

A black and yellow bird, possibly a species of honeyeater, is perched on a tree branch. The bird has a black head and neck, a yellow breast, and black and white patterned wings and tail. The background is a blurred natural setting with tree trunks and foliage.

Effective restoration: a decade of trying

Christopher Ewing
Manager, Restoration Programs

TARONGA 
Habitat
Positive



A decade of trying

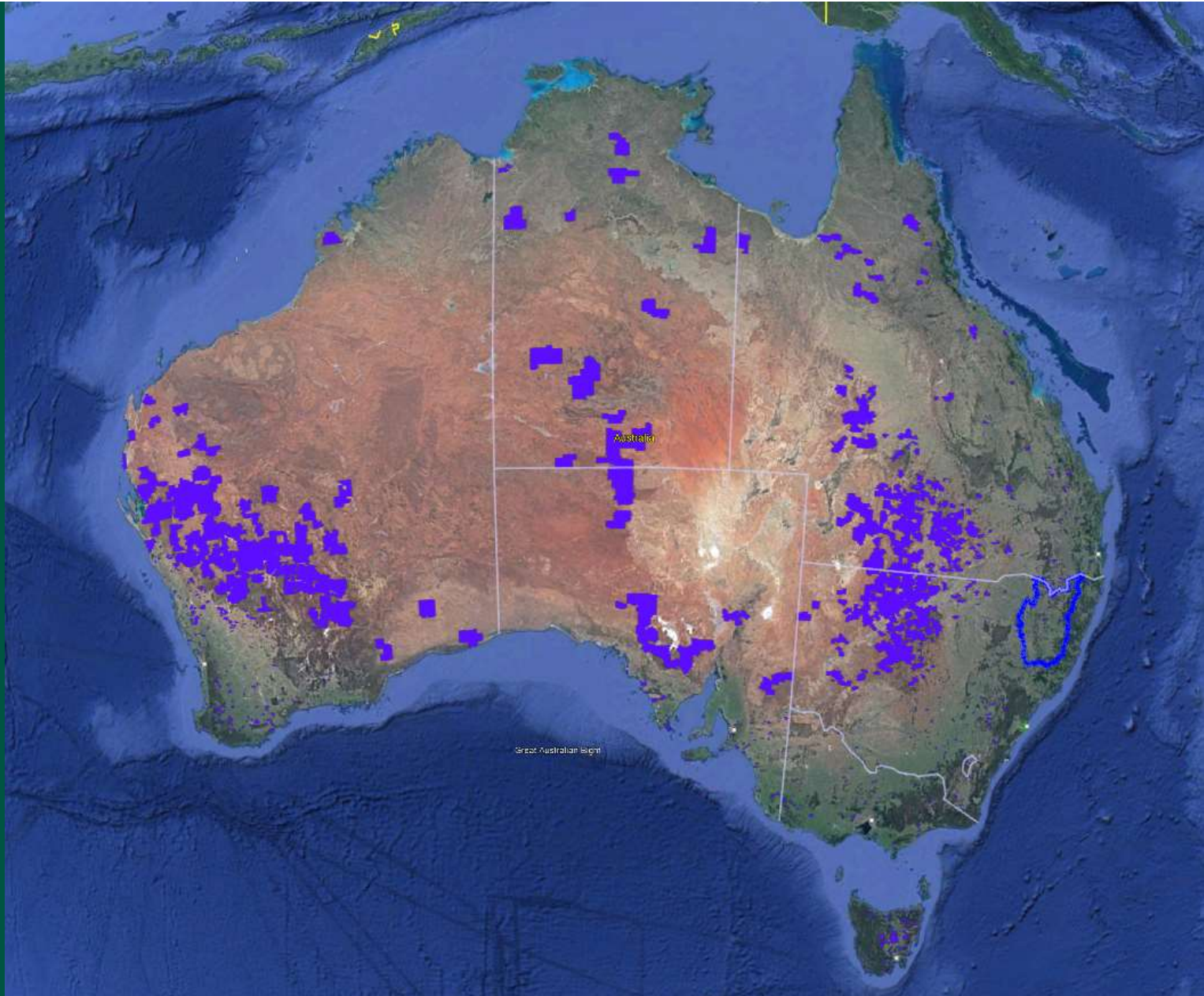
Scale?	What Projects?	Where?	With Who?	Monitoring & Adaptive Management?	Third Party Verification?
>10,000 ha	Biodiversity offsets, carbon projects, community revegetation and habitat restoration, private land conservation	East coast woodlands and forests from central Queensland to Victoria	Government, energy and resources sector, linear infrastructure, not for profits, traditional owners, community projects under various State and Commonwealth legislation and programs	Yes, each with unique management, monitoring, reporting requirements, multi decade commitments with annual quantitative monitoring (biocondition, BAM)	Yes, independent compliance audits, Accounting for Nature, government post approval teams, carbon market compliance (scheme and buyer due diligence)

What is effective restoration?

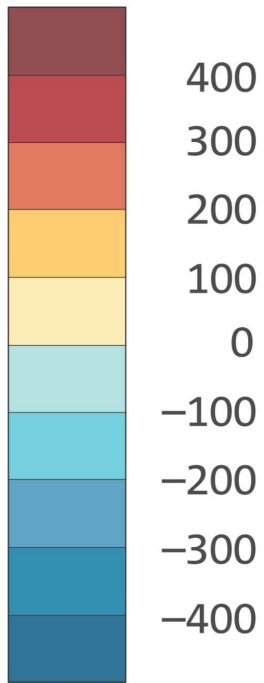
- Depends on viewpoint
- Balancing all interests
- Setting realistic expectations
- Undertaking practical actions
- Measuring the right things



Effective restoration considers climate change

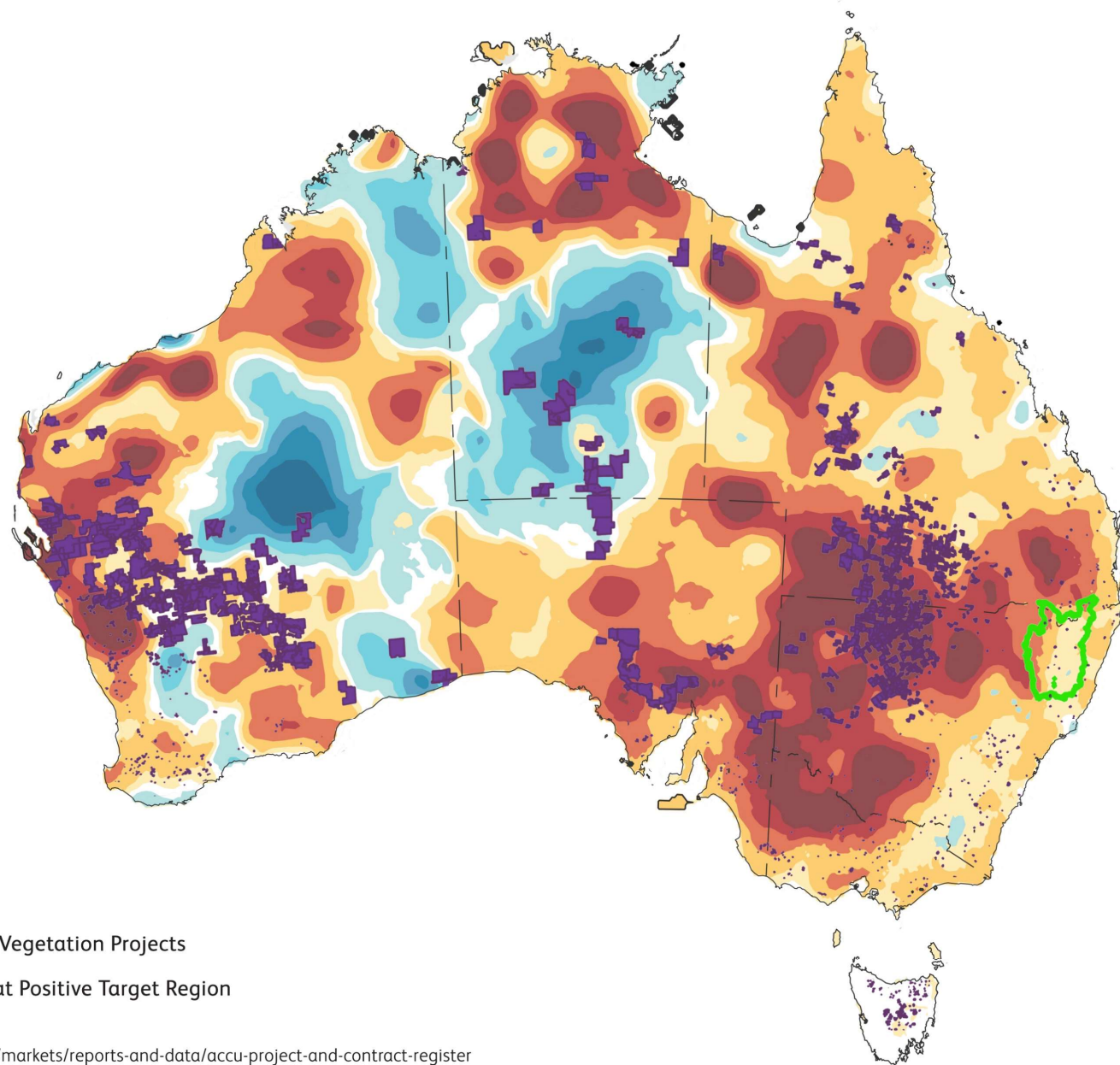
- Historically investment flows down path of least resistance
- Changing climate will mean many of those areas are likely to face big changes



Forest Fire Danger Index points/decade



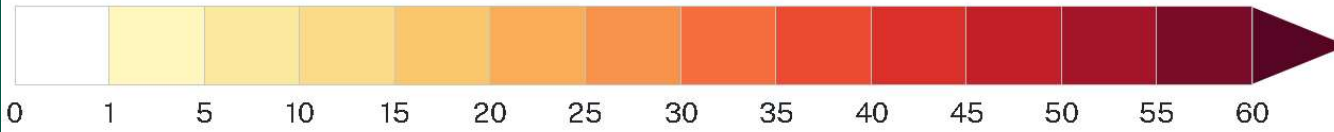
-  ACCU Scheme Vegetation Projects
-  Taronga Habitat Positive Target Region



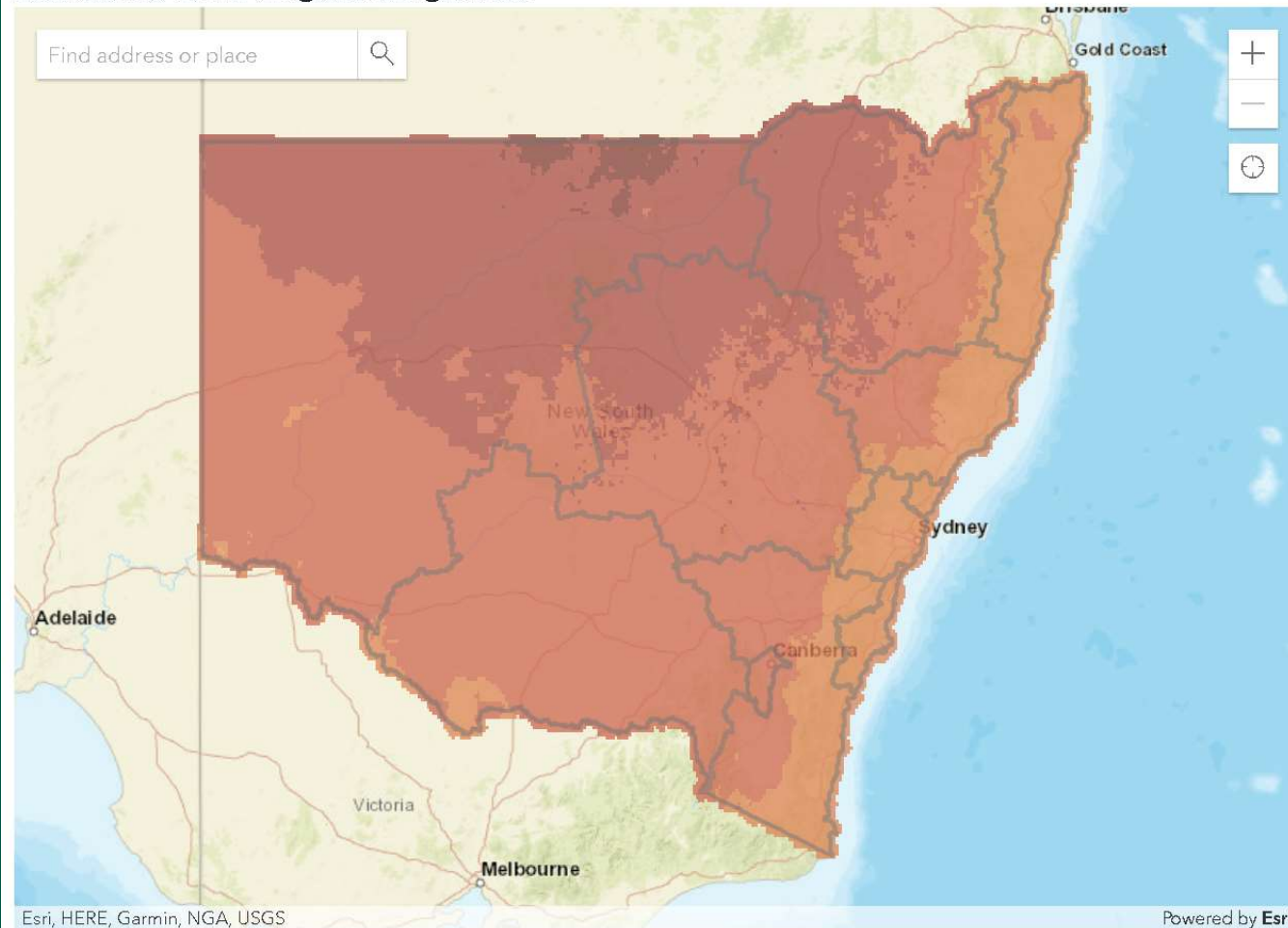
Source: cer.gov.au/markets/reports-and-data/accu-project-and-contract-register

Source: Bureau of Meteorology

Change in number of hot days (days where maximum temperature is 35°C or above)



The interactive climate projections map displays projected changes to NARCLiM2.0 climate variables across NSW and the ACT in a regional and grid view.



Annual Change
Annual
+38.6

11
common
eucalypt
woodland
species



selected as target
species to restore



Future climate
matched

source areas identified
(climate-ready
provenance)



1812 leaf
samples
collected

from the 11 target
species across 332
sites



110 011
1101 1011
11010 01011

DArTseq

DNA extraction,
sequencing and
dataset construction

Taxonomic and
distributional
boundaries
tested

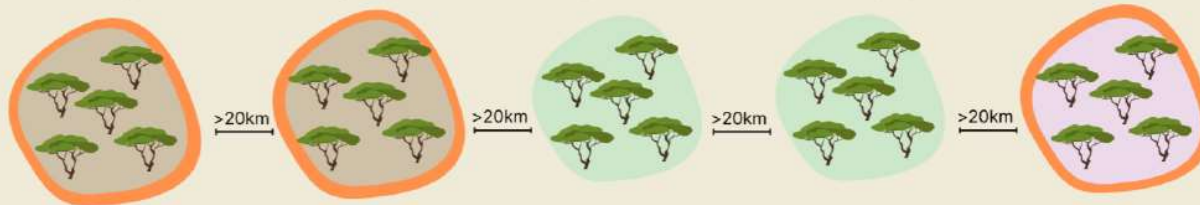
Misidentifications and
hybrids removed from
dataset

Population
genetic analysis

Genetic
neighbourhoods
identified and levels of
genetic diversity and
inbreeding estimated

Seed sourcing guidelines developed

that capture 90% of genetic diversity and **climate-ready provenances**.



10 steps to genetically diverse resilient restoration

- 1 Note refined species boundaries and distributions
- 2 Source seed from same genetic neighbourhood as target region/site
- 3 Minimise the risk of collecting hybrid seed or inbred seed
- 4 Avoid hybridisation in plantings
- 5 Sample sufficient seed lines to capture genetic diversity
- 6 Source climate suitable material
- 7 Maintain separate maternal lines
- 8 Mix species-specific seed lines in plantings to maximise interbreeding
- 9 Audit genetic diversity and representativeness of seed
- 10 Monitor ongoing genetic diversity and success of plantings

Effective restoration...

- is pragmatic
 - Realistic goals
 - Enduring Increases landscape carrying capacity for threatened species and ecosystems
 - Uses all the tools in the toolkit
- focuses on people
 - Surround yourself with good people
 - Accepted by community (ideally valued)
 - First Nations People



Thank you!