ACCESS FOR EXPLORATION AND MINING IN WESTERN AUSTRALIAN NATIONAL PARKS AND CONSERVATION RESERVES [1]

William M. B. Carr and Anthony J. Smurthwaite[2]

Abstract: Mining is of critical importance to the Western Australian economy, earning $A 10 billion in 1993/94. Mineral production is based on the principle of Crown ownership of minerals and either the concurrence of or consultation with the land manager. Through the 1970's and early 1980's public concern developed regarding the activities of mineral explorers within the State's national parks and other conservation reserves. A series of enquiries were held and policies developed between 1986 and 1994 which resulted in a system that allows for both the protection of reserves and regulated mining access.

Additional Key Words: environment, conservation reserves, mining, mineral exploration, multiple use, national parks, Western Australia.

Introduction

Mining has been of major importance to the Western Australian economy throughout this century. Accordingly the search for and exploitation of minerals has been encouraged by successive Governments. However during the 1970's and 1980's public concerns about the environmental implications of such activities increased, particularly in national parks and other conservation reserves. This paper discusses the evolution of the current approach to the provision of access to the State's national parks and other conservation reserves. It updates the situation described by Carr and Batini (1993).

Exploration and Mining in Western Australia

Mining is of critical importance to the Western Australian economy, earning $A 10 billion in 1993/94 predominantly from iron ore, gold and alumina together with substantial contributions from heavy mineral sands, diamonds and nickel.

Western Australia now has one of the most diversified mining industries of any country in the world. It is a major world source of iron ore, gold, alumina, nickel, titanium minerals, diamonds, and salt.

An expansion in mineral production from the mid 1960's has been driven by the increasing world demand for minerals assisted by improvements in mining and transport technology. These improvements have allowed isolated deposits to be brought at competitive costs to world markets.

Although the improvements in demand and technology have paved the way for exploiting mineral deposits, it has been vital to foster the exploration industry to ensure that further ore bodies were identified to satisfy the demand for mineral products. The experience in Western Australia is that exploration in particular areas of land may be repeated over several decades as improved techniques and knowledge and changing mineral prices result in discoveries in previously explored terrain.

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Exploration requires superficial access to extensive areas of land for broad scale and geophysical and geochemical survey. More intensive activity, which is usually only temporarily intrusive, is confined to relatively small areas identified from the broad scale surveys. Drill pads and survey lines are now rehabilitated to ensure that there is virtually no permanent damage to the environment.

Historically, mining centres and cleared mineral exploration survey lines were left in a derelict, unrehabilitated condition. The general public's experience of this degradation has resulted in major concerns about similar impacts on national parks and nature conservation reserves from mineral exploration and production . This perception remains, despite radical improvements in the requirements by State agencies for environmental management and the performance of explorers and producers. The public also believes that every exploration program invariably becomes an operating mine. However the Western Australian Chamber of Minerals and Energy records indicate that in approximate terms, out of 1000 broad scale exploration programs commenced only one ore deposit is defined.

Conservation Reserves in Western Australia

Of the State's 2.5 million km^2 area, or about a third of Australia's total land area, some 174 thousand km^2 or 7% is reserved as national park or one of a range of conservation reserves.

The process of reservation is ongoing as areas of particular ecological importance are progressively identified.

The main terrestrial conservation reserve types include national parks, nature reserves and State forest. Other forms of tenure include timber reserves and conservation parks. National parks range in size from 56 ha to 15 thousand km^2. They are widely distributed but tend to be smaller in the State's southwest. A similar situation applies to nature reserves with the largest number being in the southwest. State forest is restricted to the southwest corner of the State. The purposes of the various reserves are summarised in Table 1. Figure 1 summarises the land tenure in the State.

The type of reserve sets limits on the activities which may be permitted within that area. These are defined by legislation and in management plans and zoning processes.

The class of reserve is also important for management. Class A reserves can only be cancelled with the approval of both Houses of State Parliament, Class B by a proclamation from the Governor with reasons reported to Parliament and Class C by the Governor on advice from relevant ministers without reference to Parliament.

State forest and timber reserves are vested in the Lands and Forest Commission (LFC). The others are usually vested in the National Parks and Nature Conservation Authority (NPNCA). The Department of Conservation and Land Management (CALM) is the management agency for the NPNCA and LFC.

Additions to the Conservation Estate

Some 45% of the rare and threatened species of flora in Australia are from Western Australia and there is an exceptionally high degree of endemism in the State's wildlife (e.g., 62% of the flora species in the southwest of the State are endemic). Accordingly there is considerable pressure for active management and maintenance of these special values.

This preoccupation is reinforced by the aesthetic values of the areas concerned and the threat caused by introduced predators, feral animals, weeds and plant diseases.

Soon after the Environmental Protection Authority (EPA) was established in 1971, it instituted a process of identifying areas of the State which should be reserved to secure the conservation of representative biological and geomorphic types. In addition, features of special scientific interest were identified. To cater for the State's population growth and changes in mobility and population centres additional areas were recommended for national park. This action culminated in a series of recommendations to Government between 1975 and 1983.

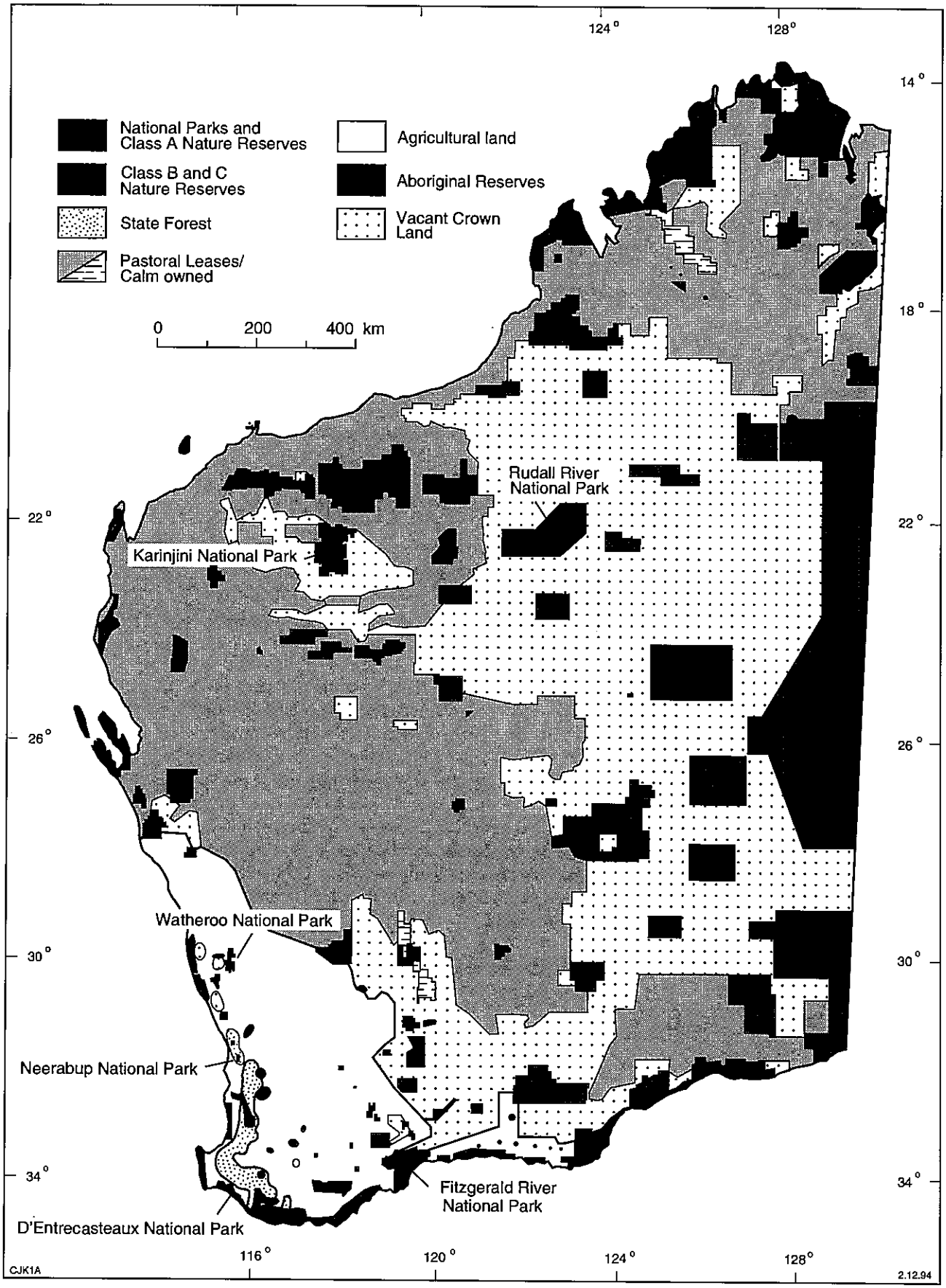

Figure 1. Land tenure and purpose in Western Australia

The EPA recommendations were contained in four reports that became known as the Red Books. The recommendations are progressively being implemented as conflicting land use issues are resolved. It was soon realised that a proportion of the recommendations had mining implications. Of the 454 localities under review, 123 had mining or petroleum interests. The majority of the recommedations with mining interests could be implemented by changes to proposed reserve boundaries or the purpose or class of the proposal. Only seven of the 123 are still unresolved because of resource issues . Because these recommendations were formulated some years ago the information on which they were based has in many cases been upgraded by subsequent biological surveys. The outstanding recommendations adjacent to Perth are now being reviewed to see if they are still relevant.

Since the Conservation and Land Management Act began operation in 1984, CALM has been able to recommend increases to the conservation estate via individual reserve proposals or as a number of proposals within regional management plans. Again in particular cases there is potential for resource conflicts to occur.

TABLE 1. Land Managed By The Department of Conservation and Land Management

LAND TENURE	AREA (ha)	PURPOSE
National Parks	4,837,000	Wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest, and enjoyment by the public.
Nature Reserves	10,770,000	Wildlife and landscape conservation, scientific study and preservation of features of archaeological, historic or scientific interest.
Conservation Parks	87,000	Wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest, and enjoyment by the public. Local or regional value.
State Forests, Timber Reserves	1,890,000	For indigenous or exotic State Forest or Timber Reserve, multiple use including: conservation; recreation; timber production on a sustained basis; catchment protection; provision for public utilities, mineral production. Timber reserves are a transitional classification to other reserve types.
Section 5(g) reserves	257,000	These reserves have a wide variety of purposes, but normally are related to recreation, wildlife conservation and historical features. This classification is now frequently being used when biological values are to be managed in areas of high mineral potential.
Marine Parks, Nature Reserves and Management Areas	1,146,000	Marine conservation and recreation. Areas may be zoned for specific purposes. Marine Management Areas multiple use.

Legislation

The principal State Acts which affect exploration and mining in conservation areas are the Mining Act, the Wildlife Conservation Act, the Conservation and Land Management Act and the Environmental Protection Act.

Mining Act

The Mining Act 1978 covers both exploration and productive mining of minerals on all land in Western Australia, with the exception of the few areas of pre-1889 freehold land. The State was established in 1829 with minerals to owner title. When the Australian Federation occured in 1890 the title system was changed so that the State retained mineral rights. The Act is based on Crown ownership of minerals and seeks to encourage the discovery and development of mineral resources by granting the rights to exploration and mine minerals to individuals and companies. In return for the right to mine, developers pay a royalty to the State.

The Mining Act includes a number of provisions relating to environmental matters which vary depending on the type of land tenure over which the tenement is granted. Rehabilitation conditions may be adjusted throughout the tenure of a mining lease to meet changing circumstances. Performance bonds are required for all productive mines and selected exploration programs. The liability of a tenement holder to meet conditions continues even after the surrender of a tenement. Also where an individual or company takes over a lease it becomes responsible for the lease and all environmentally unacceptable or unsafe aspects of that lease.

The Act has specific provisions for particular classes of land. This paper concentrates upon Public Reserves for conservation purposes.

On reserve land varying degrees of access control may be encountered. In general the Mining Act provides that before a tenement is granted, either the concurrence or recommendation of the Minister responsible for the reserve is required. Concurrence of the Minister for the Environment is required in the case of national parks, conservation parks, state forests timber reserves and Class A nature reserves.

Parliamentary approval is required before mining leases and general purposes leases can be granted in national parks and class A reserves. For conservation reserves other than national parks and Class A reserves the recommendation of the Minister for the Environment is required before the Minister for Mines can grant mining approval.

The referral procedures also enable the authority with management responsibilities for the reserved land to oppose exploration and mining or have specific conditions applied to any mining tenements granted on the reserved land. Such conditions can include restrictions on the type and manner of exploration or other mining activity, as well as detailed environmental and rehabilitation requirements.

In addition to the specific conditions that may be recommended, the Mining Act also provides for conditions to be imposed with respect to mining tenements in reserved land to ensure that "injury to the surface of the land" is made good if necessary, for the costs of such work to be recovered from the tenement holder and for the lodging of performance bonds with respect to mining. Fines or forfeiture for non-compliance or breaches of the Act or conditions are provided for.

The Mining Act is administered by the Department of Minerals and Energy (DME).

Wildlife Conservation Act

Under this Act all the State's native flora and fauna are protected with some endangered species given special protection. Premeditated damage to endangered species may only occur when it is considered to be impossible to avoid their destruction and then only with the written permission of the Minister for the Environment.

Conservation and Land Management Act

This Act cannot derogate from the operations of the Mining Act. However it establishes the management required for conservation reserves and State forest, and that conditions for access by miners may be required. The agencies involved in implementing the Act are the NPNCA, the LFC and CALM.

The Environmental Protection Act

This Act requires that a proposal which is likely to have a significant effect on the environment shall be referred to the EPA by a decision making authority (e.g., the Minister for Mines). Proposals may also be referred by third parties at any time. Following referral, the proposal cannot be approved until the EPA determines that the proposal does not require assessment or after the proposal has been assessed, the EPA's recommendations are made to the Minister for the Environment and the Minister has set conditions.

The Act also provides the basis for pollution control in the State, requiring "Works Approvals" and "Pollution Control Licences" for designated projects including mining operations.

Environmental Protection Policies are also provided for under the Act. These may require that all projects within a particular environmentally sensitive area are referred to the EPA (e.g., the lakes on the Swan Coastal Plain north and south of Perth).

Development of Government Policies for Mining on Conservation Reserves

Geologically much of Western Australia is still not well known. Broad scale mapping of the State at a scale of 1:250000 was only completed a few years ago and more detailed geological mapping as the basis for further mineral exploration within the State is now in progress. Outcrops of unweathered rock are scarce. Geological features are concealed under deeply weathered terrain or sedimentary cover. Ongoing exploration, using the results of improvements in technology and reflecting the economic value of particular mineral resources, is therefore required to adequately examine prospective areas

The Mining Act 1978 provides that exploration and mining tenements may be granted on national parks and nature reserves under certain conditions. This has essentially been the policy in the State for over 90 years until 1988. Mining has been a major employment generator since the 1890's, resulting in successive increases in the State's population.

The EPA, shortly after its inception in 1971, considered the issue of mining access to reserved land. In the first place the Authority established a review of the adequacy of the existing national parks and nature reserves. Subsequently in 1972 the EPA advised Government during the review of the Mining Act 1904 that, subject to consultation with the Minister for the Environment regarding the setting of conditions, exploration could take place in Class A nature reserves and national parks.

In 1971 the EPA recommended that the State undertake the detailed exploration needed to explore for montan wax in the then class C Fitzgerald River Reserve on the South Coast. In addition it recommended that the reserve became a national park. The Government agreed to both recommendations. The exploration drilling program was conducted by the Geological Survey but the deposit was found to be uneconomic.

Similarly, following EPA advice, boundary adjustments were made to Karijini National Park in 1972. The changes included bringing scenic attractions into the reserve, and the relinquishment of non-viable iron-ore tenements within the park.

Shortly after the Rudall River National Park was established in 1977 the Government decided to grant exploration tenements within the reserve. The EPA recommended a set of conditions on exploration to the then National Parks Authority, Western Australian Wildlife Authority and Mines Department. These conditions were jointly agreed upon and formed the basis for subsequent tenements within National Parks and Nature reserves throughout the State.

In 1981, a committee of the upper House of State Parliament published a report concerning mining in national parks. This called for a ranking of national parks and other reserves based on their ecological importance.

In 1983, some gold mining leases were granted in a remote area of Karijini Range National Park. In 1984 the EPA released its report on a proposed alluvial gold mining venture on these leases. It found that "as a matter of principle mining on leases granted following the declaration of a national park should only be allowed if the following criteria are met:

(a) there is a strategic need for the mineral; or
(b) the mineral resource is rare and of high value, and its exploration would be of significant material benefit to the State, or the nation".

As a result of this finding, the mining proposal did not go ahead.

Balancing the Scales Policy

Following the reviews during the 1970's and early 1980's the Government decided it needed to make a definitive statement regarding whether it should continue to approve mineral exploration and mining in these conservation areas. Accordingly in October 1985, the Government established a Committee to receive submissions and make recommendations on exploration and mining activities in national parks and nature reserves. The review arose out of the dilemma as to whether to

The Committee's major finding was that "exploration licences should not be granted over a National Park or Class A nature reserve unless that park or reserve has individually either been declared open for granting of exploration licences or reclassified in such a way as to accommodate exploration". In reviewing the Committee's report the EPA recommended that any exploration and mining in national parks and nature reserves should be phased out by the year 2001.

In December 1988, the Government used the Committee's findings as a basis for its policy "Mining and Environment: Balancing the Scales". The major feature of this policy was that national parks and Class A nature reserves were closed to exploration and mining tenements. It might have been possible to open a reserve for mining tenement applications under a complicated system of interdepartmental research, EPA assessment and Government and Parliamentary approval outlined in the policy.

In addition, each Class B or C nature reserve was to be reviewed and either be reclassified as Class A national park or nature reserve or have its NPNCA vesting status removed. The conservation status of any Class B or C reserve would have to be reviewed before any exploration licence application could be granted.

The only way of gaining access for exploration was essentially by way of a geoscientific survey permit which allowed non-ground disturbing exploration, but gave no automatic right to proceed to an exploration tenement.

As a result of this policy exploration on nature reserves and national parks was seriously curtailed apart from work on existing tenements and minor use of geoscientific survey permits. As a result during 1990 only 18 tenements were approved on reserved land. Some 200 applications for tenements were unprocessed in mid-1991 as a result of the major constraints placed on the grant to title process by the policy.

One useful outcome of the policy was the major review of existing Class B and C reserves which is still continuing. Out of 936 reserves, 672 were found to have only low or negligible mineral resource potential. They were approved by the DME for upgrading to A Class status. Between June 1988 and June 1990 some 504,000 ha were added to the conservation reserve system.

The policy resulted in a much more rigorous mineral resource assessment being required for any proposed national park or nature reserve. However, throughout this period the mining industry and the DME were concerned at the major restriction on exploration activity resulting from the policy.

Resolution of Conflict Policy

The restrictions on mineral exploration and subsequent resistance to the creation of new conservation reserves due to the "Balancing the Scales" policy lead to an active period of discussions between a range of Government agencies, as well as lobbying by industry and private conservation interests. Finally in November 1990, after two years experience with the "Balancing the Scales" policy, the Government announced a different approach. The "Resolution of Conflict. A Clear Policy for National Parks" policy was developed to maintain the philosophy of restricted access to important conservation reserves, but without preventing new mineral exploration.

For the first time the policy stated that there would be no mining in national parks. However in the recognition of high resource values in five of the 62 national parks, special provisions allowed for continued exploration and excision of mining leases from these five. With the excision of small areas from two national parks (Watheroo and Neerabup), only three national parks were subject to exploration and mining (D'Entrecasteaux, Rudall River and Karijini).

In addition, the Government announced that all EPA Red Book recommendations held up because of mining interests would be implemented as Class C conservation reserves. Upgrading of these reserves to Class A and the review of Class B and C nature reserves would be considered by a Ministerial Council. This Council was to consist of the Minister for Minerals and Energy, Minister for Industrial Development and Minister for the Environment. The policy did not require that all B or C class reserves be upgraded. As a result major opportunities were created for declaring conservation reserves on which mineral exploration could be carried out. This resulted in an additional 65 Class C conservation reserves being created.

An integral component of the policy was the establishment of a Mining and Environment Liaison Committee to enable the community to provide advice to the Minister for Mines regarding environmental matters arising from the operation of the Mining Act.

The DME, in consultation with CALM, NPNCA, LFC and EPA, produced schedules which detailed conditions for mineral exploration and development on reserved land. These schedules for both exploration and mining permits related to existing and proposed CALM managed conservation reserves and forests, and other environmentally sensitive areas. The conditions were detailed in Department of Minerals and Energy Western Australia, Geological Survey of Western Australia, Information Series No 11, 1992.

The conditions required approval of a clearly defined exploration program prior to any significant exploration or ground disturbing activity, with approval by the EPA for Class A reserves. No developmental or productive mining was allowed on mining leases without approval of a mining proposal that described measures to safeguard the environment.

As a result of the co-operative approach engendered by the Resolution of Conflict Policy and subsequent Coalition Government Policy, a deadlock involving minimal access for mining and few new conservation reserves being created was overcome. Where 18 tenements on conservation reserves were granted in 1990, 91 tenements were approved in 1992. Largely as a consequence of the mining industry's acceptance of the policy, between July 1990 and June 1992 over 1,770,000 ha were added to the conservation reserve system.

The way was cleared for the development of the following mining operations:

- A 50 Mt pa iron ore mining project in Karijini National Park;
- A bentonite mine in Watheroo National Park;
- A small limestone mine in Neerabup National Park;

Coalition Government Policy

In February 1993 the Coalition Government was elected. As a consequence, a series of policy changes were introduced. The Coalition Government was of the opinion that exploration should be in keeping with requirements of the Mining Act rather than under a policy regime often at variance with the legislation. Thus exploration could occur within all national parks with the agreement of the Minister for the Environment and the Minister for Mines. Mineral exploration and mining in other conservation reserves would require the advice of the Minister for the Environment. Also, if an important mineral deposit was discovered, then mining could be permitted if both Houses of Parliament agreed following environmental assessment by the EPA. It was recognised that some parts of national parks were unique and would never be open to mining.

With this philosophy in mind a number of administrative procedures were developed to institute the Government's approach. The interdepartmental committee established to undertake this task included officers of the Departments of Minerals and Energy, Conservation and Land Management and Environmental Protection. The committee aimed to ensure that the policy was implemented while providing assurance to the community that exploration and mining were not going to degrade the conservation values of the reserve system. The procedures developed were endorsed by Government in December 1993.

The major requirement was for intending explorers on national parks or A Class nature reserves to provide details of their first year of exploration including environmental management activities. This information is provided to the NPNCA with an assessment by the Geological Survey Division about the prospectivity of the reserve and of the technical and environmental accepability of the proposed exploration program and its techniques.

In addition, the strict requirements previously placed on exploration in proposed reserves have been reduced with DME now being the focus for environmental management, rather than CALM or the Department of Environmental Protection.

Consolidation of two sets of conditions were also achieved so that the same conditions are now applied to both non reserved environmentally sensitive areas (e.g., mangroves or small rain forest patches) and on proposed reserves.

It was agreed that the grant of a mining lease on any conservation reserve other than State forest or timber reserve would have to follow the environmental assessment of a mining proposal. For proposed reserves, other environmentally sensitive areas and State forests/timber reserves, a mining lease can be granted without a mining proposal. However no productive mining can take place without environmental assessment of a proposal.

Previous accepted mechanisms such as Geoscientific Survey Authorities and the Minerals Environment Liaison Committee have been retained because they are highly effective. Geoscientific Survey Authorities allow non-ground disturbing exploration over reserved land without grant of a tenement, although the Minister for the Environment must still give his consent or recommendation. The Minerals Environment Liaison Committee meets approximately twice per year and provides an effective dialogue between the community, industry and Government.

The current processes for consultation with respect to the grant and operation of mining tenements on reserved and other environmentally sensitive lands are detailed in the DME Western Australia Information Series December 1994.

The first test of the Coalition Government's approach came soon after the election. Exploration was proposed that included the wilderness zone of the scenic and biologically valuable Fitzgerald River National Park. The intending explorer provided a proposal that included considerable vehicle use in the wilderness zone. The Geological Survey prepared a resource assessment that indicated the area was prospective for a number of minerals but the Government rejected the application in the public interest.

Since then exploration licences for a number of companies have been granted in the Rudall River National Park and a range of Class A nature reserves and other conservation reserves. One applicant for tenements in the Rudall River National Park did not convince Government that it could properly consider environmental management issues. As a result the application was rejected.

CALM Act 5(g) multiple use reserves are being established for the purpose of conservation and resource management to provide for CALM management while recognising the mineral sands, nickel or gold potential of the areas. Additional areas under consideration include important limestone resources. Areas of unvested Crown land can be managed by CALM and this approach is being considered for a biologically rich region highly prospective for nickel and gold.

Outcome of Current Policy

The mining industry has been pleased with the increased access and simplification of processes afforded by introduction of the Government's policy in 1993. Furthermore the conservation movement has noted that companies demonstrating good environmental practices are allowed to explore on conservation reserves. As a result the following outcomes have been achieved:

- Opening of national parks and Class A nature reserves to well managed exploration;
- The information provided to the NPNCA to allow it to properly consider exploration applications has been improved through the provision of mineral resource assessments;
- Simplification of standard conditions applied to exploration tenements on existing or proposed conservation reserves;
- Agreement to land tenure changes to facilitate heavy mineral sand mining within D'Entrecasteaux National Park, including addition to the park of adjacent private land; and
- The agreement by CALM to the grant of approximately 400 exploration and mining tenements on reserved land. Currently out of a total of over 19,000 granted Mining Act tenements, some 600 are on reserved land.

On the other hand the following gains were made to the conservation reserve system:

- A 700,000 ha increase in the CALM managed estate;
- Creation of two new national parks, one associated with the Shark Bay World Heritage Area;
- Considerable exploration has been conducted to allow rationalisation of iron ore tenements in Karijini National Park. 21,000 ha of land have been added to the national park, including the State's highest mountain, Mt Meharry; and
- In the climate of trust that has been established the opportunity has been created for CALM to look at more experimental approaches to the provision of management for conservation while providing access for mineral exploration and development.

As further national parks and A Class reserves are proposed, there will be a need for private enterprise and the Department of Minerals and Energy to develop more sophisticated means of assessing mineral resources.

From mid 1989 the conservation estate has progressively increased by over 1 240 000 ha to 19 million ha. Over the same period Mining Act tenements continued to be granted on these areas but there was a major increase in activity reflecting first the introduction of the Resolution of Conflict Policy in November 1990 and then the Coalition Government's policy in February 1993. This is demonstrated by the number of tenements granted on national parks and nature reserves with 169 granted in 1990; 22 in 1991; 83 in 1992; 99 in 1993; and 135 in 1994.

Conclusions

Mineral exploration and mining development are of major importance to the Western Australian economy. In addition conservation reserves are important in order to provide active and comprehensive management of the State's important native flora and fauna.

A series of mining proposals in national parks during the 1970's and early 1980's lead to the development of first the "Balancing the Scales" policy and subsequently the "Resolution of Conflict" and "Coalition Government" policies. As a result of the co-operative approach engendered by the latter two policies the way was cleared for mineral exploration and mining in conservation reserves and for major and ongoing additions to the conservation reserve system.

Acknowledgement

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PETROLEUM AND MINERAL EXPLORATION AND DEVELOPMENT IN MARINE CONSERVATION RESERVES IN WESTERN AUSTRALIA[1]

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Abstract: Petroleum production is of importance to the Western Australian economy earning almost $A 2.6 billion in 1993/94. Petroleum production is based on the principle of Crown ownership of all petroleum resources and the State provides the right of access for exploration and production of these resources. Through the 1970's and early 1980's public concern developed regarding the potential risks of petroleum exploration within and adjacent to the State's marine parks. A series of inquiries were held and policies developed between 1986 and 1994 resulting in a system that allows for both the protection of reserves and regulated petroleum access. This system in now being considered as a basis for mineral exploration access to the State's marine conservation reserves, particularly in relation to diamond exploration.

Additional Key Words: oil, gas, marine reserves, exploration, production.

Introduction

Petroleum production is a major contributor to the Western Australian Economy, earning $A 2.6 billion in 1993/94. The State currently produces almost 30 percent of the nation's petroleum products and is set to overtake Victoria as the largest petroleum producing state.

Western Australia is the main focus for petroleum exploration in Australia, attracting about half the total expenditure in recent years. The drilling success rate since the early 1980's has been maintained at an exceptionally high level as demonstrated by the continuing development of new fields. The major focus for production and exploration is the northern Carnarvon Basin offshore from the north west coast.

A range of shipping accidents around the Western Australian coast with associated oil spills as well as the publicity associated with shipping accidents elsewhere have resulted in the public being very concerned about the environmental effects of offshore petroleum exploration and development. This is despite the exemplary record of the industry, with no oil spills being of a size that would warrant reporting to the authorities. In fact only 800 barrels of oil have been spilt throughout Australia since exploration and production commenced.

These issues have lead to the development of a series of Government policies to attempt to address petroleum exploration access to marine conservation reserves.

This concern regarding offshore petroleum activities is also being transferred to new proposals for offshore mineral exploration.

Marine Conservation Reserves in Western Australia

Along the State's 12 500 km coastline there are currently six marine parks and one marine nature reserve with a combined area of 11 460 km^2. These are shown on Figure 1.

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