

WATER DEMAND MANAGEMENT IN ECOTOURISM

A Wilderness Safaris case study

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Water has been described as a fundamental resource for the sustainability of natural resources, scenery, ecosystems and the people in protected areas (Kirkpatrick & Kiernan, 2006). Water is, however, also an essential input in consumption and production and is often overlooked and taken for granted (Sterner, 2003). Ecotourism is described by Honey (2008) as “visits to areas under some form of environmental protection by government, conservation organisations or private owners”. Ecotourism operators such as Wilderness Safaris depend on such fundamental resources in order to provide the experience to the discerning travellers who visit their safari camps as guests.

Operators need to understand natural drainage systems, comprising ground water, wetlands and rivers, and to base their strategies on the entire catchment rather than on individual parts of the system (Kirkpatrick & Kiernan, 2006). Tourism, while not utilising the quantities of water that other extractive industries extract or consume, still needs to manage the critical issues of discharge, flow regimes and water quality (Kirkpatrick & Kiernan, 2006). Through the promotion of strict water demand management at lodges and hotels, the tourism industry can set an example for both private home owners and particularly industry leaders who travel extensively.

From a broader view of sustainability or sustainable tourism, for many years Wilderness Safaris has been a leader in ecotourism. In recent years Eco-awards have become more rigorous and reputable, such as Condé Nast Traveler’s “World Saver Awards” (Honey, 2008) which Wilderness Safaris has won in the past as well as many other awards. Wilderness Safaris’ sustainability practices are focused on three core areas, namely Energy, Water and Waste management. Ways to use energy and water

more efficiently and to manage waste more effectively are continuously reassessed, including searching for alternatives that make environmental and economic sense. This paper focuses on water and what Wilderness Safaris has achieved and would still like to achieve in the future.

The history of Wilderness Safaris

Thirty years ago the founders of Wilderness Safaris fell in love with the remote and wild places of Africa. They realised that many of these places were not getting the attention they deserved. Some had too many visitors, while others had hardly any. Some areas were being hunted excessively. The initial Wilderness Safaris dream was to conserve these places by enabling people to visit them and at the same time for their staff and business to earn returns from the process. This was not a grand or complex idea but it was an important one. Wilderness started off by offering “journeys and experiences to discerning globally caring travellers”; however, today Wilderness Safaris is in the business of “building sustainable conservation economies” through the employment of a responsible tourism model. Wilderness Safaris began operating in Botswana and then spread out into the rest of southern Africa (Namibia, South Africa, Zimbabwe, and Zambia) and the Seychelles. Over time, the business has evolved into a specialist luxury safari operation with 61 different safari camps and lodges, comprising a total of 1 016 beds, in eight SADC countries and hosting in excess of 30 000 guests per annum.

Overview of the business

Wilderness Safaris is the original operating brand under the holding company Wilderness Holdings, which is a Botswana-based company, listed on the Botswana

Stock Exchange with a secondary inward listing on the JSE Limited. The Holding Company acts as the investment holding vehicle for the business. The business is currently supported by international and local markets, and has a value proposition of “selling original experiences in pure wilderness”. Wilderness sell these experiences to the consumers, their guests, largely through the travel trade, their clients. The channels through which these sales are made are complex and multifaceted.

The product sold to guests, through the travel trade, is vertically integrated and comprises packages incorporating some or all of the following elements:

- Safari camps, lodges and mobile explorations form the basis of the business;
- Guests and camp/lodge supplies are transported to and between the camps using air and ground transfers; and
- These integrated itineraries are developed and booked through a tour operating and reservations business which sometimes incorporates third party products into the packages (for a margin).

The tourism business comprises two main brands. Wilderness Safaris is the original trading brand of the Group and offers safaris based out of both fixed and mobile camps (the latter under Wilderness Explorations) in three tiers of camps: Premier, Classic and Adventures. These are supported by the travel trade and principally by travel agents specialising in the booking and arranging of African travel. These lodge and camp operations are supported by Wilderness Air, their flying business. The other trading brand is the Wilderness Collection. This is a stable of unique sustainable tourism operations in locations at a distance from the original areas of operation. These businesses are

managed and marketed but there is no capital investment.

Background of water demand management at Wilderness Safaris

In a Wilderness Safaris camp, water conservation is managed in three key areas:

1. On-site local water consumption:

On-site water consumption varies depending on the level of accommodation, brand and also on the environmental conditions in the vicinity of the camp. Camps in water stressed areas such as Hwange National Park may consume as little as 65L per bednight while water rich areas such as camps in the Okavango Delta may use 132L or more per bednight (see figure one below). The use of water for guest and staff showers and toilets is the most obvious, however the laundry is the largest water use in a camp, and accounts for a high proportion of the grey water that is discharged as waste. In the safari industry, the cleaning of game drive vehicles is also a significant water consumer. Other general maintenance will consume water at differing levels.

2. Bottled water consumption: The consumption of bottled water by guests is not a direct consumption of water resources at the site of the lodge but the overall environmental impact is very significant on account of the footprints associated with transport and the consumption of water at the source, offsite of the camp/lodge. There are also significant waste reduction benefits associated with reduced bottled water consumption.

3. Waste water management: Waste water management is particularly important due to the fact that



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incorrect management of waste water in the safari industry can lead to the contamination of local fresh water supplies and the environment. For this reason careful planning and implementation of a sufficient sewerage treatment system is required.

Measurement is key

Measurement of all environmental aspects is vital for creating a more conscious operational mind-set. Without knowing how much water is actually being consumed, a lodge cannot understand their impact nor set goals. Measuring water consumption alone is not enough and needs to be part of a collective set of measurements that are key to sustainable lodge operations. This includes measuring fuel use, wood use, bottled water consumption and to an extent, waste production and the levels of recycling. Once management of a lodge has measurements of water usage, these can be used to motivate staff to reduce water use and manage water more carefully. Wilderness Safaris has had varied success in this regard but for the most part, due to improved water use measurement, their camps are improving water use efficiency, even in the water rich areas such as the Okavango Delta. The difficulty of measuring water in some areas is the severe lime-scale build-up from high levels of calcium in the water which blocks and ultimately renders the water meters useless. At camps in such areas, particularly vigilant monitoring of water consumption and potential leaks from the water reticulation system is necessary.

Case study: Why does measurement need to be an integrated approach?

In 2012, a good example of the interconnectedness of measurement was provided at Wilderness Safaris Xigera camp where there is no access to public sewerage lines. In order to minimise fuel usage the Xigera camp had been converted to 100%

solar power and therefore measurement of fuel use became even more intense to ensure that the expected overall fuel savings were in accordance with the CO₂ emission reduction models. A number of months after installation of the very sophisticated fuel monitoring systems it was discovered that fuel use was strangely increasing. This was investigated and it was discovered that the pump, which delivers water from the source in the Okavango Delta to the storage tanks, had a leak in the pipe that had not been detected. Due to the more intensive and regular pumping, the battery bank of the solar plant was being depleted faster and hence the generator had to turn on more regularly to recharge the batteries as a backup to the solar array that was under pressure. After fixing the leak, the fuel savings returned to what was expected from the model and our water consumption also decreased to normal levels. This shows the importance of measuring all such environmental aspects that form part of crucial operational systems and that monitoring of one environmental system can assist in solving a problem in another. An integrated approach to environmental management and data capturing is key to any water resource management and should not be measured or seen in isolation. Proper environmental measurement systems should be the first solution put in place to best understand a lodge's water demand and the benefits of water demand management and conservation.

What are we doing and what can be done

Camp water reticulation

The key to making a positive impact and improving water demand management is to prioritise effort to where this is needed most. Wilderness Safaris do not believe that there is value in investing in water efficient systems in the Okavango Delta where water is abundant, but concentrates on water



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conservation and demand in water stressed areas, such as their camps in Namibia and in Hwange National Park in Zimbabwe where improvements can provide the greatest benefits. Once the critical areas are well managed attention is directed to camps further down the priority list. In the Central Kalahari Game Reserve (CKGR) for instance, which for all intents and purposes is a desert, Wilderness Safaris have storage for 150 000 litres of rain water. Each guest tent is fitted with a 10 000L holding tank, which together with underground storage tanks, can fill the 150 000L maximum capacity after 55mm of rain off the 990m² roofing of the camp. While this does not provide us with enough water year round, the rain water harvesting does alleviate the pressure on underground water supplies. The remaining fresh water requirements of the camp are supplied from the saline aquifer that is run through a desalinating Reverse Osmosis (RO) plant. Across most Wilderness Safaris camps, water is reticulated using a gravity fed system from tanks positioned at least 10m above

the ground. As the water pressure is low, water saving shower heads do not work and therefore standard shower heads are used. Where pressure pumps or higher pressures are available, water saving shower heads are used and have proven to be very effective, using less than 10L per minute. The other benefit of water saving shower heads is that they do not deplete the geysers' hot water as much as standard shower heads and therefore save on energy usage. In Namibia, guests are asked to place buckets under the shower while waiting for the hot water. This water, which would usually go down the drain, is later used by housekeepers to clean the tents or rooms. In most cases dual flush toilets are also used. In water stressed areas such as the camps in Namibia or Hwange National Park in Zimbabwe, Wilderness Safaris try to use water more efficiently than at camps in the water abundant Okavango Delta, for instance. Figure 1 is a graph showing the difference in water usage between water abundant areas (Botswana's Okavango

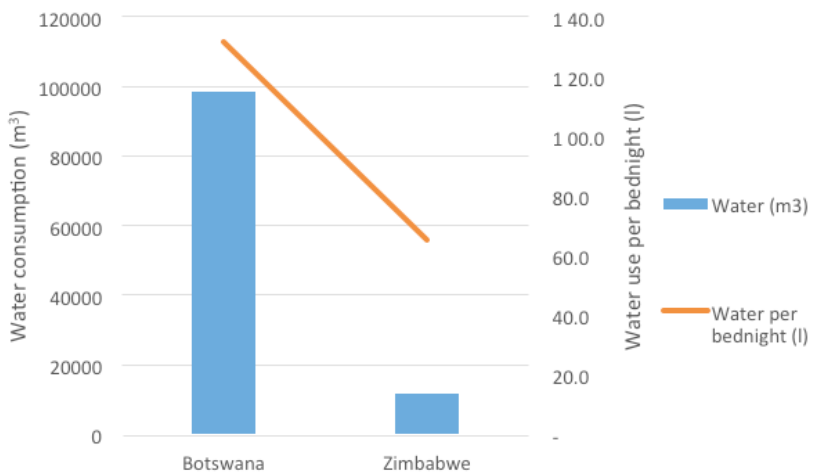


Figure 1: Total water consumption and water consumption per bednight in two regions, comparing the differences in water use efficiency.

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Delta) and water stressed areas (Zimbabwe's Hwange National Park).

Bottled water

Across Wilderness Safaris' range of camps the reduction of bottled water has been one of the best success stories. In 2009, a Group wide effort was put in place to reduce the consumption of bottled water through the installation of a reverse osmosis plant at each camp so as to produce purified drinking water for guests and reduce the need for purchasing and transporting enormous amounts of bottled water into some of the most remote areas of southern Africa. By 2012 these reverse osmosis bottling plants were in place at most camps and reduced Wilderness Safaris' overall bottled water consumption by 51%. This has also significantly reduced waste production, having saved over 406 700 half litre plastic bottles since inception. Previously guests on a game drives often opened 500ml water bottles and discard these before the water is finished. With the reusable water bottles that are provided to guests on arrival, they

only drink to their thirst or fill their bottles to what they require and waste less water as a result. This also makes an impact on raising the awareness of water conservation and raises once again the consciousness of using water efficiently and as a result also highlights better waste management. Below are two graphs that indicate the significant reduction in bottled water consumption across seven of the countries in which Wilderness Safaris operates. Figure 2 shows the overall bottled water consumption across the seven countries while Figure 3 shows the reduction in bottled water per bednight, which illustrates water efficiency more effectively.

Waste water management

An important aspect of water demand management, especially when operating in the pristine wilderness areas that Wilderness Safaris operate in, is the management of waste water from the on-site sewerage treatment plants. The key aspect to consider is the potential for ground water or river water contamination from the camps

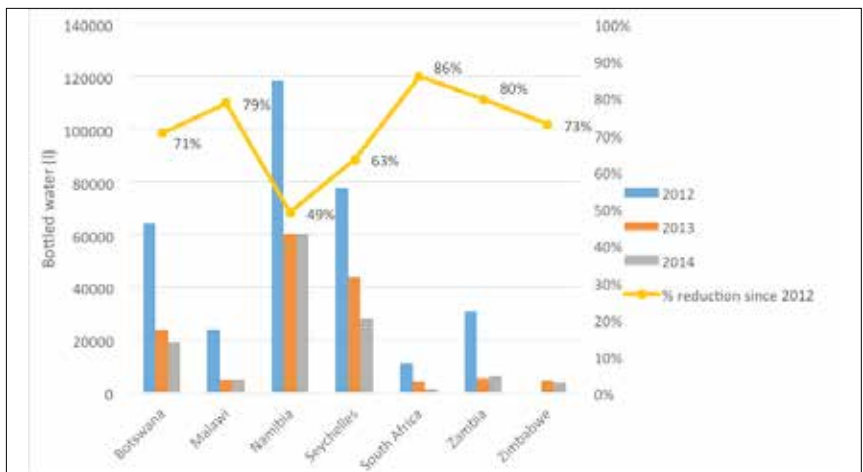


Figure 2: Bottled water consumption (l) in seven countries in which Wilderness Safaris operates, including the percentage reduction from 2012 to 2014.

waste water. Wilderness Safaris take this into serious consideration when designing the camps' waste water management systems, as contaminating ground or surface water would go against the very fabric of Wilderness Safaris.

As mentioned previously, Wilderness Safaris have a number of camps in areas where water is abundant, such as the Okavango Delta and along rivers such as the Linyanti and Zambezi Rivers. It is in these areas Wilderness Safaris have invested in sophisticated above ground sewerage treatment plants (STPs) in order to reduce any potential for fresh water contamination. As a result 40% of camps have installed STPs. STPs treat the water through a bacterial based system utilising both aerobic and anaerobic breakdown of the dissolved solids in the waste water. A final settling tank allows the cleaner water to separate from any remaining solids and is then sterilised using one of three processes (ozone, UV light or chlorine) before being safely disposed of into the environment.

Case study: Toka Leya, a water system that comes full circle

Wilderness Safaris' Toka Leya camp is situated on the Zambian bank of the Victoria Falls, 11km upstream from the Victoria Falls. This used to be the site of a village prior to the establishment of the Mosi-oa-Tunya National Park. Wilderness Safaris was the successful bidder for this site, which was put out to tender for the establishment of a light footprint tourism development. In 2008 construction commenced on what was a degraded environment as a result of human settlement, the only indigenous tree on most of the site being a baobab. As part of the conditions of winning the bid, Wilderness Safaris embarked on the restoration and rehabilitation of the site, an effort that continues today and beyond the Toka Leya camp site. In conjunction with the Zambian Wildlife Authority (ZAWA), a Greenhouse and nursery project was set up at Toka Leya in 2008. Seeds and pods were collected from the National Park,

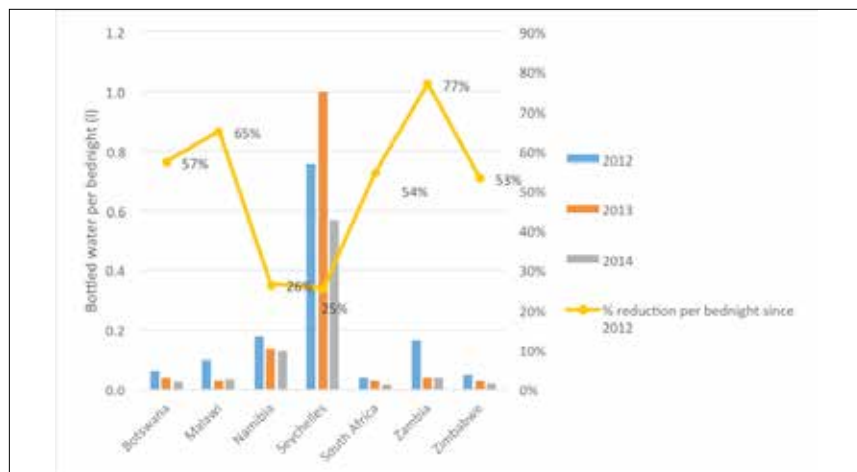


Figure 3: The bottled water consumption per bednight (l) in seven countries in which Wilderness Safaris operates, including the percentage reduction from 2012 to 2014.

and overseen by two key staff members, where they were coaxed into saplings in the nursery and planted on site as part of the rehabilitation process. In 2012 alone, 740 trees were planted at Toka Leya and surrounding areas inside the Mosi-oa-Tunya National Park. By the end of February 2012 there were a further 873 trees in the nursery that were ready for planting, 275 saplings in the greenhouse ready to go into the nursery, and a further 453 seedlings that had already germinated and were due to be moved into the greenhouse. The management of organic waste was also designed around this initiative. For the processing of waste water (both black and grey water), a state-of-the-art above-ground sewage treatment plant (STP) was installed. This system treats the waste water both aerobically and anaerobically, producing naturally treated waste water fit for discharge into the environment. The output of the water is used to irrigate the seedlings and saplings of the rehabilitation project, making effective use of this waste water.

Conclusion

Water demand management is not about reinventing the wheel and waiting for new technologies to save the day, but about improving the awareness of water use and also the quality of waste water for disposal to the environment. People in their private capacities and businesses need to understand their water use before they can start doing anything. Far too often, businesses partake in “green washing” so

that they can claim they are making an effort, but have no idea whether these are working or not, instead of first gathering a quantitative understanding of their water use and disposal. Sadly these one or two measures are put in place to hopefully sort out the problem, instead of putting in the time and effort to properly understand a lodge’s or other business’s water challenges. Water measurement is a vital step in heading towards a “conscious” water conservation approach, as opposed to ignorant water demand management where systems are installed and then never looked at again. Only once quantities are known can a lodge understand water usage and waste water disposal and therefore tailor-make their management approach for the local area. Wilderness Safaris has benefited from this approach of quantitative understanding of water demand management, which has led to a more conscious use and disposal of water at their camps.

It has also allowed their management to set targets and for regions to compete and set the example for best practice, such as being the camp with best reduction in bottled water, for instance. Alternative technologies or management approaches can then be designed and implemented to make the best impact on efficient water use and safe disposal. In this process the lodge may in fact develop their own improvements that can assist the industry as a whole and hence improve the water demand management approach of the safari tourism industry.

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