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VALUING RESOURCES: ENVIRONMENT VS DEVELOPMENT

"the price of everything and the value of nothing."

by:

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Aldo Leopold's Attitude Toward Pine Trees

Attitude Am in Love with Pines																
Evaluative Beliefs	Trees planted one self are better		It's better to help those trees which are less abundant		It's better to take care of longer living trees		Having Pines in wood lots is better than neighbors		Having Pine produces more income		It's better to withstand elements to provide shelter		Indian pipes, pyrolas & twin flowers are better than bottle gentians		Pileated wood-pecker is better than hairy wood-pecker	
	I planted pine	Birch planted itself	Birch is abundant	Pine is scarce	Pine will live for century	Birch will live less than half as long	Neighbors have no pines	Neighbors have many birches	Pine brings \$ 10 / thousand	Birch brings \$ 2 / thousand	Pine's needles stay out in winter wind	Pine provides shelter for Grouse	Bottle gentians grow under birches. Hairy woodpeckers.		Indian Pipe, Pyrola, and Twin Flower will grow under pine. Pileated will nest.	
		Family Security (Paternalism)		Equality (underdog bias)		A Sense of Accomplishment (significance)		Social Recognition (wood lot of distinction)		A comfortable life (eye on the book)		Courageous (like myself, braves the winter wind)		A world of beauty		Imaginative (stimulate my imagination)
Beliefs																
Values																

INTRODUCTION

During the 1960s and 1970s, it was not uncommon to hear and read a great deal of information directed towards the conflict between development and the environment. Americans had long been identified as the throw-away nation, with a substantial disregard for the environment. Our ability to consume goods had far outdistanced that of any other nation. Once more, few Americans were aware of the environmental degradation that occur when natural resources were used to produce consumer products. But this image slowly began to change as Americans became more environmentally conscious. The term sustainability became a fashionable catchword of the 1980s, and has since retained its relevance into the 1990s. Although gains have been made towards creating policy and regulation, the question of how to value resources where nonmarket goods are concerned remains unresolved.

Seeking sustainability requires forethought; what is to be sustained, whom does it benefit, what will it cost and can it be implemented. Furthermore, where should it begin; global, international, national, regional or local levels?

Sustainability is a very broad and yet encompassing topic. I have found a multitude of definitions that attempt to address this query, where each spin becomes a vast entanglement of

arguments, however justified, built around some central thesis whether it be economic, social, ecological and or physiological. It is fair to say that sustainability means different things to different people. Preservationists believe that sustainability is achieved through retaining possession of the environment. Conservationists believe that a balance between man and nature should be struck; that development may occur only in concert with the environment. Others argue that we live in a "learned ecology" programmed by institutions and, broad sweeping change is needed to a more convivial approach; a new holistic re-thinking of human education and development.¹ Still others believe, in a less anthropocentric position, that man must re-define himself away from a biblical definition of dominion over the earth to one in which he is "not the sole item of value which bestows value in the world."² For our purposes, we need a more explicit definition than have been given in the past to show how a revised conception of sustainable development can be integrated into practical decision making. David Pearce provides a useful definition:

"At its simplest, sustainability means making things last, making them permanent and durable. What is being

¹Ivan Illich, Tools For Conviviality, (New York: Harper and Row, 1973), 25.

²Michael R. Redclift, Sustainable Development: Exploring the Contradictions (London: Methuen & Co, 1987), 44.

sustained can be an object of choice - an economy, a culture, an ethnic grouping, an industry, an ecosystem or sets of ecosystems - but sustainable development implies that the object of concern is the whole process of economic progress in which economies contribute to improvement in human welfare, however defined."

"How sustainability comes about is the subject matter of most of the debate, but one theme is constant to all the discussions: it either means augmenting natural environmental systems, or is a condition for safeguarding economic development. This common environmental theme is suggestive of an economic interpretation of sustainable development. Sustainability requires at least a constant stock of natural capital, construed as the set of all environmental assets. Once it is interpreted in this way, sustainable development turns out to serve goals which would command wide, though not universal, assent."³

These goals are:

- 1 to provide justice in respect of the socially disadvantaged
- 2 to provide justice to future generations
- 3 to provide justice to nature; and aversion to risk arising from: our ignorance about the nature of the interactions between environment, economy and society; and the social and economic damage arising from low margins of resilience to external 'shock'.⁴

I find Pearce's definition and goals useful because they include the notion of sustainable development from both the economists and ecologists point of view. What appears to be missing in the exploration of the relationship between development and the environment however, are assertions for valuing nonmarket resources that are rooted in rationality, under

³David Pearce, "Economics, Equity and Sustainable Development," Futures, (December 1988), 598.

⁴Ibid., 599.

new social and economic paradigms, yet provide a bridge at the edge of the philosophical cliff to application. Misconceptions exist in the market place where both private and public goods are assessed. What appears to be missing is a causal connection between development thinking and the environment. I propose that valuation can assist in providing this connection by placing environmental amenities on the asset side of the balance sheet.

Like others before me, I am seeking new ground on which to base an approach for a process that focuses on natural resources as its target. In my quest, I will question the current methods used to assess the value of land and our environment and in so doing I will propose that better methods be established for deriving a balance of equity between market and nonmarket amenities and between generations. I will address what is wrong with our national accounting system and will suggest that perhaps we have fail to develop a working definition of natural resources. Next, I will get to the heart of the matter; that is valuation, by discussing the relationship between monetary value and personal preference and indicate some of the new ways in which scientists have been applying their theories. In a hypothetical scenario I will create a procedure where planners work to resolve the balancing of an environmental amenity and an economic goal. Finally, I will discuss the current dilemma that

scientists face when constructing valuation models and I will conclude with some possible ideas for overcoming these obstacles.

UNCOVERING THE ISSUES

The proponents of growth control will point to a number of issues focusing primarily on the environment or the economy and the related necessity for regulation. Environmental scientists espouse the theory that the bio-diversity of the environment is critical to the very existence of all mankind and that there is evidence of an environmental crisis on our hands. Indeed, such environmental threats have been cited in research around the world.⁵ Such environmental degradation includes: desertification, deforestation, acid rain, the greenhouse effect, the depletion of the ozone layer, toxic substances and the extinction of animals and plant species. All of these events have been explained in detail and consequence in a large but inconclusive literature. Many of these terms are now common household phrases and signify conditions which threaten the life-support systems of our planet. In the United States, advocates for the environment have strategically positioned themselves against those who favor unrestricted development. In the past, some environmental advocates touted preservation as kind of

⁵Pearce, 599.

ecclesiastical writ that must be observed. Purer environmental consciences sometimes objected to any development at all.

Environmental policies were seen as those that tried to restrict growth while development policies tended to be viewed as those that promoted growth in human activity. But this is changing. In recent years, the idea of environment as constraint has given way to an acceptance of the environment as partner.⁶

Environmentalists realize that useful compromise can result from the recognition that some development may serve the community better if critical areas can be protected.⁷ Economists on the other hand, are split. Those from the old school view natural resources purely as commodities in waiting for production; that is, to become consumed; however, economists on newer horizons, are searching for means for integrating economic and sociological theory. Nonetheless, economic growth or environmental preservation are now perceived by many as the unsettling choice that citizens now face.

Many economists will agree that our current economic dilemma seems to be waning as a development predicament while the threat of environmental degradation attracts more and more attention;

⁶Andrew Steer, "The Environment for the Development," Finance and Development, 29. no. 2 (June 1992), 18.

⁷Jerry Adler and Daniel Glick, "Put Your Trust in the Land," Newsweek, (December 10, 1990), 76.

that development is slowly bringing us out of our dilemma but only at the expense of the environment by depleting natural reserves. However, the depletion of natural resources looms as a threat to future growth, and the costs of preserving the environment are rising⁸ Says economist John Shilling:

"debt crisis and environmental crisis stem from the same root: environmental degradation resulting from the drive for rapid growth, which given social structures and technologies, leads to consumption of environmental resources beyond sustainable levels."⁹

Furthermore, he points to a myriad of individual decisions shaped by this country's policy framework and structure. "In some cases, these decisions were due to subsistence demands of the poorest segments of the population. But in many cases, it was the relatively well off trying to increase their living standards quickly."¹⁰

For centuries, governments at all levels have spurred economic growth through resource utilization. However, rarely are the costs of natural resource depletion and pollution adequately represented in governmental income accounts or in public or private budgets, meaning that drawing heavily on the environment can easily appear to substantially raise measured

⁸John D. Shilling, "Reflections on Debt and the Environment," Finance & Development, (June 1992), 28.

⁹Ibid., 28.

¹⁰Ibid., 28.

output (often overvalued) and lower measured costs (often undervalued).¹¹ When GDP is not growing very fast, or indeed falling, there is usually a scramble to protect incomes and usually to the detriment of the environment. The failure to resolve these internal distribution problems within the constraints of available resources has, in some cases, encouraged governments to follow shortsighted policies that are detrimental to the environment.¹² These policies have included the opening of fragile virgin timberland to harvest; an environmentally expensive, but quick fix solution.

At local levels of government, the opinion that growth and development are always positive and consensual is challenged by political science professor Roland Anglin who states that "local rapid economic growth has kindled debate about traffic gridlock, environmental degradation, and spiraling land costs. Because of these developments, citizens are reassessing their attitudes toward unconditional support for growth."¹³ Public-choice theory provides the dominant method used to examine local growth and development. Its axiom is that growth is maximized in

¹¹Ibid., 28.

¹²Ibid., 29.

¹³Roland Anglin, "Diminishing Utility: The Effect on Citizen Preferences of Local Growth," Urban Affairs Quarterly, 25. no. 4, (June 1990), 684.

communities through the number of high-income residents and firms and communities lure high income residents and firms by offering an attractive bundle of public goods or an increased quality of life. As benefits are divided among constituents, such as lower average costs for public goods, they stay and continue to pay local taxes. Because of such benefits, a consensus presumably develops between the elite and the masses to support unfettered growth and development. The move toward no-growth occurs where growth brings enough negative utility to certain residents.¹⁴ These residents tend to be upper to middle-class individuals possessing the resources and time needed to mount organized campaigns against rapid development and environmental degradation.¹⁵ Anglin contends that support or opposition for growth largely is determined by how residents value the by-products of growth. But these valuations are based upon the polled opinion of residents and offer diminutive use towards the establishment of economic value. What residents perceive offers only subjective response towards choices over development versus the environment. What is needed is a measurable means for capturing the intrinsic values of nature that residents maintain. These values should reflect the behavioral characteristics

¹⁴Ibid., 685.

¹⁵Baldassare, Mark. Trouble in Paradise, (New York: Columbia University Press, 1986), 86.

directly associated with the good and also be expressed in monetary terms. A carefully constructed choice model could prove to be a useful tool. Once data is obtained, it could be compared with expected value from a well established set of equitable alternatives.

CONSTRUCTING A HISTORICAL MODEL

Before we develop a choice model, it would be beneficial to discuss the context of our development versus environment dilemma. In exploring the relationship between development and the environment we need to construct a brief historical model; that is, how change has occurred over time. What we see is that there exists a conflict in U.S. policy over economic development and the environment. An on again, off again pattern had occurred between political administrations where environment and development policies have been written. Much of the environmental policy has been conducted with only fleeting reference to the development of the economy, the process which assumes greatest explanation,¹⁶ and working in tandem with capitalism has been our national quest for expansionism. Since the low point of the great depression in 1933, the US economy has experienced virtually continuous expansion; furthermore,

¹⁶Redclift, 2.

Americans like to think of themselves as being always on the move.

"Whether or not Lewis Mumford was correct - the fourth migration was to be a resettling of the countryside and to achieve a better balance between rural and urban environments for living - it is interesting to note how much the mobility of people has become a defining characteristic of what the USA stands for. Driven by technological change, the spatial patterns of the country are in a perpetual process of redefinition in a restless search for new frontiers and opportunities"¹⁷

Though arguments have been made for the right of people to live where they choose, they tend to be coupled with other arguments that people should follow capital to new frontiers of opportunity. Considerations of capital efficiency are, on the whole, taken more seriously than other kinds of logic, such as quality of life or the environment. Indeed, part of the contradictory nature of capitalism is that the environmental crisis presents a massive threat to the earning powers of entrepreneurs, as under-written by U.S. policies.¹⁸ The U.S. belief is that capital should have unrestricted mobility, and that all factors of production including labor, should locate wherever they expect the highest returns. People prosperity, it is argued, is preferable to place prosperity, because it enhances

¹⁷John Friedmann and Robin Bloch, "American Exceptionalism in Regional Planning, 1933-2000," International Journal of Urban and Regional Research 14 no. 4, (1990), 578.

¹⁸Redclift, 48.

the efficiency of capital, and all of us gain when capital gains. U.S. policies to promote regional expansionism have been availed through projects like Hoover Dam, the Tennessee Valley Authority, the Columbia River Basin Project and the construction of major transportation projects during the "New Deal" era. Beginning with the second world war, the federal budget exerted an enormous influence on the spatial patterning of the U.S. economy and these exertions were primarily based on military spending.¹⁹ The past twelve years have been an era of self-proclaimed public-private partnerships, "shameless excessiveness in the face of resurgent urban poverty, environmental degradation, and the dismantling of many social programs which popular movements had fought bitterly to establish."²⁰ Two major issues came to dominate this period: local economic development and land-use and environmental planning.

Citizen movements are beginning to demand tighter controls on growth both to protect the environment in their immediate surroundings and to ensure adequate provisions of public infrastructure commensurate with the projected growth.²¹ Friedmann and Bloch believe that the next decade will see an

¹⁹Friedmann and Bloch, 586.

²⁰Ibid., 597.

²¹Ibid., 598.

intensification of environmental activism, as the seriousness of the threats to health from air and water pollution, toxic wastes, and other hazards become increasingly apparent and as public awareness increases.

"Demands will be made for stricter growth management at local and even state levels and public opinions may well support rather drastic measures to prevent further environmental degradation and, if possible, to turn things around. Because of this, state governments will have to become even more involved than they already are with local and metropolitan efforts at controlling environmental quality and urban growth."²²

Thus, we see citizen efforts directed at re-establishing conditions of amenity in the community and environment which have been threatened by relentless and, as it seems to many, socially irresponsible growth. Furthermore, these citizens will need to understand that growth has, in the past, been directly linked to nature. "If we are interested, as we should be, in the ways in which the environment is transformed under capitalism then it might be useful to distinguish between the transformations that occur as nature enters and leaves the production process."²³ The contradiction for us, lies in the fact that we frequently overlook these transformations of exchange in value. While seeking our own indulgence through consumption we unconsciously create our undoing.

²²Ibid., 598.

²³Redclift. 178.

BORROWING FROM NATURE

We are not outside of nature, we are a part of it; which is the most important truth about ourselves. Our artifacts and our civilization is all borrowed. We are forever borrowing from the environment to create and maintain our way of life. We borrow resources from nature and transform them into goods in order to gain some temporary measure of economic well-being. Everything we transform eventually ends up back in nature after we have expropriated whatever temporary value we can from it.²⁴ The moment we introduce the idea of borrowing into economics however, a sense of responsibility suddenly enter the picture, because with borrowing comes the notion of indebtedness. If every aspect of our survival depends on borrowing, then we are indebted to the core of our being. Just as Jerome Rifkin says, "There is no such thing as free lunch," implicit in the concept of borrowing and debt is the idea of paying back; but, to whom does this responsibility rest? Some experts would say that the "me generation," are those who want it now, and prefer putting the costs of unfettered development, inefficient use of resources and other environmental externalities to future generations. Even in a short interim, those whose current life styles benefit the most

²⁴Jeremy Rifkin, Declaration of a Heretic, (Boston: Routledge & Kegan Paul, 1985), 97.

from these casualties would also choose to defer paying for environmental protection or preservation. So let us add to the list of goals offered by David Pearce that sustainability must also include advocating for equity between generations and equity within a generation.

WHO'S WILLINGNESS TO PAY

The ability to model human preferences for environmental goods, through the 'willingness to pay' principle, rests on ways of discounting present and future preferences. The rules for assessing anticipated future losses "can be modelled and analyzed in a framework which incorporates both economic and ecological considerations."²⁵ But many economists remain unconvinced that environmental resources represent a challenge which economics can and should address. Some, following a utilitarian position, would argue that there is no moral justification for extending individual rights to future generations. Some economists clearly do not see the environment as a problem for economics, even if economics is a problem for the environment.²⁶ Richard Norgaard on the other hand, insists that economic models do need to meet the challenge of future discounting. For one thing, future

²⁵Pearce, 599.

²⁶Ibid., 599.

generations need to inherit an improved capital stock and better technology that will equip them to substitute resources and overcome scarcity. The need to treat future generations as if they are living now, he argues, is not just a requirement of equity, but of the competitive conditions assumed by the economist's model which assumes exchange between generations.²⁷ Governments can rack up enormous future obligations far beyond their capacity to pay and their accounts will look perfectly balanced. Government accounting, in other words, is future-blind.²⁸ Vice president Al Gore, states that the accepted formulas of conventional economic analysis contain short-sighted and arguably illogical assumptions about what is valuable in the future as opposed to the present; "specifically, the standard 'discount rate' that assesses cost and benefit flows, resulting from the use or development of natural resources, routinely assumes that all resources belong totally to the present generation."²⁹ As a result, any value that they may have, to future generations, is heavily "discounted" when compared to the

²⁷Richard B. Norgaard, "Environmental Economics: an evolutionary critique and a plea for pluralism." Journal of Environmental Economics and Management, (August 1985), 455.

²⁸David Osborn, and Ted Gaebler, Reinventing Government, (Massachusetts: Addison-Wesley Publishing Company, Inc. 1992), 243.

²⁹Al Gore, Earth In The Balance, (Boston: Houghton Mifflin Company, 1992), 191.

value of using them up now or destroying them to make way for something else. "The effect is to magnify the power of one generation to compromise all future generations."³⁰ In the words of Herman Daly, "there is something fundamentally wrong in treating the earth as if it were a business in liquidations."³¹

A NATIONAL ACCOUNTING PROBLEM

Financial accounting teaches us that physical assets are investments. When a government builds a highway or dam, it is creating something of value, almost like a savings account. As the dam ages and wears out, its value declines - because without expensive repair, it will ultimately give way. This use is a form of spending, in business it is called depreciation. But as Herman Leonard points out, "our national accounting systems hardly takes notice."³² Since they were designed to track cash transactions, they don't record the declining value of a physical asset. At all levels of government, accounting records almost entirely ignore what assets are owned, their state of repair, and their value. These systems therefore imply that it costs nothing

³⁰Ibid, 192.

³¹Herman E. Daly and John B. Cobb, For The Common Good, (Boston: Massachusetts, Beacon Press, 1989), 8.

³²Herman B. Leonard, Checks Unbalanced: The Quiet Side of Public Spending (New York: Basic Books, 1986), 170.

to use existing assets. Indeed, they suggest the opposite: by cataloging the costs of maintenance as a current expense, they make it seem cheaper to use up assets than to keep them in good repair.³³

Consider the most basic measure of a nation's economic performance: gross national product (GNP). In calculating GNP, natural resources are not depreciated as they are used up. Buildings and factories are depreciated; so are machinery and equipment, cars and trucks. In the state of Washington, for instance, why isn't the forest depreciated when it is cut down and the topsoil washes away after careless harvesting methods have reduced its ability to resist wind and rain? Why isn't that loss measured as an economic cost of the process by which profits are produced during the year? The wear and tear on the chain saws and logging trucks as a result of a year's work will be entered on the expense side of the ledger, but the wear and tear on the forest itself will not. In fact, nowhere in the calculation of this country's GNP will there be an entry reflecting the stark reality that a million acres of forest is now gone.³⁴ And for all our institutions, the single most important measure of progress in economic performance is the

³³Ibid., 171.

³⁴Ibid., 184

movement of GNP. For all practical purposes, GNP treats the rapid and reckless destruction of the environment as a good thing!

Economist Robert Repetto believes that traditional economic valuation techniques lead to a gross distortion of national accounts. He states:

"Natural resources make important contributions to long-term economic productivity and should be considered as economic assets whose value lies not in their investment cost but in the potential income they can generate. If natural resources are not treated as productive assets, economic planners receive false signals that reinforce the unsound dichotomy between the economy and the environment."³⁵

The fundamental definition of income encompasses the notion of sustainability. In accounting and economics textbooks, income is defined as the maximum amount that the recipient could consume in a given period without reducing possible consumption in the future. Business income is defined as the maximum amount the firm could pay out in current dividends without reducing net worth. This income concept encompasses not only current earnings but also changes in asset positions: capital gains are a source on income, and capital losses are a reduction in income. Depreciation accounts reflect the fact that unless the capital stock is maintained and replaced, future consumption possibilities will inevitably decline. In resource dependant

³⁵Robert Repetto, "Nature's Resources as Productive Assets," Challenge (September-October 1989), 16.

economies, the failure to extend this depreciation concept to the capital stock embodied in natural resources, which are such a significant source of income and consumption, seriously distorts economic evaluations.³⁶ Even in economies where dependence does not rely solely on the resource, to treat the loss of natural resources and an externality is a travesty.

Such gross displacement of natural resource evaluation is not indicative solely to national accounts. State and local economies follow similar paths. Models which have been developed to consider fiscal impacts as a consequence of development specifically avoid indirect costs of environmental resource depletion because of: "the near impossibility of predicting accurately the secondary consequences of growth, the recurring potential for double counting when primary and secondary impacts are viewed simultaneously."³⁷ These indirect costs are often discounted as negative externalities to be written off because it is assumed that the "contagion effects"³⁸ of land uses in the long run will net to zero. In other words, the extension of development over areas that consequently destroys natural

³⁶Ibid., 17.

³⁷ Robert W. Burchell, David Listokin and William R. Dolphin, The New Practitioner's Guide to Fiscal Impact Analysis. (New Brunswick New Jersey: Rutgers University Center for Urban Policy Research, 1985), 3.

³⁸Ibid., 3.

resources will have no meaningful, much less measurable, consequences. Why aren't these consequences considered ahead of time? If an assessment of the monetary value based on intrinsic preferences can be made prior to a proposed development, perhaps "negative externalities" that otherwise would be discounted as worthless could be regarded as an asset. The environmental asset could be either certain or contingent; meaning the assets potential exists but is either inaccessible or unrefined in its present state. In any event, if we are to accept the notion that a natural resource can be an asset, in ways other than as a direct market good, then we need a more concise definition as I offer below.

DEFINING NATURAL RESOURCES

As previously stated, natural resources are not accounted for in our economic well-being. Somewhere down the road we have managed to confuse the idea of reproducible resource with the idea of perpetually inexhaustible resources. They are not the same. Living resources reproduce, but the life support systems that nourish them do not; for example, air and water. Michigan State University economics professor, Larry Pedersen takes an more anthropocentric view point by stating that "resources are not, they become;" that is, not until the attributes of good are

discovered does a natural commodity become a natural resource through derived demand. Therefore, resources are dynamic and socially determined. Changing tastes can make a resource uneconomical to use; for example, fur coats or burning wood for fuel. Many resources cannot be measured. They are omnibus and, as such, are available and shared by all. Thus, the means for valuing many resources is, in some minds, a stretch of the imagination; while in others, there exists a need to redefine what natural resources actually are and what they do.

Lets assume a simple definition that resources are useful and valuable commodities in the conditions we find them, either through direct consumption or after processing. Taken a step further resources serve an environmental function as:

- 1 Storehouse of raw materials
- 2 Source of convertible energy
- 3 Disposal support system for all flora and fauna
- 4 Source of aesthetic beauty
- 5 Space for occupancy

As Albert Schmidt has argued, natural resources are the products of a conversion process through which labor is applied to nature. There is nothing natural about natural resources. To begin with, the concept of property is socially determined in any given environment. Natural resources are those which are of potential use to human beings. They are socially determined in the sense that "their value is related to the technologies used

to exploit them and the existence of people who consume them."³⁹

Raleigh Barlowe defines natural resources by their division into three primary classifications: funds, flows and composites. Funds or stock resources are exhaustible. They can be chemically changed through use, they wear out slowly and they may be recyclable. Examples of fund resources include metals and some fuels. Flows are self-renewing resource. Their basic characteristic are that they can be captured, directed and applied for use. These resources would include the sun, wind, tides and other climatic phenomena. Composite resources are the biological type and follow growth and decay curves. So long as there is seed stock, composite resources can be renewed. The productivity of these resources are heavily influenced by Mans' intervention. The most prominent resource of this type is soil. All types of resources call for different types of management and are have different relationships with time and value.

NO ECONOMIC ACCOUNTABILITY

"Unless you can measure it, you can't control it," says Repetto. "Resources are declining and there are only slight efforts to quantify the natural resource system."⁴⁰ While

³⁹Albert Schmidt, The Concept of Nature in Marx. (London: New Left Books, 1971), 105.

⁴⁰Repetto, 16.

national income accounts treat buildings and equipment as productive capital whose value depreciates over time as they perform valuable work, natural resources assets are not so valued. Instead, they are treated as gifts of nature rather than as productive assets. "The hard truth is that our economic system is partially blind. It see some things and not others."⁴¹ It carefully measures and keeps track of the value of those things most important to buyers and sellers, such as; food, clothing, manufactured goods, work, and indeed, money itself. But its intricate calculations often completely ignore the value of other things that are harder to buy and sell for example; fresh water, clean air, the beauty of the mountains, the rich diversity of life in the forest, just to name a few. In fact, the partial blindness of our current economic system is the single most powerful force behind what seems to be irrational decisions about the environment.⁴²

A GROSS PROBLEM: VALUATION

The idea of attaching a price to externalities has its roots in both Marxism and Neo-classical economics. Marxists are concerned primarily, with the process through which use values

⁴¹Ibid., 17.

⁴²Gore, 183.

are converted to exchange values. Together with radical ecologists, Marxists agree that the market allocates natural resources in a inefficient way through time, ultimately destroying the basis of survival for future generations.⁴³ Nevertheless, Marxists see the commitment to commodity production under capitalism as making ecological externalities inevitable. Neo-classical economists have attempted to get around the problem of environmental values by attaching a price to externalities, enabling them to be treated as if they were part of an optimized resource model.⁴⁴ This does not necessarily enable economists to incorporate the environment successfully into their analyses, but it does enable them to model human preferences in the environment, at least at the theoretical level.⁴⁵ However, exchange values are difficult to determine. Different people have different preferences.

As we shall see, preferences will have a great deal to do with the process of valuation. Monetary value, as such, is a tightly defined and rigorously defensible concept. It is not, of course, the only possible definition of value. As one reaches beyond the economic disciplines, the concept of value takes on

⁴³Ibid., 46.

⁴⁴Redclift, 47.

⁴⁵Ibid., 47.

additional meaning and interpretation. Unaware of these additional potential interpretations of the meaning of value, economists have frequently failed to communicate the limitations of monetary measures.⁴⁶ At the heart of monetary value are the choices one makes for final consumption. These choices can be viewed as bundles. That is, bundles of good or service that the individual or group seeks to receive through the consumption of any given commodity. This implies that values are inherent in individuals. People do not buy goods because suppliers make them and people do not utilize natural environments just because they are there. Consumers decide what is actually purchased in the market place or what benefits are to be anticipated in an outdoor environmental experience. More subtle, the values being measured are the rational motivation behind actual consumer decisions and the values being sought are expected to be consistent with the observable behavior of the individual.⁴⁷ Economists model the process of ranking and comparing alternatives using indifference curves. Take for example a simple scenario like buying a cup of coffee. I will need to make some assumptions that I have equal time for each decision and that the availability (but not the

⁴⁶Robert Mendelsohn and George Peterson, "The Definition, Measurement, and Policy Use of Monetary Values", Amenity Resource Valuation, (State College, Pennsylvania: Venture Publishing, 1988), 54.

⁴⁷Ibid., 55.

price) of a cup of coffee is ubiquitous. Ordinarily I would compare the price with all possible sources and would superficially state that I arrived at my decision by comparing prices in the marketplace. My decision can also be based on a pattern of established behavior; that I have made this decision so frequently that I no longer seek the valuation of the good itself. Some economists would agree, that traditionally it is not necessary to value the commodity to value the good. However, in reality I am exploring my indifference curve by attempting to derive at my anticipated maximum benefit: good taste, a boost in energy, low calories, a hot beverage, quality, atmosphere, and whatever else. In fact, all consumers compare along their indifference curve all the benefits that they would typically receive by making a particular choice. The point is, monetary values are consequent and inadvertent behavioral values. They are intended to explain how people actually make choices. In experimental settings, psychologists have had difficulty getting people to reveal their indifference curve. In these settings, people have a tendency to be conservative and hold on to their current bundle. These experiments have suggested that the concept of an indifference curve is not part of consumer's conscious awareness even though their market behavior may be

consistent with such a notion.⁴⁸ What is required is a well defined map of indifference curves for any good or service under consideration.

COMMODITIES OF EXCHANGE

As economies grew more complex and individuals became more specialized, physical items became more specialized and awkward as a means of exchange. Thus, societies gradually moved towards a common easily transported and stable medium against which all physical items could be traded. This common medium is money. The dollars are not intended to be direct measures of satisfaction but rather the small bundle of goods each of us would give up to get more X and remain on our indifference curves. The availability of market prices as a measure of the marginal value of traded goods and services has, unfortunately led to some confusion. Because the price of traded goods is their monetary value, then goods without prices must have no value. Services provided through the public or the environment when not sold would appear to be worthless. This argument, however is flawed. Many goods are not traded in the market places so their monetary value is not reflected in market prices. For example, national defense, public education, health research,

⁴⁸Ibid., 55.

clean air and water, and most recreation opportunities in national recreation areas are not bought and sold in the market. Nonetheless, all these goods or services have monetary value as long as people are willing to trade some of their wealth for them.⁴⁹ Furthermore the value of both market and non-market goods and services change as they become more or less scarce. In any event, the problem lies not in whether monetary value exists but in the application of methods for determining the monetary value that these goods possess.

METHODS OF VALUATION

For purposes of resource allocation, monetary assessment can provide prudent and essential assistance in determining outcomes for those resource. Deriving value for an individual is much less complicated than that of society at large. Although the basic building block is the individual's preference, it can only be assumed that the social values of the individual and society are identical. Furthermore, public goods are not consumed by a single individual. For example, national defense, clean air, outdoor recreation areas, or fisheries are all resources shared by more than one user. The value of public goods, because they are jointly consumed, is the sum of what all the users would

⁴⁹Ibid., 57.

individually pay for the good. One widely recognized method is contingent valuation which encompass both the willingness to pay (WTP) and compensation demand (CD) principles that utilized a branch of psychology called hedonics.⁵⁰ This method requires two steps. First, a hedonic price schedule is estimated. This simply represents an equilibrium price schedule and generally does not reveal information about individual behavior. Second, demand or bid functions are derived; although, this step is much more complex due to theoretical and economic difficulties and potential shifts in public policy. In practice, these techniques are particularly well suited to studying localized externalities since the key problems with the hedonic methodology and benefit estimation do not arise.⁵¹ A localized externality affects only those in proximity to the externality such as urban neighborhood settings. Determining people's willingness to pay for environmental improvements or to avoid environmental degradation is important in designing environmental policies. Similarly, policy makers must frequently consider the compensation that people would require to accept reductions in environmental

⁵⁰The concept most commonly used by social psychologists to refer to the value of any object is the concept of attitude, also known as hedonics. An attitude is a disposition to respond favorably or unfavorably to a commodity, person institution of event.

⁵¹Raymond Palmquist, "Valuing Localized Externalities," Journal of Urban Economics 31 no. 1 (January 1992), 59.

quality.⁵² Outside of localized situations, WTP is not without its problems. For example, there is a long-standing controversy about the differences between willingness to pay and willingness to accept in the contingent valuation literature.⁵³

Willingness to pay reflects the money people would be willing to exchange for more of the good and still be just as happy as they are now. Willingness to accept (or compensation demand) reflects the money they would have to be given to be just as happy as with less of the resource. In both cases, the intention is that the person remains on the same indifference curve both before and after the change. Economists have had some success with willingness to pay models in recreational settings where users' behavioral characteristics are distributed over travel time, taking work off, length of stay and other criteria. On the down side however, WTA has been five to six times larger than CD, in some studies, revealing that contingent valuation estimates, or at least certain estimates of monetary values, must be viewed cautiously.⁵⁴

Other methods of valuation include simple travel costs models designed to value an entire site by estimating the demand

⁵²Ibid., 68.

⁵³Ibid., 69.

⁵⁴Mendelsohn and Peterson, 63.

for trips to the site. The hedonic property (wage) method determines the value of environmental factors surrounding private property (employment) by exploring the variation in sale values (wages) within a private market. The multiple site travel cost model is intended to value types of sites and to explore interaction among systems of sites. The generalized travel cost model attempts to value site characteristics by examining subtle shifts in the demand for trips to various sites. Finally, the hedonic travel costs method estimates the value of site characteristics by examining how users choose which site to visit.

A PROPOSED MODEL

In this section I will propose a hypothetical model that might be useful for our purpose; that is, to simulate how a valuation model might be applied for a natural environment in a localized setting. The goals are to maintain private ownership of property, to avoid the use of exaction proceedings, and to encourage the use of conservation where conservation becomes a convivial learning tool. An argument could be made for a nexus between the lose of that environment and a legitimate state interest, should a development significantly impact a natural environment; however, I will want to avoid litigation where the

issue of taking is concerned. By encouraging the use of conservation with WTP or WTA models, I hope to provide the means for achieving mutual benefit and to create a situation where participants engage in a learning process. In this scenario I have formulated a hypothetical situation where a proposal is before a local planning agency for a single family housing development on a twenty acre parcel of property. A trout stream runs through this property and is revered by fisherman as exceptional. The stream is also a part of a much larger riparian system where its banks connect with various other properties. Environmental scientists have informed us that the destruction of this portion of the stream would significantly impact the total riparian system and therefore should be protected. The planning commission does not want to prohibit the development of the property because this development will provide greatly needed housing and will augment municipal and school tax revenues. The commission would like to recommend to the city council that it establish a two part program. One that creates an initial reward for a environmentally sensitive site plan and progressively rewards the new housing association for following environmentally sound maintenance practices. The planning commission has asked us (consultants to the commission) to prepare both programs. Our report will state the following:

1. that a density bonus be developed for initial conservation effort.
2. that a ongoing tax abatement program be initiated to reward conservation efforts.⁵⁵

The planning commission has ask us to prepare a report indicating the monetary value of that portion of the property which contains the stream as it relates to the human choices based on a willingness to accept model. This model should result in a method for deriving the compensation equivalent to the tax abatement offered. Furthermore, the intrinsic values which are derived should be solicited in a market-like-environment according to the following:

Consequently, if respondents treat an evaluation procedure as a nonmarket process, their logical strategy is to exaggerate actual values. In a WTP environment, they tend to respond with value measures that understate their actual demand for the good. Likewise, in a WTA environment, they tend to overstate the compensation required to reduce the level of a good's provision. Without the addition of a market-like elicitation procedure that induces truthful revelation of value, the gap and associated asymmetry between WTP and WTA measures should not be expected to

⁵⁵The establishment of a tax abatement program is intended to simulate Garret Hardin's concept of the "Tragedy of the Commons" in which initial exploitation of a resource may lead to an immediate gain for the individual but over time the losses become to great to overcome, both for the individual and the community. To avoid degradation of the stream over time, land owners who participate in the conservation program will be rewarded through abatements. Penalties in the form of higher tax assessments will be issued should the opposite occur. In order to monitor conditions a yearly inspection will be required. Furthermore, maintenance specification will be written for the participants and would be made available, free of charge, by the city.

disappear.⁵⁶

To best simulate a market-like-environment we will select a control group to conduct our experiment. This control group will record their assessment on site at various times throughout the experiment. Economists also say that it is impossible to separate the measured value of the good from the elicitation procedure through which the value is obtained⁵⁷ thus, one of our many tasks will be to devise a questionnaire in which values are to drawn during the site visitation; however, there is another issue of bias that must be overcome. Psychologists will argue that many biases are more likely to arise from variations in the frame work by which values are elicited.⁵⁸ This means the questions must be written in a way that also achieves equilibrium between WTA and WTP. It must question the participants indifference to the use of the stream and reveal the greatest possible incentive for truthful revelations of intrinsic value. Hypothetically, the experiment would work like this: Ten individuals from the community would be randomly selected. The

⁵⁶David S. Brookshire, Don L. Coursey and Karen M. Radosevich, "Market Methods and the Assessment of Benefits: Some Further Results." Amenity Resource Valuation, (Pennsylvania: State College, Venture Publishing, 1988). 168.

⁵⁷Ibid., 168.

⁵⁸Ibid., 168.

environmental attributes and boundaries of the riparian area alone would be described to the group. They are told that only the area within the riparian boundaries are to be considered. Each individual in the control group is given 100 tokens. These tokens are to serve as a monetary equivalent to an previously determined exchange value. Prior to sending the control group out to the site they are asked to bid an amount for the value of the site; that is site unseen. Upon completion of this initial bid, the individual is asked to visit the site within a specified period of time. While at the site the individual is to answer the corresponding survey. This procedure is repeated three times and following each visit, the participants is allowed to adjust his/her initial bid. Upon completion of the experiment, the recordings are tallied and a distribution curve is developed. The mean values can now be used to arrive at a level of compensation that the homeowners would be willing to accept and the actual compensation would result in yearly tax abatements.

Of most importance to this discussion is that neither human values nor the environment of any kind or type are static. They are in a continual state of transformation. Ecosystems are constantly evolving as are human choices, influenced by tastes and trends in the market place. We cannot base our models on static assumptions about technology, tastes and environmental

investments by the community. Through time, all valuation models will require adjustment to the attending conditions.

THE PRESENT DILEMMA

Economists' tools alone might be too crude for assessing the value of the natural environment. Economists have attempted to value various environmental services but the question for them is whether or not these values are meaningful. Monetary value is a limited concept of exchange that is dependent on supply, demand, competing substitutes, and consumer sovereignty. It does not necessarily convey either inherent worth or ethical wisdom. Air, for example, has no direct monetary value, but we can't live without it. Monetary value can be further subdivided into priced and non-priced, cash and noncash values. It also can be broken into marginal prices and non-marginal values, and further comes unglued in terms of willingness to pay for rights not owned and compensation demanded for the loss of owned rights.⁵⁹ The problem for economists becomes one of maintaining efficiency. Is it possible for economic analysis, to determine the intrinsic value of nature? Environmental philosopher Mark Sagoff says yes and identifies three broad categories: instrumental, aesthetic and moral.

⁵⁹Peterson, Driver, Gregory, 258.

The instrumental value of something is utility as a means to some end. The "end" in economics is the satisfaction of preferences. Price or willingness to pay are the common measures of this type of value.⁶⁰ People also value nature aesthetically, as an object of knowledge and perception. To quote Sagoff, "While the basis of instrumental value lies in our wants and inclinations, the basis of aesthetic value lies in the object itself, in qualities that demand an appreciative response from informed and discriminating observers."⁶¹ Finally, according to Sagoff, we value an object morally when we regard it with love, affection, reverence and respect. "Like aesthetic value, the basis of moral value lies in the object itself, rather than the benefits the object confers on us."⁶² We often value moral objects as unreplaceable. Moral and aesthetic value are both intrinsic, that is, they are both concerned with the inherent worth of something. The question becomes, can intrinsic values be measured using the tools of economic analysis? Can they be reduced, at least in part, to economic terms? "Given perfect tools, economists can measure instrumental values. For example, economic value tells us nothing about distributive justice; how

⁶⁰Mark Sagoff, The Economy of the Earth: philosophy, law, and the environment, (New York: Cambridge University Press, 1988), 2.

⁶¹Ibid., 15.

⁶²Ibid., 16.

should we compare a rich person's willingness to pay for a luxury good with a poor person's willingness to pay for food? For the most part, the tools of economics are fairly well suited to measuring instrumental values."⁶³ Perhaps economists could also generate some very crude indicators of the aesthetic value of nature, depending on exactly how we define aesthetic value. While there are great philosophical and methodological problems in measuring the aesthetic value of nature,⁶⁴ I think that the tools of economics can capture some, but not all, of this type of value.

When it comes to the moral value of nature, however, even perfect economic tools would be of little use. The reason is simple: Moral values are nearly impossible to appraise across groups of individuals⁶⁵ and equally difficult to expressed in monetary terms. Moral values are associated with a host of espoused myths that are dissimilar in each person or culture group. For example, the way parents value their children or the way people value traditional burial grounds cannot be meaningfully expressed in dollars. Rather than measuring moral

⁶³David N. Bengston, "Toward Broader Theories of Values in Forest Economics," Paper presented at the Midwestern Forest Economists Meeting, Sault Ste. Marie, Ontario, 19 August 1991, 7.

⁶⁴Ibid., 8.

⁶⁵This would be an required assumption where an un-bias control groups is used to solicit a value judgement.

value using willingness to pay, exactly the opposite is required: Our unwillingness to pay, or unwillingness to accept compensation are indicators that we value something morally.⁶⁶

CONCLUSION

I am not convinced that the instruments of economics are all that are necessary for valuing resources. At times these instruments appear to be too blunt. Perhaps they should include other disciplines for measuring behavioral characteristics. Trying to estimate the intrinsic values of nature with the tools of economics is a bit like performing brain surgery with a chain saw. It can't be done, and the results are very messy and probably counterproductive. Chain saws cannot be used to perform brain surgery, and the raw tools of economics cannot be used to get at intrinsic values. New refined tools are required. When decisions are made or justified on the basis of economic value, to the neglect of deeply held, intrinsic values, the result is increased social conflict over resource management.⁶⁷ We need to recognize that people value nature in ways that are not directly be expressed in dollars; however, these deeper values seem to be becoming increasingly important as economists in concert with

⁶⁶Sagoff, 68.

⁶⁷Bengston, 8.

social scientists seem to be breaking ground in this new field.

If economists are going to contribute to managing the environment for multiple values rather than multiple uses, they need to broaden their theory of value. When real market context is not available, as in the case for nonmarketed goods, precise specifications of the context becomes especially important. The key assumption of the contingent valuation method is that consumers are able and willing to answer such questions truthfully. Those in the behavioral sciences are particularly suited to develop these specifications. Economists need to work with environmental philosophers, other social scientists, ecologists, and the public to better understand the diverse and complex values associated with nature. Nevertheless, economists are not the only ones who need to push for changes. Social psychologists and other behavioral scientists need to become more interested in valuation in the context assessing nonmarket goods of applied public policy. Many of the topics they study, or at least the way they are studied, are interesting from a scientific point of view but are not very relevant to the needs of policy analysts.⁶⁸ It will take movement from both sides if more effective collaborative arrangements are to be successfully accomplished. Perhaps it is time for a discipline of applied

⁶⁸Peterson, Driver and Gregory, 260.

behavioral economics, or applied economic behavior, with a faculty consisting both of economists and of other behavioral scientists and with a targeted agenda of policy application.

Lastly, the various value assessment models that have been developed by leading scientists need to be tried where land use applications can be found. I believe that the land use arena not only provides a rich testing grounds but will prove to be the litmus test for these models. They will either gather strength or fail miserably when challenged for constitutional validity and substance. Planners will need to exercise extreme caution when either opting for amenity valuation models or interpreting their results. In any event, the future for amenity resource evaluation appears luminous. This text is an exploration of the possibility of that new science, and of the environmental benefits that could arise from its practice.

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