

WATER: THE SECRET INGREDIENT

Dr Andrew Lothian, Scenic Solutions, October 2014

“Water in the landscape tends to be dominant because of its visibility, its movement, reflections, and color, its consequent contrasts to adjacent earth surfaces.” (Litton, 1977)

Why does water elicit such a strong response from people? Why can just a glimpse of water yield the same response as a large expanse? Why are ratings of landscapes invariably lifted by the presence of water in lakes, rivers or the sea? What is it about water that compared with any other feature in the landscape, gives it an inordinate influence way out of proportion to its extent?

Water has long fascinated us. Ralph Waldo Emerson wrote about it in his poem, Water:

*The water understands
Civilization well;
It wets my foot, but prettily,
It chills my life, but wittily,
It is not disconcerted,
It is not broken-hearted:*

*Well used, it decketh joy,
Adorneth, doubleth joy:
Ill used, it will destroy,
In perfect time and measure
With a face of golden pleasure
Elegantly destroy.*

Studies of water in the landscape

This paper examines the *why* about water; why it is that it provokes such positive response, rather than detail the results of the many studies of the perception of water. Here a brief synopsis of the role of water in the landscape is provided.

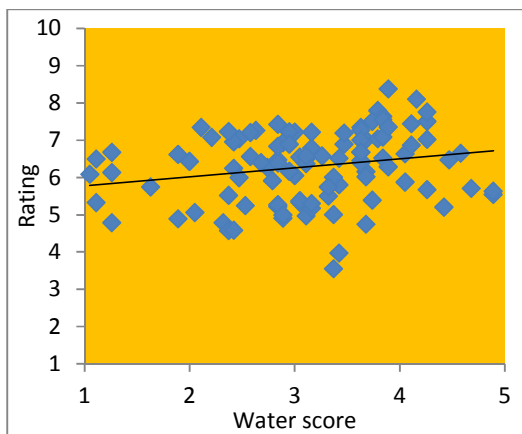


Figure 1 Ratings by water score
River Murray, Australia

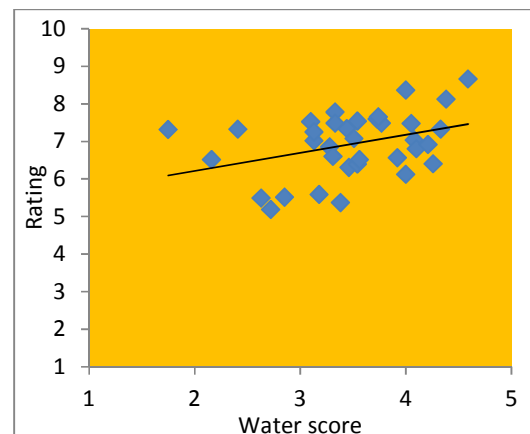


Figure 2 Ratings by water score
Lake District, England

From my own studies, water has been found to have a positive effect on landscape ratings regardless of the extent of water in the scene. Even a glimpse of water is sufficient to lift ratings. Figure 1 compares the scenic quality ratings with the score for water which measures the visual significance of the water in the scene. Scenes

without any water averaged 4.43 (1 – 10 scale) but even a glimpse of water, i.e. score = 1, lifted this to 5.78. Increasing the visual significance of the water in the scene to the maximum score of 5 increased this to 6.78. Figure 2 provides similar results from a survey in the Lake District in England. Whereas the rating for valleys without lakes averaged 6.27, that for valleys with lakes was 7.02. A glimpse of water lifted ratings to 6.71, 0.43 above scenes without water. Thus water of any quantity has a strong influence and it is not so much its extent but its presence that is important.

It is evident from the range of studies that water has a profound effect on landscape preferences. The studies reported that scenic value increased with:

- water edge (Anderson *et al*, 1976; Palmer, 1978; Whitmore *et al*, 1995)
- water area (Anderson *et al*, 1976; Brush & Shafer, 1975)
- channel stability & depth are important factors in river scenic quality (Gregory & Davis, 1993)
- moving water (Craik, 1972; Dearing, 1979; Hammitt *et al*, 1994; Whitmore *et al*, 1995)

Several researchers have found that preferences increased with river flow but peaked and then decreased as the river flow increased (Brown & Daniel, 1991; Hetherington *et al*, 1993; Pflüger *et al*, 2010). It implies that the risks associated with high river flows outweigh their beauty.

In the Rockies, Jones *et al* (1976) found that water bodies were the third most important landscape component in defining preferences after the high mountains and forests. In New Zealand, Mosley (1989) found water ranked fifth in importance after forests, view angle, relative relief and snow and ice. In the less spectacular landscape of the Connecticut River valley, Palmer and Zube (1976) found that after landform, water was the second most important dimension.

Herzog (1985) assessed the preferences for different kinds of water bodies and found in order: mountain waterscapes; large water bodies; rivers, lakes & ponds; with swampy areas last. He provides a useful review of the information processing approach to water preferences, drawing on the work of the Kaplans, Gibson's affordances and Appleton's prospect and refuge. Given that water is essential for survival and that the key tenet of the information processing approach is that "humans evolved in environments wherein the processing of spatial information was crucial to survival", it would be expected that the preference for water therefore lies in its survival enhancing qualities. Good quality water - fast flowing, large bodies would be preferred over swamps and small ponds.

Herzog's findings about the preferences for different water bodies support this. He concluded from his study that the "results confirm the general usefulness of the informational approach in accounting for waterscape preferences." Based on the results, he suggested that clarity and freshness of water, as embodied in mountain lakes, and rushing water are highly valued. In information processing terms, the most preferred waterscapes are moderately high in both the making sense (i.e. legibility and coherence) and involvement (i.e. complexity and mystery) variables.

In examining the links between landscape preferences and the individual mood states of excited, happy, relaxed, upset, ill, stressed or scared, Regan and Horn (2005) found that water induced relaxed and happy moods.

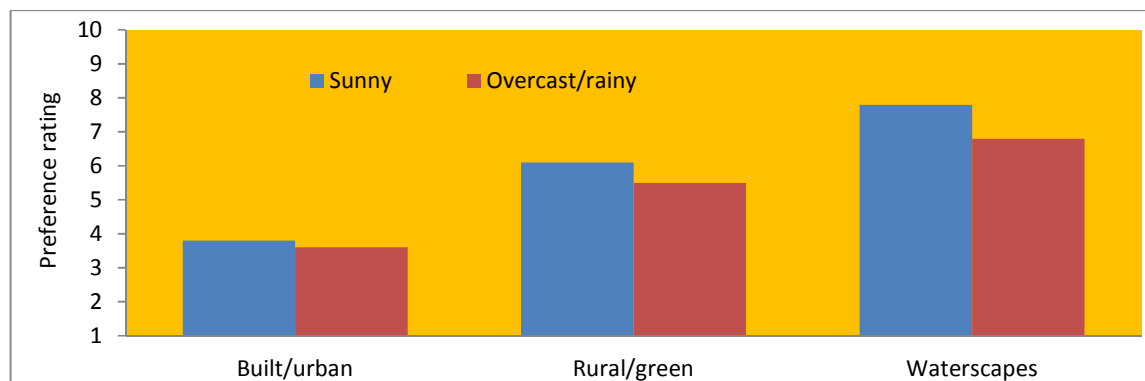
Korpela and Hartig (1996) examined ratings of favourite and unpleasant places and found that for favourite places, 73% were associated with water, compared with only 17.9% for unpleasant places.

Felsten (2009) found that among wall posters of various scenes, those with water rated highest among students for their restorative effects.

Serenity and tranquillity contrasting with awe and arousal were found to be psychological factors deriving from water bodies (Gobster & Chenoweth, 1989; Herzog & Bosley, 1992; Schroeder, 1991). Water holds one's attention and has a stabilising effect on emotions (Ulrich, 1981). Still water has a calming effect (Nasar and Lin, 2003); viewing artificial fountains and pools, participants had higher preferences for jets of water and the combination of flowing water, falling water and jets. They rated still water as most calming and moving water as higher in excitement than still water. Nasar & Li (2004) found reflecting water to be highly preferred over transparent water.

Overall, water was found to be a major and positive factor by Calvin *et al* (1972), Choker & Mene (1992), Dearinger (1979), Dobbie (2013), Dobbie & Green (2013), Dunn (1976), Felsten (2009), Herzog (1985), Herzog & Bosley (1992), Hull & Stewart (1995), Korpela and Hartig (1996), Orland (1988), Regan and Horn (2005), Shafer *et al* (1969), Ulrich (1981), Vining *et al* (1984), and Zube (1973).

Factors which were found to decrease the scenic value of water included pollution and waterlogging (Choker & Mene, 1992), water colour (Gregory & Davis, 1993), and rubbish, erosion, water quality, surface foam and industrial backdrop (Nieman, 1978; Wilson *et al*, 1995). Interestingly Hodgson & Thayer (1980) found that water bodies labelled as artificial rather than natural (e.g. reservoir instead of lake) scored lower than natural labels. White *et al* (2014) found that scenes photographed in overcast or rainy conditions had lower preference ratings than where they were photographed in sunny conditions. They found that waterscapes were particularly affected, with preferences being 12% lower for waterscapes compared with 9.8% for rural scenes and 5.2% for urban scenes (Figure 3).



Source: White et al, 2014

Figure 3 Effect of weather conditions on preference ratings

The importance of water in the view is also reflected in the higher prices fetched by properties with a water view. For example, in a study of houses along Lake Erie, houses with a view of the lake averaged \$527,184 compared with \$285,518 for those without a view. After controlling for house characteristics (e.g. lot size, house size) the premium added to homes with a view was \$256,545. With academic understatement the authors wrote: "This is quite a large premium even given the spectacular view that Lake Erie offers." (Bond, *et al*, 2002). A Swiss study of the profit derived from two hotels found that the hotel with a view of Lake Lucerne and the Alps added \$16.3m to their property value in present value terms compared with \$4.3m for the hotel without the view (Lange and Schaeffer, 2001).

Why is water an important landscape element?

While the studies have thus far established the importance of water in the landscape they offer little explanation of the reasons for this importance. Is it simply, as Bourassa (1991) notes, that humans have consistently had a need "to remain fairly close to bodies of water because humans need a constant supply of fresh water".

It is noteworthy that a significant textbook *Water and Landscape - an aesthetic overview of the role of water in the landscape* (Litton *et al*, 1974) approaches the subject from an objectivist viewpoint as a landscape architect or designer might, and offers no discussion on the role that water might play in our psyche. However, other literature provides some discussion of this.

Ulrich suggests that the appeal of water may be partly biologically-based and largely independent of the Kaplans' informational characteristics (Ulrich, 1983). Earlier (1977), he suggested that water may serve:

“as a focal element and by enhancing subjective depth. The major preference effects of water, however probably stem more from content *per se* than from informational factors.”

Balling and Falk (1982) explored the evolutionary model in a study of preferences for differing biomes, including savannas and although their study specifically excluded water, they recognised its importance to their model.

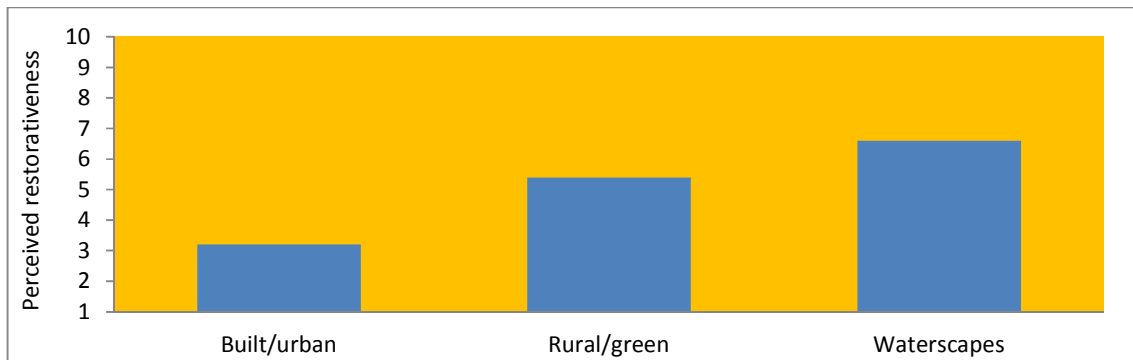
The Kaplans noted (1989) that the appeal of water is not just as a pretty picture - people love to live near water and many recreation activities involve water. Ryback and Yaw (1976) traced the historic value of water as a sacred element, noting the importance of springs to the Greeks; the mythical "fountain of youth" and "water of life" notions, with the concept of Eden being associated as a place of eternal spring. The Christian sacrament of baptism symbolises purification and rebirth and fountains have been symbols of purity. Judaism, Christianity and Islam all associated water with life events: baptism (Christianity), immersion before marriage (Judaism and Islam) and cleansing the body prior to burial (Burmil & Daniel, 1999).

The practice of throwing coins in fountains for a wish or good luck may have developed from an appeasement to the gods of the waters. Water is an important landscape element in the gardens of history (Whalley, 1988).

In a series of wonderfully evocative papers, Brian Hudson (1998 - 2006) documented people's love of waterfalls, and touches on possible reasons why waterfalls hold such attraction including their sexual arousal and symbolism and the hazards they provide in terms of Appleton's prospect: refuge theory (see Chapter 17) but finds these lack full explanatory power.

A further idea relates the preference for water to its utility value (transport, fishing, recreation, industry etc), but this use is unrelated to aesthetic preferences. One uses a road, a mineral, air or land for a variety of purposes without necessarily any feeling of aesthetic delight being associated with its use. While the ever changing appearance of water (changing light, sparkling, smooth or rough) contributes to its enjoyment, it is insufficient of itself to substantiate the strength of preference for water. Clouds exhibit similar changeability and consist of water vapour but they do not stimulate the same level of preference apparent for liquid water.

White et al (2014) found that waterscapes offered far greater restorativeness than either rural or urban environments (Figure 4). This suggests that restorativeness that water provides may be an important factor in its attractiveness but it does not explain why this might be so.



Source: White et al, 2014

Figure perceived restorativeness by landscape type

All of these explanations however - information processing, evolutionary, cultural, historical, and utility, all fail to explain sufficiently the depth of attachment and affinity which humans have for water and the positive role it plays in landscape preferences. For example, the survival theory fails to discriminate between fresh water and undrinkable seawater despite cues such as sandy beaches and the smell of salt laden air.

Human preferences for water appear to be present in all cultures and across time. Any explanation needs therefore to be common to all people regardless of their location, culture and time period in which they live. The problem with many of the above explanations is that they are unique to a particular people, time and place.

An alternative explanation for the human affinity for water approaches it from the pre-birth state of every human being inside the womb prior to birth when the baby is enveloped by water-like amniotic fluid. It is proposed that this intense, prolonged pre-birth experience of water results in the human delight in water.

The amniotic fluid is a pale straw-coloured liquid, 99% water, formed from maternal plasma and for the first half of pregnancy has a similar composition¹. Later, in the second half, its composition becomes similar to foetal urine. During the first half of pregnancy the foetal skin is highly permeable to both water and sodium and it can transfer urea, but by the 25th week the skin becomes keratinised and impermeable to the fluid. Additionally in the second half of the pregnancy there is a constant process of foetal swallowing and urine production of about 500 ml/24 hour period. The volume of amniotic fluid increases with the growth of the baby and stabilises at about one litre by the 28th week. The fluid is in constant change with a complete turnover every three hours. The growing baby thus has a close, vital relationship with its watery environment, drawing from it as well as passing waste into it.



Source: Wikipedia

**10 week baby inside the amniotic sac,
surrounded by fluid**



lo9.com

Baby contemplating

The amniotic fluid is of vital importance to the baby permitting movement, protecting it from umbilical cord compression and helping to maintain an even temperature in the womb. It allows symmetrical external growth of the foetus, prevents adherence of the amnion (i.e. the membrane sac) to the foetus, cushions it against injuries and impacts received by the mother, and enables it to move freely, thus assisting musculoskeletal development.

Stages in the development of the foetus are well established (Concar, 1996):

- 13 weeks - electrical activity occurs above the brain stem and the foetus can possibly feel pain
- 14 weeks - the body responds to touch
- 16 weeks - eye movements commence
- 20 weeks - full movements and responds to sound
- 22 weeks - cortex is fastest growing region of brain and develops its six layers
- 25 weeks - 'righting reflex' - foetus has preferred position
- 26 weeks - blinks at light on mother's stomach
- 22 - 24 weeks - nerves connect to brain's cortex - some argue the feeling of pain is not possible before now
- 29 weeks - first sign of electrical activity in brain's cortex

Although a keen debate has been in progress regarding the capacity of the foetus to feel pain prior to birth, and at what stage this occurs, there is general agreement that

the foetus is certainly capable of registering its environment from early in the second half of the pregnancy. There would seem no reason, therefore, why it should not start to perceive, albeit in a primitive way as the brain develops, the amniotic fluid in which it is located. Of course, the unborn baby cannot see with its eyes while in the womb, rather it would derive information about its habitat through other senses such as touch and possibly smell. The amniotic fluid is the first external contact for the baby as they are immersed in it. Thus the first experience of the world outside of self is of fluid.

Ryback and Yaw (1976) come close to this when they suggest that the in-utero experience is our first environment and “may be the basis for ‘pre-conditioning’ of our psychological responses.” They suggest that the soothing rocking of a cradle for the baby and of music for the adult replicates the “monotonous biologic rhythmicity of fluid and organ movement while immersed in an aqueous medium.”

It necessarily takes a leap into the unknown to suggest that the same in-utero experience of a warm, cosy, safe, quiet and nutritious environment in which every human begins life also provides the explanation for the human preference for water. However from a psychoanalytical perspective it is reasonable to propose that it is the unconscious desire for the pre-natal in-utero state in the amniotic fluid which all humans share that provides the foundation for human love of water.

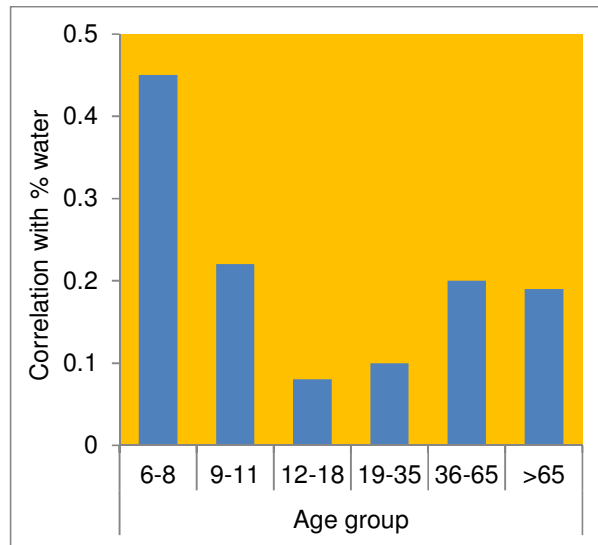
The desire to view water in its many states (rivers, waterfalls, lakes, sea), to enjoy recreation in it and on it, to live near it, to have views over it, and to have water features in our cities such as fountains may all derive from the positive pre-cognitive experience of water gained while in the womb. The ubiquity of preferences for water across all cultures and time lends support to this hypothesis.

The psychoanalytical model may provide a vehicle for understanding this. The basis of psychoanalysis is the unconscious needs and desires of which the person is scarcely aware and which develop during the individual’s earliest years (psychoanalytical concepts are discussed in Chapter 7). There is little in the literature on the development of such outcomes from the pre-birth period.

It is insufficient to point to the ubiquity of preferences for water as evidence for the hypothesis, although the types of water preferred may provide some measure of evidence. For example, the preference for both fresh water and seawater accords with it. Similarly the preference for running water over still stagnant water fulfils it and also for water bodies rather than water vapour in the form of rain, fog, mist, hail and snow.

If this hypothesis is true then it would be expected that children, particularly young children, would display strong preferences for water and that such preferences would wane somewhat with age but remain strongly present throughout life.

A finding that lends support to this hypothesis is Zube *et al* (1983) who examined the changes to landscape preferences over a lifespan. They found that children’s landscape preferences were strongly influenced by the presence of water (Figure 4). Moreover, this preference was found to decline with age until late middle-age, when it rose slightly. The authors found “Water significantly enhances scenic values for young children but is of minor importance to adults.”



Source: Zube et al, 1983

Figure 4 Correlation of Age Groups with Preference for Water

Yamashita (2002) provided cameras to children and adults to take up to 50 photographs of the river environment. Interestingly, while 29% of the adult's photos were of water, 54% of the children's were of water and the extent of water in the children's photos was also much larger than that of adults (adults 37%, children 50%), all of which suggests a much stronger interest in water by children. While adults focussed on the flow of the water (41% of their photos), children focussed instead on its quality (43%) which is also significant as in-utero amniotic fluid is essentially stationary and its quality is also important. Yamashita concluded "Water in the landscape strongly attracts the attention of child residents ..., whereas it plays a minor role in adult's... perception of the landscape." His findings reinforce the strong attraction that water has for children, an attraction that wanes in adulthood.

In a delightful study of children's play with water in a child care centre in Massachusetts, Kates and Katz (1977) documented their water play and what the children thought about it. They commented:

"The sensual and affective qualities of water are important especially to the three-year-olds. Watching water was a serious activity. Some children sat on the window seat looking at the rain and others watched water flow out of the taps. Children stood with the hands under running water, poured it over their hands, swirled the tub water with their hands making waves or stood soaking their hands in the tub for quiet minutes. They were entranced for relatively long periods of time by pouring water back and forth between two vessels, or between the large tub and a cup. Most of this play was purely abstract – there was no end product or prescribed line of play to follow. Water was enjoyed for its unique qualities."

Such a picture of the child dreaming of their in-utero state in water!

Clearly much more evidence is required in order to substantiate the hypothesis that human preference for water derives from the pre-utero state of being immersed in the amniotic fluid inside the womb.

According to a psychiatrist colleague who practices psychoanalysis, water and the sea are taken to be symbolic of the mother. The nurturing mother womb is the source of creation and has primal connotations. There is a universal desire to return to the womb. Regarding the idea that the in-utero experience might provide the basis for water preferences, he was open - while this could be, it is generally held that a baby does not create fantasies in the womb. However, he admitted the evidence for this was based more on logic than on knowledge.

CONCLUSIONS

Many studies have documented the positive influence that water has on human landscape preferences but few offer suggestions of why it has this influence. Among the possibilities are information processing, evolutionary, cultural, historical, and utility explanations, but all fail to explain sufficiently the depth of attachment and affinity which humans have for water and the positive role it plays in landscape preferences.

An alternative hypothesis is proposed, that it derives from the pre-birth state of every human being inside the womb prior to birth when the baby is enveloped by water-like amniotic fluid. This psychoanalytical explanation is that human preference for water derives from an unconscious desire for the pre-natal in-utero state in the amniotic fluid which all humans experience. Studies of children's preferences for water provide some support for the hypothesis.

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