900217

June 10, 1998

Eric Fairclough
Minister of Renewable Resources
POB 2703
Whitehorse, YT, Y1A 2C6

Dear Mr. Fairclough:

Enclosed is an article on ecological economics that I recently submitted to the newsletter of the Yukon Conservation Society. Consider it my citizen's statement to YTG regarding the many cost-benefit analysis that the Yukon is currently undertaking, including the protected area strategy, and policies for mining, logging and agriculture.

I look forward to your reply

Sincerely,

Alejandro Frid
Boreal Research Associates
Site 20, Comp. 357,
Whitehorse, YT, Y1A 4Z6
Email afrid@yknet.yk.ca
Phone 867/393-4027

CC:
Bob Kuiper (YPAS),
Danielle Heon (YTG economic development),
Joy Waters (YTG Renewable Resources),
Graham McDonald (YTG Renewable Resources),
Juri Peepre (CPAWS),
Skeeter Wright (YTG DAP),
YCS,
Susan Carlick (TRTFN)

THE ECONOMICS OF CONSERVING AND DESTROYING NATURAL CAPITAL

Submitted to the newsletter of the Yukon Conservation Society, June 1998

Alejandro Frid, Boreal Research Associates, Site 20, Comp. 357, Whitehorse, YT, Y1A 4Z6, Canada,
Email: afrid@yknet.yk.ca, Phone: 867/393-4027

Devotees of mainstream economics argue with conviction that setting aside areas to protect ecosystems is harmful to the economy. Protected areas, they warn, vaporise dollars and jobs that could've been produced from logging, mining, or some other resource extraction. Thanks to these arguments, debates over development and conservation usually result in resource extraction scoring quite well, while ecosystem conservation typically scores a big round zero. It is no secret that conservationists have been terrified of economic arguments for a long, long time. But folks, the times, they are a' changing.

After more than a century of loosing against the holy grail of mainstream economics, ecologists and a new generation of economists are developing financial arguments to support ecosystem conservation. In the growing field of ecological economics, scientific criteria are used to assign monetary value to ecosystem services, such as flood control, climate regulation, and pollution sinks. When ecosystem services are considered in quantitative and monetary terms, the common presumption that protecting land from development causes economic losses becomes debunked. For example, a recent Canadian study valued wetlands at $50,000 per hectare for their contribution to water purification and pollution sinks, and $100,000 per hectare for regulating flood peaks.

Before describing how ecological economists come up with such figures, let's briefly examine some tenets of mainstream (or neo-classical) economics. This system, which dominates our current economic worldview, is driven by the interests of individuals demanding access to goods, regardless of where goods come from and the environmental consequences of extracting the raw materials. Thus, how much wild salmon we catch today becomes a function of how much we can sell, not a function of how many are left nor the rate at which they are being depleted. In fact, according to the logic of mainstream economics, there is little reason to consider the environmental consequences of production. This is the case because the contribution of natural resources to production has the same weight, and certainly not an iota more, as the contribution of machinery, buildings, and tools. Just like a wrench or truck, natural resources are *valuable but not essential* to the production of goods. In fact, mainstream economics thrives on what is known as the doctrine of infinite substitutability. This doctrine asserts that there are no limits to growth because human technology will forever overcome scarcity of any production factor—or capital—by substituting *infinitely* natural resources with human-made resources. Mainstream economists reason that human ingenuity and technology are so amazing that no issue of scarcity is insurmountable. Not surprisingly, mainstream economist Robert Solow—who was a Nobel laureate—claimed that ".. the world can, in effect, get along without natural resources". A fine test of Solow's hypotheses would be to put a plastic bag around his head, cutting him from

access to a natural resource we call oxygen. We can then record whether, in effect, he gets along. At the very least we should ask Dr. Solow for the economic calculations and feasibility study for substituting with technology the atmospheric oxygen required by the billions of us humans and our food supplies. The tenets of mainstream economics are not only utterly naïve, but as ecological economist Paul Hawken stated, they "...have created an economic system that tells us it is cheaper to destroy the earth than it is to maintain it."

How did things get so out of hand? One reason is that the theory behind mainstream economics was developed around the 1870's. Back then, it was not completely obvious that natural resources were finite, and there were no immediate consequences to using resources at market speed. Our technology for resource extraction (and thus capacity for supply) and human population (and thus the collective demands of individuals) have grown exponentially since. To continue to drive markets solely by the sacred interests of individuals willing to pay for products, rather than by the limits of natural resources and ecosystem resilience, is like refusing to land a plane that is about to run out of fuel.

How does ecological economics differ from mainstream economics? The obvious difference is that ecological economists are aware that natural resources are finite, and that it is unrealistic to substitute such resources entirely with human technology. Thus, they recognise that letting the market be driven solely by the human interests of today could severely compromise the human interests of tomorrow. Most importantly, ecological economists recognise that natural resources are not just another factor in production—they are *the* ultimate factor that limits production. Thus, depleting natural resources severely undermines our economic future. The notion of natural capital, which recognises natural resources as a form of capital that is clearly different from that of manufactured capital, is indeed one of the trademarks of ecological economics. In contrast, mainstream economics disregards the importance of natural capital.

Perhaps more importantly, while mainstream economics values natural resources only as commodities, ecological economics also values the services that ecosystems provide to humans. For example, a mainstream economists will value a forest solely on the basis of the board feet of lumber of each tree. In contrast, an ecological economist will value the lumber, but will also consider the forest's role in flood regulation, carbon storage, oxygen production, sustaining wildlife, etc—and assign monetary value to such ecosystem services.

How do ecological economists valuate ecosystem services? One method is to quantify "substitution costs". These are the expenses that would have to be incurred to replace a given ecosystem service with technology. For example, the money we would have to spend building a dam to prevent flood damage would be the substitution cost for the flood regulation service of a wetland that we propose to fill in to build a subdivision. When valuating a forest, potential substitution costs include the money we might spend buying and trucking drinking water from elsewhere if proposed large-scale logging and silviculture have a high probability of fouling our water supply with siltation and/or chemical herbicides. (This example is close to home, as all of the drinking water in my household comes from the local river.)

Calculating "avoided expenditures" is another method for valuating ecosystem services. For example, while global warming is projected to melt ice-caps and cause a rise in sea-levels, trees absorb carbon, reducing CO_2 accumulation in the atmosphere and

decreasing the threat of global warming. Thus, the damage to human property and livelihood potentially caused by rising sea levels—the avoided expenditure—would be part of what the worlds forests are financially worth if left standing as storage units for carbon. Another financial worth of leaving a landscape undisturbed by large-scale logging or mining may include the avoided expenditure of restoring stream habitats required by commercial salmon fisheries.

Yet another method used by ecological economists is known as "input-output analysis", which considers interactions between conflicting industries. For example, the short-term economic benefits of large scale mining and logging can be explicitly weighed against the long-term economic losses of devaluing the area for subsistence hunting and wilderness tourism.

These three methods and other tools used by ecological economists are not perfect ways of valuating nature. Indeed it is far easier for the mainstream economist to measure the dollars generated by extracting resources than it is for the ecological economist to assign monetary worth to ecosystem services. The former task is a mere function of market values. The latter task is an educated guess that is limited by our knowledge of how complex ecosystems function and what they actually do for us. Because ecologists rarely know everything that ecosystems provide to humans, figures produced by ecological economists are almost certainly *underestimates* of what the ecosystem services are actually worth. Still, when looking beyond the value of commodities such as lumber and hydroelectric power, Paul Hawken reminds us that, "(w)hile there may be no right way to value a forest or a river, there *is* a wrong way, which is to give it no value at all."

Even when economic analyses use mainstream criteria and do not consider ecosystem services, evidence has not always supported the presumption that protecting land from development will harm local economies. In fact, a case study by economists Rasker & Hackman came up with the following, compelling results:

> "We analyzed employment and income trends in northwestern Montana (USA) for counties with a high degree of wildland protection versus counties with high levels of resource extraction and little wildland protection. Employment and personal income level in "wilderness" counties grew faster than in "resource-extraction" counties. Wilderness counties also showed higher degrees of economic diversification and lower unemployment rates. No direct cause and effect relationship was established between wildlands protection and economic development, but to the assertion that protecting wildland habitat for large carnivores is detrimental to a region's economy, enough counter evidence is presented to suggest an alternative hypothesis: the protection of wilderness habitat that sustains wild carnivores such as grizzly bears and wolves does not have a detrimental effect on local or regional economies. Evidence presented suggests that economic growth is stimulated by environmental amenities. Further, case studies in southern British Columbia and Alberta in Canada and the Greater Yellowstone Region, in the US, where environmental protection has been explicitly recognized as an economic development strategy, suggest that environmental protection and economic development are complementary goals."

Of course, no ecological economists would ever argue that the whole world should become a protected area. While protected areas are one important tool to conserve ecosystem services and other natural capital, nobody can deny that our houses are made of forest products, and that ecologists burn fossil fuels to pursue their research. The tenets of ecological economics, however, can be used to determine the rates and methods that we use to extract resources. Tools such as "substitution costs" and "avoided

expenditures" can be used to evaluate the costs and benefits of, for example, forestry booms reliant on feller bunchers (machines that allow single operators to clearcut large areas in a day) versus slower and smaller scale logging reliant on chainsaws. The latter may employ more people for more time, and also may be less destructive by requiring less machinery and roads.

On a personal note, I strongly believe in the spiritual and other intrinsic values of nature, and recognise that we must be cautious when we assign dollar values to biodiversity and ecological processes. Still, economic arguments ultimately will dominate most political decisions involving conservation. Ecological economics provides tools for counter-arguing the seemingly strong logic behind mainstream economic analyses that support large-scale resource extraction. While we will always need to extract resources to improve or maintain our standards of living, the economics driving such extraction need not be as naïve and short-sighted as the dominant but outdated system of mainstream economics has led us to believe.

Literature used to prepare this article

Daily, GC (editor). Nature's services: Society dependence on natural ecosystems. Island Press. (ISBN 1-55963-476-6; can be obtained by phoning 707/983-6432.)

Edwards, PJ, & C Abivardi. 1998. The value of biodiversity: where ecology and economy blend. Biological Conservation 83:239-246.

Prugh, T., R. Constanza, J. H. Cumberland, H. Daly, R. Goodland & R. B. Norgaard. 1995. (Foreword by Paul Hawken). Natural capital and human economic survival. Sinauer and Associates. Sunderland (ISBN 1-887490-02-7; can be obtained by phoning 413/549-4300.)

Rasker, R. & A. Hackman. 1996. Economic development and the conservation of large carnivores. Conservation Biology 10:991-1002