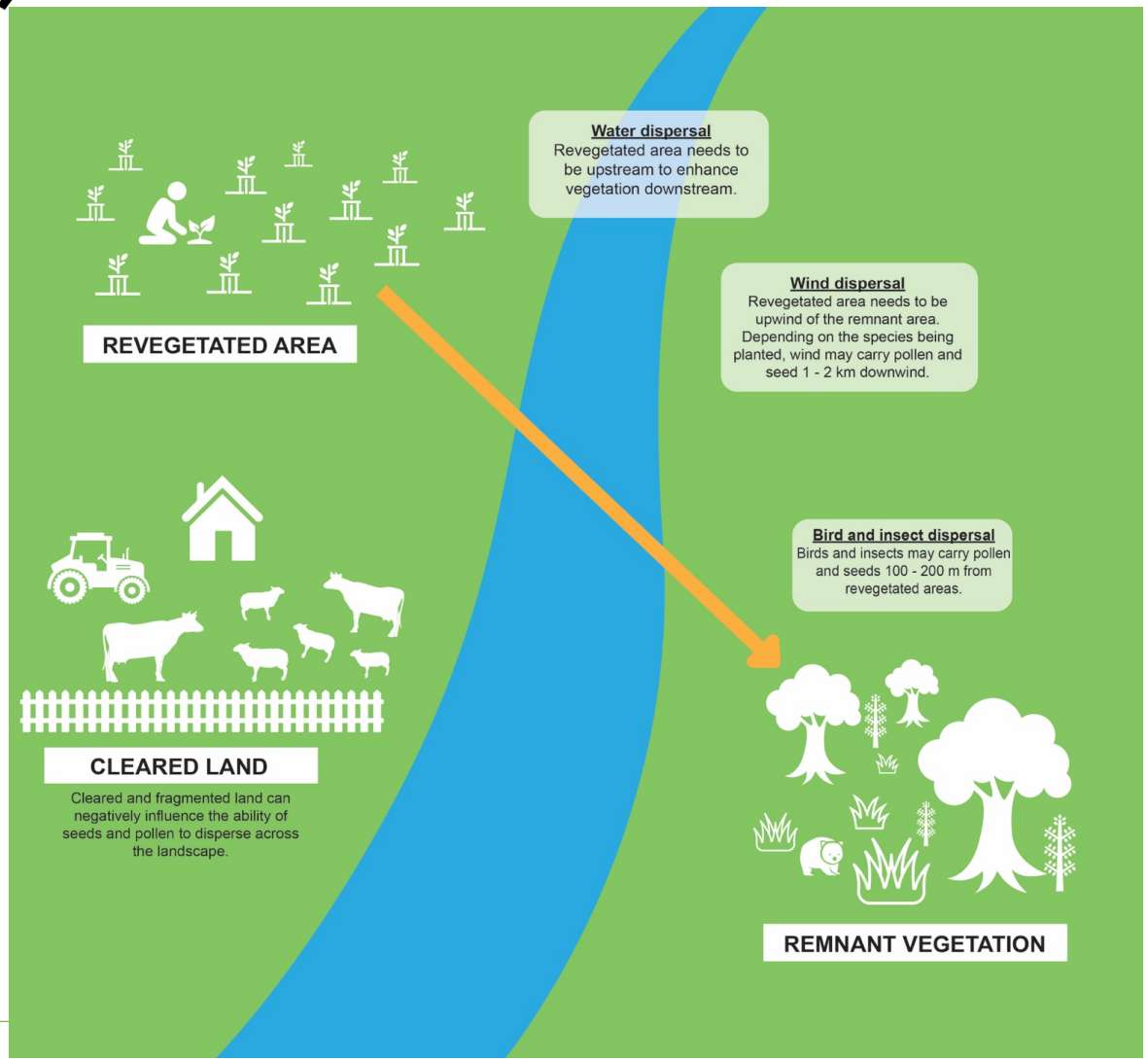
Climate Futures Plots Network



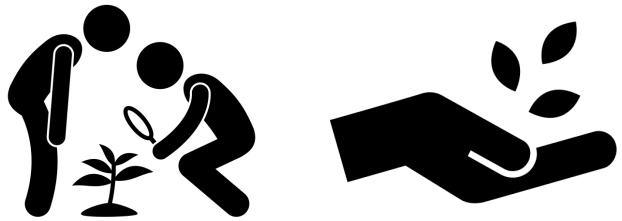
Gene flow enhancement

If you wish to facilitate gene flow between your plot and nearby remnant vegetation (seed and pollen dispersal)

- Position your plot within 100 m to 1 km of remnant vegetation and ensure you are planting some of the same species as those in the remnant area
- Ideal distance will depend on planted species
- Consider the seed dispersal distance and pollinators

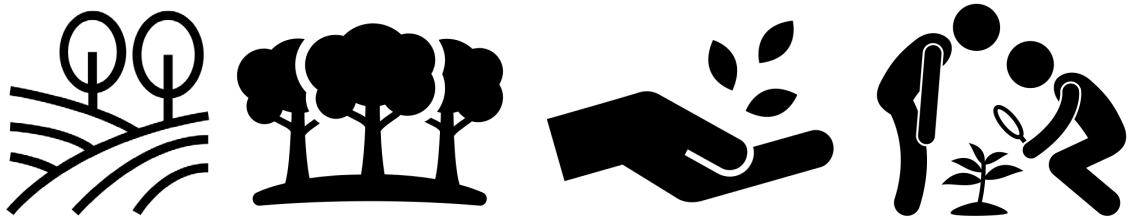


Research and seed production



- Ideally, position your plot at least 1 to 2 km away from remnant habitats (if your plots are likely to include the same plant species as the nearby remnants).
- ➢ Reduces the effect existing plants will have on your research/seed production area.
- Consider if the local species are likely to cross with the species in your research plot.
- If plots will not be isolated, undertake a genetic risk assessment (e.g. Byrne et al 2011)

Land protection and management



- Seek written, ideally legally binding, documentation to ensure site lasts at least 20 to 30 years, preferably 50+ years, especially if to be used as a research plot/SPA.

It is important to document:

- Who the agreement is with, such as the landowner and managing organisation
- Who has access to the site and who manages site access
- Who will be responsible for restoration and maintenance activities