

Importance of public information and perception for managing recreational activities in the Peel-Harvey estuary, Western Australia

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Abstract

Surveys of water recreational activities were conducted in the Peel-Harvey estuary. Channels used by recreationists to gain information about water quality, the perception of water quality and resulting behaviour were investigated. This study showed that personal perception, local knowledge and history, absence of warnings and residency were major factors contributing to risk perception and behaviour in this recreational community. Management strategies should take this information into account to achieve maximal outcomes.

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1. Introduction

Beach recreational use involves a very large number of people pursuing various leisure activities such as swimming, sunbathing, and sports. Estuarine beaches are frequented by families with young children as they are perceived as less dangerous than those of the open ocean in regard to dangerous animals and waves. However, they are more prone to pollution. Water pollution can have effects upon the benefits of beach use recreation, such as disamenity effects or potential public health risks (Machado and Mourato, 2002). Pollution can affect highly valued water properties such as transparency, taste and odour, as well as contribute to the presence of undesirable floating material. Risk is usually perceived when visible, palatable, or when water clarity is restricted to 1.2 m (Smith et al., 1991). However, high faecal contamination in the Peel-Harvey estuary (Western Australia) as suggested by bacterial indicator level exceeding Australian guidelines by almost a factor of 10 (Lepesteur et al., 2003, 2006) may not create a risk perception amongst beach users (Pendleton et al., 2001). The aim of this study was to

identify the information available to recreationists, their perception, in regard to water quality in the estuary, and their consequent behaviour.

2. Materials and methods

2.1. Site description

The Peel-Harvey estuary is located 70 km south of Perth near the City of Mandurah. Water movement in the Peel-Harvey is caused by tidal currents, wind-driven circulation, density-induced circulation and river flow. The estuary, which is connected to the ocean by a narrow inlet channel at Mandurah and an artificial channel at Dawesville, is a very shallow body of water, more than half the area being less than 0.5 m deep. The Peel Inlet Management Authority (1996) has reported a dramatic improvement in water quality since the opening of the Dawesville channel, with reduced algal and blue-green algae blooms.

There are considerable data on the types and popularity of recreational activities in the Peel-Harvey (Lepesteur et al., 2003). The major recreational pursuits, both active and passive, include fishing, crabbing, prawning, boating, sailing, swimming, water skiing, picnicking and holidaying. Summer holiday periods result in a heavy burden on

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recreation areas and facilities, particularly those centred close to major boat ramps.

The survey location “Mandurah Bridge Beach” is located in the City of Mandurah, at the mouth of the estuary. The beach area is small (about 500 m²) and water quality testing samples were taken close to the recreational users. To reduce short-term variability of indicators (Boehm et al., 2002), duplicate water samples were collected at 3 p.m., on each day the survey was conducted. Samples were collected during and outside the bathing season. They were collected 30 cm below the surface inside the main swimming area. One of the duplicate samples was taken few metres from the “up-stream side” of the swimming enclosure (where the river water enters the swimming area) while the second duplicate was collected few metres from the “downstream side” of the enclosure (where the river water leaves the enclosure). Mandurah Council collects samples monthly in the morning to test for faecal contamination and the Health Department collects samples for toxic algal blooms and nutrients.

Samples were analysed according to the Australian Standard Method (AS 4276.9-1995).

Faecal contamination of the water was evident most of the year with faecal streptococci levels ranging from 61 CFU/100 ml in April to 645 CFU/100 ml in December (Lepesteur et al., 2006). Levels outside the bathing season (April–October) averaged 186 CFU/100 ml despite an increase during the period of high rainfall and river discharge (June), in accordance with the significant increase of microbial concentration following rainfall observed by Crowther et al. (2001).

In contrast, the mean concentration during the bathing season (November–March) was as high as 414 CFU/100 ml. Increased concentrations during the bathing season in recreational areas reflected the impact of recreational users on water quality, as confirmed by lower indicator levels upstream of the main swimming area. These concentrations can be compared with the maximum recommended values of 35 faecal streptococci per 100 ml (NHMRC, 2005; WHO, 2003). Concentrations of 414 CFU/100 ml may result in more than a 16.9% risk of illness per exposure (WHO, 2003) as opposed to risk lower than 6.9% and 1.3% if the concentrations were below 200 and 35 CFU/100 ml.

2.2. Survey

For the purpose of this study, where little was known about perceptions of the water quality in the Peel-Harvey estuary, the perceptual element of the surveys provided insight into to participants perceptions, and how these guide behaviour (Babbie, 2001) (Table 1).

Surveys were conducted on five occasions during summer, the bathing season (November 2002–March 2003) and on three occasions outside the bathing season (April 2002–June 2002) at two recreational sites (Dawes-

Table 1
Survey questions

{Family size/age of members/origin}	<ul style="list-style-type: none"> ● What is your family size including age? ● Where do you usually live?
{Activities}	<ul style="list-style-type: none"> ● What activities do you participate in during your stay?
{Perception}	<ul style="list-style-type: none"> ● On a scale of 1–5 of cleanness, how do you rate the water of the Peel-Harvey Inlet?
{Information}	<ul style="list-style-type: none"> ● From where do you get information, if the water is safe?

ville Channel and Mandurah Town). On each occasion, the survey was conducted for 4 h, with participation ranging from 75% to 90% of the recreational users present in the area. The survey focused on the frequency, length and period of visits, on the activities undertaken on the age of the users as well on the public perception of the water quality and relating information available. The surveys were conducted face-to-face, with representatives from each family/group and the researcher filling in the survey form to ensure consistency. A total of 119 families were surveyed, corresponding to 340 individuals (from 0 to 67 years old).

A questionnaire focused on the different sources used by recreationists to gain information on the water quality for these sites. The sources were classified as external (sign, media and social exchange) versus personal observation and perception.

Information obtained from external sources was defined as support of information leading to socially mediated perception of water quality and support of factual knowledge. They included audiovisual as well as printing media and social exchange.

On the other hand, perception of water quality resulting from personal inspection was expected to be influenced by environmental literacy and/or immediate sensation depending on the education level of the user rather than by external channels. Information support classified as ‘others’ (4% of responses) included consulting the local government, Waters and Rivers Commission, rangers, Tourism Bureau or assessing the oceanic intrusion through salt level, demonstrating high literacy skills.

2.3. Follow-up survey

Following the initial survey during the bathing season, participants were contacted by telephone after 2 weeks and asked who among the people present the day of the original survey actually had primary contact activities. For the purpose of this study, primary contact activities were defined as swimming, paddling or playing with/on wet sand.

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