

MAN AND THE ENVIRONMENT— THE NEW ZEALAND SITUATION

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Visitors from abroad continue to be impressed by the overall magnificence of the New Zealand environment, particularly the high proportion of apparently unmodified landscapes that still persists. Most New Zealanders who have travelled abroad are similarly impressed by the high standard of environmental quality that we enjoy in this country.

To a large extent this is a fortuitous situation determined by several factors. One is the large proportion of New Zealand surface which is of mountainous terrain and thus unsuitable for productive agriculture or forestry and moreover has limited mineral potential. So about 9 percent of the land area has been designated National Park with its own protective legislation.¹ Secondly, New Zealand traditionally has been predominantly a primary producing country with only a small and slowly developing industrial base so that serious pollution associated with such enterprises has been largely absent. Thirdly, our population density is relatively very low so that human demands on the environment have been generally slight.

But several recent trends, greater industrialisation, general acceptance of western technology, increased population and urbanisation, increased exploitation of the country's natural resources, are each producing symptoms of environmental deterioration that should be heeded as warnings and encourage us to take advantage of the recent experience with environmental problems of the densely populated, highly industrialised western countries. It would be naive to be complacent about the present deteriorating situation in New Zealand since an important lesson to be learned from recent overseas experience is that in most forms of environmental rehabilitation, prevention of problems is likely to be both less difficult and in the long run less expensive than alleviation.

We have in New Zealand, at least locally, very serious problems of air and water pollution; we have experienced substantial environmental contamination of our productive soils with the persistent pesticide D.D.T., now banned; we continue to deplete our very limited and valuable but non-renewable natural resources of first-class agricultural land through urban sprawl, while our equally irreplaceable unique natural environments, particularly those along coastal and lake shorelines continue to be lost largely to real estate or hydro-electric development. Our relatively small remaining stands of merchantable native forests continue to be exploited then abandoned or replaced with some type of exotic plant cover and our unique tussock grass-

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¹ National Parks Act, 1952.

lands at lower altitudes continue to be rolled back at alarming rates by being ploughed under to make way for high producing but high nutrient-demanding agricultural land and closer settlement.

Most types of environmental deterioration are of direct concern to ecologists, whose field of study concerns itself with the welfare of organisms, including man, in relation to the environment. Conservation, which is an applied aspect of ecology, deals with the wise use of natural resources. Biologists in general but ecologists in particular have been concerned with the implications of our deteriorating environment and the excessive loss of natural resources and natural environments for several decades but they received little sympathy from the public or support from politicians until the last two decades. The sudden change in public attitude and awareness came at almost worldwide level, from the extensive publicity given to several major environmental disasters in various parts of the world—the notorious London smog of 1952 with its associated death toll of some 4,000 inhabitants from bronchial ailments; serious photochemical smog problems in Los Angeles due to automobile exhaust fumes; the near death of one of the world's largest lakes (Erie) due to discharge of excessive amounts of human and industrial wastes; major spillages of crude oil at sea, such as from the Torrey Canyon which ran aground and broke up along the English coast in 1967 releasing 170,000 tons of crude oil, and blow-outs of coastal oil wells in California (1969) and Louisiana (1970); the problems of persistent pesticides especially as outlined in Rachel Carson's book "Silent Spring", published in 1962;² condemnation of fish, both marine and fresh water, from several parts of the world due to excessive levels of mercury, chiefly from industrial pollution and in particular the debilitating Minemata disease in Japan.

These sorts of environmental or ecological problems, like the much more minor ones we have in New Zealand, have developed rather insidiously, largely through indifference or ignorance about the functioning of nature and of man's complete dependence on the operation of an efficient and self-perpetuating ecological system.

Ecologists are particularly concerned with clarifying and understanding the scientific aspects of these problems. These and other studies have demonstrated several important points about the operation of nature: that nature functions as a highly complex system—an ecosystem—in which balances between the various components may be quite delicate; once this balance is upset it may be both difficult and costly to restore as is the imbalance caused by introduction of game animals to New Zealand; man's place in the ecosystem, at the top of the food chain or "at the end of the pipeline" means that he is particularly vulnerable to the accumulation of persistent chemicals, e.g. D.D.T., the heavy metals, radio-active isotopes, that have been released into the environment; and the limited ecological resources of even the largest of the earth's ecosystems—oceans and large lakes—shown by their limited capacity to dispose of human wastes and by-products.

Public concern with these problems has been aroused, largely through the news media, but the complexity of such problems makes

2 Carson, *Silent Spring* (Boston, 1962).

interpretation for the layman a difficult and challenging task. There is always the danger of over-simplification and the hazard of bias and emotional involvement.

Sustained public interest and concern inevitably has meant that politicians could not ignore the environmental challenge. Responses have varied in different countries. In Great Britain, the extremely wide scope given the new Ministry for the Environment, now the largest of the portfolios, was undoubtedly due to over-reaction and detracts from the efficiency of the operation.

In Canada a new federal Department of the Environment was created in 1971, bringing together in a single ministry, a wide range of agencies responsible for management of renewable resources and the natural environment. Several advisory councils were also established to provide government with advice on environmental matters. The provincial governments were similarly involved in departmental reorganisation and enacting new environmental legislation.

In the United States of America there has been major funding into basic and applied environmental research, and in terms of legislation the 1970 National Environment Policy Act declared protection and improvement of the environment as firm policy of the U.S. Federal Government. The Act laid a foundation for other types of public administrative and judicial action. The Act also created a 3-member Council on Environmental Quality in the Executive Office of the President, as well as providing an ecologically based policy for the environment. The six stated objectives are commendable if idealistic: 1) to fulfil the responsibilities of each generation as trustees of the environment for succeeding generations; 2) to assure for all Americans, safe, healthful, productive and aesthetically and culturally pleasing surroundings; 3) to attain the widest range of beneficial uses of the environment without degradation or risk to health or safety; 4) to preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice; 5) to achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and 6) to enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources. Moreover, the Act also requires an interdisciplinary approach to planning for all projects that may have an impact on the environment; it requires that existing environmental amenities and values be respected; it provides for detailed and fully comprehensive reports on the environmental impact of any proposal; and in addition, it also stipulates that these reports be made available to the general public. This Act has already been involved in some major political decisions—abandonment of Florida Everglades Jet Airport, of the Cross-Florida Barge Canal and of the supersonic transport proposal, and with the Trans-Alaska oil pipeline. Since the recent energy crisis, however, there has been some relaxation of standards, particularly involving smoke emissions and open-cast exploitation of the vast western coalfields.

In New Zealand, we have recently adopted some of the American procedures but despite some public pressure, we have nothing comparable with the National Environment Policy Act. Indeed there has been negligible environmental legislation enacted in response to the upsurge in public concern. Indeed the issue which triggered public

involvement with conservation and environment in this country was undoubtedly the proposal to raise the level of Lake Manapouri in Fiordland National Park for hydro-electricity generation to supply the predominantly overseas-owned aluminium smelter at Tiwai Point. While the momentum of this controversy increased over the 13-year period following the signing of the initial agreement in 1960, there was a rapid evolution, almost a revolution, both here and abroad in the general field of conservation.

It evolved during this time from a rather narrow and non-progressive concept of preservation of natural resources which, as such, aroused little public or political sympathy, to become a leading issue of our time. It has developed into a more progressive concept of environmental management and improvement covering a wide field. As such it continues to gain in both public and political awareness, sympathy and support.

Our politicians obviously contributed, if unwittingly, to this rapid evolution through their own mismanagement of the situation, initially through their failure to honour a minuted obligation to consult with several organisations prior to signing the agreement with Comalco in 1960. Then followed a decade of suppression and restriction of information by both politicians and senior officials of some Government departments, together with the release of information obviously intended to mislead an uninformed public.

In this controversy the public clearly demonstrated their refusal to accept that a major natural resource should be exploited to its maximum for a single use while disregarding the many other uses of the resource.

As has occurred overseas, the New Zealand Government has responded to the recent upsurge in public interest and involvement with environment and conservation by initiating some new advisory bodies and some legislation.

The Nature Conservation Council was formed in 1962, largely in response to the Manapouri controversy, to advise Government on aspects of nature conservation involved with major development. Although lacking executive power the Council has been influential in many fields, particularly promotion and education.

The Environmental Council was set up in 1970 as an outcome of the 1970 Physical Environment Conference, to recognise the importance of the environment among the several other councils of the National Development groups. This Council operates largely as a complement to the Nature Conservation Council in a wide field.

A Ministry for the Environment was established in 1971 and continues to operate as a Commission rather than a Department, without special legislation, in an Ombudsman-type role. In particular it handles the Environmental Protection and Enhancement Procedures now adopted by Government for all major government and local body works which could be expected to have a significant impact on the environment. Initially an Environmental Impact Assessment, which involves a rigorous examination by the proposer, is prepared and if considered necessary by the department(s) or minister(s) involved, a more comprehensive Environmental Impact Report is commissioned. This report is expected to be more than a mere justification for the proposed action; it should state and evaluate the full range of objectives, environmental implications and possible alternatives by which

the objectives might be met. The Commission receives and makes public an Environmental Impact Report, allows 28 days for receipt of public submissions and then prepares and publishes its audit of the report before submitting it to Cabinet Works Committee or Ministers for decision making.

This procedure then, also provides a valuable avenue for affected persons, interested organisations and the general public to express their views and have them evaluated officially. Although environmental auditing of development proposals is not the only role of the Commission it has become best known in this field, at least since the release of its highly critical audit on Ministry of Works and Development proposals for development of the upper Clutha Valley. This audit has fully demonstrated the independence of the Commission's role, an important aspect of its function. However, rejection by Government of its most important and fully justified recommendations has raised serious doubts as to the real value and future role of the Commission for the Environment. Government's decision to proceed with Scheme H for Clutha River Development inevitably arouses suspicion that recommendations of the Commission will be heeded only when they conform with the desires of Cabinet.

Despite the increasing concern for environmental matters there has been no parallel increase in environmental legislation. With some 62 items of legislation concerned directly with environmental matters, it is generally agreed that sufficient legislation exists to fulfil present needs, even if the administration is shared among eight Government departments. A serious deficiency with this legislation, however, is that many important acts do not bind the Crown, and many others can be readily circumvented since the penalties are much too light. Tighter regulations and greater penalties, however, will only follow public demand.

Serious environmental problems may be allowed to persist, however, through failure to enforce legislation. The Clean Air Act 1972 is an excellent example of such a situation.

An example of environmental legislation resulting from public and political reaction to development proposals that were unreasonable and environmentally unacceptable is the Lake Wanaka Preservation Act 1973. Intentions by Government engineers, first published in July 1972, to obtain maximum water storage in Lake Wanaka throughout each summer, as part of Clutha River development, and to provide for recreational needs by bulldozing substitute beaches at higher levels, were strongly rejected and became a political issue in the General Election later that year. The ensuing Act now prevents even responsible and intelligent control of this valuable hydro resource through limited control of lake levels well within its natural range and within environmentally acceptable guidelines, as has been achieved with Lakes Manapouri and Te Anau.

Serious misinterpretation of legislation is a much rarer phenomenon but a notable and extremely serious example involved the Water Resources Council, a national Government-appointed body charged with the important responsibility of setting standards of water quality for New Zealand's natural waters, both fresh and marine, within the terms of the Water and Soil Conservation Act 1967. The Council's provisional water classifications for several regions (Southland, Bay of Islands, Otago, North Canterbury, Bay of Plenty) had all received

severe public criticism since they had been based on the principle of setting a minimum quality appropriate for a predominant use where this could be identified, and allocating the remainder to comparatively low minimum standards even though in most cases the existing quality of the water was considerably higher. Several appeals to the Town and Country Planning Appeal Board were upheld but were in turn challenged by the Water Resources Council. The matter was recently resolved by the Administrative Division of the Supreme Court which found in favour of the Appeal Board by stating that according to the Act, waters in general should not be classified below their existing quality unless it can be foreseen that there will probably be discharges or uses which should reasonably be accommodated there and which, notwithstanding all reasonable safeguards, controls or treatment, are likely to significantly lower the water quality, and also, that a classification should set higher standards than those existing if they are reasonably needed and reasonably attainable.³ Such a finding is most significant in terms of likely future trends in the quality of natural waters in New Zealand and should allow at least existing levels to be maintained.

The problems of urban sprawl on to first class agricultural land and of air pollution, both serious environmental problems in many parts of the country, will probably be taken in hand only when public concern reaches the point of demanding that the appropriate legislation, already in existence, must be enforced.

Two of our most serious long-term environmental problems, however—population and energy supply and demand—are not covered by legislation. Nor are they ever likely to be. Both problems of course are almost world-wide and since the New Zealand situation is much less serious than in many countries abroad, it is difficult to impress on either the public or the politicians the long-term consequences of our current trends. Recent concern for reducing immigration quotas, however, is an encouraging sign. Government statistics indicate that the New Zealand population will be approaching five millions by the year 2000 if present growth rates of about 1.7 percent per annum are maintained. This is a figure which many responsible organisations have claimed approaches the maximum desirable level if high standards of living and of environmental quality are to be maintained. What appears to be even less well known is that planning to limit our population to some such value must begin immediately through research and education organised by a permanent, interdisciplinary "Centre for Population Research" as suggested by the New Zealand Ecological Society (1974).⁴

More recently, the joint report of the Environmental Council and Social Development Council on New Zealand population⁵ provides Government with a clear mandate in this important environmental field. The Councils conclude that Government should state a popula-

3 Cooke, J., Supreme Court (Administrative Division), Wellington, 3 July 1975 (Nos. M. 339/74, M. 230/74, M. 231/74, M. 281/74, M. 331/74).

4 Fordham & Ogden, "An Ecological Approach to New Zealand's Future" (1974). Proceedings of the New Zealand Ecological Society 21: Supplement 32pp.

5 Report of the Environmental Council and the Social Development Council on Public Submissions on Population Matters. Occasional Paper No. 1, 1975.

tion policy directed towards reduced growth rate and having regard to future population stability, humanitarian values of freedom, choice and dignity, a balanced regional growth, a quality of life goal, a balancing of immigration and emigration, and significantly, a concept that population growth is not necessary for real economic growth. Moreover the Councils have confirmed the Ecological Society's request for an interdisciplinary centre for population studies. The Councils also state "the evidence available fails to show that a rise in population numbers will in fact lead to any higher production per head in this country or to any improvement in the quality of life", and they recommend a production policy which promotes conservation of resources, recycling and avoidance of pollution and which continues to promote food production using relatively low energy needs.

Regarding "population and the family" the Councils conclude that Government should take the lead by promoting active educational programmes designed to ensure that all members of the community understand the many issues involved in developing a population policy. They further recommend that Government takes direct action to reduce the incidence of unwanted pregnancies, and should be prepared to use financial incentives and disincentives without enforcing a limitation of family size.

This important lead now given to establishing a realistic and responsible population policy for New Zealand shows little sign of evolving in the planning of energy development, the second major field requiring urgent attention in this country. Firstly, the several fields of energy—electricity, coal, natural gas—should all be brought under a single administration, and secondly, the Government-appointed committees to review energy requirements and plan its development must be reconstituted to make them truly multi-disciplinary and thus competent to assess the important options and principles for the future, and plan accordingly.

The present absurd situation in the field of electricity, whereby these critical committees are dominated by Electrical Supply Authority and New Zealand Electricity Department representatives, is epitomised by predictions of demand and supply (Fig. 1) presented to the Second New Zealand Energy Conference.⁶ These predictions showed that even with an annual growth rate in electricity consumption reduced from the currently planned 7.1% to 6.5%, and accepting the flagrantly irresponsible and wasteful use of the vast Maui gas field solely for electricity generation at about 30% efficiency of energy conversion (compared with about 80% efficiency if used as a premium fuel), plus two 600 MW nuclear stations, together with the commitment of our total measured, indicated and even implied coal resources, demand cannot be met beyond the year 2012 AD, only 37 years hence. The conclusion is that "in the longer run when coal, oil, gas and nuclear fuel have become scarce and really expensive and the will to survive has moderated concern for the visual environment it is likely that the use of wind and solar energy for electricity generation could reach a large scale".⁷ These predictions must be taken as real warnings

6 Hitchcock, "Energy Storage and Renewable Energy Sources", Proceedings of the Second New Zealand Energy Conference (1970) Canterbury Engineering Journal 4: 80-83.

7 Ibid.

and acted on immediately since the important decision on a commitment to nuclear power is likely to be within two years.

In conclusion it should be obvious that although today, we in New Zealand enjoy a remarkably high standard of living and level of environmental quality, and that progress is being made in several fields to maintain this high standard into the foreseeable future, trends in several other fields are extremely serious and as yet have not been redirected towards what one could reasonably predict would most likely represent the interests and aspirations of the majority of the New Zealand public.

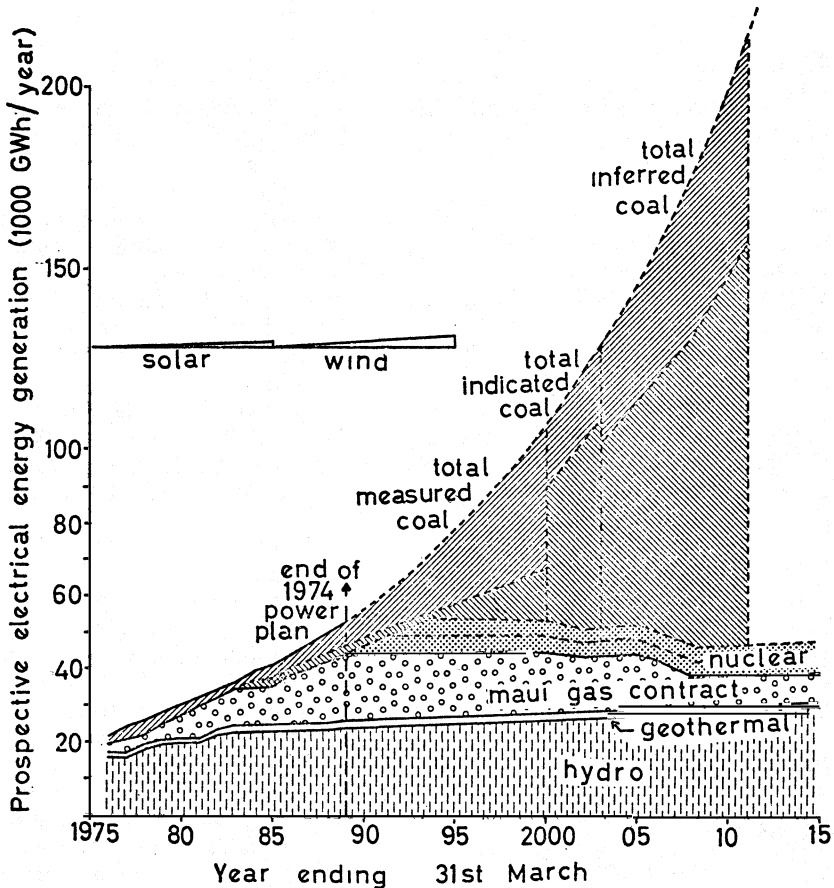


Figure legend: Projected electrical energy consumption in New Zealand and possible sources of energy. Values for coal are separated into opencast (above) and underground (below) and are given for three categories based on 1974 data: total measured coal (107,000,000 tons) and total inferred coal (541,000,000 tons). Values for nuclear generation are based on two 600 MW stations. Values for solar show the contribution which 100,000 solar water heaters per year for ten years (each 200 kWh/year) would make, while that for wind is the contribution which 130 wind turbines per year for ten years (each 1 MW and 70 metres in diameter) would make.

—Diagrams redrawn from Hitchcock "Energy Storage and Renewable Energy Sources", Proceedings of the Second New Zealand Energy Conference (1975) Canterbury Engineering Journal 4: 80-83.