Department of
Mines, Industry Regulation and Safety

GOVERNMENT OF WESTERN AUSTRALIA

CO_2 STORAGE ATLAS

Geological Survey of Western Australia

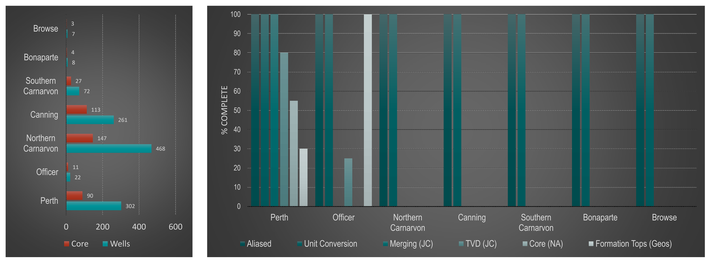
The Western Australian Government, and much of its industry, including many resources companies, is committed to achieving net zero emissions by 2050. With some of the highest per capita carbon emissions in the world, Western Australia will need access to a wide portfolio of technologies to avoid, reduce and offset emissions over the next 30 years.

The new CO_2 Storage Atlas of Western Australia will expand on the original atlas which, was published in 2013. The new atlas will cover new geographic areas and stratigraphic intervals not included in the first atlas. It will utilize higher resolution maps (including major faults), and reservoir and seal information from wireline logs in both the new regions as well as those originally investigated.

The deliverables will include a report, geoscience and engineering digital dataset, GIS-based maps and tabulation of potential sequestration reservoirs, including depleted fields (current and future) and suitable aquifers to be released 2024–25.

Reservior assessment (covers all basins)

- Clean-up of all wireline log data (about 6700 individual files) in the sedimentary basins, using machine learning has been completed. Manual merging is underway.
- Clean-up and correction of Routine Core Analysis and Well Deviation data underway.
- Release python scripts and all cleaned up wireline logs and other corrected well data as part of the project's products.
- Calculate reservoir parameters in key wells, utilizing cleaned up wireline logs and measured core analysis.

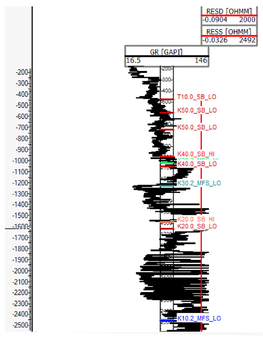


Formation tops and well correlations
(example from the Northern Carnarvon Basin)

- Create a consistent set of Formation tops and well correlations for input into mapping and reservoir analysis.
- Northern Carnarvon Basin not looked at by GSWA in over 20 years, so is currently the main focus.

Other basins have established GSWA formation picks in many wells, will address gaps after Carnarvon Basin complete.

Example of new formation picks: Flinders Shoal 1



Play	top	base	formation
T40	**SB**	**T45.2 MFS**	Exmouth SST. Delambre Fm
T40	**T45.2 MFS**	**T40.0 SB (TM1)**	Delambre Fm
T30	**T40.0 SB (TM1)**	**T37.05B**	Unnamed carbonate
T30	**T37.05B**	**T35.0 SB**	Pilgramunna Formation, Trealla Lms, unnamed carbonate
T30	**T35.0 SB**	**T30.0 SB**	Tulki Lst, Mandu Fm, Bullara Lst
T20	**T30.0 SB**	**T24.0 SB**	Giraltia Calarenite, Un-named Unit, Walcott Formation
T20	**T24.0 SB**	**T20.0**	Wilcox
T10	**T20.0**	**T10.0**	Cardabia Calcarenite, Dockrell Fm
K60	**T10.0**	**K60.0**	Miria Marl. Korojon Fm, Withnell Fm
K50	**K60.0**	**K50.0**	Toolonga Calcilutite, Beedagong Claystone, Haycock Marl
K40	**K50.0**	**K40.0**	Haycock Marl, Gearle Siltstone, Windalia Radiolarite equivalent, Windalia Sst member
K30	**K40.0**	**K30.2**	Muderong shale
K20	**K30.2**	**k20.0**	Mardie Greensand, Muderong Shale, Birdrong Sandstone, Zeepard Fm, upper barrow Gp
K10	**k20.0**	**k10.2**	Lower Barrow Group

Flinders Shoal 1	W000726	K30.2_pl	685
Flinders Shoal 1	W000726	K20.0_pl	844
Flinders Shoal 1	W000726	K10.2_pl	1089
Flinders Shoal 1	W000726	J50.0_pl	1285
Flinders Shoal 1	W000726	J40.0_pl	1884
Flinders Shoal 1	W000726	TR10.0_pl	3284

For more information, contact:
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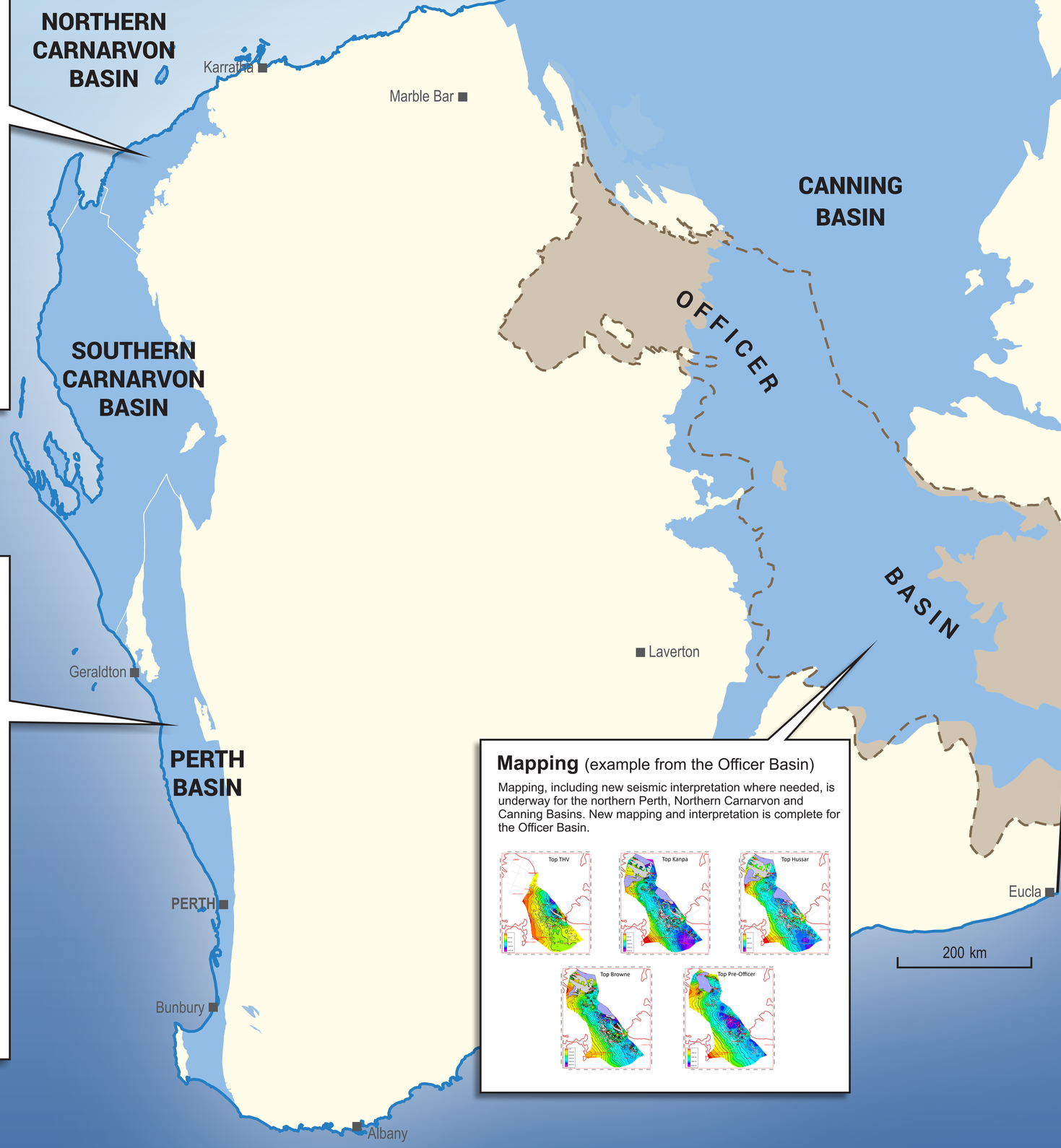

Temperature modelling
(example from the Perth Basin)

- Temperature database created and loaded into WAPIMS
- Temperature modelling underway
- Products to be generated:
  - Regional maps of geothermal gradient, heat flow
  - Temperature maps at key reservoir levels
  - Maps of depth to CO_2 storage window

**Genesis 1D modelling example –
Perth Basin, temperature vs depth**

Mapping (example from the Officer Basin)

Mapping, including new seismic interpretation where needed, is underway for the northern Perth, Northern Carnarvon and Canning Basins. New mapping and interpretation is complete for the Officer Basin.

Acknowledgement of Country
We respectfully acknowledge Aboriginal peoples as the Traditional Custodians of this land on which we deliver our services to the communities throughout Western Australia. We acknowledge their enduring connection to the lands, waterways and communities and pay our respects to Elders past and present.

IMARC OCTOBER 2023