

Wetlands and Health: How do Urban Wetlands Contribute to Community Well-being?

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Abstract Much discussion relating to interactions between wetlands and people has focused on detrimental effects on health through wetland degradation and potentially toxic exposures. In recent years, however, there is greater recognition of the role wetlands play in improving the quality of human surroundings and providing cultural ecosystem services as aesthetically pleasing places for recreation, education and spiritual development. This chapter explores positive health benefits associated with the use and enhancement of urban wetlands. Potential benefits include improved physical and psychological health, increased community connection and sense of place, and those derived from community involvement in urban conservation.

To illustrate how various human health benefits may be recorded and reported, this chapter includes a case study that explores the community benefits generated through use of the Swan Canning Riverpark in Perth, Western Australia. The Riverpark consists of more than 150 conservation reserves and recreation parklands located along the banks of the Swan and Canning Rivers—a metropolitan river system that holds great spiritual, cultural and social value for the people of Perth. In 2010, the Swan River Trust began a process of parkland assessment and survey to monitor, evaluate and report on the level of community benefit derived through use of this system.

Keywords Cultural ecosystem services · Ecosystem health · Community benefit · Community engagement · Community values · Recreation · Sense of place · Conservation · Visitor impacts · Useability

Introduction—Wetlands as Healthy Places

The links between urban green spaces and human health benefits are much studied and reported (Maller et al. 2008). Urban parks and open spaces are important sites for physical activity, relaxation and social interaction and proximity to good quality

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green space is a significant factor in predicting better self-reported health (Carter 2009; Pereira et al. 2013; Francis et al. 2012). However, the same level of attention has not been paid to the positive benefits associated with urban blue spaces (rivers, lakes, streams and ponds) often found as major natural features within cities or within their parklands and open spaces. Benefits associated with wetlands are often taken granted (Horwitz and Finlayson 2011) with little consideration given to the unique qualities of water and potentially positive effects on human health and well-being.

Increasing urbanisation is resulting in loss of wetlands at a rate greater than any other type of ecosystem (Ramsar Convention on Wetlands 2012). A resolution adopted by Ramsar in 2012 includes several statements that support more sustainable approaches to wetland management. These include the need to protect natural resources that sustain urban areas, recognition that access to urban green (blue) spaces can make a positive contribution to physical and mental health, and recognition that urban populations offer significant opportunity for community participation in wetland management and restoration in their local environment (Ramsar Convention on Wetlands 2012). Where development along rivers and around wetlands is increasing (such as the residential apartments along the Swan River shown in Fig. 1), potential health benefits for local residents can be optimised through opportunities to become involved in wetland care and restoration.



Fig. 1 Inner city apartment buildings overlooking wetlands and waterbird habitat along the opposite bank of the Swan River. (Image: M. Carter)

Landscape Appearance and Preference

It is often assumed that wetland ecosystems that attract visitors need to be healthy. To some extent this is true—a wetland landscape with swampy, smelly, turbid water may not attract high levels of visitation or be highly valued by a community. However, beauty is in the eye of the beholder and even a degraded wetland landscape may appear attractive and be valued by local communities (Manuel 2003).

Places with views of rivers and lakes are often cited as preferred environmental settings and are extremely popular visitor destinations as people seek landscapes and outdoor places that provide opportunities for enjoyable physical activity, relaxation and restoration, social interaction, cultural connection and spiritual enrichment, contact with nature, and escape from busy urban environments (Ibrahim and Cordes 2008; Pigram 2006). A recent study of parkland attributes and links to improved mental health found that water features, birdlife and walking paths were associated with positive perceptions of parkland quality (Francis et al. 2012).

Visitor experience of wetlands is influenced by the quality of sensory and emotive responses with the sights, smells, sounds and feel of the landscape all playing a part (Pigram 2006). The presence of wildlife can positively or negatively influence visitor experience, depending on whether resident wildlife is seen as attractive (birds, small mammals) or problematic (mosquitoes) (Horwitz and Carter 2011). Degradation of shoreline vegetation and erosion or changes to water quantity and quality may make water bodies more difficult to access and less appealing. At another level, changes to water quantity and quality may impede participation in recreational activity, particularly water-based activities such as boating, canoeing, water-skiing or swimming (Hadwen et al. 2008b).

Landscape appearance is an important factor in how wetlands are used and valued. Many authors have attempted to explain human responses to nature. Some consider that, in western countries, the general public have strong “nature-friendliness” and recognise the intrinsic value of retaining natural environments (van den Born et al. 2001). The *biophilia* and *biophobia* hypotheses (Wilson 1984, 1993; Kellert and Wilson 1993) suggest that people have an innately emotional affiliation to other living organisms (biophilia) and an evolutionary aversion to dangerous aspects of nature such as snakes and spiders (biophobia). Further to this, emotional spectra associated with nature and natural environments moves “from attraction to aversion, from awe to indifference, from peacefulness to fear-driven anxiety” (Wilson 1993) with responses influenced by culture and experience. The idea that evolution plays a role in human response to nature expands into landscape preference. It is suggested that people universally prefer open savannah-like landscapes with views of water, with links between preference for this type of landscape and evolutionary responses to environments that safeguard survival, either through provision of food and water or protection from predators. In modern times, these landscapes are simply seen as attractive and calming, promoting positive aesthetic responses and restorative health benefits (Ulrich 1986, 1993).

In general, preference is given to open waterscapes with edges that follow a natural form, and with trees and other edge vegetation as these environments are found to be appealing, restful and enjoyable (Kaplan et al. 1998). This observation is supported by the findings of a community consultation process undertaken to identify values associated with Perth's Swan and Canning rivers (Research Solutions 2007). In that study, community members preferred a mix of landscape types, with stronger preference for retention of more natural landscapes and vegetated shore lines. Preferred recreation sites were quiet natural places with few facilities.

Sites with waterscapes are often identified as favoured or favourite places. In numerous studies relating to identification of favourite places, participants almost invariably nominated a natural setting (Korpela et al. 2008). Visitors to favourite places report experiencing restorative benefits including relaxation, stress relief, regulation of emotions and feelings and reflection on personal goals (Hartig et al. 2003; Korpela and Hartig 1996; Korpela et al. 2008). It is suggested that promoting psychologically restorative experiences in nearby favourite places might be an important factor in primary healthcare (Korpela et al. 2008).

Visitor Impacts

With increased visitation come concerns about the impacts of use and the overuse of natural environments. These concerns tend to focus on two main areas: biophysical impacts such as water pollution, site deterioration, erosion, changes in ecological characteristics, and species disruption, and psycho-social impacts like crowding and recreation quality (Hadwen et al. 2008a, b). Overuse of popular areas produces concomitant impacts that result in the loss of supporting, provisioning, or regulating ecosystem services, and the cultural ecosystem services associated with visitation for pleasure may in time become substantially reduced.

Interventions to manage visitor impacts, such as controlling access or hardening water edges to reduce erosion and mitigate ecosystem degradation may also reduce (or improve) the attractiveness of particular destinations. For some visitors, evidence of ecological damage and human intervention through built environment changes may substantially reduce the experience they seek. For others, installation of visitor services and amenities may well contribute to heightened experience through ease of access or perceptions of lower risk (Pigram 2006).

While preference for safe, visually pleasing land and waterscapes that attract people is understandable, it may also be problematic. Making nature neat and tidy with natural features "arranged for human enjoyment" may be considered culturally appropriate and the "aesthetic of care" laden with good intentions of stewardship and community pride (Nassauer 2008). Such actions, however, may cause unintended harm through habitat destruction or use of herbicides and potentially "create the antithesis of ecological health". Nassauer further voices her concern that the "picturesque has been so successful in becoming popular culture that scenic landscapes are often assumed to be ecologically healthy" (Nassauer 2008).

As the need to balance wetland ecology and visitor use receives greater attention from those involved in wetland management and from those communities who use wetland systems, how to identify and integrate community benefits into conservation management practice presents some significant challenges (McInnes 2013). In the study of community values mentioned earlier (Research Solutions 2007), retaining the ecological values of the Swan and Canning rivers, most particularly protecting and enhancing water quality, was considered to be of paramount importance. Maintaining a healthy ecosystem that supported local biodiversity and recreational pursuits such as fishing and swimming received the highest community priority. How these values are being translated into management practice is discussed in the case study presented later in this chapter.

Cultural Ecosystem Services and Human Health

To achieve sustainable health, the complex links between population health and the health of urban ecosystems need to be considered (Verrinder 2007; Neller 2000). The Millennium Ecosystem Assessment (MEA) examined how changes in ecosystem services influence human health and established actions needed “to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being” (MEA 2005). Within the MEA, six types of cultural services provided by ecosystems were identified: cultural diversity and identity; cultural landscapes and heritage values; spiritual services; inspiration (such as for arts and folklore); and recreation and tourism (MEA 2005).

A study involving assessment of 29 urban wetland case studies conducted in 24 countries world-wide examined awareness of planned and serendipitous (planned plus incidental) ecosystem services relating to each site (McInnes 2013). The most commonly planned cultural ecosystem services included opportunities for educational activities, picnics and outings, nature observation and tourism, knowledge and research activities, and appreciation of aesthetic and sense of place values. The frequency of serendipitous ecosystem services was higher at all sites—particularly activities relating to recreational hunting and fishing, water sports and activities, inspiration, aesthetics and sense of place values, and long term monitoring of the site (Table 1). It was concluded that with a greater number of planned ecosystem services within each site, a greater number of serendipitous activities occurred, with larger, resilient, diverse ecosystems more able to provide a range of services (McInnes 2013) and return more potential health benefits to urban communities.

Horwitz and Finlayson (2011) identified a range of health determinants that exist in wetland settings. Of most relevance here are wetlands as “settings for mental health and psychological well-being” and “places that enrich people’s lives, enable them to cope, and allow them to help others”. Wetlands as settings for physical activity can also be added to this list of health determinants. River promenades and paths along lake edges are popular places for walking and cycling (Volker and

Table 1 A comparison of frequency of occurrence (% of 29 sites) of planned and serendipitous cultural ecosystem services at case study sites. (Adapted from McInnes 2013)

Cultural ecosystem service	Planned	Serendipitous
<i>Recreation and tourism</i>		
Recreational hunting and fishing	59	83
Water sports and activities	42	62
Picnics, outings, touring	83	90
Nature observation and nature-based tourism	72	73
<i>Spiritual and inspirational</i>		
Inspiration	42	79
Cultural heritage	42	45
Contemporary cultural significance	45	52
Spiritual and religious values	21	24
Aesthetic and 'sense of place' values	62	97
<i>Scientific and educational</i>		
Educational activities and opportunities	90	100
Important knowledge systems, and importance for research	72	83
Long-term monitoring site	55	76
Major scientific study site	31	38
'Type location' for a taxon	10	14

Kistemann 2013), providing opportunity for individuals to enhance both physical health and psychological well-being.

An important link in the relationship between natural environments and self-reported levels of physical and mental health and well-being is the perceived quality, diversity and capacity of those environments to be used for relaxation, social interaction and physical activity (Carter 2009). Several factors associated with predicting higher levels of wetland visitation and recreational use were identified by Syme et al. (2001). These factors include:

- *Accessibility* is essential if a wetland environment is to be used for visitation and if people are to attach meaning to that place.
- *Ownership* can be symbolic or real and greater feelings of ownership can result in more frequent use.
- *Participation* includes the involvement of users in maintenance and future planning as those who assist in managing a place are more likely to use it.
- *Comfort* refers to how well the space around a wetland meets basic human needs such as shelter and how pleasant an environment it is to visit.
- *Security* is a prerequisite as people who feel safe and secure in an environment are more likely to visit more often.
- *Action* involves one's ability to use a wetland environment for a variety of preferred activities.

The role that urban wetlands can play in promoting better health outcomes are discussed in more detail in each of the following sections. Three aspects of wetland use and potential health benefits are highlighted:

- Places for recreation and social activity;
- Engendering a sense of place and cultural connection; and
- Engaging people in conservation activities.

Places for Recreation and Social Activity

Water-based recreation has both aesthetic and functional appeal with a distinction made between *water-dependent* activities such as sailing, fishing, swimming or water skiing and *water-enhanced* activities where the experience of walking or picnicking may be heightened by views of water (Fig. 2). Involvement in water-based outdoor recreation activities can provide substantial personal satisfaction and enjoyment (Curtis 2003; Pigram 2006).

It could be assumed that these satisfying and enjoyable experiences are more likely to be found in more naturalistic settings than in much urbanised environments. This is not necessarily the case. A German study of use of Rhine river promenades



Fig. 2 A place to relax, picnic and play in riverside parkland with views across the water to Perth city. (Image: M. Carter)

in Cologne and Dusseldorf explored the health and well-being impacts associated with these urban blue spaces (Volker and Kistemann 2013). These river promenades are much developed with constructed river walls, jetties and wharves, commercial areas with shops and cafés, linear parklands and open plazas. The view of the river with its expanse of open water and parkland vegetation are often the only natural features visible. In terms of recreational use, users reported that these spaces were “lively, vital and versatile” and they experienced a “sense of freedom”. The river edges were also considered to be a “favoured meeting point” that enhanced “communication between people” and created a happy atmosphere where diverse people and social groups were brought together. Perhaps most importantly, the river provided activity spaces for passive recreation—watching others, spending time in cafés, picnicking and generally relaxing—and more active pursuits such as rowing, canoeing, kayaking, sailing, walking, jogging and cycling. Many users considered these activities to contribute to a general sense of well-being and happiness.

Engendering a Sense of Place and Cultural Connection

All urban settings, whether built or natural, contribute to sense of place, with individuals’ perceptions of quality and connections to local landscapes influencing potential health outcomes (Frumkin 2003). Positive relationships between people and place have the potential to produce positive physiological, psychological, social, spiritual and aesthetic effects (DeMiglio and Williams 2008) and for many people, the presence of nature plays an important role in “place-fixing” and place attachment (Beatley 2004). Conversely, negative perceptions of natural places, particularly feelings associated with apprehension and fear lower the appeal of particular areas, reduce visitation and restrict the range and type of activities undertaken (Bixler and Floyd 1997).

In the same vein, perceptions of neighbourhood quality can significantly influence self-reported health (Bowling et al. 2006; Collins et al. 2009). Manuel (2003) explored community perceptions of small neighbourhood wetlands in Nova Scotia. Despite relatively low levels of use (only approximately half the 82 people interviewed in this study described using the nearby wetlands for recreational purposes such as skating, catching frogs, hanging out or simply enjoying nature), these spaces were highly valued as part of the neighbourhood. In particular, having open space, a peaceful environment and a place for wildlife was well regarded by study participants.

From a different perspective, indigenous connections to wetlands can play a substantial role in supporting cultural identity and spiritual connections. A study of cultural values held by Nganguraku (indigenous) people in relation to the Murray River in south-eastern Australia (Mooney and Poh-Ling 2012) found strong connections to cultural identity through links to ancestors and traditional practice. In

addition, the river was a place for recreation and restoration—providing freedom and escape—factors that were seen to be strongly related to better health and well-being.

The importance of cultural connection to wetlands is also articulated by the Noongar (indigenous) people of south-western Australia through their relationship with the Swan River and its waterways. At a women's meeting held as part of collaborative management of a river trails project, one elder said:

The history of the whole Swan River, the history of any waterway, any river or any waterway that comes under Noongar country is matriarch country and it's always been that way—and the waterway has always been a symbol of women and women's birth, and that in itself has to be highlighted as our spiritual connection to the Swan River. And that doesn't only mean the Swan River that means the whole waterways. (South West Aboriginal Land and Sea Council 2011)

Involvement in the management of the Swan River waterways is an important aspect of Noongar heritage protection and caring for country. It is essential in maintaining a strong sense of place within a rapidly changing urban landscape where the river (and many sites along it) holds spiritual and cultural significance (South West Aboriginal Land and Sea Council 2011).

Engaging People in Conservation Activities

Apart from physical and psychological health benefits associated with use of open spaces (Bedimo-Rung et al. 2005; Giles-Corti et al. 2005; Sugiyama et al. 2008), visiting wetlands and parklands can engender feelings of attachment and affective (emotional) connection, which in turn, can influence positive attitudes to natural environments (Carter 2009; Dutcher et al. 2007; Williams and Patterson 2008). In addition, building social capital through civic engagement can contribute to better mental health and feelings of general health and well-being (Wood and Giles-Corti 2008).

Encouraging people to regularly visit and become actively involved in caring for local nature reserves and parklands can play an important role in health promotion and preventive health strategies. While there is little direct evaluation of the benefits of involvement in wetland conservation activities, one Australian study of people involved in a local bushland conservation project (Moore et al. 2006) found that participants reported better general health, fewer medical visits, greater satisfaction with daily activities and a stronger sense of community belonging. Evaluation of two Chicago-based prairie conservation programs (Miles et al. 1998; Miles et al. 2000) found being physically active was only one of many benefits associated with involvement. More important benefits reported by participants included spending time in nature, taking part in something meaningful, working with others, and the satisfaction of knowing they were making a positive contribution to preserving local environments.

The Swan Canning Riverpark: River Health and Community Benefits

The Swan Canning Riverpark is located in Perth, Western Australia and comprises more than 150 public foreshore reserves, with numerous associated areas of bushland, marshlands, creeks and streams all contributing to the Swan and Canning rivers system. It is jointly managed by the Swan River Trust (the Trust) and various state and local government agencies responsible for each area of parkland and open space along the rivers' banks. The River Protection Strategy for the Swan Canning Riverpark, drafted in conjunction with numerous organisations, agencies and community members, will guide how the river system is collaboratively managed (Swan River Trust 2012). The River Protection Strategy outlines a comprehensive monitoring, evaluation and reporting process and it is this process and its approach to assessing community benefit that is the focus of this case study. At the time of writing, the Swan River Trust was undergoing a process of amalgamation with the state Department of Parks and Wildlife and the final strategy was not yet approved.

The Swan Canning Riverpark

The Swan Canning Riverpark was created by the *Swan and Canning Rivers Management Act 2006* (SCRMA). This legislation recognised the importance of the rivers as a Perth icon, with the Riverpark considered to be an important natural asset and a community resource shared by local residents and visitors alike.

Despite being highly regarded by the community, historical and current uses of the Riverpark and its catchment are affecting the qualities most valued. The river system winds its way through a highly urbanised catchment and is showing signs of continuing environmental stress, including seasonal algal blooms and diminished water quality in some areas, fish kills, severe erosion and loss of riparian vegetation (Swan River Trust not dated a). Apart from ecological concerns, these environmental conditions can directly affect the way in which the river can be used. With an expanding urban population, there is growing pressure for increased access and opportunities for many different types of recreational use—from nature-based pursuits such as bird watching, to fishing, swimming, walking or cycling along river edges, to water-based sport such as paddling and rowing, to river cruising, water-skiing, speed boating and use of other forms of motorised watercraft (Swan River Trust 2012).

While demand for river-based recreational facilities continues to grow, the local community is also increasingly aware of the physical and mental health and well-being benefits associated with access to high-quality natural areas such as those found within the Riverpark. There is also increasing recognition of the need to protect historical and significant Aboriginal cultural sites within the Riverpark. To ensure high levels of public involvement in Riverpark protection, the Trust supports a variety of community activities including membership of the River Guardians, a network of some 1500 individuals involved in conservation, rehabilitation and



Fig. 3 Sign for collaborative urban waterways renewal project at confluence of Bickley Brook and Canning River. (Image: M. Carter)

wildlife observation projects (Swan River Trust *not dated b*). There are more than 40 community groups involved in conservation and restoration sites within the Riverpark itself. In addition, there are more than 200 community groups involved in catchment care, bushland and wetland conservation and restoration of sites within the broader Swan Canning catchment. In line with the Ramsar principles for planning and management of urban wetlands (Ramsar Convention on Wetlands 2012), finding a balance between the demand for increased urban development, recreational access and retention of the natural character of the river system is a collaborative effort between Riverpark land managers, associated government and non-government agencies and the Perth community (Swan River Trust 2012). The Bickley Brook Floodplain Restoration project is an example of collaboration between federal, state and local government agencies, a regional urban landcare council and a local community group (Fig. 3).

Assessment of Ecological Health and Community Benefit

Prior to 2006, the Swan River Trust had primarily operated as a statutory planning and environmental monitoring agency. There were long standing processes for measuring water quality and other ecological indicators and associated targets

were reported annually. However, the Trust did not have an established monitoring and reporting program for the range of ecological, community benefit and amenity values, required to be implemented following enactment of the SCRMA in 2007. As part of adaption to the new Act, the Trust began to develop a ‘State of the Rivers’ monitoring and reporting framework. This involved setting new targets, indicators and monitoring programs to reflect expanded responsibilities that included evaluation of community values, as well as the river ecology (Carter 2010).

A community survey conducted for the Trust found the Swan and Canning rivers were greatly valued for ecological purposes and for community use, as well as for values related to history, culture and spirituality (Research Solutions 2007). In particular, the community considered the Riverpark to be an iconic asset and a key feature of Perth’s recreational, social and cultural landscape. It was also reported that the community wished to retain maximum levels of public access to the foreshore, participate in recreational opportunities provided by the Riverpark, and to pass on a healthy Riverpark to their children and grandchildren to use and enjoy. In order to achieve this, however, the ecological integrity of the Riverpark, particularly water quality, was identified as a key aspect of Riverpark management (Research Solutions 2007).

These findings were translated into a set of Community Values (Fig. 4) that form the basis of the monitoring and reporting framework. The four value sets are: ecosystem health; sense of place; community benefit; and economic benefit. Ecosystem health was identified as the foundation on which all of the other values are built and most important to protect. Within each value set, aspects that were seen to hold greatest importance in protecting and enhancing river ecology, community benefit and amenity were identified.

The River Protection Strategy (Swan River Trust 2012), describes each value set and important aspects as follows:

- *ECOSYSTEM HEALTH: Ecosystem health is the fundamental ecological integrity that allows the Riverpark to function as a natural system. Ecosystem health is the most important value to protect. Without a healthy ecosystem, all of the other values will decline, so its protection is paramount. Ecosystem health includes protecting water quality, environmental flow, biodiversity and foreshore condition, on which the other values depend. Aspects such as the ecological and visual quality of the broader catchment, riverbanks and foreshore vegetation must also be considered.*
- *SENSE OF PLACE: Sense of place is the condition of people feeling content, healthy and safe, as a result of the rivers simply existing; offering quiet, natural spaces. Sense of place includes the connection people have with the rivers, related to their beliefs, traditions, memories and commitment to looking after it. Sense of place means different things to different people and can be the importance of a natural area for simply existing and people knowing it is there, whether they use the area or not. Therefore, protecting this value encompasses many things and extends across a broad range of people, from inside and outside of the locality, and includes people who don’t actually use the Riverpark. Protecting sense of place values also involves protecting historical sites and knowledge as well as providing opportunities to practice cultural activities.*

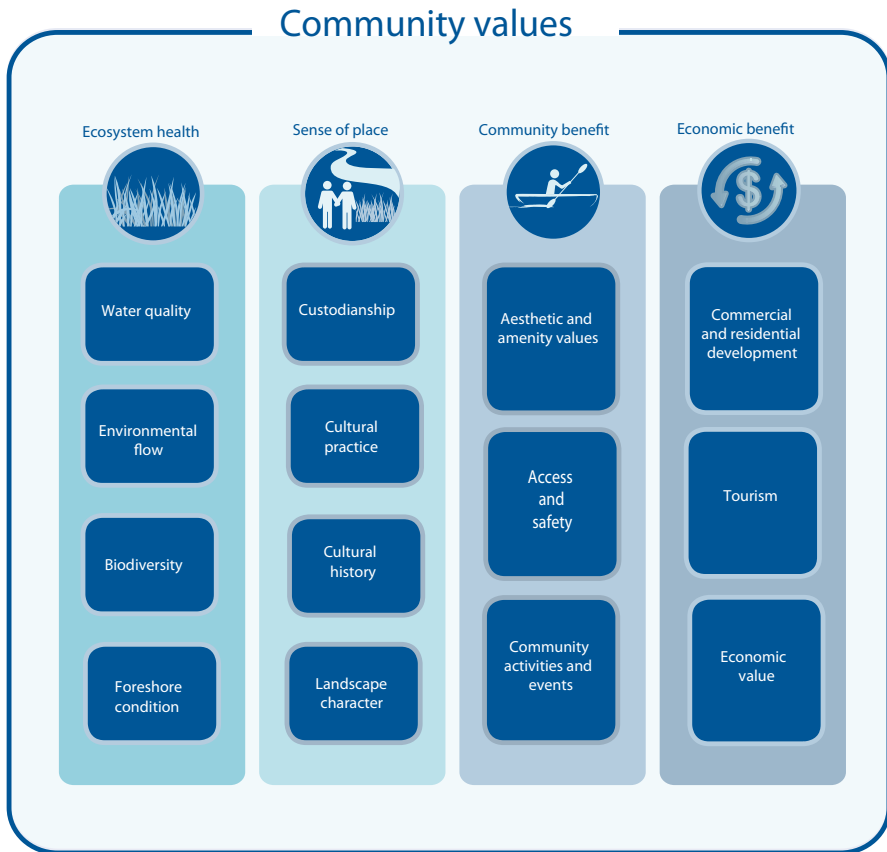


Fig. 4 Community values defined within the river protection strategy. (Source: Swan River Trust 2012)

- **COMMUNITY BENEFIT:** Community benefit includes the enjoyment and comfort brought about by providing opportunities and facilities for a broad range of activities. The community benefit value incorporates the community use of the Riverpark, including aesthetics, and providing public facilities (land and water based), providing activities and events, as well as maintaining public access and safety.
- **ECONOMIC BENEFIT:** Economic benefit is the additional financial benefit of commercial and residential development and tourism opportunities gained by their proximity to the Riverpark. The Riverpark is central to the economic well-being and lifestyle of Perth's community and underpins business opportunities associated with tourism and recreational industries.

The Swan Canning Riverpark contains numerous sites where integration of these values are evident: from boat launching points designed to minimise damage to foreshore vegetation (Fig. 5) to parklands that provide opportunities for nature discovery, recreation and relaxation, and participation in community events.



Fig. 5 Local boat launching site in the upper reaches of the Swan River with designated access points to protect foreshore vegetation. (Image: M. Carter)

Useability Index for the Swan Canning Riverpark

As stated earlier, the Trust had much experience in monitoring and reporting on ecological values associated with the river system. There was less knowledge, however, about how best to capture data that could be used to monitor and report on values associated with sense of place and community benefit. Initial review of available assessment models identified that most park management agencies measured only visitor satisfaction with facilities and services provided (Crilley et al. 2010), or simply assessed the number and purpose of visits with data most often collected through on-site surveys or observation (Ash et al. 2010; Parkin and McAlister 2010). Emerging research indicated that the personal benefits attained by visitors to a particular site (through recreational activity or contact with nature) were stronger predictors of satisfaction and positive response than the presence of infrastructure (such a pathways, toilets or car parking) or service quality (Crilley et al. 2010).

Further review of available literature suggested that rather than focusing on facilities, parks managers needed to understand and better assess potential benefits, particularly those associated with visitation setting and desired activity, and how settings might positively influence benefits attained through recreational, educational, spiritual or cultural activity. With this in mind, it was recognised by Trust staff that simply conducting visitor satisfaction surveys or collecting user information would not provide the type or quality of data required to assess whether key aspects associated with sense of place and community benefit were being addressed.

While visitor satisfaction surveys were useful in collecting specific data, a new set of indicators that could assess relevant community values was required.

At that time, a recently completed PhD study conducted in Perth (Carter 2009) had explored peoples’ attitudes to natural areas and their perceptions of the quality and of green spaces in and around their neighbourhood. In this study, public green spaces included bushland, wetland and lake systems, greenways, parkland, sports ovals and playgrounds. Three key elements—diversity, useability and value—were found to be most influential in determining whether people felt that nearby green spaces made a positive contribution to their health and well-being.

Integration of quantitative and qualitative data collected in this study enabled several universal elements of “useable” green spaces to be identified. No matter the specific setting, useable green spaces needed to:

- be in good condition and look cared for;
- be accessible;
- be welcoming with clear paths and access points;
- include places where people could relax;
- include places where people could meet others;
- feel safe and comfortable;
- meet needs of multiple users; and
- be valued as part of the surrounding area.

It was decided to adapt these, and other key aspects associated with community values, to develop an index that could be used to assess the capacity of the various parkland settings within the Riverpark to contribute to community health and well-being. The final structure of the Useability Index for the Swan Canning Riverpark is illustrated in Fig. 6. Assessment items fit within two key themes: *connection* (how emotionally connected are people to this place?) and *function* (how well does this place function as an activity and/or recreation destination?). These two themes are

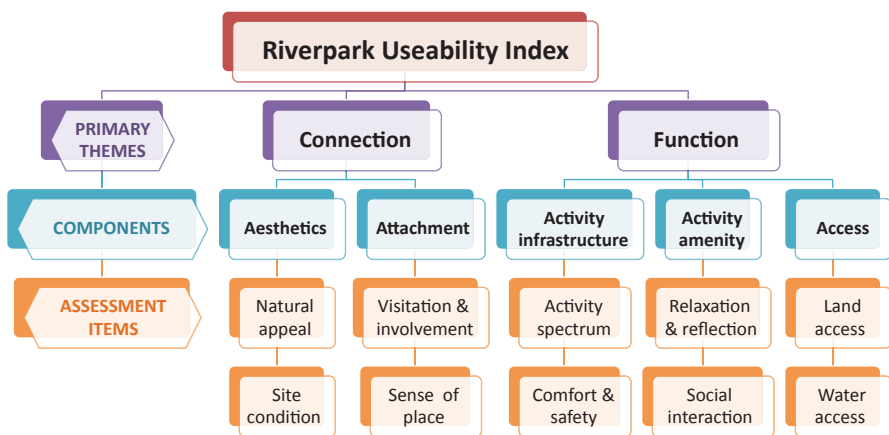


Fig. 6 Themes, components and assessment items within the Useability Index. (Source: Carter 2013)

aligned with the community values of sense of place (connection) and community benefit (function) illustrated in Fig. 4 and described above.

Within the two themes of connection and function, five components were identified.

Aesthetics and *attachment* relate to connection:

- **AESTHETICS:** The visual appeal of natural elements and the overall appearance of each site plays an important role in developing community connection and encouraging use
- **ATTACHMENT:** Engendering “a sense of place” and emotional attachment to cultural, spiritual or historical connections and landscape features plays an important role in willingness to visit, care for and protect river parklands

Activity infrastructure, *activity amenity* and *access* relate to function:

- **ACTIVITY INFRASTRUCTURE:** Appropriate activity infrastructure enables people to engage in various physical activities, recreational pastimes, social gatherings and community events
- **ACTIVITY AMENITY:** People seek appealing and amenable places where they can relax, reflect, meet others and socialise with family and friends
- **ACCESS:** Ease of access to the site (how people can get there) determines how well parklands can be used by visitors, and access within the site (such as pathways and linkages to different areas).

As illustrated in Fig. 6, ten assessment items sit under these five components. Each item includes a set of criteria that is assessed at each Riverpark site. For example, *natural appeal* includes assessment of observed water quality (whether clean, clear and odourless), attraction of cross-river views, and site appropriate trees, riparian vegetation and/or wildlife habitat. How well a site is rated (excellent to poor) in relation to each criteria determines a score (out of 10) for each assessment item. These scores can be reviewed overall (with a maximum score of 100), or by composite score for each theme or component.

In terms of what is considered a satisfactory or acceptable score, all sites are used and valued in different ways and will have their own situational constraints making it difficult to assess what is universally satisfactory. However where site assessment results in lower scores (<70%), this may indicate that a site or certain aspects of a site might benefit from greater investment, maintenance, regeneration or community involvement in planning and management to generate stronger sense of place and optimise community benefit.

At the time of writing, the Useability Index was in its final stages of implementation. More than 150 sites within the Riverpark were assessed by an independent assessor and verified in consultation with staff from relevant local government authorities. Site assessment data is held within the Swan River Trust Asset Management System and will be updated when significant site improvements are undertaken. In addition, it is planned that ongoing assessment of 35 sites selected to provide a cross-section of different types of parklands (water-based activity areas, recreation places and nature reserves) will be conducted annually by trained

volunteer River Guardians. Assessment items are linked to questions included in an annual visitor satisfaction survey (conducted at the same 35 selected sites) enabling comparison of site assessment data and visitor perceptions. This information will be used to assist in prioritising investment and guide planning decisions to ensure that the health of the Swan and Canning rivers and the community who use them are maintained for future generations.

Conclusion

This chapter highlights the importance of cultural ecosystem services and their positive relationship to human health. Perhaps more importantly it demonstrates the importance of sustainable development and the need to ensure there is no further degradation or loss of urban wetlands through increasing urbanisation (Ramsar Convention on Wetlands 2012). To achieve this, the values of cultural (and other) ecosystem services associated with urban wetlands need to be clearly articulated to ensure these values inform urban planning and decision making. Local communities can greatly benefit from appropriate access to green and blue spaces, with thoughtful long term planning, monitoring and assessment designed to involve, engage and empower people to visit, value and care for urban wetlands.

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