

Symposium Sparks Debate: Should the American Fisheries Society adopt a position on economic growth?

"Connections Between Economic Growth and Fish Conservation," a symposium held at the 2005 American Fisheries Society (AFS) conference, included eight presentations and a lively concluding discussion. The symposium dovetailed with the "Economic Growth Forum" of *Fisheries* Volume 30 and offered a chance for AFS members to discuss perhaps the most important issue facing the fisheries profession today: the relationship of economic growth to fish conservation. Ultimately, the key questions raised were: (1) Should AFS take the position that there is a conflict between economic growth and fish conservation? (2) Should AFS take the position that the establishment of a steady state economy is a more appropriate goal for certain nations than the perennial goal of economic growth?

As a professional organization devoted to the study and conservation of aquatic ecosystems, AFS may choose to adopt a formal position on economic growth for presentation to the public and the federal government, much as the U.S. Society of Ecological Economics did in 2003 and the North America Section of the Society for Conservation Biology and The Wildlife Society did in 2004. By reporting the events of the symposium, we hope to stimulate AFS members to investigate the arguments more closely and make their opinions known to the Society regarding a potential AFS position.

Our approach is to present a summary of events as we remember them. We will not attempt to present events in chronological order or to recount every fact or anecdote articulated. Rather, we will attempt to distill the major themes for clarity as objectively as possible. We note that, although we have taken conventional and ecological economics courses, we are trained primarily as ecologists, not as economists. However, we believe that ecologists are essentially "economists of nature." Ecologists and conventional economists alike study the processes of production and consumption, allocation of resources, and distribution of product. Conventional economists focus on these processes as exclusively human endeavors while ecologists tend to deal with a wider scope of species.

Two groups adopting distinctly different viewpoints quickly emerged from the symposium discussion. We refer to them as "proponents" and "opponents" of the idea that economic growth conflicts with fish conservation and that, therefore, a steady state economy (with stabilized population and per capita consumption) is more conducive to fish conservation than is economic growth. Most of the debate centered around a position statement pro-

posed in a slideshow by Phil Pister. The position was a condensed version of the position advanced by the AFS Water Quality Section following the 2004 AFS Annual Meeting. It contained nine precepts or "whereas" clauses and five resulting planks or "therefore" clauses:



Whereas (Precepts):

- (1) Economic growth is an increase in the production and consumption of goods and services, and;
- (2) Economic growth occurs when there is an increase in the product of population multiplied by per capita production and consumption, and;
- (3) Economic growth is often and generally indicated by increasing real gross domestic product (GDP) or real gross national product (GNP), and;
- (4) Based upon established principles of physics and ecology, there is a limit to economic growth, and;
- (5) A steady state economy is generally indicated by stabilized (or mildly fluctuating) real gross domestic product (GDP) or real gross national product (GNP), and;
- (6) A steady state economy, with a stabilized (or mildly fluctuating) product of population multiplied by per capita consumption, is an alternative to economic growth; and;
- (7) A steady state economy, with stabilized (or mildly fluctuating) production and consumption of goods and services, is an alternative to economic growth, and;
- (8) The North American economy grows as an integrated whole consisting of agricultural, extractive, manufacturing, and services sectors that require physical inputs and produce wastes, and;
- (9) There is increasing evidence that North American economic growth is having negative effects on the long-term ecological and economic welfare of North America and the world.

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Therefore:

- (1) There is a fundamental conflict between economic growth and fish conservation based on the ecological principle of competitive exclusion, and;
- (2) There is a fundamental conflict between economic growth and the ecological services underpinning the human economy (for example, pollination, decomposition, climate regulation), and;
- (3) Technological progress occurs via research and development that requires funding and the use of natural resources, has many positive and negative ecological and economic effects, and may not be depended upon to reconcile the conflict between economic growth and fish conservation, and;
- (4) A steady state economy is a viable, sustainable alternative to a growing economy and has become a more appropriate goal in the larger, wealthier economies of North America, and;
- (5) The long-run sustainability of a steady state economy requires its establishment at a size that does not breach ecological and economic capacity during expected or unexpected supply shocks such as droughts and energy shortages.

Pister also identified four "other clauses to consider."

- (1) Because of its negative effects on long-term ecological and economic welfare, economic growth is an increasingly dangerous and anachronistic North American goal.
- (2) A steady state economy does not preclude economic development, a qualitative process in which different technologies may be employed and the relative prominence of economic sectors may evolve, and;
- (3) Upon establishing steady state economies, it would be advisable for North American nations to assist other nations in moving from the goal of economic growth to the goal of a steady state economy, beginning with those nations currently enjoying the highest levels of per capita consumption.
- (4) For many nations with widespread poverty, increasing per capita consumption (or, alternatively, more equitable distributions of wealth) remains an appropriate goal for the time being, yet the ultimate goal should be the establishment of healthy ecological and social conditions within the framework of a steady state economy.

Pister's final slide announced, "The talks have been given: let discussion begin!" Discussion began indeed and, before long, was quite heated. Pister's show had represented the proponent view; opponents rejected the validity of the proposed position statement, with one opponent noting that he disagreed with each and every precept. A session moderator then projected on-screen each of the "whereas" clauses one by one so the two groups could identify points of agreement and disagreement. This turned out to be an illuminating

approach, as we found more instances of agreement than of disagreement.

There was no opposition to precepts 1–3, although precept 3 led to some elaboration. Although there was no disagreement that GDP and GNP were historically entrenched as indicators of economic growth, proponents and opponents alike pointed out that economists from a diversity of philosophical traditions have acknowledged the limitations of using GDP as an indicator of economic "health" or general welfare. Alternative metrics were identified, such as the Index of Sustainable Economic Welfare and the Genuine Progress Indicator, which account for other parameters of welfare such as disease rates, infant mortality, and literacy. Bhutan's "Gross Domestic Happiness" was also mentioned. Proponents stressed the fact that, in the vast majority of nations, official national income accounting agencies (such as the U.S. Bureau of Economic Analysis) discount these alternative parameters and indices, concentrating solely on GDP and GNP and conflating economic growth with general welfare.

Precept 4 generated the most intense and protracted debate. The debate illuminated a major philosophical difference between conventional or "neoclassical" economics and alternative (e.g., ecological or biophysical) economics. However, despite the tense atmosphere, respect was observed for all viewpoints and equal discussion time was granted for both.

Opponents argued that, in fact, there was no physical limit to economic growth, because much of economic activity is the result of human ingenuity, creativity, and intelligence, rather than the use of material resources. In essence, technological progress would always provide substitutes for scarce resources and reduce or ameliorate pollution. They also called attention to an emerging service economy, and especially its "information sector," that would eliminate limits to economic growth by dematerializing the economy.

Proponents stressed that the infrastructure associated with service sectors (for example, electricity for computers and universities for research and development) still requires resource inputs and results in waste production. Opponents argued that, as long as the ratio of service sectors (including information) to natural resource extraction increased, limits to growth would be overcome. Proponents then evoked the ecological principle of trophic levels and claimed that none of the service sectors, including information, are economically relevant in the absence of agricultural, extractive, and manufacturing sectors to employ the information and other services. Noting that animals (consumers) do not exist without plants (producers), they insisted that additional agricultural and extractive surplus is required for the growth of manufacturing and service sectors, thereby subjecting the economy to a size limit determined by the stock of natural resources or "natural capital."

With all agreeing on the importance of energy to economic growth, opponents claimed that the sun provides a virtually limitless source of energy. Proponents responded that the Earth operates as a system with a fixed rate of solar energy input, and that energy as well as material is, in fact, a finite resource. They argued, furthermore, that physical laws and ecological principles cannot be violated, no matter how

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intelligent future generations become. The laws of thermodynamics hold that matter and energy can neither be created nor destroyed, are conserved through all transformations, and that entropy tends to increase with every transformation. Economic activity, proponents elaborated, applies energy to natural resources to manufacture low-entropy goods, but creates high-entropy waste (pollution and heat) in the process. No physical, biological, or chemical transformation may operate at 100% efficiency, and useful low-entropy resources are degraded to waste.

Proponents then asked, if opponents were correct that economic growth could continue indefinitely on a planet of fixed size with finite resources, would that not be equivalent to maintaining a steady state economy on an ever-shrinking land mass? If so, could we not someday support a trillion dollar economy on the head of a pin? They claimed that economic growth during most of the Industrial Revolution has been "subsidized" in a sense by solar energy fixed over the course of 300 million years (i.e., via the fossilization of fuels), and that fossil fuels, especially petroleum, are becoming scarcer and more expensive.

One opponent noted that concerns about resource scarcity have been expressed since no later than the early 1800s and Thomas Malthus, yet we still have been able to maintain economic growth. Another opponent mentioned the famous bet between Julian Simon and Paul Ehrlich. Ehrlich chose 10 metals and wagered that the prices of each would be higher in 10 years because of scarcity, whereas Simon, believing that technology would obviate such scarcity, predicted that prices would remain the same or decrease. Simon won the bet. A proponent challenged the interpretation of the bet, however, stating that although Simon won per se, he actually lost in principle because price is not a good measure of scarcity for a variety of reasons (e.g., government subsidies). If the energy return on investment (EROI) had been calculated for each metal, Simon would have discovered that the cheap, abundant metals of the future were actually of lower grade and required proportionally more energy to extract and process.

On the subject of resource prices and the Ehrlich-Simon bet, another proponent pointed out that land, the aggregation of all natural resources, has increased in price inexorably for virtually all of American history.

There were no major disagreements on precepts 5-7, which are simply definitional, nor on precept 8, which is standard fare among all schools of economic thought.

Precept 9 was the other major point of contention. Opponents argued that the quality of life has improved immensely, for U.S. and world citizens alike, as a result of U.S. economic growth. They pointed to technological developments in health care, disease control, agricultural production, education, and satisfaction of material needs and wants. They challenged proponents to state how life could be better without economic growth, or why their children should not have an increased standard of living. Without economic growth, the argument went, we would not have the wealth and technology to solve environmental problems at home and around the world. Has not, for example, water quality and the amount of forested land been increasing in the United States since the 1970s?

Proponents agreed that, in many cases, technology associated with economic growth has alleviated much human suffering but has created new problems in the process. One proponent was concerned that her children would have a worse, rather than better, existence than her own because of environmental degradation, urban sprawl, traffic congestion, wars, and climate change. The implication was that each of those problems is linked to increasing production and consumption of goods and services (economic growth) and concomitant waste production. Proponents also agreed that, at least until very recently, water quality (as one example of environmental health) has improved in the United States, but argued that much of our environmental success has come at the expense of other countries. The environmental costs associated with resource extraction, energy consumption, and waste production of U.S. economic activity are paid by foreign societies, so while some of our own ecosystems appear to be intact, the damage is out of sight but just as real. Finally, proponents stated that the U.S. economy consumes a disproportionate share of world resources and produces an equally disproportionate share of world pollution, especially greenhouse gases, and that much of the resource extraction in other nations is financed by debt with inadequate concern for future generations or foreign citizens.

These were the highlights of the symposium discussion, as best we recall. We felt the debates were healthy and productive, and we hope our account is useful to those who missed the symposium. We conclude that the debates were a classic example of a difference in paradigm, reflecting different backgrounds and areas of expertise rather than vested interests and motives. Perhaps it was to be expected that the differences would predominate in the discussion. What seemed more striking, and most encouraging, was the amount of agreement on most key points. 