



Adelaide Zoo Primate Keeper Pij Olijnyk at the orangutan exhibit

Case Study

UPCLOSE

Zero Waste SA Industry Program



Zoos SA takes a sustainable route to animal care

As far as sustainability programs go, they don't come much more complex or daunting than those faced by a large zoo.

Adelaide Zoo and its open-range sister Monarto Zoo are quite different operations but both face similar significant challenges when it comes to lowering their environmental footprint.

Looking after the welfare of hundreds of animals from all parts of the world requires enormous amounts of water and electricity.

With the needs of each species different, there is no single solution to lowering usage. The task at Adelaide Zoo, the second oldest zoo in Australia, and Monarto is made more difficult because of the mix of new and ageing infrastructure.

Then there is the issue of managing all the waste. The operational requirements of thousands of visitors and the animals produce significant quantities.

In recent years Zoos SA, a not-for-profit conservation charity which runs both Adelaide and Monarto Zoos, has been making some impressive inroads into reducing energy and water use, and keeping waste out of landfill.

The environmental program has now entered its next phase and has been elevated to a new strategic level with assistance from the Zero Waste SA Industry Program.

“Zoos have some pretty spectacular sustainability challenges. We're major energy and water users and we produce gargantuan amounts of organics. Finding a solution is made even more complex because we are such a diverse business and we can't compromise the welfare of the animals in our care.”

Vicki-Jo Russell AM

Director Conservation, Planning and Sustainability, Zoos SA



Government of South Australia

Zero Waste SA

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The introduction of reporting has allowed the zoos to start charging restaurants and cafes for their waste removal.

Sustainability objectives

Raising sustainability to a new strategic level by targeting improvements in every day business across all areas.

Annual savings

	Waste to landfill	Recycling	Recovery rate
2009	197 tonnes	228 tonnes	54%
2013	79 tonnes	380 tonnes	82%

In 2013 Adelaide and Monarto Zoos recycled:

Waste streams	Tonnes
Solid organic	285
Cardboard	27.4
Timber	2.4
Co-mingle	41.4
Liquid organics	8.7
Steel	5.5
Drink containers	4.2
Concrete	5.1
e-Waste	1.0
Total	380.7

Water

Major savings have been achieved in bore water use at Adelaide Zoo, with infrastructure upgrades realising a 76% reduction in groundwater consumption.

2008	222,992 kl
2013	53,580 kl

Zero Waste SA support

- funding for eco-efficiency review
- assistance with new waste recycling and cleaning contract
- ongoing advice on new sustainability initiatives
- development of a case study

Outcomes

- achieving sustainability improvements in a highly challenging environment
- significant gains in keeping waste from landfill
- master planning for the future
- benchmarking improvements with other major zoos
- reducing excesses while maintaining animal welfare
- strong support from staff

Adelaide Zoo

Opened in 1883, Adelaide is the second oldest zoo in Australia and the only major metropolitan-based zoo owned and operated as a not-for-profit charity. The zoo houses more than 2,500 animals from 250 species which are exhibited in eight hectares of land next to Adelaide Botanic Gardens.

Monarto Zoo

Monarto is an open-range zoological park spread over 1,000 hectares of land near Murray Bridge. The zoo, which is now home to about 500 animals, was established in 1983 as a special-purpose breeding area for endangered species and opened to the public 10 years later.



John Freeth, Principal of Directed Resources and a consultant to Zero Waste SA, with Vicki-Jo Russell, Director Conservation, Planning and Sustainability and Sustainability Officer Wayne Yorath

First steps towards sustainable practice

Zoos SA began its journey to a more sustainable operation in 2009.

Management understood there could be significant financial gains in pursuing an environmental program and it fitted well with the organisation's commitment to wildlife conservation.

A green team was established and Wayne Yorath agreed to become Zoos SA's first Sustainability Officer on a part-time basis.

It was a role he admits was totally new to him, but what he lacked in experience he made up for in enthusiasm.

Wayne's trade background and 15 years in the zoo's asset department also meant he had a good understanding of its equipment, infrastructure and working practices.

One of his first challenges was helping to establish a new waste management contract.

"I didn't know a great deal about the waste management industry back then but I did notice

that we had no reporting on waste and recycling which seemed like a very good place to start," says Wayne.

"And apart from animal waste which went for composting – and accounted for more than half our total waste – there was no recycling."

The new waste management reports identified that most of the time the bulk organics bins were being transported under capacity.

On average, the bulk bin was being emptied twice weekly at about 2.2 tonnes. By using a larger bulk bin and a backhoe to compact the organic material, this was increased to an average nine to 10 tonnes per lift. This resulted in a reduction in freight charges and associated carbon emissions.

Recycling program delivers major benefits

New waste streams were progressively added to the list of items for recycling.

Underutilised bays near Adelaide Zoo's workshop became a mini transfer station with recycling expanded to include solid and liquid organics, steel, concrete, timber, drink containers, plastic, cardboard, e-Waste, medical waste and batteries.

The introduction of reporting allowed the zoos to benchmark improvements and also start charging tenants, such as restaurants and cafes, for their waste removal.

With support from staff in separating waste for recycling, the improvements were dramatic.

In the first reporting year in 2009, the two zoos recorded a 54% recovery rate, with 228 tonnes of waste going to landfill and 197 tonnes recycled. By 2013 this had been progressively improved to the stage where only 79 tonnes went to landfill and 380 tonnes were recycled – a recovery rate of 82%.

With assistance from the Zero Waste SA Industry Program, Zoos SA has now negotiated a new five-year contract with Veolia Environmental Services (VES) for an integrated waste management and cleaning service.

For the first time the contract has a capped monthly service fee and a guaranteed minimum recovery rate of 84%. This is 9% above the State Government's 75% target for commercial and industrial waste.

Veolia has also entered into a sponsorship agreement with Zoos SA and is funding the roll-out of a new three-bin recycling system for visitors. Bins are being provided at 15 public stations for drink containers, plastics, cardboard and general waste.

Master plan for sustainability

Since 2009 Zoos SA has made significant progress towards a more sustainable operation. Now the program has been elevated as a key goal under its 2012 strategic plan.

In 2012 Vicki-Jo Russell became the first senior manager with responsibility for sustainability in her role as Director Conservation, Planning

THE SUSTAINABILITY TEAM IS DRIVEN BY TWO SLOGANS:

- if you can't measure it you can't manage it
- we won't pay to give it away.

AVOID • REDUCE • REUSE • RECYCLE



Vicki-Jo Russell at Adelaide Zoo's mini transfer waste station

and Sustainability, and is working closely with Wayne to implement the program.

Vicki-Jo is an environmental specialist who received a Young Australian of the Year Award in 1998 and five years later was made a member of the Order of Australia (AM) in recognition of her work.

She says Zoos SA's commitment for a more sustainable operation is being driven by the need for economic efficiencies and is also consistent with its messages on conservation.

"Our challenge is to identify our biggest impacts and then find the most cost-effective ways of mitigating those. Sustainability has become a key part of our master planning and we are working towards embedding it into the very fabric of our business," says Vicki-Jo.

"We're a not-for-profit charity and we can't do everything, but if we do it smartly and at scale with everyone on board, then the benefits will be significant, including for our animals."

For Zoos SA to achieve its goals Vicki-Jo says it also needs some great partners.

It became a participant in the Zero Waste SA Industry Program in 2013 and is working closely with various other key organisations, such as VES, SA Water and AGL on sustainability options.

Support from Zoos SA's workforce of 230 full-time and part-time employees and more than 600 volunteers is also critical to success.

"Changing the way we do little things every day is one of the most cost-effective ways of

making improvements so it is vital our staff and volunteers are fully behind what we are trying to achieve," says Vicki-Jo.

Senior managers have been involved in the sustainability master plan and staff are regularly updated through the internal newsletter and staff forums.

Eco-efficiency review targets new savings

An eco-efficiency review has helped identify opportunities for further reducing energy and water consumption at both Adelaide and Monarto Zoos.

The review was commissioned under the Zero Waste SA Industry Program and carried out by Energyfocus with support from energy management specialists Adjel in the winter of 2013.

The assessment noted that the two sites are large and disjointed with buildings and equipment ranging widely in age, level of complexity and condition.

But it also reported that there is a "huge range of individual opportunities to reduce energy and water consumption at each site," although many would be beyond available resources.

Zoos SA is acting on several of the major findings. The review found that:

- there is scope to achieve at least a 10% reduction in electricity consumption across both zoos through small scale initiatives such as running times of appliances

- further energy and water savings could be achieved through a planned maintenance schedule on plant and equipment

- on-going energy and water management would benefit significantly from an on-line monitoring system.

Visitors' program

Each year more than 500,000 people visit Adelaide and Monarto Zoos.

Communicating the sustainability message to these visitors features prominently in Zoos SA long-term planning. Initiatives being considered include:

- developing a sustainability trail featuring environmental improvements to the animal exhibits
- building an exhibit to educate visitors on sustainability actions they can take.

Benchmarking zoos

While major zoos across Australia regularly share knowledge about their animals, they rarely communicate information on business operations such as sustainability initiatives. That's now changing.

Zoos SA initiated discussions with Melbourne Zoo and this has now been extended to include most capital city zoos through a sustainability action group which is beginning to compare and benchmark progress.



An upgrade to the hippo pool is saving 23,000 kl of water a year

For the first time sustainability issues are also being reported to the peak accreditation body the Zoo and Aquarium Association.

Tackling water use

Adelaide and Monarto Zoos use huge amounts of water for irrigation and for the habitats of some animals.

Reducing bore water use at Adelaide has been a key focus over the past five years. The results have been dramatic with annual bore water use reduced nearly six-fold from 226,992 kl in 2008 to 53,580 kl in 2013.

The impressive turnaround is the result of:

- staff changing the way they do things, such as turning appliances off when they aren't needed
- more metering to identify where water is being used
- new automated infrastructure, such as flow switches and pressure timers
- a concerted effort to rectify leaks.

Vicki-Jo says water is now part of Zoos SA's master planning to achieve long-term water security.

"We have to plan for future water restrictions even if that may be 20 years ahead," says Vicki-Jo. "At Adelaide we use predominantly bore and mains water and must assume that availability isn't always going to be continuous."

Zoos SA is liaising with SA Water about its possible involvement in the Glenelg

to Adelaide Parklands (GAP) recycled water project and is also considering a computerised weather station with multi-sensors for more controlled irrigation.

Adelaide Zoo currently has some rainwater capacity but the systems and capacity are limited.

Wastage is a major concern at Monarto Zoo which relies solely on mains water. Priorities include remote monitoring to help identify numerous leaks, and improved designs for animal ponds which lose large amounts of water through evaporation and leaking.

The zoo is also trialling new smart metering in a pilot project with SA Water.

Keeping hippos cool

A hippopotamus requires an awful lot of water to stay cool.

But 47,000 kl of bore water a year is an enormous amount even for Adelaide Zoo's precious resident hippos Brutus and Susie.

Wayne Yorath says that through upgrades involving programmable relays, the zoo has managed to nearly halve water usage in its hippo pool to 24,000 kl.

"Initially there was some hesitancy among the hippo keepers because they always have the animals' welfare in mind," says Wayne.

"But once we demonstrated the enormous wastage that was occurring and that water quality would not be compromised by the changes, they were fully supportive."

Targeting energy consumption

South Australia's searing summer temperatures and cold winter nights means heating and cooling is a priority for animals – and that involves an enormous amount of energy.

Each year Adelaide and Monarto Zoos use about 1.8 GW hours of electricity – enough to power about 270 houses. Initiatives to help reduce this include:

- a staff awareness program encouraging people to switch off appliances
- more effective monitoring, including sub-metering, smart-metering and data energy loggers, to identify where energy is being used
- increased solar power (the two zoos currently have a total 44 kW solar capacity)
- a building management system at Adelaide Zoo's new entrance.

Such initiatives will help the two zoos continue reducing energy consumption, which fell by 186,000 kWh hours (9%) in 2011–12. While usage remained unchanged in 2012–13, a significant reduction of 85,000 kWh hours was reported in the second quarter of 2013–14.

Zoos SA had achieved an 8% reduction in energy for 2012-13*, which equates to 126,000kwh saved and a saving of \$26,712, based on the current per kwh price of 0.212.

*Prior to Energy Focus report funded by Zero Waste SA



Adelaide Zoo's male orangutan Kluet. A new efficient heating system is being designed for his sleeping quarters.

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The support provided by Zero Waste SA will enable the Zoo to build upon these achievements, with the eco efficiency review identifying a further 10% in savings, and providing crucial evidence to support energy reduction goals and investment in associated capital upgrades to achieve these savings.

Keeping orangutans warm

Karta and Kluet – the two Sumatran orangutans at Adelaide Zoo – live in a large exhibit which has been specially designed to reflect a South-East Asian jungle.

While the habitat looks idyllic and is as close to their tropical home as possible, keeping the animals warm during a cold Adelaide winter night is challenging.

The animals currently sleep on heating pads which are expensive to run and heat is wasted. Now the exhibit and sleeping quarters are being used as a case study for more efficient heating and cooling. Lessons learned can be applied to other exhibits.

“This case study is very important to us because it’s critical that exhibit designs factor in both animal comfort and sustainability,” says Vicki-Jo. “We’re hoping that it will show the win-

wins that can be gained by our approach and motivate staff to get some really good benefits across our exhibits.”

Options being considered for the orangutan quarters include motorised louvers and de-stratification fans in the roof to recirculate heat.

Zoos SA

A not-for-profit conservation charity, Zoos SA operates both Adelaide and Monarto Zoos. The organisation runs conservation, breeding and research as part of an international program in addition to public education on animal habitats and endangered species.

Zero Waste SA

A South Australian Government agency that advances improved waste management policies and the development of resource recovery and recycling. The Zero Waste SA Industry Program advises and supports companies to achieve sustainability goals in waste, water and energy.

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