Australian Government

Commonwealth Environmental Water Office

MURRAY–DARLING BASIN AUTHORITY

Australian National Aquatic Ecosystems of the Murray-Darling Basin

Version 3.0 release party

Shane Brooks

BROOKS.eco ECOLOGY & TECHNOLOGY

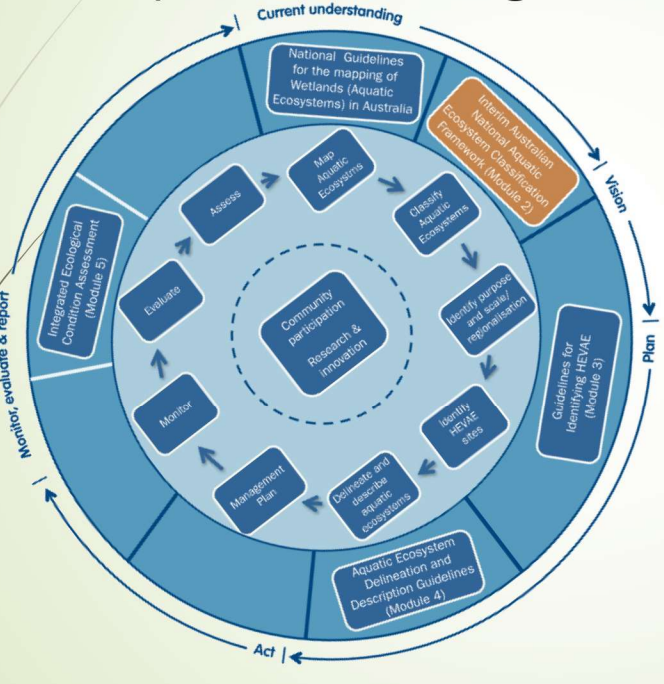
Today…

- Brief history - What is this ANAE thing?
- Version 3 Update
- Tour of the Basin
- Supporting environmental water management
- Synergies with jurisdiction wetland data and Geofabric
  (climbing outside of the box)
- Endless possibilities
- Nuts, bolts, access and instructions

Au Government and States working together under the National Water Initiative

- once the Wetlands and Waterbirds Taskforce
- then the Aquatic Ecosystems Task Group
- now the Wetlands and Aquatic Ecosystems Sub Committee

Improve consistency for cross-jurisdiction adaptive management



Acknowledgements

2013 Interim Classification (2012-2014)

- Peter Cottingham, Rhonda Butcher, Jennifer Hale, Shane Brooks,
- Working Group
  - MDBA, CEWO
  - State reps from SA, NSW, QLD, Vic

2017 Update

- Shane Brooks, Jennifer Hale, Stephen Wealands
- Working Group
  - MDBA, CEWO
  - State reps from SA, NSW, QLD, Vic

MURRAY–DARLING BASIN AUTHORITY

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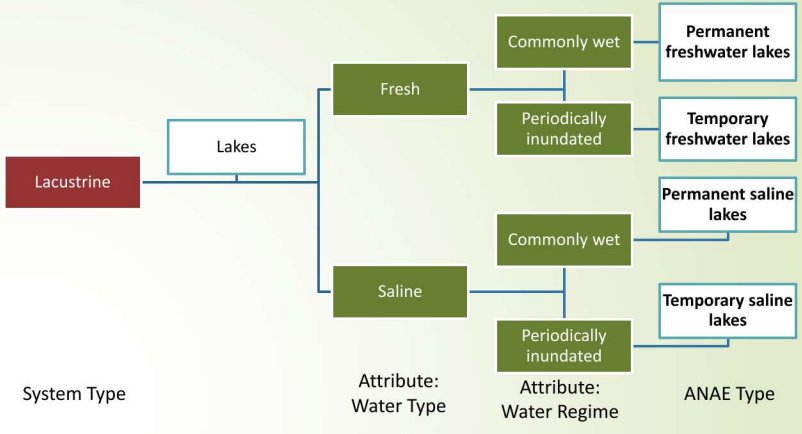
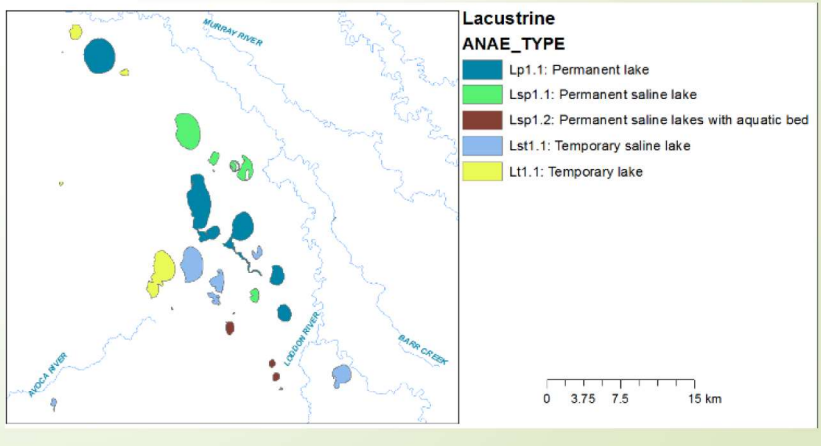
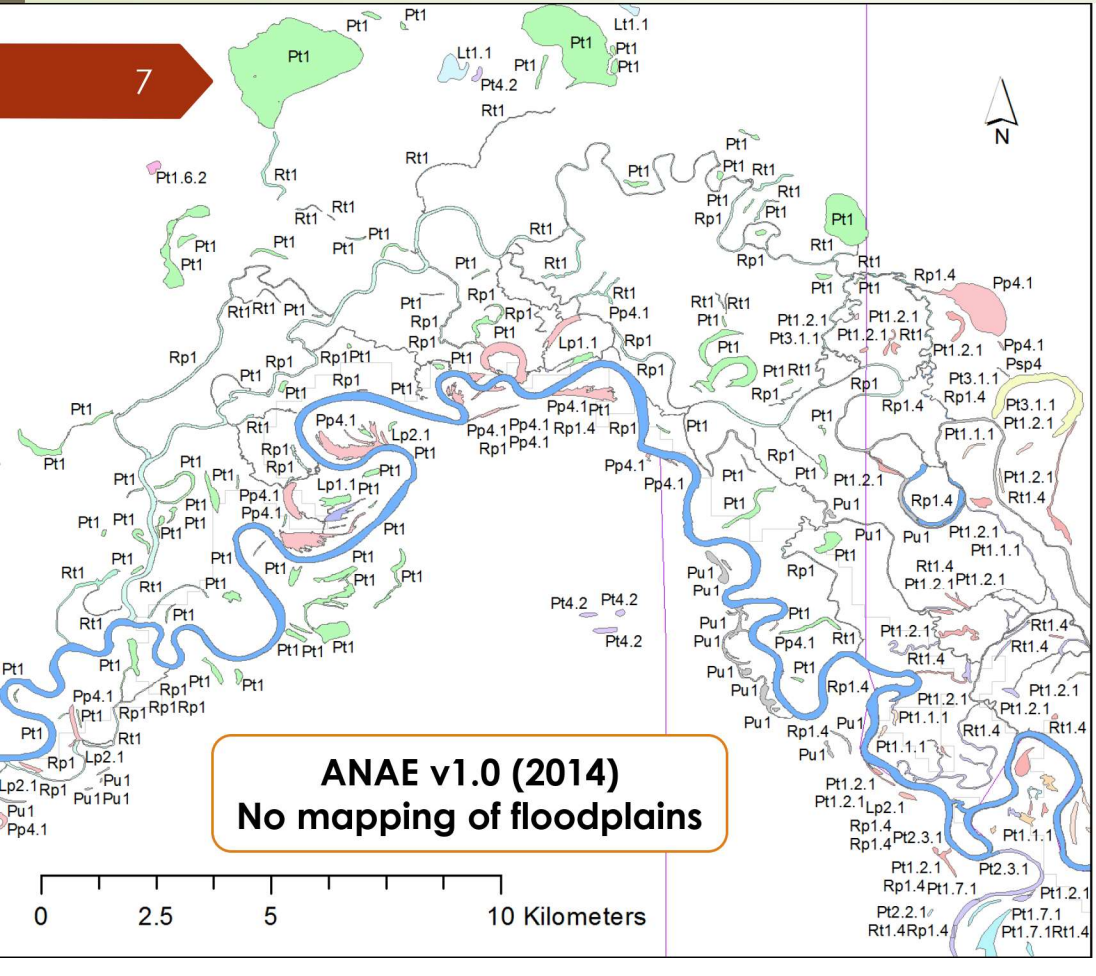
ANAE

ANAE structure										
LEVEL 1	Regional scale (Attributes: hydrology, climate, landform)									
LEVEL 2	Landscape scale (Attributes: water influence, landform, topography, climate)									
LEVEL 3 Class	Surface Water						Subterranean			
LEVEL 3 System	Marine	Estuarine	Lacustrine	Palustrine	Riverine	Floodplain	Fractured	Porous sedimentary rock	Unconsolidated	Cave/karst
LEVEL 3 Habitat	Pool of attributes to determine aquatic habitats (e.g. water type, vegetation, substrate, porosity, water source)									





Kerang Lakes Ramsar Site



Lacustrine

ANAE_TYPE

- Lp1.1: Permanent lakes
- Lp2.1: Permanent floodplain lakes
- Lt1.1: Temporary lakes

Palustrine

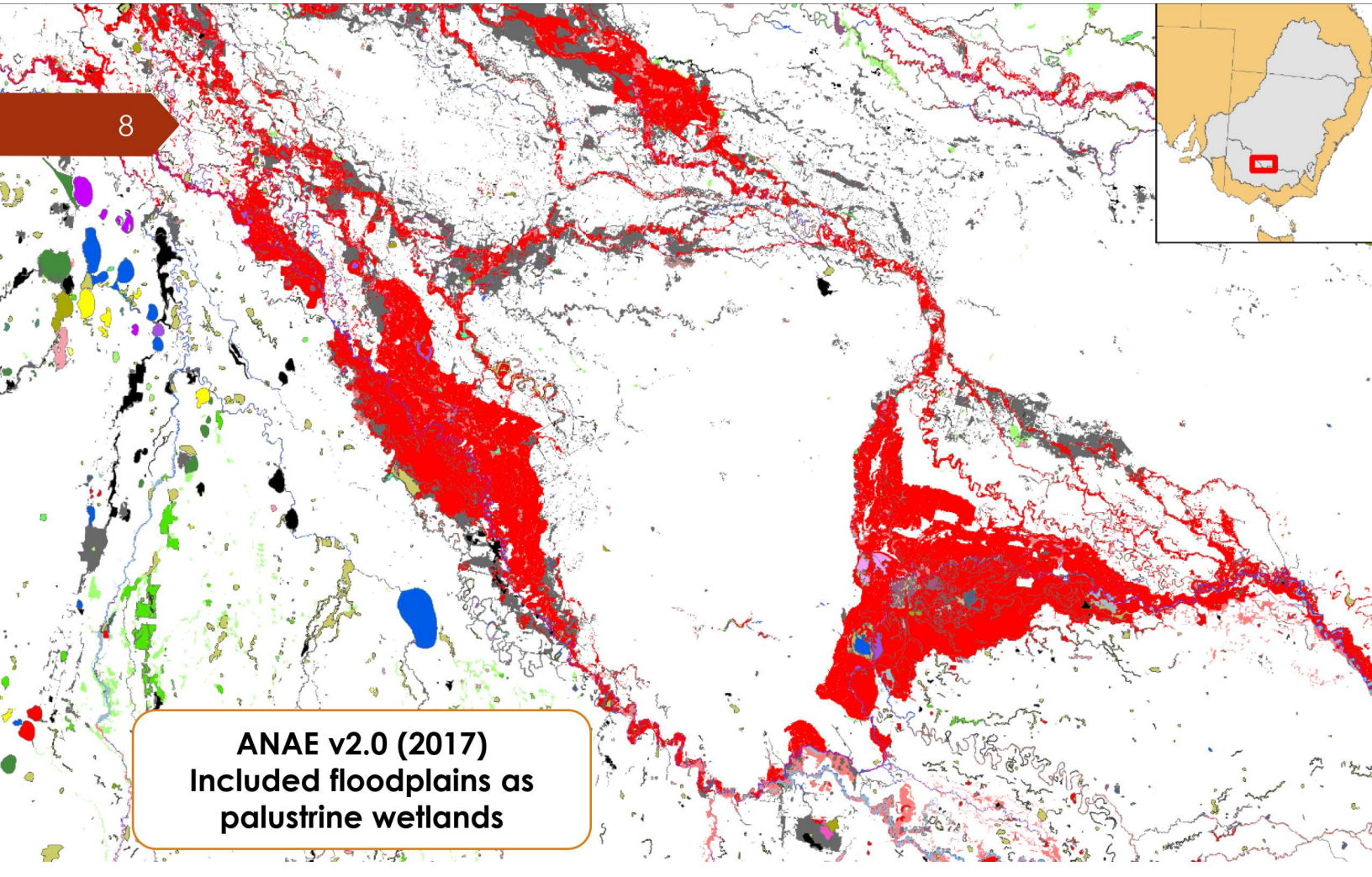
ANAE_TYPE

- Pu1: Unspecified wetland
- Pp4.1: Permanent floodplain wetland
- Psp4: Permanent saline wetland
- Pt1.1.1: Intermittent River red gum floodplain swamp
- Pt1.2.1: Intermittent Black box floodplain swamp
- Pt1.6.2: Temporary woodland swamp
- Pt1.7.1: Intermittent Lignum floodplain swamp
- Pt1: Temporary swamps
- Pt2.2.1: Temporary sedge/grass/forb floodplain marsh
- Pt2.3.1: Floodplain freshwater meadow
- Pt3.1.1: Floodplain clay pans
- Pt4.2: Temporary wetland

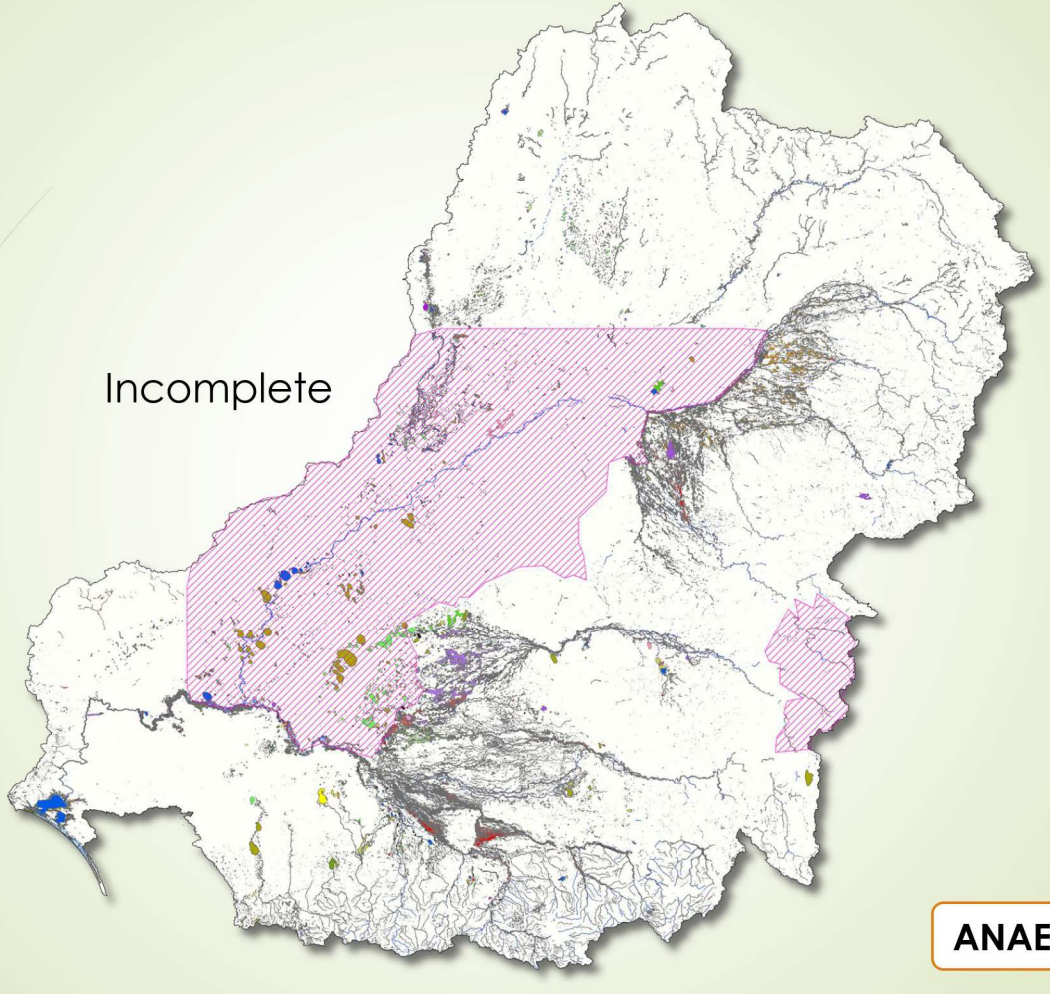
Riverine

ANAE_TYPE

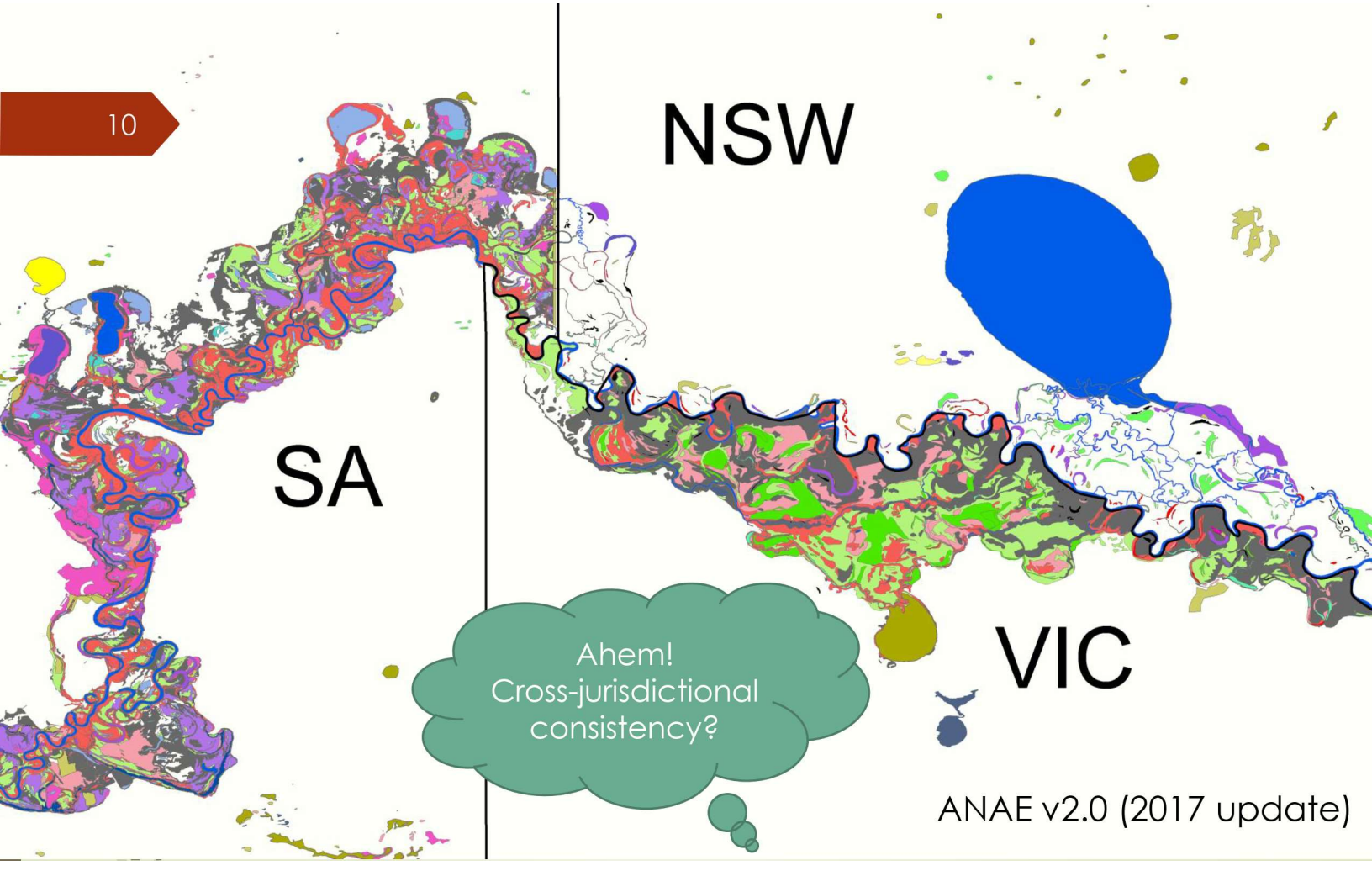
- Rp1.4: Permanent lowland streams
- Rp1: Permanent Streams
- Rt1.2: Temporary transitional zone streams
- Rt1.4: Temporary lowland streams
- Rt1: Temporary Streams



ANAE v2.0 (2017)
Included floodplains as palustrine wetlands



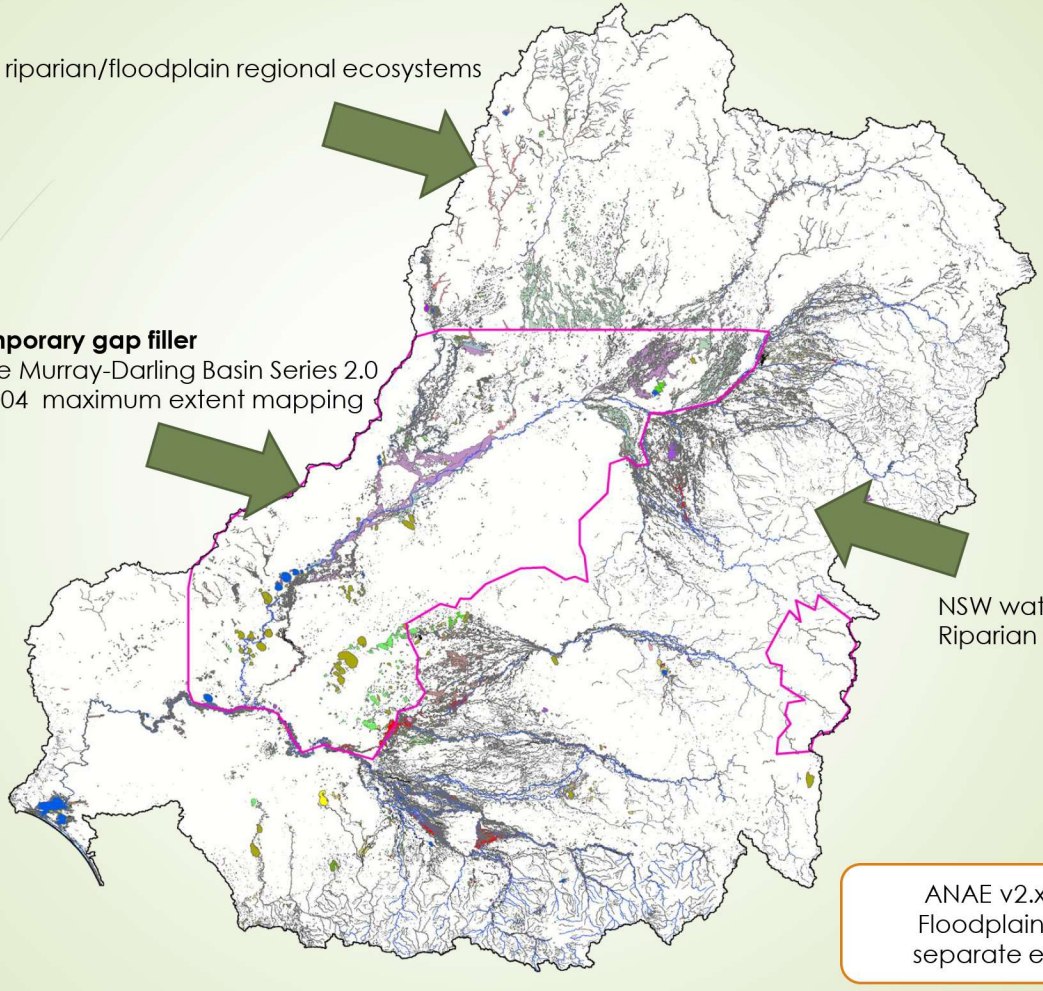
ANAE v2.0 (2017)



ANAE v2.0 (2017 update)

QLD riparian/floodplain regional ecosystems

Temporary gap filler
Wetlands GIS of the Murray-Darling Basin Series 2.0
Kingsford et al. 2004 maximum extent mapping

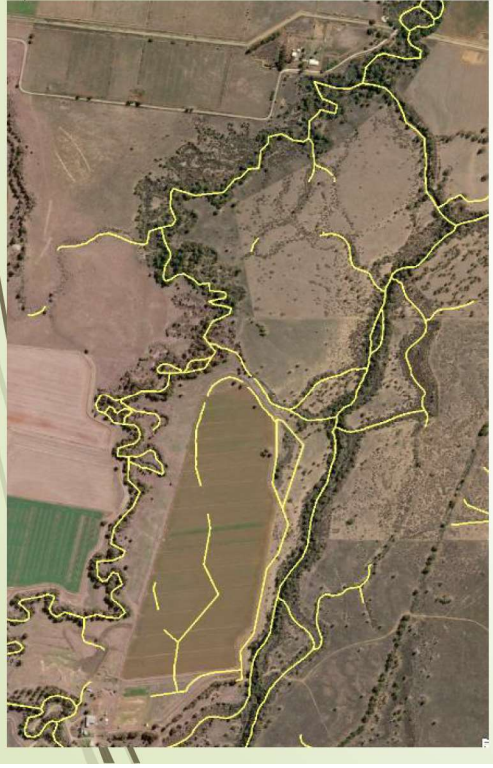


NSW water dependent
Riparian trees

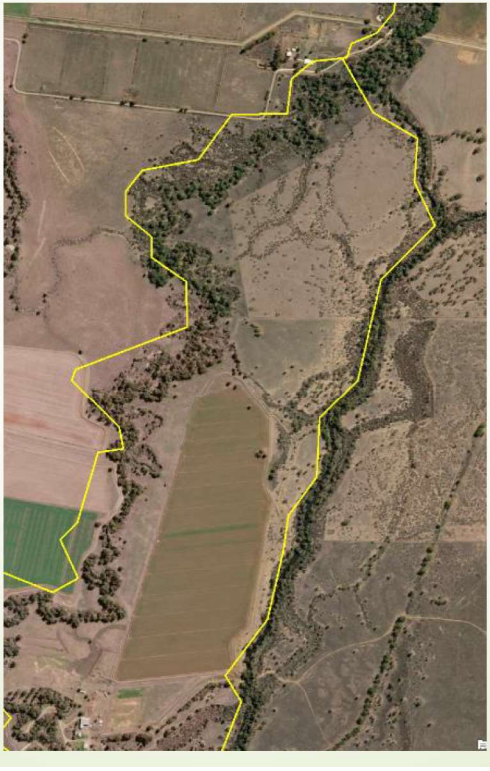
ANAE v2.x (LTIM unpub)
Floodplains restored to a
separate ecosystem type

ANAE River mapping

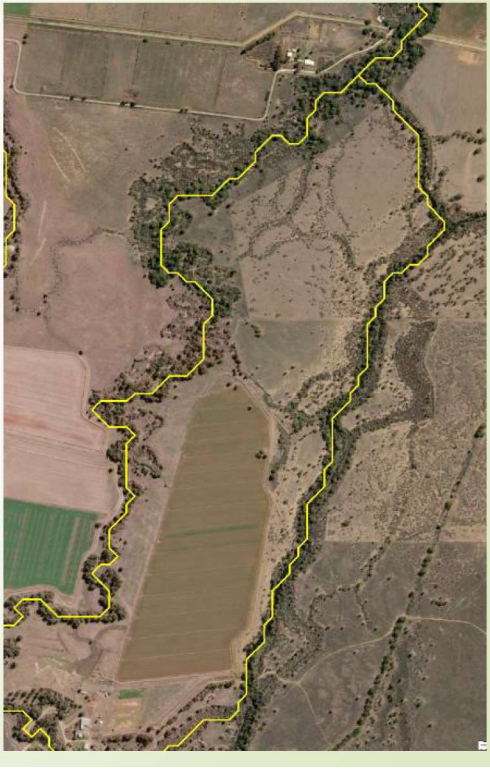
ANAE Waterways "Quasi-fabric"



ANAE Geofabric v2

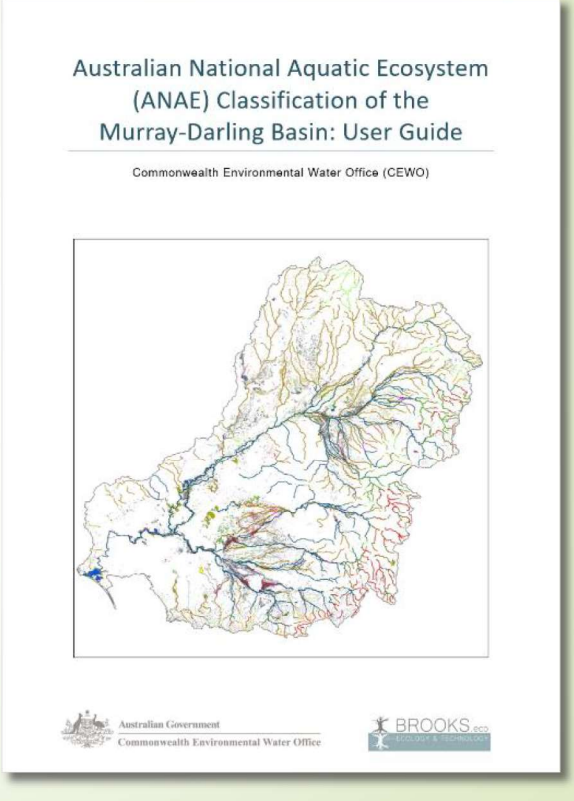


LTIM unpublished
Geofabric 3 beta



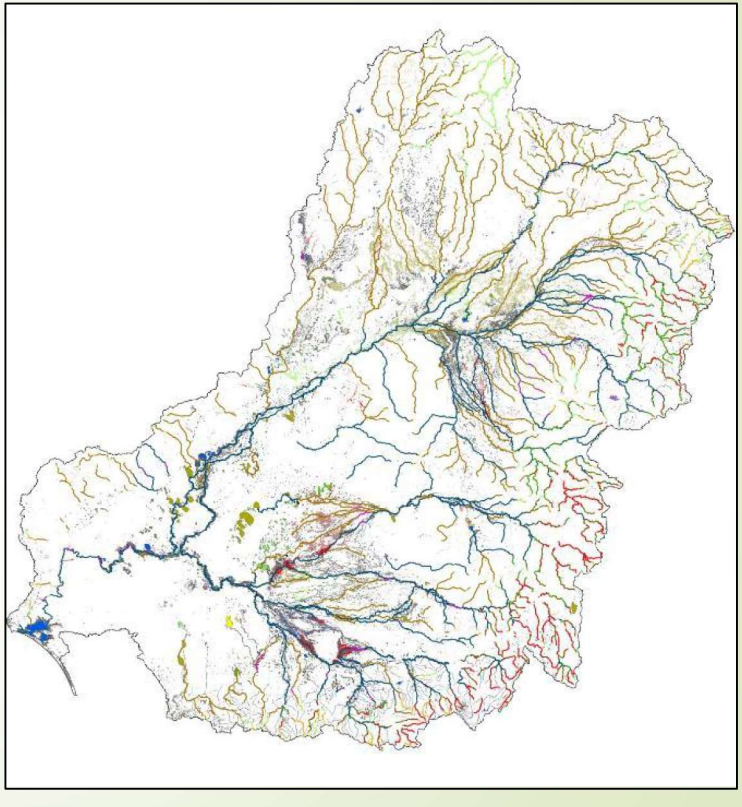
Objectives of the 2021 update to v3.0

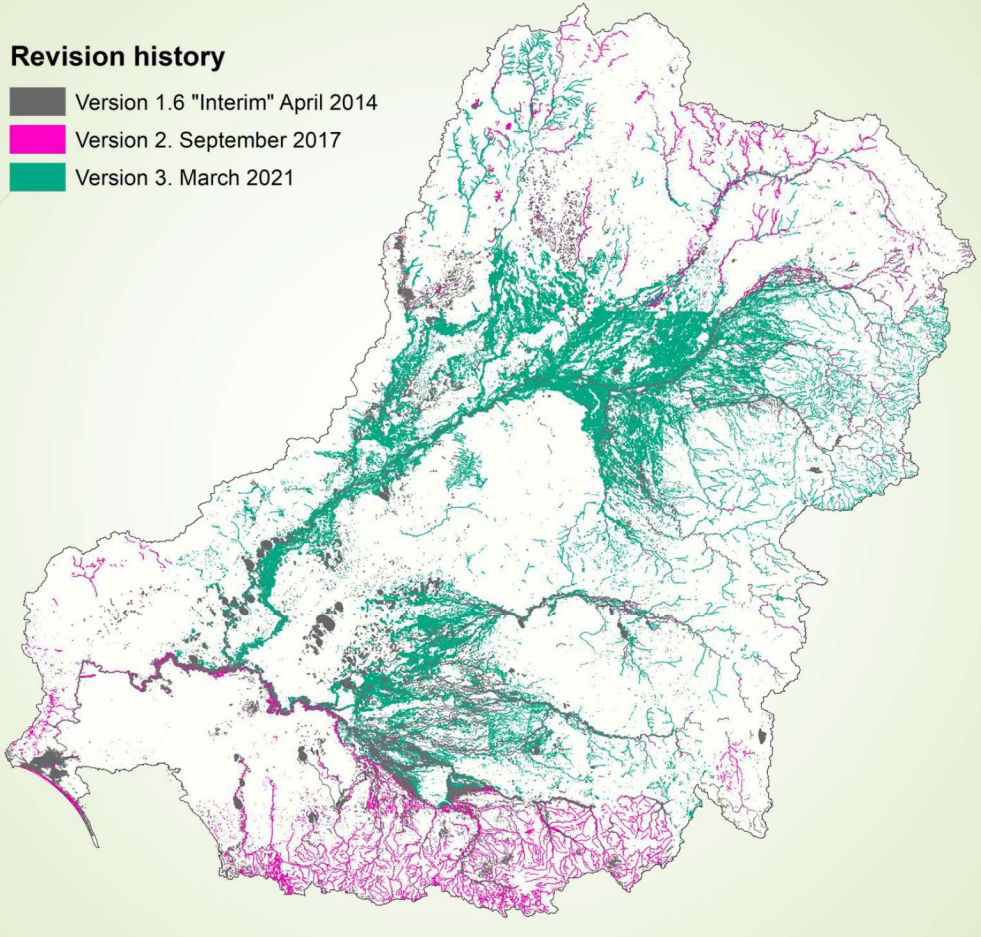
- Complete the mapping of Western NSW and Central Table-lands
- Restore Floodplains to separate ecosystem type
- Update river mapping to new higher resolution Geofabric v3
- Publish a user guide to consolidate useful information



ANAE v3.0

- 290,000 mapped features (excluding river lines)
- 230,000 river line segments
- 67 ANAE types
  - 8 lacustrine types
  - 29 palustrine wetland types
  - 12 floodplain types
  - 9 river types (+waterholes)
  - 9 estuarine types



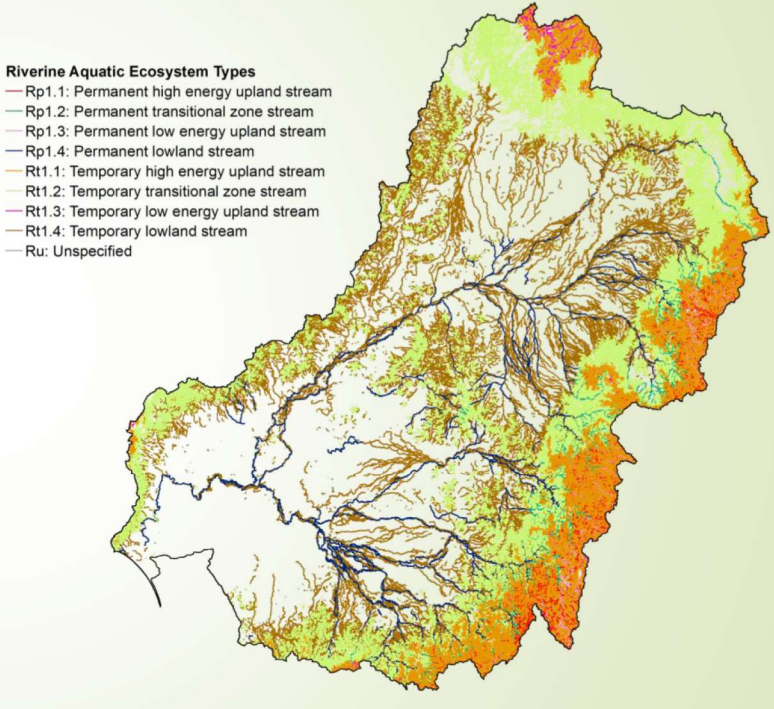

Revision history
Version 1.6 "Interim" April 2014
Version 2. September 2017
Version 3. March 2021

Rivers – Geofabric v2 and V3

New attributes
- Slope
- Altitude

Easier to interpret and improved classification

Replaces mrVBF/mrRTF



Australian Hydrological Geospatial Fabric (Geofabric)

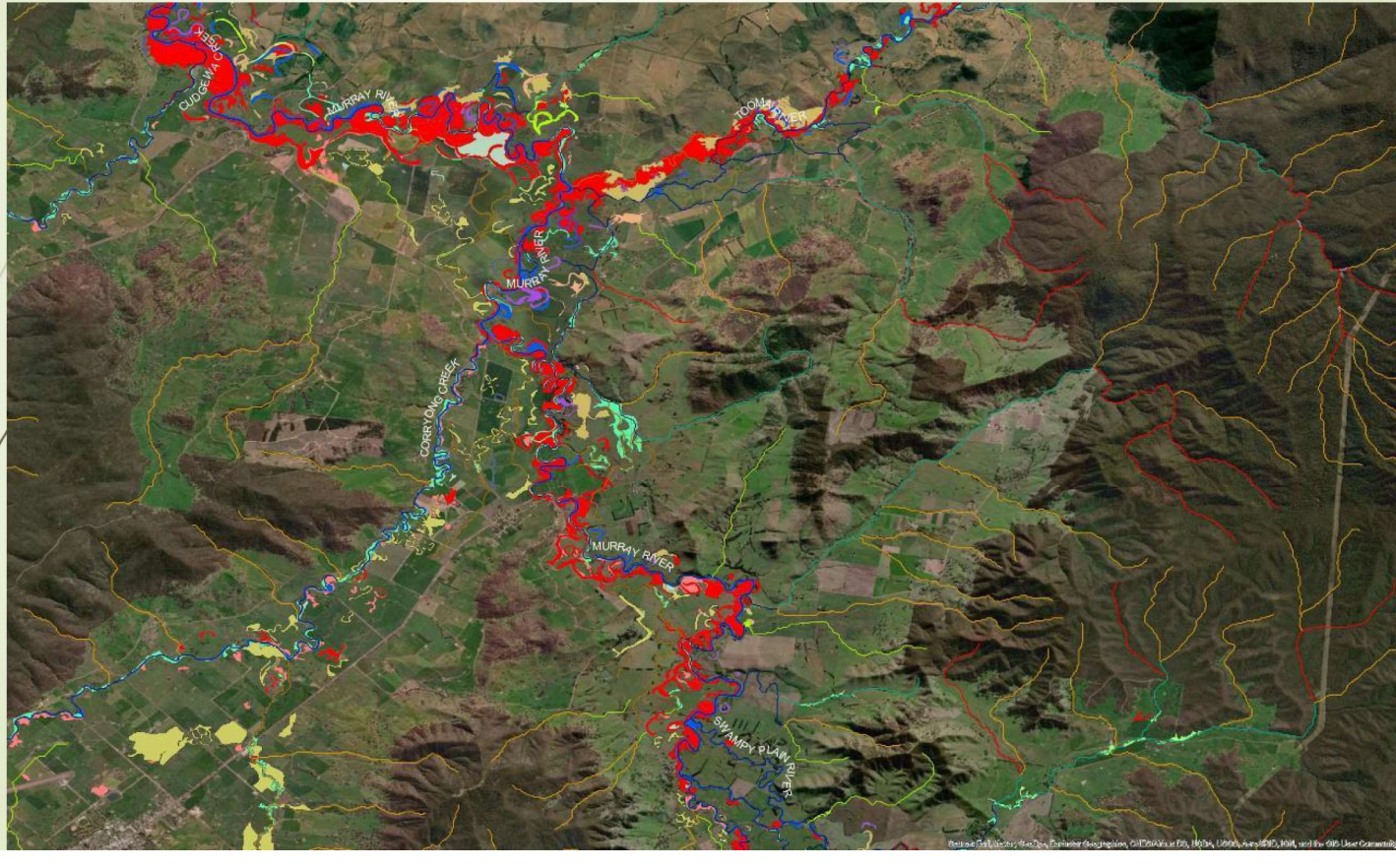
- Geofabric v2 is supported by an incredibly useful National Environmental Stream Attributes data set
  - Catchment landuse, vegetation, topography
  - Modelled seasonal and annual flows
  - River network information (e.g. stream orders)
  - Climate descriptors
  - Does not (yet?) exist for Geofabric v3

Every ANAE river segment has a unique Geofabric v2 SegmentNo

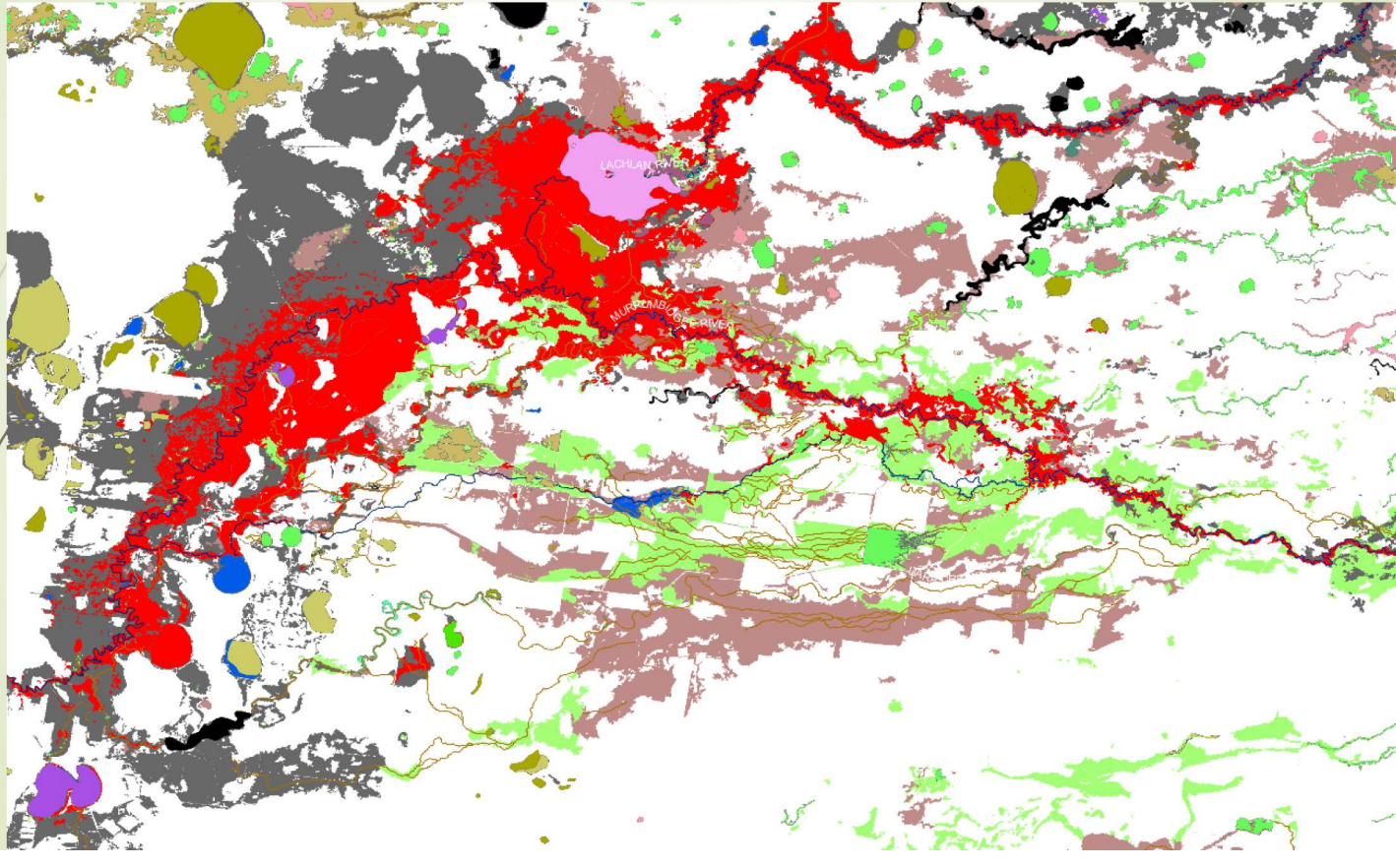
Large rivers mapped as polygons (e.g. the Murray River) are also divided into Geofabric Segments

SegmentNo is the key to link to the National Environmental Stream Attributes

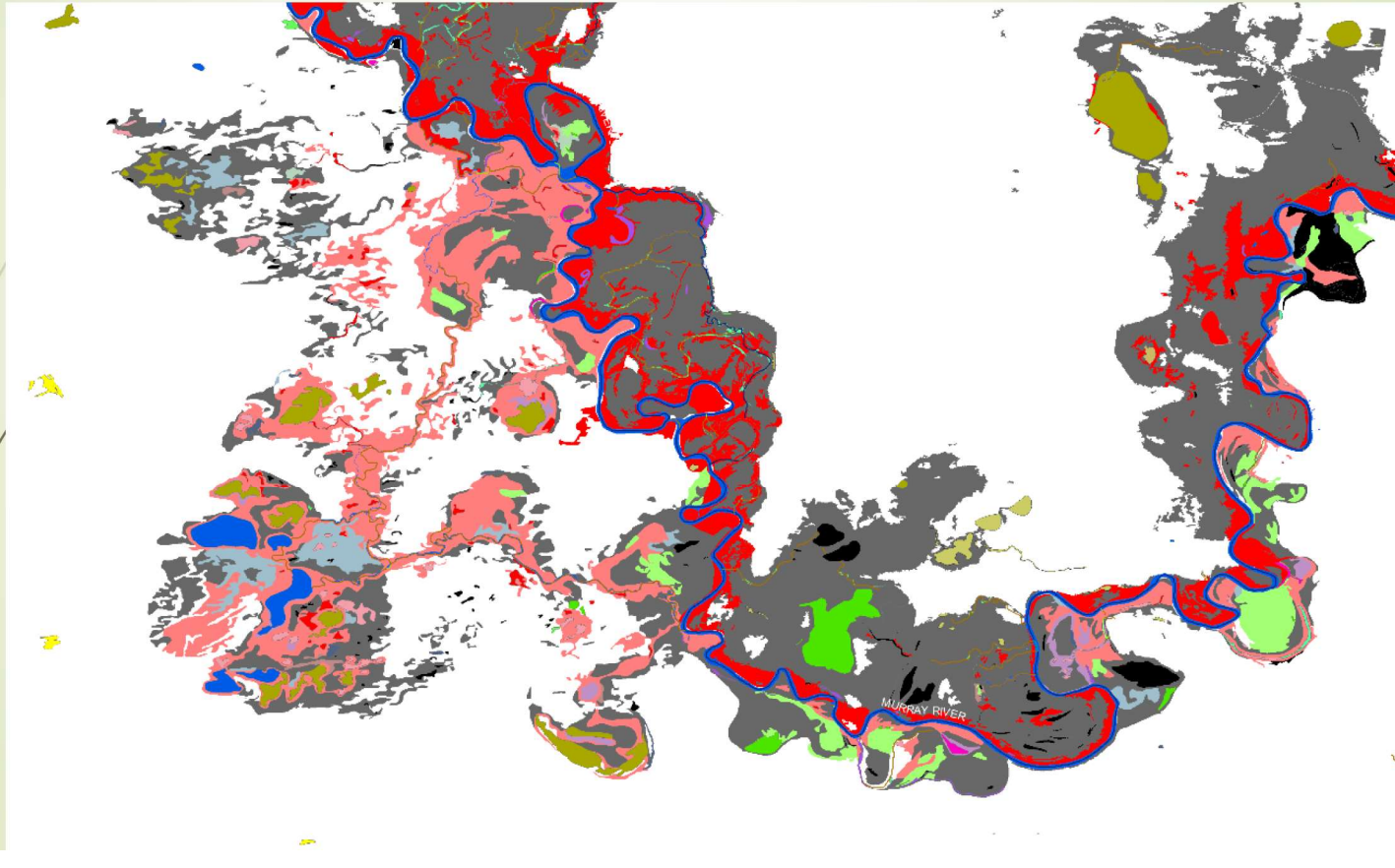
Upper Murray



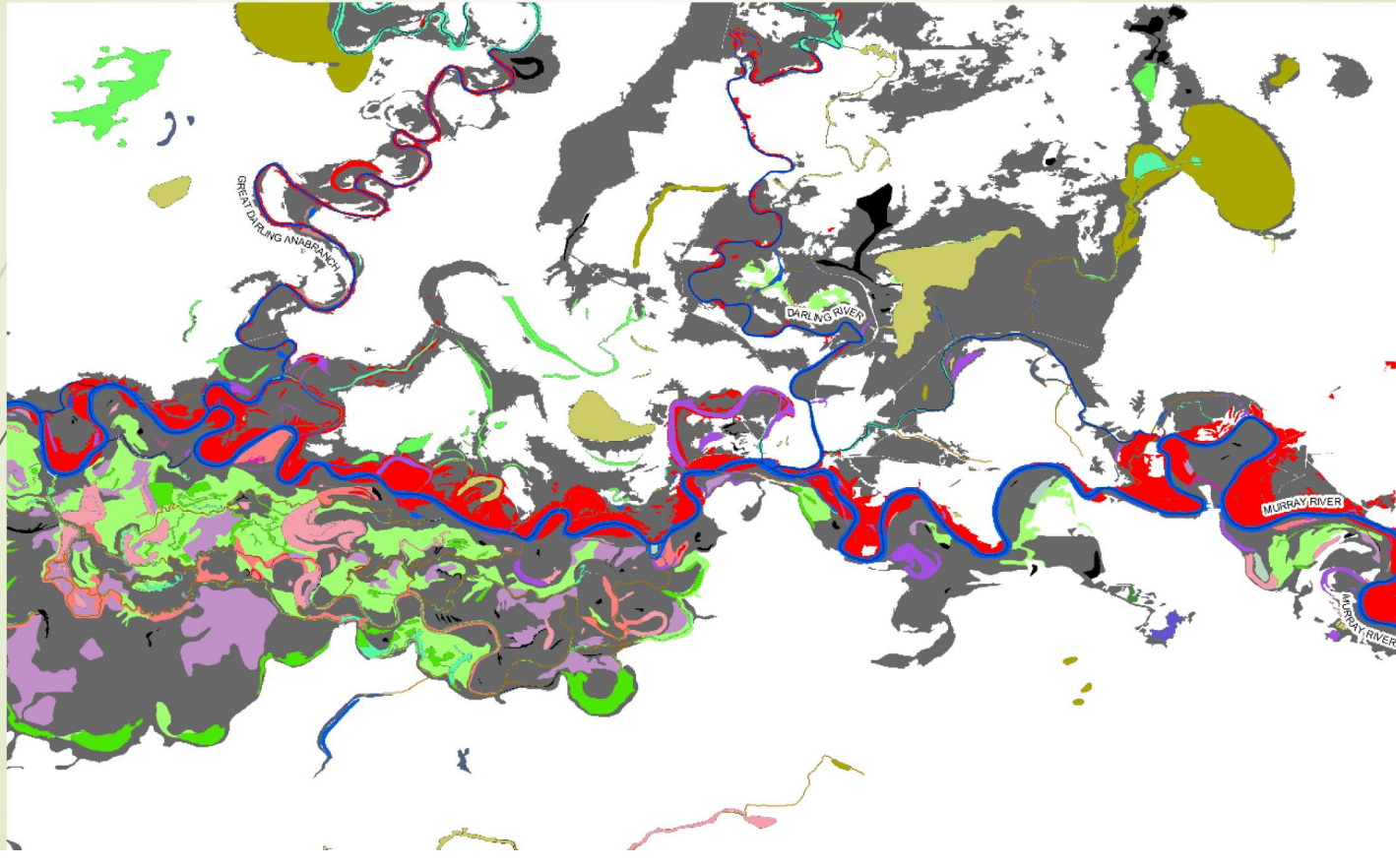
Lowbidgee



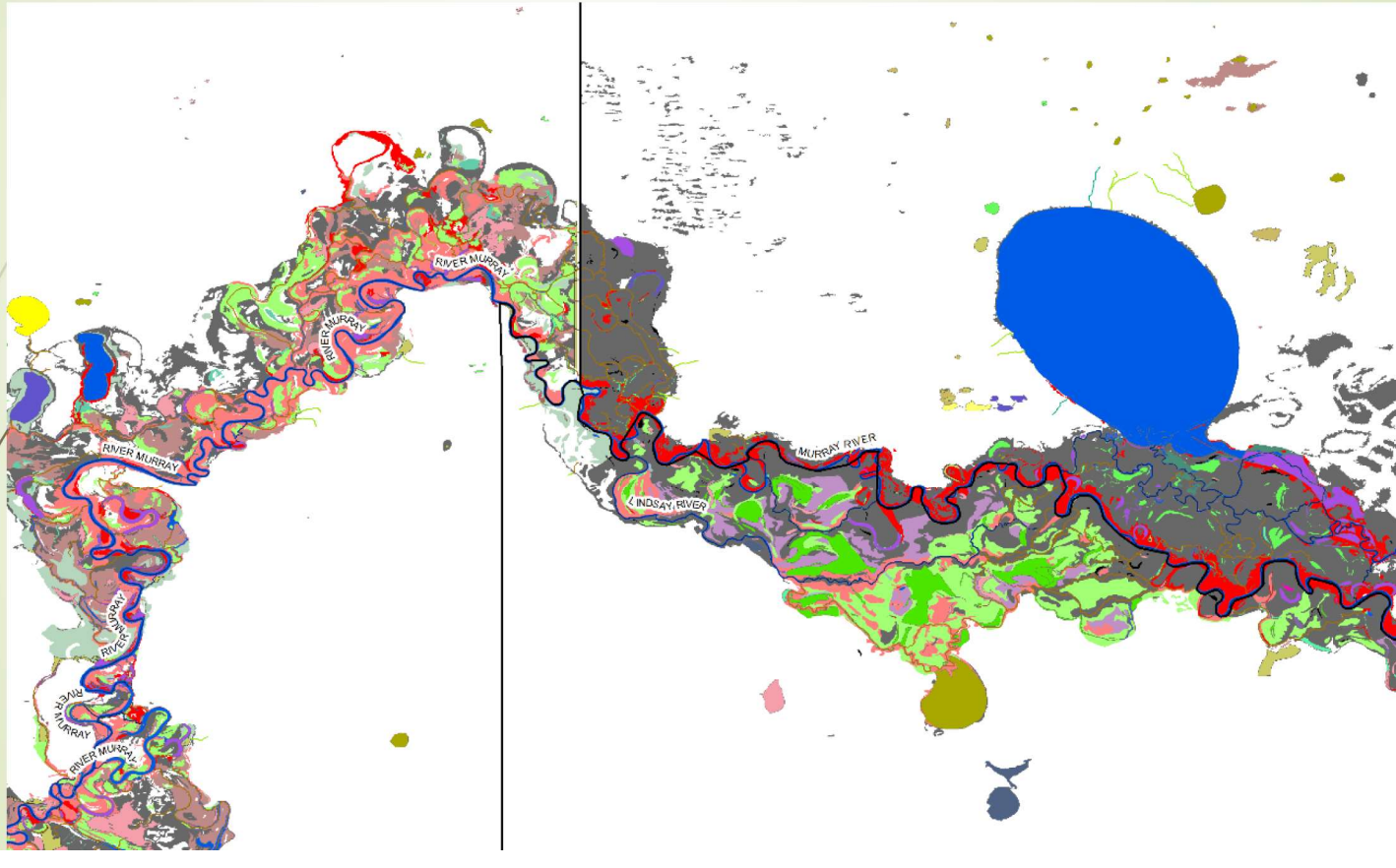
Hattah Lakes



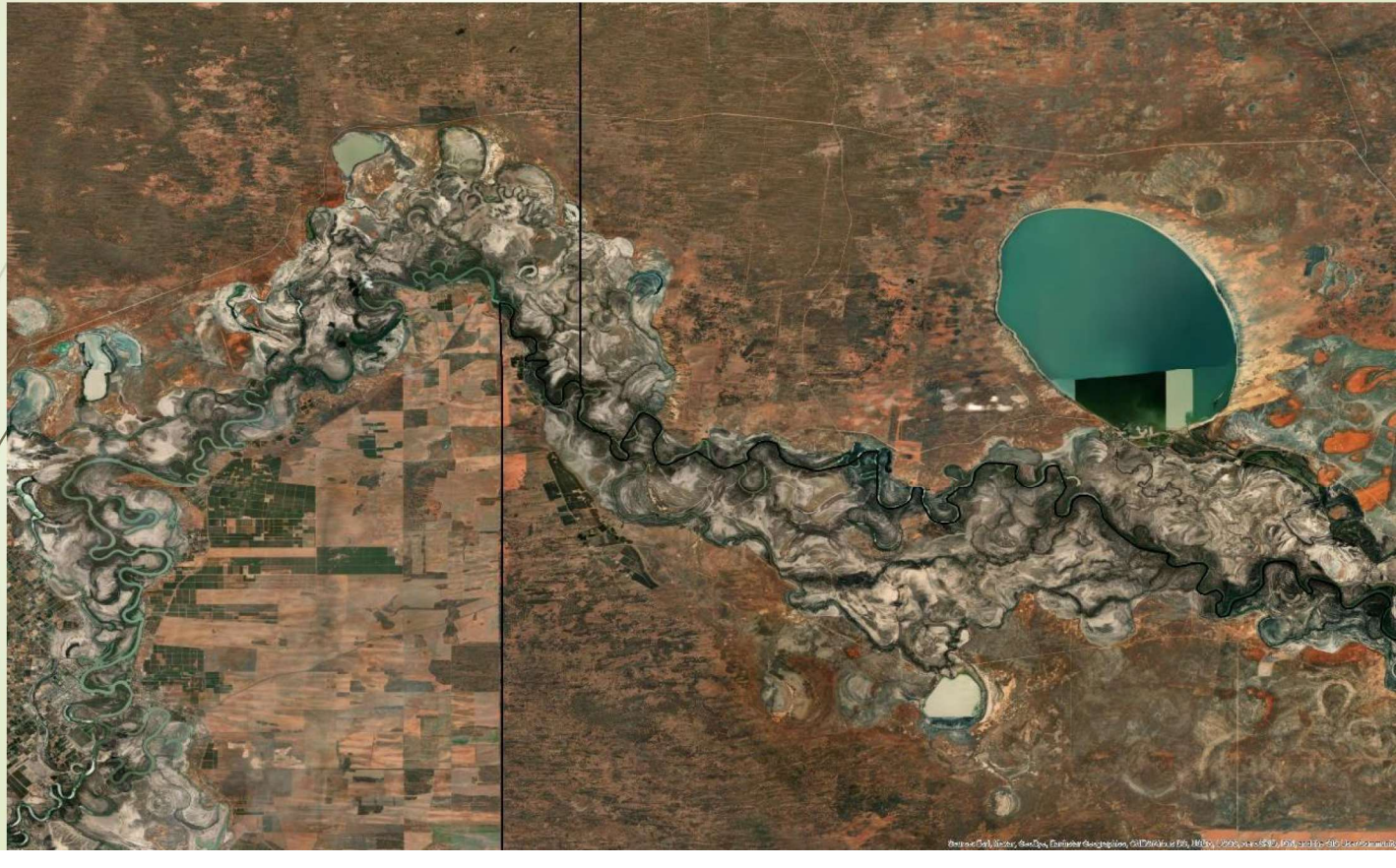
Junction of the Murray and Darling



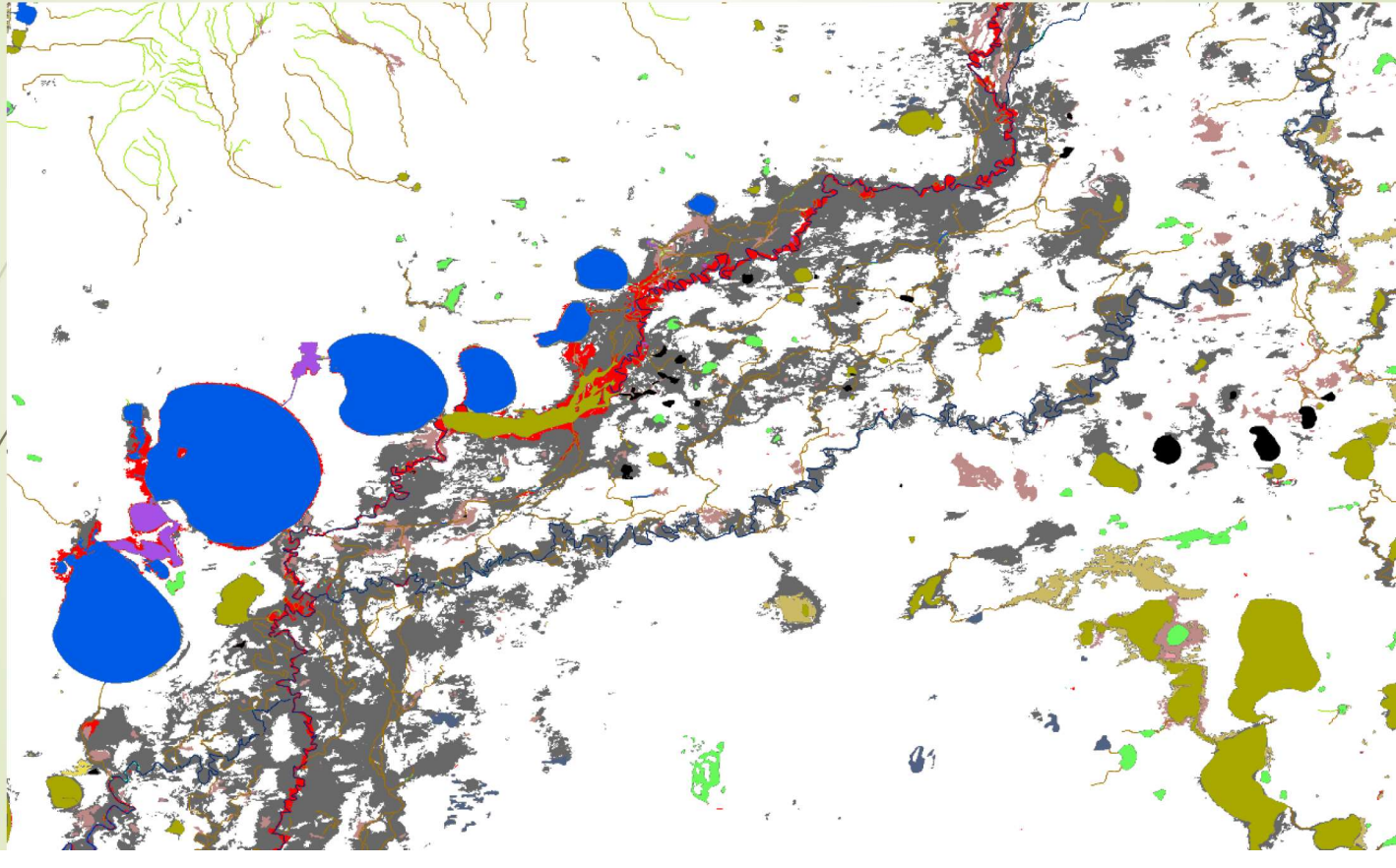
Chowilla, Lake Victoria



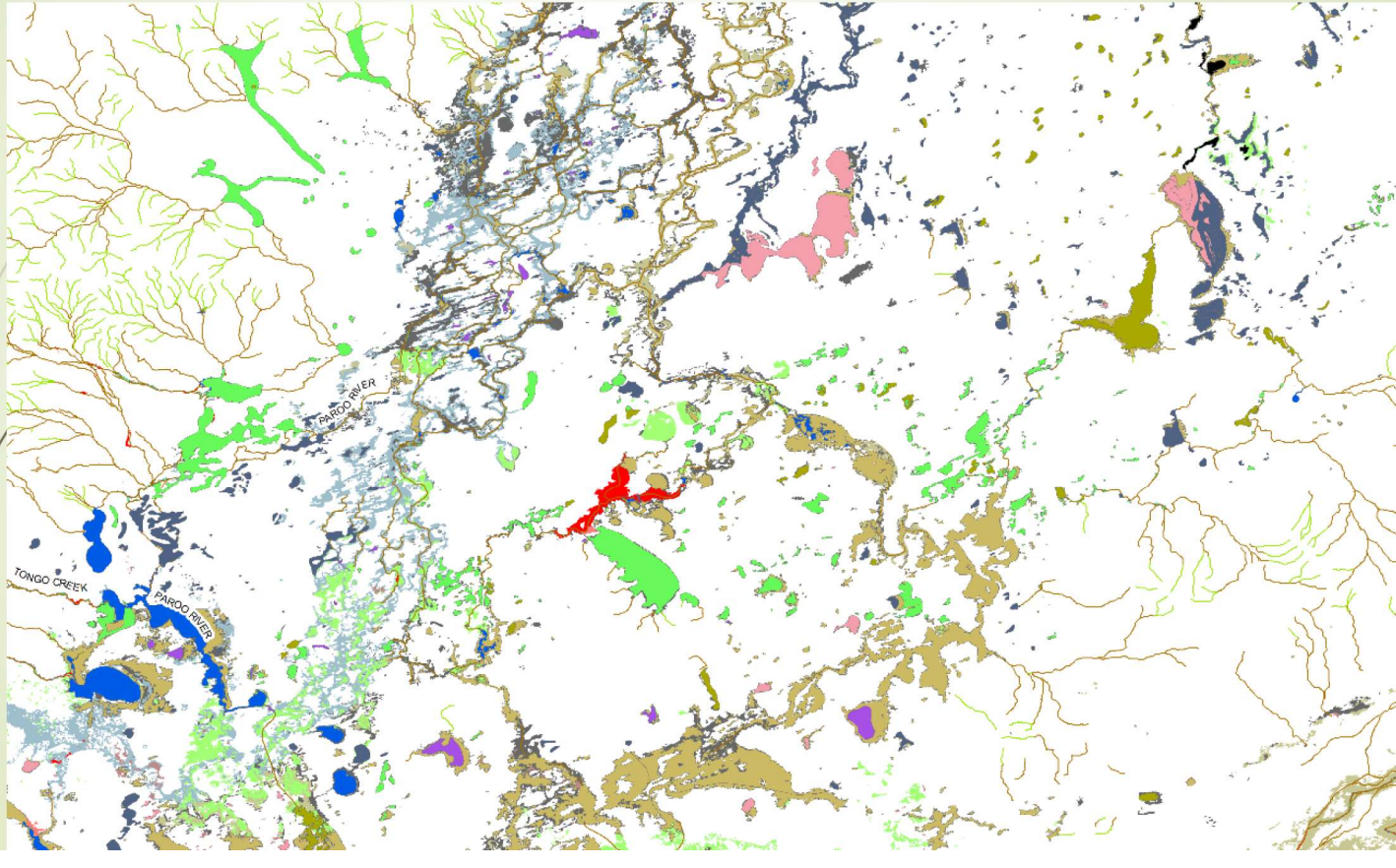
Chowilla, Lake Victoria



Menindee Lakes



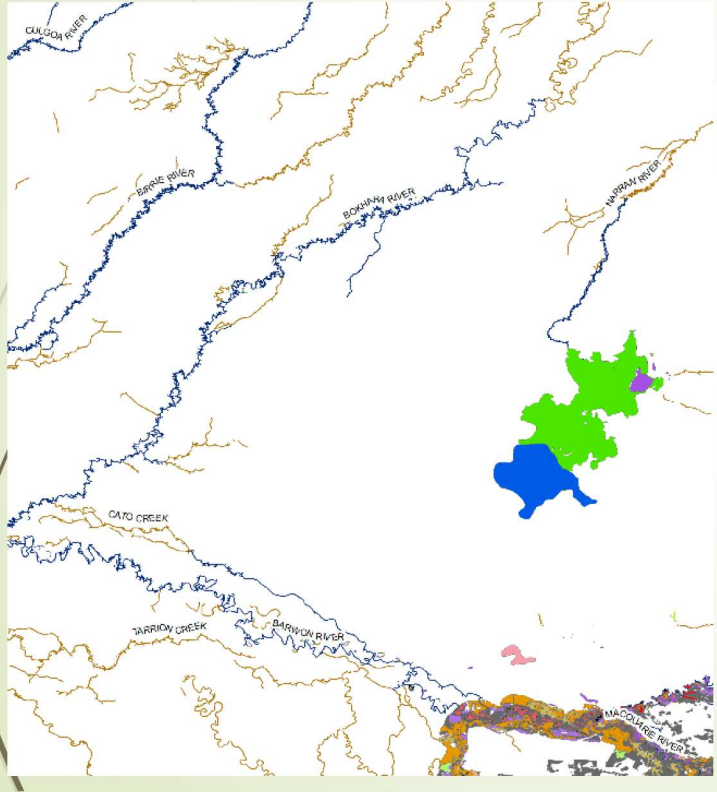
Paroo overflow



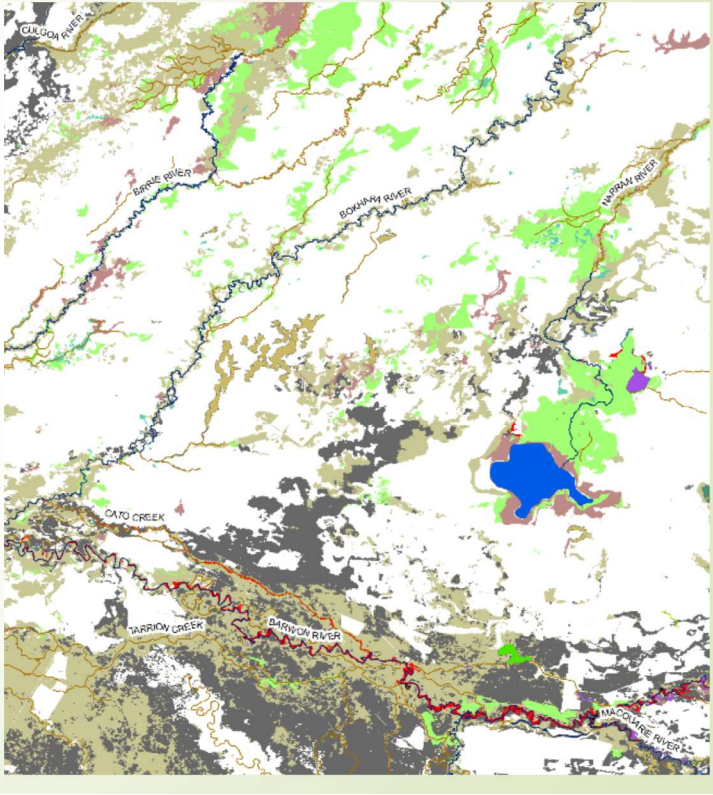
Paroo overflow

Narran Lakes

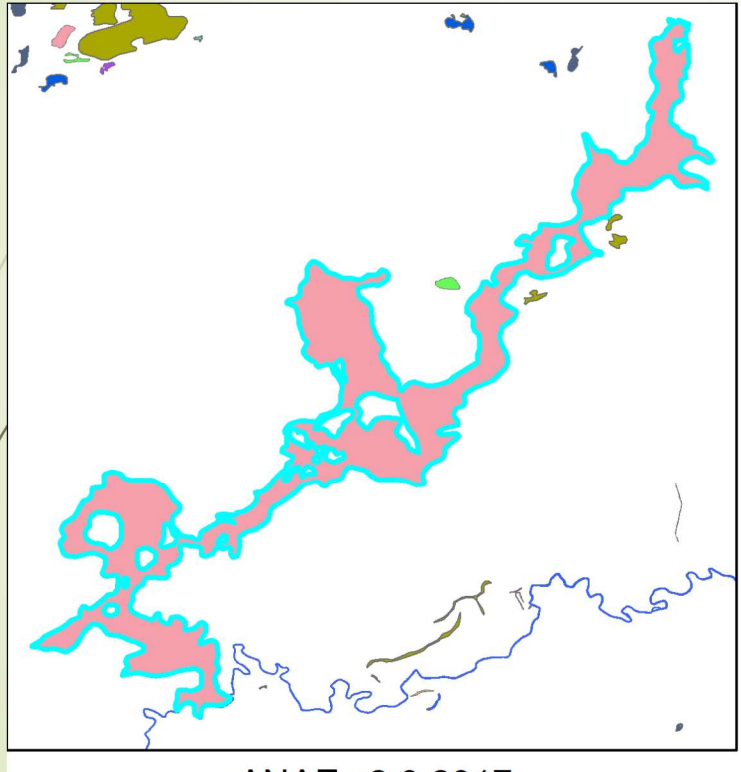
Before update



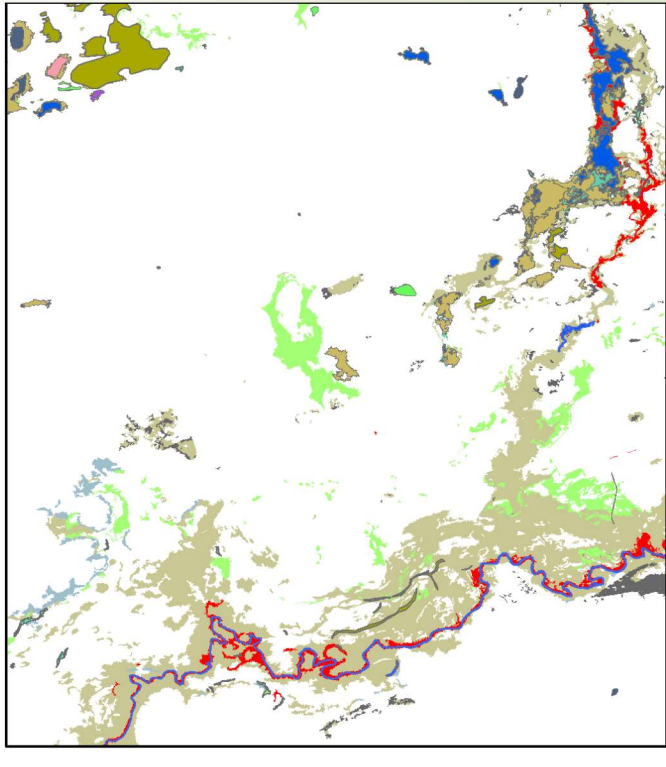
After Update



Warrego-Darling Western Floodplain

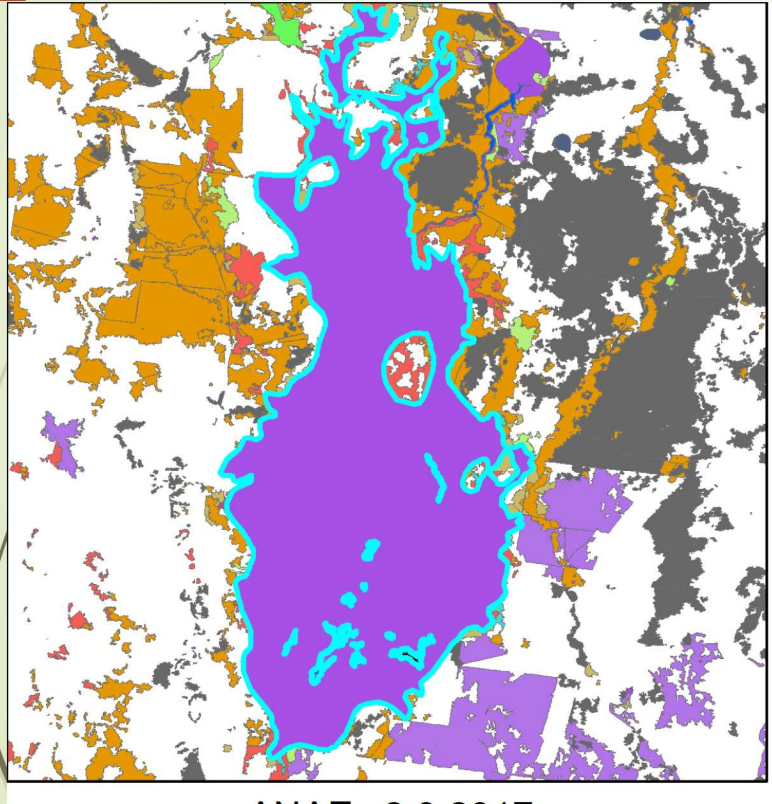


ANAE v2.0 2017

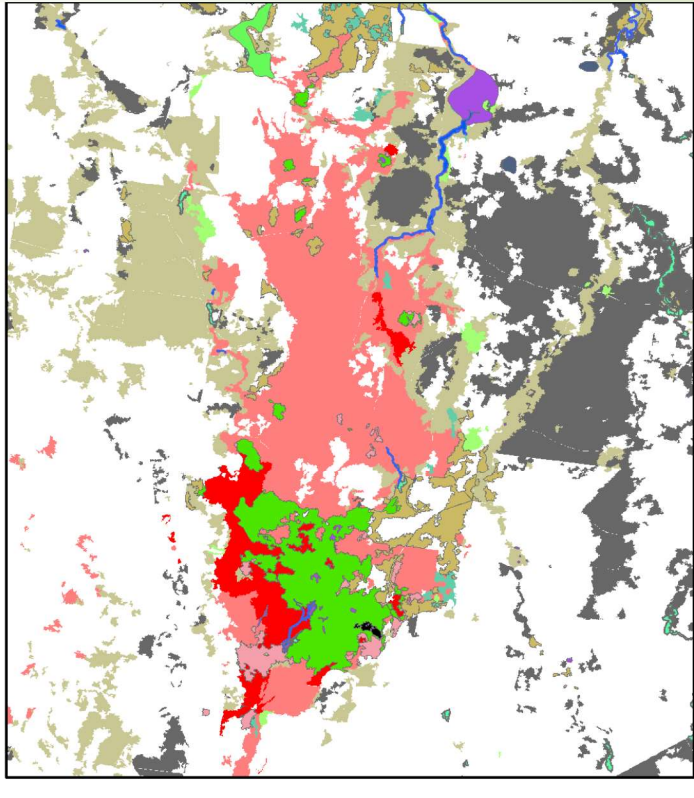


ANAE v3.0 2021

Macquarie Marshes (North marsh)

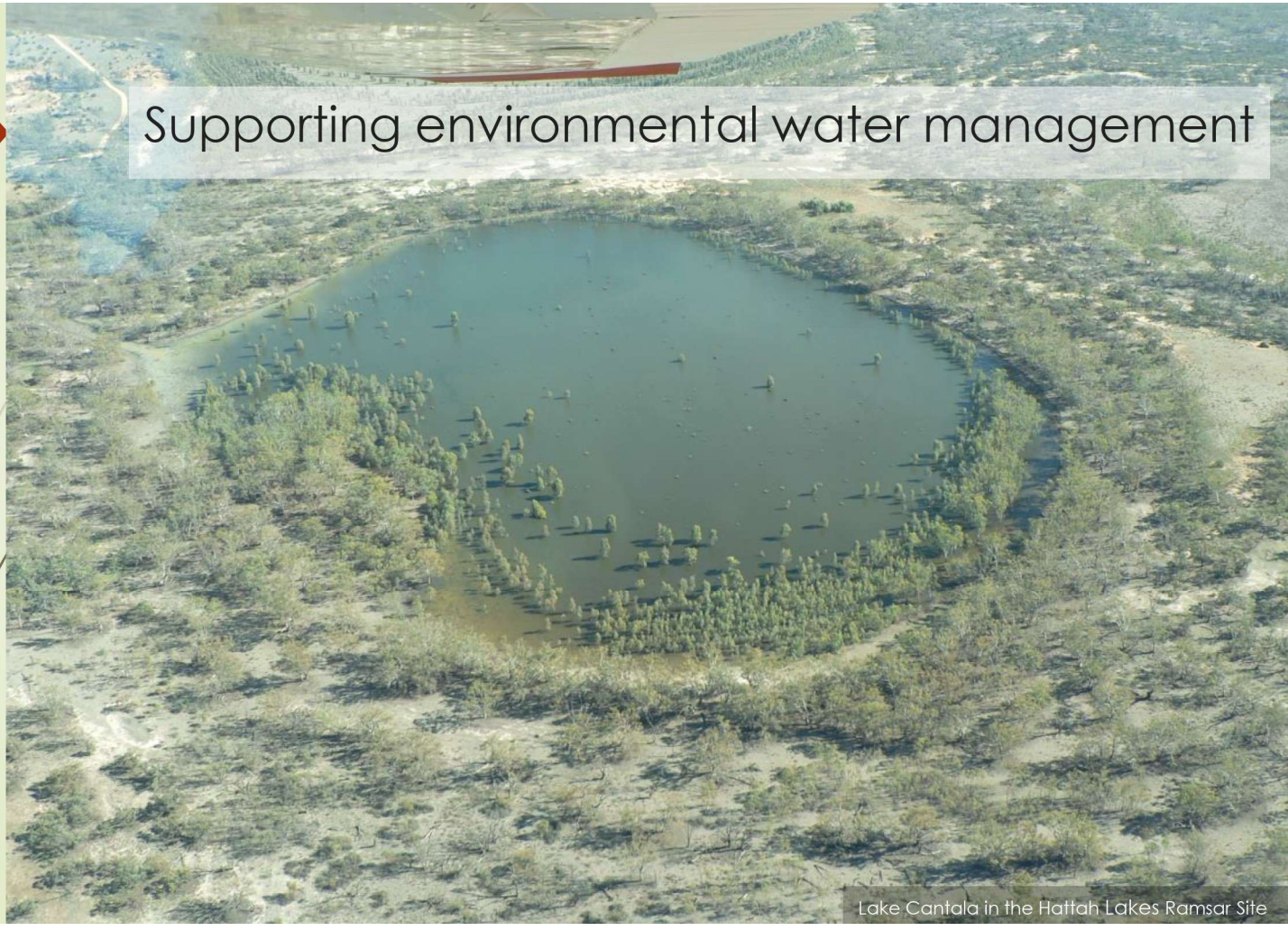


ANAE v2.0 2017



ANAE v3.0 2021

Supporting environmental water management



Lake Cantala in the Hattah Lakes Ramsar Site

Users and Uses

MDBA

- Ecological Elements scoring for the SDL Adjustment Mechanism – scoring abundance/extent
- Ecological Prioritisation of assets
- Tree Stand Condition Model

CEWO

- Monitoring, Evaluation and Research
  - Ecosystem Diversity
  - Vegetation
  - Modelling

RESEARCHERS

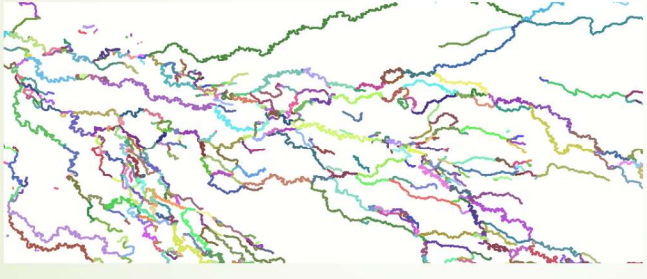
- National Carp Control Plan

STATES?

- States have their own wetland mapping aligned to their policies but many are based on the ANAE and were developed in parallel or before the Basin ANAE projects.
- QLD – Wetland mapping and regional ecosystems informed ANAE
- Victorian Wetland Classification is based on the ANAE
- SA *South Australia Aquatic Ecosystem (SAAE) classification is based on the ANAE*

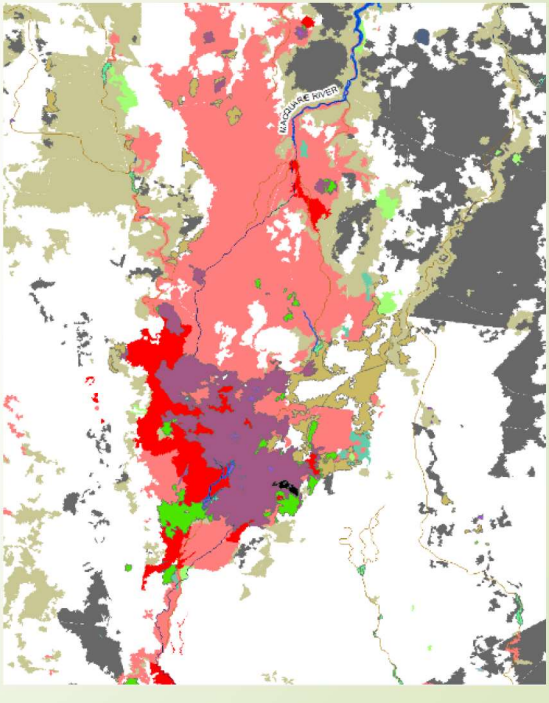
ANAE can answer fundamental questions

- What are the ecosystems?
- Where are the ecosystems?
- How many are there?
  - Where to draw the line?
  - Polygon count is a poor estimate
  - Rivers are divided into Geofabric segments



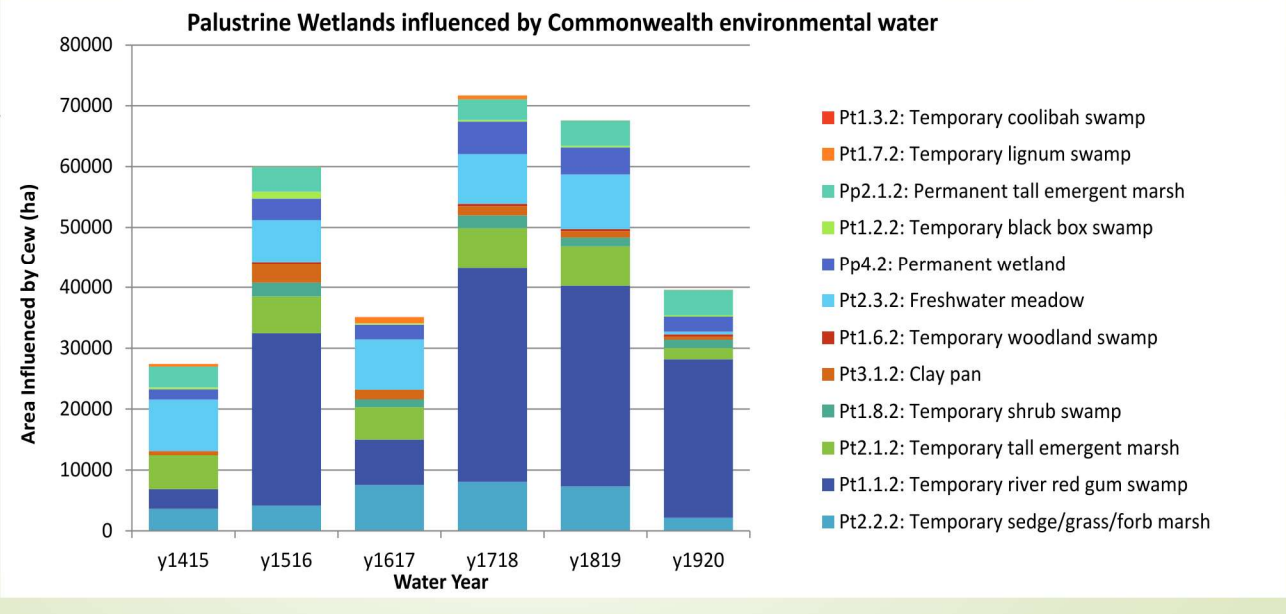
Quantify by Area and River Length

Macquarie Marsh (North Marsh)



What types of ecosystems received environmental water?

- Basis for LTIM/Flow MER ecosystem diversity evaluation



Basin Plan Evaluation

"8.05 Protection and restoration of water-dependent ecosystems

(3) An objective is to protect and restore biodiversity that is dependent on Basin water resources by ensuring that:

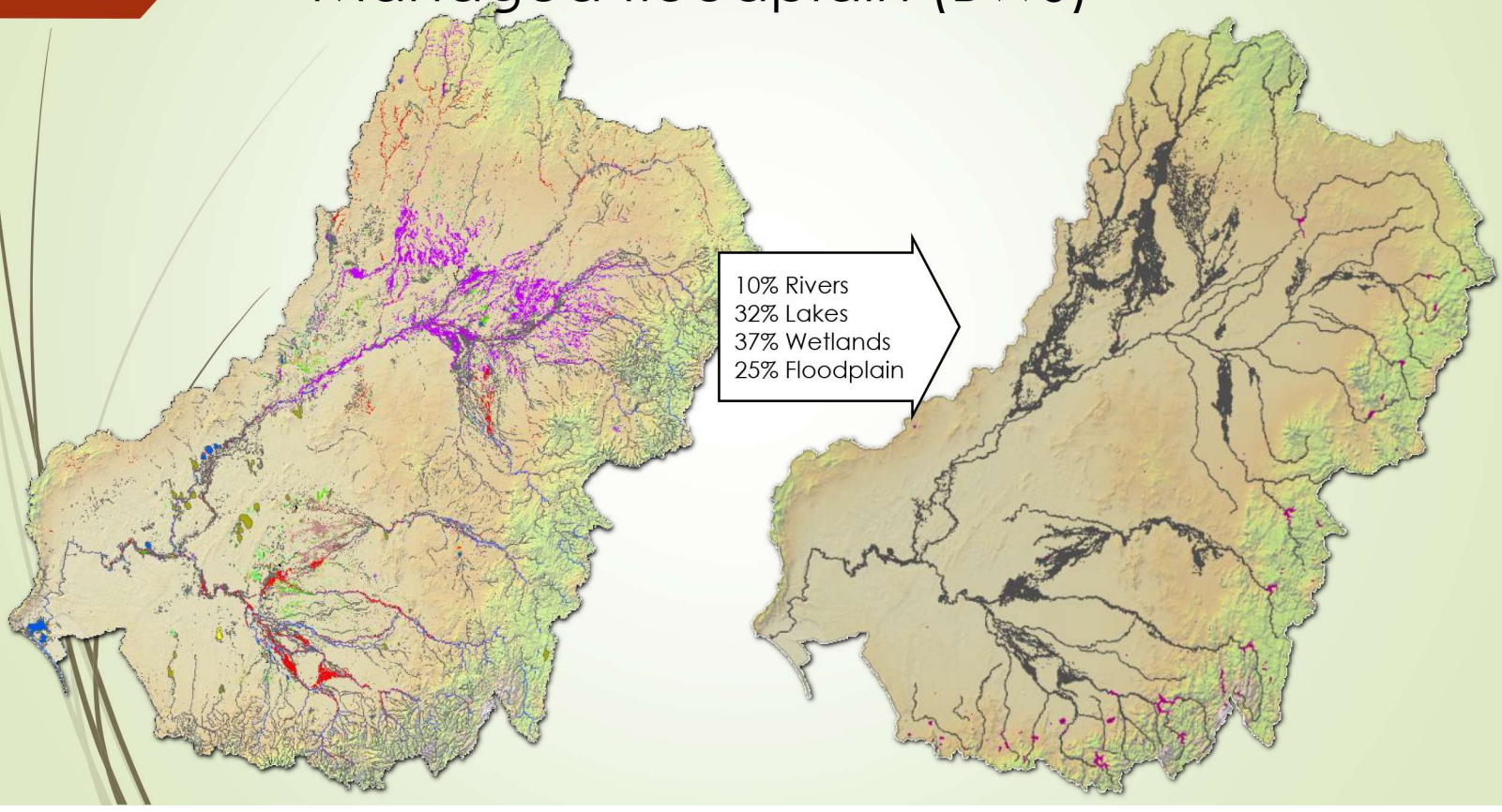
(b) representative populations and communities of native biota are protected and, if necessary, restored."

(Commonwealth of Australia 2012)

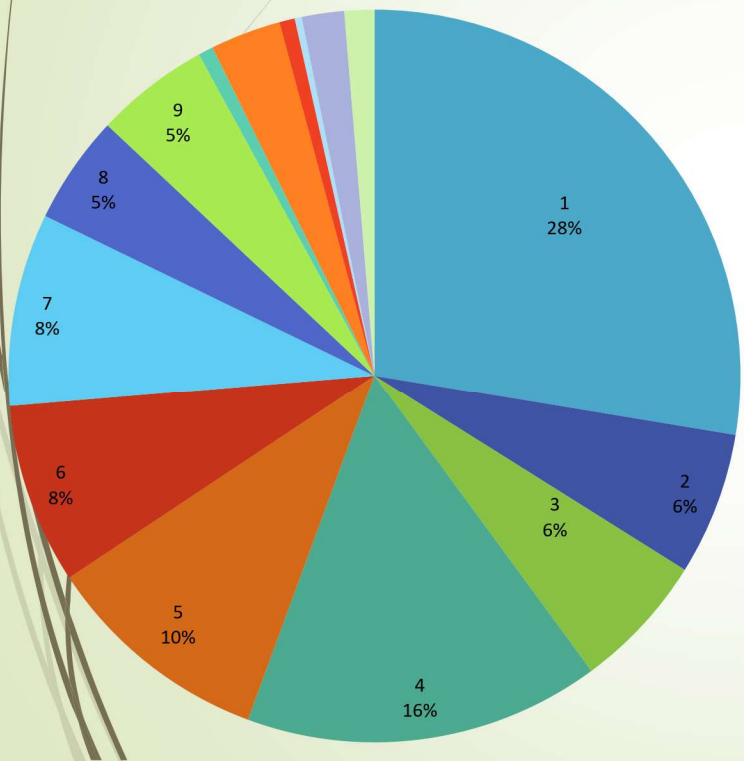
Can environmental water reach a representative subset of Basin ecosystems?

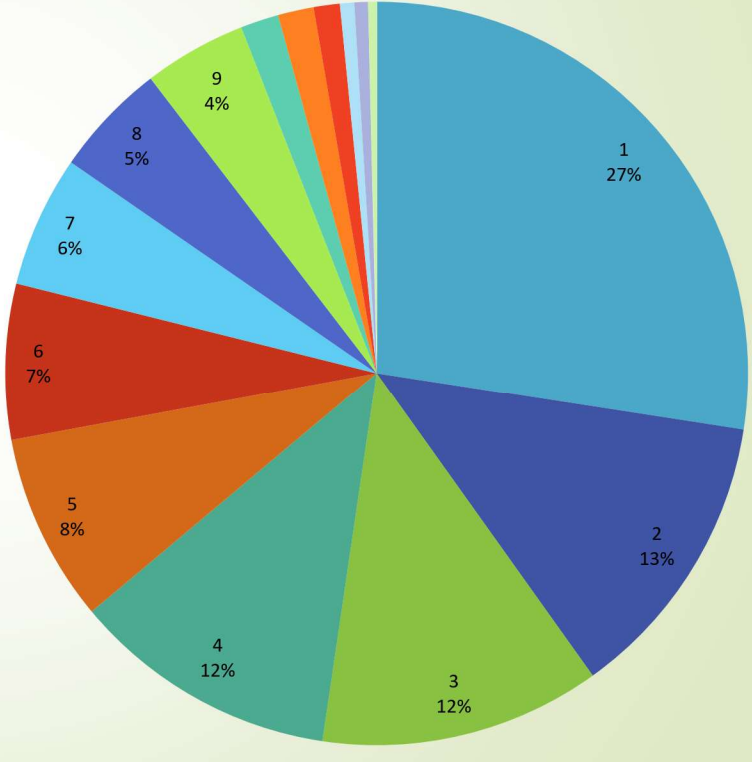
ANAE is the currency for defining what is "representative"

Managed floodplain (BWS)

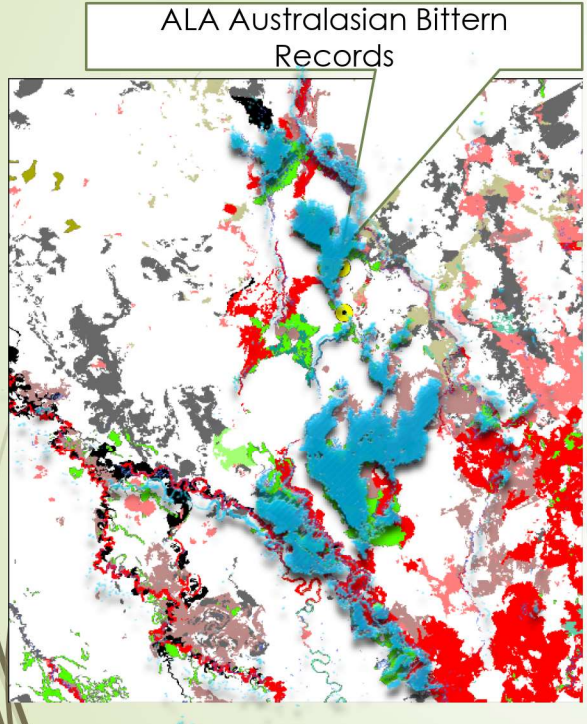


Palustrine Wetlands 37% on the Managed Floodplain





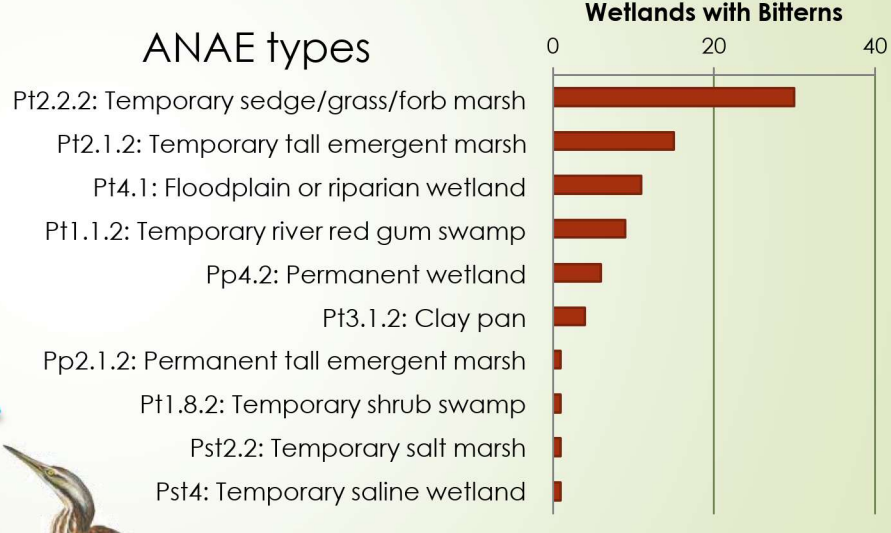
Australasian bittern

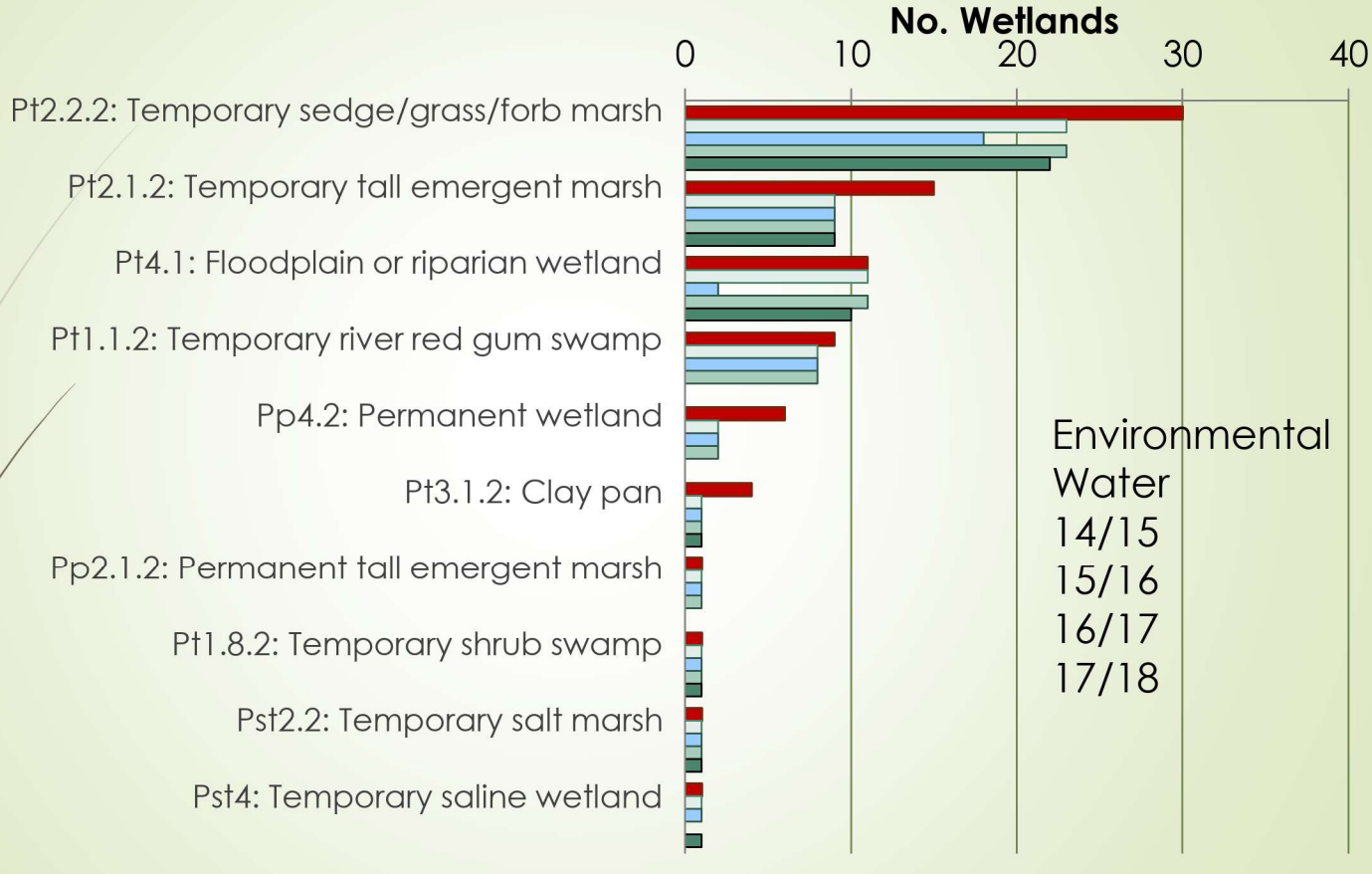


Macquarie marshes

Where do Bitterns live?

ANAE types




No. Wetlands
0
10
20
30
40
Pt2.2.2: Temporary sedge/grass/forb marsh
Pt2.1.2: Temporary tall emergent marsh
Pt4.1: Floodplain or riparian wetland
Pt1.1.2: Temporary river red gum swamp
Pp4.2: Permanent wetland
Pt3.1.2: Clay pan
Pp2.1.2: Permanent tall emergent marsh
Pt1.8.2: Temporary shrub swamp
Pst2.2: Temporary salt marsh
Pst4: Temporary saline wetland
Environmental Water
14/15
15/16
16/17
17/18

A carp biomass estimate for Australia

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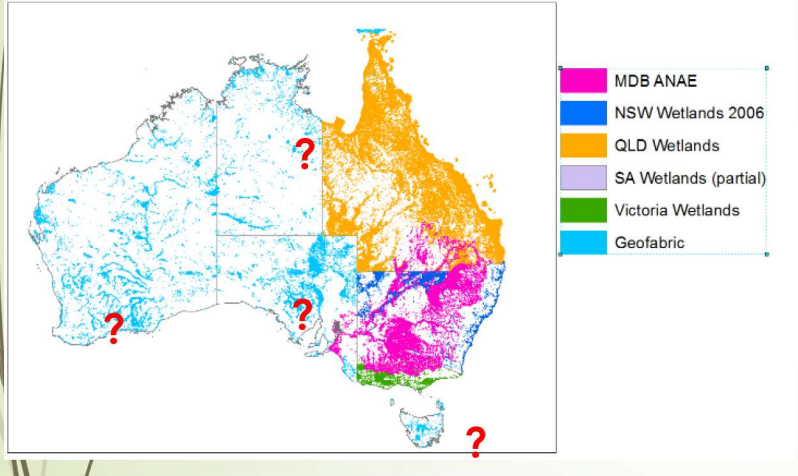
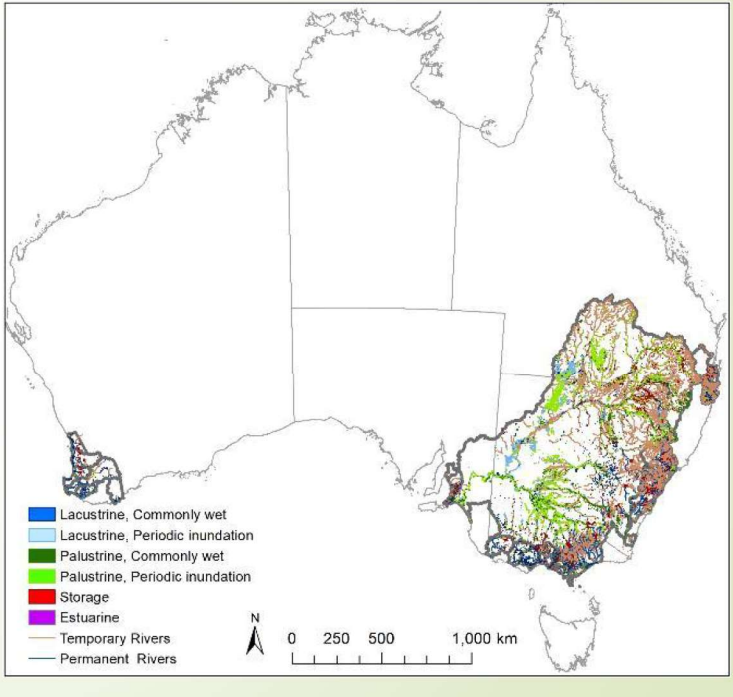
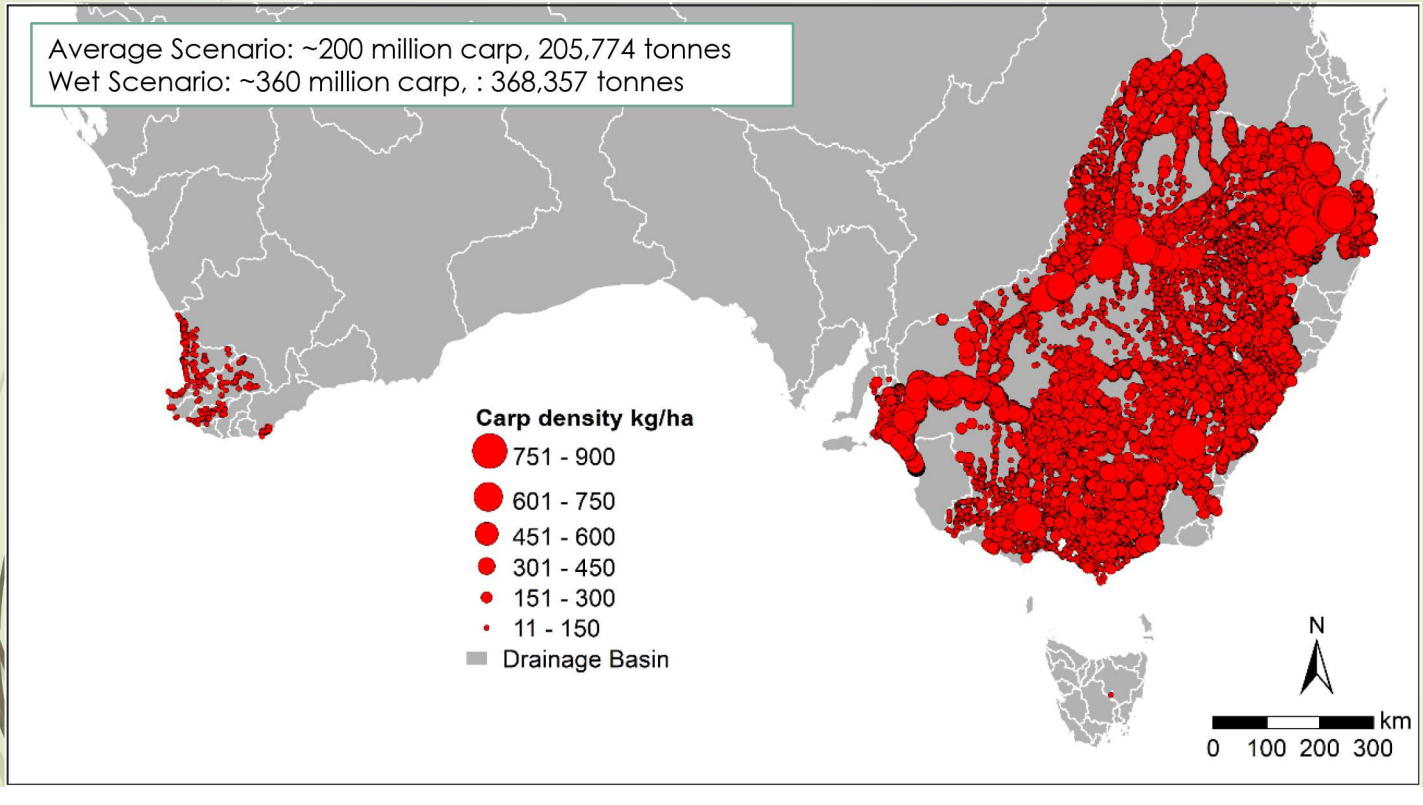
Extending past the MDB – can be done because State systems are ANAE based



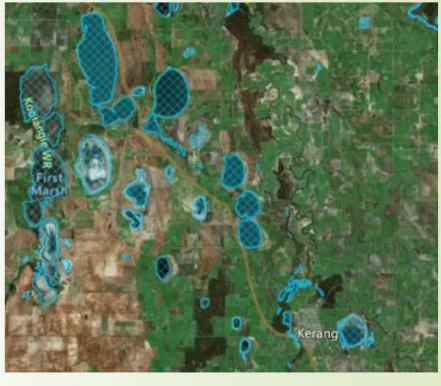


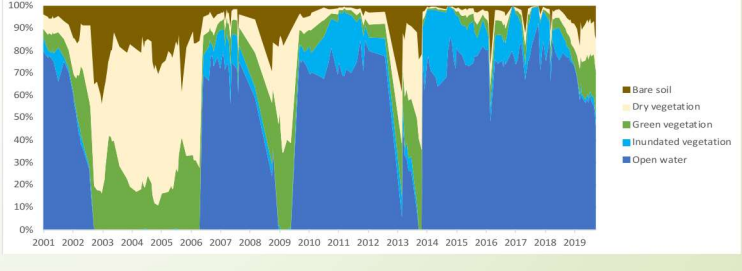
First National Carp Biomass Estimate



Where to now?

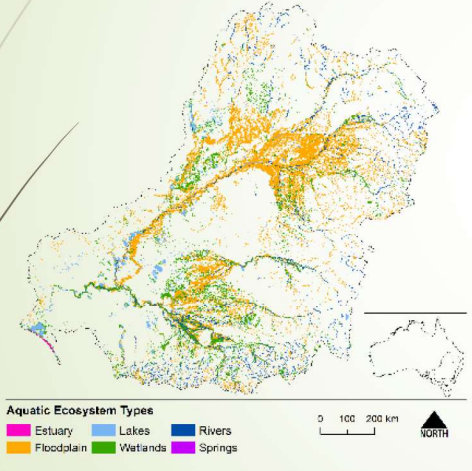
- Continue to support adaptive management in the Basin
- Improving understanding of wetland hydrology
  - Spatial units for Geoscience Australia's Wetland Insights
  - Improve ANAE Attributes
- Towards a national inventory
  - Geofabric
  - DEA Waterbodies
  - ANAE



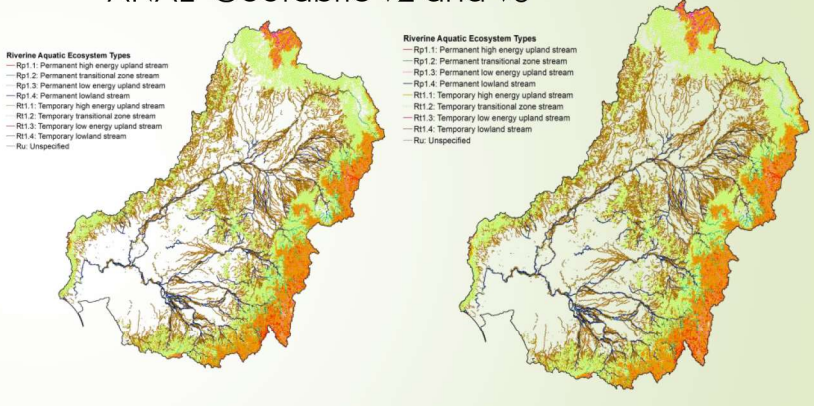


Spatial Layers – Shapefiles Data.gov

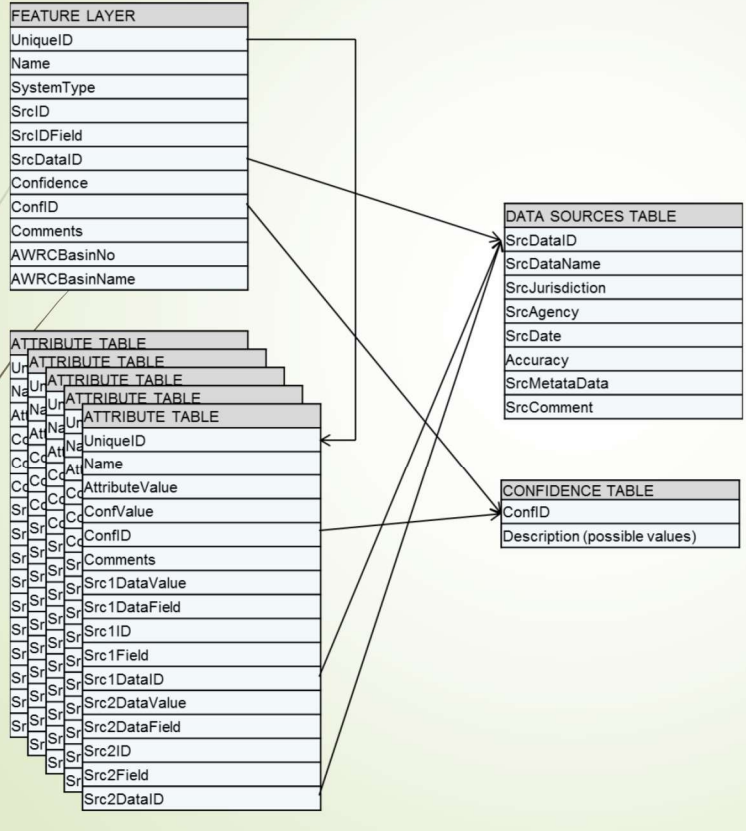
ANAE Ecosystems



ANAE Geofabric v2 and v3

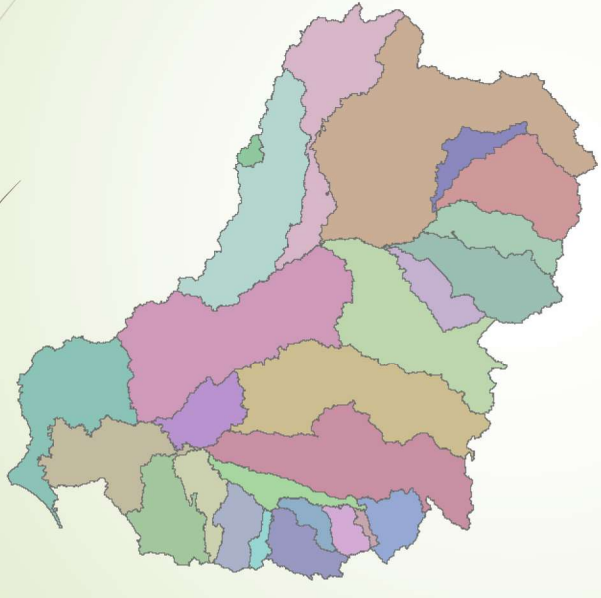


Geodatabase



- Traceability back to source information
- Assign Confidence

Catchment maps

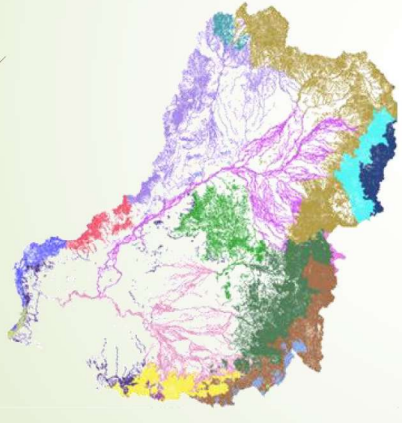


AWRC Basins

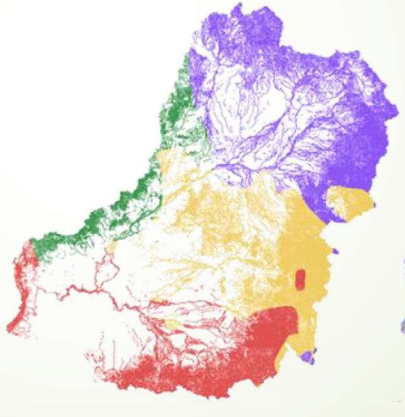
LTIM Valleys Basins

ANAE Level 1 and 2 subsets

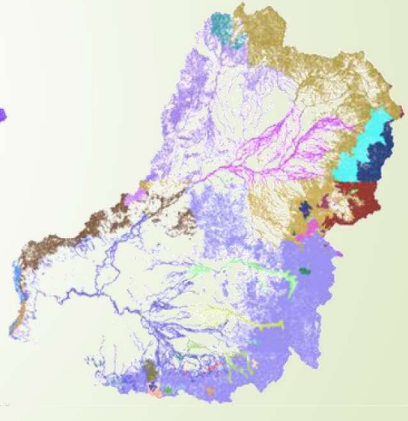
IBRA regions



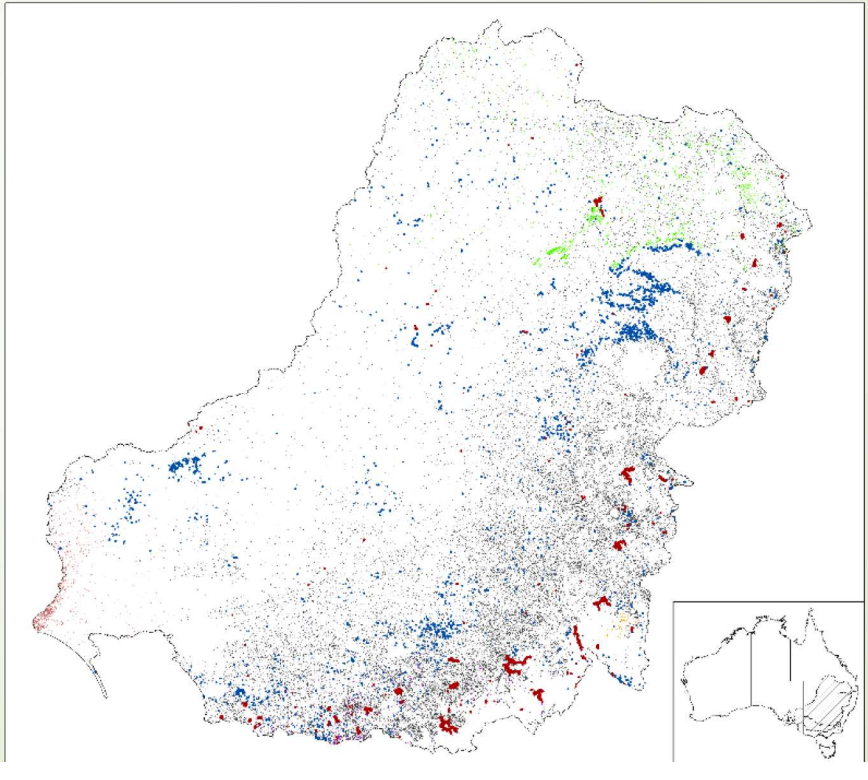
BOM seasonal rainfall zones



Hydrogeological regions



Artificial waterbodies (dams and more dams)



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