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PLACES TO SWIM

PERSPECTIVES REPORT

NOVEMBER 2023

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Contents

Figures

Executive summary

People love to recreate around, on and in the water. As part of the Department of Planning and Environment's Open Spaces Program, Places to Swim provides an opportunity to improve access to natural waterways for recreation across NSW. This report investigates the issues, barriers and benefits associated with opening waterways for recreation.

NSW is enriched with a range of beautiful and healthy waterways providing opportunities for people to swim and recreate safely, create places that people can visit, and help build better communities.

A key attribute for all swimming sites is ensuring they are safe to use. Recreation involving waterways inherently involves risks, including exposure to waterborne contaminants and the risk of injury and drowning. As new swimming sites are opened the risks need to be identified, monitored, and managed.

Responsive and effective communication is essential as water quality and site conditions can change quickly. Promptly alerting potential swimmers to changing conditions, particularly when conditions become hazardous is also required. Furthermore, people of all ages, swimming abilities and cultural backgrounds will have different needs at each new recreation site and considering these needs should be undertaken carefully.

Opening a freely accessible new site will offer multiple benefits for the community. This includes providing communities with new recreational opportunities to be active and to engage with nature. New recreational facilities on and near waterways can also offer a cooling environment for people that could be an important refuge during summer heatwaves. Benefits can include increased local economic activity from increased visitation to an area.

However, building a healthy culture of swimming in natural waterways, must be underpinned with effective and timely communication with the site's users and the wider community. The case studies explored in this report offer a range of different approaches for the governance of swimming sites and engagement with swimming site users. They also demonstrate comprehensive and regularly updated information and advice to site users. Planning for new sites across NSW will benefit from learning what others have accomplished, alongside creative approaches to their development and management, including sharing information with the community.

Part 1. Introduction

The Department of Planning and Environment's Places to Swim program aims to better connect people to water and support the health and wellbeing of the community (NSW DPE, 2022a, 2023). The program supports the creation in freely accessible public places for water recreation and swimming. It helps improve access to and recreational engagement with waterways for people of all ages, abilities, and backgrounds. These needs were identified in the 2019 NSW Greater Sydney Outdoor Study (NSW DPE, 2019).

The Greater Sydney Outdoor Study showed us that:

- Sydneysiders consider access to water very important – about half enjoy outdoor recreation involving water at least once a week.
- swimming in natural areas is increasing in popularity, with a demand for clean, safe, natural swimming holes, and improved access and amenities at swimming locations.
- there is an increased demand for access points to water for activities such as kayaking and paddle boarding, as well as storage for equipment for these water-based sports.

The findings highlight people's access to waterways for recreation varies significantly. The biggest barrier to people accessing water for recreation was travel distance. For councils, a major barrier is the financial feasibility of delivering new access.

The work that forms the basis of this report was done to help the NSW Government and local councils provide better access to swim sites in NSW. The research used a trans-disciplinary insight approach to look at issues around culture, water quality, policy, and land ownership.

The purpose of this Places to Swim Perspective Report is to:

- understand the various perceptions held by the community, governments, and stakeholders
- detail the barriers to providing swimming sites across NSW
- outline the benefits of high-quality, public open space for swimming in waterways
- explore findings, case studies and design thinking in the creation and maintenance of areas available for swimming.

Benefits of new swimming sites

There is extensive research capturing the benefits of swimming in waterways (Costello et al. 2019). New swimming sites will offer the community places where people can be more physically and socially active in their local areas. They can also meet and interact with others and build new social connections in natural environments, increasing health and wellbeing (Van Tulleken et al., 2018; Morrison et al., 2022).

The benefits from opening a new site can be categorised into four areas: economic, ecological, health and wellbeing and social and cultural (Crompton, 2005; Finlay et al. 2015; Hunter et al. 2015; Johnston 2018; Duedahl et al. 2020). The exact benefits depend on the individual characteristics of each site and the social and environmental setting of the area. The design and operation of a new recreational site will also strongly influence the resulting benefits to the community (Lloyd and Auld, 2003).

The case studies featured in this report demonstrate the range of benefits associated with Australian and international swimming sites.

Swimming sites can become very popular and help attract visitors to an area (Fogado-Fernandez et al 2018) and can provide a new recreational space for the local community. The 2019 NSW Greater Sydney Outdoor Study (DPE, 2019) found that distance to a suitable location is one of the most prominent barriers to for people to swim. In general, people are willing to travel for about 30 minutes for a swim (by whichever mode of transport is most convenient, such as driving, cycling, or walking).

Swimming sites can also attract visitors to an area (Fogado-Fernandez et al. 2018) which generates economic and employment benefits for the region. For example, tourists and locals flock to the City of Bern (Switzerland) to swim in the Aare River through the centre of the city (Groundwater, 2017). An Australian inland equivalent might be 'Wagga Beach' in the Murrumbidgee River at Wagga Wagga (Figure 1). This popular inland swimming location received international recognition when it was rated as one of the 10 best beaches in Australia (White, 2019).

Opening a swimming site can be part of a longer-term plan to rehabilitate degraded or poorly used areas. For example, the opening of the Spree River in Berlin, Germany for swimming is just one facet of broader plans to increase community usage of the surrounding urban landscape (The Source, 2018). Many communities will benefit from having a swimming site with well-designed facilities and parkland, particularly to cool off during heat waves (Harlan et al. 2006).

Many swimming sites can offer recreational opportunities both on land and in the water. They offer the community a refuge near the natural cooling effects offered by waterways. An example is the popular recreational facilities at western Sydney's Lake Parramatta, a cool and shaded lake surrounded by a 70-hectare parkland just 2 kilometres from the Parramatta central business district (Pitt, 2019), see case study).

Figure 1. Wagga Wagga Outback Lifesavers. Image Credit: Wagga Yabbies Royal Life Saving Society.

Swimming sites and associated facilities can host a variety of organised sporting activities, such as competitive water sports and triathlon events held in Canberra's urban lakes (see Part 2 – Australian Capital Territory case study). NSW's coastal beaches provide an outstanding example, with the many sporting and social activities offered by beaches. The very popular 'Nippers' activities at surf clubs encourage children of all ages to be fit and active within a strong culture that promotes confidence and water safety (NSW Surf Lifesaving, 2022). Royal Life Saving's Outback Lifesavers Program is the equivalent of surf lifesaving for inland waterways. Since the state's first pilot in Wagga Wagga in January 2021, (Figure 1) the program has expanded to Scone and Inverell. It has been developed to provide children in and across our regional/remote areas and communities near inland waterways with an active aquatic participation experience using inland waterways and local pools.

The following sections provide an overview of the benefits of providing high-quality public open space for swimming in waterways.

Economic benefits

Increased recreational activity at swim sites and at associated open space recreation areas can generate economic multiplier effects for the surrounding local economy (Kaufman, 1996). For example, increased public flows into an area can be capitalised into car parking fees at council-owned car parks and through council-organised community events by the waterways. It can lead to increased consumer expenditure in local retail, food, and beverage outlets nearby. For example, the economic benefits associated with upgraded wastewater

treatment triggered improved water quality at Sydney's beaches. This had an estimated value of an additional $330 million per year to the NSW economy through increased travel and tourism (Sustainability Matters, 2016).

New swim sites may also influence local real estate prices. Research has shown that people are prepared to pay more for a property that is located near a recreation reserve (Crompton, 2005) which can benefit can generate extra property tax revenue (Kaufman, 1996). Access to more recreational sites can also help reduce the financial burden on local and state-wide health care systems as it encourages people to build local social connections and adopt a more active and healthier lifestyle (Sato et al. 2019; Astell-Burt et al. 2021, 2022).

Ecological benefits

Managed healthy rivers and waterways provide many ecological benefits (Tickner et al.2017), of which swimming and other recreation activities benefit. Maintaining, cleaning up waterways, and restoring natural swimming sites are key components in contributing to an ecologically healthy and swimmable waterway (Garlock, 2013). Healthy waterways support biodiversity and nourish the complex interaction between organisms living in the water and the surrounding environment (Pinto et al. 2012).

Healthy waterways also help to reduce and clean stormwater run-off and maintain and help re-establish natural ecosystems (Sustainability Matters, 2016). Urban heat waves can be tempered by cooling effect of waterways to surrounding areas through better regulation of temperatures and urban heat mitigation. Cooler breezes come from over the water and water's ability to absorb solar radiation and evapotranspiration processes creates lower environmental temperatures (Broadbent et al. 2017).

Health and wellbeing benefits

The health and wellbeing benefits of people using new recreation sites, including swimming sites, is rooted in the biophilia hypothesis – there is an instinctive bond between human beings and other living systems (Maller et al. 2005). Giving people opportunity to increase contact with natural environments, like waterways, improve individuals' overall wellbeing, quality of life and mental health (Duedahl et al. 2020; Bruckner et al. 2022). Spending time in nature can reduce stress, improve mood, restore cognitive capacities and attention, increase productivity and boost imagination and creativity (Finlay et al. 2015; Markevych et al., 2017).

There are social, psychological and health benefits for the elderly suffering from dementia from spending time outdoors, particularly being beside water. The healing power of being immersed in nature and the benefits from multi-sensory experiences such as sounds and touch for elderly people have been well-researched (Hunter et al. 2015; Astell-Burt and Feng, 2019; Astell-Burt et al., 2022).

Opening a waterway site for swimming can also be an effective way for local communities to escape soaring summer temperatures, especially inland areas where urban heat island effects are acute and where heat-related illnesses and deaths are more profound (Steeneveld et al., 2014; Camero, 2017). Recreation involving natural waterways encourages local communities to maintain a healthy and active lifestyle in the long term. It can lead to lower obesity levels, lower the risk of cardiovascular disease, and help with other adverse health outcomes associated with inactivity (Costello et al., 2019).

Social and cultural benefits

Waterways and associated surrounding public open space reserves are freely accessible, open amenity spaces. Using these public assets effectively can help address social inequalities (Uddin & Piracha, 2022) by prioritising the connection of people to waterways in places that need it the most while providing an opportunity to build community social capital, which is defined as the networks of relationships among people who live and work in a particular society, enabling that society to function effectively. Having a wide range of connections (bonding, bridging, and linking) promotes social norms, trust, and cooperation among people in the local community and wider society (Putnam, 1995).

New swim sites and associated land and amenities lead to the creation of a congregation place, that can enable daily social interaction and accessible areas to play. They foster connectivity among family and friends (Morrison et al. 2021). Opening new swimming sites also forms part of the NSW Government's Places to Swim program, which is providing more inclusive public open spaces for swim to support the health and wellbeing of the community (Morrison et al. 2021b; NSW Government, 2023).

Waterway congregation places can connect and strengthen a sense of community and belonging. A strongly interconnected community with a strong sense of belonging fosters perceptions of security and confidence, along with the health and wellbeing benefits noted above (Miradyanti et al., 2021). Opening a new recreation site on a waterway provides an opportunity to improve the lives of people living nearby. Being able to spend time outdoors surrounded by nature is beneficial for communities as it allows them to feel a deeper connection with the natural world (Swim England, 2022).

Improving access and recreation at waterway sites offers a way for communities to think more deeply about the history of a place and its cultural connections – especially its indigenous heritage. For centuries, waterways have been a valuable resource and gathering place for local people (Johnston, 2018). Protecting and managing water is a custodial and intergenerational responsibility (Moggridge et al 2019). Culturally significant opportunities exist to recognise and integrate Aboriginal water values (cultural, economic, social, and spiritually) (Moggridge & Thompson 2020). Cultural and spiritual values relate to a range of uses and issues, including spiritual relationships, language, song lines, stories, sacred places, customary use, the plants, and animals associated with water, and recreational or commercial uses (https://www.waterquality.gov.au/anz-guidelines/guideline-values/derive/cultural-values).

Switzerland case study

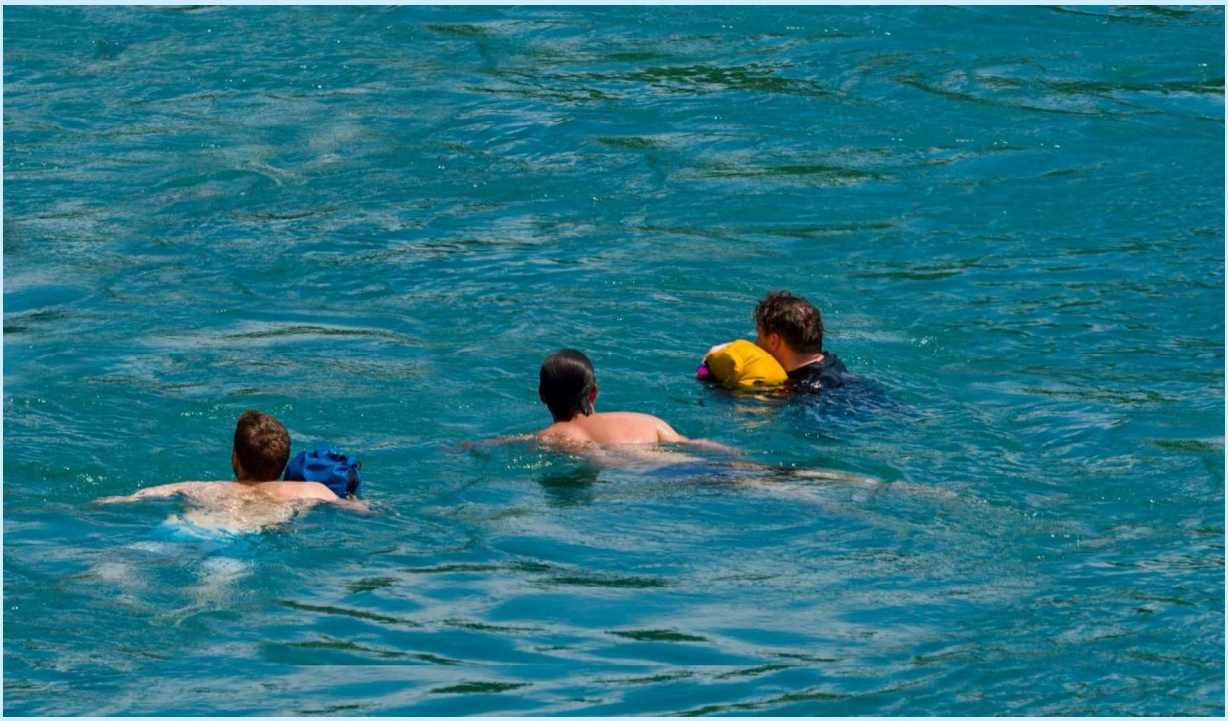


Figure 2. Swimming in the Aare River in Bern, capital of Switzerland

This case study was sourced from an article in Le News

Switzerland is a landlocked nation that lacks ocean beaches but has an abundance of freshwater lakes and rivers. It is generally recognised as a world leader in embracing rivers and lakes for swimming.

Switzerland has developed a long history of swimming in rivers and lakes in its cities. A celebrated example is summer swimming in the Aare River that flows through the City of Bern, the capital of Switzerland (Figure 2). It is extremely popular with both residents and tourists, particularly in hot summer weather. The Bernese tourist information centres offer support, including providing swimming maps and selling waterproof bags (Bernadette 'Aare' Bags) for swimmers to keep their clothes and valuables safe and dry as they swim down the river.

Summary of the barriers

There are often barriers at potential swimming sites that could individually or collectively limit their safe and effective operation. Some barriers are difficult to fully overcome. Others may not prevent a new swim site form being established but may be influential in the design and operation of a new site.

Water quality

Good water quality is an essential requirement for creating a new swimming site (Wright and Morrison, 2023). Regular occurrences of impaired water quality can create unacceptable health risks for recreational users (Graciaa et al. 2018). Swimming in contaminated water risk exposure to waterborne pathogens. They can cause acute gastrointestinal illnesses in swimmers, such as diarrhea and vomiting. Other common illnesses that can be acquired from swimming in contaminated waters include skin rashes, respiratory issues, and eye, ear nose and throat infections (CDC, 2022). Regular testing of swimming water quality assesses the microbial safety for swimmers using the National Health and Medical Research Council's *Guidelines for Managing Risks in Recreational Waters* (NHMRC 2008).

Physical aspects

Some waterways have physical characteristics that make swimming unsafe or at least need careful consideration in the design of a new swim site. This could include having water that is too cold, fast-flowing currents or areas of shallow water that can contain dangerous submerged objects (Royal Life Saving Society, 2022a).

Economic and travel

Barriers to councils developing a site may include a lack of available funding, difficulties in leadership or issues with project governance. From a recreational perspective, the biggest barrier to people accessing water for recreation is travel distance and costs. People want access to swimming sites close to where they live (NSW DPE, 2019).

Environmental impact

Many potential swimming sites are in relatively undisturbed natural environments. Developing them could have a negative impact on the natural environment and its ecology, for example disturbing habitat such as removal of snags/debris or bankside vegetation. Additional human activity, associated with a new swimming site disturb key habitat for a species of conservation significance, such as critical habitat for endangered shore birds (Marasinghe et al. 2020) or juvenile Murray Cod, where use of rock piles can be used to provide nursery habitat (Hutchinson et al. 2019).

The planning process

The planning process plays a significant role in creating new swimming sites. If a local government is interested in opening up their waterways there are a few legislative requirements that they need to consider. First, the zoning of the waterway and neighbouring land parcels, as most waterways in NSW are given a ‘waterway zone’, which comes with a set of permissible uses. This may include aquaculture, environmental protection, flood mitigation.

Furthermore, land on the banks of the waterway may be zoned environmental conservation potentially limiting types of development. Furthermore, alignment with government strategic planning documents will be important to underpin the vision and aspirations of projects. Depending on the type, scale, and nature of development, planning approval pathways need to consider the relevant State environmental planning instruments (such as State Environment Planning Policies) and be consistent with council policies including local strategic planning statements, local environmental plans, and development control plans, and policies where necessary. Also, budget allocation would be required for any upgrades, works and maintenance costs for managing the waterway. This would be a case-by-case basis dependant on the motivations of the council.

Some barriers may be overcome by considering the future management of the swimming site. For example, the community may feel safer at the swimming site if the area has adequate lighting or restricted access after-hours. These issues need to be identified and addressed at the early planning stage (Caspersen and Olafsson, 2010).

A lack of suitable adjoining land or concern from surrounding residents about noise and traffic from increased visitation are both barriers to creating a new swimming site, as is poor traffic access. Swimming can be a noisy activity which can generate noise complaints by neighbours (Lyons, 2022). The tenure of the land may also be an issue. It may, for example, require a change in zoning or ownership.

Risks and hazards

Swimming can be a hazardous activity. There are serious risks to human health from exposure to waterborne contamination, including faecal bacteria and blue–green algae (CDC, 2022). Additionally, all swimming sites have inherent risks of injury and drowning (Royal Life Saving Society, 2022b). Sydney's beaches have developed a very strong and effective safety culture and advocacy for swimming 'between the flags' at surf beaches patrolled by lifesavers is an accepted safe way to enjoy swimming in a hazardous environment (Surf Lifesaving NSW, 2022). The inland waterway equivalent is the Royal Life Saving's Outback Lifesavers Program (see Figure 1).

Communication with swimming site users

People using swimming sites need ready access to information on each site. This includes the site location, facilities available and any details that will help potential users. Other important details are transport options, availability of parking and toilet facilities. As conditions for safe swimming can change rapidly, swimmers also need to be alerted to any hazards, such as unsuitable water quality or dangerous waterway conditions (flooding, waves, debris). Several case studies include examples of providing the community with information on recreational sites, such as Yarra Watch in Victoria (Yarra Watch, 2021), or the very comprehensive range of information provided by New Zealand Aotearoa on the website 'Can I swim here'? (Land and Water Aotearoa; Wright and Morrison, 2023).

Overcoming implementation complexities

Preparing a new swimming site on a natural waterway is a complex challenge that will involve coordinated planning and ongoing site costs (Waston, 2019). Projects must be backed by strong leadership and buy-in from government and community stakeholders. A collaborative governance structure will be needed, with the cooperation of both NSW and local governments and strong community engagement. Case studies from other jurisdictions show how this can operate. For example, swimming in Victoria's Yarra River is supported by a

combination of the Environmental Protection Authority Victoria, Melbourne Water and three local councils at the four Yarra River swimming sites (Yarra Watch, 2021).

Lake Parramatta case study

Figure 3. The swimming enclosure at Lake Parramatta. Image credit: City of Paramatta

This case study was sourced from an article on OurLivingRiver.com.au

The reopening of Lake Parramatta for swimming has been a revelation to many. Parramatta residents and visitors have enjoyed swimming in its cool and clean waters, particularly in hot weather. The swimming site, its facilities and the surrounding bushland has become a popular natural freshwater and parkland oasis in the middle of the urban landscape of central Sydney. Also, usage of this site shows that recreation near waterways is highly valued by the community, even for people that do not go into the water. Lake Parramatta is a water-cooled natural landscape. It is a water-side refuge away from urban noise and traffic and summer heat.

Lake Parramatta is a 10-hectare freshwater lake that was opened to the public for swimming in 2015. Just 2 kiolometres from Parramatta CBD, it is located within a 73-hectare bushland reserve. The area offers walking trails, picnic facilities and barbeques as well as swimming and other aquatic recreation. The lake has an enclosed area reserved for swimming that is patrolled by lifeguards throughout the swimming season (Figure 3). Opening the swimming area in Lake Parramatta was an important milestone. The lake had been closed for swimming for more than 70 years. Major improvements in water quality made it safe and healthy for swimming.

Opportunities

Consider the following when identifying sites to be developed under the 'Places to Swim' program and for future similar programs:

1. **Swimming in natural 'open' waterways inherently involves human health risks**. Acknowledging these risks allows you to identify and implement measures that adequately manage the risks and effectively share information with prospective swimmers. The issue of water quality and the exposure of people to waterborne contaminants is a key public health concern. Another is the risk of injury and drowning. To mitigate these risks, you need to implement identification, monitoring and management programs and share the latest information with prospective users.

   NSW can learn from the experiences of managing these risks from freshwater river and lake swimming sites in other Australian and international jurisdictions. Case studies such as those in this report from Canberra, New Zealand, and Ontario (Canada) provide examples of how to effectively share informative and up-to-date water quality and 'swimmability' information with the community. The City of Bern (the capital of Switzerland) recognises that swimming in the Aare River is hazardous and expects swimmers to consider the risks and their capabilities before entering the water.
2. **Operating a new swimming site will involve planning, incur establishment costs, and entail considerable ongoing site maintenance costs**. The decision to open a new swimming site will have many associated costs in the short, medium, and long term. Managing each new site will include developing plans for maintaining site facilities and associated activities, monitoring water quality and preparing a comprehensive business plan. Ongoing funding from various tiers of government and others will be an important long-term consideration.
3. **Each new swimming site will benefit from a person in a senior leadership position to endorse and champion the proposed swim plan**. They can provide strong leadership and coordination when planning and establishing a new swim site. They can also help drive productive engagement with a diverse range of stakeholders.
4. **Successful councils that secure Places to Swim grant funding** could be closely monitored to understand what made their bid successful. Their experiences will be shared to help others in future new swim site activations.
5. **A variety of cost–benefit analyses, environmental and social impact assessments and demand analysis research tools need to be investigated** to understand and monitor projects. It is good to assess the widespread benefits to justify your choices and investment decisions.
6. **Collaborative governance structures and effective capacity-building strategies (stakeholder and community engagement) will ensure the successful activation of swim sites**. The case studies reflect a range of different governance models. For example, the New Zealand model has a consistent nationwide approach, with the government partnering closely with 11 regional and smaller local councils. The governance model for swimming in natural waterways in Ontario (Canada) is coordinated by a non-government organisation (Lake Ontario Waterkeeper) with Canadian and Ontario province funding and health guidance. It also uses volunteer 'citizen scientists'.
7. **Explore community values-based framework** that considers the role of councils acting as stewards for the planning and management of natural resources. Many of the case studies explored in this report reflect

this approach, particularly those at sites across New Zealand. Information provided on swimming sites in New Zealand includes information on the surrounding region, its different natural resource attributes (such as biodiversity, land uses, endangered species, and conservation areas) and local settlements and industries.

8. **Look for opportunities to recognise and integrate Aboriginal water values (cultural, economic, and social)** into plans. For example, the New Zealand case study (see Land and Water Aotearoa) incorporates information from Traditional Owners (Māori) associated with some of the swimming sites and surrounding lands.
9. **Manage waterways used for swimming sites according to appropriate NSW water quality and river flow objectives** that reflect the agreed environmental values and long-term goals, including primary and secondary contact recreation. Each case study showed that water quality guidelines were a core element in protecting human health at sites used for swimming in natural waterways. National and international case studies had considerable variation in the choice and values of water quality indicators (*E. coli*, *enterococci*, blue–green algae, turbidity), frequency of sampling, management responses to poor results and approach to how water quality results are shared with the community.
10. **The subtleties of community diversity need to be recognised and embraced**. The term 'community' relates to varying demographics, cultural, ability and socio-economic characteristics. These need to be incorporated into the planning and design processes.
11. **Prioritise connecting people to waterways in places that need it the most**, reflecting the purpose in the NSW Premier's Priorities and Public Open Space Strategy for NSW (NSW DPE, 2022).
12. **More research is needed into how to share information with the community about the benefits and risks of opening waterways swimming**. A healthy culture of urban swimming needs to be underpinned by the timely and effective dissemination of information. The New Zealand case study appears to be a world leader in effectively sharing information with the community according to an individual's needs and interests. The platform used by Land and Water Aotearoa is maintained in partnership with regional New Zealand councils and is easy to use and offers a diverse range of information.
13. **Develop international alliances and connect with the global movement of open-water swimming**. The case studies in this report cover a fraction of the developments in connecting communities to waterways. While NSW is a world leader in coastal (beach) swimming, it has limited organised swimming sites in inland waterways. Engagement with the international open swimming movement will help our state learn from the experience of other countries.

Yarra River case study

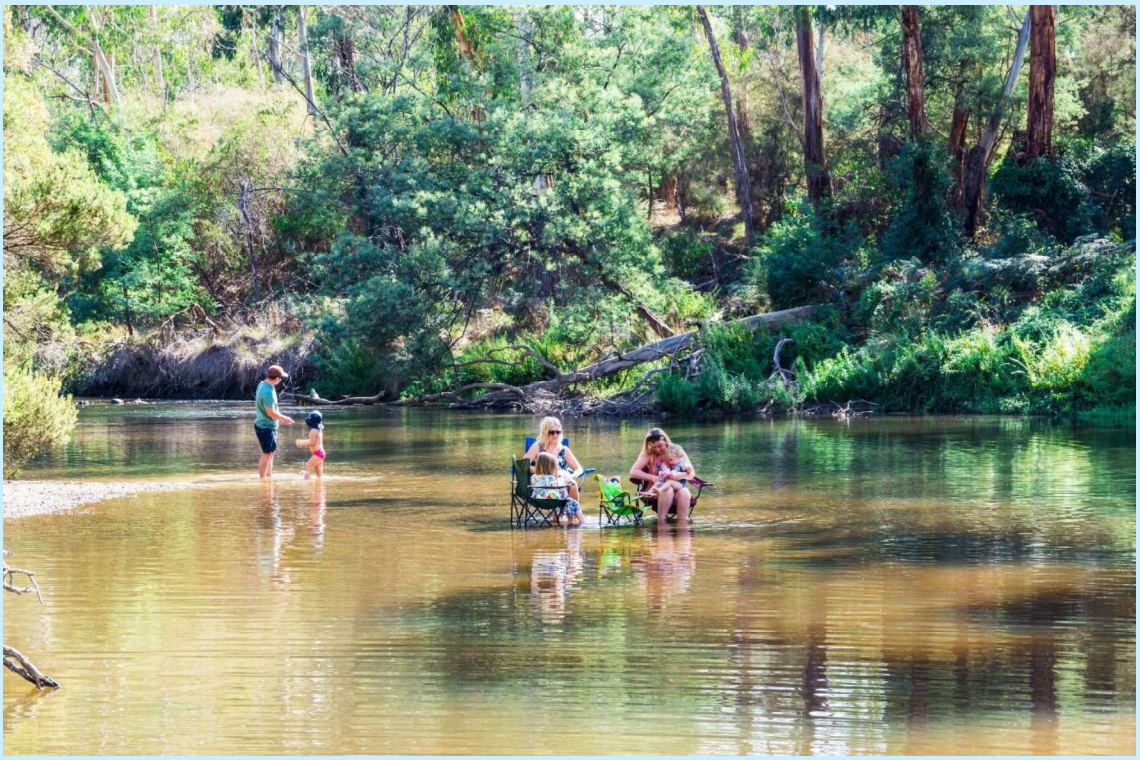


Figure 4. Swimming and recreating in the Yarra River at Warrandyte River Reserve in January 2015

This case study was sourced from an ABC news article

Swimming and recreating in Victoria's regional Yarra River is very popular (Figure 4). Swimming is supported at 4 locations (Kew, Warrandyte, Launching Place and Healesville). These swim sites are upstream of the river's most highly urbanised reaches near inner Melbourne, where swimming remains prohibited.

Yarra River swimming at these 4 swim sites use a governance model involving EPA Victoria in partnership with Melbourne Water and 3 local councils (Yarra Ranges Council, Manningham Council and City of Boroondara). Information on water quality is shared through the Yarra Watch website. Bacterial results are updated during the swimming season. Detailed advice about the location and features of Yarra River swimming sites are provided by a third-party website Swimming Hole Heaven. This website has information on inland waters (streams, rivers, lakes, and waterfalls) in Australia, New Zealand, and Fiji.

Part 2. National and international places to swim case studies

This section explores a series of Australian and international case studies that collectively demonstrate a broad range of approaches to supporting and managing community recreation in and around natural waters. Each has been chosen to help generate ideas, particularly for groups that are considering or planning their future swim site projects.

Some case studies have been running for many years in highly urban locations (such as Switzerland). Others are supported by a unique governance model. Swimming in Victoria's Yarra River involves a water utility (Melbourne Water) a state government agency (EPA Victoria) and 3 local councils. Swimming in Ontario (Canada) is based on swimming in lakes and is a volunteer community citizen science project. The New Zealand example follows a national program in partnership with local governments. Swimming in New Zealand is enabled through an easy-to-navigate and very information-rich website 'Can I swim here?' run by the national agency Land and Water Aotearoa.

Australian Capital Territory

Canberra in the Australian Capital Territory (ACT) is Australia's landlocked capital city. It lacks ready access to coastal beaches and has embraced swimming and/or other water sports in its fresh waters. This includes 3 of its urban lakes and its 3 rivers (Murrumbidgee River, Cotter River, and Molonglo River).

Monitoring water quality hazards (particularly faecal bacteria and blue–green algae) and advising the community on swimming suitability is central to protecting the public health of waterway users.

The ACT has a collaborative governance framework for multi-agency management of recreational water sites (lakes and rivers). Governance is complex and involves several agencies. ACT Health Protection Services undertakes microbial water quality monitoring of major recreational sites. ACT EPA undertakes year-round testing for blue–green algae at several swimming sites. ACT City Services manages the recreational use of 2 urban lakes and the Molonglo River corridor. It also publishes results of water quality monitoring on the ACT City Services website. This website offers regularly updated advice on whether a site is open for swimming or secondary contact recreation.

The National Capital Authority is responsible for Canberra's largest urban lake (Lake Burley Griffin). It monitors water quality in Lake Burley Griffin and provides information on its website. There are 3 designated swimming areas in this lake.

The 'swimmability' of Canberra's urban lakes is often limited due to risks from hazardous levels of blue–green algae or microbial pathogens. The National Capital Authority uses a third-party website run by 'Swim Drink Fish Canada' (theswimguide.org) to share its latest results and general recreational information on each site with the community. The ACT Government website that provides water quality advice also prominently acknowledges the Traditional Custodians of the ACT, the Ngunnawal people.

Swimming in ACT urban lakes is permitted in only 3 lakes (Lake Burley Griffin, Lake Ginninderra, and Lake Tuggeranong). River swimming is permitted at several locations along the Murrumbidgee River and other rivers.

Access Canberra is an ACT Government agency that provides the latest results for the swimming and recreational sites and advises if a site is 'open' or 'closed', if swimming and/or boating is 'not permitted' or if the site is available for dog swimming. This information is provided on the Water quality in our lakes, ponds and rivers web page (see Figure 5 and Figure 6)

The ACT waterways used for swimming and other recreation are often impaired by hazardous levels of blue–green algae. ACT has a blue–green algae action plan. It has 4 alert levels (low, medium, high, and extreme) based on algae species and their relative abundance and biovolume. There are specific management actions required for each alert level, with sites closed for swimming at the alert levels considered unsafe. Water samples are collected and tested for blue–green algae every week throughout the year.

Water testing of recreational waters is also conducted for faecal contamination and follows a clear protocol. The measure of bacteria *enterococci* per 100 mL is used as an indicator of faecal pollution. Over the swimming season samples are tested weekly. If *enterococci* results exceed 200 per 100 mL, follow-up sampling and site inspection are conducted. If the follow-up results still exceed the limit, the site is closed for swimming. Bacteria samples are collected weekly, but only during the swimming season (September to April).

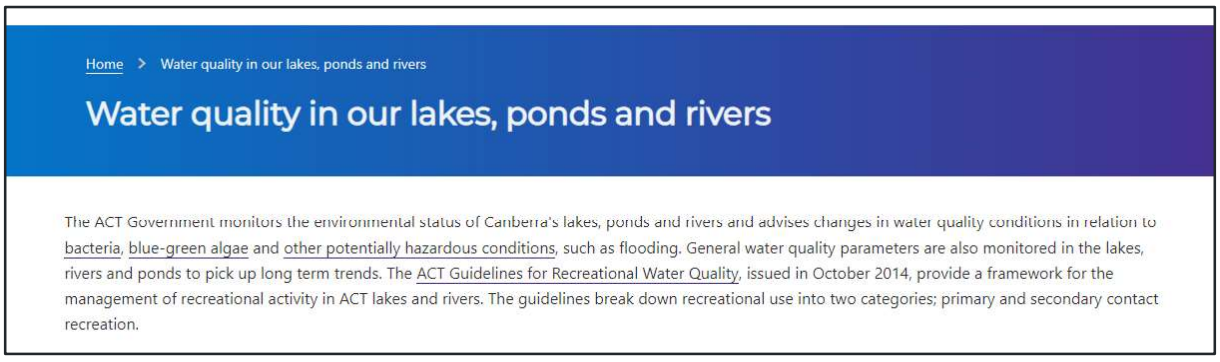
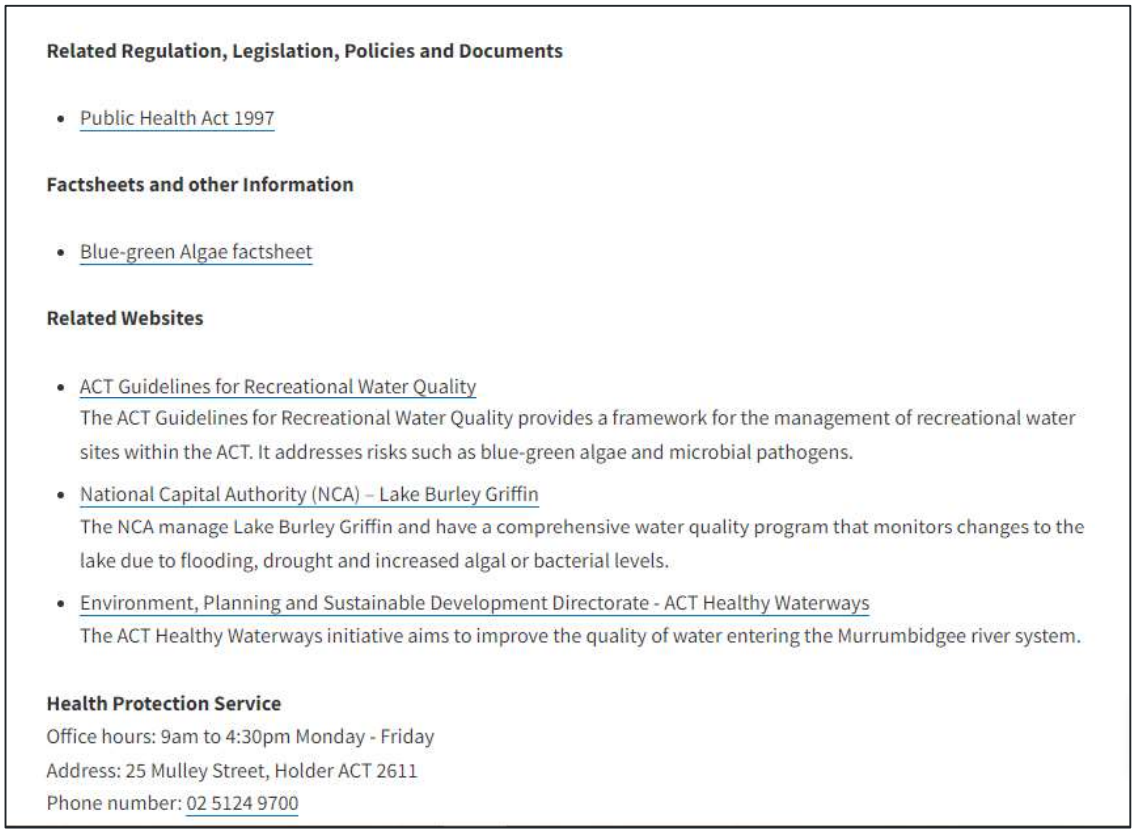


Figure 5. Extract from ACT Government's 'Water quality in our lakes, ponds, and rivers' website



Related Regulation, Legislation, Policies and Documents

- Public Health Act 1997

Factsheets and other Information

- Blue-green Algae factsheet

Related Websites

- ACT Guidelines for Recreational Water Quality
  The ACT Guidelines for Recreational Water Quality provides a framework for the management of recreational water sites within the ACT. It addresses risks such as blue-green algae and microbial pathogens.
- National Capital Authority (NCA) – Lake Burley Griffin
  The NCA manage Lake Burley Griffin and have a comprehensive water quality program that monitors changes to the lake due to flooding, drought and increased algal or bacterial levels.
- Environment, Planning and Sustainable Development Directorate - ACT Healthy Waterways
  The ACT Healthy Waterways initiative aims to improve the quality of water entering the Murrumbidgee river system.

Health Protection Service
Office hours: 9am to 4:30pm Monday - Friday
Address: 25 Mulley Street, Holder ACT 2611
Phone number: 02 5124 9700

Figure 6. Further extract from ACT Government's 'Water quality in our lakes, ponds, and rivers' website

Canberra's waterways and surrounding parklands are very popular for both casual and organised community recreation. They are embraced by the community for large and small sporting events such as sailing, rowing, swimming, and triathlon races. Some bring participants from across Australia. Water quality is particularly important for sporting events such as the 'Sri Chinmoy 10 km National Capital Swim' where swimmers are in the water for 2 hours or longer. In 2020, the event had to be moved from its usual location in Lake Burley Griffin to the smaller Lake Ginninderra due to inadequate water quality.

In addition to urban lakes, swimming in rivers is also very popular in the ACT. One of the biggest rivers is the Murrumbidgee River. It flows near some of Canberra's outlying suburbs and has several locations that are popular for recreation.

Swimming information in the ACT is shared with the wider community through 2 main portals. The ACT Government website reports whether each of the recreational sites is 'open' or 'closed' for primary or secondary contact based on water quality. A Canadian website – Swim Guide – with global data for 8,000 swim sites provides a different format and more detailed information for ACT swimming sites. For example, a popular river swimming site in the ACT is Pine Island on the Murrumbidgee River. The Swim Guide site provides a location map, a site photo and an explanation of the current water quality and suitability for swimming. As of October 2022, the website provided a clear warning about historic poor water quality that has been regularly detected at the site. It advised that the site 'Met water quality standards less than 60% of the time' (Figure 7).

The Swim Guide webpage for the Murrumbidgee River Pine Island swim site also provides summary information on historic water quality for the previous 5 years. The webpage lists the site facilities at each site (toilets,

barbeques, picnic tables, playground, walking tracks, wheelchair access, canoe entry to the river and fishing). It also advises that dogs are not allowed, and that access gates to the site are locked every night.

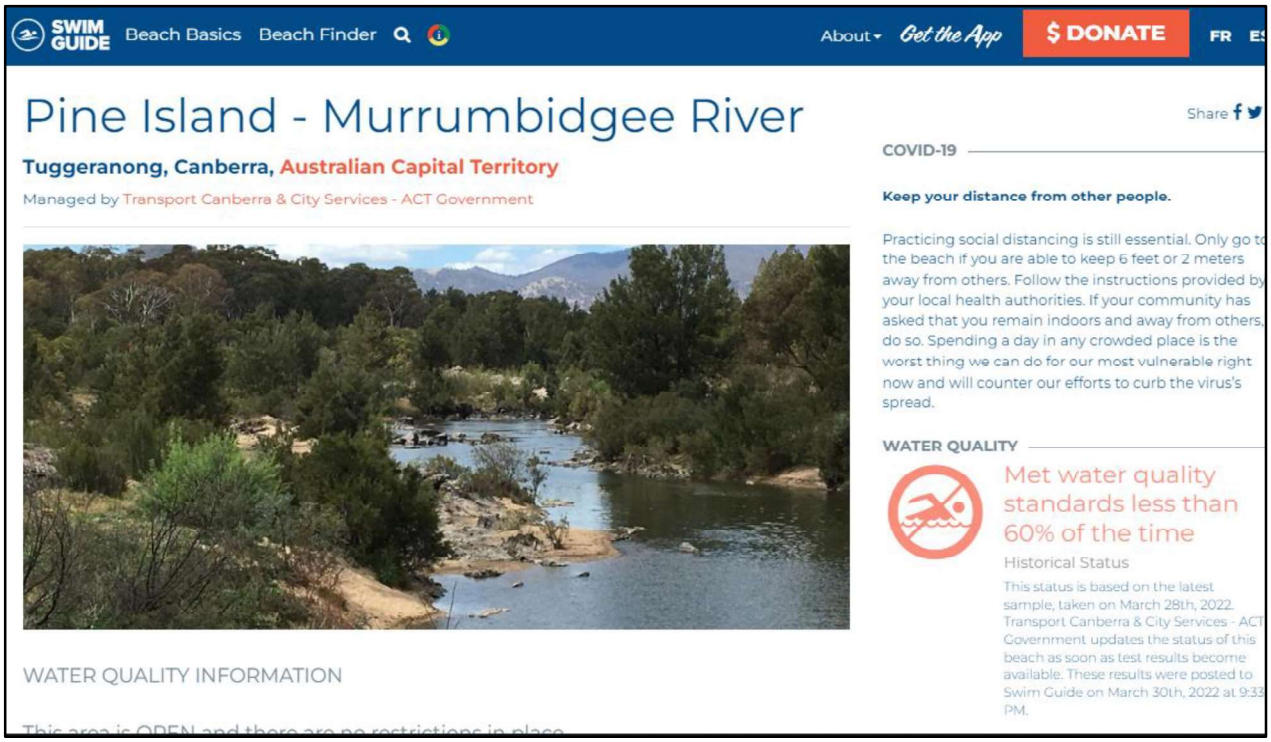


Figure 7. Swimming information on 'Pine Island – Murrumbidgee River' in October 2022 from the Swim Guide website

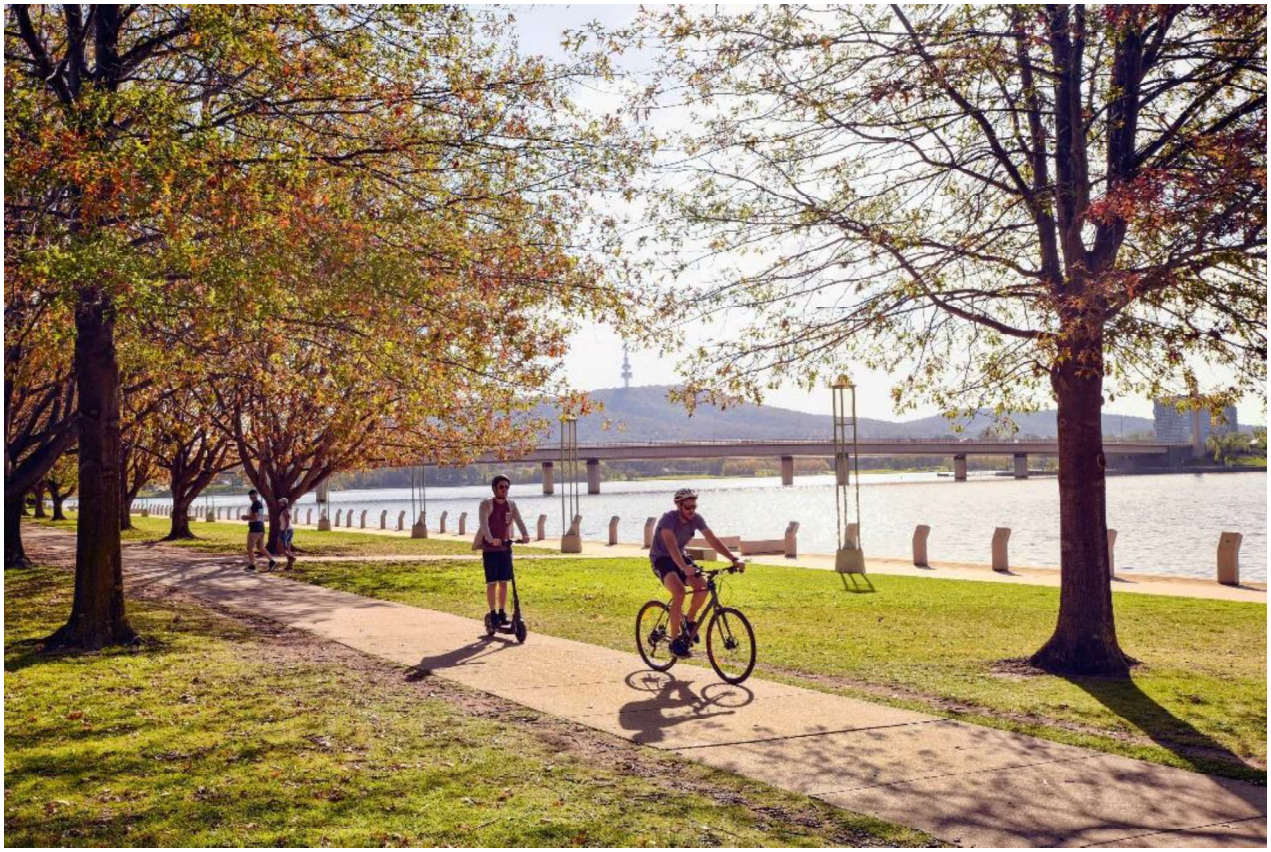


Figure 8. Canberra's waterways foreshores are surrounded by parkland with very popular bike and walking paths.

In addition to swimming sites and other water sports (sailing, rowing, etc.) the public land surrounding most ACT lakes is very popular for land-based recreation such as cycling, walking, dog exercising and picnics (see Figure 8). The extensive parkland reserves and pathways help connect the diverse Canberra community with its waterways and surrounding environments.

Victoria – Yarra River

Figure 9. The designated swimming locations along the Yarra River are located upstream from Melbourne's city centre.

Swimming in the Yarra River is supported at 4 locations: Kew, Warrandyte, Launching Place and Healesville (Figure 9). Swimming at the sites on the Yarra River uses a governance model involving the Victorian Government's environment protection authority (EPA Victoria) in partnership with Melbourne's water utility (Melbourne Water) and local government through 3 local councils (Yarra Ranges Council, Manningham Council and City of Boroondara). Information on swimming at these 4 sites is regularly updated with water quality results during the summer swimming season (1 December to 14 March) on the Yarra Watch website. The Yarra Watch website is provided by EPA Victoria and advises whether each site is safe for swimming.

In addition to providing advice on 'swimmability', bacterial data is regularly updated during the swimming season and the raw bacteria (*E.coli*) data results, collected over several years, are freely available.

The interpretation of the swimming water quality results follows the Victorian Government's recognition of waterways recreational values (Victoria Government, 2022) and water quality guidelines for aquatic recreational microbial water quality, published in the Government Gazette (Figure 10). Victorian swimming guidelines use *E. coli* bacteria for freshwater and *enterococci* for freshwater, marine and estuarine waters (Figure 11).

TABLE 13: CLASSIFICATION MATRIX FOR LONG-TERM MICROBIAL ENVIRONMENTAL QUALITY INDICATORS AND OBJECTIVES FOR PRIMARY AND SECONDARY CONTACT RECREATION

		Microbial Assessment Category (95th percentile (Hazen method) of rolling data set with min. of 60 samples)				
		A	B	C	D	E
		Suitable for primary contact and secondary recreation		Not suitable for primary contact; suitable for secondary contact recreation		Not suitable for any contact recreation
Freshwater		< 130 *E. coli*/100 mL	130 – 260 *E. coli*/100 mL	261 – 550 *E. coli*/100 mL	551 – 5,500 *E. coli*/100 mL	> 5,500 *E. coli*/100 mL
Freshwater, Marine, Estuarine		< 40 enterococci/ 100 mL	40 – 200 enterococci/ 100 mL	201 - 500 enterococci/ 100 mL	501-5,000 enterococci/ 100 mL	> 5,000 enterococci/ 100 mL
Sanitary Inspection Category	Very Low	Very Good	Very Good	Follow-up	Follow-up	Follow-up
	Low	Very Good	Good	Follow-up	Follow-up	Follow-up
	Moderate	Good	Good	Poor	Poor	Follow-up
	High	Good	Fair	Poor	Very Poor	Follow-up
	Very High	Follow-up	Follow-up	Poor	Very Poor	Follow-up

Note: The primary contact objective in all waters are the water quality grades of very good, good, or fair (see subclause (3)(d) of this Schedule). For the secondary contact objective to be met, a microbial assessment category must be no greater than as set out in column D above (see subclause (4)(a) of this Schedule).

Figure 10. Table 13 extract from Victorian Government Gazette (28 October 2018) (PDF 1.26 MB) State Environment Protection Policy (Waters)

Information on each of the 4 Yarra River swimming sites, such as access, parking, site facilities and permitted activities is difficult to access, even though the Yarra Watch website provides links to each of the 3 relevant local councils.

Manningham Council provides information on one of the swimming sites, 'Warrandyte River Reserve' (Figure 10) and advises that swimming is one of the activities advertised. But it did not provide detailed advice on swimming hazards or link to the 'Yarra Watch' website that provides recent water quality advice.

The most detailed and readily available swimming advice for swimming in the Yarra River is provided by a non-government website Swimming Hole Heaven. This website has information on 120 sites on streams, rivers, lakes and waterfalls in Australia, New Zealand and Fiji and is developed by Brad Neale. See information (below) from the 'Swimminghole Heaven' website for Yarra River at Warrandyte.

The website also provides detailed information on the locations of sites and the range of recreational facilities available, as well as providing guidance on the suitability of sites for swimmers of varying skills and abilities. For example. for the Yarra River at Warrandyte (Pond Bend), the website advises that the river is for experienced swimmers only and offers a cautious warning that beginners will need to be strictly supervised.

New Zealand

Swimming and other recreation in natural waterways are very popular across New Zealand (see Figure 11). The community is provided swimming information through a user-friendly and very information-rich website, Can I swim here?, administered by New Zealand's national agency Land and Water Aotearoa. It offers swimming and other information on more than 750 ocean beach, river, and lake recreation sites across the entire country.

The website combines access to a complex array of information with its simplicity of use. It includes information on natural swimming sites for all regions throughout the nation. It uses a national map of New Zealand (see example in Figure 12) where users can zoom in for more detailed regions and get the location of and information for individual swimming sites.

Figure 11. Swimming in Manawatú River. From The swim season is here

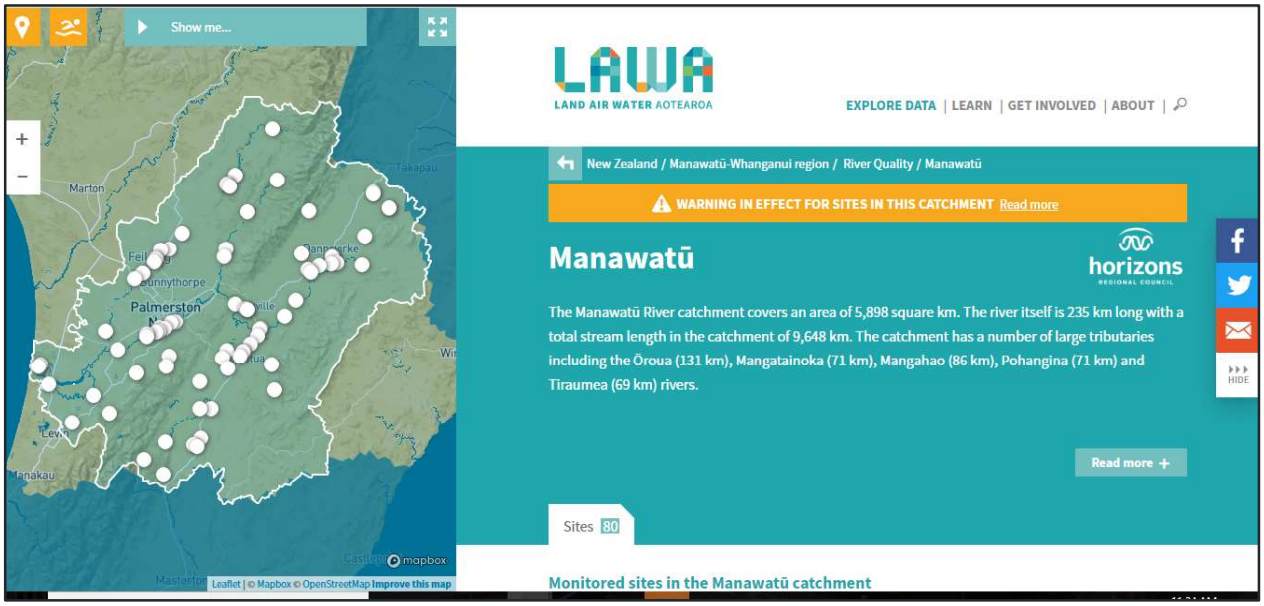


Figure 12. Webpage from Land and Water Aotearoa for Manawatú River

The comprehensive information provided on swimming sites in New Zealand (see Figure 12) includes information on water quality, access, facilities, permitted activities, site hazards and guidance on bringing dogs. It also gives information on the surrounding catchment, biodiversity, and land use and for some locations includes cultural information from the site's Traditional Owners (Māori).

This website may be one of the best in the world for ease of use and access to comprehensive information. It caters well for the different needs and interests of individual users.

One of the features of the website is that it offers a spectrum of information on a range of different recreational site attributes, including:

- facilities at site
- long-term water quality
- ninety-fifth percentile/grade for faecal bacteria *(E. coli)*
- the long-term status of swimming at each site in an easy-to-interpret form
- facilities information such as the availability of toilets
- answers to frequently asked questions such as 'Can I take my dog?'

For each swimming site, Land and Water Aotearoa provides detailed information on the water quality history (faecal bacteria) for the past year and the last 5 years. It also provides information on the adequacy of data. For example, it may explain that there was not enough data to determine the long-term grade at the site.

The website also offers plain English explanations of all scientific and water quality terms to help readers interpret the advice. For example, the website for the Hopelands site on the Manawatú River showed (in October 2022, see Figure 13) a simple graph for long-term water quality. It reported that 75% of 143 water samples tested for *E. coli* bacteria over 5 years at this site were suitable for swimming, and 18% were not suitable, with the remaining 7 % having intermediate water quality, indicating caution be taken (see Figure 16). The Land and Water Aotearoa website offers a detailed explanation and allows the download of 5 years of data for swimming sites.

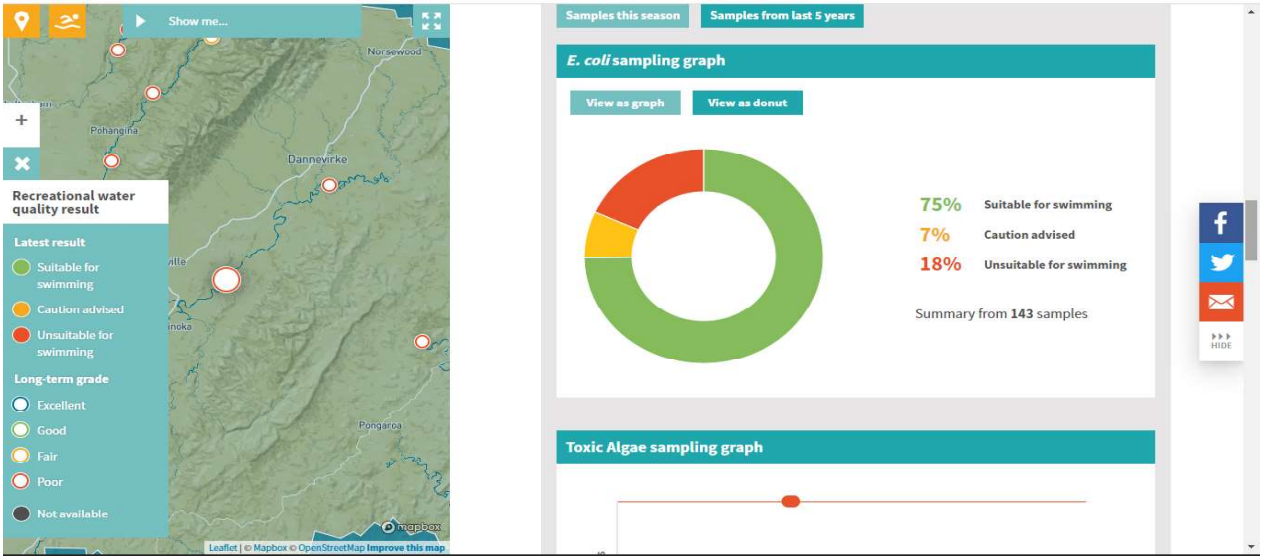


Figure 13. Long-term *E.coli* grades for swimming at site Hopelands (Manawatú River) based on 5 years of data. From Land and Water Aotearoa

Swimming in New Zealand lakes is very popular in many regions. Many lakes, and some rivers, are vulnerable to nutrient pollution and conditions may promote the growth of algae. In some waterways, this may at times expose swimmers to hazardous concentrations of blue–green algae toxins. The Land and Water Aotearoa swimming site's advice combines results from faecal bacteria and blue–green algae for many swimming sites, particularly for lake swimming.

New Zealand has developed a complex governance structure for swimming involving local government (regional councils and local councils, each responsible for weekly sampling at popular swimming sites) and New Zealand Government agencies. It follows a nationally coordinated approach. The New Zealand Government has Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas that were developed by the New Zealand Ministry for the Environment and Ministry of Health following the World Health Organization's risk-based approach. Legislation for the management of river, lake and beach swimming is contained under section 35 of the New Zealand *Resource Management Act 1991* and section 23 of the *Health Act 1956*.

Canada

Figure 14. Screenshot from the Toronto Monitoring Hub

Monitoring water quality for swimming in Canada's Ontario lakes and rivers is resourced through a unique 'grassroots' governance model. It is led by the Canadian charity organisation Lake Ontario Waterkeeper with the assistance of volunteer 'citizen scientists. Financial support is provided by the Government of Canada through the federal Department of Environment and Climate Change. Lake Ontario Waterkeeper is one of several local groups that are part of Swim Drink Fish – a Canadian environmental charity.

The About Us section of the Swim Drink Fish website states: 'We focus on water, because all communities need swimmable, drinkable, fishable water to thrive. We empower people because it takes a community to protect water'.

Recreational water quality in Canada is assessed using *E. coli* faecal bacteria. A swim site is safe for swimming when the geometric mean of at least 5 samples is less than 100 *E. coli* per 100 mL.

Canada has a short swimming season (1 June to 15 September for Toronto), and popular beaches are sampled daily. The Ontario Government reports that a clean beach is one that is open (passing swimming water quality criteria) for at least 95% of the swimming season.

Swimming water quality results for many Canadian swimming sites are made public on the Swim Guide website. This Canadian information guide has grown to be an international open data initiative from Swim Drink Fish. It seeks to provide informative, up-to-date swimming information in a standard format that it easy for the public to interpret. Some Australian swimming sites report their results on the Swim Guide, with the ACT Government uploading its results to this platform.

The City of Toronto is on the shore of Lake Ontario. Swimming water quality governance in Lake Ontario has the additional complexity of incorporating an international border. Canada's international border with the USA runs through the middle of the lake. Swimming and aquatic recreation are very popular during the warmer months. Water quality is also very poor, the poorest of all North American Great Lakes. But has been improving since the 1960s with combined efforts of the USA, Canada, and Canadian provincial governments (Ontario).

Europe

Over 40 years, member nations across Europe have made widespread improvements to swimming water quality in both coastal and inland waters. Coordinated action across Europe to improve water quality for aquatic recreation was triggered by a European 'Bathing Water Directive' in 1976 that was revised in 2006.

Swimming in urban waters is growing in popularity in European cities. The European Environment agency in a briefing on European bathing water quality in 2021 stated, 'Of all European bathing waters, more than 1,800 are located in 193 cities with more than 100,000 inhabitants and are as such a valuable attribute of urban public spaces. Socio-economic and environmental benefits that stem from clean and safe urban bathing waters in Europe include public health, ecosystem services and recreation values, but also have numerous other values'.

Bern, Switzerland

Switzerland is a global leader in inland water swimming. It also has a long history of swimming in rivers and lakes in its cities. For example, the Aare River flowing through the City of Bern (the capital of Switzerland) is extremely popular with residents and tourists (Figure 15). The City of Bern recognises the personal responsibility of swimmers. It provides a clear warning to swimmers of the hazards in the Aare River. The city's website states, 'It's important to have a healthy amount of respect for the Aare and inform yourself about the possible risks beforehand. Swimming in the Aare is recommended for experienced swimmers only. The Swiss Lifesaving Society SLRG and the "City of Bern" provide (vitally) important tips for everyone who spends time in and on the Aare'.

Figure 15. Swimming in Aare River in Bern, capital of Switzerland, image credit: Ton Ziklstra.

Berlin, Germany

An example of an ambitious program to reintroduce urban river swimming is under way in Germany in a section of the Spree River called the Spree Canal in the centre of Berlin (Figure 16). This waterway was closed for swimming in 1925 due to contaminated water quality.

Figure 16. Swimming in Spree River in Berlin. From Berlin's urban renewal is going swimmingly, image credit: Espen Eichhöfer/Ostkreuz

Berlin is a city of 4 million people and has witnessed decades of action around improving the water quality in the river. The initiative involved creating a 'Flussbad' or 'river pool' along 840 metres of the river canal for swimming. The landscaping and surrounding facilities aim to create a natural oasis for people to enjoy in the middle of the historic centre of Berlin. The project is very costly, and it is taking years to build momentum.

Every year water quality in Berlin's River Spree continues to improve. The Flussbad organisation runs public swimming competitions (Figure 16) to encourage community connection with the river.

Conclusion

This report investigates the benefits, barriers and opportunities associated with improving access to natural waterways across NSW for swimming and open-space recreation. This is part of a growing worldwide movement where communities are rediscovering the many benefits of swimming in, on or around their local rivers, streams, and lakes. The world leader in embracing rivers and lakes for swimming is Switzerland, which is a landlocked nation that lacks ocean beaches but has an abundance of freshwater lakes and rivers. Even large and crowded cities such as Berlin and Toronto are supporting greater public recreation in and around their urban waterways.

NSW can build on the successes it has had as a leader in urban swimming at its world-famous ocean beaches. Enormous numbers of people, both residents and visitors, enjoy swimming and other recreational activities at ocean beaches, many of which are in or near large cities.

Whilst there are numerous benefits to opening new swimming sites, there are several barriers that need to be addressed. Some waterways may just be physically unsuitable as a swimming site, or land may not be available. Unsuitable water quality is a major barrier for all potential swimming sites, and sufficient data collected over an adequate period of time is needed to assess its suitability. A major barrier is also how to communicate essential swimming site information to the community, particularly as water quality conditions can change very quickly. Planning for potential new swimming sites can investigate how to overcome any barriers.

While Sydney has an abundance of pristine beaches, access to swimming sites is not readily and equitably available for all areas of the city. The Greater Sydney Outdoor Study revealed that people find travelling a long distance to swim at a coastal beach a major disincentive, and that community attitudes to recreation found that many people want to go swimming in accessible locations less than 30 minutes from their homes.

The reopening of Lake Parramatta in Sydney's west for swimming has been a revelation to many. Parramatta residents and visitors have enjoyed swimming in its cool and clean waters, particularly in hot weather. The swimming site, its facilities and the surrounding bushland has been a natural freshwater oasis in the middle of the urban landscape of metropolitan Sydney. Also, usage of this site shows that recreation near waterways is also highly valued by the community, even for people that do not go into the water. It is a water-cooled, natural landscape that people enjoy. They can access a water-side refuge away from urban noise, traffic, and summer heat.

The NSW Government wants to encourage the community to connect with local green spaces. As part of this, it is exploring the creation of Places to Swim with local government and the community. Our experiences during COVID-19 taught all of us how important it is to have readily accessible, local greenspace in which to engage with nature and enjoy recreational activities. This includes having access to local waterways.

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