



# Onshore Basin Inventories: Building foundational understanding of energy resources for Australia's Future.

**Adam H.E. Bailey**  
Geoscience Australia  
[adam.bailey@ga.gov.au](mailto:adam.bailey@ga.gov.au)

**Lidena K. Carr**  
Geoscience Australia

**Susannah Macfarlane**  
Geoscience Australia

**Jade Anderson**  
Geoscience Australia

**Tehani Palu**  
Geoscience Australia

**Dianne Edwards**  
Geoscience Australia

**Tom Bernecker**  
Geoscience Australia

**Chris Boreham**  
Geoscience Australia

**Kamal Khider**  
Geoscience Australia

**Russell Korsch**  
Geoscience Australia

**Liuqi Wang**  
Geoscience Australia

**Emma Grosjean**  
Geoscience Australia

**Chris Southby**  
Geoscience Australia

**Chris Carson**  
Geoscience Australia

**Paul A. Henson**  
Geoscience Australia

## SUMMARY

Geoscience Australia's Onshore Basin Inventories program provides a whole-of-basin inventory of geology, energy systems, exploration status, data coverage and key knowledge gaps of onshore Australian basins. Volume 1 of the inventory covers the McArthur, South Nicholson, Georgina, Wiso, Amadeus, Warburton, Cooper and Galilee basins and Volume 2 expands this list to include the Officer, Perth and onshore Canning basins. These reports provide a single point of reference and create a standardised national inventory of onshore basins. In addition to summarising the current state of knowledge within each basin, the onshore basin inventory identifies critical science questions and key exploration uncertainties that may help inform future work program planning and aid in decision making for both government and industry organisations. Under Geoscience Australia's Exploring for the Future (EFTF) program, new onshore basin inventory reports will be delivered progressively until 2024.

These reports will be supported by selected value-add products that aim to address identified data gaps and evolve regional understanding of basin evolution and prospectivity. Petroleum system modelling is being undertaken in selected basins to highlight the hydrocarbon potential in underexplored provinces, and seismic reprocessing and regional geochemical studies are underway to increase the impact of existing datasets. The inventories are supported by the ongoing development of the nationwide source rock and fluids atlas, accessed through Geoscience Australia's Exploring for the Future Data Discovery Portal, which continues to improve the veracity of petroleum system modelling in Australian onshore basins.

In summarising avenues for further work, the Onshore Basin Inventories program has provided scientific and strategic direction for pre-competitive data acquisition under the EFTF work program. Here, we provide an overview of the current status of the Onshore Basin Inventories, with emphasis on its utility in shaping EFTF data acquisition and analysis, as well as new targeted data acquisition.

**Key words:** Exploring for the Future, Onshore Basin Inventories, Mesoproterozoic Basins of Australia, Officer Basin, South Nicholson Basin, Carara Sub-basin, Canning Basin, Onshore Basins, Geoscience Australia.

## INTRODUCTION

Exploring for the Future (EFTF) is an Australian Government program dedicated to stimulating industry to ensure a sustainable, long-term future for Australia through an improved understanding of the nation's minerals, energy and groundwater resource potential (Geoscience Australia, 2022). Australia's Future Energy Resources (AFER) is an EFTF project evaluating the potential for new sedimentary basin-hosted energy commodity resources, including oil, natural gas and hydrogen, to support Australia's transition to a low carbon economy. As part of this project, the current knowledge of petroleum geology and exploration history in several underexplored and frontier onshore basins is being captured to expand the national onshore basin inventory. Geoscience Australia's Onshore Basin Inventories program provides a whole-of-basin inventory of geology, petroleum systems, exploration status and data coverage of onshore Australian basins. Volume 1 of the inventory covers the McArthur, South Nicholson, Georgina, Wiso, Amadeus,

Warburton, Cooper and Galilee basins (Carr et al., 2016) and Volume 2 expands this list to include the Officer, Perth and onshore Canning basins (Hashimoto et al., 2018) (Figure 1). They provide a single point of reference and create a standardised national inventory of onshore basins. Each assessment incorporates information gathered by precompetitive work programs undertaken by Geoscience Australia and state and territory governments, as well as publicly available exploration results and the geoscientific literature. In addition to summarising the current state of knowledge within each basin, the onshore basin inventory reports identify critical science questions and key exploration uncertainties related to both conventional and unconventional hydrocarbons to help inform future work planning and aid in decision making for both government and industry organisations (Carr et al., 2016; Hashimoto et al., 2018). The Onshore Basin Inventories provide foundational data which underpins investigations into basin-hosted resources, including hydrocarbons, hydrogen, deep groundwater, geological storage potential and basin-hosted minerals systems.

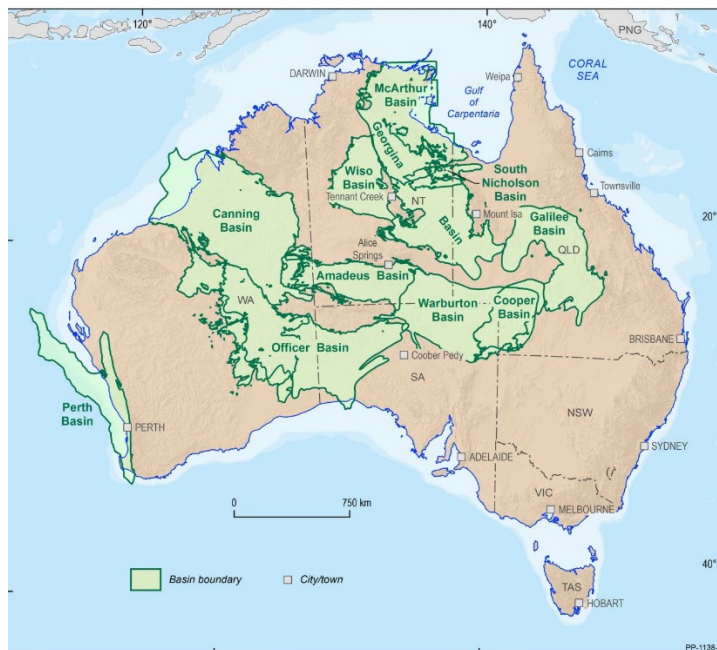


Figure 1. Basins addressed in the Onshore Basin Inventory to date

### NEW BASIN INVENTORIES

Under the aegis of the EFTF program, the Onshore Basin Inventory will be expanded to cover further basins not previously addressed in Volume 1 and Volume 2. New reports include the Adavale Basin of southern Queensland and the Victoria and Birrindudu basins in western Northern Territory.

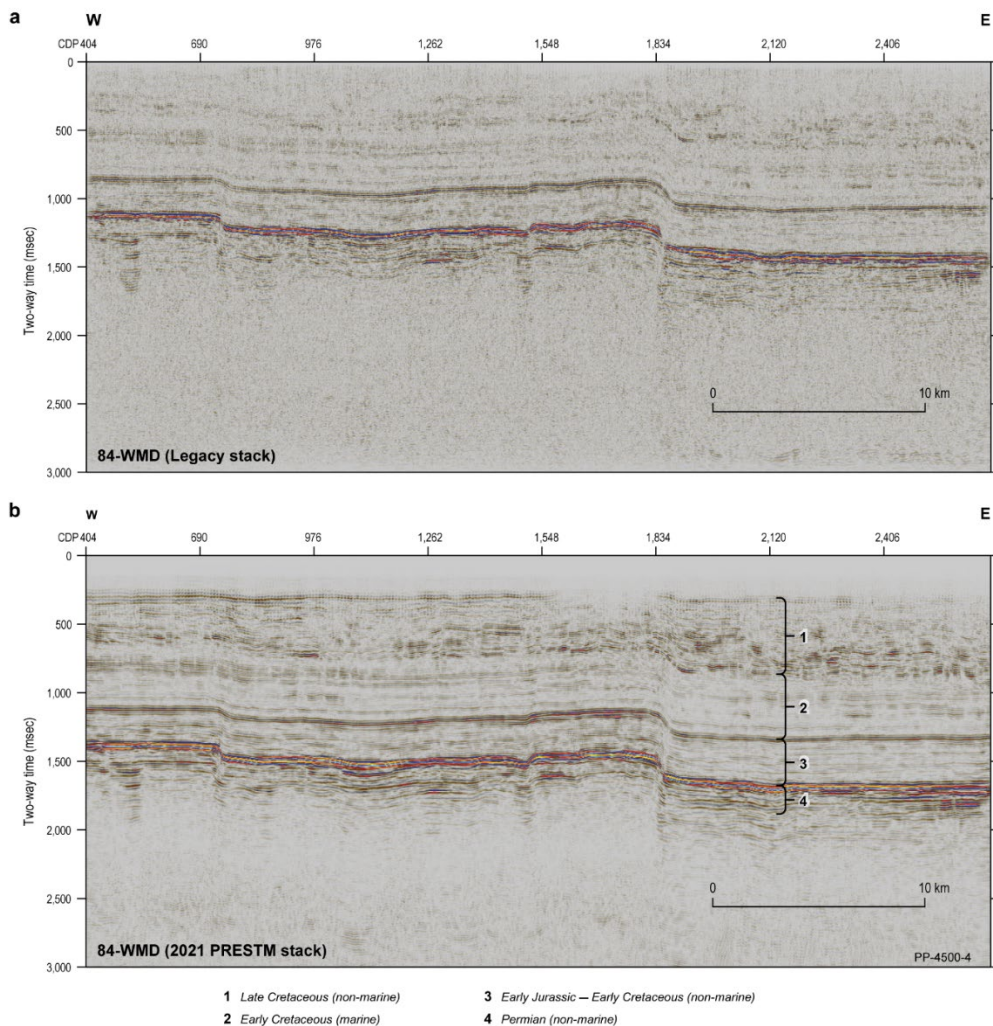
In addition to basin specific reports, a summary compilation covering the poorly understood Mesoproterozoic basins of onshore Australia has been included. Australia is known to host numerous Mesoproterozoic-aged remnant sedimentary basins or sedimentary successions, located in the Northern Territory, Queensland, Western Australia, South Australia and Tasmania. Although variably preserved and typically with limited available geological datasets, petroleum and mineral resources have been identified in Mesoproterozoic-age sedimentary units in Australia. Titled “Review of Mesoproterozoic Australian basins”, this report provides a geological overview of Australian Mesoproterozoic-age sedimentary basins and their current level of understanding, including a summary of location, stratigraphy and depositional environment, basin architecture, age constraints and known resources for each province. This review provides a necessary framework for government, academia and industry to understand the current data availability and level of knowledge to assist in future work targeted at improving the geological understanding and resource prospectivity of these regions.

A key aspect of the Onshore Basin Inventories and associated basin reports, such as the “Review of Mesoproterozoic Australian basins” are the recommendations for future work that are based on identified data and knowledge gaps. The recommendations provided by the Onshore Basin Inventories contribute to program planning at Geoscience Australia through informing pre-competitive data acquisition programs such as EFTF, by providing a summary of new data and research that should be acquired to further knowledge and understanding in each basin (e.g. Carr et al., 2020). Broad classifications of overall basin prospectivity for energy resources are defined by the Onshore Basin Inventories, allowing the comparison of basins based on not only their potential to host energy resources, but also the confidence with which that assessment is made (Carr et al., 2016; Hashimoto et al., 2018), which improves future program planning for both industry and government.

NEW DATA AND DELIVERY

The Onshore Basin Inventory reports are supported by selected value-add products, achieved through the re-analysis of existing samples and datasets which aims to address identified data gaps to improve regional understanding of basin evolution and prospectivity. One example of this is the acquisition of new regional organic geochemistry data in the Adavale and Eromanga basins, where legacy drill core with limited existing geochemical datasets were reanalysed to understand organic richness, thermal maturity, and maceral assemblages (Edwards et al., in press). This work was undertaken on five drill cores stored in the Geoscience Australia repository. Additionally, fluid inclusion stratigraphy (FIS) work was also undertaken on the same wells. Fluid inclusion stratigraphy is a process to analyse trapped volatiles preserved within fluid inclusions and pore spaces and allows for an understanding of fluid distribution and migration, particularly for resources such as hydrocarbons.

Petroleum system modelling is being undertaken in selected basins to highlight the hydrocarbon potential in underexplored provinces and provide insights into paleo-fluid flow pathways in the basins. Most recently, Palu et al. (In Press) presented the results of nine one-dimensional burial and thermal history models constructed using existing open file data to assess the lateral variation in maturity from potential source rocks in the Adavale Basin. This work incorporates the newly acquired Adavale Basin organic geochemistry work and was undertaken alongside the associated Onshore Basin Inventory chapter. These new data inform our understanding of the potential hydrocarbon generation of the region which, in turn, has significant implications for the hydrocarbon prospectivity of the Adavale Basin (Palu et al., 2022).



**Figure 2. Comparison between (a) legacy and (b) reprocessed seismic data from line 84-WMD within the reprocessed western Eromanga Basin seismic dataset. The reprocessed seismic data shows a significant uplift in the structural and stratigraphic resolution of the seismic data (Bernecker et al., 2022).**

The Onshore Basin Inventories facilitated the reprocessing of legacy seismic surveys in areas of interest such as the western Eromanga Basin region, where 3,807 line km of 2D reflection data cross both South Australia and the Northern Territory have been reprocessed. Modern processing techniques have been used to improve the resolution of seismic data, which were acquired between 1974 and 2008, helping to reduce the uncertainty in identifying potential traps and

providing clearer data to help understand basin evolution and tectonostratigraphy of the western Eromanga and the underlying Permian and Triassic basins (Bernecker et al., 2022). These data are available through Geoscience Australia’s EFTF portal.

The inventories are further supported by the ongoing development of the nationwide source rock and fluids atlas, accessed through Geoscience Australia’s Exploring for the Future Data Discovery Portal, which continues to improve the veracity of petroleum system modelling in Australian onshore basins. The source rock and fluids atlas provides up-to-date information on organic geochemical and geological data from Geoscience Australia’s Organic Geochemistry Database within both onshore and offshore basins, enabling the characterisation of petroleum source rocks and the identification of their derived petroleum fluids; two key elements of petroleum systems analysis. The portal provides relevant datasets and visualisation in map and graphical formats.

### NEW PROSPECTIVE REGIONS

The Onshore Basin Inventories provide a baseline understanding of basin architecture, evolution, resource potential, and outstanding scientific questions in the addressed basins; delivering an ideal base from which to inform the design and acquisition of new pre-competitive datasets as part of the EFTF program for industry and government agencies. In particular, the provision of prospectivity rankings along with the ability to assess the confidence with which that assessment is made allows for the creation of a prospectivity-confidence matrix (Carr et al., 2020) (Figure 3). In the planning phase of the EFTF program, this matrix was used to screen basins and guide the design of work programs in each basin, based on outstanding scientific questions, as well as identified uncertainties and data gaps. The same process was also utilised for the rapid regional prioritisation of basins in Stage 1 of the Geological and Bioregional Assessments program (Commonwealth of Australia, 2020).

To date, the foundational knowledge contained within the onshore basin inventories, have informed precompetitive data acquisition and analysis programs through the EFTF program in the South Nicholson region of northwestern Queensland and the Northern Territory, the Kidson Sub-basin of Western Australia, and the Officer Basin of South Australia and Western Australia.

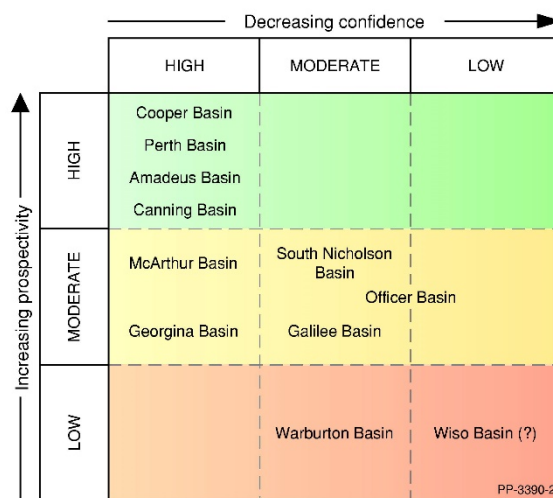
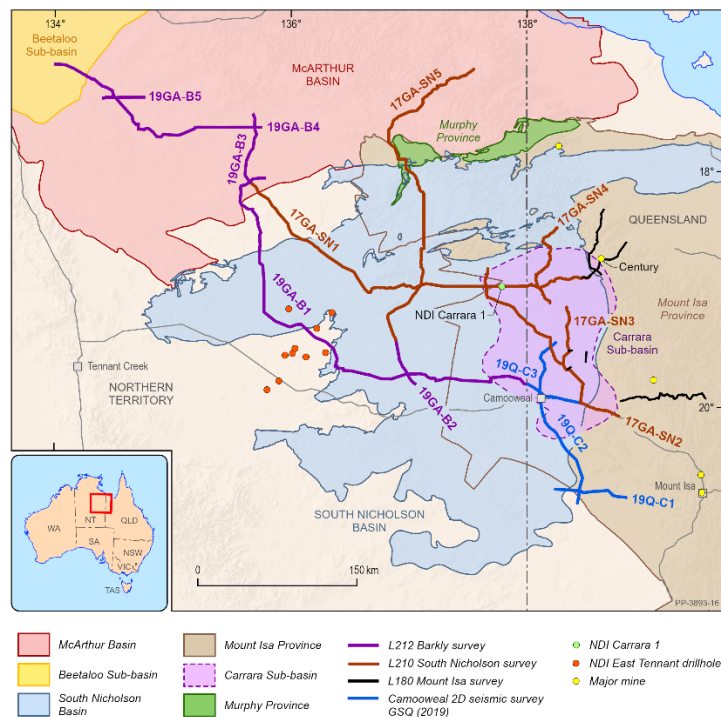


Figure 3. Prospectivity-confidence matrix for basins in Australia's Onshore Basin Inventory Volume 1 and 2 (Carr et al., 2021)

In the frontier South Nicholson region, the Onshore Basin Inventory Volume 1 identified significant uncertainty around both the subsurface architecture of the basin and the nature of potential petroleum systems, recommending new data be acquired to better define basin sequence stratigraphy and structure, and to identify potential petroleum systems (Carr et al., 2016). This included a recommendation for high resolution gravity surveys to define basin architecture and delineate major depocentres, reflection seismic surveys to define subsurface architecture and highlight the distribution of sediments, and the acquisition of new samples through stratigraphic drilling to establish the existence of effective petroleum system elements and to build regional stratigraphic correlations (Carr et al., 2016). In 2016, the EFTF program began implementing these recommendations (Henson et al., 2018; Carr et al., 2019a; Carr et al., 2019b; Carr et al., 2020a; Carr et al., 2020b; Jarrett et al., 2020; Carson et al., 2020; Fomin et al., 2020) and in 2017 acquired the L210 South Nicholson Deep Crustal Seismic Reflection Survey, which imaged thick sedimentary successions that correlate to the known Proterozoic gas plays in northwest Queensland’s northern Lawn Hill Platform. A key discovery of the South Nicholson Seismic Survey was a previously unknown depocentre of probable Proterozoic age, the Carrara Sub-basin (Carr et al., 2020b). The Carrara Sub-basin is identified as an approximately 8 km thick depocentre that straddles the border between northwest Queensland and the Northern Territory, hosting sediments interpreted as equivalent to the Paleo- to Mesoproterozoic Isa Superbasin, the Mesoproterozoic South Nicholson Basin, and the Neoproterozoic to



Paleozoic Georgina Basin. In 2019, the EFTF program acquired the L212 Barkly 2D Deep Crustal Reflection Seismic Survey to further constrain this depocentre, and to additionally image further gravity lows identified to the east of the Carrara Sub-basin (Southby et al., 2022).

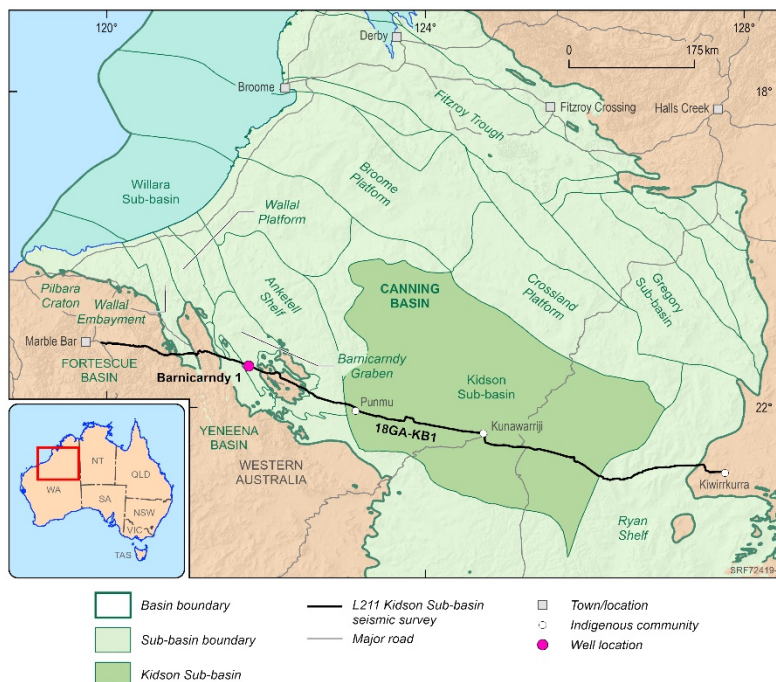


**Figure 4. Location of the deep stratigraphic drill hole NDI Carrara 1 and newly acquired seismic surveys across the South Nicholson region and the Carrara Sub-basin.**

These new seismic surveys not only demonstrate the existence of a significant depocentre in the South Nicholson region, but create a continuous seismic transect linking the Mount Isa Province of northwest Queensland with the McArthur Basin and Beetaloo Sub-basin in the Northern Territory (Southby et al., 2021). Finally, in 2020 the deep stratigraphic drill hole NDI Carrara 1 was drilled within the Northern Territory, about 250 km north-west of Mount Isa. NDI Carrara 1 is a collaboration between the MinEx CRC National Drilling Initiative (NDI), Geoscience Australia, and the NTGS and is the first to penetrate the Proterozoic Carrara Sub-basin. Drilled to a total depth (TD) of 1750.8 mRT, NDI Carrara 1 intersected a thick sequence of Proterozoic aged siliciclastic and carbonate rocks, which host several units of interest to hydrocarbon explorers due to affinities with the known Proterozoic shale gas plays of the Lawn Hill Platform. These include two organic-rich black shale sequences and a thick section of interbedded black shales and silty-sandstones where numerous hydrocarbon shows are present (Grosjean et al., 2022).

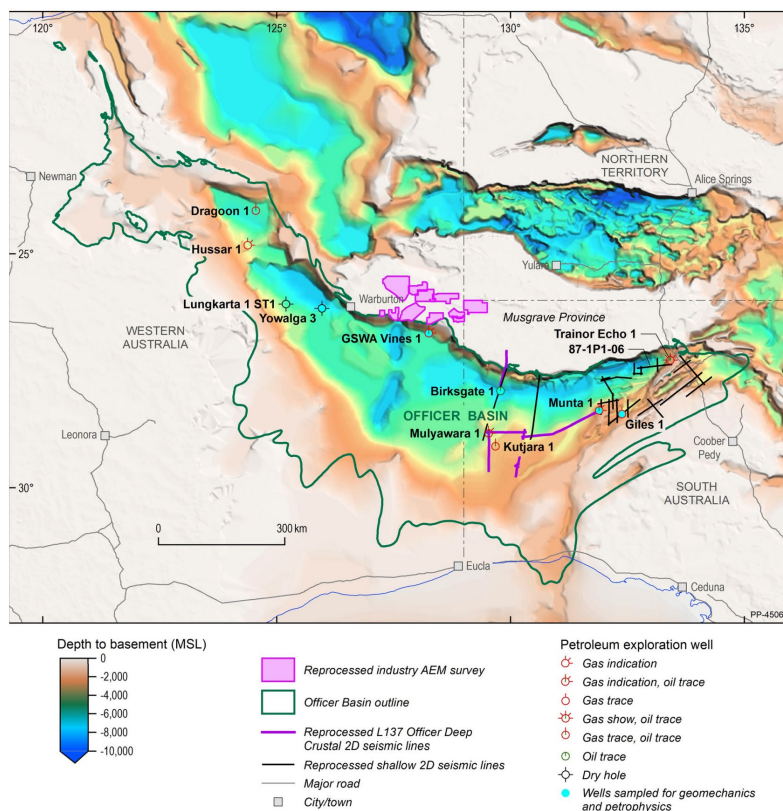
The Canning Basin of Western Australia has been highlighted as one of the least explored Paleozoic basins in the world, despite the discovery of economic hydrocarbons and affinities with large successful hydrocarbon basins in North America, North Africa and the Caspian region (Hashimoto et al., 2018). While the northern Canning Basin depocentres currently produce hydrocarbons, seismic and well data coverage over the basin is low. Sparse data coverage in the southern Canning Basin is particularly evident in the Kidson Sub-basin, a large depocentre that likely hosts the same hydrocarbon-prone strata as the northern Canning Basin (Hashimoto et al., 2018). The Onshore Basin Inventory Volume 2 identified that further work in the Canning Basin was required to improve exploration outcomes, particularly the acquisition of new 2D seismic reflection data and deep drilling in areas with major data gaps, such as the Kidson Sub-basin, to improve regional structural and stratigraphic frameworks (Hashimoto et al., 2018). Based on inventory recommendations, the EFTF program prioritised the Kidson Sub-basin as one of the primary study areas due to the frontier nature of the depocentre and the high relative prospectivity ranking of the Canning Basin (Carr et al., 2020c). Two major datasets were acquired – the 2018 L211 Kidson Sub-basin deep crustal seismic reflection survey was acquired between the Kiwirrkurra community and Marble Bar in northern Western Australia, and imaged a major, well preserved, depocentre ~500 km long and as much as 6.5 km deep. Subsequent to the acquisition of the L211 survey, the deep stratigraphic drill hole Barnicarndy 1 was drilled within the Barnicarndy Graben, 67 km west of Telfer (Carr et al., 2020c). The drill hole was sited here to provide drill hole control for the seismic successions as imaged at depth within the Kidson Sub-basin. Barnicarndy 1 was drilled to a total depth of 2680.53 m RT, terminating in low-grade Neoproterozoic metasediments and penetrating a Carboniferous to Permian fluvial clastic succession that includes glacial diamictites unconformably overlying a thick Ordovician succession (Edwards et al., 2021; Normore et al., 2021; Wang et al., 2021). These Ordovician strata incorporate fossiliferous calcareous mudstone intercalated with limestone

and siltstone, within which several thick sandstone packages are developed. No hydrocarbon indications such as excess mud gas or oil bleeds were observed at this location (Bailey et al., 2021a).



**Figure 5. Location of the Kidson Basin L211 deep crustal seismic reflection survey and the Barnicarndy 1 deep stratigraphic drill hole relative to major tectonic elements of the onshore Canning Basin.**

The Officer Basin is a remote, frontier basin located across western South Australia and Western Australia. While sharing a common Neoproterozoic history with the currently producing Amadeus Basin of central Australia, no hydrocarbon accumulations have been discovered to date in the Officer Basin (Hashimoto et al., 2018). The Onshore Basin Inventory Volume 2 highlights the isolation of the Officer Basin from markets and infrastructure as a primary barrier to increased exploration, despite there being sound evidence for the existence of several petroleum systems, high-quality reservoirs, and regional and local seals that result in an overall prospectivity classification of moderate (Hashimoto et al., 2018, Figure 3). Recommendations for future work include the acquisition of new regional-scale 2D reflection seismic data to further delineate the architecture of the basin, stratigraphic drilling, and 3D reflection seismic data acquisition across high-graded prospects and leads. In the first instance legacy data and samples from the Officer Basin have been investigated in order to build further understanding of the lithology and stratigraphy, with a particular focus on correlating the eastern and western sections of the basin (Carr et al., 2022). Towards this end, a new chemostratigraphic framework was developed utilising elemental data obtained from Inductively Coupled Plasma - Optical Emission Spectrometry (ICP-OES) and Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) testing by Chemostrat Australia on 1245 cuttings and 241 core samples from 10 Officer Basin wells (Munday et al., 2022). This study defined five chemostratigraphic mega-sequences within the Officer Basin, which has led to an update of the stratigraphy of the Officer Basin (Edwards et al., 2022). Additionally, existing 2D seismic lines have been reprocessed to provide improved data to help understand basin evolution and tectonostratigraphy across the western basin depocentres (Carr et al., 2022). The Onshore Basin Inventory Volume 2 also recommended that geomechanical studies should be conducted to assess if hydrocarbons are recoverable from low-permeability reservoir rocks in the basin (Hashimoto et al., 2018). Under EFTF, Geoscience Australia has acquired significant new geomechanical and petrophysical data covering potential unconventional and conventional reservoirs throughout the Neoproterozoic – Cambrian successions of the Officer Basin, improving understanding of rock properties across the basin (Bailey et al., 2021b).



**Figure 6. Map showing the Officer-Musgrave region in both Western Australia and South Australia superimposed on OZ SEEBASE® 2021 (Geonostics, 2021), highlighting the work undertaken as part of the EFTF program following the recommendations of the Onshore Basin Inventory Volume 2 (Carr et al., 2022).**

### SUMMARY AND CONCLUSIONS

Geoscience Australia’s Onshore Basin Inventory program provides a summary of available data and the level of geological knowledge for onshore Australian basins, delivering a foundational understanding of energy resources. Each basin inventory report provides a whole-of-basin summary of the geology, petroleum systems, exploration status and data coverage, incorporating information gathered by the precompetitive work programs as well as publicly available exploration results and geoscientific research. New basins are being assessed under the Exploring for the Future program, with new Onshore Basin Inventory chapters being released as they are finalised, beginning with the Adavale Basin of southern Queensland and a compilation covering poorly understood onshore basins of presumed Mesoproterozoic age. Reports on the Victoria and Birrindudu basins in the western Northern Territory will also be prioritised. Importantly, each basin inventory report makes a broad-based assessment of the current level of basin prospectivity for hydrocarbons and summarises issues and remaining questions, highlighting outstanding scientific problems within the basins which future work programs should address in order to increase understanding of basin architecture, evolution and resource potential.

These identified outstanding scientific issues and related recommendations have heavily informed the Exploring for the Future precompetitive data acquisition program, guiding project design and delivering new fundamental datasets that build understanding in poorly understood regions with significant energy potential. The up-to-date, foundational work undertaken in the Onshore Basin Inventories presents a launching pad from which data acquisition can be planned by both industry and government, and has contributed to scoping and planning of Exploring for the Future and other Geoscience Australia programs such as the Geological and Bioregional Assessments. As a result, significant new precompetitive datasets have been acquired in the South Nicholson region and the Canning and Officer basins, significantly enhancing understanding of basin architecture and resource potential and, hence, attractiveness for exploration. These reports are valuable to industry, governments, and academia in scoping potential areas for investment and research.

Selected value-add products are being delivered alongside the Onshore Basin Inventories, providing gap-filling data that develops regional understanding of basin evolution and prospectivity through the re-analysis of existing samples and datasets. This includes geochemistry, petroleum systems modelling, seismic reprocessing and the continued expansion of the source rock and fluids atlas.

The Onshore Basin Inventory provides a concise summary of the data and geological knowledge of hydrocarbon-prone onshore Australian sedimentary basins and is publically available. This information assists in advising the Commonwealth Government, state and territory governments, the energy industry and other stakeholders about the exploration status and potential hydrocarbon prospectivity of onshore Australian basins, helping to promote Australia as an attractive exploration destination.

## ACKNOWLEDGMENTS

This study was funded by Geoscience Australia's Exploring for the Future program. We thank Tim Evans and Joshua Lester for internal peer reviews. This paper is published with the permission of the CEO, Geoscience Australia. eCat 147372

## REFERENCES

- Bailey, A.H.E., Grosjean, E., & Wang, L. 2021a. Stratigraphic drilling in the era of EFTF: The Barnicarndy 1 and NDI Carrara 1 wells. Proceedings of the 3rd AEGC: Geosciences for Sustainable World – 18-21 April 2021, Brisbane, Australia. <http://pid.geoscience.gov.au/dataset/ga/145296>
- Bailey, A., Wang, L., Dewhurst, D., Esteban, L., Kager, S., Monmusson, L., Anderson, J., Jarrett, A.J.M., Henson, P. 2021b. Exploring for the Future – petrophysical and geomechanical testing program data release, Officer Basin, Australia. GA RECORD: 2021/028. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/Record.2021.028>
- Bernecker, T., Brashaw, B., Iwanec, J., Kalinowski, A., Rollet, N., Tenthorey, E., 2022. The 'Australia's Future Energy Resources' project: Investigating the energy resources potential in central Australia, in: Annual Geoscience Exploration Seminar (AGES) Proceedings, Alice Springs, Northern Territory, 5–6 April 2022. Northern Territory Geological Survey, Darwin.
- Carr, L., Bailey, A., Palu, T.J., Henson, P. 2020b. Onshore Basin Inventory: building on Geoscience Australia's pre-competitive work program with Exploring for the Future. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/132127>
- Carr, L.K., Edwards, D.S., Southby, C., Henson, P., Haines, P.W., Normore, L., Zhan, A., Brooks, D., MacFarlane, S., Boreham, C.J., Grosjean, E., Mory, A.J., Wang, L., & Gunning, M-E. 2020c. Kidson Sub-basin seismic survey and Waukarlycarly 1 stratigraphic well: an acquisition program for evaluating Canning Basin petroleum systems. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/134073>
- Carr, L.K., Korsch, R.J., Palu, T.J. 2016. Onshore Basin Inventory: the McArthur, South Nicholson, Georgina, Amadeus, Warburton, Wiso, Galilee and Cooper basins. Record 2016/004. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/Record.2016.004>
- Carr, L.K., Henson, P., Wang, L., Bailey, A., Fomin, T., Boreham, C., Edwards, D., Southby, C., Symington, N., Smith, M., Halas, L., & Jones, T. 2022. Exploring for the Future in the Officer Musgrave region. Geoscience Australia, Canberra. <https://dx.doi.org/10.26186/146988>
- Carr L. K., Southby, C., Henson, P., Anderson, J.R., Costelloe, R., Jarrett, A.J.M., Carson, C.J., MacFarlane, S.K., Gorton, J., Hutton, L., Troup, A., Williams, B., Khider, K., Bailey, A.H.E., & Fomin, T. 2020a. South Nicholson Basin seismic interpretation. In: Czarnota, K., et al. (eds.) Exploring for the Future: Extended Abstracts, Geoscience Australia, Canberra. 1–4. <http://dx.doi.org/10.11636/132029>
- Carr, L. K., Southby, C., Henson, P., Carson, C.J., Anderson, J.R., MacFarlane, S., Jarrett, A.J.M., Fomin, T., & Costelloe, R.D. 2019. Exploring for the Future: South Nicholson Basin region project outcomes and sequence stratigraphy, Annual Geoscience Exploration Seminar (AGES) Proceedings 2019, Alice Springs, Northern Territory, 19–20 March 2019. Northern Territory Geological Survey, Darwin.
- Carr, L. K., Southby, C., Henson, P., Costelloe, R., Anderson, J.R., Jarrett, A.J.M., Carson, C.J., MacFarlane, S., Gorton, J., Hutton, L., Troup, A., Williams, B., Khider, K., Bailey, A., & Fomin, T. 2019. Exploring for the Future: South Nicholson Basin Geological summary and seismic data interpretation. Record 2019/21. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/Record.2019.021>
- Carson, C. J., Kositcin, N., Anderson, J. R., Cross, A. & Henson, P. A., 2020. New U–Pb geochronology for the South Nicholson region and implications for stratigraphic correlations. In: Czarnota, K., et al., (eds.) Exploring for the Future Extended Abstracts, Geoscience Australia, Canberra. 1–4. <http://dx.doi.org/10.11636/132876>



Commonwealth of Australia, 2020. Bioregional Assessment Program. Last accessed: 21/10/2022. <http://www.bioregionalassessments.gov.au>

Edwards, D.S., MacFarlane, S., Grosjean, E., Buckler, T., Boreham, C.J., Henson, P., Cherukoori, R., Tracey-Patte, T., van der Wielen, S.E., Ray, J., Raymond, O. 2020. Australian source rocks, fluids and petroleum systems – a new integrated geoscience data discovery portal for maximising data potential. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/133751>

Edwards, D. MacFarlane, S., Kroeger, K., Funnell, R., Boreham, B., Grosjean, E., Wang, L., Palu, T., Southby, C., Carr, L., Khider, K., Henson, P., Buckler, T., Sohn, J., Jinadasa, N., Hong, Z., 2021. Petroleum systems synthesis of the Canning Basin: increasing our knowledge of frontier regions. AAPG Geosciences Technology Workshop Advanced Petroleum Systems Analysis in the Asia Pacific Region: New Technology and Applications, 17–18 March 2021, Perth, Australia.

Edwards, D., Munday, S., Wang, L., Riley, D., & Khider, K. 2022. Neoproterozoic and Cambrian chemostratigraphic mega-sequences of the Officer Basin; a regional framework to assist petroleum and mineral exploration. Geoscience Australia, Canberra. <https://dx.doi.org/10.26186/146285>

Fomin, T., Holzschuh, J., Costelloe, R. D. & Henson, P., 2020. Deep Northern Australian 2D seismic reflection surveys. In: Czarnota, K., et al. (eds.), Exploring for the Future: Extended Abstracts, Geoscience Australia, 1–4. <http://dx.doi.org/10.11636/134962>

Geognostics, 2021. OZ SEEBASE® 2021 from March, Geognostics Australia Pty Ltd, <https://www.geognostics.com/oz-seebase-2021>

Geoscience Australia, 2022. Exploring for the Future. Last accessed: 21/10/2022. <https://www.eftf.ga.gov.au/>

Grosjean, E., Jarrett, A.J.M., Boreham, C., Butcher, G., Carson, C., Bailey, A.H.E., Wang, L., Munson, T., & Henson, P. 2022. The energy resource potential of the Carrara Sub-basin revealed by new stratigraphic drilling. in: Annual Geoscience Exploration Seminar (AGES) Proceedings, Alice Springs, Northern Territory, 5–6 April 2022. Northern Territory Geological Survey, Darwin.

Hashimoto, T., Bailey, A.H.E., Chirinos, A., Carr, L.K. 2018. Onshore Basin Inventory Volume 2: The Canning, Perth and Officer basins. Record 2018/018. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/Record.2018.018>

Henson, P., Carr, L., Fomin, T., Gerner, E., Costelloe, R., Southby, C., Anderson, J., Bailey, A., Lewis, C., Champion, D. & Huston, D. 2018. Exploring for the Future - Discovering the South Nicholson Basin region with new seismic data. In: Annual Geoscience Exploration Seminar (AGES) 2018 Record of Abstracts. Northern Territory Geological Survey, Darwin. NTGS Record 2018-002, 52–54.

Jarrett, A.J.M., Bailey, A.H.E., Carr, L.K., Anderson, J.R., Palu, T.J., Carson, C.J., Boreham, C., Southby, C., MacFarlane, S.K., Hall, L., Bradshaw, B., Orr, M., Munson, T., Williams, B., Simmons, J., Close, D., Edwards, S., Troupe, A, Gorton, J., Gunning, M., Henson, P. 2020. A multidisciplinary approach to improving energy prospectivity in the South Nicholson region. In: Czarnota, K., et al. (eds.) Exploring for the Future: Extended Abstracts, Geoscience Australia, Canberra. 1–4. <http://dx.doi.org/10.11636/134164>

Munday S., Edwards, D.S., Chandra, J., Wang, L., Forbes, A., Riley, D., Anderson J., Grosjean, E., Bailey, A. & Boreham, C.J., 2022. Exploring for the Future: defining a chemostratigraphic framework for the Officer Basin: inorganic and stable isotopic analyses of ten petroleum wells from Western Australia and South Australia. Record 2022/07. Geoscience Australia, Canberra, <https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/145387>

Normore, L., Haines, P., Carr, L., Henson, P., Zhan, A., Edwards, D., Boreham, C. & Grosjean, E. (2021). Stratigraphic drilling: Waukarlycarly 1, southern Canning Basin. The APPEA Journal, 61, 224-235.

Palu, T. J., Korsch, R. J., Edwards, D. S., Khider, K., Boreham, C. J., MacFarlane S. K., & Bailey A.H.E. (In Press) Petroleum systems modelling of the Adavale Basin: 1D burial and thermal history modelling. Geoscience Australia, Canberra.

Southby, C., Carson, C.J., Fomin, T., Rollet, N., Henson, P.A., Carr, L.K., Doublier, M.P., & Close, D. 2022. Exploring for the Future - The 2019 Barkly Reflection Seismic Survey (L212). RECORD: 2022/009. Geoscience Australia, Canberra. <http://dx.doi.org/10.11636/Record.2022.009>

Southby, C., Rollet, N., Carson, C., Carr, L., Henson, P., Fomin, T., Costelloe, R., Doublier, M., & Close, D. 2021. The Exploring for the Future 2019 Barkly 2D Deep Crustal Reflection Seismic Survey: Key discoveries and implications for resources. In: Annual Geoscience Exploration Seminar (AGES) Proceedings, Alice Springs, Northern Territory, 20–21 April 2021. Northern Territory Geological Survey, Darwin.

Wang L, Edwards D.S., Bailey A.H.E., Carr L.K., Boreham C.J., Grosjean E., Normore L., Anderson J., Jarrett A.J. M., MacFarlane S., Southby C., Carson C.J., Khider K., Henson P.A., Haines P., Walker M. 2021. Petrophysical and geochemical interpretations of well logs from the pre-Carboniferous succession in Barnicarndy 1, Canning Basin, Western Australia. *The APPEA Journal* 61, 253-270. <https://doi.org/10.1071/AJ20038>