WATER ACROSS WURUNDJERI COUNTRY: VISUALISING WATER SYSTEMS FROM A FIRST NATIONS PERSPECTIVE

Michael Browne [1], Melanie Grills[2], Celeste Morgan [2], Neha Shetty [2]
1. Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation, VIC, Australia
2. Arup, Melbourne (Naarm), VIC, Australia

KEYWORDS

Traditional owner perspective, water on country, water cycle, visualisations, data

INTRODUCTION

As part of the Water is Life roadmap, Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation (WWCHAC) invites all people to see what through their eyes, talk with them to understand their values and to partner with them to re-energise caring for water as they fulfil their cultural duty in bringing back all water on Wurundjeri Country back to health. For First Nations peoples', water is more than a physical resource, it is a living entity that holds cultural, ecological and spiritual significance.

This case study showcases a data visualisation tool developed by WWCHAC and Arup to support understanding and exploration of water on Wurundjeri Country.

YEAR CASE STUDY WAS IMPLEMENTED

2024 to 2025

CASE STUDY SUMMARY

This case study highlights the collaboration between the Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation (WWCHAC) and Arup to develop a data visualisation tool for understanding water on Wurundjeri Country. The tool, created through a co-design approach, integrates hydrological data, ecological indicators, water supply and use data, waterway catchments and water infrastructure locations. It aims to support WWCHAC in advocating for the health of Country and informing decision-making by providing a holistic view of water on Country from a First Nations perspective.

CASE STUDY DETAIL

Our aim: The need to visualise and explore water on Country

When decisions and activities have the potential to impact water within Wurundjeri Woi-wurrung Country, the WWCHAC work with other stakeholders to make decisions. In practical terms, this can mean that WWCHAC are asked to contribute to a wide number and range of projects and need access to area-specific data and information about water on country to understand the full context. WWCHAC and Arup worked together to develop a spatial tool to visualise water systems and interconnections on Country.

Acknowledging that the construction of infrastructure to supply water for a developing landscape changed the way water interacted with the land, waterways, beings and sky became the priority for ensuring that the tool support WWCHAC. Combining the technical knowledge of Arup with the cultural values of WWCHAC, identified the lack of recognition within the water industry to the relationship between Wurundjeri Woi-wurrung people and the broader water cycle.

Our approach: A co-designed approach

The project was developed through a co-design approach, to ensure that the visualisation tool was tailored to the needs of WWCHAC. The co-design process began with collaborative workshops and conversations to understand the needs, aspirations, and challenges faced by WWCHAC staff and community members. These discussions included mapping the pains and gains, identifying barriers to accessing water data, and exploring opportunities for more effective water planning.

The content for the tool was developed with input from water authorities with a role in managing water on Wurundjeri Country, including the Department of Energy, Environment and Climate Action, Melbourne Water, Greater Western Water, Yarra Valley Water and Southern Rural Water. Engagement with water authorities assisted in sourcing data to embed in the tool, but also in highlighting the inconsistencies and gaps in the ways water data are currently collected and managed. This process began an ongoing partnership to try to improve data sourcing and sharing to develop an understanding of water on Country.

Key explorations: Building understanding of water on Country through a First Nations lens

In exploring the need for the tool, it was important to explore how we frame and understand water on Country through a First Nations lens. Systemically, water systems and water management in Melbourne (Naarm) is based around a delineation of the water cycle and its components (e.g. water supply, wastewater management, stormwater management, waterways), as conceptualised in Figure 2.

This is fundamentally different to a First Nations understanding of Country as an interconnected and living entity which cannot be segmented. As part of the development of the tool, we explored conceptualisations of water and Country (see Figure 3), to inform the structure and narrative within the tool (see Figure 4). This interconnected understanding of water and Country was fundamental in improving communication between Wurundjeri and other stakeholders in the water sector, as well as building a shared understanding. Some key water stories that are told through the tool, with supporting spatial data and other information are:

- *How water moves across Country*: Information on bulk water storages and transfers was important for Wurundjeri, as bulk water supply systems in the Melbourne region effectively harvest water from rainforest Country in the Yarra Ranges and transfer it across to the dry grassland Country of western Melbourne. In the case of desalinated supply, water is taken from sea Country and distributed across the region. Spatial data on transfers, bulk entitlements and water use can help to identify opportunities to reduce use from the bulk water system and return water to the land on which it fell.
- *Health of waterways on Country*: Spatial data and information on waterway flows and water quality is helpful to understand waterways and their catchments, and how their health, pathways and flow has changed over time.
- *Changes to billabongs, wetlands and introduction of constructed drainage*: Spatial mapping of pre-colonisation billabongs and wetlands, along with the presence of constructed farm dams, wetlands and storages, is important to understand how land has been altered and how water in the landscape has changed. Equally, data around stormwater generation within catchments, and discharges of both stormwater and treated wastewater to waterways is important to paint a picture of how changes to the land through urbanisation has altered Country.
- *Groundwater*: The below Country layer brings together data on groundwater use, health and soil conditions to shed light on an aspect of water in Country where there is limited knowledge and recognition of the potential impacts of reduced infiltration and over extraction. In recognising the changes to groundwater and groundwater levels as a result of continued development and increasing imperviousness, understanding the impacts to vegetation that may be reliant on this previously reliable source of water.

Outcomes: Bringing together an interconnected understanding of water on Country

A spatially rich and culturally grounded StoryMap (a product platform of ArcGIS suite) was developed to be both a technical resource and a cultural narrative. The storymap was co-developed through ongoing dialogue and feedback. WWCHAC guided the selection of data layers, spatial representations, and narrative elements. The final product integrates hydrological data, ecological indicators, water supply and use data, waterway catchments and water infrastructure locations to create a multi-dimensional view of water on Country (see Figure 5). It also embeds useful data sources, videos and documents to provide access to key information from one place. The storymap is structured as a story, with a narrative that guides the user through the layers of Water Country.

The outcomes of the project are significant. The storymap provides a powerful tool to support the engagement of WWCHAC in water management conversations. It enables WWCHAC staff to brief internal teams, educate new members, and advocate for Country in water planning forums. By making data and information more

accessible, the storymap empowers community members to participate in decision-making and strengthens the role of Indigenous knowledge in shaping water futures.

Lessons for the water industry and data gaps

Several key considerations emerged during this process, these included the importance of data soverignty, the need for visual tools that reflect First Nations relationships with water, and the value of collaborative ongoing data and information sharing with water authorities. Understanding the relationship between First Peoples and water, highlights the importance of including cultural awareness within water literacy, to improve the community's connection to and valuing of water.

CONCLUSION

In conclusion, this project demonstrates the value of co-design, a Country-centred perspective, and stakeholder collaboration in understanding and managing water on Country. It highlights the potential of spatial tools to support both technical planning and cultural engagement. It also underscores the importance of centering First Nations voices in the water sector.

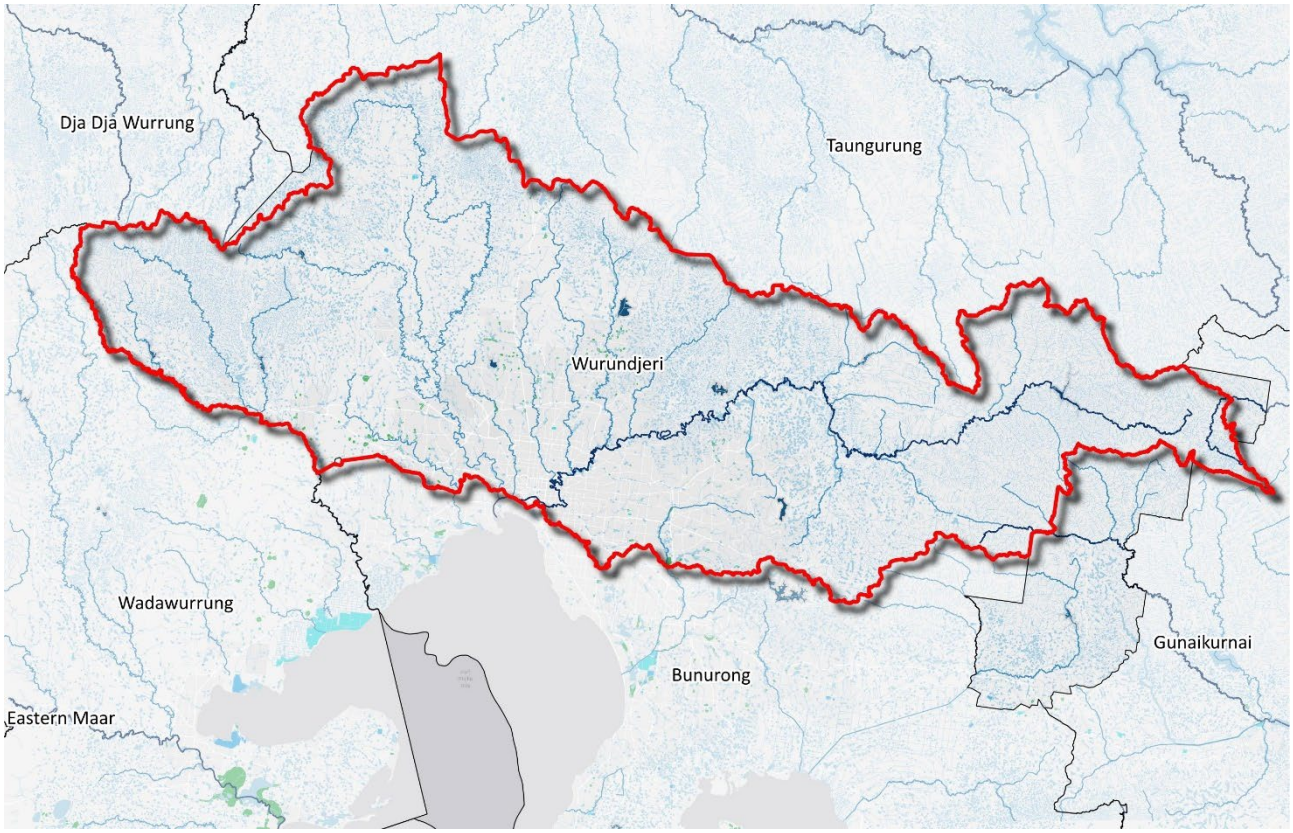

Figure 1: Map of Wurundjeri Country

Figure 2: Representation of the water cycle on Wurundjeri Country

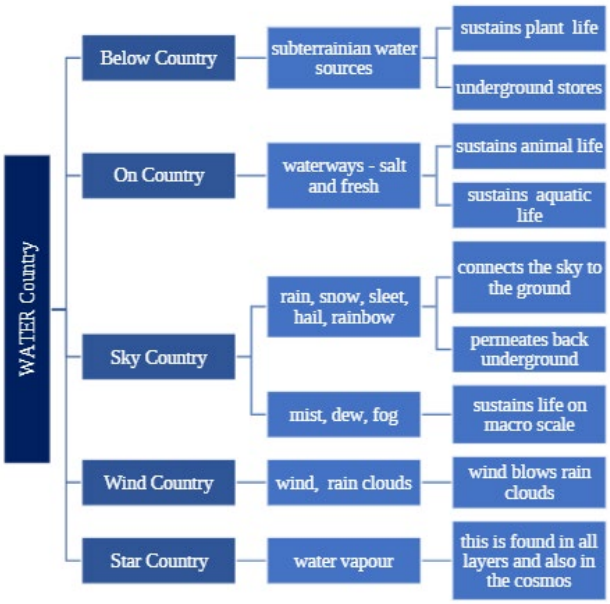

Figure 3: Conceptualisation of water country which is key to life and present in everything around us, embedded in each layer of Wurundjeri Country (Source: Mandy Nicholson (2023) Being on Country Off Country. Thesis, Monash University)

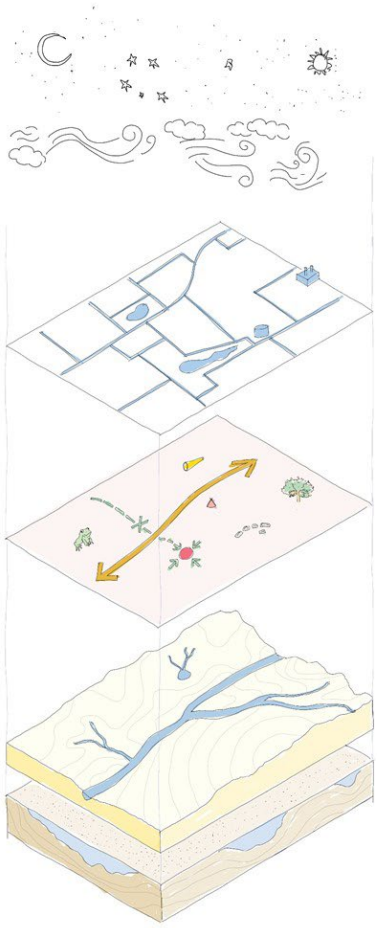

Figure 4: The layers of Wurundjeri Water Country used as the navigation for the StoryMap (Adapted from Hromek, D 2020, Aboriginal Cultural Values: An Approach for Engaging with Country, Department of Planning, Industry and Environment.)

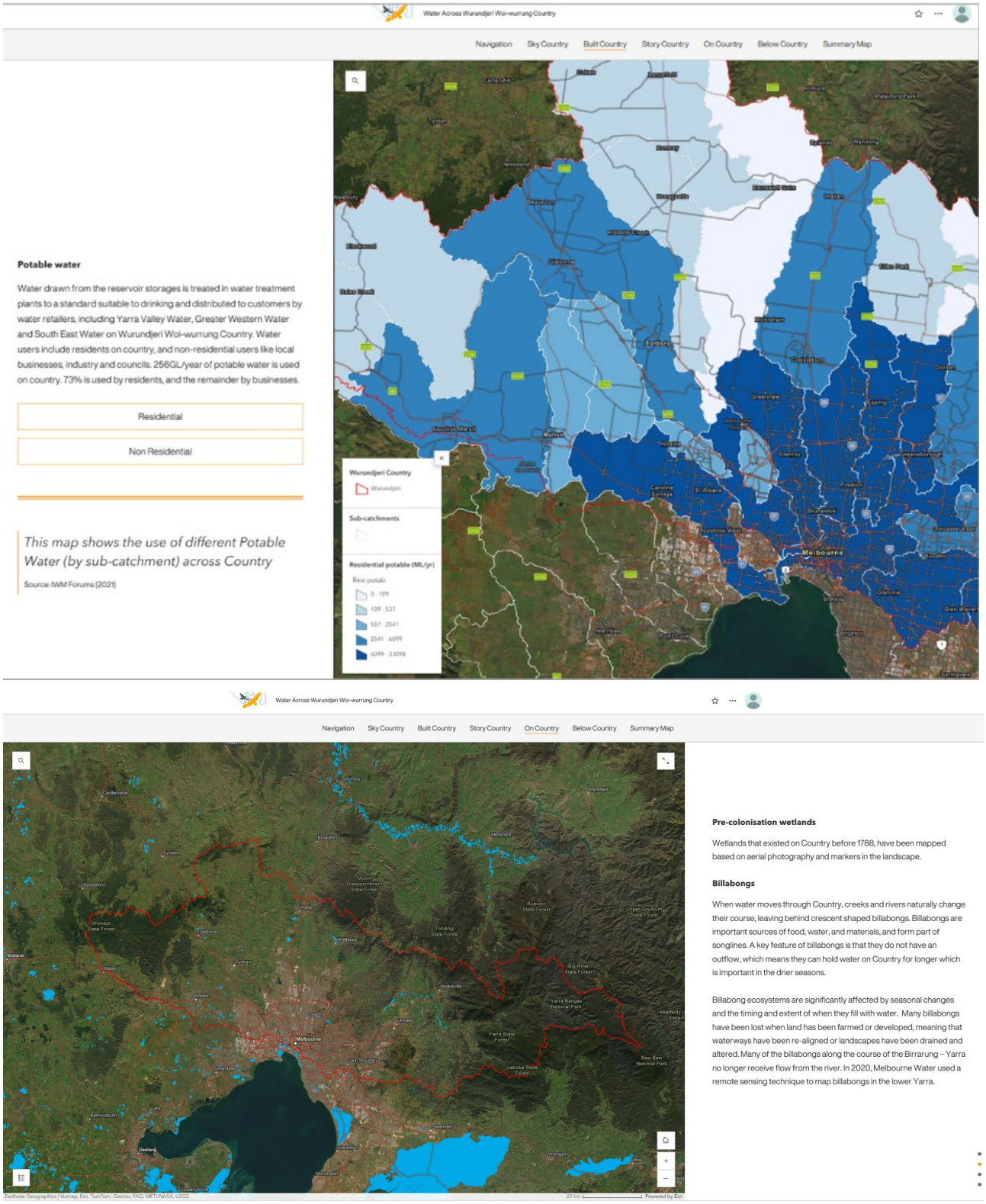

Figure 5: Screenshots from the Water on Wurundjeri Country StoryMap