United States General Accounting Office

GAO

Report to the Honorable
Slade Gorton, U.S. Senate

April 1995

INTERNATIONAL TRADE

Canada's Restrictions on Certain Salmon Imports

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GAO

United States
General Accounting Office
Washington, D.C. 20548

General Government Division

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April 20, 1995

The Honorable Slade Gorton
United States Senate

Dear Senator Gorton:

This report responds to your request for information on Canada's policy regarding imports of fertilized salmon eggs and smolts[1] to British Columbia. Canadian restrictions on such imports to that province have resulted in a loss of market opportunities for Washington State salmon producers. As you indicated in your letter to us, the North American Free Trade Agreement (NAFTA) was intended to allow the free flow of goods between the United States, Canada, and Mexico without unreasonable restrictions.[2] To address the concerns raised in your letter, we (1) identified the key elements of Canada's policy concerning imports of fertilized salmon eggs and smolts to British Columbia and the rationale for the policy, (2) obtained the views of the concerned parties in the United States and Canada regarding the reasonableness of the Canadian policy, and (3) examined whether there are opportunities for U.S. producers to increase exports of fertilized salmon eggs and smolts to British Columbia.

Results in Brief

Since 1985, Canadian authorities have maintained a policy that requires quarantine of imports of fertilized Atlantic salmon eggs and bans imports of Atlantic salmon smolts into British Columbia.[3] The policy is a federal requirement that the Canadian Department of Fisheries and Oceans (DFO) has applied only in the province of British Columbia. Hatchery facilities must also be certified by DFO as free of certain diseases specified in Canadian regulations over a period of 18 months in order to export fertilized salmon eggs to the province. According to DFO officials, this

[1]Smolts are young salmon at the stage of development when they are ready to go from a fresh water to a salt water environment.

[2]NAFTA contains rules relating to the enforcement of sanitary and phytosanitary (plant health) measures to protect humans, animals, and plants. The rules state that each party is to use "international standards, guidelines, or recommendations" in order to try to achieve equivalent or identical measures. However, each country may choose its own level of protection and maintain standards higher than international standards if such measures conform to other provisions of the agreement. These measures must (1) be based on scientific principles (taking into account relevant factors, including geographic conditions), (2) be based on a risk assessment appropriate to the circumstances, and (3) treat imports in the same way as domestic products.

[3]Atlantic salmon is the principal salmon species used in worldwide aquaculture production (the production of plants or animals in water under controlled conditions) and accounts for about 60 percent of farmed salmon production in British Columbia. In 1988, Canada established a similar policy for Pacific salmon imports. However, there is a limited market for Pacific salmon eggs and smolts in British Columbia.

policy was developed to protect British Columbia's valuable fishery resources from pathogens[4] that could be inadvertently introduced via imports of fertilized fish eggs or live fish. In 1992, DFO revised certain elements of the policy, reducing the length of time required for quarantine and lifting the limit on the number of eggs that could be imported.

Salmon producers in Washington State and British Columbia as well as U.S. state and federal government officials have raised questions about the appropriateness of certain elements of the Canadian policy. For example, both Washington State and British Columbian producers questioned whether a lengthy and costly quarantine of imported eggs is necessary, given DFO's strict requirements for certifying hatchery facilities that can export to Canada. The effectiveness of DFO's strict certification requirements is reflected in the fact that in 9 years of testing, none of the hatchlings from imported eggs have been found to carry pathogens.

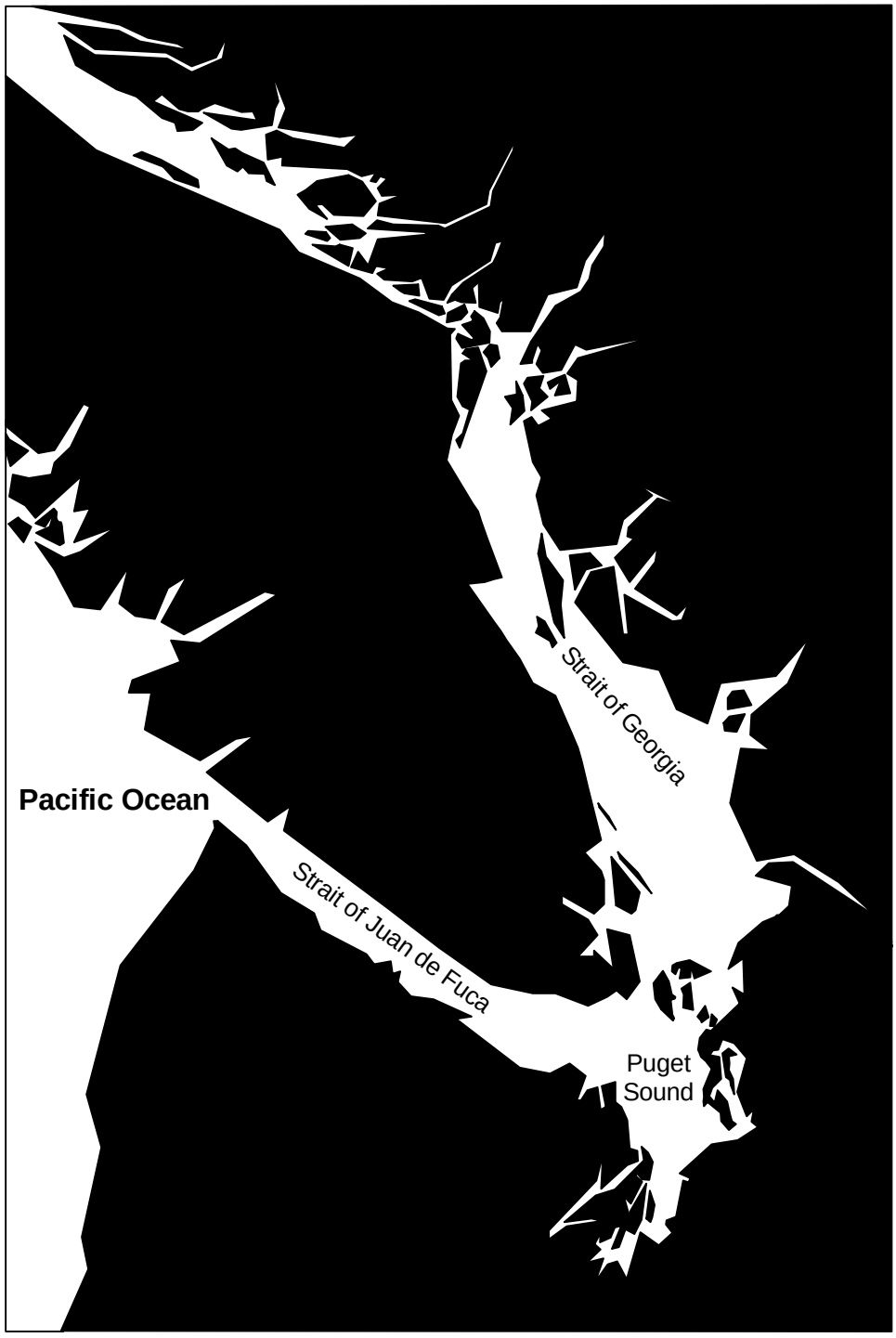
Similarly, Washington State and U.S. federal fish and wildlife officials questioned the need for a ban on exports of smolts from Washington State to British Columbia. They noted that the coastal waters off Washington State and British Columbia constitute a common watershed.[5] (See fig. 1.) Wild salmon populations from various river systems that drain into this watershed on both sides of the border migrate past net pens[6] where farmed salmon are kept. They argued that farmed salmon smolts transferred to net pens off the coast of British Columbia from Washington State would not present a greater risk of introducing pathogens than do wild salmon populations that migrate freely in this watershed.

[4]Pathogens are disease agents, including bacteria, viruses, fungi, and parasites.

[5]A watershed is defined as a region draining into a common body of water. In the case of the geographic region of British Columbia and Washington State, this includes the contiguous waters of Puget Sound, the Strait of Juan de Fuca, and the Strait of Georgia.

[6]Net pens are floating structures anchored relatively close to shore.

Figure 1: Coastline of Washington State and British Columbia



Canada's restrictions on imports of fertilized salmon eggs and smolts to British Columbia have resulted in a loss of market opportunities, according to representatives of the Washington Fish Growers Association. Major Washington State exporters indicated that if a more open import policy were adopted, there would be great market potential in British Columbia for their fertilized salmon eggs and moderate to great market potential for their smolts. Spokespersons for the British Columbia Salmon Farmers Association agreed that there is a potential market in the province for imports of salmon eggs and smolts from Washington State.

Background

Aquaculture is defined as the production of any plant or animal in water and under controlled conditions. In the United States, aquaculture is a relatively new but rapidly growing industry. The value of U.S. aquaculture production more than quadrupled during the 1980s. Salmon is one of the four principal aquaculture products in the United States. Salmon farming operations begin in fresh water facilities, where ready-to-spawn broodstock or parent fish are stripped of eggs and sperm. The fertilized eggs are held in fresh water containers for about 2 months until they hatch. The hatchlings or fry are then raised in tanks from 4 to 15 months until they reach smolt stage, at which time they are capable of adapting to a salt water environment. Once the salmon reach this stage, they are transported to salt water net pens to begin the "grow out" phase. Depending on the species or variety of salmon, the fish are ready to be marketed for human consumption between 9 months and 2 years from the time they are placed in the pens.

Farmed salmon production worldwide has increased from about 48,000 metric tons in 1985 to 331,000 metric tons in 1992. This increase in farmed production has transformed the international market for salmon. Currently, farmed salmon represents about 27 percent of the salmon brought to market worldwide. The principal international producers of farmed salmon are Norway, Chile, the United Kingdom, and Canada. Relative to these countries the United States is a minor producer, accounting for about 4 percent of total world production.

U.S. Farmed Salmon Production

U.S. production of farmed salmon is concentrated almost entirely in Maine and Washington State. In 1992, domestic farmed salmon production was about 12,000 metric tons, with Washington State accounting for approximately 40 percent of the total. U.S. production is expected to reach

nearly 17,000 metric tons in 1995. Domestic production supplies approximately 23 percent of total U.S. consumption.

Salmon farming in Washington State is a $40 million a year industry. There are about 18 salmon farming operations in Washington State. Some of these are only involved in raising salmon for human consumption, while others run hatcheries that produce fertilized eggs and smolts. According to Washington State producers, they have developed a market niche in the production of quality fertilized salmon eggs, which are then exported to such countries as Chile, Japan, and Canada.

Canadian Farmed Salmon Production

Canada is the principal supplier of farmed salmon to the United States. In 1992, Canadian exports, mainly from British Columbia, accounted for 44 percent of U.S. farmed salmon consumption. Canada exports about 75 percent of its total farmed salmon production to the United States. In 1992, Canada produced 29,500 metric tons of salmon with an estimated Canadian value of $200 million. British Columbia accounted for about 66 percent of total Canadian production. The province of New Brunswick, on the Atlantic coast, is the other major Canadian producer of farmed salmon.

The salmon farming industry in British Columbia has grown dramatically in recent years. There are now approximately 100 salmon farming operations in British Columbia, producing about three times as much salmon as Washington State. According to industry spokesmen in British Columbia, while domestic hatcheries supply most of the fertilized eggs needed by the province's salmon farms, there is still room in the market for imported eggs.

As the industry has expanded, British Columbian salmon farmers have shifted production from various native Pacific salmon species, such as Coho or Chinook, to Atlantic salmon. In fact, Atlantic salmon has become the preferred species for aquaculture production around the world because it is less vulnerable to certain pathogens and has a lower feed-to-body-weight ratio than Pacific salmon varieties.

Scope and Methodology

To ascertain Canada's restrictions on imports of salmon eggs and smolts into British Columbia, we reviewed the various policies implemented since 1985 and clarified key elements of these policies with officials from DFO; the British Columbian Ministry of Environment, Lands and Parks; and the

Ministry of Agriculture, Fisheries and Food. To gain an understanding of the rationale for these policies, we obtained and reviewed documents provided by DFO, and we discussed the basis for these policies with DFO and British Columbian officials.

To obtain industry views concerning the implementation and impact of the Canadian policy, we met with representatives of the British Columbia Salmon Farmers Association and the Washington Fish Growers Association. We also discussed the basis for the Canadian requirements with officials from the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Department of Agriculture's Office of Aquaculture as well as its Animal and Plant Health Inspection Service. We also discussed technical aspects of the Canadian policy with researchers from the University of Washington's School of Fisheries, the National Biological Survey, and Washington State's Department of Fisheries. In addition, we met with officials from the Office of the U.S. Trade Representative to obtain their views regarding the international trade ramifications of the Canadian policy.

To determine what opportunities existed for U.S. producers to increase exports of salmon eggs and smolts to British Columbia, we interviewed representatives of the Washington Fish Growers Association and major Washington State exporters of fertilized salmon eggs and smolts. In addition, we obtained the views of the British Columbia Salmon Farmers Association and of spokespersons for two leading British Columbian salmon producers.

Because the Census Bureau does not collect data on exports of fertilized salmon eggs and smolts by using a distinct tariff code, we were unable to obtain official figures on the level of exports of these commodities. Nevertheless, by directly contacting major exporters in Washington State, we were able to obtain some data on exports of fertilized salmon eggs and smolts. However, because of the proprietary nature of these data and producers' concerns about confidentiality, we were unable to report the level of exports to specific countries or regions, including British Columbia. Further, Washington State and British Columbian producers were unable to provide us with definitive data on the production costs of salmon eggs and smolts.

In February and March 1995, we obtained oral comments from the director of DFO's Aquaculture and Habitat Science Branch and the National

Aquaculture Coordinator of the Department of the Interior's Fish and Wildlife Service. Their comments are discussed at the end of this letter.

We conducted our work from June 1994 to February 1995 in accordance with generally accepted government auditing standards.

Elements of British Columbia's Import Policy for Salmon Eggs and Smolts

Since 1985, DFO, in coordination with the British Columbian Ministry of Environment, Lands and Parks, has required extended quarantine for imports of fertilized Atlantic salmon eggs. Further, DFO has banned all imports of Atlantic salmon smolts. This policy was established to protect the province's valuable wild and cultured salmonid[7] stocks from inadvertent contamination by pathogens that might be introduced with imported fish eggs or live fish. The policy was officially adopted in writing in 1987.[8] The following were some major elements of the 1987 policy:

- Imports had to comply with the Canadian national fish health protection regulations.[9] Imports were permitted only from facilities that had been approved or certified by a Canadian fish health officer appointed by DFO.
- Only fertilized eggs that had been surface disinfected in an iodine solution could be imported. No live fish (smolts) or unfertilized eggs were allowed.
- All Atlantic salmon eggs and resultant stock had to be held under strict quarantine for a minimum of 12 months.
- Shipments were limited to 300,000 eggs per year per import license.
- Eggs were allowed only from broodstock or parent fish that had been held at the source facility (hatchery), separate from other stocks, for one full generation.

[7]The term salmonid applies to various related salmon and trout species.

[8]In addition to the import policy for Atlantic salmon eggs and smolts, in 1988 DFO and the British Columbia Ministry of Environment, Lands and Parks established a parallel policy for imports of eggs and smolts of various Pacific salmon species. This policy, which is still in effect, is somewhat similar to that for imports of Atlantic salmon; however, there are some important differences. For example, for Pacific salmon (1) while the eggs are usually subject to a quarantine, the time period for the quarantine is not specified; (2) egg shipments are limited to 20,000 per license per year; and (3) after January 1, 1990, the importation of eggs for aquaculture production purposes is not permitted without prior approval of the Director General of DFO's Pacific Region and the Director of the British Columbian Ministry of Environment, Lands and Parks, Recreational Fisheries Branch.

[9]Canada's fish health protection regulations set minimum sanitary standards for imports of fish and fish products into the country and for the transfer of fish between provinces. Among other things, these regulations require that before a facility can be certified and granted approval to export to Canada, it must be free of specified disease agents following four consecutive inspections over a period of not less than 18 months.

- After March 31, 1989, no further imports of Atlantic salmon were to be permitted. Importers were required to hold a number of fish to maturity for reproduction purposes.[10]

In 1992, DFO revised its policy by relaxing the restrictions on imports of fertilized Atlantic salmon eggs. According to DFO officials, they decided to ease the original requirements because they had not detected any pathogens in tests of hatchlings from imported eggs since the policy had been put into effect. As shown in table 1, the revised policy, which is still in effect, (1) repealed the limit on the size of shipments of egg imports, (2) eliminated the prohibition on imports of Atlantic salmon after March 31, 1989, and (3) reduced the period during which eggs had to be quarantined. DFO, however, did not lift its ban on imports of Atlantic salmon smolts.

Table 1: Principal Differences Between DFO's 1987 and 1992 Import Policies on Atlantic Salmon Eggs and Smolts

1987 policy	1992 policy
Limit of 300,000 eggs per year per license	No limit on number of eggs per license
After March 31, 1989, no further imports of fertilized eggs except for research or broodstock development	No prohibition on further imports of fertilized Atlantic salmon eggs
Eggs and resultant stocks held in quarantine for minimum of 12 months	Eggs and resultant stock held in quarantine for a minimum of 120 days or until they reach 3 gram size. The fish are then held in isolation until transferred to salt water

Source: DFO.

In explaining their rationale for establishing the current policy on imports of fertilized Atlantic salmon eggs and smolts into British Columbia, DFO officials cited examples of fish pathogens that had been transferred with shipments of live fish in other parts of the world. Specifically, they referred to two pathogens introduced into Norway during the mid-1980s.[11] DFO officials noted that there are numerous reports in the scientific literature of pathogens identified in various parts of the world, including areas of the United States, that have not been found in salmonid

[10]Atlantic salmon eggs were imported for the purpose of developing aquaculture broodstocks in British Columbia.

[11]These two cases involved the disease furunculosis (caused by the bacteria Aeromonas salmonicida) and a strain of the parasite Gyrodactylus salaris believed to have been introduced into Norway with imported salmon from Scotland and Sweden, respectively.

populations in British Columbia.[12] They maintained that the current policy was justified in order to prevent the introduction of such pathogens into the province, particularly since Atlantic salmon is a species that is not native to British Columbia. They argued that the policy was not intended to be a nontariff barrier to imports; they pointed out that the policy was applied impartially to imports of Atlantic salmon eggs and smolts from any source outside British Columbia, including other Canadian provinces.

Questions Concerning DFO's Import Policy

Spokespersons for associations representing producers in both Washington State and British Columbia challenged the need for the costly, prolonged quarantine requirement for fertilized eggs, given DFO's strict rules for certifying hatchery facilities that can export to Canada. As noted earlier, under Canadian fish health protection regulations, such facilities must be certified to be disease free after four consecutive inspections over a period of 18 months. Certification must be obtained from an agent designated and authorized by DFO. Test results from hatchlings of imported fertilized eggs in British Columbia provide an indication of the effectiveness of DFO's strict certification requirement. According to DFO's own data, in 9 years of testing, no pathogens have been found among hatchlings from imported fertilized eggs.

A spokesman for the British Columbia Salmon Farmers Association, which has an interest in preventing the introduction of pathogens into the province, stated that raising hatchlings from imported eggs in isolation rather than under strict quarantine conditions would be sufficient to minimize the risk of inadvertent introduction of exotic pathogens. He noted that imported fertilized eggs would be more competitive with domestically produced eggs if hatchlings did not have to be raised under quarantine conditions. He explained that the quarantine process is very costly because DFO's quarantine protocol calls for treating runoff from facilities where imported hatchlings are raised, to eliminate potential contaminants before the runoff can be discharged into the ground. (He noted that the fresh water phase of salmon farming operations generates considerable runoff.) If the hatchlings of imported eggs were simply placed in isolation, he pointed out, they would be raised in separate containers from domestic hatchlings and monitored until they were placed in the salt water pens, and the runoff would not have to be treated.

[12]A U.S. Fish and Wildlife Service official noted that some fish pathogens detected in the United States may not have been detected in British Columbia because testing in the United States is more extensive and comprehensive than in Canada.

Questions about DFO's total ban on smolt imports to British Columbia centered on whether smolts from Washington State should be exempt from the ban, given the fact that the contiguous coastal waters off the Pacific Northwest constitute a single watershed. According to various academic, industry, and U.S. government experts, it is highly unlikely that pathogens found in coastal waters on one side of the border would not be present on the other side, because wild Pacific salmon from river systems that drain into these waters migrate north and south along the coast. The experts noted that wild salmon, which are vulnerable to the same pathogens as farmed salmon, swim past the salt water net pens where the farmed salmon are kept. They argued that transporting salmon smolts for aquaculture purposes from coastal waters off Washington State to coastal waters off British Columbia would not impose an additional risk of introducing exotic pathogens because existing wild salmon populations migrate from Washington past the coast of British Columbia, and vice versa.

A representative from the British Columbia Salmon Farmers Association told us that his organization would not oppose imports of smolts from Washington State as long as the smolts were transported in salt water containers and placed directly into salt water pens. Similarly, spokespersons for the Washington Fish Growers Association told us that Canadian authorities need to recognize that the waters off Washington State and British Columbia constitute a common watershed. In their view, DFO officials should consider allowing Washington State producers that comply with Canadian fish health protection regulations to export to British Columbia. They pointed out that currently DFO allows producers from the state of Maine that comply with these regulations to export Atlantic salmon smolts to the neighboring Canadian province of New Brunswick.

Canadian federal and provincial officials in British Columbia told us that conditions in British Columbia are not comparable to those in New Brunswick because Atlantic salmon is not native to the Pacific Northwest. They argued that it would not be appropriate for Washington State producers that comply with Canadian fish health protection regulations to be allowed to export to British Columbia because Atlantic salmon is an "exotic" species in the Pacific Northwest. They expressed concern about the possibility that Atlantic salmon that escape from aquaculture facilities might eventually establish wild populations that would compete with the

native Pacific salmon species.[13] On the other hand, Washington State producers told us that it is unfair to restrict imports of Atlantic salmon from Washington State on the basis that Atlantic salmon is an "exotic" species in British Columbia, since the province already has large farmed Atlantic salmon populations.

Finally, industry spokesmen, U.S. state and federal officials, and academicians we interviewed argued that DFO officials should have conducted a comprehensive risk analysis before adopting the strict sanitary measures called for in the Canadian policy. DFO officials told us that the policy is based on an accumulation of information on disease distribution over many years, including data on the occurrence of pathogens in the United States and British Columbia. As noted earlier, DFO officials also cited examples of fish pathogens that have been transferred with shipments of live fish in other parts of the world. However, an official with the U.S. Fish and Wildlife Service and various academic experts contended that Canadian authorities should undertake a risk assessment appropriate to the unique circumstances in the Pacific Northwest. They argued that Canadian sanitary measures should also take into consideration such factors as geography, ecosystems, and the effectiveness of sanitary controls in Washington State.

Opportunities for U.S. Exports to British Columbia

When DFO's policy on imports of Atlantic salmon eggs and smolts was established in 1985, the commercial salmon farming industry in British Columbia was developing into an international business, and the market for eggs and smolts was beginning to expand. According to representatives of the Washington Fish Growers Association, Canada's import restrictions effectively precluded most U.S. producers of salmon eggs and smolts from entering the British Columbian market. Thus, there is no way to determine what share of the market Washington State producers of eggs and smolts might have been able to capture if they had been able to compete in the British Columbian market. Nevertheless, spokespersons for the Washington Fish Growers Association and major Washington State exporters agreed that DFO's restrictions on imports of salmon eggs and smolts have resulted in a loss of market opportunities for them in British Columbia. According to Association representatives, DFO's policy has discouraged most Washington State producers from exploring British

[13]Every year some Atlantic salmon escape from aquaculture net pens as a result of storms or other accidents. To date, they have not established a self-sustaining wild population in the Pacific Northwest. According to a report by the British Columbia Ministry of Agriculture, Fisheries and Food, during the early 1900s various efforts to intentionally establish wild populations of Atlantic salmon in British Columbia ended in failure.

Columbia as a market, while other companies that tried to export in the past have given up.

Major salmon egg exporters from Washington State agreed that there would be great market potential for their Atlantic salmon eggs in British Columbia if existing import restrictions were removed. Similarly, these exporters believed that there would be moderate to great market potential for Atlantic salmon smolts in the province if the ban on them were lifted. Representatives of the Washington Fish Growers Association pointed out that, because of its proximity and the large size of its salmon farming industry, British Columbia represents a natural market for their salmon eggs and smolts. They noted that, although they have been able to develop markets in other areas of the world, such as Chile and Japan, only a small percentage of their exports goes to British Columbia. While there are no exact figures available on exports of salmon eggs and smolts worldwide, Washington State exporters reported exporting approximately 47 million salmon eggs worldwide in 1993. Exports to British Columbia represented less than 10 percent of this figure.

Salmon producers we interviewed in British Columbia also told us that there is a market in the province for imports of Atlantic salmon eggs and smolts from Washington State. Their comments echoed the findings of a September 1990 report on British Columbia's Atlantic salmon farming industry commissioned by DFO. In that report, the availability of more and better quality Atlantic salmon eggs was cited as one of the industry's highest priorities. The report noted the poor quality of the Atlantic salmon strains in British Columbia and predicted that, unless import requirements for salmon eggs in the province were simplified, British Columbian salmon farmers would find it increasingly difficult to compete with producers from other parts of the world. One British Columbian producer told us of the excellent quality of Atlantic salmon eggs he had imported from Washington State, and he indicated he would like to purchase more eggs at comparable quality and cost. He explained that the expense associated with quarantining imported eggs effectively discouraged expanding imports from Washington State.

Agency Comments

In February 1995, we provided relevant portions of this report to the director of DFO's Aquaculture and Habitat Science Branch, and she provided some technical clarifications that we incorporated where appropriate. In addition, on March 6, 1995, we discussed the contents of this report with the National Aquaculture Coordinator of the Department

of the Interior's Fish and Wildlife Service. He agreed with the contents of our report and offered a few clarifying comments, which we have incorporated where appropriate.

We are sending copies of this report to the Secretaries of Agriculture, Commerce, State, and the Interior and to the U.S. Trade Representative. We will also make copies available to other interested parties upon request.

Major contributors to this report were Elizabeth Sirois, Assistant Director; Juan Gobel, Project Manager; and Larry Thomas, Evaluator-In-Charge. Please call me at (202) 512-4823 if you have any questions concerning this report.

Sincerely yours,

Allan I. Mendelowitz, Managing Director
International Trade, Finance,
and Competitiveness

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