



Policy and Its Application – Not Always the Same by Lester W. Reed, PhD

Public policy as espoused by governments is often a study in contrasting statements and actions. Actually a more accurate gauge of policy is “Policy is what policy does.” By that I mean that, what an organization (governmental, corporate, private, etc.) does, or how it behaves, is really the indicator of what are its true policies. Stated policy can often conflict with concrete examples of the policy being pursued. This approach to judging policy is certainly appropriate in the arena of environmental policy where protection of ecosystem is often a stated goal but destruction is facilitated. Faculty who wish to heighten their students’ awareness of policy issues have many options. One which is especially meaningful because of its international connotation is the approach to managing the Antarctic.

The Antarctic, unlike the Arctic region, is actually a continent. Also, unlike the Arctic, it is not governed by various sovereign nations who “own pieces of the region”. The national territorial claims to the Antarctic continent are currently held in abeyance and activities governed by international agreements. The primary agreement is the [Antarctic Treaty](#) and its accompanying amendments. It is designed to protect the continent's environment and prevent exploitation for military and commercial purposes. (See www.anta.canterbury.ac.nz/resources for an in-depth review of the treaty and its environmental protocols.)

Basically the treaty’s policy approach to the environment is to prohibit activities that would disrupt the natural balance. However, in spite of that intent, there are increasing threats to the fragile ecosystem of Antarctica.

Among the primary threats is ecotourism which is surely to increase with the artistic and economic success of the documentary *The March of the Penguins*.



Penguins on the March

As of 2003, 14,000 tourists visited Antarctica up from 3,700 in 1990. With tourists come pollutants, intrusion into natural environmental processes, and the potential of introduction

of invasive species.

Another threat is the sixteen research stations operated by nine nations. There is little doubt that a great deal of Antarctic science and research has global significance. Residents at these sites are involved in some type of scientific undertaking, either research or related to logistical operations. Unfortunately some scientific bases have been characterized by their lack of environmental awareness. Waste items such as oil drums have been allowed to accumulate and pollute areas.



Penguins sharing an old fuel dump

Now most governments and scientists recognize the value of a clean Antarctica and are taking steps to avoid contaminating it. However, the presence of these sites creates the possibility of serious negative impacts on the region either by accidents or “unintended consequences” of their activities.

A third threat is the possible move to extraction activities aimed at recovering raw materials. Iron ore, coal, and other minerals have been found in the Antarctic, but their quantities are unknown. It has been theorized that oil and natural gas exist beneath the continental shelf, although no commercial-size deposits have yet been found. To date the highly uneconomical nature of mining resources there effectively prevents exploitation, but as worldwide reserves of these items diminish and technology improves, mining operations become more a possibility.

How the treaty provisions apply and the action of the signatories to mitigating or eliminating these threats provides an excellent topic for examination of environmental policy as it is stated and applied.

For more information on Antarctica search *Antarctica Environmental Issues* and *Antarctica Research*.



Shifting Baselines by Wynn W. Cudmore, PhD

Faculty in natural resources and environmental science are often asked by students to explain the apparent apathy of the public to the slow erosion of our natural resources. Human greed, population growth and short-sighted public policy have all been cited as contributing factors in one situation or another. However, these causes do not necessarily contribute to our understanding of the general acceptance by the public of the persistent decline of environmental quality. I would argue that another factor needs to be added to the list - the change in perception of what is considered "acceptable". As reference points of "how things used to be" are allowed to shift, we lose track of our standard and accept a more degraded state as being "normal" or "natural".

The concept of "shifting baselines" was originally developed in 1995 by fisheries biologist, Daniel Pauly of the University of British Columbia to explain the decline of commercial fish stocks. As catch rates of commercially important species such as Atlantic cod, striped bass and Pacific salmon gradually declined, the perception of the condition of the stock also changed. Expectations for landings of these species declined gradually right along with the population size of the fish themselves. For salmon, restoration efforts and hatchery programs have boosted populations to levels nearly twice those of the 1930's. However, these levels are no more than 10% of the populations in the 1800's. What is the baseline for the 30-year old fisherman in the Columbia River today? What would be considered a "good year"? Depending on the time-frame being used, what is accepted as a "good year" today might have been seen as a "disaster" less than 100 years ago. And with shifting baselines, perhaps a "disastrous year" today will be seen as a "banner year" in the not too distant future.

More recently the concept of shifting baselines has been applied to a wide variety of environmental problems. Shifting baselines result in a continual, gradual degradation of a number of environmental parameters that go unnoticed by the average citizen. Ocean conditions, fish and wildlife abundance, air quality, forest condition, etc. may all degrade over time without significant awareness by the average citizen. Land conversion, for example, from natural vegetation to agricultural land to residential and commercial land clearly

illustrates the concept. This change can occur quite rapidly with significant impacts (generally negative) on natural resources and the natural environment. Population growth, land ownership, existing land use laws and other factors may influence the rate and nature of this conversion. At the same time there are greater demands placed on the existing infrastructure such as roads, schools, parks and wastewater treatment systems. Some would argue that this land conversion along with greater demands placed on services we value may result in a significant decline in the overall livability of an area. Yet, for the most part, these changes are readily accepted by society.

An individual may be quite willing to accept a change in environmental condition seen over a short time frame when in reality that is just a small portion of a larger, gradual decline. The baseline of what is commonly accepted shifts as time marches on. The mobility of modern society aggravates the problem. Since people move frequently and settle in different places, it is rare for a single individual to become sufficiently familiar with the baseline conditions at a single location (i.e., they do not develop what has been called a "sense of place"). Having no familiarity with historical conditions makes one more willing to accept the current condition as the baseline. Only the elders of the community who have lived all or most of their lives in one location have the perspective to appreciate the change. When these elders are asked, "What was it like when you were young?", invariably they report that, "Things were much different then." In today's society, individuals with this longer perspective are becoming more rare.

Even if such elders can be identified in a community, this type of awareness is limited by the human life span. Changes that occur across generations are even more difficult to document as they require inter-generational communication. When this communication fails, the baseline shifts again. While there may be a few individuals in a community who take the initiative to explore past conditions through research, these individuals are in a minority. The general awareness of past conditions and the desire to return to them is lacking.

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Natural Resources Adaptation Institute for Middle & High School Instructors
August 6-11, 2006 in Salem, Oregon

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NCSR Natural Resources Adaptation Institute

The institute will provide experiences that will enable teachers to connect their students to their communities through community exploration lessons, conduct community needs and opportunities assessments, and design and conduct community projects that focus on the environment and the use and management of natural resources. Participants will learn how to design educational opportunities that will connect student learning experiences to the community they live in.

Time will be provided for each participant to develop a community-based project to be implemented during the following school year. Each participating teacher will receive \$300 for attending the institute and another \$200 when they have submitted evidence of the project that students have carried out.

The Institute will be held at Western Mennonite High School campus from August 6-11, 2006. The site is located approximately 10 miles northwest of Salem, OR. They have a beautiful campus with a dormitory, kitchen, and classroom facilities making it a great site for the institute.

Shifting Baselines continued...

Environmental degradation that occurs as a result of shifting baselines is a gradual, insidious degradation that will be far more difficult to reverse than the short-term degradation to which we more readily respond. For example, we are far better equipped to deal with the clean-up of a major oil spill than the gradual decline of oil reserves. We are far better equipped to stop the point source pollution of our rivers by industry than the long-term addition of non-point source runoff from huge land areas. And, as a society we are far more likely to resist the addition of a new Wal-Mart to the community than the decades-long land conversion of land use of which it is but a small part. Unfortunately, in the long run, *these* are the types of environmental changes that have the potential to have long-term effects on the environment and as a result the livability of our environment and quality of life.

Most natural resource faculty incorporate the elements of ecosystem change and ecological restoration into their courses. To provide a complete picture of environmental change, students should be made aware of the magnitude of change from historical points of reference. This long-term perspective and an awareness of the role of shifting baselines should help students understand the current status of natural resources. It may also provide some direction for the sustainability of natural resources and the restoration of those ecosystems that have been degraded.

More information on the application of shifting baselines may be obtained from:

www.shiftingbaselines.org





Placing a Value on Ecosystem Services by Wynn W. Cudmore, PhD

In modern natural resource management, business models and market strategies have become commonplace. As a result, natural resource decisions are often based on "return on investment" analyses in which the justification for investment is based on short-term profits gained. This approach is probably quite effective for commodities that are readily traded in our markets, such as lumber, lobsters and wheat. Other values, however, such as esthetics, wildlife habitat and clean water may be more difficult to manage on this basis. The relatively new field of environmental economics attempts to assign value to these less traditional commodities.

Obviously, humans derive many essential commodities from natural ecosystems - seafood, game animals, fuel wood, timber and pharmaceuticals are just a few examples. These goods represent important and familiar parts of the economy. Less appreciated are ecosystem *services* such as soil formation, decomposition of wastes, pollination, climate regulation and erosion control. These services are critical to the functioning of Earth's "life support system". Without them, natural systems and the human economies that depend upon them would grind to a halt. Although they contribute both directly and indirectly to human welfare, the value of these services is not usually represented in commercial markets. Economists refer to such services as "externalities" - resources that belong to no one in particular and thus are enjoyed for free. This neglect by our economic system may ultimately compromise the ability of humans to live sustainably on Earth. The incorporation of their value into decision-making processes would seem to be an important first step in the development of a sustainable society. Only then, can society be expected to respond to threats to ecosystem services or shortages in the goods that ecosystems produce.

To gain some appreciation for our reliance on functioning natural ecosystems, imagine that humans wish to colonize

the moon. You are given responsibility for the preparation of the lunar landscape before colonization. Assume that the moon has somehow acquired some of the basic conditions for supporting life - a suitable atmosphere, a moderate climate and the physical components of soil. Your primary task will be deciding which of Earth's estimated 30 million species should be transported to the moon to convert the sterile landscape into one that could support humans. Which species would you select?

You might start with those species that we exploit directly - foods, drink, fiber, timber, oils, drugs, spices, etc. This would probably keep you busy for a while but you could do it. Your list would total hundreds or perhaps thousands of species, but that would only be the beginning. You would then need to consider those species required to support each of those on your first list - bacteria, fungi, insect pollinators, food species for animals, etc. Clearly your list would soon spiral out of control. Additionally, humans have not yet gained sufficient knowledge of any ecosystem to determine all those species required to allow it to function.

In recent years, a number of scientists and economists have attempted to estimate the value of ecosystem services in an effort to inform the public of their true value. Researchers have used three approaches to calculate the value of nature's goods and services. When available, market prices were applied. More commonly, however, "replacement value", the amount of money required to replace these services should they be lost, were calculated. If neither of these could be determined, the public's "willingness to pay", was estimated and used as a value. The researchers identified 17 categories of goods and services (flood control, pollination, etc.) provided by nature and then, using published reports, estimated the dollar value of each. Then, they partitioned the Earth's surface into 16 biomes and determined which services



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Placing a Value on Ecosystem Services continued...

could be provided by which biomes. Dollar values were applied to the area of each biome that provided that service to determine total value.

For the entire biosphere, the value of ecosystem services was estimated to be in the range of \$16 - 54 trillion per year with an average of \$33 trillion per year. Most of this value lies outside of conventional economic markets. For comparison, the global gross national product (GNP) total is approximately \$18 trillion per year. Thus, by this estimate, ecosystem services have a value that is equivalent to nearly twice the global GNP!

Clearly, these numbers are estimates with a high degree of built-in uncertainties and authors of these studies acknowledge these uncertainties. It is extremely difficult to assign dollar values, for example, to environmental esthetics or long-term environmental benefits. Nevertheless, given our incomplete knowledge of ecosystem function, an estimated value of \$33 trillion is almost certainly an under-estimate of actual value. "Replacement value" holds little meaning for an ecosystem service that is irreplaceable.

Estimates such as these make it abundantly clear that ecosystem services provide an important portion of the total contribution to human welfare on this planet. If ecosystem services were actually paid for, the global pricing system would be very different from what it is today. The price of commodities using ecosystem services directly or indirectly would be much higher. Wages, interest rates and profits would change dramatically. Estimates of the value of global ecosystems could be used to modify national accounting systems to better reflect the true value of ecosystem goods and services. These estimates could also be used in decision making processes that use a cost-benefit analysis to determine a particular course of action. In the past, these services have been largely ignored in these determinations. The result has been a number of human

endeavors whose social costs far outweigh their benefits.

Economic development that destroys ecosystems and impairs services that they provide can create costs to humanity over the long term that greatly exceed the short-term benefits of the development. A short-term focus on economic development and how we use the land often incurs great costs to be paid, not by us, but by future generations.

Issues concerning the advantages and disadvantages of placing a value on ecosystem services provide fertile ground for classroom discussions. Despite its popularity, assigning proper value to ecosystem services is not without controversy. For example, some would contend that even if we are able to put a price tag on ecosystem services, only with a fundamental shift in the human-nature relationship will some values be preserved. In any case, students will likely voice a variety of viewpoints on the topic and will benefit from thinking about how environmental issues interface with other aspects of society.

An internet search for "value of ecosystem services" will yield an abundance of resources on this topic. Robert Costanza of the University of Vermont and Gretchen Daily of Stanford University are two of the most prominent scientists who have published extensively on environmental economics.

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Wolves and the Public by Lester W. Reed, Jr., PhD

In a recent article I discussed the reintroduction of the Gray Wolf into Yellowstone as an example for introducing habitat recovery efforts. A secondary issue of this reintroduction effort is the psychological impact on and behavior of segments of the public. Reaction to wolves' reintroduction is polarized between those in favor and those opposed. Few animals carry the degree of controversy and the ability to trigger passionate responses, as does the wolf.

For the wolf-lovers sitting around the campfire, the wolf's howl might touch a spiritual chord connecting the listener to the natural world. For ranchers sitting at the campfire, the howl might trigger anger, trepidation, and a feeling of threat to their way of life. For the big game hunters it may signal the loss of a prize trophy elk. All sides develop their political agenda based on these reactions. As a result there have been compromises to public policy and regulation



which do not seem to satisfy either side. Pushing solutions from barring livestock from public lands to shooting on sight, the debate continues. Lost are the facts or the science behind the facts. The wolves' reintroduction provides faculty with an excellent vehicle to explore public attitudes

about ecosystem restoration and provides a setting for critical analysis of a current ongoing debate. For references, search topics such as *Yellowstone Wolf Public Reaction* or *Wolves Public Reaction*. The available sites provide a wealth of materials for developing instructional materials that focus on the impact of public attitudes on the recovery of habitat and ecological systems.

New Instructional Module Survey

NCSR is developing new instructional modules for natural resource topics. We will be contacting selected faculty to determine the relevance of the proposed topics.

If you receive a copy of the module survey please take a few moments to respond. Your input is important and will be greatly appreciated.