Advocates for Wild, Healthy Oceans

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Finfish & Open-Ocean Aquaculture

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The Ocean Conservancy

The Ocean Conservancy's Position

To protect ocean ecosystems, native fish populations, and human health, The Ocean Conservancy believes that aquaculture in ocean waters must be governed by a strict regime of scientifically sound regulations. Regulations are necessary to eliminate damage caused by effluents, escapes of cultured organisms, and other risks posed by aquaculture operations. The need for such measures is urgent, given the anticipated growth of the industry. Open-ocean culture of finfish in submerged or floating cages has proven especially harmful due to escape of non-native fish, water pollution, and the introduction of diseases and parasites.

Cultured moi in an offshore cage in Hawaii. Photo courtesy NOAA.

Current regulations and mitigation strategies are inadequate. Therefore, The Ocean Conservancy will advocate for scientifically based standards to govern finfish aquaculture in ocean areas. Until comprehensive regulations are in place, we will oppose the culture of finfish in the ocean and encourage a shift to land-based, recirculating systems to reduce the risks to ocean ecosystems.

Background

Fish farming and other forms of aquaculture have received widespread attention as an answer to dwindling wild stocks and a source of employment. In some cases, aquaculture can help to ease fishing pressure on certain natural stocks and supply the public with alternate sources of seafood. Some types of aquaculture operations, such as land-based closed-system tanks, can be conducted sustainably, without causing major harm to the ocean environment. However, without comprehensive regulations, culturing finfish in ocean waters poses numerous risks to the marine environment.

Water pollution from aquaculture operations can be particularly significant. The excreta from an average floating cage farm can produce nutrients equal to a city of 7,500.[1] These wastes flow into surrounding waters and can cause biological and chemical pollution and harmful algal blooms. Food and medications supplied to fish in open cages cannot be contained, and its accumulation in ocean-bottom habitats can cause changes in those ecosystems.

Culturing finfish in cages poses numerous biological threats. Outbreaks of diseases and parasites are a constant risk because fish density in aquaculture operations is so much higher than in nature, and such outbreaks threaten the health and vitality of wild stocks. Escapes of cultured species are common and may lead to exotic organisms becoming established and threatening or competing

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with native species. Finally, aquaculture can create an incentive for people to overexploit wild fish populations to provide inexpensive feed for cultured fish.

Environmental performance standards and conservation principles would minimize the risks posed to ocean ecosystems by aquaculture operations. Yet to date, few standards have been developed. This is of particular concern given the past and projected growth of the industry. According to a report by the Pew Oceans Commission, worldwide aquaculture grew by 10 percent annually during the 1990s, and ocean finfish and shellfish cultivation was the fastest-growing segment of the industry.[2] Moreover, the U.S. Department of Commerce has called for aquaculture production in the United States to increase fivefold by 2025.[3]

Rationale

The Ocean Conservancy's opposition to current ocean finfish aquaculture operations reflects our serious concerns about their potential for significant adverse ecological impacts and the lack of performance standards and regulations to control such impacts.

Water Pollution. Chemicals used at aquaculture facilities in day-to-day activities include antibiotics, parasiticides, pesticides, hormones, anesthetics, pigments, and herbicides. These chemicals are released into surrounding waters, together with excess nutrients from fish waste. These substances can be toxic to marine organisms and have seriously impaired coastal waters in many areas. In shallow sites, feed and fecal matter flowing out of aquaculture facilities can deplete oxygen in seawater, leading to fish kills and "dead zones."

Feeding fish in netpens on Catalina Island, California. Photo: NOAA

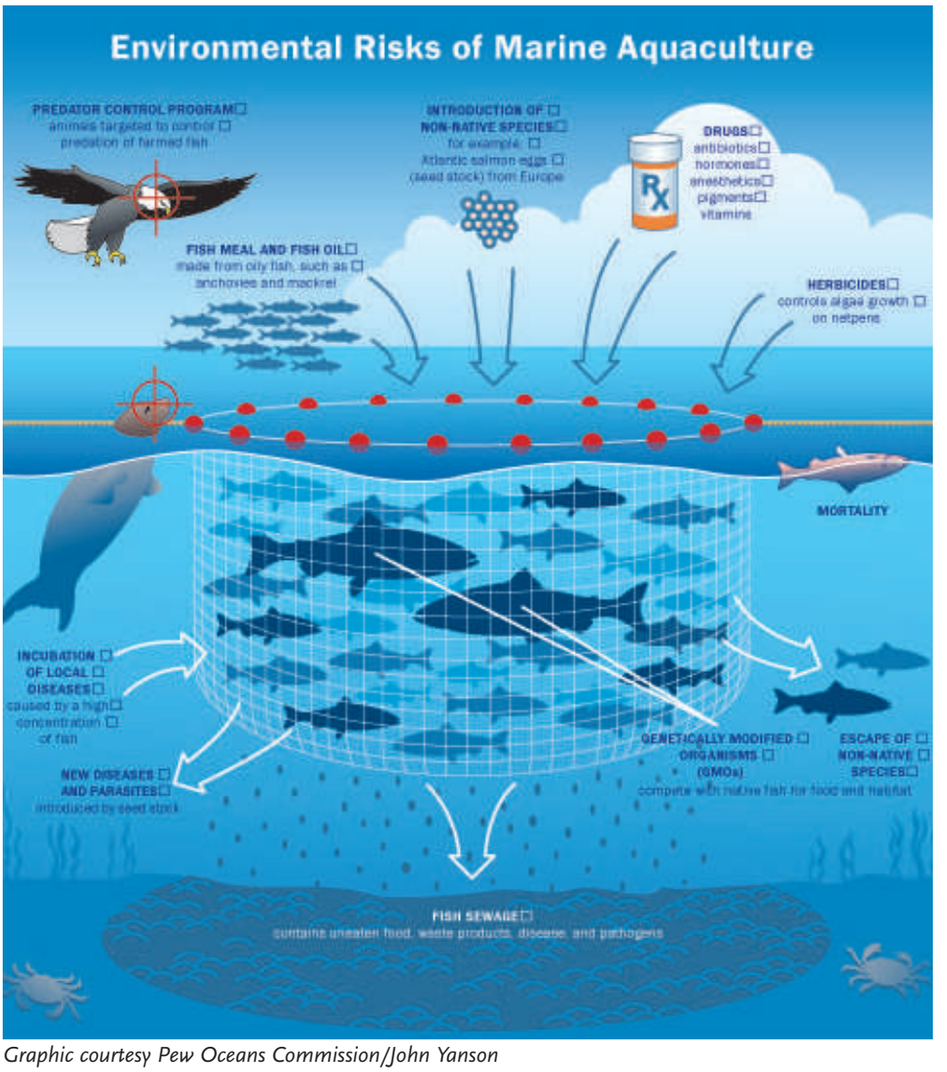
Recent studies have demonstrated that cancer-causing PCBs, dioxins, toxaphene, and dieldrin were consistently and significantly more concentrated in farmed salmon than wild salmon. One study analyzed approximately 700 farmed and wild salmon and found that farmed Atlantic salmon pose health risks that detract from the beneficial effects of fish consumption.[4] The source of these contaminants may be the feed used in salmon farm operations. The effect of the PCBs on surrounding waters has not yet been quantified.

Threats to Native Species. Millions of fish farmed in ocean pens routinely escape into the wild each year, either because of human error, storms, or hungry predators, such as seals or sea lions tearing at nets.[5]

Escaped, non-native farmed fish can compete with wild populations for food and habitat, can transmit native or non-native diseases, and often prey on native fish, significantly disrupting local ecosystems. Many species now being farmed in the United States are either non-native or outside their native range. For example, escaped Atlantic salmon now survive in the wild in the Pacific Northwest. They have been found spawning on Vancouver Island and have been identified in 79 other British Columbian rivers and streams, competing with wild salmon for food and habitat.[6]

Even when native species of farmed fish escape, they can harm wild populations, particularly when substantial genetic differences exist between the farmed and wild populations. Wild Atlantic salmon, for example, varies significantly from region to region. In the Gulf of Maine, the salmon industry has expanded its use of a European salmon strain, and escaped farmed salmon have competed for food and shelter, and in some cases bred, with the wild salmon population.

Escaped, genetically engineered, or "transgenic" fish can also threaten native populations and can lead to the extinction of the native species. According to the National Academy of Sciences National Research Council, government agencies consistently fail to review the potential environmental effects of new transgenic organisms before approving them for commercial use.[7]



Graphic courtesy Pew Oceans Commission/John Yanson

Harming Ocean Habitat. Some aquaculture operations require dredging, drilling, dropping large anchors and otherwise disturbing sediment and bottom habitats. These activities can displace ocean wildlife, smother bottom-dwelling animals, destroy hiding places for young fish, and cause other ecological changes to the seafloor.

Spreading Diseases, Viruses, and Parasites. Aquaculture facilities can be breeding grounds for certain diseases and parasites, such as flesh-eating parasites, known as sea lice, which can spread to wild salmon populations. Another parasite, the African sabellid worm, has infected California abalone, weakening the shells, reducing growth rates and production, and causing deformities.

Controlling diseases chemically–through prescribed doses of drugs that are placed into the water directly or put into feed and then spread throughout cages–can cause chemical pollution in surrounding waters and impact other ocean life. For example, some of the pesticides used to kill sea lice are toxic to shrimp, prawns, and crabs.

Inefficiency. Most cultured finfish and crustaceans are fed wild species, such

A netpen and oil rig in the Gulf of Mexico. Photo: NOAA

as squid, sardines, and other small fish. These fish are also critical prey for marine mammals, birds, and other wild fish. Because many wild fish depend on the availability and abundance of such prey for their survival, the practice of using wild feed for farmed fish can actually reduce, rather than increase, the amount of fish available for human use.

Given these enormous risks, The Ocean Conservancy opposes current methods of culturing finfish in ocean waters that do not follow set standards and regulations. We further believe that all ocean aquaculture should be tightly and carefully regulated, and that all facilities should be held to strong environmental performance standards and conservation principles. Before any aquaculture project is permitted to operate, all mitigation measures must be in place to ensure the greatest protections for the oceans and ocean life.

The Ocean Conservancy's Plan for the Future

The Ocean Conservancy is working to draft federal legislation that would provide prudent, consistent, and responsible controls for finfish aquaculture operations. We will continue to advocate for regulations and standards that include siting criteria, permitting criteria, lease fees, restoration requirements, fish density limits, introduction procedures, prohibitions against genetically modified organisms, bans on non-native species, certifications of disease-free brood stock, record keeping, bonding provisions, public notification processes, dispute resolution, limited periods for length of permits, substantial fines for permit violations, procedures for when escapes occur, procedures for disease outbreaks, monitoring, procedures for weather damage and inspections. Further, all projects must comply fully and openly with existing environmental legislation.

In the absence of such standards and regulations, we will continue to challenge aquaculture permits that do not adequately protect the health and integrity of native ocean ecosystems. This is essential for the current and future health of oceans and ocean life.

Endnotes

[1] Salmon Nation, (2002). *What's Behind That Farmed Salmon Steak*? www.salmonnation.com/farmed.html, citing David Suzuki Foundation, (2002). *Ocean Pollution from Salmon Farming,* http://www.davidsuzuki.org/Oceans/Fish_Farming/Salmon/Pollution.asp.

[2] Rebecca J. Goldburg, Matthew S. Elliott, and Rosamond L. Naylor, *Marine Aquaculture in the United States* (Arlington, VA: The Pew Oceans Commission, 2001), p. 2.

[3] Ibid., pp. 3-4.

[4] Ronald A. Hites et al., "Global Assessment of Organic Contaminants in Farmed Salmon," *Science*, January 9, 2004, **303:**226.

[5] Philip McGinnity et al., *Fitness reduction and potential extinction of wild populations of Atlantic salmon, Salmo salar, as a result of interactions with escaped farm salmon,* The Royal Society, July 9, 2003, p. 03pb0468.1.

[6] Fisheries and Oceans, *The Effects of Salmon Farming in British Columbia on the Management of Wild Salmon Stocks,* Chapter 30 (Report of the Auditor General of Canada, December 2000).

[7] *Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation* (Washington, DC: National Research Council, 2002).