

REPORT: RESOURCE POLICY COMMITTEE

Economic Growth and Fish Conservation

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Views and opinions presented by the units involved do not necessarily represent those of the authors' employers.

INTRODUCTION

At its 2005 Annual Meeting, the American Fisheries Society (AFS) Governing Board asked the Resource Policy Committee (RPC), in partnership with the Socioeconomics Section (SES) and the Water Quality Section (WQS), to develop a study report summarizing the relationship between economic growth and fish conservation. This article is intended to update readers on that effort, and will be supported by a verbal report with alternatives to the Governing Board in Lake Placid in September 2006. The Board will then decide whether to ask the three Units to prepare an AFS policy statement on economic growth and, if so, which alternative direction would be preferred by AFS leadership.

Economic growth and fish conservation represents an intersection of human population growth, open access to public trust resources, resource consumption, and fish conservation, with the latter including water quality and related environmental concerns, the species, and harvest. In approaching such a complex assignment, the Committee and Sections recognized that socioeconomics, water quality, and fisheries trends are intertwined and difficult to separate in terms of their influence on fish conservation. Their collective effort provides some underlying basis for economic principles, resource trends, and ecological principles related to fish conservation. Our hope is that this article, and perhaps a more detailed study report that could lead to an AFS policy statement, will illuminate both the relationship between economic growth and fish conservation and a possible role for AFS.

This subject has proven to be quite controversial. AFS members working on earlier drafts of our study reports offered different opinions on approach and recommendations. Because consensus could not be reached among the three AFS Units contributing intellectual energy to this effort, our work to date is best presented in differing positions on the central issues. Accordingly, this article includes an opening statement by the Water Quality Section followed by a statement by the Socioeconomics Section.

FINDINGS AND POLICY PROPOSAL OF THE AFS WATER QUALITY SECTION

On 16 February 2005, the Society's WQS formally requested that the RPC consider a policy position on economic growth and fish conservation. The WQS had previously voted that economic growth—increasing production and consumption of goods and services—was incompatible with water quality and fish conservation, including the conservation of fish species, the ecosystems they depend on, and harvestable fisheries. The formal process of AFS position-taking was engaged, and this article represents one stage in the process.

As explained above, AFS established a committee to produce a draft study report on the relationship of economic growth to fish conservation. Ultimately the draft study report was not sanctioned by the SES representatives.

This article is a condensed version of the draft study report on economic growth and fish conservation as sanctioned by the WQS. For the sake of conserving space, references are not provided here but are available in the draft study report, which may be viewed at **(Query: Web address?)**.

Economic growth is an increase in the level of national product, income, and expenditure. It occurs via increasing population and per capita consumption, where "consumption" refers to that of households, firms, and government. Economic growth is indicated by increasing gross domestic product (GDP) or gross national product (GNP).

U.S. and North American economies have grown continually throughout their histories. In recent decades, the U.S. economy grew at a rate of approximately 2.5% per year. By the end of 2005, U.S., Canadian, and Mexican GDP were \$12.37, \$1.08, and \$1.06 trillion, respectively. Population growth and economic growth are virtually inextricable. All else equal, an economy grows at the rate of its population. Historically, however, North American economies have grown as a result of per capita consumption growth as well as population growth. In the United States, for example, per capita consumption is now more than four times its 1900 level.

It is theoretically possible to have economic growth based exclusively on growth in per capita consumption. However, population growth provides firms with more labor and consumers, and the government with more taxpayers. Public policy that encourages population growth is usually motivated out of concerns for economic growth. Therefore, it is impractical to address the issue of population growth in the policy arena without concomitantly addressing the issue of economic growth.

Major fisheries and fish species are in decline worldwide. These include species from primary consumers to the "super-carnivores" occupying the highest trophic levels; 90% of large predatory fish species are depleted in the oceans. At least 364 North American freshwater fishes are endangered, threatened, or vulnerable. This situation can be attributed to two main causes: overfishing and habitat degradation.

The linkage of economic growth to overfishing is clear. As the economy grows via population, there are more mouths to feed and, all else equal, more fish eaten. As the economy

grows via per capita consumption (which entails per capita income), wealthier consumers tend to eat higher in the trophic levels and eat more fish relative to less expensive foods.

The linkage of economic growth to habitat degradation is just as clear. When we look at the causes of habitat degradation, these causes invariably represent sectors, infrastructure, or byproducts of the economy. The sectors include such prominent economic activities as agriculture, mining, logging, ranching, and fishing. Examples of infrastructure include roads, power plants, and dams. The byproducts of economic production are generally referred to as pollution.

It is also worth noting the connection of economic growth to three other prominent threats to fish conservation: invasive species, urbanization, and global warming. Invasive species travel the globe as a function of commerce, often via ballast waters, the aquarium trade, and deliberate stocking of sport and forage fish. Urbanization represents the concentrated proliferation of the labor force, light manufacturing, and service sectors, resulting in fundamental alteration of natural habitats. Global warming is a function of economic activity, and nowhere is this clearer than in the United States where the economy is 85% fossil-fueled.

Humans are ultimately limited by such ecosystem goods and services as soil, water, minerals, primary production, renewable and non-renewable fuels, natural pathogen controls, and natural air and water purification. The less each human consumes, the more (or longer) humans (or other species) may be supported. Theoretically, the ultimate carrying capacity would be reached when all individuals in the population were using the bare minimum of resources to survive and all available resources were being used. If each human consumed twice as much, then the planet could support one-half as many. In other words, human carrying capacity may not be described solely in terms of population, nor solely in terms of per capita consumption, but rather in terms of population times per capita consumption, i.e., in terms of the size of the economy as indicated or approximated by GDP.

Principles of ecology add essential context for understanding the relationship of economic growth to fish conservation. Due to the tremendous breadth of the human niche, which continues to expand with new technology, the human economy grows at the competitive exclusion of nonhuman species in the aggregate, including fish and other species. That growth also fundamentally alters the structure and function of aquatic and marine ecosystems.

Invention and innovation, or "technological progress," have allowed *Homo sapiens* to broaden its niche dramatically at the competitive exclusion of other species. Yet there is another side of technological progress cited by those who do not acknowledge a fundamental conflict between economic growth and biodiversity conservation. In purely economic terms, technological progress refers to increasing output (of goods and services) per unit input (of land, labor, and capital). If this aspect of technological progress was predominant, then perhaps economic growth could be reconciled with biodiversity conservation. This prospect is sometimes referred to as "green growth."

The WQS does not view this prospect as valid, much less likely. When technological progress occurs in the context of economic growth as a national goal, the efficiency gains are not used to conserve input (land, labor, and capital) in the aggregate. Rather, when the goal is economic growth, the input that may have been conserved is used instead to obtain more output (goods and services).

Economic growth policy has been left entirely to politicians and economists. Fisheries and aquatic science must be advanced for purposes of informed economic policy-making. The mission of AFS is "to improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science and promoting the development of fisheries professionals." It seems clear that the "conservation and sustainability of fishery resources" will not "improve" when: (1) there is a fundamental conflict between economic growth and fish conservation, and (2)

economic growth is among nations' highest priorities. Both of these conditions exist, and only the second is malleable. The AFS mission includes the qualifier, "by advancing fisheries and aquatic science." It is precisely such science that has been omitted from policy discussions relevant to economic growth and fish conservation.

A steady state economy occurs when there is a stable or mildly fluctuating production and consumption of goods and services, which entails stable or mildly fluctuating population times per capita consumption. A steady state economy is not limited to a particular kind of political or economic system such as a capitalist democracy or a communist dictatorship.

It is unrealistic to expect the public and policy makers to immediately embrace the steady state economy as an immediate policy goal, although it is reasonable to expect the public and policy makers to slowly accept the appropriateness of a steady state economy as a long-term policy goal. In the interim, society must consider short-term approaches, or "stepping stones" toward a steady state economy. These stepping stones amount to lowered rates of economic growth. Therefore, it behooves the AFS to support a downward trend in the rate of economic growth. As the economic growth rate decreases, the rate of natural capital depletion will also decrease as will the decline of fish species and biodiversity.

Unlike a steady state economy, a gradually declining rate of economic growth is something that may be advocated and implemented immediately, because it is the normal course of affairs in economic policy-making to debate and negotiate preferred rates of economic growth. In the United States, for example, such dialogue regularly occurs among the Council of Economic Advisors, Federal Reserve System, and Department of Commerce, with various amounts of input from the public and other entities. The parties to the dialogue cannot do an adequate job of considering the public welfare without information on the conflict between economic growth and various aspects of environmental protection and ecological condition, including fish conservation. Such information is unlikely to come

from sources other than professional natural resources societies.

Given the findings presented in the draft study report, the WQS proposes

that the following position on economic growth (preceded if necessary by a preamble) be considered for adoption by the AFS:

Whereas,

- (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 the per capita production and consumption of households, firms, and government entities, and;
- (3) Economic growth is indicated by increasing real gross domestic product (GDP) or real gross national product (GNP), and;
- (4) Economies grow as integrated wholes consisting of agricultural, extractive, manufacturing, and services sectors that require physical inputs and produce wastes, and;
- (5) Based upon established principles of physics and ecology, there is a limit to economic growth, and;
- (6) A steady state economy is an economy with stabilized (or mildly fluctuating) production and consumption of goods and services, and with a stabilized (or mildly fluctuating) product of population multiplied by per capita consumption, and;
- (7) A steady state economy is generally indicated by stabilized (or mildly fluctuating) real gross domestic product (GDP) or real gross national product (GNP).

Therefore,

- (1) There is a fundamental conflict between economic growth and fish conservation based on ecological principles including niche breadth, carrying capacity, and competitive exclusion, and;
- (2) 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;
- (3) A steady state economy is a viable, sustainable alternative to a growing economy, especially in the larger, wealthier American economies, and;
- (4) 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, and;
- (5) 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;
- (6) A steady state economy is ultimately required for the conservation of fish, the ecosystems they depend upon, and harvestable fisheries, and;
- (7) Macroeconomic and microeconomic policy tools may be used in tandem to gradually reduce rates of economic growth pursuant to the long-run goal of a steady state economy, and;
- (8) Economic policy tools for human population stabilization may be carefully and gradually introduced for purposes of achieving sustainable, healthy economies including sustainable, healthy fish populations and fisheries.

An AFS policy statement on economic growth does not necessarily need to be explicit on which policy tools would be used to temper economic growth and to strive for the establishment of a steady state economy. However, we offer some observations on policy tools that could be incorporated in the statement if necessary.

Policy tools for fish conservation may be thought of in conventional economic terms as microeconomic and macroeconomic. An example of a microeconomic policy tool is an individual transferable quota, or ITQ, which is a transferable share of a Total Allowable Catch (TAC). The share may be sold or leased. An ITQ/TAC system falls under the general category of "cap-and-trade" systems. An ITQ/TAC system is conducive to the sustainability of a fishery, but is not a sufficient condition for sustainability. Fisheries are affected by a wide variety of variables, including various economic sectors operating upstream.


Another example is a tax on pollution. Polluters may be taxed to compensate for the costs to society of the pollution. Pollution is a major threat to fish conservation, and the fisheries profession should support all efforts to establish taxes that "internalize" the social costs (including degradation of fisheries and their ecosystems) of pollution.

Macroeconomic policies are roughly divided into fiscal and monetary. Fiscal policy refers to government expenditure and the financing thereof, most notably via taxes. Total expenditure and total taxes influence the scale of an economy. In general, increased expenditure has an expanding effect on scale, and increased taxes have a contractionary effect.

Monetary policy refers to the manipulation of the money supply and interest rates, which in turn affect each other. Along with fiscal policy, monetary policy is a blunt tool for affecting the scale of the economy. In general, expanding the money supply and decreasing interest rates have the general effect of expanding scale. These actions tend to stimulate spending and, especially in the case of lowering interest rates, investment, which stimulates the establishment and expansion of housing, infrastructure, and industry. The money supply may be expanded by reducing reserve requirements, i.e., the fraction of bank deposits that must be held on demand, buying government bonds on the open market, and lowering the interest rate.

Facing a fundamental conflict between economic growth and fish conservation, it is appropriate for the AFS to support macroeconomic policy reforms conducive to a steady state economy. These should be advocated in a way that makes it clear that an immediate transition from a growing economy to a steady state economy is both virtually impossible and highly undesirable. Instead, the AFS should advocate a cautious and gradual transition toward a steady state economy.

No credible set of economic policy recommendations for sustainability would be complete without addressing population growth. All else equal, population growth results in economic growth and is, along with economic growth, unsustainable. As with fish conservation, population growth may be addressed with economic tools. For example, certain aspects of the U.S. and state tax codes provide incentives



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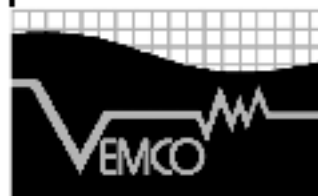
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for having children. The most obvious example is a per-dependent tax break for parents. Tax breaks could be provided for having no children, or for the first child, and eliminated for further children. A more stringent approach would entail a graduated tax on parents based on the number of children and the parent's income.

**SOCIOECONOMICS SECTION
COMMENTS ON THE "DRAFT
STUDY REPORT AND POLICY
STATEMENT ON ECONOMIC
GROWTH AND FISHERIES"**

The "Draft Study Report and Policy Statement on Economic Growth and Fisheries" authored by the RPC and WQS work group identifies major fish conservation issues and problems in the United States and the world. The report argues that macroeconomic growth is the primary source of these problems and identifies one preferred alternative to the goal of macroeconomic growth: a zero growth, steady state economy. That alternative is explained by the WQS in the preceding section of this article.

While the SES agrees that fisheries face many problems, the SES disagrees that a steady-state economy would solve them. The Socioeconomics Section is concerned about five issues. Finally, the SES offers two alternative policy suggestions designed to improve fish conservation without gross negative impacts on the rest of the economy (See the spring issue of the Socioeconomics Section newsletter for an expanded version of these comments: www.fisheries.org/socioecon).

The focus on economic growth and not the broader concern of economic

improved, but not larger, structure or system" and economic growth as "increase in the real level of national product, income, and expenditure." These definitions ignore the relationship between growth and development. Economic growth is one component of economic development. These are not necessarily competing objectives.

Achieving a goal of zero economic growth would require contractionary macroeconomic policy. The two major macro policy instruments currently used in the United States are monetary policy and fiscal policy. While one can use monetary and fiscal policy in an attempt to control economic growth, these are blunt, untargeted policies, and their links to the environment are tenuous at best. Indeed, the pursuit of zero macroeconomic growth with contractionary macroeconomic policy could cause the perverse result of degrading the environment.

Macroeconomic growth is the product of population growth and per capita gross domestic product (GDP) growth. GDP is a measure of aggregate, i.e., macro,

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development is justified by a false dichotomy. Economic development is defined as "qualitative change, realization of potential, evolution toward an



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economic performance. It is microeconomic activity, not macroeconomic growth, that contributes to overfishing, pollution and other environmental problems. As such, microeconomic policies, e.g., pollution taxes, are more appropriate policies for the goal of fish conservation.

The positive correlation between GDP and threatened and endangered species listings is the only empirical evidence advanced to support the goal of a steady state economy. This evidence is weak for several reasons. First, as the RPC/WQS draft study report is clear to state, correlation does not imply causality. Second, the time-series econometric model confuses stock and flow variables. Third, listing decisions are imperfect measures of endangered status. In contrast, the SES estimates similar models considering the issues raised above. Using similar time-series data and cross-section data the SES finds no empirical evidence to support the claim that per-capita GDP negatively impacts fish conservation. Models suggest that the problem is population growth.


Relationships between economic growth and fish conservation are extremely complex, and it is an oversimplification to assert that merely stopping growth will benefit fisheries. Even if it could be proven that a steady state economy is ultimately required for sustainability, left unanswered are critical questions such as who chooses which steady state, and who are the winners and losers of said choice?

The divergent goals of maximum economic growth and zero economic growth is a false choice. There is much middle ground. A goal of sustainable development is an alternative. Also, since gross domestic product is a flawed measure of economic growth and development, so-called Green GDP measures are alternatives that incorporate environmental quality. Pursuit of economic growth in green GDP is a viable alternative to a steady state economy. With these alternatives, households and business firms are not constrained by contractionary macroeconomic policy, but their negative impact on the environment is constrained with microeconomic-based environmental policy.

The AFS should focus on policies that educate economic experts, government leaders, and the public about the negatives associated with unregulated economic activity. The AFS should argue that society should pursue more fisheries conservation, not by imposing strict limits on GDP, but because it is in the best interests of society due to the increasing social costs of continued environmental degradation.

CONCLUSIONS

This article presents the differing views of two AFS Sections. The challenge before our Society is to weigh these and other options as we decide whether one could form the basis of a Society policy statement. Such statements form the basis for the Society's position on legislation, budgets, and decisions. The discussion leading up to Lake Placid, and like continuing beyond, will be robust. We encourage your participation, whether through a Chapter, Division, Section, Committee, or as an individual.



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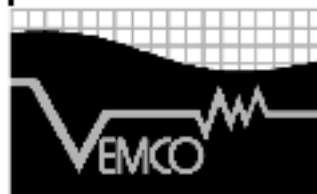
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