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*167th National Meeting of the
American Association for the
Advancement of Science*

Rebecca Paulson, Editor

Michael S. Strauss, Ph.D.,
Annual Meeting Program Director

The Aquaculture Paradox: Does Fish Farming Supplement or Deplete World Fisheries?

Sunday, February 18
Hilton, Ballroom Level

3:00pm–6:00pm
Franciscan Room A

Organized by Roz Naylor, Stanford University; Rebecca Goldberg, Environmental Defense; Meryl Williams, International Center for Living Aquatic Resources Management

Sponsored by AAAS Section on Biological Sciences

Global production of farmed fish and shellfish has more than doubled during the past 15 years and currently accounts for over one-quarter of all fish directly consumed by humans. While many people believe such growth relieves pressure on ocean fisheries, the opposite is true for some types of aquaculture. Farming carnivorous species requires large inputs of wild fish for feed. Some aquaculture systems also reduce wild fish supplies through habitat modification, wild seedstock collection, and other ecological impacts such as effluent discharge, exotic species introductions, and pathogen invasions. On balance, global aquaculture production still adds to world fish supplies. However, if the growing aquaculture industry is to sustain its contribution to world fish supplies, it must reduce wild fish inputs in feed and adopt more ecologically sound management practices. This session will examine marine and freshwater aquaculture farming activities around the world. Among others, the session will address the following questions, "What are the overall impacts of aquaculture activities on environmental systems worldwide?"; "Does aquaculture enhance or diminish the available fish supply?"; "What changes in current practices could ensure long-term sustainability?" This session will present an important scientific and policy issue, and one that also addresses the common perception that aquaculture enhances current ocean fish productivity. Panel presenters will also address the opportunities and solutions available towards this end.

CHAIRS

Roz Naylor, Stanford University
Rebecca Goldberg, Environmental Defense

SPEAKERS

Meryl Williams, International Center for Living Aquatic Resources Management

The Right Type of Aquaculture

Albert Tacon, The Oceanic Institute

New Approaches and Strategies to Aquaculture Nutrition and Feed Development

Daniel Pauly, University of British Columbia, Canada

Down with Fisheries, Up with Aquaculture: Implications of Global Trends in the Mean Trophic Level of Fish

Nils Kautsky, Stockholm University, Sweden and The Beijer Institute of Ecological Economics, Stockholm, Sweden

Aquaculture and Biodiversity

Jurgenne Primavera, SEAFDEC

Socioeconomic Impacts of Aquaculture with Particular Reference to Shrimp Culture

Jason W. Clay, World Wildlife Fund

Private Sector Approaches: Implementation of Best Management Practices for Shrimp Farming

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DOWN WITH FISHERIES, UP WITH AQUACULTURE: IMPLICATIONS OF GLOBAL TRENDS IN THE MEAN TROPHIC LEVELS OF FISH Pauly, D. University of British Columbia, Vancouver, BC, Canada

Globally, the mean trophic level of fish landed by capture fisheries has tended to decline in the last decades, implying massive changes in the structure of the food webs from which these landings are extracted. Notably, this implies that large, long-lived fishes near the top of their food webs are gradually replaced in landings, and hence in the underlying ecosystems, by short-lived, smaller fishes and invertebrates, operating low in marine and freshwater food webs (Pauly et al. Science, Feb. 6, 1998). It will be shown that, conversely, the mean trophic level of aquaculture products has increased in many parts of the world, whether trophic levels are estimated based on the natural food of the species under cultivation, or the artificial feed used in various culture systems and which are usually rich in (marine) fish meal or oil. These paradoxical trends can be explained only in terms of global markets responding to perverse incentives, due to non-consideration of what economists call 'externalities' (notably pollution, and other forms of environmental degradation), supported by a research establishment that has lost itself in techno-fixes. Some implications of these and related trends are discussed, with emphasis on their implications for aquatic biodiversity and global food security issues.