ENVIRONMENTAL PROTECTION

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Western Australia

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Western Australia — an environment worth protection

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PREFACE

Working in environmental protection is exciting and rewarding; exciting because of the challenge of a new field and the breadth of topics; rewarding because of the chance to work with others to achieve goals which are mutually satisfactory, and because of the opportunity to make a difference.

Environmental protection has come of age. It is a comprehensive system to the professionals working in it. But though the environment is highly valued by the community, environmental protection has not been portrayed for the integrated package that it is.

This essay portrays the whole package; the big picture of environmental protection. It is written mainly for the newcomer to environmental protection, in the hope that it will be thought about, and even read again because some of it is demanding. But it is meant to help anybody wanting to come to grips with environmental protection.

It starts with the value statements of environmental protection; the ethic which underpins. It develops the principles of environmental protection that may apply around the world, and finishes with a description of the practices of environmental protection in Western Australia.

I thank my fellow members of the Environmental Protection Authority, the many academics, business people, and opinion leaders who provided advice and criticism, and the many colleagues who helped in the conception and production, especially Michelle Andrews and Robert Millhouse.

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Chapter 1

VALUES OF ENVIRONMENTAL PROTECTION

We have few simple texts on environmental protection. Most deal with its science rather than its philosophy. This essay explains the meaning of environmental protection, why we have it and how we achieve it.

Fundamentally, it is a simple concept and a simple process. Here, we explain how the values of society have led to the evolution of environmental protection. We then look at the principles of environmental protection — those universal beliefs which provide the foundation for achieving it. The values and principles may have some claim to global nature. Finally, this essay discusses some of the practices of environmental protection as they apply in Western Australia.

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We have created environmental protection. This generation. While reticulated sewerage and water supplies, and urban planning were developed by the ancient Romans in some of the earliest expressions of environmental protection, only now is the whole package coming together.

Compared with old disciplines like science, law, planning and economics, comprehensive environmental protection is very new, a product of the second half of this century. It has become a vibrant and coherent player on the stage of human activity.

First, and most important, environmental protection is based on values. Human values. Society values. Environmental protection is not a science like ecology; it is not absolute like physics or mathematics. It is a system created by people to satisfy human values. It has evolved to serve our wants and needs.

Societies embrace many different activities and processes that govern our daily lives — science, law, planning, and economics, to name a few. In law, for example, we have a human activity that is based heavily on written rules created by people. The rules stem from basic values like the rights of individuals, respect and protection for the rights of societies, and belief in the equality of all people in their rights before the law. These rights contain nothing that is absolutely right; they just happen to be values by which societies have chosen to live. Throughout the modern world, some societies choose different values, and so they have different systems of law. But they still have systems of law.

A value system for environmental protection needs to be clearly recognised and stated. But which value system do we use? We believe it must be one that captures the hopes and aspirations of most people:

> ***"Our world should be a good place in which to live, and to make a living, for all of us, and for our children and theirs."***

Many other value statements appear throughout this essay, but this is the major one.

Other people have expressed this value statement more eloquently. The World Conservation Strategy, in 1980 (using the word "conservation" in the same sense as we use "environmental protection"), said:

> *"Conservation (environmental protection) . . . is the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.*
>
> *". . . Conservation (environmental protection) and sustainable development are mutually dependent."*

The World Conservation Strategy — that critical cornerstone of environmental protection — talks about the management of human use, or what people do to

nature, rather than the management of nature. Perhaps this should be obvious where nature can look after itself; it is the use and misuse by people which requires management.

Various countries took the World Conservation Strategy as a basis for national strategies. For example, the 1984 Australian National Conservation Strategy said:

> *"Development and conservation (environmental protection) are but different expressions of the one process. Together they are the means of providing for the needs of the present and the future."*

In some countries, the targets for environmental strategies were regions or states. In 1987, the West Australian Conservation Strategy said:

> *". . . The community is a part of the environment which must continue to function as a healthy whole if we are to achieve a high quality of life that is sustainable."*

The primary value

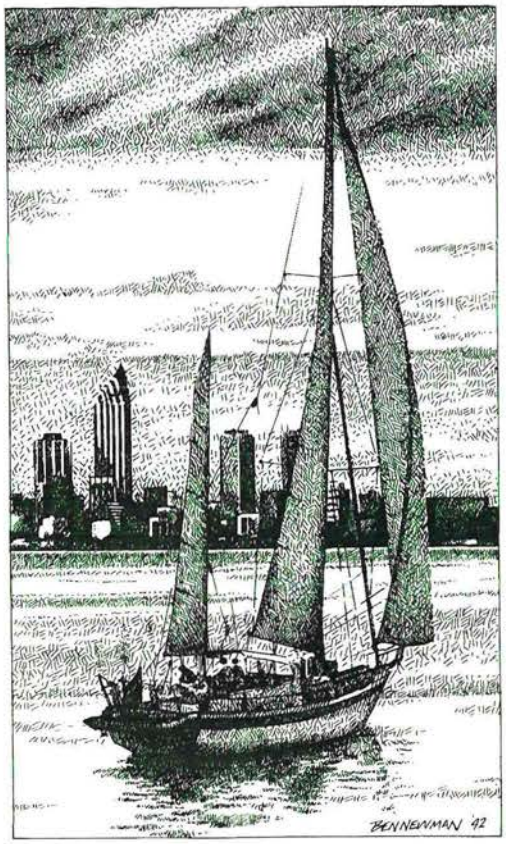
The value statements of the world, Australian and West Australian conservation strategies are similar. They mean that the world, Australia and Western Australia should be a good place in which to live and make a living, today and tomorrow. Put simply, and in a global context, the primary value of environmental protection is:

> ***Our world should be a good place in which to live, and to make a living, for all of us, and for our children and theirs.***

When Australia is the object for environmental protection, the primary value becomes:

> ***Australia should be a good place in which to live, and to make a living, for all of us, and for our children and theirs.***

Similarly, Western Australia becomes part of the primary value when environmental protection is put into a local context:



Western Australia should be a good place in which to live, and to make a living, for all of us, and for our children and theirs.

The international, national and state values are linked. Environmental protection unashamedly revolves around people's values, and people's values place importance on the environment. People's values also place importance on development. Acceptance of this fact is acceptance that environmental protection and sustainable development are linked and depend on each other. We cannot have one without the other.

And we do not suggest that people are more or less important than other life forms on earth. But, if environmental protection is about managing the effects of people on nature, then our focus must be on people's values.

It is imperative that we clearly recognise that everything which follows — no matter how scientific, rigorous, objective and dispassionate — is firmly based on the values we have adopted. The clear value statement — we want development and we want a good environment — is the strength of our system of environmental protection. It would be demeaning to shroud it in false objectivity. Sure — and to illustrate the point by example — economic arguments can be mounted for protecting whales from extinction. Arguments also can be mounted for protecting gene pools through protecting whales from extinction. But our values are the main

reason for protecting whales from extinction. We simply do not want whales to be extinct.

In another example, ecological arguments can be mounted for protecting 400-year-old karri trees. Arguments also are put in support of tourism, and perhaps species security, in maintaining a range of ages of karri trees. But, in deciding not to log these trees, we again are driven by our values. We simply feel better for having some mature karri trees. Our values do not necessarily imply that all whales should be protected, or that all mature karri trees should be left standing (though they do for some people). But our values imply clearly that these species must be maintained.

The secondary values

As well as the primary value of environmental protection, other values have evolved in societies around the world. Four secondary values are particularly important as fundamentals for environmental protection. These secondary values say that we expect:

- **2a. Some parts of the environment should be kept natural.**
- **2b. Animals and plants should be protected from extinction.**
- **2c. Productive capacity should be protected.**
- **2d. People should be able to live in a clean, healthy and safe environment.**

These statements contain nothing that is absolutely right. They just happen to be statements about the sort of world we want to have for us and our children. Some of the values may be held more dearly than others, and some people may have other values. What is important is that the system of environmental protection accommodates society's values.

For instance, people living in a polluted city may feel more strongly about breathing clean air than they may about ensuring parts of a forest are kept natural.

Whatever our individual priorities may be, these values may be categorised as general statements about our environment.

2a. Some parts of the environment should be kept natural

Some people want natural areas protected simply because these areas are natural. Others want them protected so they can visit and admire their natural beauty, natural experiences, or even enjoy the wilderness. Almost everywhere, people feel richer in just knowing they have natural areas set aside for protection. Some also feel richer if they can actually experience those natural areas.

To some people, natural means original, pristine, virgin. To others, it means living plant and animal systems which inspire in people the qualities of nature.

2b. Animals and plants should be protected from extinction

A driving force of the modern environment movement is a rejection of the notion that species of plants and animals are expendable. World-wide action has protected whales from extinction when it looked certain that the whaling industry would destroy some of the world's largest animals. Australians lament the loss of the Tasmanian Tiger, or thylacine, destroyed only this century. New Zealanders lament the loss of the flightless moa, and the world waits to see whether mountain gorillas will survive into the next century.

Arguments often are mounted for the protection of plants and gene pools so the option of using plants for human needs can be kept open. People also argue for the protection of living plants and animals because of their inherent value. Sometimes these arguments transcend the direct needs of humans. And this value should not be clouded by the extremes. Some extinction occurs in nature, as does evolution. Furthermore, few would mourn the extinction of the AIDS virus, or small pox.

A strange aspect of people's arguments against extinction is that some people feel richer for things they may never see; richer for knowing certain plants and animals are being protected from extinction. In the United States, thousands of people

gave money to protect the spotted owl from extinction, though most of them would never see it. In mainland Australia, and Tasmania, thousands protested against damming the Franklin River, though many would probably never see it. In Western Australia, the numbat — the state animal emblem — is rare and endangered. If it were lost, West Australians would feel poorer, though very few have ever seen one.

This value — that plants and animals should be protected from extinction — is very strong.

2c. Productive capacity should be protected

This simple value has been a source of confusion and conflict. Perhaps it has been over-simplified or over-complicated but all people believe that our children should inherit a world that has the capacity to produce. The production of our world depends on harvesting the resources which are renewed by nature, and controlling the use of resources which are not renewed.

In wanting to protect productive capacity, people believe that renewable resources such as soil, forests and fisheries should be used by this generation so they can be used equally by the next generation. In using renewable resources, we should aim at achieving sustainable development.

On the other hand, protection of productive capacity also involves non-renewable resources such as fossil fuels and minerals. In this regard, we should use them wisely, and not waste them in extraction or use.

2d. People should be able to live in a clean, healthy and safe environment

In some parts of the world, this value is taken for granted. In others, it is a distant dream. When people live and work in an unclean, unhealthy and unsafe environment, this value takes precedence over all other environmental values. Pollution in some parts of eastern Europe has caused disease and shortened lives. Dirty water supplies in early Australia caused illness and death and, in recent time, seawater pollution near Sydney has been unacceptable.

In some areas, risks to human safety from rare industrial events such as accidents may be more of an issue than the daily impact of industrial pollution. Although people are prepared to accept some risk from activities they choose themselves, they expect to be protected from risks imposed by others.

In these cases, where poor hygiene, health and safety directly threaten life, people expect protection. The aesthetic values of a pristine forest may have little relevance to them if the air they breathe is fouled by motor vehicles.

Summary

Comprehensive environmental protection is a product of this generation. It is based on the values of our society. These values are:

- **1. Our world should be a good place in which to live, and to make a living, for all of us, and for our children and theirs.**
- **2a. Some parts of the environment should be kept natural.**
- **2b. Animals and plants should be protected from extinction.**
- **2c. Productive capacity should be protected.**
- **2d. People should be able to live in a clean, healthy and safe environment.**

Chapter 2

PRINCIPLES OF ENVIRONMENTAL PROTECTION

Every facet of our human endeavour is based on some value system. Having established a set of values for environmental protection, the next step is more definitive. It is a step which establishes principles to give tangible form to our values.

Environmental principles are critical for making environmental protection work. They are the building blocks which lead to effective environmental protection. Environmental principles have a universal nature and apply across a wide range of cultures and societies. The four basic principles of environmental protection are:

- **1. Conservation through reserves**
- **2. Protection through management**
- **3. Wise use of natural resources**
- **4. Protection of people**

1. Conservation through reserves

Conservation through reserves satisfies the normal public expectation of environmental protection. It means that areas are chosen to be set aside as reserves and managed so that their values are protected. The primary land use in these areas is conservation, or environmental protection. Conservation reserves take many forms and may include national parks which are areas of superior natural beauty that are managed so they may be used by people; nature reserves which are managed to ensure the protection of plants and animals; forest reserves which are managed to protect forests and ensure the wise use of timber resources, and public

open space which includes a mix of natural plants and animals and facilities for people, such as playgrounds.

Generally, reserves are chosen for their natural values, and managed so that these natural values are maintained or enhanced. Other activities may be allowed inside those conservation reserves, but only where they do not significantly detract from the primary objective of conservation.

Conservation through reserves may, at one extreme, be preservation. At the other extreme, it may be management of a living ecosystem.

The methods of selecting conservation reserves varies around the world. Some conservation reserves are chosen because the environment is special. For example, they may have tall forests, rare and attractive animals, or great scenic beauty. In other areas, selection is based on protecting particular ecosystems, such as coastal heaths, open woodlands, or deserts. Hence, conservation reserves may be chosen because they are special, or because they are representative of particular ecosystems. The size of conservation reserves depends on the nature of the ecosystem, and the nature of the surrounding land use.

Conservation through reserves satisfies our value statements that "parts of the environment should be kept natural" and that "animals and plants should be protected from extinction". Importantly, conservation through reserves ensures that all of the ecosystem within reserves is protected.

Conservation through reserves is accepted as the most secure form of protection of bio-diversity. This security is based on the "whole" of a particular area being reserved. This does not imply that we know all there is to know about managing

any particular part of this system; nor that we know what is there, nor the importance of any particular part. But it does imply that any part of the whole system which is reserved will be protected for all people for all time.

Well-known systems of conservation through reserves include the Yellowstone National Park in the United States where areas have been set aside to protect natural and scenic values for the enjoyment of millions of people. On the great plains of Africa, conservation through reserves is applied to the homeland of vast herds of grazing animals. In Australia, conservation through reserves protects the high plains of the Snowy Mountains, the wet forests of Tasmania, and the conservation reserves of the jarrah and karri forests of Western Australia's South-West. In each case, the principle of conservation through reserves means that significant areas within the whole ecosystem are protected and managed in their entirety. And, in each case, the primary objective of any land use is conservation or environmental protection.

2. Protection through management

Protection through management is a more diffuse principle than conservation through reserves. It applies where the major goal of an area is not environmental protection, but some other land use. The manner in which the primary land use is managed results in environmental protection.

The principle of protection through management contains many variations of which three are more obvious examples.

Protection through management includes protection through economic management. In this principle, economic parameters are set so those who protect the environment get an economic advantage. Polluter pays — where those who cause pollution must pay to correct the impact — or user pays — where the users of environmental resources pay according to their use of that environment — are well recognised subjects of protection through economic management. In recent time, some societies have developed more sophisticated variations, including

tradability and rental of rights to emit to the environment. (But it should be noted that while the economic management of rights to emit may provide an environmental benefit, an environmental case cannot be argued for rights to pollute).

A second example of protection through management is protection through management and monitoring. In this example, development or land use is designed to protect the environment, based on knowledge or specific research. The development's impact is then monitored and, where necessary, the development is modified so the impact is adjusted to be within the environment's capacity to cope.

Environmental impact assessment is a key component of this example of protection through management because it requires developers to describe their projects, the environmental impact the projects might have, and how they intend to manage that impact so the environment is protected.

A third example is protection through management for conservation. This means that particular parts of the environment are managed to achieve conservation objectives while some other land use is the primary objective. Production forestry may be managed to protect habitat for particular animals, or to protect environments for particular plants. Agricultural production also may be compatible with a conservation objective. For example, a small grove of rare plants may be protected without creating a conservation reserve. This managed protection may simply mean limiting the time or intensity of grazing on natural pasture so the rare plants are protected from over-feeding by cattle. It also is possible to manage extensive grazing areas so the habitat of birds of prey like eagles and hawks is protected. All that may be needed is the protection of small areas so the birds can nest or that they be protected from shooting or poisoning.

In these examples, the conservation objective — protecting rare plants and animals — and the economic objective — grazing cattle for food or harvesting trees — are both satisfied without the need for conservation reserves. Protection through management allows conservation and production where both aims are important, and where society finds it difficult to choose between the two.

Protection through management in its various forms satisfies several of the values of environmental protection. It supports the primary value of protecting the world in which we live, while we make a living. It also may support the values that animals and plants should be protected from extinction and that we should use and protect productive capacity. Protection through management may be important in managing for a clean, healthy and safe environment.

3. Wise use of natural resources

The wise use of natural resources is a principle based on a recognition that conservative and wise use of natural resources will protect the rights of future generations, and also may be critical to the well-being of the natural environment.

"Wise use" is better left with broad definition. It refers to the wisdom of the primary value of environmental protection, and it acknowledges people and the natural environment, today and for future generations.

"Wise use" may relate to consumption. Some parts of modern society use resources excessively. Some people use too much water, fuel, packaging, and raw materials, and they generate too much waste. In this sense of wise use, the re-use or recycling of reusable material is important.

"Wise use" goes beyond avoiding excessive waste from industry or private consumers. "Wise use" means that productive activity should not generate waste

which cannot be assimilated by the environment. It means that ozone-depleting substances, such as chlorofluorocarbons, should not be released, and that greenhouse gases should be minimised. It means that plants and factories should be designed so that the generation of intractable waste is minimised or eliminated.

"Wise use" may mean that scarce, high-quality land for agriculture or mining should be protected against other land development, such as urban expansion, industrial parks or transport corridors, when this development can occur elsewhere.

In the mining and timber industries, "wise use" means that production is planned so society may use the whole of the available economic resource. This principle means that natural resources should not be "high graded" to include only the best timber or highest quality mineral. If only the best part of the resource is taken, the lower grade ore or timber is left, wasted because it cannot be economically retrieved.

Where the resource is renewable, or replenished in time, wise use of natural resources includes sustainable development, meaning that renewable resources should not be used faster than they are replaced. Hence, productive forests should not be harvested faster than they can re-grow; farms should be managed so their potential for production remains year after year; commercial fisheries should not be fished so their potential for yield is diminished; and natural pastures should not be grazed to such an extent that the grazing potential or the stability of the soil and plants is lost.

Wise use of natural resources is a principle which supports the primary environmental value that "our world should be a good place in which to live, and to make a living, for all of us, and for our children and theirs". It also directly supports the value that "productive capacity should be protected".

4. Protection of people

Protection of people is a principle which recognises that quality of life depends heavily on the environment close to people. To many people, modern environmental protection had its roots in the desire to protect people from the

impact of a hostile environment in crowded cities and towns. Even before modern medicine, great progress was made in human health through simple environmental engineering, such as separating sewage from drinking water sources. Cleaner water supplies and organised sewage management have improved public health and reduced the incidence of diseases such as cholera and typhoid. Some parts of the world have never been heavily polluted by airborne industrial waste. But some cities are still emerging from the era of dirty air.

Protection of people recognises that people want to live in an environment with clean air and clean water. People also expect noise in which it is comfortable to work, live and sleep.

Modern industry with modern technology has little reason to continue daily emissions which pollute, and pollution which has caused concern in some modern industries has not occurred daily. It has resulted from rare incidents which may have had extreme consequences. World-wide attention to risks and hazards has been alerted by a major gas explosion in Mexico City, a major chemical accident at Bhopal in India, and a major nuclear accident at Chernobyl in Ukraine. Today, people expect, as a principle, to be protected from risk from accidents in industry.

Summary

The building blocks of environmental protection are principles which give a tangible form to the higher beliefs, or values, of the sort of world we want. These principles, which apply everywhere, are crucial to protecting the environment. They are:

- **1. Conservation through reserves**
- **2. Protection through management**
- **3. Wise use of natural resources**
- **4. Protection of people**

Chapter 3

PRACTICES OF ENVIRONMENTAL PROTECTION

IN WESTERN AUSTRALIA

We talk about values and principles in a universal sense; to a greater or lesser extent they apply everywhere. But practices are more specific to different places. The practices of environmental protection have evolved to best fit the local culture. We will describe the practices of environmental protection in Western Australia, which is regarded as having an advanced system.

Environmental protection has clear, systematic links between environmental values, principles and practices. The values of environmental protection embody the sort of world we want. From these values flow principles to guide us in ensuring that our values have meaning. And from principles flow practices which help us to achieve our primary aim — protection of our environment.

The practices of environmental protection are the daily, visible tasks of people charged with protecting the environment, whether they be bureaucrats or developers, politicians or the public. The practices are what we do to protect the environment.

In making environmental protection work, the first practice is to develop policies which implement the principles of environmental protection. These are policies to conserve parts of the environment through reserves, to protect parts through management, to use natural resources wisely, and to protect people. These policies are a **direct** implementation of the principles.

The second practice is the evaluation of new projects through environmental impact assessment so they may be designed and managed to protect the environment. The third environmental practice is environmental management, including pollution control, so existing development does not adversely or

significantly affect the environment. The second and third practices are **indirect** methods of implementing principles.

Environmental policies make people aware of what needs to be done when they are planning new projects. Developed through consultation with government, developers, conservationists and the community, environmental policies provide clear guidelines to society about environmental protection. Good policies send clear messages to everybody involved in environmental protection about what is acceptable development and environmental protection.

Likewise, the practice of environmental impact assessment of new projects and the controlling of pollution from existing projects provide opportunities to reinforce the principles of environmental protection. Each activity or development is considered within the framework of the values, principles and practices of environmental protection.

Intelligent and informed decisions can be made about the sort of environment we want through an integrated package of environmental policies, environmental impact assessment, and environmental management. In this way, each part of the environmental protection system reinforces the other.

In a diagrammatic sense, the system of intermeshing principles and practices can be illustrated as two gear wheels with intermeshing cogs (please see **Figure 1** on the next page). With each project, the practices reinforce the principles in a way which is structured to make the most of environment and development opportunities.

In summary, the practices of environmental protection in Western Australia are:

- **1. Environmental policies**
- **2. Environmental impact assessment**
- **3. Environmental management**

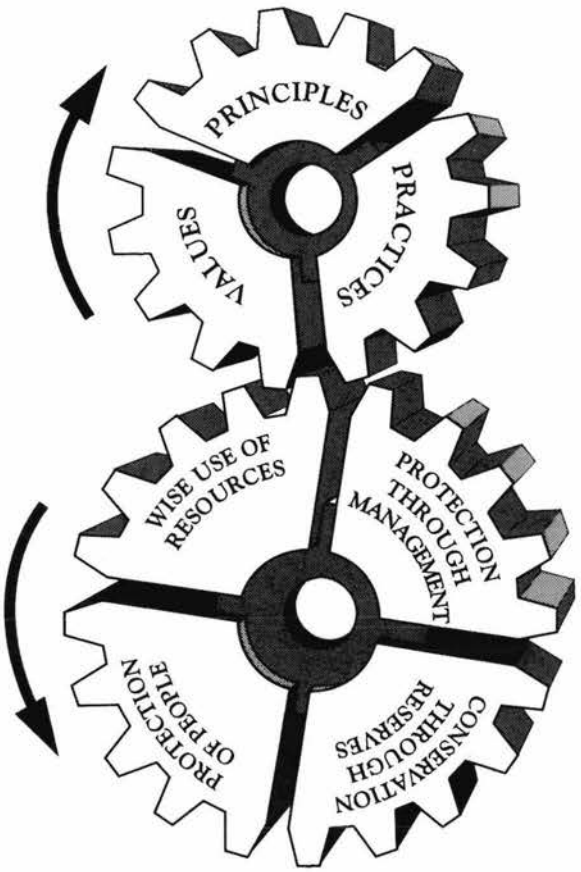


Figure 1: Environmental protection: A system in which values, principles and practices reinforce each other to conserve and protect parts of the environment through reserves or through management, using resources wisely and protecting people.

1. Environmental policies

Environmental policies are direct methods of implementing the four principles of environmental protection — conservation through reserves, protection through management, wise use of natural resources and protection of people. Policies are used to choose and implement conservation reserves. Indeed, in most parts of the world, the first and most fundamental practice of environmental protection is the formation of policies for conservation reserves.

The second use of environmental policies is in protection through management. For example, specific or rare species may be chosen for protection; laws may be imposed to limit the impact of development on selected plants and animals, or land-use plans may guide development away from sensitive areas. In another example of environmental policies in protection through management, policies are designed to impose economic incentives and disincentives to encourage environmental protection.

Environmental policies often help to implement the third principle of environmental protection — the wise use of natural resources. Throughout the world, people are striving to use fossil fuels more efficiently. They also are demanding of governments better policies for improved domestic and industrial recycling and for the most efficient use of resources such as minerals and timber. The importance of policies for sustainable development continues to grow, especially as the world has realised the fragility of forests and farms which have been over-exploited. Some policies are being implemented now to ensure sustainable forestry, fisheries and farming.

Finally, environmental policies can be used as a tool to protect the environment in which people live. In some parts of the world, policies to protect the environment in which people live are paramount. For example, environmental policies which set standards for air and water quality, and acceptable noise and industrial risk are priorities in heavily populated areas such as cities. As a general rule, legal methods support the implementation of policies to protect the environment in which people live. Examples include noise abatement laws, government standards for air quality, and licences for industries which have a potential to cause pollution.

Environmental policies at work

Two examples from Western Australia — the South-West forests and the groundwater of the Swan Coastal Plain — illustrate environmental policies at work.

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The application of environmental policies to forest management in forests of the South-West is shown in **Figure 2** on the next page. The forests have a secure system of conservation through reserves. These reserves — called national parks, nature reserves or conservation parks — have been chosen to protect native animals and plants, particularly jarrah and karri forests. The reserves, which protect natural areas or habitats, ensure the survival of these species. The reserves represent about 17 per cent of the remaining South-West forests. They have security of tenure and purpose, and require decisions of Parliament to change this security. Security of management is provided by a dedicated government agency (the Department of Conservation and Land Management) with public accountability through the National Parks and Nature Conservation Authority. The southern forests also have a system of road, river and stream reserves of more than 72,000 hectares which have security under the Environmental Protection Act. The road, river and stream reserves are another system of conservation through reserves, although they contain elements of protection through management.

The forests have several examples of environmental policies that lead to protection through management. Rare plants and animals have been identified and several management plans protect them. For example, a policy controls the picking of wildflowers throughout most of the forests. This has saved many attractive plants which otherwise would be vulnerable to exploitation. In some parts of the forest-logging operation, certain trees must be left standing as refuges for animals like birds and possums.

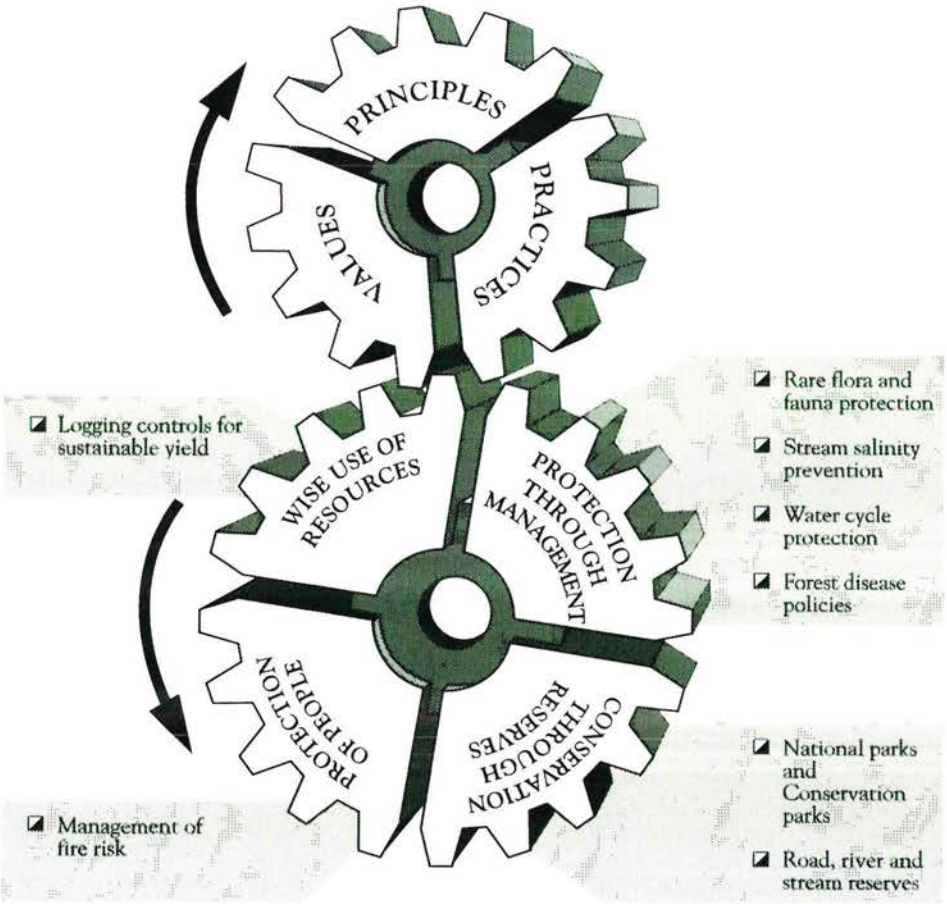

Figure 2: Environmental policies to protect forests in Western Australia reinforce the values, principles and practices of environmental protection. In the process, reserves are created, rare plants and animals are protected, logging controls help to ensure sustainable yield and fire risk is managed.

Protection through management also has been achieved through policies to protect forest streams from salt through rising groundwater tables in areas which have heavy salt concentrations deep in the soil. In these areas, logging is limited to individual trees or groups of trees of 10 hectares or less, thus limiting the amount

of forest cleared at any one time. Furthermore, fire management and forest care in the immediate years after logging are planned to optimise forest regrowth. These methods of protection through management mean that the forest can recover from logging before rising water tables affect the salinity of streams. The policy of protecting forest streams from salt also helps to ensure clean water for human consumption.

Wise resource use in forests is achieved through policies for sustainable harvesting. Only in recent years have policies changed so the rate of taking trees has slowed to that approaching the rate at which forests regrow. For example, the estimated growth rate of jarrah and karri forests in 1990 was about 1.6 million cubic metres a year, yet only 1.4 million cubic metres was expected to be harvested.

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The application of environmental protection policies to the protection of the groundwater of the Swan Coastal Plain in Western Australia is shown in **Figure 3** on the next page. The Swan Coastal Plain, with Perth at its centre, contains huge groundwater reserves covered with sandy soil. The groundwater is an almost continuous sheet, intersected by several rivers and estuaries. It is recharged annually by winter rain, and gradually flows towards the rivers and the ocean. At low parts in the landscape, the groundwater is visible as lakes and wetlands.

The groundwater is pumped to supply half of Perth's water demand. It is used for drinking and to irrigate domestic gardens and commercial crops. It supplies industry and public parks. Apart from direct use by people, the groundwater's most important function is in the open waterbodies — lakes and wetlands — for

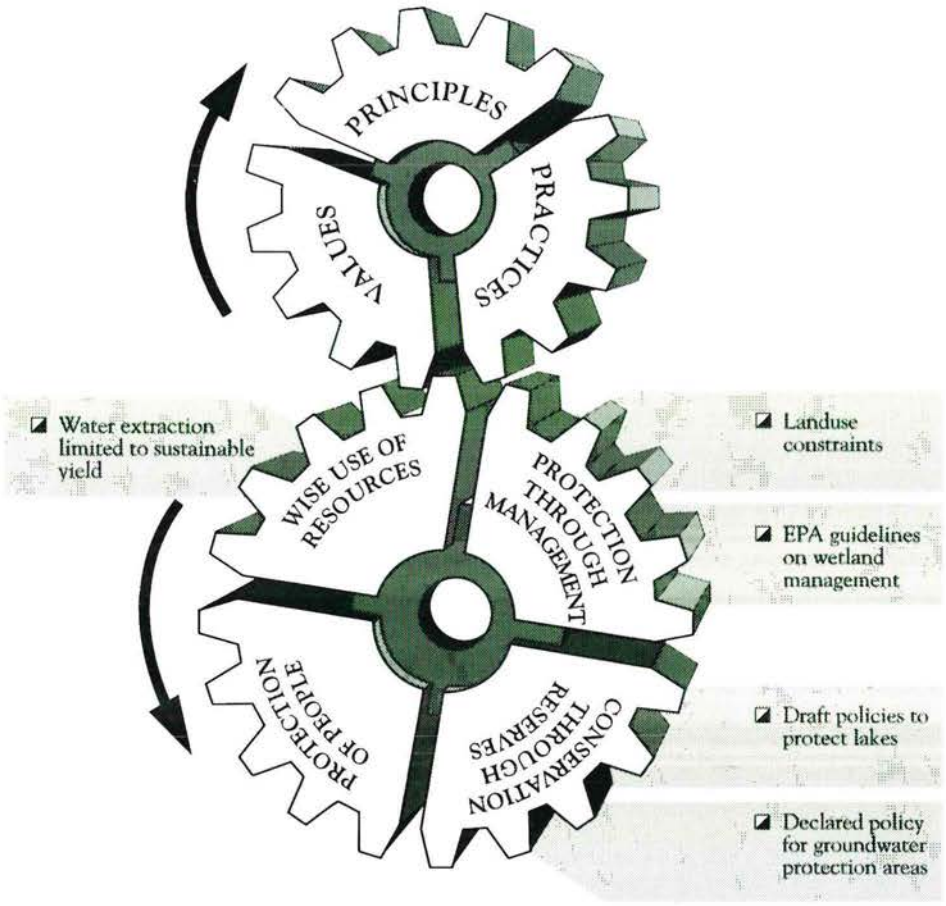


Figure 3: Environmental policies to protect groundwater on the Swan Coastal Plain reinforce the values, principles and practices of environmental protection. In the process, lakes are set aside for protection, land use is managed and water use controls help to achieve sustainable yield.

water birds and other aquatic animals. About three-quarters of lakes on the Swan Coastal Plain have been lost through draining or filling in 150 years since European settlement. Many also have been affected by unnatural levels of excess nutrients, leading to algae growth.

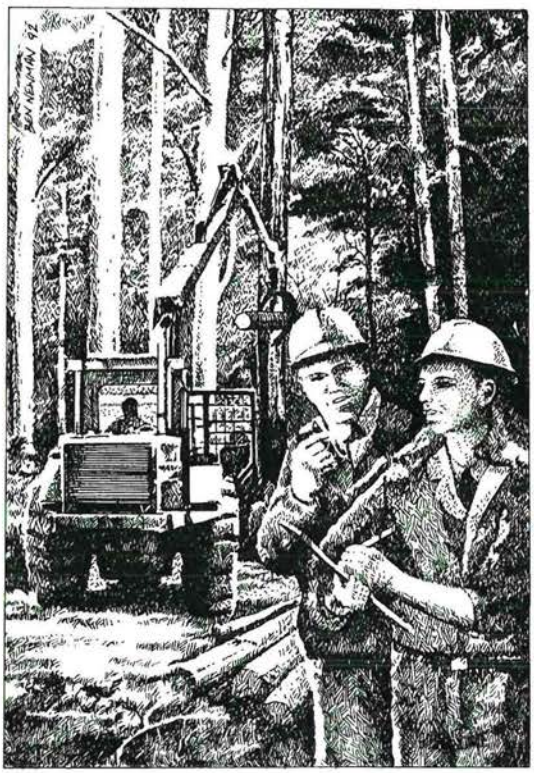
Until recently, policies to conserve lakes have been piecemeal. The remaining lakes of the Swan Coastal Plain have survived because people have not wanted them for development or they have needed them for drainage areas or rubbish tips. In a few cases, they have survived because the surrounding land has been reserved for parks or other forms of recreation. Over recent years, the scarcity of lakes and changing values about their environmental importance have been big incentives for saving the remaining lakes. In 1991, for example, the West Australian Government approved an interim regulation to prevent draining or filling of lakes, pending the finalisation of an Environmental Protection Policy. After 1992, it is proposed to implement a policy that any lake larger than 1000 square metres in the first week of summer shall be protected forever from filling or draining. This, effectively, is a policy for conservation through reserves, although it contains elements of protection through management.

Western Australia also has policies to protect groundwater on the Swan Coastal Plain from over-use in the major recharge areas where environmental conditions, which have been set under the Environmental Protection Act, prohibit water abstraction beyond the effective annual recharge rate. These are a form of policy for wise use of resources. The policy also protects the water supply for future generations. Policies covering land use also direct potentially polluting activity away from major groundwater recharge areas. In this way, people can expect a clean, fresh water supply. These policies are for protection through management.

2. Environmental impact assessment

Environmental impact assessment has evolved during the past 25 years. It started with a wide community expectation that protection of the environment should be considered before new projects were built. It was a realisation that protecting the environment by attempting to fix damage after it was done was ineffective and inordinately expensive. Environmental impact assessment has now evolved into a sophisticated process, critical to implementing and reinforcing the principles of environmental protection.

Environmental impact assessment of new development is systematic in that each new project is considered within the framework of the values, principles and practices of environmental protection. Each new development which might affect the environment is assessed individually. Projects are considered on their merits, and within a context set by the environment. As a result of the individual consideration of many separate projects, the cumulative protection of the environment is ensured.



Environmental impact assessment is designed to protect the environment from the impact of new development. Before new projects are built, developers are required to determine what they want to develop, what the environmental impact could be, and then to design and manage the project so the impact can be contained or avoided.

It is hard to see environmental impact assessment as a process which determines only a fair balance between development and

environmental protection. The balance between them has been determined largely before the process starts; society expects generally to have both development and environment. Instead, the process is aimed at resolving questions of "how to" develop projects rather than to say "yes" or "no" to development. Of course, issues of balance occur at the margins, and a very few projects are so poorly designed, or the environment is so fragile, that environmentally acceptable development is impossible.

In most parts of the world, environmental impact assessment has a wide scope to consider protection of most aspects of the environment — people, air, water, land, natural ecosystems and artificial systems. But this wide scope is usually balanced by a very narrow power. In most cases, the process produces only recommendations, with the power to decide and impose conditions properly vested with elected governments with a charter wider than environmental protection.

Environmental impact assessment is most effective within a system of values. It also must recognise that society expects development and environmental protection. It must recognise the balance between scope and power. And, importantly, it must recognise the expectations of the many people in the process.

Expectations and the West Australian system

The West Australian system of environmental impact assessment well illustrates the expectation of stakeholders. This system, which has evolved since 1970, is now enshrined in the Environmental Protection Act of 1986. It has taken the better components of systems from elsewhere, and has some highlights of its own. The system has evolved through vigorous and wide debate over many years. It is a system of the stakeholders. It has not been imposed on them.

The main stakeholders are: the proponents or developers of new projects; the people who may feel immediately affected by new projects; the general, interested public at large; the assessing agency or the Environmental Protection Authority;

and the State Government. In each case where projects have the potential to affect the environment, the environment is the major player.

Developers

Developers have four expectations. First, they expect to have the right to design and manage their own projects and to be able to use their own expertise, skills and experience. This right does not exist in environmental impact assessment systems which impose designs and prescribe management plans on developers.

The second expectation concerns methods of control. Developers expect the regulatory authorities to set objectives for ambient environmental quality, rather than emission or "end-of-pipe" standards. This expectation means that developers can adapt designs and management intelligently so that production is optimised within the limits of protection of the environment.

Third, developers expect decisions to be made by elected governments which, in turn, are expected to take account of variables other than environmental protection. This means that regulatory authorities should not be the ultimate decision makers, nor that law courts should make final decisions on environmental protection.

Fourth, developers expect timely decisions. Importantly, they expect decisions to be made in a reasonable time.

Governments

Governments have four expectations of environmental protection. First, they expect public discussion about development to occur before they make a decision. This is different from the old model of "decide and defend" where the public discussion occurs after the decision. Public discussion before decisions has evolved because public ownership and knowledge of environmental protection is now high. People also have a more sophisticated and intelligent approach to environmental decision making.

Second, governments expect environmental impact assessment to provide them with sound and informed advice before they make environmental decisions. This implies a need for the relevant issues of environmental protection to be identified, and for the environmental advice to be of high quality and able to withstand scrutiny.

Third, governments expect that environmental decisions should be made by the Minister for the Environment. This is in line with the system of ministerial accountability in government, where it is expected, for example, that the Minister for Mines will be accountable for mining, or the Treasurer will be accountable for budgets. This expectation, too, is relatively recent, and in some out-moded legislation, the Minister for the Environment has neither power nor accountability for government decisions on the environment.

Fourth, governments expect that all relevant government decision makers should be involved in final environmental decisions. In practice, this means that ministers responsible for development — for example, mining, construction, development, forests, fisheries and water supply — need an avenue for comment and dispute resolution to the Minister for the Environment. The appropriate avenue for resolution of ministerial dispute is Cabinet.

People

People have expectations in two different ways. First, they expect a process that has integrity. Second, they expect a clean environment.

Expectations of integrity in environmental impact assessment start with a desire for the process to be overseen by an agency that is independent of developers, decision makers, governments, and groups which represent particular views or interests. In this way, credibility of the process is accepted and the role of developers and decision makers is credible.

People also expect environmental impact assessment to be open to the public. They expect to be told about proposed development which may affect the

environment. They further expect to be informed about proposed development; to be given enough clear information to establish an informed position; and to have a say on proposed development before governments make decisions.

The public may not expect to make final decisions. But they do expect to have a say before governments decide, and they expect the process to take enough time for their views to be heard.

People who live in an environment which may be affected by new projects expect environmental impact assessment to protect their clean environment. They expect clean air and clean water, and they expect protection from unacceptable noise and freedom from industrial risk. They expect that environmental impact assessment should consider the cumulative impact of all development so their environment stays clean.

Environmental impact assessment in Western Australia

In Western Australia, environmental impact assessment begins when developers decide that they want to build a new project. If developers think that their proposals may affect the environment, then proposals are referred to the Environmental Protection Authority. Proposals also may be referred by Government agencies or the general public. Referral at this early stage allows protection of the environment to be considered as an integral part of development rather than as an add-on after all other decisions have been made.

The Environmental Protection Authority determines the level of assessment for new proposals. For most projects, no formal assessment is necessary. Instead,

advice is given to help developers and other decision makers to protect the environment. If the Authority decides that the potential environmental impact of projects is significant, or that the environmental issues are of such public interest, or that they need formal government decisions, then formal environmental impact assessment is required.

In Western Australia, a formal environmental impact assessment is known as an environmental review. The term "review" implies that the interest is more than an assessment of whether proposals are acceptable. It also entails a review of how the environment will be protected. Environmental management plans and commitments to environmental protection are an integral part of environmental reviews.

The most important players in environmental impact assessment are developers. In line with modern expectation, developers do most of the work and bear most of the costs. Developers are required to design their proposals so that the environment is protected. They must demonstrate how the environment will be protected. In a nutshell, developers are required to prepare proposals which simply state what they propose to develop, how the environment may be affected, and, finally, how they expect to plan and manage their projects so that the environment is protected.

The public is told about projects, through newspaper advertisements placed by the Environmental Protection Authority, when proposals are first referred for assessment. The public is informed about projects through detailed information supplied by developers in their environmental reviews presented to the Environmental Protection Authority and made available to the public. The public then may comment on proposals during the public review of the developers' documents. These comments are considered by the Authority and the developers, and, as a result, projects often are modified to better protect the environment. After the public review, the Authority publicly reports its recommendations to the Government through the Minister for the Environment. The public may appeal against the Authority's reports and recommendations.

The process is interactive and maximises the scope for all issues to be covered before the Minister makes final decisions. Developers are required by the Environmental Protection Authority to go through the environmental impact assessment process. The Authority also helps them to go through the process. The public are guaranteed a say in projects and they are guaranteed a hearing before the Authority reports to the Government.

The Government, through the Minister for the Environment, is obliged to publicly release Environmental Protection Authority reports. The Minister determines appeals against reports, and then consults other ministers who may have decision-making roles with projects. For example, the Minister may need to consult the Minister for Mines over a mining development or the Minister for Water Resources for a new dam. After this consultation, the Minister for the Environment then sets legally binding environmental conditions which govern the environmental performance of new proposals. In rare circumstances where no way can be found to protect the environment from the impact of a new development, the Environmental Protection Authority may recommend, and the Minister may decide, that the proposal is environmentally unacceptable and it may not proceed.

The assessment of projects is thus based on the framework of the values, principles and practices of environmental protection. Each new development is considered systematically, and it follows that intelligent and informed decisions are made within a framework of society's expectations.

Success of environmental impact assessment

Environmental impact assessment succeeds because it meets the expectations of stakeholders, it demonstrates protection of the environment and it allows development. It reinforces all of the values of environmental protection and it recognises and uses its principles.

The process meets the expectations of developers. They design and manage their own projects. They get environmental conditions, based mainly on their own

commitments which control environmental impact rather than set levels for "end-of-pipe" industrial emissions. Decisions to proceed or not to proceed, and decisions on environmental conditions, are made by elected governments and timely decisions are not impeded by subsequent referrals to law courts.

Environmental impact assessment meets the expectations of governments which get public input before decisions are made. Governments receive sound and informed advice from the Environmental Protection Authority before the Minister for the Environment makes the environmental decisions. Input from all relevant government decision makers is effective, and locked in as a formal requirement of the process.

The system also succeeds because the stakeholders' expectations of the process are met and society's expectations of the environment are met. The process is overseen by an independent agency, the Environmental Protection Authority. People are told about development, they are informed about it, and they have a say on it before decisions are made. Often, public input promotes modifications which improve projects. The process provides legally enforceable conditions which ensure clean air, water, soil, acceptable noise and freedom from industrial risk.

An important factor in the success of environmental impact assessment in Western Australia is the honesty and openness of the process. The public is provided with all relevant information, and the public issues are addressed before decisions are made. The courts or judicial systems are not needed for decisions because these are made publicly by elected governments.

3. Environmental management

The values and principles of environmental protection are made to work through the environmental management of existing projects and activities. Environmental management has many categories, including:

- **a. management of land for conservation, including land set aside for conservation through reserves;**

- **b. rehabilitation of disturbed land, including rehabilitation after mining. This rehabilitation is designed to replace a land use that was present before disturbance, or even create a new land use chosen by society;**

- **c. environmental management of existing industry so emissions or waste do not damage the environment; and**

- **d. pollution control.**

The first three topics are sufficiently broad to warrant their own discussion elsewhere but it is sufficient in this essay to discuss pollution control as an illustration of environmental management as reinforcement of values and principles.

Pollution control is an historic name. If we were coining a title today, we would call it pollution prevention. Pollution is not acceptable today, and should therefore not be controlled, but prevented.

Pollution is not acceptable in Western Australia. This does not mean that pollution does not occur. It means that it is unacceptable when it does. This is a direct derivation of the value that people should be able to live in a clean, healthy and safe environment. It also embodies society's demands for clean air and water, and protection from unacceptable noise and freedom from industrial risk.

Pollution is an unacceptable environmental impact. It is not a play on words; it is worth repeating. Pollution is not acceptable in Western Australia. To say this with credibility, it is necessary to define pollution.

The emissions of gas or liquid are not automatically pollution. Emission of noise is not automatically pollution. Emissions cause pollution only when their impact on the surrounding environment exceeds some threshold. An emission to the environment may be acceptable and, provided the impact does not exceed some threshold, it may not be pollution. A change to the environment may be acceptable and, provided that change does not exceed some threshold, then the impact may not be pollution.

Pollution is a change to the environment greater than some threshold. One type of threshold is an environmental standard or concentration level in the surrounding environment. For example, a concentration in the air that people breathe of sulphur dioxide above 700 micrograms per cubic metre, or noise above 50 decibels where people live, may be regarded as pollution. These levels have been chosen on the experience that they have an unacceptable impact on people. An important corollary is that levels below this are acceptable, and are not pollution.

The second type of threshold is based on environmental impact. If the impact causes a change to the environment which is intolerable, or from which the environment cannot readily recover, then that is pollution. This is an environmental threshold, and is commonly used in pollution control for the myriad of emissions where no environmental standards exist, or where physical measurement is difficult or inappropriate. Examples are the impact on people of offensive smells and the nutrient discharge from diffuse sources which lead to algal growth in water bodies.

Pollution control in Western Australia is aimed at protecting the environment from pollution. It is not designed to stop emissions. It is not designed to set specific limits on emissions as they come from exhaust pipes or chimney stacks. It is to protect the environment. This means that the capacity of the environment to cope with emissions is important, as is the cumulative impact of other emissions.

Historically, control agencies have found it tempting, and easy, to determine pollution by the amount of waste emitted from pipe ends and chimney stacks. Today, the emphasis is on preventing environmental impact.

Pollution control is not designed to set technology standards for industry, or to insist on the best available technology that is economically achievable. If the impact of emissions is below a threshold which already protects the environment, strong environmental arguments cannot be sustained to force industry to use better technology or management to further reduce those emissions. Conversely, "best available technology" cannot be used as an argument to justify destruction of the environment. This does not mean that the carrying capacity of the environment should be wasted unreasonably, nor that a clean environment should be compromised for the sake of cost to industry.

The concept of acceptable standards or thresholds has changed with recent history, and varies with living standards and societal expectations around the world. The physical tolerance of people to pollution once determined its acceptable impact. In later years, acceptability was based on the protection of human health. Today, it also considers human comfort and amenity, or quality of life.

A major value of environmental protection — that people should be able to live in a clean, healthy and safe environment — is the guiding light of pollution control.

In Western Australia, pollution is prevented by three strategies. The first depends on communication of the values and principles of environmental protection, and of the expectation that pollution is unacceptable.

The second strategy involves environmental rules for developers. These rules may be general environmental standards for the receiving environment, for clean air, water, acceptable noise or protection from industrial risk. These rules may be specific to the development, set through environmental impact assessment or determined by environmental licences issued to industry. The third strategy of

pollution prevention is through the law. Pollution is an offence against the Environmental Protection Act.

Hence, pollution control sets levels of environmental protection based on values and principles of environmental protection. Each individual industry, or each individual event, is then managed in a systematic reinforcement of these values and principles.

Summary

The practices of environmental protection are the everyday activities of people charged with protecting the environment. As practices are implemented, they reinforce the values and principles of environmental protection. Practices provide ways to protect the environment before, during and after development. They are:

- **1. Environmental policies**
- **2. Environmental impact assessment**
- **3. Environmental management**

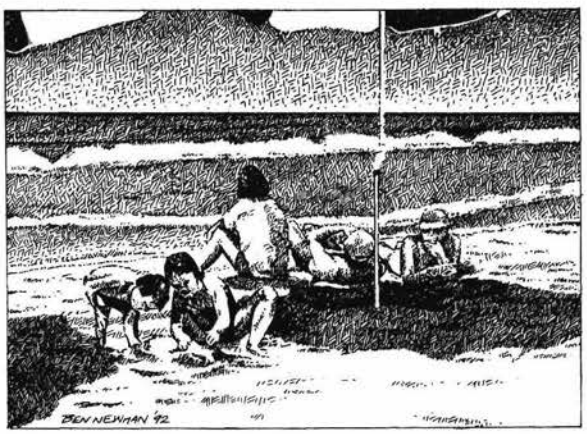
Chapter 4

CONCLUSION

The philosophy of environmental protection is remarkably simple. It is based on the values of people and it is based on the needs of the environment. It accepts that people want a good environment and they want development. It recognises that environmental protection and sustainable development depend on each other.

Environmental protection is a three-phase, self-sustaining process in which each phase reinforces the other. It is about values, principles and practices. The values of environmental protection outline the sort of world people want. The principles provide ways to achieve the sort of world people want. The practices are the daily means of protecting the environment.

Environmental protection recognises the private rights of developers, while accommodating the public rights of the environment. It is an interesting evolution of our generation.



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