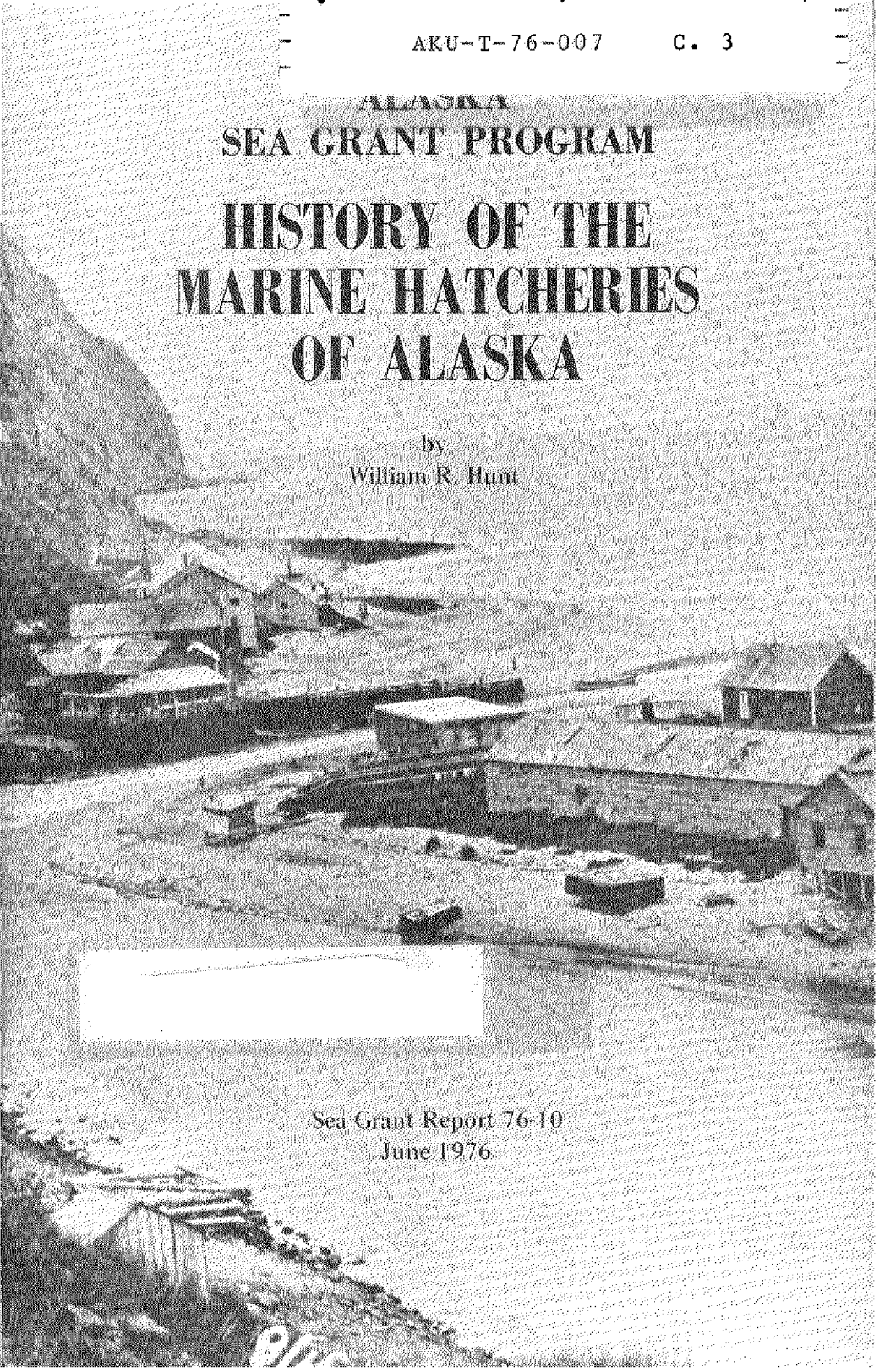
ALASKA
SEA GRANT PROGRAM

HISTORY OF THE MARINE HATCHERIES OF ALASKA

by
William R. Hunt



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The cover photograph shows the fishing village of Karluk on Kodiak Island at the turn of the century. Karluk was the site of one of the initial attempts to establish salmon hatcheries in Alaska. (Courtesy of the Elkinton Collection, Archives, University of Alaska, Fairbanks)

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INTRODUCTION

Commercial interests initially discovered the value of Alaska's salmon in 1878 when the first canneries were established in the territory recently acquired from Russia. Of course, the five species of Pacific salmon -- king or chinook, red or sockeye, pink or humpback, silver or coho, chum or dog -- had long sustained a large portion of Alaska's natives. Natives along the Yukon, Kuskokwim, and other interior rivers set up fishing camps each season and awaited the unfailing return of the fish which battled their way up river to complete their life cycle. The Indians of southeastern Alaska developed the richest and most complex of all aboriginal cultures because of the abundant salmon catch.

Controversy has raged continually over the salmon fishery. From the advent of the canneries, Alaskans have complained about the exploitation of the resource. Critics of the industry warned of the perils of overfishing, cried out against the use of traps, and called for a closer federal regulation of the fisheries. Over the years embattled public officials strove to manage the salmon in a way that would assure a maximum yield without depleting the leading source of the territory's wealth. According to former territorial governor Ernest Gruening, the federal government failed miserably in its efforts to achieve these goals. Gruening summarized the salmon story in censorious terms, as an episode of "how greed, ignorance, politics, and federal mismanagement combined to bring this great resource almost to the vanishing point." (Richard A. Cooley, Politics and Conservation, p. xiv).

It is not the purpose of this report to confirm or refute Gruening's view, but the history of marine hatchery enterprises in Alaska should be considered against the background of the salmon depletion which he noted. The emphasis on aquaculture as a means of resource preservation arose out of the deficiency of other means of control. Cannery interests lobbied effectively in Washington against restrictive regulations. They insisted that their concern with preservation of the resource equaled that of the government. For very sound political reasons the government found it more expedient to rely upon hatcheries, however imperfectly the science of aquaculture was understood, than to severely restrict types of gear or enforce draconian closures.

SAVE THE SALMON

As early as 1891 cannery men realized that something had to be done to preserve the salmon. The situation at Karluk on Kodiak Island appeared particulatly critical because several canneries depended upon the salmon run there and even the sturdiest optimists conceded the danger of depletion. Consequently, the Karluk canneries built a hatchery on a lagoon with the firm resolve of maintaining what had been the world's most bountiful salmon fishery. This initial venture aborted. Although 2,500,000 eggs were taken from spawning salmon, only 500,000 fish were hatched because of bad water, crude appliances, and a lack of experience in management. Cannery operators squabbled over the reasons for their failure and abandoned the hatchery after this single attempt.

But the concept of aquaculture remained vital and a single individual, unconnected with the salmon industry, maintained a persistent belief in

the hatchery potential. John C. Callbreath, a trader of southeastern Alaska, started a small and primitive hatchery on Kutlakoo Creek (on Kuiu Island of the Alexander Archipelago) in 1892. Some 1,000,000 eggs were fertilized there but before hatching an exceptionally high September tide destroyed the plant. This failure did not discourage Callbreath. In the fall of 1892 he negotiated with local Indians for the right to use Jadjeska stream, which empties into McHenry Inlet on Etolin Island, and built a small hatchery 200 yards from the stream's mouth. A year later Callbreath moved the hatchery to the north side of a small lake, the headwaters of the stream, about three-eighths of a mile from tidewater.

Callbreath depended entirely upon natural methods. He penned the spawners in the river and protected the hatch until it could be released into the ocean. In four years Callbreath expected the return of mature salmon but, as the time elapsed, his expectations were not realized. Bureau inspectors speculated that the spawning stream was too shallow or otherwise unappealing to the returning salmon. This analysis may or may not have been correct but the uncertainty of the experts revealed the paucity of existing knowledge of the habits of salmon and aquaculture methodology.

Callbreath refused to be discouraged by this and subsequent failures and appealed to the government for assistance. In 1901 he pointed out that several canneries operated near the stream and he feared that overfishing in the area would destroy his hatchery operation. "It will work a cruel hardship on me if, after having made preparations involving

a considerable outlay, fishermen come in and in one swoop gobble up from three to five thousand red fish and leave me none to propogate with." (Salmon Fisheries of Alaska, 1901, p. 54). Callbreath asked that a ban on fishing his hatchery stream be imposed, a request which was also warmly supported by the government's fishery agent. In supporting Callbreath's petition the agent argued that "Mr. Callbreath's enterprise has gone to the enrichment of waters other than his own." (Report on the Salmon Fisheries of Alaska, 1897, p. 25). The agent reflected that if, in fact, Callbreath's hatch had returned to streams other than his "it would seem to refute one of the most generally accepted theories of fish experts, and warrant the establishing of hatcheries at central points for the benefit of all adjacent streams." (Ibid.).

Contrary to the advice of the Alaska fishery agent, the government disdained to help Callbreath either by restricting fishing in his region or by direct subsidy. In his report for 1907, the agent recorded the termination of the pioneer aquaculturist's efforts in poignant terms: "Captain John C. Callbreath's hatchery was operated during the season of 1906-1907, but the owner, now totally blind, is no longer capable of maintaining the establishment." (Fisheries of Alaska in 1907, p. 26). Unfortunately, Callbreath did not even qualify for rebates for fry liberated, the incentive the government had recently provided to encourage cannery operators to establish hatcheries, because he did not engage in the canning or salting of salmon. "The hatchery thus is operated, and has been for fifteen years, without the slightest possibility of a money return for work or expense, being a heavy outlay in an earnest effort to build up the fisheries of that region." (Ibid., p. 27).

TRAVAILS AT FORTMAN

The government established its first hatcheries in 1905. Prior to entering the field, the Bureau of Fisheries required canneries to maintain hatcheries. This regulation proved inaffective. Some explanations for this have been considered elsewhere in this paper, but a summary history of some private hatcheries indicates some common problems.

The Alaska Packers Association's hatchery at Fortman on the west coast of Revillagigado Island operated from 1902 through 1927. Like other hatcheries, Fortman's success was often thwarted by the vagaries of nature. During a cold January of 1907 a flume supplying water to a portion of the hatchery froze solidly. The staff hurriedly removed about 18,000,000 eggs dependent upon the water to a pond, but virtually all the eggs died. Hatcherymen made an attempt to recover from this disaster by transporting 6,000,000 eggs from Quadra, another hatchery 61 miles away, but this enterprise failed as well. The eggs could not survive the short journey.

Hatchery foremen battled constantly against the predators of salmon fry. At Fortman a trap baited with salmon eggs was set in a stream near the hatchery frequented by sculpins or "bullheads." As many as 40,000 sculpins were destroyed every season. Thousands of Dolly Varden trout, another of the salmon fry's chief predators, were trapped as well. It was also the custom at Fortman to destroy trout "by dynamiting the pools and places in which they lurk." (Fisheries of Alaska in 1907, p. 17).

Hatchery managers needed to maintain an optimistic spirit in the face of the many threats to their delicate product. Fortman's foremen reported a disappointing season in 1908. Although the hatchery had a capacity of 100,000,000 eggs, only 25,000,000 were gathered. For some reason the spawning salmon did not appear in their usual numbers in the streams near the hatchery. Huge schools of salmon were observed traveling up nearby streams, but before obstructions to efficient egg collection could be cleared the run ended and no eggs could be gathered.

Heavy rainfall in southeastern Alaska in 1909 caused trouble for Fortman. Twenty-nine inches of rain fell in September. The other southeastern hatcheries managed to prevent their dams and racks from washing out and collected the necessary eggs, but high water at Fortman disrupted seining. Thus only 24,465,000 eggs were gathered, compared with the 50,000,000 taken at Yes Lake and the 46,380,000 taken at Afgonak, an island in the Kodiak group.

Bad weather plagued Fortman again the following year. Rain and snow poured down in record quantities -- 161 inches of rain and a snowfall of 289 inches. As the government's annual report observed dourly: "This record will give a slight idea of the weather conditions with which the superintendents of hatcheries in Alaska have to contend." (Fisheries of Alaska in 1910, p. 12).

Fortman's capacity exceeded that of all other hatcheries. It could handle 100,000,000 eggs. By comparison, the other government stations running in 1913, -- Eagle and Uganik Lakes, both on Kodiak Island, -- had the

capacity to handle 72,000,000 eggs. Private hatcheries at Karluk, Quadra, Hetta, and Klawak could handle 48,000,000; 17,000,000; 12,000,000; and 10,000,000 respectively. Despite Fortman's capacity -- it was the world's largest hatchery -- and the experience gained over the years, Fortman failed repeatedly to meet its potential. In 1912 only 23,160,000 eggs were taken, and the take plunged to 9,480,000 red salmon eggs the following year. "The situation," reported Bureau of Fishery agents, "simply was that the run of breeding salmon did not materialize." (Alaska Fisheries and Fur Industries, 1913, p. 72). No one knew why the salmon did not "materialize." But the emphasis in the hatcheries continued to be on collecting eggs and hatching ever more fry. With great hope the hatchery men played the numbers game rather than concerning themselves with basic scientific research into the environmental quality of the hatching and release waters or an improvement in hatchery methodology. Funding for research of this kind did not exist at the scale needed, yet for lack of a clearer understanding of the problems involved, the hatchery work was largely wasted at Fortman and at the other hatchery locations as well.

METHODS AND CRITICS

Running a salmon hatchery involved a good deal of hard work. John P. Taylor, who worked at Karluk in 1909-1910, has provided a graphic picture of the seasonal routine. Just before the salmon run commenced the men built a wire fish corral in the river. The corral covered an area of about an acre, enclosing water which would be two feet deep at low tide. Next the workers prepared rowboats for transporting salmon at

the corral by replacing parts of boats' sides with chicken wire. When the boats were in use they sank to the gunwales and were half full of water, thus keeping the fish alive until they could be taken to the corral.

Taylor marvelled at the density of the run as he rowed out for his first fishing experience. "There were so many fish that they almost pushed each other out of the water. When we went out in rowboats it sounded like someone beating a tattoo on the bottom of the boat, and we had to pole because the fish were so thick you couldn't get the oars down to row." (John P. Taylor, "Eighteen Months at the Karluk Hatchery." Alaska Sportsman, January, 1964, p. 36).

The fishermen used drag seines to catch the fish and dip nets to pick out the red salmon for the corral where they would ripen for spawning. Spawning the ripe salmon involved five men. "No. 1 nets a female salmon and passes her to No. 2 who is wearing cotton gloves and grabs her by the tail. He swings her under his arm and squeezes to see whether she is ready to spawn. If she is, he squeezes the eggs into a pan held by No. 3. Meanwhile, No. 4 has netted a male salmon, which he passed to No. 5 who follows the same procedure, fertilizing the eggs with the milt." (Ibid.).

After the spawning the workers placed the eggs in large wire baskets and set them in troughs in the main hatchery building. Water ran continually in the troughs and each day until the hatching period, workers shook each basket lightly and picked out any bad eggs. An improvement on this process was reported in 1914:

> "When the eggs reached the proper stage of development they were put through a salt solution to remove all unfertilized and dead ones. This process is now a regular feature of the work, for it not only means a great saving in the labor of hand picking, but it improves the quality of the eggs. The operation consists simply of placing the eggs in the solution, which is of about one part of salt to nine parts of water, and as the specific gravity of the poor eggs is slightly less, they remain at the surface and are easily removed. Caution is necessary to have the solution of the correct density, or there will not be a thorough separation of the good and bad eggs." (Ibid.).

Keeping the water running to the troughs over harsh winter days necessitated caution and hard work. At the first sign of a frozen flume the workers had to rush out and reopen the passage before any damage to the eggs occurred. A constant water supply was needed to maintain the oxygen supply required by the eggs.

One more essential job followed before the salmon fry could be released. The ubiquitous Dolly Vardens swarmed near the release stream, eagerly awaiting their seasonal feast. "We went down the river," Taylor wrote, "and seined thousands and thousands of Dolly Vardens, dragging them up on the bank to die. Every one of them was there to gorge on salmon fry and would have eaten fifty or more a day." (Ibid.).

A fuller description of the hatchery process for the early period is taken from the 1911 and 1913 Bureau reports.

"Each ripe female salmon should be killed by a blow on the head, following which an incision should be made in the abdominal wall from the pectoral fins to the region of the vent. The eggs will flow in a mass into the spawning pan placed beneath. Immediately after being fertilized they should be washed by immersing in the stream and pouring the water off. Repeating the process two or at most three times will be sufficient. It is entirely unnecessary to have the eggs remain in milt and water any longer than is required in the washing process following immediately after the application of the milt.

After washing, each pan of eggs should be poured into a bucket partly filled with water and placed in the bed of the stream where the water is several inches deep, so that the temperature in the bucket will be the same as that of the stream. After filling the bucket about half full of eggs, it should be allowed to remain undisturbed for about an hour, or until such time as the eggs have become fully water hardened and are entirely separated. While standing in the bucket the eggs will absorb sufficient water to increase their size about 40 per cent, hence the buckets must not be filled over half full.

During this period of absorption the eggs are extremely sensitive and must remain absolutely undisturbed." (Ibid.).

The clumsiness of the hatchery operations in the early days startled the sympathetic inspectors of the Bureau of Fisheries. Viewing the Karluk

hatchery in 1897, the inspectors deplored the loss of the mature fish which were taken for spawning purposes. The hatchery superintendent admitted that a loss of up to 65 percent of the salmon occurred. "They die in the fresh-water ponds where they are placed to 'ripen'." (Salmon Fisheries of Alaska, 1897, p. 24).

Watching the salmon "struggle and flounce about," the inspector noted that "much of the time the salmon were completely out of the water." Of course, a loss of vitality resulted by the time the fish were transferred to the ponds. "It may also be that these ponds are insufficient in size for the number of fish put into them. No explanation was attempted, but it was conceded that the loss was greater than it should be." Yet the means of eliminating such waste appeared obvious: "I think the explanation of this first is to be found in the method of handling. When caught they are placed in water boats -- those especially constructed to allow a flow of water through them -- and it seems probable that the number there packed is altogether too great, and that they are roughly treated."

Four years later the Bureau inspector expressed a good measure of confidence in the Karluk hatchery. "It is probably not surpassed in completion and successful operation by any public establishment of the kind." Private industry maintained the hatchery at a "heavy cost and should be applauded for their determination." Only one aspect worried the inspector and that was the possibility that mature salmon which had been released as fry might not return to Karluk. If this happened it would mean that the hatchery owners must "share the fruits of their

enterprise with parties who have not contributed to the cost." (Salmon Fisheries of Alaska, 1901, p. 20).

Karluk hatchery operators believed they had proved the practicality of their work. "It is the most reassuring evidence of the success of the Karluk hatchery," the Bureau of Fisheries agent wrote, "that salmon were taken this year having marks which were put on the fry at the hatchery," in 1897. No one knew what percentage of artificially spawned salmon returned, but the discovery of a few marked fish inspired optimism: "The return of the mature fish this year would go to confirm the contention that four years marks the age from spawning to maturity, and that then, and not before, the fish return to the parent stream, and that stream only." (Ibid.).

Yet, puzzled the inspector, why did such results follow such an inconsistent pattern. "The Etoline Island hatchery planted fry seven years ago, and none has yet come back. The enigma is still further befogged by the fact that this season, at several widely separated fisheries, salmon not more than half grown and quite destitute of spawn were found among the schools of mature fish; and at other places salmon of a variety never before seen there were taken in large quantities." (Ibid.).

It must have come as a relief to hatchery operators and Bureau agents when a seasonal failure could be clearly attributed to natural causes. In 1912 the thunderous eruption of Mount Katmai covered the Afognak station with ash. As a consequence some 8,000 to 10,000 sockeye salmon were destroyed. Katmai erupted again in September, 1913. This eruption,

although far less violent than the earlier one, disrupted the hatchery's work once more. On these occurrences explanations for the disasters were obvious. It was not necessary to speculate on the unknown, to wonder why fewer salmon appeared to spawn, or to worry about what happened to the fry released in prior years.

Bureau of Fishery inspectors' complaints of the management of the hatcheries followed a repetitive pattern. Reporting on Karluk in 1910, an agent observed that overcrowding in the corral devastated the ripening salmon. Of a total of 85,623 adult salmon impounded, half perished before spawning. "The need of reform at Karluk is strikingly apparent," the agent scolded, "and the justification of fish-cultural methods under present conditions is most questionable." The inspector urged the hatchery be moved to Karluk Lake, since it was impractical to transport fry from the present site to the lake. For some reason -- probably because of the costs involved -- the private hatchery managers ignored this advice despite its repetition for several years.

Another criticism levied against hatcheries by government inspectors concerned the handling of fry planting. "A feeling has often prevailed," reported one inspector in 1913, "that responsibility at the hatchery ceases when the fish are ready for planting." (Alaska Fisheries and Fur Industries, 1913, p. 78).

Greater care and intelligent thought should be devoted to the selection of suitable sites for release. "Rather than a promiscuous dumping of the fish in open lake waters, it would be much better to select protected

tributary streams." (Ibid.). And because of Dolly Vardens, "no fish culturist would think of having even one Dolly Varden trout in the rearing pond," and would remove a trout at once; "yet the next day, perhaps, he will complacently carry out several hundred thousand fine young salmon and unhesitantly dump them into waters where trout abound, often making no effort to destroy a single one of the trout." (Ibid.).

The inspectors believed that "hatchery work is highly perfected up to the time of planting." (Ibid.). The traditional hatchery process up to the stage of hatching, as has been described elsewhere, seemed to meet with the approval of all concerned.

The process of taking eggs for artificial propagation has changed very little over the decades. It is only after the eggs have eyed that improved practices have been instituted. Today's hatchery operators have more biological knowledge and can achieve far better results. Today, at the Deer Mountain Hatchery near Ketchikan, for example, 76 percent of the eggs taken survive to reach the outmigrant or release stage. It is impossible to compare the survival of the fry after release today with the early hatchery period. Earlier, biologists had no accurate estimates of the return. But currently the Fish and Game management of the Deer Mountain hatchery can demonstrate that only 9 percent of naturally spawned eggs survive to the fry state and only one to two percent survive to return as mature adults. By contrast 7 percent of artifically spawned fry survive to return to Deer Mountain.

On occasion, the Bureau supplemented the annual reports of field agents with special investigations of the salmon industry and hatchery work. One such special investigation of the Alaskan fisheries, headed by biologist E. Lester Jones in 1914, critically examined every aspect of the territory's marine resources. The Bureau men visited five private hatcheries in operation at the time: Karluk, on Kodiak Island; Heckman Lake; Hetta Lake, near the sourthern end of Prince of Wales Island; Quadra, at the head of Smith Lake, on Buschmann Creek in southeastern Alaska; and Klawak on the west coast of Prince of Wales Island.

Jones discovered deficiencies in all the private canneries. At Karluk, which had been established 19 years earlier, Jones condemned the location of the hatchery because it determined that the fry must be released directly into the sea: "This is objectionable and cannot possibly produce the desired results." (R. Lester Jones, Report of Alaska Investigations in 1914, p. 74). Heckman Lake's location made it "rather inaccessible" since it could be reached only by crossing a lagoon, two portages, and two lakes. "For this reason it is objectionable on account of the difficulty experienced in the transportation of supplies." At Hetta Lake, Jones called for better protection of the stream to improve egg collection, which was not up to the facility's potential. The same failure to collect enough eggs was observed at Klawak. Jones liked several aspects of the Quadra hatchery but complained of the inconvenient arrangement of the buildings.

Among the questions raised by the investigations was that of the tax rebate which had been allowed packers who maintained hatcheries since

1906. Jones recommended strongly that the rebate be discontinued. He believed that the Bureau conducted its hatcheries in excellent fashion. "It is good business to presume that the practice of paying private concerns to carry on this part of what is really the government's business should cease at once, and in the future all such operations should be conducted by the government through the proper departments." (E. Lester Jones, Report of Alaska Investigations in 1914, Washington: GPO., 1915, p. 74).

GOVERNMENT ENTERS THE FIELD

When the U. S. Fish Commissioner proposed aquaculture as a means of salmon conservation no scientific evidence of its feasibility existed. (Richard Cooley, Politics of Conservation, p. 75). Cannerymen longed for a means of conservation, particularly one which did not restrict their catch, and clutched at what appeared to be a solution. Once the industry and the Bureau agreed that hatcheries constituted a panacea, federal support followed shortly.

Before succumbing to the call of the fishing industry and its own field agents, the Bureau tried to encourage further private hatchery enterprise. Government regulations promulgated in 1900 required all canneries to establish hatcheries capable of returning four times as many salmon fry to the sea as the total of their year's catch of mature salmon. Generally packers ignored this regulation. The location of some canneries proved unfeasible for hatcheries and the costs of a hatchery were prohibitive

to smaller canneries. Another handicap to hatchery development was in the difficulty of hiring trained technicians. After a few years, the hatchery requirement was withdrawn by the government.

The Bureau built two hatcheries in 1905. From 1906 to 1920 the government spent $525,000 in maintaining their own installations and gave $600,000 in rebates to larger canneries who maintained hatcheries. Such largess exceeded by many times the appropriation made for policing the canneries and for scientific research of the salmon.

Over the years, salmon packers continued to extoll hatcheries as the answer to conservation. With a vigorous aquaculture program, they asserted, government regulation of the fisheries would be unnecessary. Editorials in the Pacific Fisherman, the organ of the industry, indicated the unrestrained hopes of the packers that they might continue to have and eat their cake. A lead article in 1911 followed the argument stated in its title - "Hatcheries Make Extermination of Salmon Impossible." The magazine did not admit that hatchery operators had never been able to determine how many fry escaped their natural predators and survived to maturity. Hatchery men estimated their success in extravagant and optimistic numbers which bore no relationship to scientific data. An article in a 1912 issue of Pacific Fisherman blasted a critic who predicted the salmon would follow the buffalo of the Great Plains into virtual extinction. In fact, the Pacific Fisherman insisted that 100 eggs were being left on the spawning grounds for every mature salmon caught. The implication of such statements was that a considerable portion of these eggs would survive to become mature salmon. Such

statements represented self-serving guesses and ignored the reality of the situation. Judging from the unchecked depletion of the salmon it seems apparent that, in fact, the hatcheries contributed very little to the preservation cause.

The government's rebate allowance granted a credit on the federal fishery tax of 40 cents for every 1,000 red or king salmon fry liberated. Packers paid only four cents on each case packed so the rebate represented their tax on ten cases for each unit of 1,000 fry. According to the Bureau of Fisheries the rebate rate was "based upon calculations showing that year in and year out this is the average cost of producing a thousand vigorous salmon fry." (Alaska Fisheries and Fur Industries in 1914, pp. 19-20).

Critics of the rebate system clamored against what they considered discrimination against other Alaska industries in favor of the packers. The Valdez Grand Jury, meeting in 1911, complained that the rebate law deprived Alaska of revenue because hatchery inspection was minimal, "the law practically permits the canneries to name for themselves the sum they shall pay in taxes." (Alaska Fisheries and Fur Industries, 1911, p. 16).

The Bureau responded to this criticism by calling for a government take-over of all private hatcheries in Alaska. A bill for government purchase, introduced before congress in 1915, failed approval. Obviously the former ebullient optimism concerning hatcheries had been checked by a rising disbelief in the effectiveness of aquaculture. Further evidence

of unchecked depletions appeared each season and, with the election of President Franklin D. Roosevelt in 1932, new, hard eyes examined the problem. In the next year the Commissioner of the Bureau of Fisheries declared that the government hatcheries had been a "complete waste of public funds," and ordered their closure. (Richard Cooley, Politics of Conservation, p. 137).

When the government closed its two remaining hatcheries, only one private venture remained. The hatchery at Quadra carried on for two more years before finally shutting down to end the first phase of aquaculture in Alaska.

GOVERNORS' APPRAISAL

Another view of the artificial propogation problem is available in the annual reports of the governors of Alaska to the Secretary of the Interior. While the governors depended upon both Bureau of Fishery agents and hatchery men for information, their recommendations also reflected the wider scope of their territorial concerns. Reporting in 1902, the governor expressed less optimism for the success of hatcheries than did the Bureau inspector at the time. The governor indicated that the cannery interests desired to comply with the Treasury regulation requiring hatchery maintenance, but pointed out some of the drawbacks: "Most of them (cannery owners) feel their inability in this matter, for it is a work which is not generally understood, and to be made successful must be in the hands of experts."

The governor did not hesitate to call attention forcefully to the uncertainty of salmon propogation: "Those who are hatching successfully and putting millions of fry out have no real assurance that they will return to the same streams in which they are hatched." He did not understate the case by insisting that "much remains to be discovered in regard to the breeding habits of the salmon." (Report of the Governor of Alaska to the Secretary of the Interior, 1902, pp. 37-38).

Like the Bureau agents in the field, the governor called for government control of all hatcheries and reminded the Secretary that this change had been urged from year to year: "But no step has been taken to bring it about . . . it is history that many in the Bureau are hostile toward any law that will call upon them to perform executive duties. In a country like this, science and executive should go hand in hand . . . we cannot afford to let such grand wealth be wasted and ruined." (Ibid., p. 38).

Whether the governor assessed the Bureau's reluctance to "perform executive duties" correctly or not, his recommendation was supported constantly by the Bureau's field agents in their annual reports to Washington.

The governor urged the Secretary of the Interior to take over the hatcheries again in 1903 and 1904, and the government did establish hatcheries in 1905. This innovation did not entirely eliminate the concern of the governor's office with the hatchery question. The executive awaited results from the work patiently from 1905 through

1907, but from 1908 through 1910, when no indications of a prolific return of mature salmon were reported, his reports voiced a warning. Something was wrong. Perhaps, the governor suggested, the Bureau should determine the accuracy of the count of fry released by the hatcheries.

A constant refrain expressed in the reports of the governors from 1910 to 1920 supported the recommendations of the Bureau's field agents. The government should abandon the practice of paying tax rebates to cannery owners who maintained hatcheries. Other business interests in Alaska received no such tax benefits and were therefore discriminated against. Eliminate the rebate and let the government run all hatcheries as "a legitimate and customary function of government," urged the successive governors who heard often from Alaskan businessmen on this matter. (Report of the Governor of Alaska, 1911, p. 13).

A high point of ebullience in the annual reports of territorial governors manifested itself in 1912 -- a banner year for salmon fishermen. "Never before in the history of Alaska has so great an annual increase in the salmon industry been recorded," boasted the governor. Not withstanding the heavy inroads on fish, "the danger of serious depletion was not continuing imminent provided the fishermen observed properly the protection laws now in force . . . and provided a suitable number of hatcheries is maintained." (Report of the Governors of Alaska, 1912, pp. 12-13). Unfortunately, this confident forecast constituted the last burst of optimism emerging from the governor's office. In the following years the executive could only lament the decline of the salmon catch and record, without comment, the numbers of eggs gathered and fry released by the hatcheries.

When the Territorial Fish Commission started a hatchery at Juneau in 1921, in response to the belief that more effort should be expended on salmon preservation, the then governor reflected on a new experiment in methodology: "The protection of eggs deposited in streams was deemed paramount." The Juneau hatchery superintendent placed the eggs in troughs until they reached the eyed stage, then put them in barren lakes with unobstructed outlets to salt water or buried them in sand and gravel bars of streams. This proceeding protected the eggs from predatory fish and allowed them to hatch under natural conditions. "The theory is that the instinct of self-preservation would become somewhat perverted if they were allowed to hatch in the trough and that the fry would fall easy prey to trout. However, when the eggs in the trough are not allowed to go beyond the eyed stage the fry are not released until they have abandoned the food sac so they will not be handicapped in making their escape from their enemies." Without arguing that this system provided fresh hope, the governor merely stated that "this is a different operation from government and private hatcheries." (Report of the Governor of Alaska, 1921 , p. 40).

From 1922 to 1937 the governors confined their hatchery report entirely to the statistics of eggs gathered and fry released. Obviously, no grounds for optimism existed. The 1937 statement on hatcheries was the last comment issued -- and a brief one: "All fish-cultural work in Alaska has been discontinued." (Report of the Governor of Alaska, 1937, p. 12).

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APPENDICES

The salmon statistics appended here include the value of Alaska's fishery products, the value of canned salmon shipped from Alaska, number of cases of salmon shipped outside, the federal funds appropriated for conservation and research of Alaska fisheries, the years and numbers of hatcheries in operation in Alaska, and the numbers of eggs gathered and fry released by various hatcheries. No precise correlation between any year's pack and the hatchery effort of that season exists. Actually the hatchery work followed a more consistent pattern than did the harvesting of salmon. But the narrative reports on the hatcheries reveal, after the first few years of operation, a gloom that is not reflected in the statistics on eggs and fry. Still it was a rare occurrence for a Bureau of Fisheries agent or anyone else to urge that a closer scrutiny of hatcheries' success be made.

Some of the statistics were taken from the files of Alaska's congressional delegates prior to statehood. Alaska's political representatives quoted the figures accurately but used them in different ways -- depending upon their current interests. They cited the decline in the catch when urging closer regulation of the resource and asking for more funds for the fishery research. But when the paramount issue was Alaska's readiness for statehood, delegate E. L. "Bob" Bartlett focused on the high monetary value of the salmon pack to indicate the great economic potential of the territory.

APPENDIX

Value of

FISHERY PRODUCTS

of Alaska*

Year	Value of Salmon
1868	$ 16,000
1869	13,600
1870	14,400
1871	6,300
1872	9,000
1873	7,200
1874	11,200
1875	9,600
1876	14,400
1877	15,700
1878	41,272
1879	65,590
1880	52,517
1881	42,771
1882	118,245
1883	210,270
1884	249,612
1885	279,315
1886	469,944
1887	655,833
1888	1,321,645
1889	2,215,601
1890	2,210,124
1891	2,475,504
1892	1,565,019
1893	2,041,045
1894	2,235,380
1895	1,964,994
1896	2,996,519
1897	2,866,630
1898	3,182,457
1899	3,404,653
1900	4,917,065
1901	6,247,961
1902	7,851,534
1903	7,059,252
1904	5,967,577
1905	5,972,370
1906	8,166,373

Year	Value of Salmon
1907	9,166,008
1908	10,671,651
1909	9,853,388
1910	11,501,105
1911	15,128,156
1912	17,144,672
1913	14,449,234
1914	19,558,529
1915	19,214,145
1916	24,054,838
1917	47,778,081
1918	53,514,812
1919	44,944,886
1920	36,641,836
1921	20,986,584
1922	31,566,257
1923	34,238,763
1924	34,793,504
1925	33,740,900
1926	48,178,995
1927	32,361,767
1928	47,487,763
1929	42,524,845
1930	31,532,488
1931	31,161,256
1932	21,715,801
1933	28,376,014
1934	37,611,950
1935	25,768,136
1936	44,751,633
1937	44,547,769
1938	36,636,897
1939	34,441,082
1940	31,474,942
1941	56,217,601
1942	48,298,913
1943	57,823,679
1944	53,875,972
1945	48,917,141
1946	59,090,973
1947	93,084,856
1948	96,522,290
1949	81,273,603
1950	82,346,644
1951	79,249,185
1952	76,363,000

*Figures from U.S. Fish and Wildlife Service, E.L. Bartlett papers, Alaska Statehood Statistics File.

APPENDIX

VALUE OF CANNED SALMON SHIPPED FROM ALASKA

1903 - 1946

1903	$ 8,108,591	1925	$ 28,705,956
1904	8,569,698	1926	48,336,013
1905	6,736,693	1927	27,223,447
1906	8,449,360	1928	45,548,683
1907	7,721,749	1929	38,568,165
1908	9,282,952	1930	30,084,228
1909	10,424,811	1931	31,161,256
1910	10,418,508	1932	22,145,179
1911	13,136,980	1933	25,620,856
1912	15,551,794	1934	36,811,224
1913	13,349,438	1935	24,156,394
1914	17,906,215	1936	46,173,176
1915	17,892,377	1937	42,026,365
1916	21,567,123	1938	38,633,965
1917	41,478,514	1939	29,976,665
1918	44,493,418	1940	29,119,398
1919	37,998,478	1941	52,113,213
1920	34,781,970	1942	45,886,011
1921	19,559,628	1943	52,119,736
1922	29,487,626	1944	50,488,747
1923	30,514,286	1945	45,852,327
1924	31,415,190	1946	40,031,663
	$438,845,399		$830,782,667

Grand Total $1,269,628,066

Figures from Bureau of Foreign and Domestic Commerce and Bureau of Customs

APPENDIX

ALASKA SALMON PACK

1907 to Statehood*

Year	No. of Cases	Year	No. of Cases
1907	2,202,100	1934	7,470,586
1908	2,618,048	1935	5,155,826
1909	2,403,669	1936	8,454,948
1910	2,438,777	1937	6,654,038
1911	2,820,963	1938	6,791,544
1912	4,060,129	1939	5,239,211
1913	3,756,433	1940	5,028,378
1914	4,167,832	1941	6,906,503
1915	4,489,002	1942	5,089,109
1916	4,919,589	1943	5,396,509
1917	5,922,320	1944	4,877,796
1918	6,677,369	1945	4,341,120
1919	4,591,110	1946	3,971,109
1920	4,395,509	1947	4,302,466
1921	2,604,973	1948	4,010,612
1922	4,501,355	1949	4,391,051
1923	5,063,340	1950	3,272,643
1924	5,305,923	1951	3,484,468
1925	4,450,898	1952	3,574,128
1926	6,652,882	1953	2,925,570
1927	3,506,072	1954	3,207,154
1928	6,070,110	1955	2,457,969
1929	5,370,242	1956	2,950,354
1930	4,988,987	1957	2,447,448
1931	5,432,535	1958	2,948,371
1932	5,260,488	1959	1,600,000
1933	5,266,698		

*All Figures from PACIFIC FISHERMAN YEAR BOOK, 1958)

APPENDIX

FEDERAL FUNDS APPROPRIATED FOR CONSERVATION AND RESEARCH

ALASKA FISHERIES

1930-1959

Year	Management	Research	Total
1959	$1,510,025	$906,250	$2,416,275
1958	1,592,350	859,600	2,451,950
1957	1,390,590	952,750	2,343,340
1956	1,385,400	238,721	1,624,121
1955	1,265,600	175,000	1,440,600
1954	1,256,466	175,000	1,431,466
1953	1,099,718	172,000	1,271,718
1952	845,593	178,000	1,023,593
1951	873,884	178,700[b]	1,052,584
1950	998,800[a]	150,000[b]	1,148,800
1949	712,400	197,900[b]	910,300
1948	472,400	105,300[b]	577,700
1947	442,957	59,500[b]	502,457
1946	297,046	56,000	353,046
1945	287,655	63,000	350,655
1944	259,020	63,000	322,020
1943	280,700	75,000	355,700
1942	247,060	84,200	331,260
1941	234,610	94,000	328,610
1940	213,510	103,000	316,510
1939	212,990	100,000	312,990
1938	205,810	32,000	237,810
1937	222,210	22,500	244,710
1936	213,720	18,500	232,220
1935	205,990	22,500	228,490
1934	208,300	22,500	230,800
1933	320,200	28,900	349,100
1932	392,600	31,200	423,800
1931	286,600	21,500	308,100
1930	261,963	12,400	274,363

SOURCE: Regional Office, U.S. Fish and Wildlife Service, Juneau, Alaska.

[a] Includes $250,000 for construction of aircraft facilities at Anchorage.

[b] Excludes stream improvement funds.

APPENDIX

Years and Number of Hatcheries in Operation in Alaska*

	Yes Bay Hatchery 1/	Callbreath Hatchery 2/	Cordova Hatchery 3/	Fortman Hatchery 4/	Hetta Hatchery 5/	Juneau Hatchery 6/	Karluk Hatchery 7/	Klawak Hatchery 8/	Quadra Hatchery 9/	Afognak Hatchery 9/	Seward Hatchery 9/
1891											
1892		X									
1893		X									
1894		X									
1895		X									
1896		X									
1897		X					X				
1898		X					X	X	X		
1899		X			X		X	X	X		
1900		X			X		X	X	X		
1901		X			X		X	X	X		
1902		X		X	X		X	X	X		
1903		X		X	X		X	X	X		
1904		X		X	X		X	X	X		
1905	X	X		X	X		X	X	X		
1906	X	X		X	X		X	X	X		
1907	X			X	X		X	X	X	X	
1908	X			X	X		X	X	X	X	
1909	X			X	X		X	X	X	X	
1910	X			X	X		X	X	X	X	
1911	X			X	X		X	X	X	X	
1912	X			X	X		X	X	X	X	
1913	X			X	X		X	X	X	X	
1914	X			X	X		X	X	X	X	
1915	X			X	X		X	X	X	X	
1916	X			X	X		X	X	X	X	
1917	X			X	X			X	X	X	
1918	X			X	X				X	X	
1919	X			X		X			X	X	
1920	X			X		X			X	X	
1921	X		X	X		X			X	X	
1922	X		X	X		X			X	X	
1923	X		X	X		X			X10/	X	
1924	X		X	X		X			X	X	
1925	X		X	X		X			X	X	X

1926	X		X	X	X	X	X	X
1927	X		X	X	X	X	X	X
1928	X				X	X		
1929	X				X	X		
1930	X				X	X		
1931	X				X	X		
1932	X				X	X		
1933	X				X	X		
1934					X			
1935					X			

End of fish-cultural operations in Alaska

1/ U.S. Government (known as McDonald Lake Hatchery)
2/ U.S. Government
3/ Private (known as Heckman Lake Hatchery)
4/ Private
5/ Private (known as Klawak Lake Hatchery)
6/ Private (Hetta stream on West side of Prince of Wales Island)
7/ Private (Located on Judjeska stream, McHenry Inlet, Etclin Island)
8/ Private (Located on Quadra Bay)
9/ Territory of Alaska
10/ Commencing with the 1923 season, the Juneau hatchery was closed and operations transferred to a hatchery at Ketchikan.

*From C.E. Atkinson, A Review of the Salmon Fisheries of Alaska.

OUTPUT OF THE SALMON HATCHERIES OF ALASKA, 1893 TO 1906

Year ended June 30 --	Callbreath's hatchery		Karluk hatchery		Klawak hatchery		Hetta hatchery	
	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Fry liberated
1893	900,000	600,000	---	---	---	---	---	---
1894	3,000,000	2,204,000	---	---	---	---	---	---
1895	6,300,000	5,291,000	---	---	---	---	---	---
1896	6,200,000	5,475,000	---	---	---	---	---	---
1897	5,400,000	4,390,000	2,556,440	---	---	---	---	---
1898	3,400,000	2,526,000	6,340,000	2,023,000	800,000	---	---	---
1899	3,000,000	2,050,000	3,369,000	3,600,000	3,000,000	2,800,000	2,800,000	2,600,000
1900	3,400,000	2,335,000	7,872,000	3,600,000	1,000,000	2,000,000	2,000,000	1,500,000
1901	---	---	10,496,900	---	---	1,800,000	1,800,000	500,000
1902	6,000,000	5,500,000	19,334,000	15,566,800	---	---	---	---
1903	6,000,000	5,000,000	32,800,000	28,700,000	3,500,000	2,800,000	2,500,000	1,700,000
1904	6,000,000	5,000,000	23,400,000	17,559,000	3,500,000	1,500,000	4,800,000	4,000,000
1905	6,050,000	5,250,000	28,113,000	22,000,000	3,000,000	1,700,000	5,217,500	3,750,000
1906	7,700,000	6,500,000	45,500,000	33,670,000	2,800,000	2,000,000	---	---
			36,933,000	32,501,040	2,800,000	2,000,000	---	---
TOTAL	63,350,000	52,121,000	212,757,900	170,130,280	24,823,000	14,800,000	19,027,500	14,050,000

OUTPUT OF THE SALMON HATCHERIES OF ALASKA, 1893 TO 1906

Year ended June 30 --	Quadra Bay hatchery		Freshwater Bay hatchery		Fortman hatchery		Kell Bay hatchery	
	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Fry liberated
1893	---	---	---	---	---	---	---	---
1894	---	---	---	---	---	---	---	---
1895	---	---	---	---	---	---	---	---
1896	---	---	---	---	---	---	---	---
1897	---	---	---	---	---	---	---	---
1898	---	---	---	---	---	---	---	---
1899	---	---	---	---	---	---	---	---
1900	---	---	---	---	---	---	---	---
1901	---	---	---	---	---	---	---	---
1902	4,500,000	3,500,000	1,500,000	1,000,000	11,460,000	10,300,000	---	---
1903	5,500,000	4,000,000	---	---	40,050,000	29,005,000	2,500,000	2,000,000
1904	600,000	400,000	---	---	22,203,000	13,780,000	---	---
1905	---	---	---	---	65,010,000	63,181,000	---	---
1906	---	---	---	---	71,139,000	65,313,710	---	---
Total	10,600,000	7,900,000	1,500,000	1,000,000	209,862,000	181,579,710	2,500,000	2,000,000

OUTPUT OF THE SALMON HATCHERIES OF ALASKA, 1893 TO 1906

Year ended June 30 --	McDonald hatchery		Total	
	Eggs taken	Fry planted	Eggs taken	Fry liberated
1893	---	---	900,000	600,000
1894	---	---	3,000,000	2,204,000
1895	---	---	6,300,000	5,291,000
1896	---	---	6,200,000	5,475,000
1897	---	---	8,636,000	6,946,440
1898	---	---	13,877,000	9,666,000
1899	---	---	13,891,000	11,019,000
1900	---	---	19,496,900	12,707,000
1901	---	---	21,134,000	16,066,800
1902	---	---	62,260,000	53,500,000
1903	---	---	85,750,000	63,060,000
1904	---	---	65,043,500	46,630,000
1905	---	---	119,360,000	104,101,000
1906	7,000,000	5,000,000	125,572,000	111,314,750
Total	7,000,000	5,000,000	551,420,400	448,580,990

OUTPUT OF THE SALMON HATCHERIES OF ALASKA IN 1905-6 AND 1906-7

Hatcheries	1905-6				1906-7		
	Sockeye		Coho		Sockeye	Coho	Steelhead trout
	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Eggs taken	Eggs taken
Karluk	36,933,000	28,236,412	---	---	38,679,200	---	---
Fortman	68,715,000	67,643,000	2,424,000	1,837,000	105,420,000	30,000	---
Yes Lake	7,031,480	6,638,550	---	---	58,210,000	---	182,000
Klawak	2,800,000	2,300,000	---	---	3,600,000	---	---
Total	115,479,480	104,817,962	2,424,000	1,837,000	205,909,200	30,000	182,000

OUTPUT OF THE SALMON HATCHERIES OF ALASKA 1906-7 AND 1907-8

Hatcheries	1906-7								1907-8
	Sockeye		Coho		Steelhead trout		Total		Sockeye
	Eggs taken	Fry liberated	Eggs taken	Fry liber-ated	Eggs taken	Fry liber-ated	Eggs taken	Fry liberated	Eggs taken
Karluk	38,679,200	36,846,000	---	---	---	---	38,679,200	36,846,000	47,808,200
Fortman	105,420,000	80,946,000	30,000	27,000	---	---	105,450,000	80,973,000	41,280,000
Yes Lake	58,210,000	54,610,800	---	---	182,000	143,500	58,392,000	54,754,300	65,550,000
Klawak	3,600,000	1,187,000	---	---	---	---	3,600,000	1,187,000	3,500,000
Callbreath[a]	---	---	---	---	---	---	---	---	---
Hetta	---	---	---	---	---	---	---	---	8,000,000
Total	20,5909,200	173,589,800	30,000	27,000	182,000	143,500	206,121,200	173,760,300	166,138,200

[a]Operated in 1906-7 but no report received; probably not operated in 1907-8.

OUTPUT OF THE SALMON HATCHERIES IN ALASKA

Hatcheries	Year ending June 30, 1909								
	Red, or sockeye		Coho, or silver		Humpback		Red, or sockeye	Coho, or silver	Humpback
	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken	Fry liberated	Eggs taken, 1909-10		
Yes Lake	50,000,000	48,653,000	17,000	9,900	---	---	72,000,000	5,000	---
Afognak	46,380,000	39,325,870	---	---	---	10,000	76,020,000	---	499,400
Fortman	24,465,000	22,785,000	---	---	---	---	53,340,000	---	---
Karluk	40,320,000	37,105,000	---	---	---	---	45,228,000	---	---
Klawak	3,500,000	3,200,000	---	---	---	---	(a)	---	---
Hetta	8,400,000	8,134,000	---	---	---	---	8,000,000	---	---
Quadra	3,325,000	3,025,000	---	---	---	---	9,660,000	---	---
Total	176,390,000	162,228,620	17,000	9,900	---	10,000	264,248,000	5,000	499,400

a No report received.

OUTPUT OF THE SALMON HATCHERIES OF ALASKA

Hatcheries	Year ended June 30, 1910 [a]				Eggs taken 1910-11	
	Red, or sockeye		Humpback, or pink		Red, or sockeye	Humpback, or pink
	Eggs taken	Fry liberated	Eggs taken	Fry liberated		
Yes Lake	[b]72,005,000	69,879,600	---	---	72,000,000	114,000
Afognak	76,020,000	68,422,170	499,400	363,740	30,725,000	405,000
Fortman	53,340,000	50,725,000	---	---	34,920,000	---
Karluk	45,228,000	40,620,000	---	---	49,626,000	---
Klawak	(c)	5,300,000	---	---	(c)	---
Hetta	10,313,000	9,000,000	---	---	9,141,000	---
Quadra	10,863,000	9,850,000	---	---	11,200,000	---
Total	---	253,796,770	499,400	363,740	9,141,000	519,000

[a] In three instances fry were held until July, 1910, and in order to make the record for the season complete these have been included.

[b] Of these, 5,000 were reported as coho eggs.

[c] No report.

OPERATIONS OF ALASKA HATCHERIES IN 1912

Stations	Red or sock-eye salmon eggs taken in 1911	Red or sock-eye salmon fry liberated 1911-12	Per cent of loss	Red or sock-eye salmon eggs taken in 1912
Yes Lake	72,000,000	68,335,000	5	66,125,000
Afognak	30,520,000	18,394,700	34.7	14,589,470
Fortman	107,520,000	100,335,000	6.6	23,160,000
Karluk	41,026,800	37,495,100	8.6	45,600,000
Klawak	5,600,000	3,530,000	37	3,835,000
Hetta	2,585,000	2,342,000	9.4	3,700,000
Quadra	11,000,000	10,166,000	7.5	10,000,000
TOTAL	270,251,800	240,597,800	--	167,109,470

OPERATIONS OF ALASKA HATCHERIES IN 1913.

Stations	Red or sock-eye salmon eggs taken in 1912	Red or sock-eye salmon fry liberated 1912-13	Per cent of loss	Red or sock-eye salmon eggs taken in 1913
Yes Lake	66,125,000	60,422,100	5.5	49,050,000
Afognak	14,689,470	12,551,100	14.5	10,989,000
Eagle Lake	---	---	---	2,180,000
Uganik Lake	---	---	---	1,970,000
Fortman (Naha)	23,160,000	20,800,000	10.1	9,480,000
Karluk	45,600,000	41,803,155	8.3	34,629,160
Quadra	10,000,000	8,127,000	18.7	18,400,000
Hetta	3,780,000	3,592,000	4.9	4,082,000
Klawak	3,835,000	3,675,000	4.1	3,645,000
TOTAL	167,189,470	150,970,355	---	134,425,160

OPERATIONS OF ALASKA HATCHERIES IN 1914

Stations	Red or sock-eye salmon eggs taken in 1913	Red or sock-eye salmon liberated 1913-14	Red or sock-eye salmon eggs taken in 1914
Yes Bay	49,050,000	43,401,400	41,300,000
Afognak	10,989,000	7,761,700	7,390,000
Eagle Lake	2,180,000	2,180,000	---
Uganik	1,970,000	1,970,000	---
Fortman (Naha)	9,480,000	8,700,000	22,500,000
Karluk	34,629,160	31,546,080	30,240,000
Quadra	18,400,000	17,054,000	21,300,000
Hetta	4,082,000	3,590,500	7,438,500
Klawak	3,645,000	3,465,000	3,816,000
TOTAL	134,425,160	119,668,680	133,984,500

OPERATIONS OF ALASKA HATCHERIES IN 1915

Stations	Red or sock-eye salmon eggs taken in 1914	Red or sock-eye salmon liberated in 1914-15	Red or sock-eye salmon eggs taken in 1915
Yes Bay	41,300,000	36,720,000	72,000,000
Afognak	7,390,000	5,444,830	8,183,000
Uganik	---	---	2,685,000
Seal Bay	---	---	3,232,100
Fortman (Naha)	22,500,000	20,820,000	26,520,000
Karluk	30,240,000	27,704,000	41,135,000
Quadra	21,300,000	20,300,000	7,500,000
Hetta	7,438,500	7,142,500	8,114,000
Klawak	3,816,000	3,653,000	4,130,000
TOTAL	133,984,500	121,784,330	173,499,100

OPERATIONS OF ALASKA HATCHERIES IN 1916

Stations	Red or sock-eye salmon eggs taken in 1915	Red or sock-eye salmon liberated 1915-16	Red or sock-eye salmon eggs taken in 1916
Yes Bay	72,000,000	52,317,500	58,000,000
Afognak	6,353,000	22,933,640	17,044,000
Uganik	2,685,000	---	692,000
Seal Bay	3,232,100	---	4,678,000
Fortman (Naha)	26,520,000	25,055,000	62,580,000
Karluk	41,135,000	23,948,000	1,016,000
Quadra	7,408,000	7,092,000	16,125,000
Hetta	8,114,000	7,598,000	3,271,000
Klawak	4,180,000	4,020,000	8,160,000
TOTAL	171,627,100	142,964,140	171,566,000

OPERATIONS OF ALASKA HATCHERIES IN 1917

Stations	Red or sock-eye salmon eggs taken in 1916	Red or sock-eye salmon liberated 1916-17	Red or sock-eye salmon eggs taken in 1917
Yes Bay	58,000,000	51,175,000	34,950,000
Afognak	17,044,000	21,116,000	53,036,000
Uganik	692,000	---	---
Seal Bay	4,678,000	---	2,712,000
Karluk	1,016,000	---	---
Fortman (Naha Stream)	62,580,000	57,405,000	6,840,000
Quadra	16,125,000	15,003,000	13,600,000
Hetta	3,247,000	3,120,000	4,826,000
Klawak	8,160,000	7,822,000	---
TOTAL	171,542,000	155,641,000	115,964,000

OPERATIONS OF ALASKA HATCHERIES IN 1918

Stations	Red or sock-eye salmon eggs taken in 1917	Red or sock-eye salmon liberated in 1917-18	Red or sock-eye salmon eggs taken in 1918
McDonald Lake (Yes Bay)	34,950,000	32,539,200	47,300,000
Afognak	53,036,000	31,427,000	54,681,000
Seal Bay	2,712,000	2,712,000	---
Fortman	6,840,000	6,135,000	19,620,000
Quadra	13,600,000	12,990,000	20,400,000
Hetta	4,826,000	4,587,000	---
TOTAL	115,964,000	90,390,200	142,001,000

OPERATIONS OF ALASKA HATCHERIES IN 1919

Stations	Red or sock-eye salmon eggs taken in 1918	Red or sock-eye salmon liberated in 1918-19	Red or sock-eye salmon eggs taken in 1919
McDonald	47,300,000	35,329,700	9,752,000
Afognak	54,681,000	25,583,000	79,178,000
Fortman	19,620,000	15,205,000	18,420,000
Quadra	20,400,000	19,852,000	11,710,000
TOTAL	142,001,000	95,969,700	119,060,000

OPERATIONS OF FEDERAL AND PRIVATE HATCHERIES IN ALASKA IN 1920

Stations	Red or sock-eye salmon eggs taken in 1919	Red or sock-eye salmon liberated in 1919-20	Red or sock-eye salmon eggs taken in 1920
McDonald Lake	9,752,000	9,387,000	---
Afognak Lake	79,178,000	61,524,000	62,300,000
Fortmann	18,420,000	17,070,000	18,240,000
Quadra	11,710,000	11,357,000	19,450,000
TOTAL	119,060,000	99,338,000	99,990,000

OPERATIONS OF FEDERAL AND PRIVATE HATCHERIES IN ALASKA IN 1921

Stations	Eggs taken in 1920	Salmon liberated in 1920-21	Eggs taken in 1921
McDonald Lake	---	4,025,000	51,000,000
Afognak Lake	62,300,000	47,808,000	53,835,000
Fortmann	18,240,000	17,375,000	13,380,000
Quadra	19,450,000	18,913,000	9,985,000
TOTAL	99,990,000	88,121,000	128,200,000

OPERATIONS OF FEDERAL AND PRIVATE HATCHERIES IN ALASKA IN 1925

Location of hatchery	Red or sockeye salmon		
	Eggs taken in 1924	Salmon liberated in 1924-25	Eggs taken in 1925
Afognak	---	---	11,000,000
McDonald Lake	30,080,000	27,382,000	39,680,000
Heckman Lake (Fortmann)	11,640,000	11,005,000	16,920,000
Hugh Smith Lake (Quadra)	20,050,000	19,430,000	20,240,000
TOTAL	61,770,000	57,817,000	87,840,000