

PAPER FOR THE SECRETARIAT
CONVENTION ON BIOLOGICAL DIVERSITY

INCENTIVES FOR THE CONSERVATION OF
BIOLOGICAL DIVERSITY

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INCENTIVES FOR THE CONSERVATION OF BIOLOGICAL DIVERSITY IN AUSTRALIA

1.0 CONTEXT

At its third meeting held in Buenos Aires, Argentina from 4 to 15 November 1996, the Conference of Parties to the Convention on Biological Diversity resolved "that incentive measures shall be included as appropriate on the agenda and be integrated into the sectoral and thematic items under the medium-term programme of the Conference of Parties" (UNEP, 1997). This resolution supports the implementation of article 11, "the adoption of economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity" (UNEP, 1992).

The following information is provided to the Secretariat by Australia at its request as part of Australia's commitment under the Convention. Australia has an established commitment to the development of incentive mechanisms for the conservation of biological diversity, both on and off reserves. This commitment is backed by appropriate legislation and a range of initiatives which are outlined below. Documented case studies which demonstrate the use of incentive measures for biodiversity conservation form the second part of this paper.

2.0 INTRODUCTION

Australia is internationally recognised for its large number of endemic species, genera and families making it one of the most biologically diverse countries in the world. This level of endemism is the result of geographic isolation and climatic changes over long periods of time. Although not the most diverse country in the world in terms of numbers of species, Australia is distinguished by the possession of a highly unusual fauna and flora. It has higher levels of vertebrate endemism than any other country, consisting of 82 % of mammals, 42% of birds, 89% of reptiles and 93% of amphibian species. In addition, around 85% of higher plants are endemic (OECD, 1996). As the only developed nation in the world with such mega-diverse flora and fauna it also has the opportunity to develop a range of mechanisms to protect this diversity and to lead the way in the development of incentives to its conservation and sustainable use in socially sound ways.

It has become increasingly obvious that in order to protect biological diversity and meet its obligations under the Convention, a huge effort by Australian governments and the community will be necessary. Nor will the cost be insubstantial. The protected area reserve system, even if extended as anticipated, will not be adequate to protect the range of biological diversity values. Although many ecosystems are conserved within the protected area estate, others are not represented at all and only occur on privately owned or managed land. The protection of biodiversity in the marine environment presents its own particular problems.

The historical record in Australia reveals significant loss of species and ecological communities. Consequently Australia has a keen interest in developing and implementing a range of incentive mechanisms for the voluntary conservation of biological diversity on privately managed land, especially in, but not limited to, the agricultural and pastoral regions, and has already made some progress towards this end. It is also looking at a range of institutional changes that may have to take place in order to maximise the potential for the conservation of

biological diversity across all land tenures and within the marine environment. There is a recognition that these need to be socially acceptable and economically viable.

While the acquisition of land for national parks is a well established policy action, until recently little attention had been given to the effects of economic and other policies on biological diversity values.

3.0 LEGISLATIVE AND POLICY FRAMEWORKS.

The National Strategy for Ecologically Sustainable Development, Australia's commitment to Agenda 21, is a fundamental basis for all policy development. Within the context of this strategy, Australia will consider, amongst other things, options which develop economic instruments and other incentive arrangements which minimise government outlays and intervention and increase private sector participation in, and ownership of, conservation activity.

A National Strategy for the Conservation of Australia's Biological Diversity was signed by all Australian State and Territory governments in February, 1996. This follows priority given to biological diversity conservation and maintenance in the Inter-Governmental Agreement on Ecologically Sustainable Development encompassed in the Inter-governmental Agreement on the Environment. The National Strategy contains a number of actions and objectives relevant to the development of incentive mechanisms.

The Natural Heritage Trust is a new policy initiative being implemented by the Australian government over the next five years. Through the Trust biodiversity conservation and sustainable agriculture will be addressed in a positive and integrated way. Local communities will have the opportunity to participate in conservation by identifying sites for environmental action and applying for funding to conserve, protect, rehabilitate and better manage local areas. Within the context of regional strategies specially designed incentive packages will be developed in areas identified as having high conservation significance.

3.1 The National Vegetation Initiative

Under the Natural Heritage Trust a National Vegetation Initiative has been established. Some 500 million hectares, or more than two-thirds of Australia's land area, are currently managed by private landholders, while about 40 million hectares are within the terrestrial reserves system. Conservation of biodiversity through reserves alone is clearly inadequate. Biodiversity outside reserves has, for many years, been affected by vegetation clearance and modification. For large parts of Australia only scattered remnants of the original natural vegetation exist.

The Natural Heritage Trust, through its National Vegetation Initiative, will provide incentives for land users to conserve biodiversity outside the reserves system, in particular, by encouraging the sustainable management of remnant vegetation. This will involve innovative combinations of rate relief (working through local government), management agreements/covenants, direct subsidies for fencing and technical support to extend best practice management of bushland remnants.

Environment Australia and the Land and Water Resources Research and Development Corporation have commissioned CSIRO Australia's principle research institute to research and develop specific proposals to:

- make land management agreements more cost effective;
- facilitate making the costs of conserving remnant vegetation tax deductible;
- provide incentives for local government to protect remnant vegetation;
- make land tax and local government rating systems more supportive of conservation objectives; and
- encourage non government organisations to raise money needed to conserve remnant vegetation.

3.2 A National Reserve System

The National System of Reserves, which incorporates the protected area networks of each of the States and Territories, covers over 60 million hectares. Over 40 protected area designations are included within the system, and it includes protected areas ranging from small nature reserves to major National Parks. At present there are significant gaps in the existing reserves system, with important ecosystems not adequately represented.

The Commonwealth, with the support of the State and Territory nature conservation agencies, has developed a bioregional approach to the establishment of the National Reserve System (NRS). This is being used in planning the reservation of areas of highest priority, and ultimately in planning and establishing a comprehensive nationwide system of reserves. Scientifically based guidelines for prioritising additions to the NRS have been drafted and are expected to be finalised in 1997. The acquisition of land for inclusion in the National Reserve system is funded jointly by the Commonwealth and the States and Territories. The States and Territories undertake the acquisition and assume on going management responsibility for the new protected areas. Funds are being provided to State governments and community groups for the purchase of land to add to the reserve system. Land purchases will compliment other incentive mechanisms but are only likely to occur in special circumstances.

3.2.1 Partnerships with Indigenous landholders

The Australian Commonwealth, in consultation with indigenous organisations, is investigating the feasibility of establishing protected areas on lands owned by indigenous people. As several biogeographic regions across the nation cover largely or entirely indigenous owned lands, the achievement of a representative National System of Reserves is dependent on inclusion of some of these lands in the system. The Commonwealth seeks to achieve this through agreements with, and support for, indigenous land holders who choose to manage their lands in accordance with protected area guidelines. A variety of incentives, including capacity building, employment programs, cooperative research and the adoption of ethnobiological land management systems will be investigated.

Joint management arrangements with Aboriginal traditional owners are in place for three national parks - Booderee (previously known as Jervis Bay), Kakadu and Uluru-Kata Tjuta. Australia is recognised as a world leader in joint management of national parks with indigenous people. Kakadu and Uluru-Kata Tjuta National Parks are included on the World

Heritage list. Both parks have been awarded national and international recognition for management and visitor and cultural infrastructure.

3.2.2 Regional Forest Agreements

Governments have agreed to develop a comprehensive, adequate and representative forest

reserves system. Reserves will be established according to nationally agreed criteria, which will be applied flexibly to ensure optimal environmental, social and economic outcomes. The criteria are designed to preserve:

- 15 per cent of pre-1750 distribution of each forest ecosystem;
- at least 60 per cent of existing forest ecosystems that are recognised as vulnerable;
- all remaining occurrences of rare and endangered forest ecosystems;
- approximately 80 per cent of existing forest ecosystems identified as old growth;
- all viable occurrences of rare or depleted old growth within a forest ecosystem; and
- 90 per cent (or more if practicable) of high quality wilderness that meet minimum area requirements.

Reservation will be complimented by a plantation and farm forestry agenda which will play an expanding role in both timber production and revegetation. The National Forest Policy Statement and the Wood and Paper Industry Strategy promote continued development of a diverse, internationally competitive industry based on ecologically sustainable management practices.

The aim of the farm forestry programme is to encourage the incorporation of commercial tree growing and management into farming systems for the purpose of wood and non-wood production, increasing agricultural productivity and sustainable natural resource management. The Commonwealth is fostering a regional approach by working in partnership with the States, Territory, local government, industry and Landcare and community groups. Incentives will be provided to support extension, demonstration, education and training, information gathering and dissemination, planning and coordination, and practical research and development activities aimed at enhancing the uptake of farm forestry.

3.3 Feral Animals And Weeds

Feral animals and weeds have highly deleterious impacts on both agricultural production and nature conservation. Australia is developing best management practices to be implemented by a range of parties including government agencies and community and landholder groups. Weeds are one of the most widely distributed and diverse group of invasive species in Australia. Australia is committed to the implementation of a National Weed Strategy, endorsed in late 1996, and a National Feral Animal Control Strategy. A range of incentive measures from regulation to financial assistance are indicated within these strategies.

3.4 Endangered species

A range of other legislation to conserve biodiversity exists at both State and national levels, including endangered species legislation, land clearance legislation and fisheries management legislation. A strong legislative framework for vegetation and habitat conservation is

being developed, which clearly establishes the entitlements and obligations of land owners for the management of vegetation and endangered species. There is a strong trend towards clarifying the obligations of land managers to conserve biological diversity in order to protect endangered species.

A variety of incentives are available to landowners to improve endangered species and vegetation management. The highly successful Land for Wildlife program (case study 6) provides information and extension services to landowners enabling them to protect habitats. It is anticipated that land for wildlife properties will become part of a broader conservation effort on private land through the introduction of covenants and co-management agreements.

A unique project in north east Arnhem land combining traditional Aboriginal knowledge of sea turtles with modern science has been recognised internationally in a resolution passed by the International Congress of Chelonian Conservation (ICCC) at its recent meeting in France. Aimed at producing guidelines for the sustainable use of sea turtles, the project is a collaborative research effort between the Dhimurru Aboriginal Land Management Corporation, the North Australia Research Unit of the Australian National University, the Parks and Wildlife Commission of the Northern Territory and Environment Australia. (case study 3). In this case the incentive measures include capacity building, recognition of traditional knowledge, the development of cooperative partnerships and employment.

Community understanding and support, integral to threatened species conservation, is being encouraged through: networks, such as the Threatened Species Network, to facilitate information exchange and cooperation between government and the community; by producing and distributing educational materials; and by encouraging community involvement in recovery planning. The Natural Heritage Trust will provide enhanced funding to community groups as an incentive to encourage further initiatives to protect threatened and endangered species.

3.5 Oceans Policy

Australia is currently developing a comprehensive and integrated national policy for marine areas under its jurisdiction. The Australian Oceans Policy is being developed by the Commonwealth in partnership with State and Territory governments and in consultation with local government, environment, industry and more broadly-based groups within the Australian community. The Australian Oceans Policy will provide the strategic framework for planning, management and ecologically sustainable ocean use, including fisheries, shipping, oil and gas, and other seabed resources, while conserving the biological base and maintaining the underlying ocean ecosystem processes.

The consultation phase is focussing on an initial Consultation Paper and a series of commissioned papers on issues including, for example: indigenous interests, the conservation of marine biological diversity, integrated planning and management, best practice and incentive mechanisms.

A draft Policy is due for release in early 1998 as part of the process of wide consultation, with the final Australian Oceans Policy to be launched in July 1998.

4.0 Bioregional Frameworks

Bioregional Planning is an initiative receiving increased attention in Australia as a means of tackling a diminishing biological diversity resource. Consistent with the National Strategy on Ecologically Sustainable Development the concept stresses the incorporation of social, economic and biodiversity conservation factors in regional planning and management, and the involvement of all stakeholders in planning processes. The National Strategy for the Conservation of Australia's Biological Diversity acknowledges the underlying importance of bioregional planning and management to biodiversity conservation in Objective 1.2, "Manage biological diversity on a regional basis, using natural boundaries to facilitate the integration of conservation and production-oriented management (Commonwealth of Australia 1996)".

The National Landcare Project has pioneered the promotion and adoption of an integrated regional approach to project development and implementation, in which large scale projects encompassing a range of activities within an overarching strategic framework, are undertaken in a particular region. Incentives in the form of grants, extension services and strategic planning processes are provided to regional and local bodies. Examples include: the Mt Lofty Ranges Collaborative Catchment Projects; Eyre Peninsula of South Australia; and the South Coast Regional Initiative in Western Australia.

A more comprehensive example is that provided by the Murray-Darling Basin Commission, which is seeking to reverse land degradation and loss of agricultural productivity in a vast area covering some 1.1 million square kilometres of the continent. The area includes parts of four States, and all of the Australian Capital Territory. While it includes many ecosystems and thus would encompass far more than a bioregion, it is an important example of how large scale planning can involve all stakeholders, and address large environmental concerns. In recognition on the time lag between awareness raising exercises and action on the ground, the Murray Darling Basin Commission, was asked to recommend priorities for the provision of additional funds where public benefits were indicated. A paper was developed for discussion (Murray Darling Basin Commission 1996) discussing cost-sharing models which take into account free-market forces and the implications of polluter-pays and beneficiary-pays systems for management and restoration of the basin and identifying public benefits v's private benefits in cost-sharing equations. Market based incentives, such as increased production, tradeable water permits and penalties for non compliance with regulations designed to improve water quality were identified.

Other examples of regional and catchment management include the Great Barrier Reef Marine Park and the Wet Tropics areas of north Queensland where there is a significant gap between funds required to adequately manage these highly biodiverse World Heritage Areas and funds allocated. While both areas are centred on conservation reserves, they both must incorporate the demands of industries, including power generation and tourism, as well as include the active participation of indigenous and other local communities. A range of incentives from user-pays to regulation, and alternative energy system subsidies to industry licences are either used, or under discussion, as a means of protecting, or increasing funds for, the management of these areas.

New institutional frameworks have been established in recognition of the complexity of managing such large and diverse areas as the last three mentioned above. The learning processes of the management agencies

responsible have served as important tools to guide the development of bioregional planning.

5.0 THE FUTURE

As part of its commitment to Ecologically Sustainable Development which encompasses biodiversity objectives, Australia has an interest in developing policy on incentive measures for the conservation of biological diversity which will be cost effective and involve the whole community. The use of incentive mechanisms for environmental protection is seen as a practical means of implementing the principles of sustainable development. The most persuasive case for the use of incentives is the claim that they help to achieve environmental objectives at least cost to the community.

A wide range of options is available for consideration. These include the following:

5.1 Voluntary Programs

Voluntary programs are generally favoured over binding contractual arrangements or compensatory measures as a mechanism for conserving biological diversity on private land (Young 1996). These may occur with or without compensatory mechanisms for compliance. Voluntary arrangements can maximise the opportunities for off-reserve conservation using a range of economic and management incentives.

5.2 Community Action

Voluntary conservation groups and community-based organisations, of which there are many in Australia, are an important and cost effective means of promoting biodiversity conservation. A relatively small amount of resourcing for these groups often leads to a huge effort in conserving a resource. As well they provide an information and support function for individuals attempting to protect biodiversity. They provide a basis for attitudinal change and the adoption of an ethic for conserving nature on private land, an integral part of any efforts to introduce incentives to conserve biological diversity.

Extension officers have been attached to agricultural and conservation departments to advise on farm practises for many years. The very successful National Landcare Program has mobilised individuals and community groups across Australia in a multiplicity of programs whose aim is to arrest land degradation. These community groups are serviced with advice and networking capacity by extension officers employed both by government and community organisations. Recent initiatives such as Farming for the Future are now providing for extension officers specifically to advise on biodiversity conservation within a property management planning framework. The deployment of more biodiversity advisers at the community level is seen as a necessary component to the development of voluntary biodiversity incentive mechanisms.

5.3 Education and Capacity Building

The establishment of a National Biodiversity Education Program to parallel all stages of the implementation of the National Strategy for the Conservation of Australia's Biological Diversity would enable a broader understanding of biodiversity conservation in the community generally.

Education and awareness campaigns are considered an essential adjunct to incentive-based measures for biological diversity conservation. Voluntary programs, potentially one of the most efficient and cost

effective ways of conserving biodiversity, need to be underpinned by a high level of understanding and awareness. Evidence from a recent New South Wales study, indicates that only a small percentage of the Australian population has an understanding of biodiversity conservation at present. (NSW National Parks & Wildlife Service 1996) Because of this there are doubts that voluntary programs alone will produce positive results quickly enough to halt biodiversity loss.

5.4 Economic Instruments

In the last few years there has been greater support for using economic instruments to manage the environment. In part, this has been the result of broader policy initiatives based on international and national commitments, as well as an increasing realisation that economic instruments offer scope for achieving environmental objectives in more cost-effective ways than traditional command-and-control or regulatory mechanisms. Thus the use of economic instruments for environmental management may be seen as one way to achieve more efficient government, and to encourage environmental good practice while improving economic performance and international competitiveness.

5.5 Resource Planning

The establishment of a comprehensive, adequate, and representative system of protected areas for both terrestrial and marine environments is currently underway. A range of national strategies supported by intergovernmental agreements between national, State and local governments are under development with the possibility of purchasing lands which are required for the system. A bioregional approach may be essential to achieve the best outcomes for biodiversity conservation in this context.

5.6 Institutional Arrangements

New institutional arrangements may be required to improve the capacity particularly of regional governments to improve biodiversity conservation. Indications are that these should tend towards bioregional mechanisms for biodiversity conservation and an educational framework to support voluntary conservation initiatives.

5.7 Taxation Policy

Taxation Policy in Australia already provides incentives for land management activities and voluntary donations associated with conservation and the protection of remnant species. Possible additional incentives would include tax credits which could include fees and taxes paid to state and local governments and the removal of perverse incentives to biological diversity conservation.

5.8 Ownership and Use Rights.

Many management options for the sustainable use of natural resources hinge on the allocation of property rights. The separation of resource control rights from resource ownership often leads to the better protection of the biodiversity resource. This is particularly the case when communal ownership takes over from state ownership and is pertinent to lands held by indigenous groups. Tradeable and transferable rights to resources such as fishing and water are valuable commodities where limits are placed on the total use of a resource. However use rights may also contain disincentives to biodiversity conservation.

5.9 Legal Liabilities and Safe Minimum Standards

Legal liabilities operate as an incentive by encouraging compliance to prevent legal action. Where insurance premiums are attached to a no

claims bonus this may provide an additional incentive. However defining what are safe minimum standards and invoking the precautionary principle currently presents problems for resource managers.

5.10 Accreditation Schemes

Accreditation is used widely to establish the value of products in the market place. Schemes for green labelling, including labelling of products and services for their biodiversity value are being considered in Australia. Most notable of these are the labelling of timber products and ecotourism services.

5.11 User- and Polluter- pays Principle.

This is being used more widely to cover the cost of conserving biological diversity but could be expanded to cover many more uses. At present some States are charging fees for visits to national parks, governments issue licences for resource use, and polluters are being asked to pay the costs of repair to the environment. However the full costs of resource use, taking into account the environmental costs for loss of, or damage to, a biological resource are generally not recovered. Incentives which reward conservation of the resource could be applied in many instances.

5.12 Environment funds

A range of environmental funds are in existence with money put aside specifically for conservation purposes. These range from government funds eg the anticipated National Heritage Trust of Australia, funds which manage debt-for-conservation swaps and green investment funds managed by financial institutions. Funds which buy land for covenanting purposes are also developing.

5.13 Biodiversity Prospecting Contracts and the Commercialisation of Wildlife.

These provide a mechanism for countries and communities with a high biodiversity resource to benefit from this resource and from the traditional knowledge associated with its use. Therefore they provide an incentive for the protection of the genetic resource.

6.0 CONCLUSION

The biodiversity resources of the world form the basis of all life on earth. Australia, with a unique and relatively untapped biological resource, is in a pivotal position to contribute to the protection of this resource. Protection needs to occur at all three levels of ecosystem, species and genetic diversity. Impacts on the biodiversity resource are occurring as a result of government policy, community attitudes and individual actions although there are many positive examples of ecosystem repair through community and individual action as well as government intervention.

A range of incentives that positively influence the attitudes and motivations of people as well as recognise their desire for economic well being is required. Many of the options available to initiate a reversal of negative impacts on biodiversity and protect the resource are canvassed above. The choice of mechanisms and their successful implementation will depend on a range of circumstances including the state of local economies, the perceived importance of the resource and the will of both governments and communities.

CASE STUDY ONE

1.0 Land for Wildlife

Incentive - Voluntary Community Action

This case study has been derived from Platt S.J. and Ahern I. D., pages 300 - 310, Nature Conservation on private land in Victoria, Australia - the role of Land for Wildlife in Nature Conservation 4: The Role of Networks, Saunders, D.A., Craig, J.L. and Mattiske, E.M. eds, Surray Beatie & Sons 1995.

1.1 Overview

Land for Wildlife, a Victorian Government programme for conserving flora and fauna on private land, is a co-operative initiative between the Department Natural Resources and Environment and the Bird Observers Club of Australia (a community-based organisation). Land for Wildlife began in 1981 in response to the need to recognise the valuable contribution being made by some landholders to nature conservation on private land and was substantially upgraded in 1990.

There are two main thrusts to the programme. Firstly, there is Land for Wildlife property registration which caters for landholders who believe that they have a role to play and wish to be kept informed and encouraged. In this case, the registration scheme acts as a sort of club from which participating members can obtain information and continuing support. Secondly, there is the broader programme, which aims to assist landholders to find better solutions to management problems that involve protection and enhancement of wildlife habitat. Land for Wildlife seeks to encourage change in attitudes and promotes an ethic of conserving nature on private land.

1.2 Biodiversity Conservation Objectives

The programme aims to encourage and assist private landholders to integrate nature conservation with other uses of their property. Membership is entirely voluntary and instigated by the landholder. The legal status of the property is not altered in any way and registration is open to private and community-owned land. This means that bush blocks, parks, roadsides, cemeteries, school-grounds and golf-courses, as well as farms, can be considered for registration.

Each property applying for Land for Wildlife registration is assessed individually to determine eligibility and record property and habitat details. This is an opportunity for Land for Wildlife staff to offer advice on the property. Small blocks are not excluded but are judged for their ability to provide significant habitat. Registration is acknowledged by provision of a certificate and sign, both of which serve to advertise that the property supports the principles of the programme.

Land for Wildlife Group registration has recently been introduced to encourage co-operative endeavours involving a number of landholders at a landscape or catchment level. This concept provides a way for groups formed under Landcare (the umbrella government supported community programme for sustainable land use) to become involved in the programme, and to promote networks of vegetation and community management initiatives. This approach also offers an opportunity for small properties, which could only support limited habitat in isolation, to join together to achieve registration.

1.3 Incentive mechanisms

Land for Wildlife provides a structural framework, to support its many networks of land managers. This framework consists of a full-time statewide co-ordinator who provides policy and planning direction, ensures uniform standards, sets overall objectives, liaises with other groups and organisations at the state and interstate level, supports extension officers and develops monitoring and communication systems. It also includes a team of extension officers who coordinate the programme at a local level, have regular contact with landholders, actively build networks and are the first point of contact with the Department of Natural Resources and Environment for advice. These staff are the ambassadors of the programme, skilled in wildlife extension. Many are also privately involved in land management. They are a conduit between the policy-makers and landholders, recruited (wherever possible) from the community to ensure that the programme responds to the needs and practicalities of land-holders. Their role extends beyond property appraisal to seeking out information and ideas and recognising and solving management problems faced by land-holders. Most extension officers work on a part-time basis and several also work with related organisations and hence provide a link with those groups. A wide range of other staff and community volunteers assist with property assessment and liaison with land-holders. Their role is to offer support and encouragement to the landholder, provide advice on property and wildlife management, accurately record habitat occurrence and other property attributes, make recommendations regarding eligibility for registration under the programme and promote the principles of Land for Wildlife. Specialists, such as the department's Wildlife Damage Control Officer, participate in meetings of landholders and regularly contribute to the programme newsletter.

Property and habitat details are recorded on the Statewide Property Register database. In addition to record management, the database supports distribution of publications and analysis and monitoring of the performance of the programme. For example, mailing labels or reports can be generated for properties with particular attributes (same local government area, common habitat, etc.) enabling literature, such as advice of forthcoming meetings, training workshops, field days or assistance available to be circulated to relevant landholders. The Statewide Property Register is linked to the Department's Geographic Information System and Atlas of Victorian Wildlife. The Geographic Information System enables maps of Land for Wildlife property locations to be matched to land use, species location records, local government boundaries, cadastral maps, satellite imagery, wetland boundaries and other functions, all of which are constantly being upgraded and appended by other sections of the Department. The Atlas provides a computerised listing of wildlife distribution records.

Information is distributed via a low cost quarterly newsletter 'Land for Wildlife News', a series of Notes (that provide technical and management guidelines and essential background information), through meetings, field days, the media, and other publications of the Department and other organisations. Land for Wildlife offers free advice to all landholders who apply for registration, whether or not their property currently qualifies for full registration. The programme does not provide financial incentives of its own but offers advice on the assistance available elsewhere. A range of other services is offered to landholders including fauna lists and textbook discounts.

Land for Wildlife is not burdened with legal expenses or time-consuming property evaluations. A typical property assessment takes two hours and an induction package costing approximately \$13 is provided. The on-going cost of providing publications to a landholder is about \$5 per annum.

Equally important is the network that keeps staff informed. A staff mailing list, training sessions, bulletins and informal contacts ensure that staff across the department are included as an essential part of the Land for Wildlife network.

In addition to the standard registration and extension services, numerous discrete localised extension projects have been undertaken. Based on the advice of professional biologists, and in conjunction with planning staff, extension officers contact landholders, individually and in groups, in areas that have been identified as of high value to wildlife. These activities usually follow specific actions, identified in conservation programmes or species recovery plans, as relating to private land (e.g., Davidson and Chambers, undated).

1.4 Achievements

The experiences gained through implementation of the Land for Wildlife programme indicate that many landholders wish to contribute to nature conservation on private land in Victoria and many more appear likely to do so with encouragement, sound advice and support. Many landholders are attracted by a rural lifestyle, of which an important component is the natural environment. Landholders are becoming increasingly aware that the environment is intimately linked to their economic fortunes (Curtis *et al*, 1993). It is now well recognised that protection of remnant vegetation and revegetation are part of the solution required to achieve sustainable land use (Office of the Commissioner for the Environment, 1991). The rapid rise in Land for Wildlife registrations indicates that many landholders wish to conserve flora and fauna on their land. Hill (1980) found that of 2959 Victorian landholders sampled nearly half (45.6%) wanted more wildlife (mainly waterbirds) on their properties, a further 44.4% were happy with existing wildlife and less than 10% wanted less wildlife. Of 137 landholders resident in the Otway Ranges who responded to an agroforestry survey, 21% regarded flora and fauna protection as a valuable role of remnant vegetation (Anon., 1994). Overall, as of July 1997 there were 4,192 properties involved in the programme, on which 96,182 hectares have been identified by landholders as being managed for wildlife.

The challenge for nature conservation on private land is to identify ways in which people can benefit from a more ecologically sound approach to management of their land and to convey this vision, along with sufficient technical knowledge and practical skills, to the landholder. Support is also needed at a level sufficient to enable actions to be undertaken where financial or physical constraints would otherwise act as barriers.

By creating a network of private landholders, the Land for Wildlife programme has attempted to influence decision-making processes at a local level, involving those people who implement management actions. The need to integrate nature conservation goals with other management objectives has been stressed. As networks of landholders grow, so further opportunities develop, such as scope to work with groups. It is also intended to work with existing landholder groups to develop with them a vision for flora and fauna on their land. The programme currently has a proposal to develop a regional nature conservation strategy for

private land in conjunction with community groups in a Landcare Region and is working toward a pilot integrated project on a smaller scale.

1.5 Conclusion

Land for Wildlife, by supporting extensive networks, allows for exchange of information, reinforcement of attitudes, encouragement, pooling and efficient use of limited resources, teamwork and ownership. Networks of people have influence.

The Land for Wildlife programme has demonstrated its capacity to involve landholders, build new networks, focus upon habitats of conservation significance and be cost-effective. It may provide a suitable basis for a national approach to voluntary nature conservation on private land. Moreover, building on the success and recognition already gained by Land for Wildlife may have significant benefits for a national programme.

CASE STUDY TWO

2.0 Wet Tropics Case Study Summary

Incentive Mechanisms - Varied

This case study has been derived from Young M D, Gunningham N, Elix J, Lambert J, Howard B, Grabosky P and McCrone E, 1996, Reimbursing the Future. An Evaluation of motivational, voluntary, price-based, property-right, and regulatory incentives for the conservation of biodiversity. Department of Environment, Sport and Territories. Canberra ACT.

2.1. Overview

This case study of the potential for incentives to promote conservation of biodiversity specifically addresses the potential for Nature Based and Ecotourism (NBE) to act as an incentive for biodiversity conservation. The area considered is the Wet Tropics World Heritage Area (WHA) and surrounding terrestrial region in North Queensland. The Wet Tropics WHA covers approximately 9000 square kilometres and runs in a discontinuous band from north of Townsville almost to Cooktown. Most of the remaining tropical rainforest of this region is included in the Wet Tropics WHA, along with areas of adjacent wet sclerophyll forest and other vegetation assemblages (Wet Tropics Management Authority, 1992).

NBE can be defined as visits which focus on nature appreciation, and the infrastructure (park facilities, tours, accommodation, roads etc) which support these visits. NBE can be potentially both of assistance to, and a threat to, biodiversity conservation. The activity can be a threat where visitation of a sensitive area in an uncontrolled manner, results in trampling of vegetation, disturbance of wildlife or extraction of flora or fauna, or involves extensive clearing and pollution. On the other hand, NBE can be carefully sited, utilise site hardening and visitor control, and be based on carefully designed accommodation and infrastructure that minimises clearing and employs practices to minimise impacts of people. There will inevitably be some environmental impacts associated with even well planned and managed NBE in natural areas. However, with care and appropriate limits, these can be managed to be consistent with biodiversity conservation.

NBE can be a positive force for biodiversity conservation on public reserves and private lands when it provides: an income-producing land use on private lands, funds for management of public lands, a rationale for placing extra land in conservation reserves, or a vehicle to increase the appreciation and support of biodiversity values amongst visitors and the local community. NBE also may provide a beneficial role by educating the community about nature and providing some motivation for attitudinal change.

Two questions arise when considering the potential for NBE to provide a means of financing biodiversity conservation. For private lands, the questions is 'Can NBE provide a superior financial return and substitute for other land uses, or does it provide just an additional pressure to clear land?' The ability for NBE to provide an alternative will vary across sites in the region with varying demand for NBE facilities and varying suitability of particular land parcels for different uses. In areas such as north of the Daintree River where the tourism volume is high, substitution of NBE for grazing and horticulture is occurring. For public lands, the question is 'Can NBE deliver the financial means to

undertake management to neutralise the impacts of tourism on biodiversity, or even to fund more extensive works for biodiversity conservation?' In the Wet Tropics WHA to date, collected visitor fees have fallen short of the direct costs of management for tourism.

2.2 Biodiversity Status and Threats

The greatest threat to biodiversity conservation in the Wet Tropics region is probably clearing of native vegetation on private land. Agriculture, urban development and tourism which is not nature-based (eg golf courses), all require clearing of native vegetation whereas, by definition all forms of NBE, including accommodation establishments, rely on retaining natural vegetation to the greatest extent possible. Where NBE can provide a viable return on private land and an alternative to other land uses, clearing may be minimised. One unresolved issue however is the extent to which NBE contributes to general pressures on the natural environment of the region from population and services supported by NBE (its 'footprint'). These effects are likely to be removed from the NBE activity itself and difficult to identify.

Surrounding the Wet Tropics WHA, much of the land has been cleared for agriculture and urban uses (including tourism infrastructure). The region includes the cities of Cairns and Townsville plus numerous smaller urban settlements. Some areas of native vegetation remain, and some of these are important in the context of conservation of biodiversity in the region. Much of the remaining native vegetation outside the Wet Tropics WHA is in private ownership and currently this remains under threat from clearing. Potential exists for areas of cleared land that link existing areas of natural vegetation to contribute to biodiversity conservation if revegetated.

The Wet Tropics WHA is of outstanding biodiversity status. The area was inscribed onto the World Heritage List in 1988 in recognition of its international significance. The area is one of about twelve WHAs to meet all four natural heritage criteria for inclusion on the World Heritage List. The Wet Tropics is the only location for over 500 species of plants and 30 species of animals (plus unknown numbers of invertebrates) that are regarded as rare, vulnerable or endangered (Rainforest Conservation Society of Queensland, 1994)

Clearing constitutes the greatest direct threat to ecosystem diversity in the Wet Tropics region. It has been estimated that 30% to 50% of the vegetation extant at the time of European settlement of North Queensland has been cleared. Extensive clearing on the coastal lowlands has left only 20% of original vegetation, much in fragmented remnants (Winter *et al*, 1991). The other significant area of clearing was the Atherton Tablelands and the remaining rainforest is in small isolated patches. The majority of rainforest in the Wet Tropics region is protected in the Wet Tropics WHA. Conservation of rare and threatened species cannot be guaranteed however simply by reservation of the Wet Tropics WHA, for a number of reasons:

- more mobile species such as bats and birds range between the reserved area and areas under greater threat of habitat clearing and modification;
- important populations of some species lie outside the reserved area;
- threatening processes including feral animals, exotic plants, disease and fire can cross

reserve boundaries and the biological invaders are already established in the reserved area;

- some of the remnant areas of reserved forest are small fragments of the original vegetation cover and gene pools may not be sufficient for long term species viability;
- activities (including tourism) continue within the Wet Tropics WHA which may exacerbate threats to species and populations; and
- frog species are declining within the Wet Tropics WHA with no obvious cause.

2.3 Nature Based and Ecotourism

Tourism is a major economic activity in the Wet Tropics region. In 1992, tourism contributed 25% of both Gross Regional Product and employment in the Far North Queensland region (Horwarth and Horwarth, 1993). This region, centred on Cairns, has seen significant growth in tourist numbers and infrastructure over the last decade. Projections to the year 2001 are for a doubling in visitor nights over the 1992 level (National Centre for Studies in Travel and Tourism, 1993)

The Wet Tropics WHA is the location of 4.77 million visits to different sites for tourism (National Centre for Studies in Travel and Tourism, 1993) and recreation per year (Manidis Roberts, Consultants 1994). Around 50 companies offer regular tours, mainly day trips, to sites in the Wet Tropics WHA. People are also able to visit the Wet Tropics WHA as independent travellers by private car or hire car. This group of visitors includes local North Queensland people plus tourists visiting the region. There is virtually no commercial accommodation within the Wet Tropics WHA. Camping is allowed, but a number of camping areas are actually adjacent to but outside the WHA. The vast majority of visitors are accommodated outside the WHA, mostly in Cairns. Some accommodation establishments are located close to the Wet Tropics WHA, in the Daintree, Mission Beach and Atherton Tablelands areas. A number of these are promoted as 'ecotourism' facilities.

2.4 Existing Regulations, Incentive Instruments and Mixes

Within the Wet Tropics WHA, the regulatory environment is directed specifically towards the conservation of natural heritage values and thus towards biodiversity conservation. Strong regulatory measures include the prohibition of activities such as clearing of vegetation without permission*, and the taking of fauna. Within the boundaries of the WHA, lands have retained their pre-existing tenure.

The State Forests and Timber Reserves continue to be managed under the Forestry Act 1959 by the Queensland Department of Primary Industries Forest Service. As logging is prohibited in the Wet Tropics WHA, the focus of management is on multiple use, including recreation and tourism. The National Parks are managed by the Queensland Department of Environment ~~and Heritage~~ under the Nature Conservation Act 1992. There are 14 local authorities including two Aboriginal community councils with part of their area in the Wet Tropics WHA.

The Wet Tropics World Heritage Protection and Management Act 1993, a piece of Queensland legislation, establishes the objectives for the WHA and mechanisms to achieve them. Under the Act, the overall management of the Wet Tropics WHA is the responsibility of the Wet Tropics Management Authority. The Authority provides a structure for the coordination of all parties with an interest in the WHA. The Act allows for the participation in management by Aboriginal people 'particularly concerned with the land' through joint management agreements. No such agreements have been drawn up yet.

Management of tourism and recreation in the Wet Tropics WHA utilises a number of strategies. At the broadest level, it is expected that the Wet Tropics Management Plan will delineate the areas in which visitor user is permitted and is not permitted. The Plan will be complemented by more detailed Area Management Plans. A Wet Tropics Nature-based Tourism Strategy is currently under preparation also.

* not fully in force at present

Commercial tour operators are obliged under both the Forestry Act and the Nature Conservation Act to hold a permit to conduct commercial tours on Crown Land (except gazetted roads). The land management agencies use the permit system to require operators comply with standard conditions of operation and to set special conditions at certain sites or for certain types of operation.

Private visitors do not require a permit to visit most areas, except those specifically not managed for public visitation. Permits are required for camping. There are no limits placed on the number of private visitors allowed at any site, though limits are proposed by QDPI-FS at a number of sites (Hess, 1995). The provision of signs and interpretive displays are an important component of visitor management.

The Daintree Rescue Package (DRP) is a program of incentives specifically aimed at the conservation of biodiversity and the development of ecologically sustainable tourism in the area north of the Daintree River (Brannock Humphreys, 1993). The Daintree Rescue Package was formulated to address the potential for clearing of private land and to put the growing tourism industry on a sustainable basis. A significant proportion of the forested area north of the Daintree is in private ownership and was not included in the Wet Tropics WHA, although heritage values in the uncleared areas would generally support World Heritage Listing (Brannock Humphreys, 1993).

The DRP is nearing completion, the measures that relate to private land holders are entirely voluntary. There has been great interest in the buy back scheme.

The following statistics describe progress on land acquisition to 30 September 1997.

Properties on offer for sale	483
Properties prioritised for purchase	140
Completed evaluations	81

Properties under negotiation	1
Properties under contract	2
Properties purchased	74
Area purchased (approx.)	1375ha
Amount paid for purchased land	\$13,116,500

The DRP emphasises community support with the delivery of information via an extension program that employs a Cassowary Conservation Officer and a Rainforest Officer. The tourism infrastructure program aims to minimise impacts by providing adequate facilities and encouraging community support with the provision of recreation facilities for locals only.

The primary regulatory control over activities on private lands is through Local Authority planning schemes and regulations. Details of the planning schemes of each Local Authority are different, but in all cases the major tool for control over land use is zoning, accompanied by regulations. The attitudes and approaches of the Local Authorities towards clearing of land differs. At least one Local Authority has the ability to prevent vegetation clearing on private lands. Some Local Authorities are attempting to promote biodiversity conservation through incentive mechanisms. Encouragement of tourism as a land use providing for economic development and conservation is included in some of these approaches (see more detail later). Proactive conservation measures, including tree planting schemes, are practiced in a number of the Local Authority areas.

2.5 Preferred Mix of Incentives Preferred Mix of Incentives

The preferred mix of incentives for the Wet Tropics region should take account of the national and international significance of the biodiversity values in the region. Having a strong regulatory safety-net that underpins other policy opportunities is recommended. Once the Wet Tropics Management Plan has been endorsed this regulatory support will largely be in place for areas within the Wet Tropics WHA. Mechanisms exist to prevent clearing on private land if necessary.

Another priority is the generation of information, including vegetation and fauna audits and species recovery plans to determine what actions are most necessary to achieve biodiversity conservation. This information can be used to design a cost-effective approach to biodiversity conservation. The collection of policy opportunities designed to minimise clearing of private lands is based on the assumption that all native vegetation clearing is a threat to biodiversity.

This premise could be better informed with the type of information recommended above.

The FNQ 2010 Regional Environment Strategy identifies permit areas for biodiversity conservation outside the WTQWHA and provides recommendations for appropriate incentive mechanisms in this regard.

Opportunities for NBE to provide viable land use alternatives and the attractiveness of the schemes to individual land holders are likely to be variable. The uptake and effectiveness of these options for preventing clearing and encouraging stewardship of land is also likely

to be variable. It seems that where high priority for biodiversity conservation has been identified, as in the Daintree, targeted public funding (voluntary buy back, CMAs based on financial or material payments) will be the most effective means of ensuring the outcome desired. The various options described for Conservation Management Agreements are all worth pursuing. Those that do not rely on public funding (tradeable vegetation rights, increased development rights) could be a useful adjunct to publicly funded schemes. Provision of information to land holders via extension may be a cost-effective means of encouraging effective stewardship of private lands under native vegetation.

On public lands, such as those within the Wet Tropics WHA, the regulatory safety net is extended from reservation of lands to planning and setting limits on use. Within these limits, tradeable permits may provide security of access for tour operators and hence an incentive for stewardship of the area. A major benefit claimed from tradeable permits is economic efficiency but this can be only indirectly linked with incentives for biodiversity conservation. Funding of the management necessary to allow tourism to occur with minimal impact is essential for biodiversity conservation. Levying fees on visitors will contribute to funding and free up public funds for other aspects of biodiversity conservation. It is recommended that comprehensive visitor fees be introduced.

The financing of biodiversity conservation is an important issue both from the point of adequacy and equity. The international and national significance of the biodiversity of the Wet Tropics region calls for a significant amount of funding to be provided by the widely dispersed beneficiaries, not just the local community. Some funding is needed to be for actions that will benefit future generations. There is still an argument for the local community to fund actions that deliver economic benefits to the community, especially through NBE.

The argument for Commonwealth Government and State Government stewardship has been recognised in the Wet Tropics region through funding by the Commonwealth Government and the Queensland Government for management of the Wet Tropics WHA and the Daintree Rescue Package. This funding represents a significant injection of resources, but they are intended to be of limited duration. The initial funding for the Wet Tropics WHA included a large component for capital works and the annual appropriation is likely to reduce from next year. It may be necessary to find alternative sources of funds for management in the future and the NBE sector is a likely target.

All of the CMA options described provide tangible economic incentives for biodiversity conservation. Some require outside funding, either from the local community or higher levels of government. A greater ability to engage in NBE is one option provided by several of the incentive mechanisms described. This may be effective in reducing vegetation clearing in some, but not all, cases. The search for cost-effective means of promoting biodiversity conservation is important, measures such as research, extension and encouraging community involvement are a valuable part of any program for biodiversity conservation.

2.5 Conclusions

The Wet Tropics is indisputably an internationally and nationally important area having high biodiversity value. A major contribution to biodiversity conservation is the regulatory safety-net provided by the

declaration of the Wet Tropics WHA. The challenge for management of the WHA is to allow the benefits which flow to the community and to visitors from the NBE to continue and grow in a manner consistent with biodiversity conservation. There is potential to better harness NBE for biodiversity conservation by levying fees on visitors to pay for management.

The major threat to biodiversity conservation outside the Wet Tropics WHA has been identified as **clearing** and Commonwealth Government and Queensland Government funds are being made available for a program to reduce the potential for clearing. Other areas of private land within the region are also important for biodiversity conservation. Several mechanisms designed to provide effective incentives to private landholders to minimise clearing have been suggested where outside funds are likely to be limited. Opportunities to engage NBE are amongst the potential incentives, but NBE has been assessed as unlikely to provide an alternative in all cases. NBE itself can potentially threaten biodiversity values but with good design and operation, can be compatible with biodiversity conservation.

CASE STUDY THREE

3.0 Dhimurru Land Management Aboriginal Corporation.

Incentive mechanisms - Capacity Building, Cooperative Partnerships, Knowledge sharing

This case study has been derived from Gillespie D. and Cook P, 1997, Improving the Capacity of Indigenous people to Contribute to the Conservation of Biodiversity in Australia. (un published)

3.1 Overview

The Dhimurru Land Management Aboriginal Corporation (DLMAC) was formed by Yolngu landowners in 1992 in recognition of "an urgent need for planned and sustainable management of Yolngu land as the township of Nhulunbuy develops and visitor numbers increase". The mining town of Nhulunbuy was established in the late 1960s against the wishes of traditional owners, who are part of the Yolngu cultural bloc, occupying about 8500 sq km of North East Arnhem Land in Australia's Northern Territory. There are now about 3500 non-Aboriginal people in the Gove Peninsula area and about 1500 Yolngu at Nhulunbuy, Yirrkala, Gunyangara and associated outstations.

Threats to biodiversity developed with increased use and occupation of the area under Yolngu management. These included:

- increasing overuse and unauthorised use of areas of traditional estates made available for recreational activities;
- disturbance to sacred sites;
- severe localised damage in some areas including soil erosion, loss of vegetation, wildlife habitat interference, feral animal damage and pollution;
- an increasing perception that a minority of non-Aboriginal residents regard unrestricted access as a right and that all areas were available for recreational use;
- illegal fishing in estuarine and inshore waters.

Discussion of these issues, facilitated by the Northern Land Council led to the formation of Dhimurru. About 20 clans are now involved to varying degrees with Dhimurru which has broadened the scope of its operations considerably beyond its original focus on management of recreational areas.

3.2 Biodiversity Conservation Objectives

Implicit within the concept of management for biodiversity conservation is the prerequisite that management strategies be grounded in a relevant and sufficiently extensive body of ecological knowledge. The gathering, analysis, ownership and use of such ecological knowledge is increasingly acknowledged as no longer the exclusive preserve of practitioners of science based on evolutionary theory and Linnaean taxonomy. This trend is evidenced in growth of interest in the traditional ecological knowledge of indigenous peoples over the past 20 years (Baker and Mutitjulu Community 1992, Williams and Baines 1988) and the increasing incorporation of indigenous traditional land management practices by management services on reserve lands. This has been particularly evident in respect of fire where indigenous practice is perhaps most

widely integrated into annual cycles of fire management practice at Kakadu and Uluru National Parks.

Despite increased debate and practice in the field there still remains a general lack of understanding and trust between indigenous people and mainstream biological researchers. The discussion here proceeds from accepting as valid as a general principle the conclusion of Reid, Baker, Morton and Mutitjulu Community (1992) that "traditional knowledge plus ecological survey equals better land management". They assert that co-operative research between Anangu, the traditional caretakers of Uluru National Park and ecologists has yielded exciting discoveries, improvements in the management of the park's biota and greater cross-cultural understanding. However they caution that non-Aboriginal researchers still need to overcome obstacles to the transfer of information and resolve a few conflicting interests and beliefs.

Dhimurru operates on principles of Yolngu control and a community-based approach to planning, embracing a range of land and sea management considerations, including:

- traditional Yolngu approach to resource use and cultural landscape perceptions;
- sustainable and appropriate development of commercial operations;
- control of access to Yolngu estates;
- education and interpretation initiatives;
- environmental evaluation and monitoring;
- demands and provision for recreational use;
- endangered species and habitat protection;
- land rehabilitation and protection;
- feral animal and noxious weed control.

Dhimurru currently employs five full-time Yolngu Rangers, and two non-Aboriginal employees in full time administrative positions. There has been almost no turnover in Yolngu staff and the organisation is regularly approached by Yolngu seeking to work as Rangers. A formal Ranger training program for Yolngu Rangers started in 1993 and has utilised Batchelor College's community-based Associate Diploma of Applied Science (Natural and Cultural Resource Management) and on-site training from a Northern Territory Government Parks and Wildlife Commission (PWCNT) ranger. Dhimurru has now established a close working relationship with the Northern Territory University's Centre for Indigenous Natural and Cultural Resource Management, established in 1997.

In addition to training assistance, collaboration with the Northern Territory Parks and Wildlife Commission has provided Dhimurru with access to equipment and training facilities of the Territory Parks and Wildlife Commission, technical and scientific advice and assistance, including ethnobotanical, botanical, wildlife research, soil conservation and landcare assistance. Dhimurru received "valuable assistance" through the former Australian National Parks and Wildlife service, including funding from the culturalists and also advice on Ranger training, staff interchange arrangements and technical advice and assistance as well as support for research initiatives. Dhimurru describes CEPANCRM funding as having been "pivotal" in success achieved, in particular in resourcing consultation with Yolngu community elders during the organisation's establishment phase as well as specific on-ground projects.

Other supporting government agencies have included Commonwealth Bureau of Rural Resources, Commonwealth Department of Industry, Science and Tourism, Australian Heritage Commission, NT Department of Primary Industries and Fisheries (DPIF), and the NT Department of Lands, Planning and Environment. Dhimurru is strongly supported by the Miwatj ATSIC Regional Council and has strong working relationships with major Aboriginal organisations in the region as well as a continuing close working relationship with the Northern Land Council at the regional office level. The larger relationship with the NLC however involves questions of autonomy and jurisdiction which, according to Dhimurru, require ongoing dialogue and mediation. Dhimurru has received limited direct funding from Nabalco since 1994. In recent years traditional owners have provided critically needed funds from royalty payments to support Dhimurru.

Dhimurru is negotiating towards an agreement for "co-operative working arrangements" with the PWCNT which may be formalised utilising S.74 of the *Territory Parks and Wildlife Conservation Act*. Key aspects of the Dhimurru's approach to collaboration include:

- utilisation of an evolutionary or developmental model where the starting point is short term "trial" arrangements or 'phases' which can be advanced as collaborative practice is developed and confirmed;
- no 'lease back' or rental arrangements;
- to build on the work of Yolngu Rangers and the locally based PWCNT Senior District Ranger in developing a mutually acceptable form of interaction and working relationships;
- ongoing evaluation of the co-operative relationship.

Dhimurru believes that the establishment of co-operative working arrangements with NT Government and other agencies has the potential to provide a great deal of benefit to all parties. In nurturing the growth of these relationships Dhimurru stresses the need for acceptance by partners of Yolngu interpretations of the environment.

The latest internal annual review of Dhimurru policies and practice renewed a commitment to:

- continuing development of the Yolngu Ranger role so that it is distinctive and so that the role of the PWCNT Rangers within Dhimurru's jurisdiction is articulated in such a way that job and career structures are complementary and work activities are collaborative;
- the importance of traditional ecological knowledge (TEK) and its foundation role in contemporary, Aboriginal controlled, cultural and natural resource management;
- the need to effectively integrate traditional and scientific natural and cultural resource management strategies into a workable management regime; and
- the need for constructive, carefully negotiated partnerships with mainstream agencies which maintain and strengthen Yolngu autonomy and control.

3.3 Incentive Mechanisms

Set out below are some incentives which might be applied to encourage scientific researchers and government and research organisations particularly in the biological and resource use and planning fields to deal appropriately with indigenous people and to encourage positive collaboration.

- All relevant research funding programs should give priority to funding negotiations between researchers and indigenous communities in developing collaborative submissions.
- Evaluation criteria for research funding programs should provide bonus ratings for submissions which can demonstrate that there has been indigenous community involvement and support at the planning stage which has resulted in agreement on goals, fieldwork and steps for mutually acceptable review and use of the results of collaborative work.
- Conversely evaluation procedures for research programs should provide for reducing priority in respect of research projects for Aboriginal land which do not include indigenous participation at the planning stage
- While avoiding the creation of models, there is a need for a comprehensive analysis of parameters for collaborative research and for development of appropriate ethics, guidelines and protocols.
- Submissions for research on Aboriginal land should address in some detail relevant ethical considerations by the proponents.
- In project planning there should be a recognition that "marriages" don't always work out. Thus the first stage, (after planning), of a major collaborative project involving researchers and indigenous people who do not have a history of collaboration should be a discrete small scale collaborative interaction followed by evaluation by both parties before proceeding to a larger and more long-term or extensive phase. This would increase the rate of success for major projects by weeding out collaborations where, for various reasons, appropriate relationships don't develop and where the best course is to abandon the project or change personnel and/or location.
- Government should support the development of capacity within agencies which can act with experience and skill as facilitators in the planning phase of collaborative research as well as being available as independent mediators. Such agencies could include regional development organisations and land management units within Aboriginal Land Councils (such as Balkanu Cape York Development Corporation and the Northern Land Council's Caring for Country Unit) or Aboriginal Land Councils and academic institutions such as the Centre for Indigenous Natural and Cultural Resource Management at NTU and similar indigenous studies units within other Australian universities. Such agencies could be funded to assist the planning and negotiation stage of collaboration, supporting costs for both potential researchers and potential indigenous participants

3.4 Achievements: Dhimurru Turtle Project

The coastline managed by Dhimurru represents a significant breeding area for four species of marine turtle (Green, Flatback, Olive Ridley and Hawksbill) and is within the range of Loggerhead and Leatherback turtles. Working with (now) postdoctoral fellow at NTU, Dr Rod Kennett, Dhimurru has been engaged over the past 18 months in a project to:

- develop culturally appropriate methodologies for recording traditional and contemporary Yolngu knowledge of sea turtle distribution, biology, utilisation and cultural significance;
- develop culturally appropriate strategies for facilitating Yolngu participation in contemporary research and management;
- quantify turtle harvest by Yolngu;
- determine other threatening factors for turtles;

- enhance the available information on distribution and abundance of turtles in the region;
- foster an appreciation among mainstream resource researchers of the value of traditional ecological knowledge and the cultural contexts within which this knowledge is embedded.

All sea turtle species are of enormous cultural significance to Yolngu as well as being important subsistence resources. Particular groups of Yolngu have totemic and/or other affiliations with certain turtle species. Reference to turtles is encoded in Yolngu ceremony, song and art. Eggs of the locally nesting species are harvested and adults are hunted by boat and harpoon. Turtle meat is often shared with distant communities, reinforcing family and social links. Cultural significance is probably greater than economic or nutritional significance and little cash income is produced from turtle products.

In mid-1997 Dhimurru received widespread publicity on television for showing the effect on turtle mortality of sections of drift net and prawn net as well as some domestic and foreign flotsam and jetsam from fishing boats floating loose in the Arafura Sea. Yolngu hunters are participating in monitoring, through return of tags from hunted turtles and providing turtle heads for genetic analysis. The finding in East Arnhem Land of tags from turtles tagged in Western Australia has led to a visit of the four Dhimurru rangers to Broome, as a first step in fostering links between indigenous groups with an interest in sea turtle conservation. At landowners requests Dhimurru has closed areas of beach to vehicle traffic to protect nests and are using local public awareness campaigns to modify harvesting practice, including limiting or ceasing capture of adult females coming ashore at night to lay eggs. Some Yolngu have also adopted the practice of sparing a proportion of nests when collecting eggs. Dhimurru may in future encourage Yolngu to avoid the nests of endangered species, such as the Olive Ridley, and focus collection on more common species such as green and flatback turtles.

Dhimurru believes that local acceptance of harvesting constraints is enhanced by the fact that traditional owners "own" the organisation co-ordinating the turtle project which develops an environment of trust, active collaboration and responsiveness to management and sustainability issues.

3.5 Conclusion

Reasons for Dhimurru's success appear to include:

- Commitment to establishing collaborative working relationships with a wide variety of Government, non-Government, indigenous and non-indigenous bodies;
- Commitment to an "incremental" approach to development of institutional capacity within the organisation and to linkages with other organisations;
- Commitment to equity in wages and conditions for Yolngu staff;
- Commitment to linking the pace of institutional growth with extent and degree of community participation and recognition of useful tools to encourage community "ownership" (for example, locally produced, local language videos and printed material).
- Commitment to a balance between indigenous and non-indigenous concepts of wildlife management, which recognises the essential importance of both traditional ecological knowledge (TEK) and traditional spiritual relationships to species and habitats.

- Commitment to recognition of the traditional and statutory rights of landowners to be in charge of their country and of their right voluntarily participate, or not participate, in Dhimurru programs and rejection of "lease back' or rental arrangements for biodiversity conservation on Yolngu land.

This case study has been derived from Gillespie D. and Cook P, 1997, Improving the Capacity of Indigenous people to Contribute to the Conservation of Biodiversity in Australia. (un published)

CASE STUDY FOUR

4.0 Individual Transferable Quotas in the South East Fishery

Incentive Mechanism - Tradeable Quotas

This case study has been derived from Mobbs M, 1996, Regulating and Restoring Riparian & Aquatic Habitat in Australia, Department of Primary Industry and Energy, (unpublished)

4.1 Overview

The South East Fishery covers a wide range of commercial fish species, harvesting more than 90 species of finfish and invertebrates. The main species include blue grenadier, blue warehou, blue-eye trevalla, eastern gemfish, eastern school whiting, jackass morwong, john dory, ling, mirror dory, ocean perch, orange roughy, redfish, royal red prawn, silver trevally, spotted warehou, tiger flathead and western gemfish. Ten species account for more than 80 per cent of the catch and one species, orange roughy, provides one-third of the catch (Staples & Tilzey, 1995).

The main fishing method is demersal trawling, with Danish seining also occurring off Victoria. Other methods include drop-lining and gill-netting. The total recorded catch increased from the early 1980s - largely due to the significant increase in catches of orange roughy - reached a peak in 1990, and has continued to decline since.

4.2 Instrument Selection

Until 1992 the fishery was controlled mainly through restrictions on effort. In 1991, under the provisions of the Fisheries Act, the Minister for Primary Industries introduced the South East Fishery Individual Transferable Quota (ITQ) Management Plan 1991 (Commonwealth of Australia, 1991b), which changed the management focus from input controls to output controls in the fishery. The plan provided for total allowable catches and ITQs to be applied to trawl fishing. The scheme was amended in 1992 and discontinued at the end of 1992.

As from 1 January 1993, AFMA became responsible for managing the fishery under the provisions of the Fisheries Management Act 1991. AFMA has managed the fishery since then by means of administrative arrangements, which rely on the issue of permits under section 32 of the Fisheries Management Act. These permits function in the same way as ITQs. The conditions applying to the permits are defined in section 32(6) of the Act. Fees and levies are collected on permits, which include an application fee, an issue fee, a general boat levy, and a research and development levy.

A new management plan is currently being prepared for the fishery, to take effect in 1997. For species such as blue-eye trevalla, blue warehou and ling taken by non-trawl methods, total allowable catches and ITQs are expected to be introduced by 1 January 1998.

The reasons for introducing ITQs in the South East Fishery include: overfishing of certain species; inappropriate fishing methods; stock depletion; declining catches and decreasing profits in the industry. Earlier attempts to regulate the fishery, including a boat replacement policy, restrictions on the size of vessels, limitations on entry to the industry and various kinds of input controls, failed to prevent economic

deterioration of the industry and threatened stock depletion for some species.

4.3 Description of Instrument

ITQs are currently applicable to 16 species or species groups. Each fisher has been allocated a given number of quota units for each species, determined in accordance with a formula, taking into account the number of boat units (based on boat size and engine power) as well as recorded historical catches from 1985 to 1989. The total number of permits available to the South East Fishery in 1995 was 151, of which 29 were inactive. Quota units are transferable, subject to approval by the management authority.

The total number of quota units for each species is limited by its total allowable catch, which is determined annually for each species. Each quota unit represents 1 kilogram liveweight, but this is adjusted in proportion to any change that may be announced in the total allowable catch. Some of the quota species are caught by recreational fishers, but these are exempt from the quota system.

AFMA's management objectives in managing the South East Fishery are:

- to ensure that the resource is utilised in a manner consistent with the principles of ecologically sustainable development and to maximise the economic efficiency in the utilisation of resources;
 - to promote the rebuilding of depleted fish stocks and to promote the identification and development of additional or underutilised fish resources of the industry;
- to implement effective and efficient fisheries management on behalf of the Commonwealth.

The immediate objectives for the management of quota species are to ensure:

- the spawning biomass of specified species does not significantly decline below their 1994 level;
- the spawning biomass of specified species does not significantly decline below a percentage of biomass at the onset of significant commercial fishing;
- sufficient recruitment so the spawning biomass does not collapse; and
- the resources in the South East Fishery are utilised to their full economic potential.

4.4 Assessment Against Criteria for Evaluation

Although it is too early to assess the full effects of the new management regime, there are already signs of industry restructuring and improved profitability. Fishing effort has not altered greatly since 1986, but the efficiency of operations has increased.

Monitoring and stock assessment procedures have been improved in recent years, thus predictions of population dynamics should improve and lead to better management of the fishery.

Since the introduction of ITQs to the South East Fishery, there has been considerable restructuring of the orange roughy fleet, with a number of vessels leaving the fishery and others diversifying to fish the upper slope fishery. In assessing the effects of management systems on natural resources, the possible boundaries of effect should be taken into consideration in the design phase.

4.5 Concluding Evaluation

The system of ITQs applicable to the South East Fishery is potentially an effective and economically attractive method of controlling the catch and ensuring long-run sustainability of the resource. Economic efficiency appears to be improving in the industry as a consequence of the new management approach. Although total allowable catches/ITQs are relatively successful in the South East Fishery, the multi-species nature of the fishery makes it difficult to extend the system on a species basis. More novel approaches to managing species outside the quota system may need to be considered.

CASE STUDY FIVE

5.0 Control of fishing effort in the Northern Prawn Fishery

Incentive mechanism - Licensing

This case study has been derived from Mobbs M, 1996, Regulating and Restoring Riparian & Aquatic Habitat in Australia, Department of Primary Industry and Energy, (unpublished)

This case study has been included as a contrast to case study three "Individual Transferable Quotas in the South East Fishery" to demonstrate that the mechanism used 'control of inputs' has proved to be successful in reestablishing the sustainability of the Northern Prawn fishery whereas in case study three it proved to be unsuccessful in establishing sustainability.

5.1 Overview

The Northern Prawn Fishery operates in an area extending from Cape York Peninsula in the east to Cape Londonderry in the west, including the Gulf of Carpentaria. The main species caught include the banana prawn, tiger prawn and endeavour prawn.

The industry began in the mid-1960s, operating from the port of Karumba. Many of the boats entering the industry came from waters off east Queensland, following a decline in catches from that area. These boats were primarily small boats, described as 'wet boats'. They were constructed of wood and stored their catches in brine. Since then, new vessel types known as 'dry boats' have entered the industry. These boats are large freezer trawlers with a capacity for large catches and product storage.

Management controls were introduced by the Australia Fisheries Council in 1977. During the 1980s the Northern Fisheries Committee managed the fishery, with representatives from Queensland, Western Australia, the Northern Territory, the Commonwealth Government, the fishing industry and CSIRO Division of Fisheries and Oceanography. Since 1991 AFMA has managed it, with advice from the Northern Prawn Fishery Management Advisory Committee.

5.2 Instrument Selection

The Northern Prawn Fishery Management Plan 1995 was introduced in February 1995 under the provisions of the Fisheries Management Act 1991 (Haynes and Pascoe 1988). Pascoe (1988), Collins and Kloessing (1988), and Pascoe and Scott (1989) have described the operation of the management regime before 1991.

The primary focus for managing the fishery has been on fishing effort rather than on catch. Such an approach is common in fisheries, where it can be difficult to estimate stocks and enforce compliance with catch quotas. Conservation of the stock has not been considered to be a problem in managing the resource, as a range of management controls has been in place, such as seasonal restrictions and regulations governing gear and fishing methods.

5.3 Description of Instrument

The fishery is a limited entry fishery. Each boat operating in the industry requires a class B unit (bestowing the right to one class B unit) giving an entitlement to fish. The number of active licence entitlements has decreased from between 250 and 290 in the mid-1980s to 130 active vessels as a result of buy-back schemes introduced in the late 1980s and early 1990s, combined with a compulsory surrender of 30 per cent of units in 1993. An additional 10 licences were issued for a subsection of the fishery.

Class B licences failed to control the growth of fishing effort, as they did not allow for the increased size of vessels or for increased fishing power. It was estimated that the effective level of effort per unit of time more than doubled since 1979 and increased more than tenfold since 1970 (Buckworth, 1987). The average catch per unit effort remained constant in the mid-1980s, although it decreased for tiger prawns and increased for banana prawns (Collins & Kloessing, 1988).

To control fishing effort, it was decided to introduce additional controls, implemented through a system of class A units. Each class A unit is a measure of fishing effort, calculated as the sum of the engine power (in kilowatts) and hull size (in cubic metres of underdeck volume).

The average size of vessels in the industry increased to around 427 class A units in the 1980s. Boats are classified in terms of two main groups: those less than or equal to 375 class A units and those above this size. By the late 1980s the estimated capacity of the fleet was 100,000 class A units.

The main provision for reducing the fishing effort was through buy-back arrangements known as the Voluntary Adjustment Scheme. This scheme was initially funded with a grant of \$3 million by the Commonwealth Government, but was then funded entirely by the operators. It covered both class B and class A units. Once purchased through the Voluntary Adjustment Scheme, the units ceased to exist. Unit holders are also repaying the loan required to purchase units from the buy-back schemes, which was a total of approximately \$20 million in addition to the direct government grants.

To cover the costs of administration and compliance for the management system, each operator pays a levy according to the number of class A units held. The levy rate is lower for boats equal to or smaller than 375 class A units. Contributions to the scheme have been around \$4 million per year.

5.4 Assessment Against Criteria for Evaluation

The Voluntary Adjustment Scheme initially aimed to achieve a target of 70,000 class A units by 1993, a decrease of 46,000 units from the 1985 level. It also aimed to reduce the number of class B units to 160, representing a 40 per cent reduction.

Policy evaluations conducted with a linear programming model by the Australian Bureau of Agricultural and Resource Economics (ABARE) in the late 1980s indicated that the industry could earn a higher level of economic rent by reducing fishing effort below 70,000 units (Haynes & Pascoe, 1988). ABARE's model simulations revealed that the feasible range of values that maximises economic rent extends to quite a low level - 24,000 class A units in some simulations; 30,000 in other baseline simulations; and 19,000 in sensitivity analyses. The upper end

of the range of values extended to 48,000 units. The ABARE analyses indicated that an appropriate target to control fishing effort and increase economic rent in the industry would be 50,000 class A units.

AFMA made a policy decision in the early 1990s to cancel up to 30 per cent of class A units and reduce the number to around 50,000 units. This resulted in legal challenges by some operators in the industry, but the courts have upheld the decision as equitable.

There is strong support in the theoretical literature for this kind of policy action. Munro and Scott (1985, p. 624), for example, have stated that:

'If the authorities, i.e. the government, should intervene in the fishery to conserve the resource by imposing seasonal or yearly limits on the total harvest, but do nothing to restrict the number of fishers and vessels competing for the limited harvests, then excess capacity is almost certain to emerge in the fishery.'

The theory indicates that a significant reduction in fishing effort is generally required to restore resource rents in the industry. Furthermore, it is common for the level of effort required to achieve an economic optimum (that is, the maximisation of rent for the fishery as a whole) to be lower than the level of effort that results in the maximum biological sustained yield.

The application of models in the management of renewable resources such as fisheries is a complex task. The process involves conceptualising the problem to be addressed, identifying its main characteristics and management controls, formulating the mathematical specifications of the model, fitting the model to available empirical evidence, simulating the effects of management options, and interpreting the results for policy purposes. At each of these stages judgements are required.

Prediction of the optimal level of harvesting and fishing effort can depend on whether the underlying model is static (that is, repeats a given set of bioeconomic conditions) or dynamic (that is, takes into account changing conditions and required adaptations in management controls). Dynamic models of fisheries are largely confined to the theoretical literature. They are mathematically complex and are difficult to apply to real-world management problems. In practice, much greater reliance has been placed on static models.

The Haynes-Pascoe model is a static model. The theoretical principles underlying the model are widely accepted. Linear programming models have, furthermore, been widely applied in the management of natural resources, including fisheries.

One of the claims made against the Haynes-Pascoe analysis was that their modelling work did not specify probability distributions for costs within the industry and for other management variables such as yield-effort relationships. The management decision in relation to the Northern Prawn Fishery, however, involved uncertainty rather than risk in assessing the effect of restricting fishing effort on economic rent in the industry. 'Risk' in economic decisions is usually defined in conjunction with known probability distributions for the system variables. When uncertainty prevails, the probability distributions are unknown.

Uncertainty is endemic in nearly all natural resource management problems. Uncertainty in fisheries modelling can arise from several

sources. It may refer to ignorance about the variables to include in the model; to inadequate information about the parameters or functional forms determining the interrelations of variables in the model; and to limitations in the data concerning variables that affect the model's predictions, such as costs, prices, the technology of harvesting and the biological behaviour of the fishery.

There are several ways of dealing with the problem of uncertainty in natural resource and environmental management when the relevant probability distributions are unknown (Norton 1984; Dixon, James & Sherman 1989; OECD 1994). Haynes and Pascoe applied the technique of 'sensitivity analysis'.

An important factor taken into consideration in interpreting the results of the Haynes-Pascoe modelling work is the prospect of technological change in fishing methods, resulting in an increase in fishing power in the future. This is an additional source of uncertainty in interpreting the model results.

It suggests that, to maintain effective control over fishing effort in the future, the fleet size should be even smaller than that predicted by the model. The required compensation for this effect, in terms of reduced fleet size, is a matter of judgement, but the direction of required change in fleet size is clearly downward. This does not take into account additional input controls imposed by AFMA that are being used to restrict effort, including area and time closures, where the current fishery operates for just over six months of the year.

5.5 Concluding Evaluation

Use of restrictions on harvesting effort as a means of regulating the Northern Prawn Fishery has been well suited to the particular characteristics of the natural resource. In this case, where the level of economic rent earned by the industry rather than sustainability of the resource has been the major issue, it has been more effective to apply restrictions on inputs rather than on outputs of the industry.

The system of class B and class A units has enabled management authorities to control both the number and size of vessels. The case study provides an interesting example of how formal economic modelling, in this case the use of linear programming, can be used to facilitate the formulation of management targets. Uncertainties over the appropriate level of input control originally created some difficulties in achieving acceptance of the management policies by all operators in the industry, when the process was implemented in 1993. In 1996, industry acceptance and support for the approach is markedly different, with significant economic improvements resulting for both the fishery as a whole and individual operators.