

WITH THE COMPLIMENTS  
of  
THE DANDENONG VALLEY AUTHORITY

r, Dandenong Valley

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208 Princes Highway,  
Dandenong.

Correspondence to:  
P.O. Box 550,  
Dandenong, 3175.

Phone 792-9792  
791-2744

'There is nothing at all intimidating in this country,' Berrigan once insisted to Meredith. 'Nothing frightening. It's such a safe place, so quiet, so gentle.' It was, indeed, quiet as he spoke, for they were far from any human habitation, camped in a dry creekbed near the Palmer River.

'Safe,' Meredith challenged him. 'You know it's never been safe. Bushfires, flood, dry river, dust, drought...I mean the total bloody hostility of the place.' 'No, that isn't what I meant. That's really only concerned with us, with man himself, with ambition, if you like.'

'With survival.' 'Well, we're all concerned with that wherever we are, aren't we? But it's still not what I'm talking about. I'm talking about it, the land itself. If one can come to terms with it, I mean, the way the aborigines came to terms with it. There's nothing predatory here, no wild beasts, no wild people. Nothing harmful. Watch the birds, how they fly low to the ground, how they come right up to you, curious, unafraid. There isn't anything to be afraid of, you see.'

'Except us. People. Remember the old rule we had about coming to grips with this country, when we were trying to settle it? If it grows chop it down, if it moves shoot it. Coming to grips, not coming to terms.' .....

(George Johnston: A Cartload of Clay: Collins 1971)

#### INTRODUCTION

It was not until many years after the European came to Australia that its environment came under stress. The original inhabitants lived in harmony with nature placing little pressure, if any, on the various ecosystems which make up the natural environment. Likewise the European pioneers initially were able to use the environment for their various desires without great effect, until the mid 19 c when over grazing of marginal land together with adverse weather conditions lead to wholesale erosion, dust storms and destruction of the delicate balance that existed in the initial environment. Like many societies throughout history the Pioneer society progresses at the expense of the environment, makes decisions based on emotive factors (its a good idea) rather than sound logical reason and devises laws which ensures that the landowner is free from any responsibility for consequent environmental destruction by codifying his rights to do what he likes on his own land.

The Pioneer society may be acceptable whilst the resources of land and the environment is unlimited or not under stress. However, we are fast approaching, in many areas, a finite limit of resources and an environment which has become to be accepted as one of these limited resources. We are approaching a "Spaceship Earth" society which in order to survive must accept constraints based on rational analyses and proper decision-making as a fundamental basis of management of the environment including the use of air, land and streams.

It is therefore in the context of the future that this paper considers the philosophy of catchment management applied to the highly stressed environment of urban or semi-urban areas and its application or probable application in the Dandenong Valley and surrounding areas east of Melbourne with the aim of a better understanding.

#### CATCHMENT MANAGEMENT

'to define catchment management as the control or organisation of the actions of people and resource factors within an area based on watersheds for the achievement or attainment of set goals, neglects to appreciate the complex interaction of the fundamental factors that make up rational decision-making and even more importantly the fact that we live in a continuing system which is subject to changing criteria, values and needs. Maybe goals are only the setting down of guidelines or boundaries within which we aim to advantageously encourage the processes of society whilst at the same time deter those which are known to be detrimental.

Let us postulate firstly an adequate basis for the making of decisions, the implementation of which forms one of the fundamental aspects of management.

Properly made decisions are based on an adequate awareness of the technical, environmental, social, legal and economic factors influencing the decision together with a realistic assessment of the weighting to be given to each factor relative to the other four at the time that the decision is made. It can be seen therefore that no decision can be made with absolute confidence nor can it be considered to be satisfactory from all points of view. Rational analysis requires the decision to be based on a clear understanding of what is known with confidence and a system of future checks on the effect of a decision to ensure its continued acceptability should some of the lesser known material prove to act unpredictably.

Hence in managing catchments the natural environment and its use either as resource material for commerce and industry or the maximization of beneficial needs of people and fauna, it is soon realized that confident knowledge is limited and those whom have previously studied many environmental,

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social and legal factors have been observers of a relatively static environmental situation. Little has been known of the effect of outside change let alone the stress that can be applied to a situation without causing detriment. Hence developments of the fields of applied natural science and the life sciences, as well as a clearer understanding of the sociological processes by which society exists and acts, are fruitful fields for research and investigation.

The role of catchment management may therefore be

- a) Investigation to gain a better understanding of current knowledge of basic material, and the confidence with which it is known.
- b) Analysis of the interactions that may occur as a result of management options.
- c) Determination of policies and guidelines relating to preservation of amenity, and maximization of beneficial uses, within a system which preserves freedom of thought and action within the community.
- d) Implementation of a system of checks relating to such policies and guidelines.

Clearly then this is a service role (as opposed to a profit making one) and is logically administered by a governmental agency. However in practice this administration is usually linked with resource development or other service type activities.

## AGENCY LEGISLATION

The implementation of legislation containing catchment management provisions and associated administration is the role of statutory or semi-statutory Authorities. In Victoria the significant Acts relating to urban areas include:-

- 1) The provisions of the Soil Conservation Act which permit a water supply catchment to be declared thence managed to minimize detrimental effect on the water supply derived therefrom, as well as the usual soil conservation activities.
- 2) The provisions of the Drainage of Land Act which (a) codify drainage law (b) set up a drainage tribunal to determine drainage disputes and (c) permit declaration and administrations of flood-plain areas.
- 3) The provisions of the Town and Country Planning Acts which create regional and local planning Authorities, as well as an appeals tribunal to determine permitted land use based on an ever improving comprehensive basic surveys of the physical features and uses of land in a region. What is important is the regard that town planning gives to catchments as a fundamental tool in land use management.
- 4) The provisions of the Environmental Protection Act and the utilization of waterway management Authorities as delegated agencies for licensing waste discharge to waterways.
- 5) The provisions of the Dandenong Valley Authority Act, which created a unique regional statutory authority with its area of jurisdiction comprising the catchment of the Dandenong Creek, east of Melbourne, and powers to manage and control waterways therein, including flood-plain declarations, waterway pollution control and flood mitigation.
- 6) Others which might have been included are

M.M.B.W. Act, the Water Acts and the Local Government Act.

Also there are a number of governmental guidelines, of which those relating to Environmental Effects Statements produced by the Ministry for Conservation is of some significance.

The management of catchments other than some M.M.B.W. water supply catchments does not rest solely with one Authority but rather with a number of them. Each having specialities that cover a wider spectrum than the catchment boundaries. Undoubtedly the Dandenong Valley Authority area of jurisdiction and concentration of expertise into the drainage and river management field has not only enabled an improved weighting being given to these aspects when decisions are made but also a willingness to accept and evaluate criteria on a broader basis than traditional accepted practice.

## TOWN PLANNING

A listing of important factors relating to urban catchment management would include:-

The interaction between town planning (land utilization) and waterway management leading to the creation of stream zones enabling retention of natural waterways, the use of enhanced topographical features, such as tree reservations along catchment boundaries, to heighten the sense of community adherence and definition in urban areas, the preservation of flood-plains, swamps and other areas of significance to stream management goals whilst the general area is being raised to a higher and better use in terms of property values (i.e. rural to urban) but planning of lesser practical assistance in correcting past decisions requiring a reversal of this process.

Waterway management in common with town planning is fundamentally a service orientated activity requiring a master plan of policy as a framework for development or utilization of the physical features for the community to meet social, recreational and commercial needs. The higher objects being attainment of a high quality of life in a stimulating environment. To be responsive to the community needs both disciplines need to be close to the people and hence regional jurisdiction controlled by elected representatives backed by public participation leads to more integrated and acceptable decisions.

Significant advances and trends in town planning should therefore desirably be reflected in waterway management and vice versa. To be effective such an interaction necessitates good communications- a readiness to meet and discuss with the view of a co-operative approach to solving mutual problems and a clear understanding of each discipline.

## ENVIRONMENTAL PROTECTION

The inclusion of waterway pollution control and land waste disposal control as a function of catchment management but within the state-wide system of co-ordination has the advantage of providing attention to detail and ratepayer needs whilst ensuring the availability of a wide range of background information and interaction with allied Authorities.

The concept of assimilative capacity of waterways based on a residual oxygen content, has with the introduction of biological ecosystems as the basis of study, been challenged. Cairns ref.(1) suggests assimilative capacity should be defined as the

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ability of the aquatic ecosystems to assimilate a substance without degrading or damaging its ecological integrity or the maintenance of structure and function characteristics of the locale. He goes on to discuss "critter counts", pollutional stress and means whereby the numbers of desirable critters can be increased. Hence even though ecological systems are incredibly complex, the study of biological activity in streams and stream beds can more clearly identify the integrated effects of pollution than the sampling, testing and recording of chemical or physical characteristics of the water. However waste discharge licences require an assessment of permitted chemical and other concentrations and for these not to be so conservative that cost of achievement does not exceed a reasonable valuation of the improved benefits expected. Here we have an apparent paradox that needs resolution.

Throughout history industry and society have put profit and expediency ahead of environmental protection, the change to a more evenly balanced situation should not be revolutionary to the extent that an industry is no longer viable, but rather, necessary change to be achieved over a reasonable period of time. The recent decision of the High Court of Australia (Ref.(2)).- That economic viability was not a factor to be considered by the E.P.A. in granting or refusing a licence has some undesirable aspects. Is such a decision in the best interests of the community?

Studies involving the assessment of waterway action become even more complex in the presence of salt water. Stratification of waters in narrow estuaries is a common experience that results in polluted fresh water skimming over a saline wedge which if not replenished with oxygen can lead to anaerobic bed conditions devoid of life. Interdisciplinary teams are essential to the investigation and analysis of complex technology as well as the discernment of effects of future action on other non-technical factors.

Studies of this nature should be aimed to achieve a satisfactory quality of stream consistent with its beneficial uses, without detriment to downstream conditions or unreasonable imposition of conditions on adjacent society. Public awareness and opportunity for comment is essential to adequate assessment of their benefits, needs and desires. Public involvement such as tree planting can also be advantageous. However, the impact on stream conditions of the washing of fully sewered urban areas by stormwaters can be serious and the effects of accidental discharge of toxic or similar wastes to high quality waterways warrants a protective system even at a considerable cost as detrimental effects can be long lasting. Such a protective system may involve continuous monitoring but should include an alarm warning device and planned action to isolate and eventually dispose of the problem waste.

## SOIL CONSERVATION

The need to protect the land from erosive forces has long been accepted by the application of soil conservation principles to farming, and other rural activities but need to protect streams from soil disturbance arising from basically civil engineering works has not been seen to be that important. Recently a working party studied soil disturbance under the auspices of the Victorian Ministry for Conservation ref.(3) and prepared broad guidelines for the preparation of specific codes of practice suitable to control of works being undertaken in a

particular locality such as a Municipality. Advisory assistance is to be provided by the Soil Conservation Authority and pilot operations by various Authorities have begun to list their beneficial effects. It is essential that land capability studies have been undertaken and an assessment is made of erosivity of surface soils. Also the ability of streams to accept sediment or turbidity should be known but the extent of present knowledge does not make this possible. An assessment based on observations assists in determining the potential hazard of works thence the degree for protective action. There is ample evidence of the destructive nature of stream erosion and sedimentation but the added settlement of organic and nutrient material as well as heavy metals and toxic substances derived from urban runoff can present a major demand for stream oxygen especially where flat gradients and sluggish low flows prevail. Anaerobic conditions result in  $H_2S$  being given off and other objectionable conditions- solutions may be best achieved by attainment of a natural environmental balance.

A sediment control program should be accepted at all levels of planning, design and construction of developmental works as sediment mitigation is compatible with good construction practice with the addition of sediment traps downstream of the works,

## FLOOD-PLAINS

Flood-plains are land resources which take many forms but society must abandon the philosophy that the only worthwhile activity is development for housing or industry. Their natural state includes wetlands with distinctive flora and fauna and their function of storing and absorbing floodwaters should rarely be jeopardised. Town planning should identify flood-plains for non-urban uses of which the Dandenong Valley Metropolitan Park is an excellent example.

In June 1977 a report on defining flood-plains with guidelines for permissible uses ref.(4) was circulated for comment. Land liable to flooding was defined as that which would be inundated by either the flood of record or that which can be expected to have a 1% chance of being equalled or exceeded during any one year. The guidelines are aimed to direct the use of flood-plain lands in order to minimize or avoid uses which might cause adverse effects. This includes diversion, passage or storage of flood waters or the raising of flood levels, together with effects which may be dangerous or result in erosion or sedimentation of the waterway system. The Committee also advised on the circumstances within which flood-plain lands in urban areas should be brought into public ownership. Residential vacant lots that are prevented from development by the flood-plain declaration and cannot be protected by a structural answer should be either acquired or exchanged for comparable blocks on flood free land. Otherwise special situations should apply as a prerequisite for acquisition.

A clear example of guidelines deterring detrimental actions whilst encouraging favourable community process.

## DANDENONG VALLEY AUTHORITY

Whilst the D.V.A. is a catchment orientated river improvement and flood mitigation Authority with delegated powers from the E.P.A. relating to licensing of wastes being discharged into waterways, its significant success has been in aiding the effective drainage of urban subdivisions, by the

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adoption of long range plans and broad policies for planning and development of outfall drainage for such subdivisions. The policies include -

- a) A restraint on housing development across the valley floors.
- b) A requirement for house floors to be above the 1 in 100 year return period flood level.
- c) A restriction on houses built lower than downstream embankments such as those found in freeway construction
- d) A requirement for urban development storm runoff to be controlled to that comparable to runoff from the original rural situation.
- e) Application of a sediment control program on subdivisions in areas having sedimentation problems in downstream waterways.
- f) A restraint on polluted water discharge to drains.
- g) Limits on urban development in flood-plains to the fringe area only.
- h) Retention of wide stream reservations along significant creeks and waterways especially perennial streams.
- i) Requirements on low density subdivision to absorb all domestic wastes within the confines of the allotment.
- j) Enhancement of natural stream storage characteristics by construction of retarding basins.

The Authority has also undertaken a number of special studies of estuarine waterways and associated bankside flora. Landscaping has become a significant part of the design process which has been extended to include consideration of a number of so-called soft engineering type solutions.

Research in the form of studies of urban rainfall-runoff relationships, infiltration studies or urban pervious areas, water quality study operation hydrographs, and package treatment based on a re-circulating biodisc system is either being undertaken or fostered by the Authority. Mile Creek experimental catchment is the basis for many of these studies.

## ENVIRONMENTAL AND OTHER EFFECTS

In the foreword to the Guidelines for environmental assessment ref.(5) the Victorian Director for Conservation Dr. R.G. Downes requires the decision makers to recognise the need for having adequate information about their environment and social effects in addition to the usual information about technical and economic feasibility. To this legal effects have been added because there is a rigidity associated with the law which should be subject to question and because in the wider field of decision making many acts and their interpretation can unnecessarily complicate the proper evaluation of what might be termed our regard for the law. For instance the B.A.D.A.C. report ref.(6) discloses that a person applying for a building permit could be subject in Victoria to 47 Acts and 90 sets of regulations. The Law Reform Commission's report ref. (7) relating to public interest suits indicates a trend in legal thought or some significance to decision makers.

It is not proposed to dwell on the technical/economic studies which traditionally has been the basis for most engineering decisions relating to works, but it should be said that value for the dollar spent will continue to receive a major weighting by decision makers as it relates strongly to continued viability of a project or operational process.

However history records that many such undertakings were only profitable at the expense of some other factor usually either the environment or social value. The broader base of decision making mentioned herein hence has wide ramifications necessitating quite significant adjustments in policy and attitude.

Environmental effects therefore are an essential factor in decision making being required to be taken into account by law in some cases and Governmental direction in others. Most effects can be adequately determined, some need an extension of our knowledge and a few are so complex that one wonders whether the investigation warrants the large amount of expenditure involved. The problem really is a determination of the weighting of environmental factors relative to other factors involved in decision making. The practical engineering point of view is well put by Madsen ref.(8) and Hessayon ref.(9) points out some tragic consequences of a too ready a reaction to environmental hazards.

Having prepared an environmental effects statement based on considerable knowledge and public participation, and thence analysing the public response and amount of unknown material introduced by this means, it appears to be a highly expensive and time wasting effort that can be avoided by other more satisfactory means. Undoubtedly there are times when the preparation and publication of a document for public review and comment can be warranted. However the use of conservation advisory committees meeting regularly and providing a continuing interaction with management on policy and works appears to be a more fruitful exercise in adequately weighting environmental considerations at least in the waterway management field.

There is an urgent need for research and development into the relative importance of environmental and social factors and the means whereby they can be rationally evaluated with the view of general acceptance across the wide spectrum of society. There is also a need for improvement of technical/legal processes and trends to ensure an evaluated weighting rather than mandatory weighting of legal effects.

## CONCLUDING REMARKS

The horizons of catchment management have in the past been limited almost exclusively to resource development. With the advent of social awareness of environmental issues management must reflect consideration of these issues in the decision-making process. In order to fairly undertake such a task all basic factors should be adequately investigated and their relative influence properly assessed. Aims should be defined in terms of a continuity of evolving social and environmental progress towards a better way of life in a sensible harmony with nature.

Planning decisions especially those relating to the life sciences take the form of organised complexity. Such form may be guidelines creating a framework fostering beneficial action whilst deterring

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detrimental action. Hence the individual application is allowed to be dealt with in sufficient detail to permit answers which are peculiarly unique to the situation.

In the highly stressed environment of Melbourne suburbia both regional town planning authorities and water management authorities are broadening their basis of planning and intensifying their basic surveys. Yet generalised standards are the foundation of control, inductive reasoning is not the basis for many rules and the concept of "average" is often mistakenly accepted as comprehensive fact. Decisions unique to the situation are more likely to achieve satisfactory answers.

So to the traditional catchment manager with water conservation aims and a lesser regard for means of conveyance, his involvement with the waterway itself - its environment, its ecosystems and its beneficial uses - is now clearly required as a fundamental part of his professional expertise.

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