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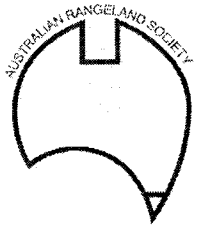

The Australian Rangeland Society

ARE MINERS THE BUNNIES OR THE BILBIES OF THE RANGELANDS?

J.L. Read

WMC Resources, PO Box 150, Roxby Downs SA 5725

ABSTRACT

As preferred sustainable landusers of the Australian rangelands, mining operations should legacy net environmental and community benefits in the regions in which they operate. The positive and negative environmental implications of the Olympic Dam mine in arid South Australia are compared in this study. Criteria assessed include the relative area of affected vs improved landscape, environmental research, pest control and the facilitation of proactive conservation and sustainable diversification outcomes. A call is made for consistent treatment of potential environmental impacts across all rangeland users and the adoption of biodiversity trading to improve regional conservation outcomes. A challenge is issued to all miners and other rangeland landusers to demonstrate that, like bilbies, their net effects are beneficial to the environments that they have inherited.

INTRODUCTION

Rabbits are the primary pests to conservation and pastoral production in much of the Australian rangelands because they affect vegetation communities, dig holes and support high predator numbers. By contrast, bilbies, which also influence vegetation, soil and food chains, are conservation icons for the same environments. In spite of their strikingly similar appearance and superficially similar ecologies, rabbits are pests because their detrimental environmental impacts outweigh their advantageous ecosystem services, whereas the reverse is true for bilbies. Like rabbits and bilbies, all contemporary rangeland users affect ecosystem functioning. In the growing pursuit of environmental sustainability, industries or operators with net detrimental environmental outcomes will face a less secure future than those that can demonstrably claim to improve the regional environment.

Extractive mining and high intensity pastoralism, which cause catastrophic modification to localised landscapes or ecosystem processes, are the most obvious environmental impacts in some rangeland regions. However, oil and mineral exploration, broad-scale pastoral activities, military and communications developments, tourism and settlements of indigenous and non-indigenous peoples collectively affect most of the rangelands more subtly, yet arguably more significantly, than intensive mining and pastoral activities.

Rangeland roads improve access for feral predators and weeds, with harmful consequences for biodiversity and production. These roads, along with modified herbivore concentrations and settlement patterns of indigenous Australians, have affected the functioning of rangeland ecosystems by changing historical fire regimes (Latz and Griffin 1978). Control of dingoes increases populations of kangaroos and emus (Pople *et al.* 2000), feral herbivores and predators (Newsome 1990, Pettigrew 1993), with commensurate detrimental conservation implications that extend beyond those areas used for pastoralism. Soil disturbance, through vehicles, machinery, hard-hooved domestic stock and vegetation removal, enhances erosion and may promote salinisation, which also erodes the long-term productivity of the nutrient-deficient rangelands. Rangeland industries may further alter nutrient and chemical cycles through chemical pollution, firewood collection and export of harvested herbivores from the rangelands.

Legislation and society have historically tolerated most of these detrimental environmental outcomes that have been considered to be the unavoidable consequences of conventional rangeland industry. Indeed in some cases rangeland operators can validly argue that they inflict less intensive impacts than similar activities in more productive mesic regions. Although their productivity is typically lower, domestic stock

raised on natural pastures and shrublands coexist with far more indigenous plants and animals than do their counterparts in cleared, irrigated and fertilized agricultural regions. Likewise, due to the low rainfall and endorheic drainage throughout much of central Australia, watercourses and marine environments are rarely affected by mine, urban or industrial residues from the rangelands.

This study explores a key component of the idyllic paradigm that sustainable rangeland industries should legacy net benefits to the environments and communities in which they operate. Through a case study of the positive and negative environmental implications of a major mining and mineral processing operation, I will explore whether miners have the potential to be the bilbies, rather than the bunnies, of the rangelands. I then challenge miners, other rangeland industries, legislators, the media and society to facilitate the necessary adjustments to enable current and future rangeland industries to legacy net environmental, as well as community, improvements.

Olympic Dam Operations

WMC Resources own a large copper, uranium, gold and silver mine and processing facility at Olympic Dam, approximately 530 km north of Adelaide in central South Australia. The Olympic Dam orebody was discovered in 1975 and production of refined metals and Uranium oxide commenced in 1988. The expected life of the mine, at greater than 9 million tonnes ore milled per annum, is at least another 50 years. The environmental performance of Olympic Dam Operations is assessed against five relevant conservation-related criteria:

a) Environmental footprint vs rehabilitation success
b) Biological surveys and research
c) Feral animals and weed control
d) Pastoral lease management
e) Proactive conservation initiatives

Environmental impact footprint

One crude, yet defendable, measure of the relative positive or negative environmental impacts of a mining operation is a comparison of the areas damaged versus the areas in the same landsystems that are improved by mining. The area directly disturbed by infrastructure, was approximately 2600 ha in June 2002. Calculations from an integrated bioindicator model suggest that a further 1400 ha are affected by pervasive pollutants. This total disturbed area equates to approximately 22% of the Olympic Dam mining leases, which has been destocked since 1986.

Proactive rehabilitation initiatives are anticipated to further limit the ratio of impacted to improved landscapes as exploration regions sequentially fulfill ecologically sustainable completion criteria. However, despite enormous expense, some artificial landscapes are unlikely to ever mimic functioning local environments. Current estimates indicate that $60M will be required to rehabilitate the Olympic Dam tailings dams. Ironically, rehabilitation of these tailings will also require disturbance of considerable additional land to mine topsoil. The wisdom of this expenditure and extra disturbance, when compared with rehabilitation requirements of other industries is questionable. Furthermore, significant conservation benefits could be generated from an investment of this scale in similar environments elsewhere in the region.

The cessation of flow, due to mining water extraction, of two small mound springs of limited biological and heritage significance, is a negative impact of the Olympic Dam mine. Another spring group experienced reductions in flow, with likely ecological implications, until remedial engineering and changes to water abstraction patterns reverted flows back towards natural levels. By contrast, a joint WMC-State Government-financed program to control and pipe water from previously freely-flowing

pastoral bores is planned to save 37 megalitres per day of water currently consumed from the Great Artesian Basin (GAB). Although flows from many mound springs are not directly affected by water saved from elsewhere in the GAB, the conservation of more water than the 32 megalitres currently used at Olympic Dam must ameliorate environmental impacts of mine-based water abstraction.

Biological surveys and research

Proactive, sustainable environmental management requires a thorough understanding of local ecosystems. As such, comprehensive biological surveys and research should be both precursors to, and proactively pursued throughout the life of, major mining operations. Prior to the Environmental Impact Studies for the Olympic Dam mine, the region was one of the most poorly studied areas of South Australia (Reid 1982). However, intensive and prolonged research conducted both during and since the EIS (Kinhill-Stearns Joint Venture 1982; Read 1992, 1994) has redressed this deficiency to the point where the Olympic Dam region now arguably boasts the most comprehensive and long-term comprehensive biological dataset of any South Australian arid zone locality. WMC have clearly been the principal drivers and facilitators of regional environmental surveys, research and management with outputs exceeding those of the other industries and academic and government institutions with interests in the region.

The Olympic Dam herbarium boasts over 750 plant species. The seasonal occurrences of 166 bird species (Read *et al.* 2000a) and over 20 000 herptiles from 55 species have now been recorded from the Roxby Downs region. Fifteen years of regular monitoring has revealed that several rare mammals, including the Desert Mouse and Plains Rat, inhabit the local region and WMC staff have coordinated research into the biology and distribution of these mammals (Owens and Read 1999, Read *et al.* 1999).

Research seldom has conservation outcomes unless it is both published and stimulates changed perceptions, management or monitoring approaches. Over 50 peer-reviewed scientific publications, along with many conference presentations and media articles have resulted from biological studies by WMC staff or contractors in the Roxby Downs region. A study of bioindicators of local mining and pastoral impacts has led to tighter pollution controls being implemented at the mine and changed the way that reptiles (Read 1998a), birds (Read *et al.* 2000b) and ants (Read 1996a, Read and Andersen 2000) are monitored locally. Several research projects have concluded that the mining operation and especially the contentious issue of radiation, which rapidly attenuates to background levels, has had limited effects on sensitive indicator species (Read 1997, Read and Pickering 1999). An innovative solution to reducing risks to birds from toxic tailings dams was also developed through research at Olympic Dam (Read 1999). Long-term studies into optimum fauna monitoring techniques (Moseby and Read 2001, Read and Moseby 2001) have implications that extend throughout the Australian rangelands. Mound spring biological studies by over a dozen researchers supported by WMC have improved the scientific understanding and appropriate management approaches for these unique ecosystems, including providing the scientific basis for improving fire management of some mound springs environments for conservation gain (Lamb *et al.* 2001, Davies 2001).

Feral animal and weed management

Improved control of rabbits, cats and foxes provides a prime opportunity for rangeland industries to improve local environmental conditions. WMC invested $150,000 into research of the biological control of rabbits. This research ultimately contributed to the introduction of rabbit hemorrhagic disease (RHD) and the long-term rabbit monitoring program made Olympic Dam a key site for assessing the effectiveness of RHD (Bowen and Read 1998) and resultant environmental responses. Over 1 000 feral cats have been shot or trapped over the past 15 years and research has shown that regional cat numbers are primarily governed by rabbit and rodent abundance, yet feed extensively on reptiles (Read and Bowen 2001).

Ironically, higher numbers of cats, foxes, kangaroos and emus as a result of dingo control for the pastoral industry have environmental and management implications for conservation, mining and tourism landusers in the rangelands. Were the mining industry responsible for such a widespread conservation issue, the public and regulatory backlash would undoubtedly be far greater than current scrutiny of the secondary effects of dingo control.

Towns and service corridors provide conduits for feral animals and weeds through the rangelands. Weeds including buffel grass, fountain grass and Salvation Jane have made incursions since the establishment of Roxby Downs, but increased focus on pastoral weeds such as Bathurst burr, horehound and devil's rope cactus–has probably reduced the distribution of these pest populations since WMC acquisition of local pastoral leases. A recently established GIS-supported management program for weeds, in conjunction with Soil Board initiatives, will enable tighter monitoring and control of weeds in the region.

Pastoral Lease Management

Between 1995 and 1999, WMC purchased four pastoral stations with a total area of 1,200,000 ha adjacent to its Olympic Dam mine lease to facilitate land access required for any future expansions of Olympic Dam. WMC considers that minimizing environmental and heritage risks to their more lucrative mining venture outweighs the economic return from their pastoral leases. Regular vegetation monitoring has shown an improvement in the condition of the country since WMC has prohibited stock grazing from degraded areas and run lower stock numbers over the remainder of the leases (C. Turner pers. com.).

Due to the greater emphasis on environmental management than immediate commercial success, WMC have been able to support sustainable kangaroo harvesting and camel pastoralism, on the grounds that they may reduce the environmental effects of harvesting meat from the rangelands

Olympic Dam is typical of many mining projects that pipe water from external borefields. Pastoral access to permanent waterpoints from mining pipelines, which may be offered as a community gesture or in compensation for perceived disturbance, can have mixed environmental blessings. On one hand, piped waters allow grazing pressure to be reduced on existing waters and minimizes the expense and environmental implications of maintaining dams across biologically important watercourses. However, permanent waters can also be abused, particularly in dry times when surface waters are scarce and damage to perennial vegetation is most pronounced. The long-term environmental consequences of installing a series of pastoral offtakes from a WMC water pipeline, were potentially far greater than the impact of constructing the buried pipeline. WMC went to inordinate lengths to ensure that no trees were removed, and even measured and relocated over 3 600 animals from the 150 km trench. Post-construction environmental monitoring, required by legislation, included searching for nomadic bird species within the corridor of the buried pipeline but did not require any monitoring of the predictable and widespread effects of installing waterpoints in previously unwatered regions. Like the acceptance of the deleterious effects of dingo control, such an inconsistency in dealing with the environmental impacts of mining and pastoralism did not reflect real environmental risks.

Proactive conservation initiatives

Over 10,000 ha and funding for fencing were provided by WMC to include many significant mound springs into an expanded Wabma Kadarbu Conservation Park. Stock have also been excluded from all other mound springs on WMC pastoral leases. Cattle, and in two cases rabbits, have been removed from nearly 300 sq km of exclosures on WMC leases, which amounts to over 7 times the area of the mining footprint. WMC Land management staff coordinate and assist with regional feral animal surveys and control and rangeland assessments.

The most ambitious conservation project initiated at Roxby Downs is the Arid Recovery Project, which is a partnership between the South Australian Department for Environment, Adelaide University, the local community and WMC. Since its inception in 1997, the Arid Recovery Reserve has increased in size to 59 sq km, that extends from the Olympic Dam mine lease onto four neighbouring pastoral properties. The Reserve is enclosed within a custom-designed and tested rabbit, cat and fox proof fence and was declared free of these feral animals in 2001, with commensurate improvements to native plant and animal communities already detectable (ARP 2002). Dozens of tertiary students and thousands of hours of volunteer labour and a million dollar investment, half-funded by WMC, have assisted 2-4 permanent staff to develop and manage this demonstration site. Four threatened mammal species, namely stick-nest rats, burrowing bettongs, bilbies and western barred bandicoots have been successfully reintroduced to the Reserve (ARP 2002). Ecosystem restoration studies are currently being prepared for publication. Future planned expansions into an unfenced, yet feral animal controlled buffer zone, should more than keep pace with potential increases to the local footprint of the Olympic Dam mine.

SUMMARY

The Australian rangelands, with their low rainfall, stable flat terrain, and scarce human population are arguably amongst the most favourable environments in the world for large-scale mining ventures. Contamination of offsite riverine and marine environments is not an issue at Olympic Dam, as it is for many other mining ventures outside of the rangelands. Given the wide-scale legacy of unsustainable grazing, feral animals, weed invasions, altered fire regimes and local extinctions of native species, there are ample opportunities for miners to facilitate overall environmental benefits in rangeland regions.

The analyses presented here suggest to me that the environmental benefits of Olympic Dam outweigh the local impacts. However, what is more important than the 'bilby or bunny' value judgment is the acceptance that Olympic Dam has achieved a number of conservation gains that would not have been feasible without the mine.

Public and legislative acceptance of the potential environmental benefits of mining should encourage a more proactive approach by mining companies to environmental management. Rather than simply aiming to minimise the negative implications of their operations, successful mining operations should endeavour to maximise their regional environmental benefits. Conservation gains may be in part facilitated by sensible biodiversity trading, whereby localised environmental impacts are offset by more significant environmental gains in similar environments elsewhere in the region. For example, the money saved by stabilizing, instead of attempting to completely rehabilitate some relatively small-scale mining structures to functioning ecosystems, could be diverted to nationally significant conservation partnerships such as the Arid Recovery Project. Any such arrangements should be accompanied by long-term financial and management commitments by miners that are appropriate for the long timescale of their landscape impacts. In keeping with a matured regulatory and approvals framework for the mining industry, miners should also demonstrate how they intend providing regional environmental benefits before license to operate is granted.

However, miners only manage a very small percentage of the rangelands. Other rangeland managers also need to deal with the problems of feral animals, weeds, soil erosion and fire. The challenge should therefore be issued to all landusers to demonstrate through rehabilitation and sensitive and proactive environmental management, that they can be considered 'bilbies', rather than 'bunnies' of the rangelands.

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