

Salmon farming, like other food producing operations—whether for tomatoes, beef, wheat or any other commodity—impacts our environment. Thus, like these other agricultural production systems, it must stand up to rigorous evaluation of its environmental impact.

Evaluating the environmental impact of a food producing operation must consider not only what happens to the environment immediately surrounding the production site, but also how it impacts the worldwide ecosystem. As a relatively new and rapidly evolving form of food production,

salmon farming and the rest of aquaculture have been the subject of intensive environmental assessments.

These assessments, when done with unbiased scientific scrutiny, consistently find that salmon farming poses a low risk to the environment, and the ones that do occur are fully reversible through natural processes in a relatively short period of time. It is also noteworthy that salmon farming, as is all of aquaculture, is extremely efficient in converting inputs into food, which has a positive impact far beyond local environmental effects.

## Feed Conversion

Feed conversion is an important measure of the impact of animal production on the environment. The lower the conversion ratio, the less feed it takes to produce a pound of edible product. In this regard, farmed Atlantic salmon are among the most productive food animals. Conversely, the production efficiency for wild salmon is relatively low (high ratio of feed-to-fish) primarily because of the high mortality rates of the wild fish before they are caught.

Feed Conversion	
Ratio of feed to edible food (in pounds)	
Farmed Atlantic Salmon	2:1
Beef	10:1
Pork	5:1
Chicken	2:1
Wild Salmon	10:1 to 15:1*

\*Difficult to calculate accurately due to wildly varying mortality rates and feeding.

## The Effect on Feed Fish Stocks

Fishmeal used in salmon farming represents about 30 percent of the salmon feed consumed, which accounts for about 9 percent of the world consumption of fishmeal. The bulk of the fishmeal used worldwide goes into livestock and poultry feeds and for fertilizer.

The fishmeal used in salmon feed is composed primarily of fish, commonly called forage fish, that are fast-growing, short-lived, and not generally used for human consumption. The Food & Agricultural Organization (FAO) of the United Nations has stated that the forage fish sources for fishmeal are not over-fished or depleted.

The industry continues to work on ways to utilize more vegetable-based feed sources such as soybeans and canola, so that as the industry grows a reliable feed source is assured.

## The Footprint of a Salmon Farm

Salmon farming sites occupy a tiny portion of the coastal zone areas in which they are located. Issuing permits for each site is the responsibility of the local, regional and national jurisdictions and varies by locale. This process is rigorous; for example, in Maine the process involves the review by over 15 authorities and typically takes 24 months to complete.

In Maine the total area occupied is about 635 acres for all sites. This represents a very small percentage of the more than 2.5 million acres of fishable waters off Maine’s coast, which includes several hundred miles of shoreline. The actual salmon pens on these sites represent only about 30 percent of the 635 acres, the rest being open water. By comparison, pleasure boat marinas in Maine are estimated to occupy 1,275 acres of water space. And, of course, unlike salmon farm sites, these are all located on the most accessible shoreline.

In Canada, including operations in both British Columbia and the Bay of Fundy in the east, the total area is about 8,900 acres, which represents less than 1/10,000 (0.01%) of the coastal area in which these sites are placed.

In Chile it is estimated salmon farm sites occupy less than 1/50,000 (0.002%) of the available area.

## The Effect on Water Quality

One example from Maine is representative of the total additional load placed on the environment: Based on a single-year class cycle (24 months) at a farm site that includes 18 cages with 500,000 salmon, on average, each day a total of 294 pounds (dry weight) of salmon byproduct are discharged. At this particular site, this is integrated into approximately 1.7 billion gallons of water (two tidal flushes). This is equivalent to 2 tablespoons of salmon byproduct being integrated into the amount of water found in 24 average-size, in-ground swimming pools.

## The Effect on Wild Salmon

Wild Pacific and Atlantic salmon stocks in the lower 48 states and Canada have seen significant declines over the last several decades, starting long before salmon farming operations started. All the evidence points to the fact that the declines were caused by a combination of climate change, over-fishing, and freshwater-habitat destruction.

The evidence shows salmon farming has not had a significant impact and poses a low risk to Pacific salmon. On the east coast of the United States, wild Atlantic salmon is an endangered species. While farmed Atlantic salmon did not impact on their decline, there is concern about interbreeding between wild and escaped farmed salmon. This is being addressed by the industry.

## How Farming Techniques Help Wild Salmon

Many people are surprised to learn that about one in three of the salmon caught in the waters off Alaska, the principal salmon fishery, started their life in a hatchery. Over 1.5 billion of these salmon are released into the ocean each year where they join their naturally wild cousins, grow and are caught with them. In Alaska, this represents about 30 percent of the catch. In the lower 48 states, hatcheries account for over half the salmon caught.

These hatchery programs allow wild salmon to flourish even as the catch exceeds natural reproduction capacity. In the hatchery these young salmon are reared almost identically to the salmon that will be farm-raised.