

SAVING ENDANGERED SPECIES PRIVATELY

A CASE STUDY OF EARTH SANCTUARIES, LTD.

MICHAEL DE ALESSI  AUGUST 2003



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by Michael De Alessi

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PACIFIC RESEARCH INSTITUTE
755 Sansome Street, Suite 450
San Francisco, CA 94111
tel: 415.989.0833 | 800.276.7600
fax: 415.989.2411
email: info@pacificresearch.org

REASON PUBLIC POLICY INSTITUTE
3415 S. Sepulveda Blvd., Suite 400
Los Angeles, CA 90034
tel: 310.391.2245
fax: 310.391.4395

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CONTENTS

1	EXECUTIVE SUMMARY
3	INTRODUCTION
4	SAVING ENDANGERED SPECIES PRIVATELY
24	NOTES
28	APPENDIX 1
31	APPENDIX 2
32	APPENDIX 3
33	ABOUT THE AUTHOR / ACKNOWLEDGEMENTS
34	ABOUT THE PACIFIC RESEARCH INSTITUTE
35	ABOUT THE REASON PUBLIC POLICY INSTITUTE

EXECUTIVE SUMMARY

Australia has one of the worst records of mammalian extinction in the world, in large part because so many of its species evolved in isolation and were not well-equipped to deal with the introduced species that came with European settlement. In recent years, however, a focus on feral eradication and on protection of native species in feral-proof enclosures or sanctuaries has started to reverse this trend.

Earth Sanctuaries, Ltd., a private company in Australia, has been at the forefront of this type of protection. It has played a significant role in the recovery of many species.

This study explains the history of Earth Sanctuaries, particularly the successes and challenges it has faced in trying to save species through commercialization. Following recent financial difficulties, the company is now a leaner, more focused operation. And Australia's wildlife is all the better for it.

- 23 species extinctions have occurred in Australia in the last 200 years, more than any other continent.
- It has been estimated that since European settlement began two centuries ago, 90 percent of Australia's native vegetation in the Eastern, temperate regions of Australia, and more than one-third of all of Australia's forests and woodlands, have been removed by human habitation and activity.
- Introduced cats, foxes, and rabbits have long been blamed for the extinction of numerous species in Australia. But with the creation of Earth Sanctuaries, Ltd. (ESL), conservation strategies began to focus on eradication rather than control.
- ESL pioneered the use of feral-proof fencing to demonstrate that small native mammals could recover if *all* non-native predators and competitors were removed.
- Since its inception in 1985, ESL has dramatically raised the awareness of the plight of Australia's mammals and the threat posed by non-native species. Based on ESL's success, national parks and conservation areas, especially in Western Australia, have changed the way they operate their reserves.
- At ESL's Warrawong Sanctuary, numbers of Australia's smallest and rarest kangaroo, the woylie, have increased 200-fold; the population of Australia's most primitive kangaroo, the long-nosed potoroo, increased from four to more than 100; and the Sydney subspecies of the red-necked pademelon, believed to be the last colony of this subspecies in the world, increased from just two to more than 50.
- At its peak of land ownership, ESL owned 10 sanctuaries covering more than 90,000 hectares.
- On May 8, 2000, Earth Sanctuaries, Ltd. was listed on the Australian Stock Exchange (ASX code: ESL). This public offering raised A\$12 million, increased the number of shareholders to almost 7,000, and allowed Earth Sanctuaries to proudly declare itself the first publicly traded company whose core business is conservation.

- Valuing ESL as a company is difficult. One of its greatest assets – endangered and threatened species – cannot be legally traded, and therefore valued, in the marketplace.
- Since shortly after ESL's initial public share offering at A\$2.50, the share price declined and hovered around 20 cents, forcing ESL to restructure.
- ESL's restructuring only reinforces the point that markets have tremendous power to conserve resources. ESL has emerged a leaner and more focused operation. In contrast, little has changed at Yellowstone National Park – the world's oldest and most famous national park – since severe mismanagement resulted in devastating fires in 1988.
- Conservation and commerce are not mutually exclusive – in fact, they are inextricably linked.

INTRODUCTION

Scientists routinely claim that the Earth is in the midst of a “mass extinction” on a scale never seen before.¹ These claims, however, rely on extrapolated numbers of microbial species and even presumed species not yet discovered. Very few charismatic species, mammals and birds, for example, teeter on the verge of extinction.

In fact, in recent years, no species of mammal has gone extinct in the wild – except in Australia. The mainland mala (www.wildlifebiz.org), which through the early 1900s was one of the most common animals in central Australia, was reduced to two small colonies by 1960. One of those colonies was taken out in the late 1980s by a single fox, and the other in the early 1990s by a wildfire.²

Unlike many of Australia’s extinctions in the wild over the last 200 years, small numbers of the mainland mala still exist in captivity. But the fate of the mala underscores the major causes of extinction in Australia – alteration of the landscape and the introduction of non-native animals, especially cats, foxes, and rabbits. Despite knowledge of the threats these non-native species posed, state and federal efforts to keep them in check met with only limited success.

Private efforts to conserve native species, on the other hand, have proven highly successful, and deserve careful study by those concerned about ways to protect rare species and the welfare of animals in general.

Consider the case of committed conservationist John Wamsley (www.esl.com.au/jw.htm), who determined that the key to saving Australia’s species was putting them in feral-proof sanctuaries. Wamsley knew that his conservation efforts were going to be expensive, and the only way to raise that kind of money was through the marketplace.

In the ensuing years, his Earth Sanctuaries, Ltd. (ESL) (www.esl.com.au) has had some dazzling successes bringing back species from the brink of extinction and changing the way that both conservationists and the government think about endangered species protection in Australia. ESL became the world’s first publicly traded company whose core business is conservation. Despite some recent financial stumbles, ESL remains a remarkable demonstration of the power of private conservation, and of the marketplace, to allow entrepreneurs to do good while doing well.

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THE AUSTRALIAN CONTINENT AND ITS WILDLIFE

Australia is the smallest of the seven continents, and, apart from Antarctica, the most isolated. Animals in Australia have evolved in relative isolation, which accounts for the large number of unique, endemic Australian species. Many of these species are well known, from the koala to the kangaroo to the platypus, but many are not, including potoroos, wallabies, bilbies, wombats, numbats, and bettongs, to name a few. Photos of these and other species can be found on www.esl.com.au/wildlife.htm, www.animalinfo.org/spec_ind.htm, www.animalinfo.org/country/austral.htm, and www.pictureaustralia.org/contact.html.

All of these Australian species evolved without adapting to predation by species such as cats and foxes, and without competing for ecological niches with voracious breeders such as rabbits. The Australian science writer Tim Flannery notes an important difference between the evolution of Australian species and that of their European counterparts.³

Flannery points out that Australia's native species were so severely limited by soil fertility that, rather than competing for resources like their European counterparts, they evolved in a way that complemented each other's utilization of what little resources were available.⁴

Australian species were successful, but they would never be called "colonizers." The proliferation of human-disturbed environments and fertile soils in Europe, however, favored animals that had broad ecological niches, bred rapidly, and co-existed well with human settlement. "Mobile, fertile, and robust, Europe's life forms were purpose-made to inherit new lands."⁵ And that is what they did in Australia.

The Aboriginals who first migrated to Australia 60,000 years ago never developed formal agriculture, although their use of fire had widespread effect on species composition. When the first Europeans settled in Australia at the end of the 18th century (the first penal settlement near what is now Sydney was started in 1788), they began to radically alter the Australian landscape. Fires were suppressed, agriculture and ranching of non-native species became widespread, and non-native animals such as foxes, cats, and rabbits were deliberately introduced.

It has been estimated that since European settlement began two centuries ago, 90 percent of Australia's native vegetation in the Eastern, temperate regions of Australia, and more than one-third of all of Australia's forests and woodlands have been removed by human habitation and activity.⁶ No country has experienced more mammal extinctions than Australia since the dawn of European settlement.

ENDANGERED SPECIES IN AUSTRALIA

Of the original 144 species of native marsupials, 10 are gone,⁷ and of the original 53 native species of rodents, eight are extinct.⁸ Many of these extinctions occurred recently enough that etchings and even photographs exist for some animals, including the Tasmanian tiger, the desert bandicoot, and the crescent nail-tailed wallaby, which was last seen as recently as the 1960s. (See Appendix 2 for a list of mammal extinctions.)

In all, 23 mammalian extinctions have occurred in Australia in the last 200 years, more than any other continent. These 23 species amount to almost 10 percent of Australian mammals which existed in 1788, and account for one-third of all mammal extinctions worldwide in the last 500 years.⁹

According to the Red List of Threatened Species (www.redlist.org) of the World Conservation Union (IUCN), Australia now has 63 threatened and endangered mammal species and 37 threatened birds species, one of the highest counts in the world.¹⁰

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INTRODUCED SPECIES IN AUSTRALIA

Early settlers to Australia often thought native mammals were not good for much besides “a little sport and an occasional meal.”¹¹ In the early 1800s Acclimatisation Societies introduced many non-native species of plants and animals, including birds, fish, and even camels. None of the early introduced species wreaked more havoc than the rabbit, whose widespread presence is credited to a few English wild grey rabbits released in Victoria for sport hunting by a man named Thomas Austin in 1859.¹² Within 10 years the rabbit was considered a pest, but there was no holding back the spread of what was commonly called the “grey blanket.”

Climate finally restricted the range of the rabbit to the north in Queensland, but it continued to spread west, leading the state government of Western Australia to build a famously ineffectual, 2109 kilometer long “rabbit proof fence” between 1902 and 1907. The fence slowed down the rabbits’ westward march, but by the 1920s, rabbits were in Western Australia “in plague proportions.”¹³

Louis Pasteur first suggested controlling Australia’s rabbit problem through the introduction of rabbit-specific diseases in the late 1800s.¹⁴ But it was not until 1951 that the Australian government scored its first major victory with the introduction of a virus called myxomatosis, which cut back the rabbit population by as much as 95 percent in some regions and 25 percent in others.¹⁵ In the following years wool, lamb, and beef production rose, and siltation in rivers declined as increased ground cover reduced erosion.

Of course, it was not a permanent fix, and rabbit numbers began to rise as their immunity increased. The 1990s saw the introduction of a new virus (calicivirus), which is producing similar results to the initial release of myxo. Despite these recent successes, it is still a battle of containment, and the damage to Australia’s vegetation and landscape remains considerable.

While rabbits out-competed native wildlife for food, cats and foxes hunted them down. Foxes were also originally released for hunting in Victoria in the 1870s, and they too spread rapidly throughout southern Australia – sustained, no doubt, by the abundance of rabbits. Cats made it into the wild on their own and have thrived, ranging into the North of Australia where rabbits and foxes have not. There has been some recent success in controlling these predators, especially with the development of the poison 1080, which is derived from a native plant so that native species are immune to it. Once again, however, it is largely a containment strategy.

Feral cats, foxes, and rabbits¹⁶ have long been blamed for the extinction of numerous species in Australia, although recent work has also emphasized the importance of habitat alteration and of the special susceptibility of small, desert marsupials and rodents to extinction pressures. For example, Tim Flannery points out that the brunt of extinctions has been borne by small species (50g to 5kg) inhabiting drier regions, while similarly sized reptiles, birds, and rainforest dwellers have not suffered the same fate.¹⁷ Nevertheless, there is no doubt these feral predators and competitors play a central role in extinction.

PUBLIC CONSERVATION IN AUSTRALIA

Australia has one of the world's oldest national parks systems, although initially the parks tended to be near population centers and did not attempt to conserve native Australian landscapes, striving instead to replicate European environs.¹⁸ That changed with the rise of the environmental movement in the 1960s, which was followed by a host of new park designations and a flurry of environmental legislation.

Unfortunately, according to Kevin Frawley, an environmental planner from Canberra, many of these efforts served simply “to establish complex bureaucratic and inquiry processes which delay difficult decision making, and allow governments to be seen to be doing something.”¹⁹

Attempts to protect endangered species themselves have been largely legislative, and have concerned themselves more with prohibitions on killing the animals than on providing them with the habitat they need to survive.²⁰ The national parks have not fared all that much better.

The Hattah-Kulkyne National Park in Victoria, for example, was set up as a reserve for rare plants. But without funds for rabbit control and a severe overpopulation of kangaroos, the park was described in the early 1990s as “a waste ground.”²¹ Parks Victoria was similarly hesitant to control the kangaroo population inside a predator-free portion of the Woodlands Historic Reserve (WWW.PARKWEB.VIC.GOV.AU/1PARK_DISPLAY.CFM) in the late 1990s, which had seen its population of endangered eastern barred bandicoots decline as a result of overgrazing by common kangaroos.²² The problems of a control program were also in evidence in 1998 at the Belair National Park in South Australia (WWW.ENVIRONMENT.SA.GOV.AU/PARKS/BELAIR), where parks officials kill about 50 foxes every year.

As one park ranger noted, “as soon as we kill the [foxes] in the park, more just come in to take their place.”²³ This is despite a A\$30 million Parks Agenda announced by South Australia in 1997, which has primarily gone toward acquiring new land in the same area. Fire control has also been a problem, as longstanding Aboriginal fire regimes gave way to fire suppression and large buildups of fuel.

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In January 2003, for example, two-thirds of New South Wales’s Kosciuszko National Park – more than 337,000 hectares²⁴ – was lost to fire, which many blamed on the Park’s mismanagement.²⁵ In the year 2000, the federal government’s Environment Protection and Biodiversity Conservation Act 1999 (www.ea.gov.au/epbc) went into effect, but it will be some time before its success may be judged. It does, however, move Australia closer to the form of endangered species protection practiced in the United States through its Endangered Species Act (<http://endangered.fws.gov/esa.html>), which has largely failed to recover any species. (See Appendix 1.)

Other parks and recent state conservation efforts have been more successful, most notably Western Australia’s Western Shield program to bait for foxes and cats annually over three and a half million hectares. Arguably, the shift toward eradication instead of control and to predator-proof fencing are the results of the successful application of these two ideals by a private conservationist, John Wamsley.²⁶

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JOHN WAMSLEY

When John Wamsley was young, his father bought some land for growing citrus in New South Wales, which was surrounded by thousands of acres of bush. Wamsley spent most of his time outdoors, and was especially fond of the native animals that thrived there. But by the time he was 12 years old, foxes and cats appeared, and he watched as first the native species disappeared and then as wildfires destroyed the bush.²⁷

After leaving home at an early age, Wamsley pursued a number of occupations and received a PhD in mathematics before he was 30. At the time, state conservation efforts were sporadic, and feral controls were half-hearted at best. Wamsley was convinced that feral control was the only way to save Australia's species, and he was also convinced that "the National Park system has failed to protect wildlife."²⁸ So he set out to save those species himself.

In 1969, while teaching mathematics at Flinders University, Wamsley purchased a dilapidated dairy farm outside of Adelaide, which he called Warrawong (an Aboriginal word meaning "side of the hill"). It seemed logical to him that the way to protect native species was to insulate them from predatory feral animals. It also seemed logical to judge success by a simple performance measure – population numbers.

Wamsley was frustrated with the way that public conservation was practiced, especially its emphasis on process over progress. In an interview in 2001, he summed up his thoughts using the mainland mala as an example. He noted that since the mala recovery group was formed 20 years earlier, it had received A\$10 million in funding, published hundreds of research papers, and gotten thousands of people involved. "The only thing that went wrong was that they lost the mala," said Wamsley. "Other than that, it was a perfect program... I would say the success of the mala program is measured by how many mala are out there, not by how many research papers you published or how much funding you got."²⁹

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To put his ideas into practice, Wamsley chose South Australia because it was the only state to permit fencing in native species – even though shooting them at the time was perfectly legal.³⁰ According to Wamsley, fencing was only legal because the authorities "just hadn't gotten around to making it illegal" – which they tried to do as soon as they realized what he was up to.³¹ It was the first of many legal battles.

WARRAWONG

As soon as he purchased Warrawong (www.warrawong.com), John Wamsley began undoing 100 years of intensive farming. He began by planting native trees and building a dam for what he hoped would one day be platypus habitat. Eventually, more than 100,000 native trees and shrubs would be planted, and more than a kilometer of creeks and pools created.³² Warrawong's electrified, feral-proof fence was finally completed in 1975, but it was not until 1981 that the sanctuary was "feral free." The fence was the first of its kind in Australia, and its impact on the species released into the sanctuary was felt immediately.

Wamsley first obtained native species – brushtail bettongs and striped pademelons ([HTTP://RAINFOREST-AUSTRALIA.COM/PADEMELON.HTM](http://rainforest-australia.com/pademelon.htm)) – from a zoo in Victoria that was closing down. Warrawong Sanctuary was opened to the public on January 1, 1985. Only 30 minutes from central Adelaide, Warrawong was well situated for tourism, but it took awhile for word to get out.

In 1988, Wamsley received permission to relocate five platypus from Kangaroo Island. Three young females came in 1988, and then two young males in 1989. In 1991, two puggles (baby platypus) were born – the first platypus bred in captivity since 1943 – and today there are two dozen platypus at Warrawong. The platypus is not endangered, but it is one of Australia's most charismatic species, and Warrawong is one of only two captive breeding success stories in the country. Wamsley's breeding success earned him the nickname "the platypus man" and helped bring visitors to Warrawong.

Other species that have been re-introduced to Warrawong's habitat include the long-nosed potoroo, woylie, rufus bettong, southern brown bandicoot, tammar wallaby, red-necked pademelon, red-necked wallaby, and Western grey kangaroo. Warrawong was successfully paying its way shortly after it opened, but Wamsley was not content. Instead, he set his sights on saving *all* of Australia's endangered mammals. He knew that such an ambitious plan would require the kind of capital which only two entities could supply in abundance – government and the marketplace. And Wamsley was no fan of government conservation efforts.

He believed that such efforts, mired in bureaucracy and inefficiency, were one of the last bastions of socialism.³³ He also believed that governments rarely "saved" endangered animals except by simply reclassifying them as not endangered.³⁴ Ultimately, too much money was spent on research and too little on actually protecting native species.

With the success of the feral-proof fence at Warrawong, Wamsley came to believe that "If I had one percent of their [all of Australia's wildlife agencies'] budgets, I could save Australia's wildlife."³⁵ And so he set out to do just that by raising the money on his own – through commercialization and the marketplace.

EARTH SANCTUARIES, LTD., 1988–2000

In 1987, Wamsley left the mathematics department at Flinders University, and incorporated Earth Sanctuaries, Ltd. (ESL) in January 1988. Yookamurra, a second sanctuary, followed the same year. Revenues would be generated by attracting visitors and through consulting work. The goal of the company would be “to ensure the survival of remaining Australian native flora and fauna within a commercial environment, [and] to maximize the returns to shareholders.”³⁶ A recent prospectus from the company refined this approach.

“Whereas normal businesses are motivated by profit, Earth Sanctuaries is motivated by the need to ensure the survival of all the species that make up the ecosystem. However, it was recognized that if the business did not earn a profit, it would quickly cease operation.”³⁷ The prioritization of conservation first, profit second foreshadowed financial troubles years later. But in the meantime, ESL set out on its ambitious plan to acquire land, fence it, eradicate all feral animals, reintroduce native animals, and manage these properties for both ecological and financial sustainability.

The difference between the efforts of government conservation and ESL are highlighted in ESL’s annual reports. In 1995, for example, Wamsley wrote in his director’s report that “The argument that our natural resources are of such importance that their ownership must be vested in the State has caused as much destruction of Australia’s natural resources as the argument that the means of production is of such importance that it must be vested in the State has caused to the Russian economy.”³⁸

He carried on in 1998, stating that “Earth Sanctuaries, Ltd. is committed to saving Australia’s vanishing wildlife. It does not wish to do this as part of some overall political plan devised by a central government. It does not wish to be part of the present ‘recovery group processes’ which have clearly been demonstrated to fail. It does not wish to lobby to make someone else do it. The Company wishes to do it itself. The Company accepts responsibility for saving Australia’s mammal species. The Company wishes to do this within the framework of the free enterprise system. The Company believes that our wildlife is the most undervalued asset this country has. It is the Company’s intention to grow to the stage where it is a viable alternative to Australia’s National Parks System.”³⁹

The “Threatened Species Industry” all too often exists solely to raise funds to perpetuate itself, rather than the species it purports to care about.

ESL, on the other hand, must demonstrate performance measures to its shareholders and to the marketplace that evaluates the value of its business.

Wamsley also does not hesitate to criticize more typical environmental protection groups in Australia, charging that the “Threatened Species Industry” all too often exists solely to raise funds to perpetuate itself, rather than the species it purports to care about.⁴⁰ ESL, on the other hand, must demonstrate performance measures to its shareholders and to the marketplace that evaluates the value of its business.

CONSERVATION SUCCESSES

As of 2002, Earth Sanctuaries, Ltd. had successfully reintroduced 25 mammal species to their former range.⁴¹ Since 1988, ESL has spent A\$30 million on fencing and eradication of feral cats, foxes, rabbits, and goats from more than 10,000 hectares.

Warrawong remains ESL's most popular and lucrative site. It features tent-style accommodations (local planners would not permit permanent lodgings), a restaurant, gift shop, native plant nursery, and, of course, dawn and dusk nature walks. It has been the winner of numerous tourism awards, including runner up in the Conde Nast Travelers Choice Awards in 1997. In 2001, about 50,000 people visited Warrawong.⁴²

At its peak of land ownership in 2001, ESL owned 10 sanctuaries covering more than 90,000 hectares.⁴³ Since restructuring in 2002, ESL has sold most of these properties, but they remain wildlife sanctuaries still worth noting. The second property acquired was Yookamura, which opened to the public in 1990 and demonstrated the tenacity and the ingenuity of ESL.

Finding a stand of old-growth mallee trees in South Australia was no easy task. They were once common over one-fifth of Australia, but became quite rare – due in no small part to a government requirement that landowners clear their property of mallee. The only way ESL was able to track down a suitable property was by finding one local farmer who “enjoyed his drink too much to get on with the task,” leaving a stand of untouched, old-growth mallee.⁴⁴

The next hurdle was eradicating the non-native wildlife, and when ESL aims to eradicate, it really means eradicate – down to the last animal. Yookamura is where ESL cut many of its feral eradication techniques, including damming water so that animals leave the area through one-way exits, and even drawing grids in the sand to track a last, lone fox that it

took more than seven months to nab. Species introduced to Yookamura's feral-free, 1,100 hectare old-growth mallee habitat included woylies, numbats, boodies, bilbies, and stick-nest rats.

Another notable sanctuary no longer in the ESL stable is Scotia, covering almost 65,000 hectares in the far west of New South Wales. The fencing project was to be done in stages, and by 1998, 40 kilometers were feral-free. Before ESL started its program of feral-proof fencing in the 1980s, not one species of rare or endangered native Australian mammal was increasing in numbers. Now, the list is growing, both at ESL and at other private and state-run sanctuaries.

At Warrawong alone, for example, numbers of Australia's smallest and rarest kangaroo, the woylie, have increased 200-fold; the population of Australia's most primitive kangaroo, the long-nosed potoroo, increased from four to more than 100; and the Sydney subspecies of the red-necked pademelon, believed to be the last colony of this subspecies in the world, increased from just two to more than 50.⁴⁵

NUMBATS: The numbat is something like the Australian equivalent of an anteater. It is a small animal, but has a long snout and a sticky tongue. Numbats are especially fond of old-growth mallee trees, but it takes a mallee tree 400 years to develop hollows large enough for a numbat to inhabit.

In the 1970s, the numbat population was down to about 100 animals, leading David Attenborough, in his early 1980s television series "Life on Earth," to declare it to be the next most likely mammal to go extinct.⁴⁶ Today, thanks in large part to ESL's reintroduction efforts, there are more than 2,000 numbats, and they have been removed from the endangered list. The IUCN still considers the numbat vulnerable, and lists the greatest threats to its survival as foxes, wildfires, and habitat destruction.⁴⁷

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WOYLIES (AKA BRUSH-TAILED BETTONGS): The woylie is a strictly nocturnal animal, spending its day sleeping in nests made of grass. Once widespread but now endangered, the woylie was first introduced at Warrawong from a population in Western Australia. It was ESL's first real success story.

As late as 1990, Tim Flannery classified the woylie as critically endangered, and its numbers were estimated to be near 100.⁴⁸ Thanks primarily to ESL and the Western Shield project, it is estimated that there are now about 20,000 woylies living in feral-managed areas in Australia. IUCN's Red List categorizes the woylie as a low risk for extinction and, not surprisingly, lists its greatest threats as habitat loss due to human activity and predation by alien species.⁴⁹

BILBIES: The bilby is a shy, nocturnal animal, the largest of the Australian species of bandicoots. Bilbies once ranged over 70 percent of mainland Australia, but now survive only in remote areas. They were last seen in Victoria in 1866 and in New South Wales in 1912.⁵⁰ Bilbies were considered endangered in the early 1990s.⁵¹

One of most prominent features of the bilby is a large pair of pointed ears, leading ESL to do everything it can to promote the "Easter bilby" as a replacement for the hated rabbit. They even sell chocolate bilbies at the Warrawong gift shop. In fact, the bilby's resemblance to the rabbit was one reason for its decline.

Apart from being outcompeted for burrows, in the early 1990s bilby pelts were marketed, and many fell victim to rabbit traps. The IUCN lists the bilby as vulnerable, and points out that "current bilby distribution is associated with a low abundance or absence of foxes, rabbits, and livestock."⁵²

SOUTHERN BROWN BANDICOOTS: Bandicoots are small, omnivorous marsupials that closely resemble rodents in appearance. The southern brown bandicoot is a sub-species of bandicoot, and the last remaining in South Australia of eight known bandicoot inhabitants.

The IUCN Red List describes their numbers as declining, and Australia considers them endangered due to land-management practices, especially burning, and feral cats. At Warrawong, however, there is a stable population of about 100 animals, with a number each year either translocated or escaping through the fence (the very young are small enough to slip through). John Wamsley wrote in 2001 that the increase in the southern brown bandicoot was probably ESL's "most remarkable success" because, despite falling numbers nationally, its numbers in the Adelaide Hills had risen to the highest point in 20 years.⁵³

BRIDLED NAIL-TAILED WALLABY: Like so many other species, the bridled nail-tailed wallaby was once common in Eastern Australia, but by 1937 was considered extinct. Some local governments had put bounties on their heads, but the greatest reason for their decline was habitat alteration and predation. Then, remarkably, a remnant population was discovered in Queensland in 1973. It is a shy, nocturnal, solitary, medium sized marsupial (standing about half a meter tall), characterized by a spur or "nail" at the end of its tail.

The IUCN now considers the species endangered and in decline. In 1998, the ESL Foundation purchased six from the Queensland government for A\$48,000. After only two breeding seasons the ESL population had risen to 15.

CONTROVERSY AND CRITICISM

John Wamsley and ESL's candor and determination have often drawn criticism, especially from environmental activists. By turning to the marketplace for support, ESL relies on an acceptance of the "value" of the species it protects. This belief, that the only way to save species is to value them (i.e., attach a price to them), makes ESL a prime target. For example, David Butcher, chief executive officer of the World Wide Fund for Nature, has said that just the opposite is true, that species are "far more likely to be conserved if they haven't got a value to be flogged off somewhere."⁵⁴

Putting a price on animals does, at first glance, seem like a recipe for disaster, especially given the fate of such species as the passenger pigeon and the bison in the United States. However, no one *owned* those species, and so they were ripe for what Garret Hardin termed "the tragedy of the commons."⁵⁵ In fact, bison are flourishing today because a few committed ranchers took them off the open range and into private ownership.⁵⁶ In even simpler terms, ownership and marketable value are the reasons why cows, sheep, and dogs have never been in danger of extinction.

Butcher tries to bolster his argument by citing the case of the black rhino, killed in great numbers because people value the contents of its horn. The evidence from Africa, however, tells a different story. South Africa saved its white rhino population through commercialization, raising money for rhino conservation through both hunts and live animal sales.⁵⁷ In Zimbabwe, tremendous resources were allocated to creating and improving wildlife habitat through a simple change in the law that allowed landowners and communal villages to manage wildlife as if it were their own.⁵⁸ Numbers of black rhino in Zimbabwe started rising after the remaining species were moved to private conservancies where the profit motive spurred their protection.⁵⁹

Ownership and marketable value are the reasons why cows, sheep, and dogs have never been in danger of extinction.

In 1792, the English agriculturist Arthur Young said, "Give a man the secure possession of a bleak rock and he will turn it into a garden. Give him a nine years' lease of a garden and he will convert it into a desert."⁶⁰ Ownership makes all the difference.

The virtue of placing a value on species does have its supporters in Australia, notably Grahame Webb, a crocodile specialist in the Northern Territory who is quick to point out that commercialization saved the saltwater crocodile there.⁶¹ Landowners saw crocodiles as a

menace until the market for their skins developed. As a valuable asset, crocodiles were tolerated and their wetland habitat maintained.

Other critics have been more subtle, worrying that the profit motive will dilute the conservation goals of ESL. Barry Spergel, the World Wide Fund for Nature's conservation finance director, has asked "If the shareholders pressure Wamsley to make higher returns, will he compromise his values by building mega-lodges or overstocking his reserves? Is he really conserving natural ecosystems, or just creating large zoos?"⁶²

The mega-lodge seems unlikely, given the tourists' preference to see species in their natural habitat. Overstocking would degrade the environment and the value of the land, which is exactly what ESL is trying to protect. As for the zoo comment, the same logic could be applied to national parks, or anything that has a boundary. Some will always think it too small, but at 45 hectares, Warrawong is a far larger habitat than a cage or zoo. And in fact, Wamsley has said, "It is only possible to save wildlife in the wild together with the whole ecosystem necessary for its survival."⁶³

Others have asked, considering ESL's accounting standards, is it in their best interests to keep numbers of rare animals low and, therefore, more valuable? Unlikely, especially considering that the two most popular species attractions in Australia are koalas and platypus, neither of which is endangered.

In a similar vein, some critics worry that profit goals will differ substantially from conservation goals, for example by focusing effort on the short term. But ecosystem health is surely a long-term project, so if ESL's valuation is based on the expected future health of the ecosystems it strives to protect (which is its aim), then short-sightedness is hardly an issue.

Others have criticized ESL's emphasis on small mammals, worrying that less charismatic species will fall by the wayside. But ESL's emphasis is on saving species in their natural habitat – which means keeping everything in balance, from native grasses all the way to mammals. As Tim Flannery points out, "rabbits are as much a symptom of a sick environment as they are the cause of it."⁶⁴ And there are few things ESL would rather do than ensure that rabbits do not return.

Inbreeding among small numbers of animals has also been raised as an issue, but ESL is careful to swap species with other sanctuaries, zoos, and wildlife departments simply to promote genetic diversity.

Some of these criticisms have fueled political battles over ESL's expansion, such as the fight that ESL eventually lost over its plans to create an Earth Sanctuary at the site of an abandoned mine in the Blue Mountains, not far from Sydney. The land abutted the Greater Blue Mountains National Park, and other environmental groups and some local politicians preferred to see the land revert to the National Park, which is eventually what happened.⁶⁵

The failed Blue Mountains sanctuary is certainly one case where ESL's outspoken approach came back to haunt it. Without such a confrontational approach, ESL may have

enjoyed even greater success, and might be managing Australia's national parks under contract today. On the other hand, without being so outspoken, ESL may also have failed to send the wake up call necessary for the eventual shift toward feral eradication that is now proving so successful throughout Australia.

LEGAL CONSTRAINTS

Many criticisms of Earth Sanctuaries stem from constraints placed on them by external legal institutions. Chief among them is that it is illegal to sell rare and endangered wildlife, which makes ESL's asset valuation difficult.

Another hurdle is that much of the state legislation that covers wildlife is based on the animals being "wild," but differentiating between wild and captive is not so easy in ESL's case. Thus, it is rarely clear which regulatory regime applies, and so ESL faces a great deal of uncertainty. There are also some remaining lease stipulations that are at cross purposes with ESL's mission. At Scotia Sanctuary, for example, the government lease conditions specified that the land must be used for grazing.⁶⁶ To satisfy this requirement, ESL had to maintain a remnant population of feral goats at the sanctuary.

To use the law in its favor, ESL has tried to demonstrate that the public provision of wildlife habitat violates Australia's competitive neutrality laws, which stipulate that public sector activities that compete with private sector activities must not undercut those businesses by subsidizing or otherwise subsuming their costs. In 1998, ESL lodged a suit against Cleland Wildlife Park, a South Australian Park not far from Warrawong. The suit forced the South Australian Department of Environment and Heritage to establish Cleland as a separate entity to ensure that its costs and revenues were clearly defined.

FINANCIAL CONSTRAINTS

When Earth Sanctuaries was formed in 1988, the goal was to save Australia's wildlife, and the means to finance all the feral eradication, wildlife translocation, and fencing material would be private capital. John Wamsley understood well that as a society what we value is what we protect and take care of, so he was determined to demonstrate the value of Australia's native species to the marketplace.

One of the great problems with public conservation is that it is rarely driven by results. In fact, in places like the United States and Australia, where National Park budgets are determined politically, failure may even be encouraged. The more endangered a species or fragile a habitat, the greater the justification for a larger budget and staff.

A business, on the other hand, has investors who demand that the company maximize its share value. If that share value is inextricably tied to the health of the environment or the recovery of a species, then the company directors have a fiduciary obligation to produce those

results. If, on the other hand, the environment has no financial value, then environmental degradation may well be part of profit making.

Putting a price on species means that the more valuable the species are that ESL looks after, the more money it could raise and the greater its responsibility would be to protect and increase the number of those species. The more that wildlife and the environment resemble tangible assets, the more effort will be put into protecting them. Investors also demand a business plan, and ESL had an ambitious one – to own one percent of Australia and have every major habitat in the country represented in one of its sanctuaries.

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resemble tangible assets, the more effort
will be put into protecting them.**

Shortly after incorporation, ESL began offering shares to investors through a series of private prospectuses. The numbers of shareholders rose steadily, as did the share price in the secondary market. In 1995, for example, ESL had more than 600 shareholders, and the prospectus that year offered shares in the company at A\$1.10.⁶⁷ By the year 2000, the last private prospectus before ESL went public, shares were offered at A\$2.50, and the number of shareholders had risen to more than 4,000.⁶⁸

While no doubt many investors made their decisions on a purely financial basis, many others were motivated to support ESL's vision. Witness the large number of shareholders who turn dividends (when they are paid) over to the non-profit arm of ESL, the Earth Sanctuaries Foundation. In addition, shareholders also receive discounts at all ESL properties, and are invited to shareholder-only weekends.

On May 8, 2000, Earth Sanctuaries, Ltd. was listed on the Australian Stock Exchange (ASX code: ESL) (WWW.ASX.COM.AU/ASX/HOMEPAGE/INDEX.JSP). This public offering raised A\$12 million, increased the number of shareholders to almost 7,000, and allowed Earth Sanctuaries to proudly declare itself the first publicly traded company whose core business is conservation.

As John Wamsley described in 1995, ESL's "main business is conservation... However, we need a cash flow and we get that from tourism... All the exquisite wildlife which live within the protected areas we are developing would not survive without tourism. That is a fact. However, we only operate our tourism business to allow us to carry out our conservation business."⁶⁹

Tourism may have been the main source of revenue for ESL, but the company viewed the wildlife it was conserving as its greatest asset. This probably explains why ESL's initial expan-

sion placed a greater emphasis on the conservation value of a property than on its proximity to major population centers (i.e. than on tourism profits) – and why it eventually ran into financial difficulties.

Tourism is much easier to value than conservation, which has made life difficult for ESL. What is the value of an endangered species? The single greatest difficulty in valuing endangered species is that it is simply illegal to sell them, both under Australian law and under CITES, the UN treaty Convention on International Trade in Endangered Species.

In any other business, capital gains (increases in species numbers and distribution) would be visible as increases in the asset value of the company. In a sort of catch-22, the government not only bans trade in species, but also sets accounting standards that preclude valuing anything above what it can be traded for. The effect is to say that because natural resources are so valuable, their financial value must be set at zero.⁷⁰

To address this frustration, in 1995 ESL started keeping two sets of accounts, using an Australian government publication entitled “Techniques to value environmental resources.”⁷¹ This method values, for example, rock formations that provide shelter to animals at the cost of building an adequate shelter for those animals; trees at the cost of planting and maintaining those trees; vegetation at the rate that the Australian government has paid landowners to stop clearing similar areas; and wildlife by the percentage of international tourists motivated to visit Australia to see the wildlife, and the fraction of those species that are protected by Earth Sanctuaries. Using these methods, ESL estimated total valuation in 1995 at A\$34,340,000. Using standard accounting practices, however, ESL listed its net assets at A\$5,500,000.

ESL’s proactive approach to finding ways to value species was one impetus for the Australian Accounting Standards Board to create an accounting category for “self-generating and regenerating assets” (SGARAs) in 1999, and mandated their inclusion in company reports in 2001. Examples of SGARAs include “animals, wheat crops, apple trees in an orchard” that are held primarily for “aesthetic, heritage, ecological, environmental or recreational purposes.”⁷² Under this standard, ESL’s valuation of its rare and endangered species was more conservative, as it was based on the costs of re-establishing species populations. Thus, in its 2001 annual report, ESL estimated the value of its 2,285 rare, vulnerable, and endangered species at A\$5,412,000.⁷³

In 1996, John Wamsley wrote that “Unfortunately, present analysis of investment opportunities only looks at the very narrow, financial value of the investment. This is all very well for the investor who is only interested in direct personal gain. It fails the investor who believes in other ideals.”⁷⁴ In the language of economics, he was frustrated that ESL was not more highly valued for its “value to society,” for the positive externalities and public goods it provides. Economics could also have informed ESL that it would have a difficult time finding investors willing to compensate it for those activities.

ESL’s frustration is understandable, but compensation for public goods is tricky business. Should education facilities or hospitals be rewarded with additional assets on their balance

sheets for their value to society? As long as the benefits they provide remain ephemeral, the marketplace will not value them. Private compensation is possible, however, if innovative ways can be found to internalize those benefits to society, and ESL has already made great progress in this regard.

By selling shares and offering shareholder-only discounts and weekends at their sanctuaries, ESL encourages investors who simply want to fund effective species conservation. ESL also created the Earth Sanctuaries Foundation, a non-profit organization separate but complementary to ESL.

It allows for charitable donations to be made, and funds many projects on ESL properties, such as the translocation of six endangered bridled nail-tailed wallabies to Scotia Sanctuary in 1998. There are now more than 65 of these animals thriving there. In fact, despite the sale of Scotia to the Australian Wildlife Conservancy (AWC), the Earth Sanctuaries Foundation remains an active partner with AWC in the management of Scotia. The Foundation also coordinates the activities of volunteers at Earth Sanctuaries, and for the fiscal year 2000, donations to the Foundation were higher than every other source of ESL's income except for restaurant revenue.

But even with progress that had been made in recognizing environmental assets with the introduction of SGARAs by the accounting profession, it was not enough to stave off difficult times for ESL.

ROUGH TIMES AND REORGANIZATION

By late 2001, ESL was in trouble financially. The initial public share offering of A\$2.50 in May 2000 had declined to 16.5 cents in January 2001. Since then, the price has hovered around 20 cents.⁷⁵ The drastic drop in price seems to be a combination of timing – the entire market started to take a dive around this time – and simple market valuation. Apparently, the market paid closer attention to ESL's valuation under standard accounting practices than the “green” valuations.

At the start of 2002, ESL owned or managed 10 sanctuaries (about 93,000 hectares of land), but only five were open for business. And only one – Warrawong – was making money. ESL was still selling stock and bringing in investments, but it was all going into running day-to-day operations. A financial consultant recommended restructuring and asset sales, and ESL followed the advice.

In early 2002 the news media began to foretell the demise of ESL, with headlines like “Future of Earth Sanctuaries Ltd. at risk”⁷⁶ and “Australian species in peril as savior founders.”⁷⁷ Even John Wamsley had some pessimistic moments, but remained unbowed in his belief that “the only hope our wildlife has, the only hope our environment has, is to commercialize it.”⁷⁸ ESL soldiered on, determined to emerge a leaner and more focused organization.

Tough times also brought out strong praise for ESL, especially from the well-known English naturalist David Bellamy. Despite a recently rocky financial road, Bellamy believes that ESL is “the best thing that ever happened in conservation” because it has led the way for conservation organizations to actually get down to the business of saving species rather than simply talking about it.⁷⁹

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John Wamsley stepped down as director, to be replaced by his wife and longtime partner at ESL, Proo Geddes. Staff were let go, and all but three of the sanctuaries sold. That left Warawong, Hanson Bay (a leased property on Kangaroo Island off the coast of South Australia), and Little River, a property under development near Melbourne. The three remaining sanctuaries cover just under 5,000 hectares.

Scotia and Yookamurra Sanctuaries, as well as ESL’s other remote properties, were sold to the Australian Wildlife Conservancy (AWC), a not-for-profit organization. AWC was inspired by Earth Sanctuaries’ success, and started by opening one sanctuary in the Perth Hills in 1991. With the addition of the ESL properties, AWC now owns or manages 10 properties across Australia covering more than 575,000 hectares (1.3 million acres) of Australian bush.⁸⁰ The land is managed in very similar fashion to an Earth Sanctuary, the primary difference being the structure of the organization.

In fact, ESL even looked for government assistance to run Scotia sanctuary in particular, but was turned down. AWC, on the other hand, received almost A\$2 million from the federal government to assist in the purchase and management of Scotia.⁸¹

After the sales and other changes, ESL emerged clear of debt and with a new mission to pay closer attention to revenues and the tourist trade – specifically by focusing its efforts on properties near major population centers. Proo Geddes made it clear that despite the reorganization, little has changed in ESL’s approach, emphasizing “the importance of having a conservation entity based on outcomes rather than processes. It is clear to me that the best way to achieve this is through a business structure.”⁸²

As reported in the ESL Annual Report 2002, after the restructuring ESL had A\$5 million cash reserves and net assets (without placing a monetary value on wildlife) of 38 cents

per share. ESL also reported that by late 2002 it had attracted more than A\$2 million in new funds and added 1,000 shareholders.⁸³ The Little River Earth Sanctuary opened in September 2002, and in April 2003, ESL purchased the Waratah Wildlife Park near Sydney.

CURRENT ESL EFFORTS

LITTLE RIVER: The Little River Earth Sanctuary in Victoria, 45 minutes from Melbourne, opened on September 7, 2002 – National Threatened Species Day. The sanctuary covers about 200 hectares. Initially about 200 native mammals were released into the feral-proof area, including 50 southern brown bandicoots from Warrawong, which ESL estimates will grow to a population of as much as 3,000.⁸⁴ Other species in the sanctuary include the long-nosed potoroo, rufous bettong, and red-bellied pademelon (rufous wallaby).

As native trees, grasses, and shrubs are planted and the habitat regenerates further, other species to be released include the Eastern barred bandicoot, Eastern quoll, Eastern brush-tailed bettong, brush-tailed rock wallaby, and platypus.

An additional boost was the filming of the motion picture *Ned Kelly* on the property. Many of the props still provide an additional attraction for visitors.

HANSON BAY: ESL manages the Hanson Bay sanctuary, which it leases from an American company. The spot on Kangaroo Island is especially well known as a good place to see koala in the wild and offers coastal views and log cabins. Other species protected at the sanctuary include tamar wallabies, Kangaroo Island kangaroos, Southern brown bandicoots, and pygmy possums.

WARATAH PARK: ESL's newest purchase lies 40 minutes north of Sydney in the Terrey Hills and was the well-known location of a late-1960s television program called "Skippy the Bush Kangaroo."⁸⁵ The Park was purchased in April 2003, and development will follow a familiar pattern – feral proof fencing, eradication of non-native species, reintroduction of native mammals, and eventually tourist facilities. Species planned for reintroduction include pademelons, bettongs, bandicoots, potoroos, and the yellow-footed rock wallaby.

RHETORIC VERSUS RESULTS

Financial difficulties, common with all kinds of corporations, individuals, and even governments, are not an argument against private conservation. Indeed, ESL remains dramatic proof of the power of private conservation – as evidenced by its role in helping to remove four species of mammals in Australia from the endangered list.

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ESL has dramatically raised the awareness of the plight of Australia’s mammals and the threat posed by non-native species. Based on ESL’s success, national parks and conservation areas, especially in Western Australia, have changed the way they operate their reserves. ESL inspired the creation of more private sanctuaries, most notably the Australian Wildlife Conservancy. It has also improved land management in other ways through its consultancy work, advising clients such as mining companies and other large landholders to pay more attention to feral controls and native trees and grasses.

ESL’s restructuring only further proves the point that markets have tremendous power to conserve resources. One of the greatest aspects of private conservation is that it allows for a plurality of approaches rather than the one-size-fits-all approach typical of government. All of the sanctuaries that ESL sold are still being protected by a conservation organization, and in the manner that ESL pioneered.

One hopes that ESL’s financial roller coaster will not deter investors from backing private conservation organizations in the future. It will likely do the opposite, as public scrutiny will help ensure ESL’s financial success in the future, a time frame that is far more important to investors than the past.

ESL has emerged a leaner and more focused operation. In contrast, what has changed at Yellowstone National Park – the world’s oldest and most famous national park – since severe mismanagement resulted in devastating fires in 1988? What has changed about the U.S. Endangered Species Act (see Appendix 1), which since its inception in 1971 has witnessed as many extinctions as recoveries? The answer is very little, apart from some cosmetic changes. There can be no doubt that if Yellowstone were managed by a private company, or if a private endangered species recovery project had the track record of the U.S. Fish and Wildlife Service, the marketplace and the shareholders would long ago have disciplined them severely.

The conservation of threatened species is a noble and worthy goal. That is precisely why efforts in this field must be judged not by rhetoric or intentions but by results. Trade bans and prohibitions have caused a tremendous amount of mischief the world over. That is especially true of the U.S. Endangered Species Act and CITES, which aim to save species by devaluing them – that is, by making them worthless.

ESL, on the other hand, proved that turning species and other environmental amenities into tangible assets is a sound path to stewardship. The results cannot be denied and for legislators and policymakers, the lessons are clear. Private conservation works and should be the keystone of policy for protecting endangered species in Australia, America, Africa, and around the world.

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APPENDIX 1: ENDANGERED SPECIES AND PRIVATE ACTION IN THE UNITED STATES

A private conservation effort such as Earth Sanctuaries, Ltd. would have an even harder time getting off the ground in the United States. Some private organizations, most notably the Peregrine Fund, have made major contributions to endangered species conservation through their captive breeding programs. But to commercialize endangered species would be unthinkable under the strict regulation of the U.S. Endangered Species Act (ESA).

The ESA, which became law in 1973, has a dismal track record of species recovery, producing far more lawsuits than progress. As of June 2003, 35 species had been removed from the list.¹ Of those, only 11 were “recovered”.² The rest either became extinct (seven) or were listed erroneously to start. That is, once people started looking they discovered that they weren’t endangered after all.

If one also takes into account the species recovered due to bans on whale hunting and DDT (which affected bird reproduction), both of which predated the passage of the ESA, the number of species recovered drops to six. Unfortunately, things are even worse than they seem. The ESA appears not only to have had little success in recovering species, there is evidence that it has actually been detrimental to recovery efforts.

Under the ESA, use of private land may be prohibited when federally listed endangered species are present. This creates a potentially devastating financial impact, a perverse incentive which has led landowners to preemptively alter habitat to make it unattractive to certain endangered species. For example, owners of forests that would evolve into endangered red-cockaded woodpecker habitat (they prefer old-growth trees) tend to cut their trees ahead of schedule to avoid attracting the birds.³ Clearly, the ESA is incompatible with an attempt to make endangered species count as an asset. Indeed, it has made them a significant liability.

There have been some changes in the ESA in recent years, most notably the creation of what are called Safe Harbor agreements that give landowners some measure of reassurance that they won’t be penalized for any new endangered species that are attracted to their land. The agreements are certainly a step in the right direction, and have facilitated some real conservation efforts on private land.

For example, after the creation of the Safe Harbor program, the Peregrine Fund was able to work closely with landowners in south Texas to reintroduce the Aplomado falcon there.⁴ Still, a Safe Harbor agreement requires a complex permitting process, and the ESA remains onerous for those landowners who already have endangered species on their land. At the same time that Safe Harbors are growing, so are Critical Habitat designations, which make land-use decisions even more difficult.

In May 2003, for example, the U.S. Fish and Wildlife Service designated as Critical Habitat nearly 100,000 acres on the island of Maui. The plan purports to protect 60 species of threat-

ened and endangered plants, and is part of a series of four habitat designations mandated by federal court. Some environmentalists criticized the designation as “bad policy” because it excluded private land that the Fish and Wildlife Service felt was already “adequately managed to protect listed endangered species.”⁵

The United States has also had problems with invasive species eradication. In March 2003, for example, a federal judge in Idaho ruled against a Department of Agriculture program to eradicate predators such as foxes from sage grouse habitat.⁶ Sage grouse are not protected under the ESA, but have been declining in recent years, and the proposal aimed to eradicate most predators on 1,400 square miles of public lands. The agency is confident that “one in three adult sage grouse die each year from predators.”⁷

HAWAII

The most analogous situation to Australia in the United States occurs in Hawaii, another biodiversity hotspot that has seen tremendous damage done by non-native species. Like Australia, species evolved there in isolation. In fact, it was only 1,800 years ago that the Polynesians came to Hawaii, followed by Europeans about 200 years ago.

As described recently by the *Los Angeles Times*:

The alien species are turning Hawaii’s environment upside down. Legions of tiny frogs fan out across the islands and produce an ear-splitting screech that irritates visitors. A jungle tree from South America threatens to envelop Hawaii’s forests in a darkness that snuffs out wildlife beneath its canopy. Native flora and fauna are being devoured by wild pigs and rats, overrun by weeds and starved because pollinating insects and birds are no longer present to spread the seeds of life. The Aloha State has bid farewell to more species than any other. It has lost 80 percent of its bird species — a greater proportion than on all the continents — to Polynesian hunters, egg-snatching rodents and avian malaria borne by nonnative mosquitoes among other killers. One-third of the plants that were here when Capt. James Cook arrived in 1778 are gone. The federal government has identified 317 endangered species in Hawaii; California is second with 296, most of those imperiled by habitat loss.⁸

Hawaii’s state bird is the Nene, or Hawaiian goose. The IUCN categorizes it as “vulnerable”⁹ and its story is a telling one. The nene is the only waterfowl adapted to live on lava flows (they have even lost most of the webbing on their feet), and it is most easily found at Volcanoes National Park on the Big Island of Hawaii. Before the arrival of Captain Cook in 1778, it has been estimated that there were 25,000 nene in the Hawaiian Islands. Those numbers, however, quickly declined as the birds were easily approached by both humans and introduced predators, such as cats and mongoose. By 1949, it was estimated that only 30 birds remained.

Fortunately, some of these birds were taken into captivity, including some that wound up in England at the private Wildfowl and Wetlands Trust, along with state and federal efforts in the U.S. In the 1960s a program began to reintroduce the nene in Hawaii. By 1992, more than 2,200 nene had been released, including 200 from the Wildfowl Trust.¹⁰

Captive breeding saved the nene from extinction, and approximately 550–600 nene exist in the wild today. However, the population does not seem to be self-sustaining (that is, the numbers are only maintained by adding captive bred stock). A large research survey undertaken throughout the 1980s, which included the Wildfowl Trust, Hawaiian Department of Forestry and Wildlife, Hawaiian National Park Service, U.S. Fish & Wildlife Service, University of North Dakota, and the Smithsonian, found that most nene populations were not self-sustaining due to a variety of causes. These include low gosling survival, poor foraging conditions, predation by introduced predators (rats, cats, dogs, pigs, and mongooses), and road fatalities – about 10 nenes are run over by cars in Hawaii every year.¹¹

No doubt the next step will be more research, while what is really needed is a safe, roadless, predator-free environment for the nene.

NOTES

- ¹ U.S. Fish and Wildlife Service, Threatened and Endangered Species System (TESS), *Delisted Species Report*, as of May 2, 2003. <http://ecos.fws.gov/servlet/TESSWebpageDelisted?listings=0>.
- ² Bizarrely, the list of recovered species include three species of Australian kangaroo, which the U.S. ESA obviously had nothing to do with, and which, if included, would raise the number to 14.
- ³ Lueck, Dean, and Jeffrey Michael, “Preemptive Habitat Destruction Under the Endangered Species Act,” in Anderson, T. (ed.), *Political Environmentalism: Going behind the Green Curtain*, Stanford: Hoover Institution Press, 2000.
- ⁴ Bean, Michael, Peter Jenny, and Brian van Eerden, “Safe Harbor Agreements: Carving out a new role for NGOs,” *Conservation Biology in Practice*, Vol. 2, no. 2, Spring, 2001, pp. 9-16.
- ⁵ “FWS designates 100,000 acres of critical habitat in Hawaii,” *Greenwire*, May 16, 2003.
- ⁶ Henry, Natalie, “Judge says government program to kill sage grouse predators is illegal,” *Greenwire*, March 24, 2003.
- ⁷ *Ibid.*
- ⁸ Polakovic, Gary, “Paradise Losing in Hawaii,” *Los Angeles Times*, January 2, 2003.
- ⁹ IUCN, 2002.
- ¹⁰ Wildfowl and Wetlands Trust, “Hawaiian Goose,” <http://www.wwt.org.uk/threatsp/pastwwt/nene.htm>.
- ¹¹ Wildfowl and Wetlands Trust, “Hawaiian Goose,” <http://www.wwt.org.uk/threatsp/pastwwt/nene.htm>.

APPENDIX 2: RECENT EXTINCTIONS IN AUSTRALIA

Source: IUCN Red List

MAMMAL SPECIES

Gould's mouse (*Pseudomys gouldii*) – nd
 Rabbit-eared tree rat (*Conilurus albipes*) – 1800s
 Darling Downs hopping-mouse (*Notomys mordax*) – 1840s
 Big-eared hopping mouse (*Notomys macrotis*) – 1843
 Broad-faced potoroo (*Potorous platyops*) – 1875
 Eastern hare wallaby (*Lagorchestes leporides*) – 1890
 Alice Springs mouse (*Pseudomys fieldi*) – 1895
 Short-tailed hopping mouse (*Notomys amplus*) – 1896
 Long-tailed hopping mouse (*Notomys longicaudatus*) – 1901
 Pig-footed bandicoot (*Chaeropus ecaudatus*) – 1907
 Lesser bilby (*Macrotis leucura*) – 1931
 Central-hare wallaby (*Lagorchestes asomatus*) – 1932
 Lesser stick-nest rat (*Leporillus apicalis*) – 1933
 Desert rat kangaroo (*Caloprymnus campestris*) – 1935
 Tasmanian tiger (*Thylacinus cynocephalus*) – 1936
 Toolache wallaby (*Macropus greyi*) – 1937
 Desert bandicoot (*Perameles eremiana*) – 1943
 Crescent nail-tailed wallaby (*Onychogalea lunata*) – 1960s

MAMMAL SUBSPECIES

Eastern bettong (*Bettongia Gaimardi ssp gaimardi*) – 1910
 Brush-tailed bettong (*Bettongia penicillata ssp penicillata*) – 1923
 Burrowing bettong (*Bettongia lesueur ssp graii*) – 1960s
 Rufous hare wallaby (*Lagorchestes hirsutus ssp hirsutus*) – ?
 Banded hare wallaby (*Lagostrophus fasciatus ssp albipilis*) – 1906
 Tammar wallaby (*Macropus eugenii ssp eugenii*) – 1920*
 Western barred bandicoot (*Perameles bougainvillea ssp fasciata*) – 1930s

* Feral populations do exist in New Zealand.

APPENDIX 3: EARTH SANCTUARIES FINANCIAL PERFORMANCE

For the year ending December 31, 2002, there was an operating loss of A\$ 672,000 (as compared to A\$ 3,769,000 in 2001). The company lists current net assets as A\$ 10,600,000.

SHARE PRICE:

ASX listing price – A\$ 2.50.

ASX trading price in June 2003 – 18.5¢

PRIVATE SHARE OFFERINGS:

2000 – A\$ 2.50

1999 (Fall) – A\$ 2.25

1999 (Spring) – A\$ 2.00

1998 – A\$ 1.50

1997 – A\$ 1.50

NET ASSETS:

1996	A\$ 57,750,000 green	A\$ 6,900,000 regular <i>Annual Report, 1996</i>
1997	A\$ 66,900,000 green	A\$ 9,670,000 regular <i>Annual Report, 1997</i>
1998	A\$ 92,600,000 green	A\$ 11,380,000 regular <i>Annual Report, 1998</i>
1999	No green in 1999	A\$ 20,900,000 regular <i>Annual Report, 1999</i>
2000		A\$ 34,850,000 regular
2001		A\$ 21,800,000, due primarily to drop in cash
2002		A\$ 11,350,000 regular

Dividends have ranged from a low of 2 cents per share in 1994 to 5 cents per share in 1999. Since the company went public in 2000, no dividends have been paid.

* “Director’s Report,” posted at the Australian Stock Exchange website (www.asx.com.au).

ABOUT THE AUTHOR

MICHAEL DE ALESSI is Director of Natural Resource Policy for the Reason Public Policy Institute (www.reason.org) in Los Angeles and a Fellow in Environmental Studies for the Pacific Research Institute in San Francisco. He specializes in marine conservation, water policy, and wildlife issues. He is the former director of the Center for Private Conservation at the Competitive Enterprise Institute in Washington, D.C.

He is the author of *Fishing for Solutions* (London: Institute of Economic Affairs, 1998), and his articles have appeared in such publications as *New Scientist*, *International Herald Tribune*, *The Wall Street Journal Europe*, and *The Asian Wall Street Journal*.

He received a B.A. in Economics and an M.S. in Engineering Economic Systems from Stanford University and an M.A. in Marine Policy from the Rosenstiel School of Marine and Atmospheric Science at the University of Miami.

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DISCLOSURE: After meeting John Wamsley and Proo Geddes in the summer of 1998, the author bought 500 shares – the minimum investment at the time – of Earth Sanctuaries Ltd. stock on November 30, 1998. On April 24, 2003, that stock was trading at about A\$.21, or US\$.13, for a total share value of US\$ 65. All dividends, when they are paid, go directly to the ESL Foundation.

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