

## SOME ECONOMIC PRINCIPLES IN CONSERVATION ISSUES

by  
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There is a large and growing literature on economic aspects of conservation which the author did not have the opportunity to peruse. Consequently, and because of time limitations here, this paper covers only a few rather general economic principles which are perceived as having particular applicability to a conservation framework. The concepts would be equally applicable to any conservation problem, emphasizing that caves are but one of many environmental issues with which we should be concerned.

### Introduction

In this paper I do not propose to examine the economics of particular cases of cave conservation. What I want to do is to point out briefly the approach which economists make to conservation issues in general, to indicate some of the pitfalls in thinking to be avoided and to make easier an understanding of more technical papers on particular issues.

In our society the decisions as to which goods and services will be produced, how much and who will get them rests basically in a market system where values of widely differing commodities are reduced to the common denominator of money. Money price controls the commodities which are produced and they are allocated to the highest bidder. The economist says that the problem is solved by the interaction of supply and demand.

This paper will discuss these problems of theory:

1. whether a particular resource will be conserved or not;
2. how much of it will be conserved;
3. who will benefit by the setting aside of it—i.e. how to allocate the benefits of conservation.

Conservation is treated as a commodity — a good or service for which there may or may not be a market. In our case, though, fundamental problems arise:

1. there is trouble in reducing conservation values to a common denominator of money;
2. the price paid is really a 'social price' in the sense that it is a price paid jointly by society and not individually by consumers.

### The "cost" of conservation

First, let us examine the "price" of alternative resource uses, since this is a term often bandied around in conservation arguments. There are three ways of looking at price as a cost paid for obtaining the benefit of a commodity: the financial cost, the economic cost and the social cost.

The financial cost is a very unreliable criterion of resource allocation. The reason is not merely that it is not easy to put a money value on alternatives. It is in fact quite easy in principle to obtain comparative figures using the present value approach which will be discussed later.

The economic or real cost of one alternative is simply any other one that we have to go without if we choose the first. The real cost of incorporating Colong Caves Reserve within the Kanangra-Boyd National Park is simply the limestone that we thereby have to forgo, together with such secondary and now non-existent effects of the purchasing power that miners would have earned. In this respect however, it is important to remember that in a full employment economy like ours this latter factor is not as significant as the politicians, particularly those representing rural electorates, would have us believe. For if Fred Smith does not work for APCM Ltd, he can work for GMH or anyone else and hopefully earn the same income, making the same contribution to Gross National Product without mining limestone.

The social cost is the hardest one to pin down. It includes all sort of intangible, non-monetary and subjective aspects like aesthetic appreciation, protection of rare species for pure scientific value, and possible redistributive effects caused by having to move people around. There is no market in which a price can form and evaluation is therefore rather subjective. There are, though, quantitative methods which while not entirely satisfactory do yield results more objective than the rather emotional outbursts we have heard in the past about the "public interest".

- (a) there is the opportunity cost approach, the same as economic cost which says merely that the value of the intangible benefit is equal to the *monetary* value of the alternative economic use;
- (b) in a few cases there is the possibility of direct construction of a market demand curve as in recreational projects.

For example, a very rough calculation shows that the holding of this speleological convention in Hobart brought at least \$10,000 of mainland money down. The field trips to Mole Creek will yield local businesses at least \$500 — a substantial amount for a country village. Yet I calculate that at the moment, Tassie caves have approximately 1% of the visitor usage of those in N.S.W., where we have 10 times as many cavers in far fewer caves. If caving here approaches

N.S.W. in popularity – which Heaven forbid – then in 10 or 20 years cavers will be supporting the Mole Creek economy. What price more dairy farming, timber cutting or dam building?

- (c) there is a more general possibility which I call the individual marginal utility approach. This is a method of measuring the satisfaction which individual consumers gain from consumption of varying quantities of a commodity. The economist's approach to this concept is rather abstract. Consider the maximum sum of money which various individuals would pay rather than forgo a particular commodity altogether. For given quantities, different people are prepared to pay different amounts, but they are alike in that each will pay more for the first few units consumed than for subsequent units. On a hot day you may be prepared to pay as much as one dollar for a bottle of beer rather than go without, and if the price of beer is only fifty cents you will drink merrily until the value you place on the next bottle is less than fifty cents. Unless of course you are irrational which would not be unlikely. These individual monetary units can be summed to obtain an estimate of the social demand curve, i.e. of the quantities which people together would want to consume. In principle these methods give some measure of the demand for commodities and provide a decision framework in which will be determined whether or not a resource will be conserved.

### How much conservation?

Let us now consider *how much* of the commodity will be supplied, i.e. how much land of a particular type will be conserved. Land is subject to the general law of supply, that the higher the going price paid by consumers (in our case, conservationists or recreationists, picnickers etc.) the more is supplied, whether by private owners or by the Crown. There are two main interferences with the operation of a free market here:

1. The fact that land is limited in quantity (in one sense there is an absolute limit but in another supply is variable because of the differing uses to which land may be put). This means that a higher price does not necessarily have the effect of calling forth more land but simply re-allocates the existing supply among those consumers most willing to pay. In practice, supply of land is quite inelastic and therefore the price paid for its use contains an element of economic rent (see below).
2. Crown land may not necessarily be called forth by higher prices. The fact that Crown land is owned jointly by society members means that there is no one person ready to release it when a high enough price is paid. On the other hand, more land can be released than the price would warrant if the government considers this in the interests of society at large. This has assumed the importance of an election promise in New South Wales.

### Conservation as investment

Conservation as a commodity is a special case of a resource in that it comprises elements of both land and capital. To the economist, setting up a national park is equivalent to investment in new capital as well as allocation of existing land (investment being defined as addition to capital stock). A properly protected natural resource of any kind is part of the country's capital stock held as such in order to provide the means of producing goods and services both now and in the future. Now a wise business manager is constantly assessing his company's need for new capital to enable the firm to grow. Similarly a country should be constantly assessing its needs for new ways of ensuring its future prosperity. But to do this requires that some resources which would otherwise have been consumed are instead kept for the future.

The question is, *how much* to put away for the future. How much to invest? this is the same as asking how much of our present stock of goods and services should be *saved* for the future.

If we conserve too much, we cut our present living standards for a doubtful future; if we conserve too little, we depreciate our capital stock of resources on which the future prosperity of the country is based. It is too easy for polar viewpoints to emerge here. It is easy for the miner to say: let us mine that area, for in doing so we provide raw materials for industry, create employment, and put purchasing power in the hands of the consumers, and perhaps provide export income with which to purchase other consumption or capital goods, either of which contribute to our rising standard of living. It is easy for the conservationist to say, let us protect that park area, for it will provide recreational outlets for a growing population, aesthetic attractions for the aesthete, and ecological protection of flora and fauna.

Normally, open market forces will determine how resources will be re-allocated. The major problem is that the kind of goods which conservationists want preserved are those where private property rights do not exist. To prevent excessively rapid and uneconomic depletion, conservationists propose to control the rate by establishing government authorities. Too often, their emotive arguments for such action fail to appreciate that there may be cogent economic support as well.

How does the economist approach the issue?

Now a business man will only invest in capital if it can show him a rate of return at least equal to the going rate of interest, otherwise he may as well live on his money equivalent capital. Therefore, the expected rate of return obtained by conserving an area must exceed the rate of interest as well as exceeding the rate of return on alternative land uses, e.g. mining. Furthermore, investment in *newly* conserved land must be at least sufficient to balance the depreciation of existing similar resources.

From an economic viewpoint, much of the price of land of any kind is a pure economic rent — rent being here defined as that part of the price of a commodity which does not affect the amount of that commodity supplied. Willingness to pay at least the rental price to get some of the land is an objective way of:

1. asserting that the use made of the good will yield greater value than other uses;
2. getting that good assigned for future use;

Strictly speaking, potentially conserved land resources have an element of quasi-rent, meaning that it involves an implicit cost payment that has no effect on the amount conserved now, but does affect the amount in existence in the future. The same principles apply.

It is, of course, virtually impossible to pre-determine rental and interest components of land price. The best way to reduce comparisons to a common denominator is to consider the expected present value of alternative resource uses. In the case of Colong, for example, this means considering the present value equivalent of all future returns from recreation etc., and comparing this with all future returns from mining. Present value tables show, for various rates of interest, the amount you would have to receive now which, if invested at the going rate of interest, would yield the returns expected alternately from mining and recreation uses. The significant point is that a low but rising annual return over a long period of time (e.g. from recreation or just from caving) soon exceeds in value a high but declining annual return over a shorter time, e.g. from mining.

Having decided whether to conserve a natural resource and if so how much, there is still the question of how to allocate the benefits among members of society. Consider a national park. Even when it has been declared there are still problems of allocating portions to competing interest groups. One of the ways of achieving this is in zoning and I dealt with the principles of this in a paper at the Mirboo North Conference. In economic terms zoning (different areas for different uses) has the function of differentiating the product just as the motor car market is differentiated into the sports car market, the four wheel drive vehicle market, the station sedan market etc. In a differentiated market it is possible for different buyers to be charged different prices according to the real or imagined differences in the product. The prices may or may not be paid in money terms — they may be opportunity costs, in particular a cost expressed by the substitution of time for money, e.g. wilderness area.

The important point here is that users of certain zones of a park may be able to virtually exclude others from that zone merely by being willing to pay a higher price for use of that zone. Thus cavers will place a higher value on their right to use the Yarrangobilly special area of Kosciusko National Park than will bushwalkers, who will themselves be prepared to pay a higher price than the average tourist. This is merely the market exercising its function of re-allocation. Each individual has his own demand curve for the use of Yarrangobilly caves, but for any given quantity cavers will pay a higher price than most people. Therefore it may be that cavers may form a specialised market sufficient to keep the 'price' of Yarrangobilly well above what would be the social price, and therefore make more likely the preservation of the area. Another way of looking at this is to say that if all comers are charged the same rate to enter the park, then cavers will call forth a greater usage than any other individual or group.

### The prevailing social framework

There are several important facets of our whole way of life in Australia which ultimately impinge on the microcosm of caving. The most significant is that current economic growth theory is founded on assumptions of ever-increasing material wealth helped by rapid population increase and resource development. To attack this assumption is heresy. Politicians and the public alike seem convinced that our future prosperity requires rapid population growth and professional economists simply have not come to grips with the possibility of economic growth with static population. Now economists calculate that every 1% increase in output of the goods and services on which our current living standards depend requires a 4-5% increase in capital production. This means that material resource development commands abnormally high returns, making conservation that much more difficult. At the same time, the over-emphasis on capital goods limits current living standards without necessarily leading to saving of sufficient recreational reserves and national parks to ensure our future prosperity in the areas that will matter most. Just remember that tourism and recreation are the world's fastest growing industries.

So the single greatest pressure on conservable resources is brought about ultimately by population increases and the resulting overemphasis on acquisition of material capital. We urgently require a new economic theory of zero population growth. As well, the economists need to contrive a method of quantifying non-economic measures of our living standards (such as aesthetic and humanitarian aspects) so that Gross National Product becomes a true measure of the performance of the whole economy, and, as the first President of the Australian Speleological Federation, Professor Brian O'Brien, remarked to S.U.S.S. last year, what we need is a concept of Gross National Loss. This would quantify the long term loss of resources, or negative production brought about by wanton pollution and wasteful practices, in the same way that Gross National Product measures material production of goods and services.

### Conclusion

In summary, this paper has pointed out some theoretical principles by which:

- (a) money values may sometimes be placed on non-monetary commodities;
- (b) decisions may be made as to whether a given resource should be consumed now or conserved for the future;
- (c) economic analysis can be applied to certain essentially non-economic phenomena;
- (d) a decision framework may be made for the allocation of public property among competing non-economic ends.

It has also been pointed out that the placing of a special price on the use of a public commodity is not necessarily just revenue-hunting but is a rational method of restricting resource usage to those most willing to pay. Finally, it has been suggested that fitting conservation into the general framework of resource allocation is prejudiced by inadequacies in current economic theory and social thinking. The solution lies at the very least in the devising of a truly representative measure of our living standards, and in a serious examination of the effects of rapid population growth on the non-quantifiable aspects of our standard of living, those aspects which concern a conservationist most.

If there are any practical lessons arising from this, they are these:

1. Do not complain too loudly about having to pay to enter national parks. The price is not a revenue device but a method of allocating available park among those most willing to pay.
2. There is something to be said for the practice some societies have of charging trip fees. They serve the function not merely of raising revenue for the club, but also of ensuring that the only cavers who visit certain areas are those who place a value on the resource at least as great as the price paid (if rational).
3. You may have a greater *economic* effect on your caving areas than either you, the local community, or potential miners realise.

In concluding, I would like to reinforce my frequent exhortations that caves are but one of the many environmental issues, that the same principles apply in general, and that every other conservation issue that you support affects prevailing social and economic thought and makes it that much less likely that another cave will be mined away.