By John Epifanio, Ph.D.
Director, Center for Aquatic Ecology
Illinois Natural History Survey

Testimony to the Subcommittee on Fisheries & Oceans Oversight Hearing on the Federal Fish Hatchery System

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I wish to thank Chairman Gilchrest and the members of the Fisheries & Oceans Subcommittee for convening this hearing on an important public resource issue. I also wish to thank Congressman Pallone for inviting me to share my views and experiences on Federal hatcheries incorporation of the best scientific practices into their operations and uses, as well as to provide some insights into the future role(s) of Federal hatchery production and release programs.

During the past 20 years, I have had a number of relevant experiences that have shaped my perspective on these issues. First, as an aquatic resource scientist and fishery conservation geneticist with the Illinois Natural History Survey, the scope of my work has in large measure focused on the uses and the ecological-genetic impacts from the release of a broad range artificially propagated fish species (ranging from black basses to trout and salmon to American shad) on fish populations in recipient ecosystems. Additionally, I formerly served as the Assistant National Fisheries Program Leader for the USDA Forest Service, where we were mandated to manage aquatic resources and fisheries for multiple uses including ecosystem function, recreation, and other public uses. I also served in mid-1990s as a resource conservation scientist with the national office of Trout Unlimited, a non-governmental organization whose mission is to conserve trout and salmon and the ecosystems upon which they depend. Much of my focus at TU was to examine a broad range of hatchery practices at the federal, state, and local levels. Lastly, I presently serve on the Northwest Power and Conservation Council's Independent Scientific Review Panel where we review the scientific rigor of the Columbia basin's fish and wildlife programs - artificial production is a central focus for projects reviewed by the ISRP. In short, each of these experiences has contributed and given shape to the perspectives I will offer today.

My brief testimony today is intended to provide the members of the Subcommittee and Congress with an introduction to an alternate perspective on the need for an expanded investment in public infrastructure for producing and releasing a narrow subset of species and an even narrower component of biological diversity of those species. These perspectives and the information from which they are derived may be found in fuller detail in a list of articles and papers I provided to your staff and that have been published in the nation's leading professional and technically-reviewed journals by numerous authors, including myself.

To begin, I am not suggesting that we ought to dissolve the National Fish Hatchery System or cease federal public funding of state, tribal, or local hatchery production and release programs into public waterways. I am suggesting that we might explore alternate ways of using the federal hatchery system to strengthen and stabilize aquatic ecosystems. As a former agency program officer, however, I have experienced first-hand the difficulty in changing the direction and modernizing aquatic resource management approaches. My best scientific judgment is, however, that if we do not institute such changes by taking a more system-wide view and adapting our management approaches (based on a continuous stream of data and analysis), our chances of ensuring properly functioning aquatic ecosystems (and the products and services they provide) will be greatly diminished.

Ultimately, in my judgment, the proper frame of the debate at both the scientific and public policy levels should not be about whether to preserve, to enhance, or even to down-size the national hatchery infrastructure, but rather it should be about how we can most effectively conserve healthy and properly functioning aquatic ecosystems – and how the federal hatchery system can enhance, not undermine, our efforts conservation efforts. By taking such an approach, healthy self-sustaining fish populations and communities will result and thereby provide for desired multiple uses - including recreational catch, commercial and cultural harvest, various aesthetic and intrinsic values, and ecosystem services. In short, hatcheries alone are not an effective or adequate substitute over the long run for clean water, productive habitats, and the like.

Over the course of the past several decades, a host of scientific meetings sponsored by agencies and professional organizations such as the American Fisheries Society, as well as numerous "blue ribbon" panels have been convened to examine and address the appropriate direction, role, effectiveness, benefits, and risks associated with a focus on artificially propagated organisms as a tool for aquatic resource management. To highlight a few the Report of the National Fish Hatchery Review Team by the Conservation Fund in 1994, the "Upstream" report by a committee of the National Research Council in 1995, the "Supplementation of Salmon and Steelhead" reports by the Independent Science Advisory

Board of the Northwest Power and Conservation Council in 2004, and the 2004 report by NOAA Fisheries' Recovery Science Review Panel each in turn challenge the scientific underpinnings of the assumed and wholesale benefits from releasing artificially produced fish. (I will permit the next panelist to appropriately describe efforts of the American Fisheries Society).

The findings and recommendations within these reports, as well as those issuing contrarian positions in other reports might lead you to conclude that the "science" behind the debate remains riddled with uncertainty and lacks an overwhelmingly clear consensus. Ultimately, scientific debate is a healthy process because it helps frame the various sides of positions taken - as long as broader, general scientific principles are rigorously applied and factual evidence tiering to these principles is analyzed with robust methodologies and appropriate designs followed by qualified expert review for rigor and avoidance of inappropriate speculation or simple "wishful-thinking."

In a 2001 review article my coauthor and I suggested that part of the confusion and uncertainty had two root causes: a general misunderstanding that not all hatcheries or programs are identical in terms of their operation and approach; and, that the professional discourse about the various benefits and risks routinely rely on all-too-general terminology and focus. To address these root causes, we categorized hatchery propagation programs by overarching goal and operation along with the kinds of biological risks associated with each category. The bottom line was that if we are to advance the debate beyond an arrow-slinging exercise, we need to begin using a common accepted terminology and frame of discussion.

Ultimately, however, there are a number of general caveats and considerations relevant to all or most categories of production we defined. As the Subcommittee further debates the issues before it, I offer the following such general caveats and considerations.

1) Hatchery-reared fish often differ in fundamental ways (ecologically, genetically, behaviorally, and even in ability to fight or transmit diseases) from their naturally-produced relatives. Such differences are not trivial and emerge from vastly divergent rearing environments, growth patterns, learned behaviors, and even the choice of mated broodstock.

2) Hatchery production does not occur in a vacuum - fish produced ultimately are released into the wild and have effects (be these positive or negative) on recipient ecosystems. I believe it is a mistake to compartmentalize artificial hatchery production from its effects, relationships, and impacts with a recipient ecosystem following release. Two cases typify the potential problems. One is the continued wide-spread release of trout infected with whirling disease into the wild by certain fish and game programs. By focusing primarily on the production side of the equation, the high numbers of trout produced and released ignores the potential impact on native or recipient trout communities. A second example has emerged from the informal trading system among hatcheries to maximize production output. Such trades even for native species routinely include genetic stocks long-diverged from the intended recipient populations. These so called "genetic stock transfers" lead to homogenization of adaptive biogeographical structure or worse cause a reduction of productivity because of genetic mixing.

3) In fact, too often "success" of artificial production programs is defined in terms of pounds produced or numbers released. We need to identify and to better define more robust metrics of success, especially in terms of contribution to natural productivity, as a fundamental criterion of effective scientific adaptive management. Moreover, benefit-risk analyses need to fully account for and include risks as well as benefits of production and release.

4) Our focus on increasing the efficiency of artificial production within the hatchery might better be replaced by a focus on increasing the effectiveness of releases at restoring or stabilizing natural productivity.

5) There are a number of non-biological variables that drive decision-making about the use of hatchery fish. Because of upfront capitalization costs, costs of maintaining hatchery infrastructure, and operational costs there is considerable ongoing programmatic pressure to find a suitable use for artificially produced fish rather than operating programs as well-designed experiments to test the effectiveness of various management alternatives.

6) Ultimately, in spite of more than a century of artificial production and release as a tool for managing our nation's fishery resources, there is a surprisingly thin record and documentation of its success at stabilizing or restoring natural productivity in recipient ecosystems. In fact, much of the recent published record indicates that hatchery fish not only fail to supplement natural productivity, rather they more often displace or suppress natural production.

Based on these observations and consideration, I offer the following recommendations:
1) The future of federally operated and funded hatchery production and release programs will take advantage of the wealth of vetted scientific information and rigorous methods to ensure the appropriate application of science in aquatic resource management. As such, I believe federally operated and funded hatcheries should be:

- operated in a manner consistent with modern ecosystem management principles.
- viewed appropriately as part of the mix of aquatic ecosystem management, conservation, and restoration approaches rather than as separate or compartmentalized operations – that is, impacts must be accounted for in the balance sheet.
- based less on a “factory” model of aquatic resource management and more on a framework consistent with information and modern concepts from the fields of field ecology, population genetics, epidemiology and wild animal health, physiology, and others.
- planned, operated, and executed as well-designed experiments to provide data and appropriate indicators permitting informed adaptive management decisions and actions.
- used more as tools to learn about the effectiveness of various management options rather than as the preferred method until such time as it can be documented.

2) As a closing thought, because the depth of issues under examination today, the Subcommittee might wish to consider calling an independent panel (either through the National Academy of Sciences or other appropriately independent scientific body) to provide a fresh, unbiased, and appropriately focused assessment of federally operated and funded hatchery production and release programs for their successes, impacts, risks, and future opportunities.

Thank you, again, for the opportunity to share these views. I would be happy to address any questions Members might have.