



THE CENTER FOR FOOD SAFETY

October 25, 2010

ECONOMIC CONCERNS AND IMPACTS RELATING TO GE SALMON

On August 25, 2010, U.S. Food and Drug Administration (FDA) officials announced their process for making a decision on an application relating to the first genetically engineered (GE) animal intended for human consumption, the AquaAdvantage Salmon (AA Salmon) produced by Aqua Bounty Technologies. FDA convened two separate public meetings in September to discuss the GE fish, yet absent from FDA's meetings and materials are any discussions about potential economic impacts that would result from GE salmon approval or the unintended escape of GE salmon. Below is a summary of the major concerns:

Market Contamination

The AA Salmon application under consideration by FDA stipulates that the GE eggs will be grown in a land-based facility on Prince Edward Island, Canada, and then shipped to a land-based facility in Panama where they will be grown-out and processed for shipment to the U.S. and the international market. If GE salmon are approved, there exists significant potential for GE contamination of processed seafood as well as the likelihood for GE salmon to be sold as non-GE due to either human or tracking error. The international seafood market already suffers from deficient regulation and any tracking measures beyond the Country-of-Origin Labeling (COOL) requirements will be very difficult. FDA officials acknowledged during the public meetings that the Agency currently inspects only a small amount of fish imported to the US, making the risk of global market contamination a vital concern.

As demonstrated by the StarLink contamination fiasco, biological contamination of non-GE foods can have tremendous consequences for producers and markets. StarLink was a variety of GE corn was not approved for human consumption due to concerns that it could cause allergic reactions. However, wide swaths of corn acreages were contaminated by StarLink, which lead to the recall of tens of millions of supermarket items. The event was further complicated by the slow and deplorable investigation by the FDA. In 2003, a group of farmers was awarded a \$110 million settlement due to the loss of foreign markets resulting from the StarLink contamination.ⁱ

Market Confusion or Rejection

The risk of market confusion or rejection resulting from GE salmon approval would have additional effects on the U.S. salmon and seafood industry. Consumer confusion about what types of salmon or seafood are genetically engineered may deter shoppers from purchasing such products. This confusion would be made worse by the absence of mandatory GE labeling requirements. Approving GE salmon is a sharp contradiction to the agreements the United States has signed at the North Atlantic Salmon Conservation Organization, where transgenic salmonids are considered a serious threat to wild salmon. Furthermore, GE salmon could result in trade disparities and the potential loss of foreign markets that may have differing opinions on labeling or safety assessments - for example in the EU, all GE animals must be labeled. Concerns over potential food contamination or environmental impacts may also affect consumer choice in the U.S. which could lead to consumers' forgoing buying wild and farmed salmon altogether. A recent poll from Lake Research Partners found that 91 percent of Americans felt FDA should not introduce GE fish and meat into the marketplace.ⁱⁱ A 2008 Consumer Reports poll found that 95 percent of respondents said they thought food from genetically engineered animals should be labeled.ⁱⁱⁱ

A number of fishing associations as well as salmon farming companies have already voiced their opposition to the use of transgenic salmon including the Bristol Bay Regional Seafood Development Association, the Pacific Coast Federation of Fishermen's Association, International Salmon Farmers Association, the Irish Salmon Growers Association, the New Brunswick Salmon Growers' Association, Alaska Trollers Association, the Gloucester Fishermen's Wives Association, the Massachusetts Fishermen Partnership, Inc, Cooke Aquaculture, Inc, Marine Harvest ASA, Canadian Aquaculture Industry Alliance, Scottish Salmon Producers Organization, California Fisheries Network, SalmonAid, North Atlantic Marine Alliance, the Rhode Island Fishermen's Alliance, and many others. AquaBounty conducted trials of genetically engineered salmon in both New Zealand and Scotland that were halted by government regulators in New Zealand and public outcry in Scotland. Salmon producers worry that since AquaBounty has approached Chilean salmon farmers about growing its salmon once it is approved in the US, Chile, the second largest farmed salmon producer in the world, could become a major source of this GE fish.

Effect on Wild Stocks and Fisheries

Millions of farmed salmon have escaped from open-water net pens, competing with wild species for resources and placing an increased pressure on ecosystems.^{iv} A potential escape of GE salmon will both directly and indirectly affect the livelihoods of the tens of thousands of salmon fishers and fishing communities in the U.S. and will have ripple effects throughout markets. States that have commercial salmon fishing are Alaska, California, Oregon and Washington. Species of commercially fished salmon are: Chum, Pink (Humpback), Sockeye (Red), Coho (Silver), Chinook (King). Each state has different regulations on which species can be fished commercially; for example, in Alaska you can fish for all five species of salmon. In the Northeastern United States, wild Atlantic salmon is on the endangered species list and commercial fishing is prohibited. In both restricted and commercial fisheries, GE salmon would pose serious risks to wild populations of fish and any approval of GE fish will have direct and indirect effects on wild stocks as well as the fisheries themselves.

The seafood industry in Alaska is the largest private sector employer creating 56,600 direct and 22,000 indirect jobs annually, more jobs than oil, gas and mining combined.^v In 2007, the overall value of the Alaska seafood industry alone was over \$1.5 billion paid to fishermen and \$3.6 billion at the wholesale level. Total 2007 value at the dock for the non-Indian commercial salmon fisheries within Washington, Oregon and California was \$11.6 million.^{vi} Research published by Andrew Dyke and U. Rashid Sumaila notes that wild fisheries can also have significant economic impacts in other sectors, such as agriculture, forestry, manufacturing and financial services, observing that "changes in the fishing industry could affect livelihoods in and the viability of many economic sectors." The researchers found that regionally, every \$1 of fisheries-sector output supports more than \$3 of output throughout the North American economy.^{vii} Many of Alaska's salmon processors are based in Seattle and elsewhere in Washington, Oregon or California, meaning that revenue and value is generated and spread across many states. At the same time, the increased demands by salmon farms for forage fish and fishmeal additionally affect the health of wild stocks and place an added stress on wild fisheries.

The American Sportfishing Association (ASA), the trade association representing the sportfishing industry, released economic information indicating that a full recovery of California's Central Valley Chinook salmon runs can potentially provide \$5.7 billion in new economic activity for the state and the creation of 94,000 new jobs. It is estimated that the current shutdown of the salmon fishery due to pollution and degradation of habitats is costing California \$1.4 billion in lost economic activity and 23,000 jobs in both the commercial and recreational saltwater fishing sectors.^{viii} As ASA suggests, reinvestment in wild fisheries could generate thousands of new jobs and billions of dollars in revenue. Investments to restore native Atlantic salmon fisheries in the Northeast are being made and through strong support there could be a similar creation of new jobs and additional revenue.

Conclusion

In moving forward, it is critical that economic impacts associated with the production and sale of GE salmon are fully addressed. In the recent Supreme Court case *Monsanto v. Geertson Farms*, the Court recognized that the threat of transgenic contamination is harmful and onerous to organic and conventional farmers and that the injury allows them to challenge future biotech crop commercializations in court. Given the serious potential economic consequences, not to mention potential environmental and human health risks associated with the GE salmon, FDA must complete an Environmental Impact Statement (EIS) to consider the range of foreseeable economic impacts of this novel fish.

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ⁱ Paul E. (2003, February 7). Biotech firms pay \$110 million to settle StarLink lawsuit. *Associated Press*. Available at http://ipm.osu.edu/trans/023_071.htm.

ⁱⁱ Lake Research Partners, Commissioned by Food and Water Watch. 9/20/10 <http://documents.foodandwaterwatch.org/release-FWW-Omnibus.pdf>

ⁱⁱⁱ Consumer Reports. 11/11/08 <http://www.greenerchoices.org/pdf/foodpoll2008.pdf>

^{iv} 1 According to the Ministry of Agriculture and Lands (BCMAL) in Canada, the agency responsible for tracking industry-reported farmed salmon escapes, over 1.5 million farmed salmon escaped into BC waters between 1987 and 2008 (http://www.al.gov.bc.ca/fisheries/escape/escape_reports.htm); This is also referenced in a report by World Wildlife Federation [Eva B. Thorstad, Ian A. Fleming, Philip McGinnity, Doris Soto, Vidar Wennevik & Fred Whoriskey (January 2008). Incidence and Impacts of Escaped Farmed Atlantic Salmon in Nature, Technical Report to the Salmon Aquaculture Dialogue. World Wildlife Federation, p.5.

^v Northern Economics of Anchorage (January 2009) *The Seafood Industry in Alaska's Economy*. Commissioned by the Marine Conservation Alliance, At-sea Processors Association and the Pacific Seafood Processors Association.

^{vi} Pacific Fishery Management Council. 2008. *Review of 2007 Ocean Salmon Fisheries*. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, Oregon 97220-1384

^{vii} Dyck, A.J. and U.R. Sumaila. 2010. Economic impact of ocean fish populations in the global fishery.

Journal of Bioeconomics. DOI: 10.1007/s10818-010-9088-3 [See attached summary by PEW Environment Group]

^{viii} See "Economic Data Supports Efforts to Recover California's Salmon Fisheries" (August 2009) Commissioned by the American Sportfishing Association and produced by Southwick Associates.